A geochemical and isotopic investigation of micrometre-thin rims of zircon from the North Caribou Superterrane, western Superior Province, Canada

Colter Kelly

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Department of Earth Sciences
Faculty of Science
University of Ottawa

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Abstract

Micrometer-thin rims of hydrothermally altered zircon preserve significant geological information regarding the timing and nature of fluid infiltration. The research presented in this thesis details an investigation of the isotopic and geochemical composition zircon rims from deformed Archean meta-sedimentary rocks proximal to the world class Musselwhite gold deposit. A continuous ablation Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) U-Pb technique is proposed in conjunction with Secondary Ion Mass Spectrometry (SIMS) U-Pb and LA-ICP-MS REE depth profile methods. These techniques are capable of identifying and analyzing isotopic and chemical modification of zircon rims that are <5 μm thick by ablating directly into the surface of unpolished crystals. The age of analyzed rims is >100 m.y younger than crystal interiors and corresponds to periods of regional magmatism and hydrothermal activity. The measured thickness of rims is variable across single grains and between grain suites suggesting that they do not form as a uniform mantle around the crystal interior. Instead the interacting fluids exploit pre-existing structural weaknesses caused by sedimentary transport and the α-decay of uranium. A novel LA-ICP-MS single element grain 2-dimension mapping technique for unpolished zircon demonstrates preferential element mobility along fractures and in isolated patches. Pressure-temperature experiments were conducted on a zircon reference material under lower greenschist facies conditions to better understand the low temperature incorporation of REEs into the zircon structure. LA-ICP-MS element mapping of unpolished grains reveals that zircon are chemically modified under these conditions, as characterized by an increase in Ce and Y concentration (up to an order of magnitude enrichment) in $CePO_4$-bearing and YPO_4-bearing experiments, respectively, when compared with the concentrations of unaltered primary grains. The integration of these micro-analytical techniques

on unpolished zircon can provide insight into the timing of low- to moderate-temperature history of supracrustal rocks which would remain otherwise undefined.

Résumé

Les couronnes des zircons altérés par processus hydrothermiques, ayant une épaisseur dans l'ordre de micromètres, préservent de l'information géologique significative en ce qui concerne l'origine des fluides et servent à déterminer des contraintes temporelles pour l'infiltration de fluides. Cette thèse présente une étude de la composition isotopique et géochimique des couronnes de zircons provenant de métasédiments Archéens déformés, situés à proximité du dépôt d'or renommé Musselwhite. Une technique innovatrice de spectrométrie de masse à plasma induit couplée à l'ablation laser (LA-ICP-MS) pour le système U-Pb est proposée, en conjonction avec la spectrométrie de masse à ionisation secondaire (SIMS) pour le système U-Pb, ainsi que des profils de profondeur des éléments de terres rares (REE) par LA-ICP-MS. À l'aide de ces techniques, les modifications isotopiques et chimiques des couronnes de zircons ayant une épaisseur inférieure à 5 μm peuvent être identifiées et analysées par ablation directement sur la surface de cristaux non-polis. Les résultats des analyses indiquent que les couronnes sont plus jeunes que l'intérieur des cristaux par >100 Ma, ce qui correspond aux périodes de magmatisme régional et processus hydrothermiques. L'épaisseur des couronnes n'est pas uniforme et varie aussi de grain en grain, ce qui suggère que les couronnes ne se forment pas comme un manteau uniforme autour des cristaux. Au lieu, les fluides exploitent les faiblesses structurales préexistantes causées par le transport sédimentaire et la désintégration-α de l'uranium. Une nouvelle technique d'imagerie à 2 dimensions d'élément unique par LA-ICP-MS pour zircons non-polis démontre une mobilité préférentielle des éléments le long des fractures et

des régions isolées. Des expériences avec pression et température ont été conduites sur un matériel de référence pour le zircon, sous des conditions de faciès schiste vert pour comprendre d'avantage l'incorporation des REE dans la structure du zircon. L'imagerie des éléments par LA-ICP-MS des grains non-polis démontre que les zircons sont chimiquement modifiés sous ces conditions, ce qui est caractérisé par une augmentation en concentrations de Ce et Y (jusqu'à un enrichissement d'un ordre de magnitude) dans des expériences avec $CePO_4$ et YPO_4, respectivement, lorsque comparé aux concentrations provenant des grains primaires non-altérés. L'intégration de ces techniques micro-analytiques sur zircons non-polis peuvent fournir des contraintes temporelles pour les événements de température basse à modérée que subissent les roches supracrustales, qui seraient autrement indéterminées.

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In the words of Bill Watterson, “Life is like topography, Hobbes. There are summits of happiness and success, flat stretches of boring routine and valleys of frustration and failure”. This thesis represents the culmination of a four and a half year journey that was anything but direct. There have been many detours, but never a shortage of helping hands to point me in the right direction. This adventure has led to my growth as a scientist, husband and father.

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Chapter 1

Introduction

Zircon ($ZrSiO_4$) is a common accessory mineral in many igneous, metamorphic and sedimentary rocks. It is considered chemically stable under high P – T conditions (Geisler *et al.* 2002) and contains very little initial radiogenic Pb (Pb*) at the time of crystallization making it an ideal geochronometer. Zircon is widely regarded as the preferred mineral for U-Pb geochronology having resolved much of the geologic history of the Earth (Hanchar *et al.* 2001 and references therein). As early as the mid 1960's, experimental analyses of zircon have demonstrated that, in the presence of fluids, Pb* can be incrementally leached out at low temperatures (Pidgeon *et al.* 1966, 1973, 1995). This has led to an abundance of further experimental investigation which has provided much insight into the understanding of the chemical modification of zircon geochemistry (Geisler *et al.* 2001, 2002; Hanchar et al 2001; Harlov and Dunkley 2010; Rizvanova *et al.* 2000; Schmidt *et al.* 2006; Sinha *et al.* 1992). Zircon can be recrystallized by hydrothermal fluids via coupled dissolution-reprecipitation (Tomasheck *et al.* 2003) and ion-exchange between those fluids (Geisler *et al.* 2003). Both processes can operate synchronously (Hoskin 2005) and are facilitated by the presence of porosity and permeability on the micron- to nano-scale (Geisler *et al.* 2007). These processes result in the formation of thin rims (<5 μm) that are rarely observable in scanning electron probe imagery and would be unresolvable using conventional Secondary Ion Mass Spectrometry (SIMS) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) single spot analyses on polished grain mounts. The ability to analyze isotopically distinct micrometer-scale rims of zircon has been moved forward through the application of depth profiling techniques on unpolished zircon and LA-ICP-MS single element unpolished grain mapping. Whereas depth profile techniques measure change in mineral geochemistry or age as a function of depth into the crystal's interior (Zeitler and Williams 1988; Zeitler *et al.* 1989), LA-ICP-MS single element

unpolished grain mapping uses a grid of contiguous 5-10 μm spots over an entire crystal face to map lateral changes in the outer most 3 μm of the mineral phase. Studies have shown that hydrothermal rims of zircon are isotopically and geochemically distinct compared to the crystal interior, recording both the timing and chemical signature of infiltrating fluids (Breeding *et al.*, 2004; Carson *et al.*, 2002; Cottle *et al.*, 2009, 2012; Kelly *et al.*, 2014, 2017; Marsh and Stockli 2015; Schneider *et al.* 2011, 2012; Steely *et al.*, 2014; Viete *et al.*, 2015). I am interested in how these systems modify the primary chemical and isotopic signature of the zircon, growing new zircon material at the expense of pre-existing crystalline zircon in a process generally referred to as recrystallization (cf. Geisler *et al.* 2007).

The natural laboratory for this study is the Neoarchean North Caribou greenstone belt (NCGB) and the Horseshoe Lake greenstone belt (HSGB) in the northern North Caribou Superterrane (NCS), western Superior Province, Canada. The NCS is regarded as the core of the western Superior Province, to which other terranes accreted from the north and the south between 2720 Ma and 2680 Ma (Thurston *et al.* 1991; Percival *et al.* 2006). Both greenstone belts are comprised of metasediments, which range from conglomerates to mudstones, and volcanic sequences dominated by pillow basalts and locally containing rhyolitic horizons. Metamorphic grade in the belts ranges from lower greenschist facies (chlorite zone) to upper amphibolite facies (staurolite-sillimanite zone) in addition to local occurrences of high-temperature assemblages such as andalusite-cordierite (Breaks *et al.* 2001; Kelly *et al.* 2013). The NCGB is home to the world class Musselwhite gold deposit. The NCS has experienced a protracted tectonothermal history punctuated by five episodes of volcanism/magmatism: (1) >3000 Ma, (2) 2990–2959 Ma, (3) 2870–2856 Ma, (4) 2729–2723 Ma and (5) a late intrusive event at *ca.* 2670 Ma (Biczok *et al.* 2012; Van Lankvelt *et al.* 2016). Resolving the timing of

hydrothermal activity with respect to peak metamorphism and crustal heating (e.g. magma emplacement) is critical to our understanding of orogenic gold systems. Samarium-Nd dating of auriferous garnets from the main Au-hosting BIF zone at the Musselwhite mine suggests that mineralization occurred between *ca.* 2717–2664 Ma (Biczok *et al.* 2012). This overlaps with the estimates of hydrothermal activity in the granites surrounding the belt (Van Lankvelt *et al.* 2016), which is documented by LA-ICP-MS U-Pb ages on zircon rims and titanite to resolve ages of *ca.* 2760–2680 Ma. The NCS provides the opportunity to further explore on the geochronology and geochemical evolution of Neoarchean supracrustal belts with notable gold endowment through innovative micro-analytical techniques. This thesis contains four main chapters (2-5) which provide new geochemical and isotopic data to explore the phenomena of zircon recrystallization and its practical application in revealing the geologic history of Archean greenstone belts.

In Chapter Two, the depth profile techniques applied throughout subsequent chapters are described. The primary objective of this study was to develop a LA-ICP-MS U-Pb depth profile technique capable of reproducing the results of a SIMS U-Pb depth profile analysis of zircon from the same population. This is because LA-ICP-MS are readily available and capable of performing analyses over significantly less time than the alternative, SIMS U-Pb depth profile analysis. The LA-ICP-MS technique utilizes a 193 nm laser with a 48 µm beam diameter at a repetition rate of 2.5 Hz, the slowest rate capable of being smoothed into a steady signal by the SQUID smoothing device employed. The isotopically distinct mineral domains are characterized by *ca.* 100 m.y. younger $^{207}Pb/^{206}Pb$ ages associated with 2σ age uncertainties as low as ~0.2%, in addition to elevated U content relative to grain interiors (up to an order of magnitude). These results overlap with the 2σ uncertainties of the SIMS U-Pb depth profile technique. This work is

published in *Geostandards and Geoanalytical Research* (Kelly *et al.* 2014). In addition to the guidance and supervision of David Schneider (UO), Chris McFarlane (UNB) assisted with the LA-ICP-MS U-Pb data acquisition and zircon trace element data was collected and processed with the assistance of Simon Jackson (GSC-Ottawa).

Chapter Three presents the first attempt to resolve the timing and nature of fluid infiltration within the HSGB. An in depth analysis of micrometer thin rims of naturally altered Archean zircon from deformed metasediments of the HSGB using SIMS U-Pb and LA-ICP-MS REE depth profiling methods underpins the results in the context of the tectonothermal history of the region. This is of interest given the proximity of the HSGB to the Musselwhite deposit in the NCGB, as well as gold showings within the belt. In particular, the temporal and chemical relationship between zircon rims and the emplacement of quartz feldspar porphyry intrusions and local gold anomalies was investigated by strategic sampling adjacent to exposures of the sediment-intrusion contact. Micrometer thin rims correspond temporally with known regional magmatic events while the emplacement of the porphyry intrusions fails to be recorded within the data set. This work is prepared for submission to *Canadian Journal of Earth Sciences*. Together with the guidance of David Schneider (UO), co-author contributions are as follows: Marie-Eve Lajoie (UO) and Simon Jackson (GSC-Ottawa) assisted with the data reduction of LA-ICP-MS trace element data and Chris McFarlane (UNB) assisted with LA-ICP-MS U-Pb data acquisition.

The aim of Chapter Four was to elaborate on the hydrothermal history of the NCGB which contains the Musselwhite gold deposit. This was achieved through the targeted sampling of metasediments adjacent to structures which would likely facilitate fluid flow in the belt, identified using aeromagnetic survey data and mapped metamorphic mineral assemblages

(Breaks *et al.* 2001; Kelly *et al.* 2013; Gagnon *et al.* 2016). SIMS U-Pb and LA-ICP-MS REE depth profile techniques were utilized to resolve the timing and nature of micrometer-thin zircon rims. The $^{207}Pb/^{206}Pb$ age of rims is consistent with proposed fluid activity within the NCGB. Inconsistent rim thickness was reconciled by the application of LA-ICP-MS element mapping technique described above, which provides insight into the lateral distribution and chemical modification across the surface of the crystal.

The results of Chapter Four are published in *Chemical Geology* (Kelly *et al.* 2017). Elements of this work, including field-based interpretations of metamorphism and deformation, and regional geochronological implications are published within Ontario Geologic Survey (OGS) and Geological Survey of Canada (GSC) Open File Reports (Kelly *et al.* 2013; Kelly and Schneider 2015). In addition to supervision/guidance provided by David Schneider (UO), the co-author contributions to Chapter Four include: assistance with zircon trace element data acquisition (LA-ICP-MS REE depth profiling and unpolished grain mapping) and data processing from Simon Jackson (GSC-Ottawa), LA-ICP-MS U-Pb zircon data collection and processing from Tash Kalbfleisch (UO) and Chris McFarlane (UNB), and assistance in the field and metamorphic interpretations from Émilie Gagnon (UO).

Chapter Five summarizes the results of a laboratory experiment which approximates the physio-fluid conditions experienced by naturally recrystallized zircon of the NCGB. Zircon reference material was witness to lower greenschist metamorphic conditions (350 ºC and 100 MPa) in the presence of alkaline fluids for 6 months. The alkaline fluids (1 M KOH or 1 M NaOH) were doped with representative REE elements (Ce and Y) in order to monitor the behaviour of REE in solution. A subset of initially unaltered and experimentally altered zircon was then mapped using the LA-ICP-MS element grain mapping technique to document the

chemical mobility. This work is prepared for submission to *Geochimica et Cosmochimica Acta*. David Schneider's (UO) guidance and supervision is again acknowledged, in addition to Dan Harlov (GFZ-Potsdam) for conducting the experiments and Simon Jackson (GSC-Ottawa) for assisting with the data collection and processing required for producing the unpolished grain maps.

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Chapter 2

Dating Micrometer-Thin Rims Using a LA-ICP-MS Depth-Profiling Technique on Zircon from an Archean Metasediment: Comparison with the SIMS Depth Profiling Method

C.J. Kelly[1], C.R.M. McFarlane[2], D.A. Schneider[1] & S.E. Jackson[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON, K1N 6N5 Canada
[2]Department. of Earth Sciences, University of New Brunswick, Fredericton, NB, E3B 5A3 Canada
[3]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada

Abstract

Laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) was examined as a tool for measuring isotopic variation as a function of ablation depth in unpolished zircon from an Archaean metasediments specimen. This technique was able to identify micrometer-thin (< 3 μm) isotopically distinct mineral domains characterised by *ca.* 100 M.y. younger $^{207}Pb/^{206}Pb$ ages associated with 2s age uncertainties as low ~ 0.2%, as well as elevated U content relative to grain interiors (up to an order of magnitude). Our calculated drilling rate suggests that each laser pulse excavated depths of ~ 0.06 μm. Ages resolved through the LA-ICP-MS methods overlap the 2s uncertainties of $^{207}Pb/^{206}Pb$ ages measured using SIMS depth profiling on the same zircon population. The rims were further evinced by the detection of relative enrichment (> 3 orders of magnitude) in REE in the outermost micrometers of the same zircon, measured using a different and independent LA-ICP-MS depth profiling technique. We propose a LA-ICP-MS U–Pb technique capable of quickly identifying and quantifying rims, which are indication of late, yet geologically significant, fluid events that are otherwise undefined.

2.1 Introduction

Advances over the past decade in the geochemical and geochronological analysis of zircon have allowed researchers to resolve isotopically distinct micrometer-scale mineral domains. In particular, these developments have been moved forward through the application of depth profiling techniques on unpolished mineral grains. The depth profile approach is the ability to measure change in mineral geochemistry or age as a function of depth into the crystal's interior. First suggested by Zeitler and Williams (1988) and Zeitler *et al.* (1989), early studies used the moderate sputtering rate of secondary ion mass spectrometry (SIMS; Grove and Harrison 1999, Carson *et al.* 2002, Mojzsis and Harrison 2002, Breeding *et al.* 2004), whereas more recent studies have begun to utilise (more readily available) laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS, e.g., Margetic *et al.* 2001, Mason and Mank 2001, Eggins *et al.* 2003, Woodhead *et al.* 2004, Cottle *et al.* 2009, 2012, Steely *et al.* 2014). Two distinct LA-ICP-MS methodologies have emerged, the first using a continuous ablation (Paton *et al.* 2010, Tollstrup *et al.* 2012) and the second using a single-pulse approach or variations thereof (Cottle *et al.* 2009, 2012, Steely *et al.* 2014).

Depth profiling using laser ablation has met with challenges since, compared with SIMS, it is accompanied by more aggressive pit excavation during an analysis. SIMS depth profiling has a sputtering rate of ~ 0.075 μm per mass sweep (Breeding *et al.* 2004), and Schmitt (2011) demonstrated that no isotopic fractionation occurs as long as the beam diameter-to-pit depth ratio is < 1. Modern attempts at depth profiling using LA-ICP-MS have been able to produce similar resolutions; Cottle *et al.* (2009) demonstrate a drilling rate of 0.1 μm per pulse and similarly Steely *et al.* (2014) report a 0.5 μm drilling rate per five pulses, whereas Tollstrup *et al.* (2012) determined that each pulse excavates a depth of ~ 0.06 μm. As these studies have illustrated, by

regulating the intensity and frequency (slowing) at which ablation proceeds, it is possible to minimise the analysed volume in LA-ICP-MS analyses to levels comparable to those of SIMS. By minimising the ablated volume, one is in turn reducing sample mixing and masking of micrometer-wide chemical zones.

This study used zircon grains from a Neoarchean metasediment to evaluate the effectiveness of LA-ICP-MS as a U–Pb depth profiling technique on unpolished, naturally zoned zircon, and compares the results with those of SIMS U–Pb depth profiling on grains from the same specimen. To confirm the presence of chemically distinct rims, REE depth profiles were completed on the same unpolished zircons. We use the term rim to describe the thin, outermost layer of zircon that is a topotactic phase of the original zircon, formed by a coupled dissolution–reprecipitation process. These rims are probably recrystallized phases and not neocrystallized ones.

2.2 Sample selection and preparation

As part of a larger study to better understand rock–fluid alteration near metallic ore deposits, we collected samples from the North Caribou superterrane (NCT) in the Archaean Superior Province of northern Ontario. Host to the Abitibi and Red Lake greenstone belts, the Superior Province has historically been one of the largest gold producers in the world, with gold occurring within shear zones and proximal to the intrusions. The Horseshoe Lake greenstone belt (HSGB) is located in the northern portion of the NCT and represents a *ca.* 2.86 Ga greenstone belt dominated by intercalated mafic volcanic sequences and sedimentary rocks (Percival *et al.* 2006), which have been metamorphosed under greenschist facies conditions and deformed into a broad km scale fold (Figure 2.1; Jensen 1989). A series of *ca.* 2.73 Ga feldspar porphyry granitic

dykes discordantly intrude stratigraphy proximal to the hinge of a major fold (Jensen 1989, Lajoie *et al.* 2014), introducing heat and fluids into the system. Jensen (1989) also reports an undated extensive K-metasomatism event affecting the surrounding granitoid belt to the south. To illustrate the comparative effectiveness of the depth profiling approach, we selected a single rock specimen, a Neoarchean greenschist facies arkose (13- HSGB-12) sampled < 10 cm away from a *ca.* 2.73 Ga intrusion. The arkose contains evidence of hydrothermal alteration in the form of late chlorite and sericite, and local gold occurrences have been reported (Jensen 1989). Given the proximity of our specimen to a younger, cross-cutting magmatic rock and petrological evidence of late fluid infiltration, one may expect to detect evidence of this heating/fluid event recorded in zircon grains – a hypothesis that will be tested.

Zircons were separated from the rock via conventional crushing methods and were concentrated using density and magnetic methods. Zircons ranging in size from ~ 100 to 250 μm and having widths of at least 30 μm, lacking noticeable fractures and outgrowths, were selected using a binocular microscope. The zircons in this sample were clear to pink in colour, and their morphologies were prismatic and subrounded to rounded, exhibiting smooth to mottled outer surface structure (Figure 2.2). The sample mount consisted of an aluminium disc, with a set of 4–5 holes that contained indium-pressed flush into the disc. Zircon reference material fragments were pressed into one of the indium wells in the mount. After inserting the reference samples, but before inserting the unknowns, the mount was polished using conventional polishing methods to expose the interiors of the reference zircon grains. Using a titanium rod, more than thirty zircons from the sample were then pressed into another well on the same disc, with a crystal face for each zircon as flat and horizontal as possible to maximise SIMS sputter geometry. To ensure that crystal faces were oriented parallel to the mount surface, a final piston-

press assembly was utilized. The mount was then given a dilute HCl sonic bath to reduce surficial Pb contamination.

After mounting, individual zircons were imaged with a JEOL6610LV scanning electron microscope (SEM; University of Ottawa, Ottawa, Canada) using secondary electron imaging in a high vacuum with a 1.7 kV beam (Figures 2.2 and 2.3). Samples were then imaged after depth profiling analysis to ensure that the analysed volume was free of any inclusions or fractured crystal faces, as well as outgrowths (e.g., xenotime, quartz, albite) as identified through energy dispersive X-ray spectroscopy (used in conjunction with the SEM). In a previous SIMS depth profiling study, Schneider *et al.* (2011) noted distinct xenotime outgrowths present as individual < 5 μm crystals on the outer surface of a larger zircon grain from greenschist facies metasediments; in this study, we discovered zircon outgrowths that were enriched in FeO.

After SIMS and LA-ICP-MS analyses, a MicroXAM surface profilometer (University of California, Los Angeles, USA) was used to map the ablation pit dimensions (Figure 2.4). The MicroXAM is a noncontact surface-mapping microscope capable of detecting topographic changes of approximately 1 nm. As discussed below, by assuming a constant sputter or ablation rate throughout an analysis (Steely *et al.* 2014), it was possible to estimate the rate of drilling by dividing the depth by the total number of mass sweeps (cycles) or pulses, respectively.

Even though mounted in indium within an aluminium disc, gentle polishing of the mount after completion of the depth profiling analyses was possible and is recommended in order to image the internal structure of the minerals.

2.3 Analytical methods and data reduction

Zircon U–Pb dates are presented and interpreted using $^{207}Pb/^{206}Pb$ ages, a common practice for ages older than 1.0 Ga since Allen and Campbell (2012) have demonstrated that there is no resolvable matrix effect among the Pb isotopes nor down-hole fractionation when using ICP-MS measured $^{207}Pb/^{206}Pb$ ratios. In addition, the $^{207}Pb/^{206}Pb$ value provides an age that is independent of U, and therefore of the uncertainties associated with Pb/U calibrations (Ireland and Williams 2003).

2.3.1 SIMS U–Pb depth profiling

SIMS U–Pb measurements were made using a CAMECA ims1270 ion microprobe (at the University of California, Los Angeles, CA, USA) according to the methods of Breeding *et al.* (2004) for the depth profiling of unpolished crystals (unknowns) and Schmitt *et al.* (2003) for analyses of polished grains (reference materials). The U–Pb measurements were made with a primary O- beam accelerated at a total impact energy of 12 kV, which yielded excavation ('sputter') rates of ~ 0.05 $\mu m^3\ nA^{-1}\ s^{-1}$ or 0.2 $pg\ nA^{-1}\ s^{-1}$ for zircon (Schmitt 2007). A field aperture smaller than the secondary beam was used to improve depth resolution by minimizing the secondary ions produced from the periphery of the analysis pit. For a conventional SIMS analysis lasting ~ 20 min at beam intensities of 40–60 nA, the depth of the analysis crater is a few micrometers, approximately one order of magnitude smaller than the lateral resolution of the primary beam spot (~ 20–40 μm; Schmitt 2011). Our analyses were undertaken at lower beam intensities of 12 nA conducted over ≤ 50 cycles resulting in ~ 30-μm diameter pits that were < 5 μm in depth (Figure 2.4) with a sputtering rate of ~ 100 nm per mass sweep, which is consistent with the depth resolutions proposed by Breeding *et al.* (2004). Despite a consistent sputter rate

across all analyses, the analysis time (or drilling depth) for a single zircon was independently assessed during data collection. This was to focus analytical time on grains of interest. We used zircon AS3 (U–Pb: 1099 ± 1 Ma; Paces and Miller 1993) as our analytical reference material. Analysis of reference materials was conducted after every five analyses of unknowns. The calibration of the sensitivity factor protocol involved the determination of the intensities of $^{94}Zr_2O^+$, $^{204}Pb^+$, $^{206}Pb^+$, $^{207}Pb^+$, $^{208}Pb^+$, $^{232}ThO^+$ and $^{238}UO^+$. Zirconium oxide ions were included as reference peaks to centre the magnetic field for adjacent low-intensity peaks and to normalise sputter yields for estimation of U abundance (Schmitt 2011). Common Pb was corrected using the values 18.86 for $^{206}Pb/^{204}Pb$ and 15.62 for $^{207}Pb/^{204}Pb$, estimated from the model of Stacey and Kramers (1975).

U–Pb ages were calculated from measured ion intensities using UCLA's in-house ZIPS v3.0.4 software written by C.D. Coath and ISOPLOT v3.75 software (Ludwig 2012); uncertainties of single data points are reported at 1s and were calculated as outlined by Stern and Amelin (2003). Integrated ages are reported as 2s uncertainties. By plotting the $^{207}Pb/^{206}Pb$ age, Th/U values and percentage discordance from all mass sweeps as a function of depth in the crystal, we were able to explore sub-micrometer variations through the zircon.

2.3.2 LA-ICP-MS U–Pb depth profiling

Unknowns and reference materials were loaded into a two-volume Laurin Technic Pty S-155 ablation cell incorporated in the Resonetics RESOlution series 193 nm ArF laser ablation system connected (via Nylon™ tubing) to an Agilent 77009 quadrupole ICP-MS (University of New Brunswick, Fredericton, Canada). Zircon reference material FC1 (U–Pb: 1099 ± 1 Ma; Paces and Miller 1993) was used to correct for laser-induced element fractionation (LIEF) and

instrumental mass bias, and was analysed at least fifteen times for each set of unknowns. Zircon reference material 91500 (U–Pb: 1065.4 ± 0.3 Ma; Wiedenbeck *et al.* 1995) and Kaap Valley tonalite (KVT; U–Pb: 3227 ± 1 Ma; Schoene *et al.* 2006) were also loaded and used to verify the accuracy of the corrected $^{207}Pb/^{206}Pb$ ages: they were analysed at least five times with each set of unknowns. Additionally, NIST SRM 610 was used as a 'concentration' RM and was analysed at the start and end of sequences. After establishing stable ICP conditions with laser cell gas flows of 300 ml min^{-1} He, 900 ml min^{-1} Ar and 2 ml min^{-1} N_2, the ICP-MS torch position and ion lens settings were tuned by rastering across NIST SRM 610 (Pearce *et al.* 1997) and ensuring that sensitivity for ^{207}Pb was maximised while at the same time maintaining $^{248}ThO/^{232}Th < 0.3\%$ and $^{238}U/^{232}Th$ at ~1.0, thereby ensuring robust plasma conditions. For ablation of unpolished zircons, the laser beam diameter was set to 48 μm (suitable for analysing the smallest grains in the mount), and the laser repetition rate and fluence reduced to 2.5 Hz and ~ 3 J cm^{-2}, respectively. This repetition rate was identified as the slowest ablation rate capable of being smoothed into a steady signal by the Laurin Technic SQUID smoothing device. The ICP-MS analyte list and associated dwell times were set to ^{31}P (10 ms), ^{204}Pb (50 ms), ^{206}Pb (20 ms), ^{207}Pb (30 ms) and ^{238}U (20 ms), giving a total quadrupole sweep time (including quadrupole settling) of ~ 0.13 s. A canonical $^{238}U/^{235}U$ value of 137.88 was used to calculate ^{235}U offline during the data reduction. Analytes were measured in auto detector mode, which allowed the ICP-MS to switch automatically between pulse counting (< ~ 1.0 x 10^6 cps) and analogue mode (> ~ 1.2 x 10^6 cps). The pulse/analogue (P/A) calibration factors were tuned on NIST SRM 610 prior to each ablation sequence. Each analysis comprised 30 s of gas background collection followed by 60 s of ablation, producing 150 laser pulses and 460 measurement cycles by the ICP-MS. Data from the first 2-s (five pulses) of the ablation on both RMs and unknowns were

discarded to ensure the signal had stabilised, following the approach demonstrated by Cottle *et al.* (2012) and Steely *et al.* (2014). The resulting craters were ~10 μm deep. The ablation rate was calibrated to be a linear function of the number of pulses: ~ 0.06 μm per pulse. This was determined by measuring the pit depth for six 48 μm craters in zircon FC1 generated by 2, 5, 10, 50, 100 and 150 laser pulses, respectively (Figure 2.5). The depth of each of the resulting craters was measured by comparing the focus position, observed in reflected light using a 950 objective lens and a Zeiss AxioImager (University of New Brunswick, Fredericton, Canada), at the target surface and crater floor. This approach could not resolve crater depths < 2 μm, the Z-distance between two ticks on the fine focus Vernier scale of the AxioImager. The integrated net sensitivity (i.e., background- subtracted net cps/ppm for the entire 60 s ablation) under these analytical conditions as measured on NIST SRM 610 was ~ 1200 cps/ppm for all Pb masses and ~ 3000 cps/ppm for ^{238}U.

The data were reduced using Iolite v.2.31 (Paton *et al.* 2011) and VizualAge v. 2013.02 (Petrus and Kamber 2012) run as plug-ins in Wavemetrics IgorPro 6.23. Propagated errors are reported as 2s, and these represent the combined measurement repeatability (2 SE) and excess measurement reproducibility (2 SE) associated with dispersion in the reference materials used to correct for laser-induced elemental fractionation and instrumental factors (Paton *et al.* 2010). For all runs reported here, integrations for each analysis of the FC1 zircon reference material were carefully inspected and refined (if necessary) to achieve a concordant population with a MSWD value of < 1.5, thereby minimising excess measurement reproducibility. A value less than 1.5 is considered ideal as calculated from the technique described by Wendt and Carl (1991). A typical analysis comprising fifteen or more FC1 analyses resulted in a 2 SE value on the mean ^{207}Pb/^{206}Pb ratio of ~ 0.15%. All of the data collected following the 2-s rise time were included

in the primary observation of the results. Using the depths obtained from the microXAM and assuming a constant ablation rate, the $^{207}Pb/^{206}Pb$ age, U concentration and percentage discordance were plotted as a function of depth in the crystal. Plots of this nature allow the visual identification of distinct sub-micrometer mineral domains, which can be further explored using the data reduction software. For internal consistency in the identification of the rim material, the transition from rim to interior was constrained by identifying step functions in U concentration and $^{207}Pb/^{206}Pb$ age as a function of time. This (on occasion) led to the incorporation of ages that would have, if selected independently of U, been assumed to be transition zone measurements, resulting in consistent identification of rim material at the cost of periodically higher MSWD. These were typically of < 10 s (eighty mass sweeps) duration. Although ^{204}Pb was measured to monitor common Pb contributions from surface contamination, altered domains or cracks within the analytical volume, no corrections were applied.

2.3.3 Precision and accuracy

The bulk of the zircons analysed using this method yielded integrated beam intensities of 2.7×10^5–1.6×10^6 cps ^{206}Pb, 6.2×10^4–3.6×10^5 cps ^{207}Pb and 2.7×10^5–1.6×10^6 cps for ^{238}U. The theoretical measurement repeatability for each $^{207}Pb/^{206}Pb$ mass sweep in the ablation time series propagated from counting statistics alone was ~ 0.5%. Propagated 2s uncertainties for $^{207}Pb/^{206}Pb$ age on the integrations selected in Iolite and VizualAge were typically < 10 Myr with the most homogeneous zircons (i.e., displaying constant $^{207}Pb/^{206}Pb$ ages for the entire ablation) yielding absolute 2s uncertainties between 3 and 6 Myr (0.1 to 0.2%). Precision on Pb/U ratios for the same intervals was somewhat lower, where propagated 2s uncertainties for $^{207}Pb/^{235}U$ ages ranged from 0.6 to 2.1% compared with 0.6 to 2.0% for $^{206}Pb/^{238}U$ ages.

Accuracy of the measured $^{207}Pb/^{206}Pb$ ages was confirmed by replicate analyses of 91500 zircon (1065.4 ± 0.3 Ma) and KVT zircon (3227 ± 1 Ma) under the same analytical conditions. For the 91500 zircon reference material, the resulting weighted mean $^{207}Pb/^{206}Pb$ age of 1066 ± 6 Ma (n = 12, 1 reject) was calculated using the full 30 s of ablation for each 91500 ablation from each analytical session: this verifies the accuracy of the analytical conditions and data reduction. Additionally, to determine the accuracy of the method when applied to identifying subdomains of the analysed volume, we segmented the ablation for analyses of the KVT zircon into five equal intervals of ~ 10 s, with each interval representing a progressively deeper part of the ~ 10μm crater. This yielded results of 3216 ± 13, 3223 ± 14, 3241 ± 15, 3231 ± 15 and 3237 ± 14 (SI Table 1). Finally, the long-term (5 month) reproducibility for the KVT zircon analysed under a variety of LA-ICP-MS conditions yielded a weighted average $^{207}Pb/^{206}Pb$ age of 3226 ± 2 (n = 42, 3 rejects, MSWD = 1.4; SI Table 2).

2.3.4 LA-ICP-MS trace element depth profiling

Rare earth element (REE) determinations were conducted using a Photon-Machines Analyte 193 nm ArF excimer laser ablation system coupled to an Agilent 7700 x ICP-MS system (Geological Survey of Canada, Ottawa, Canada). The analyses were performed at an energy density of ~ 6 J cm^{-2} at a repetition rate of 3 Hz. A rise time of 2 s allowed for the laser to stabilise for the 60 s of ablation. A spot size of 17 μm was used for the analyses, and penetrations went as deep as 20 μm at a drilling rate of ~ 300 nm per pulse. Determined elements included the following: Al, Si, P, Sc, Ti, Fe, Sr, Y, Zr, Sn, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Th and U. SiO^2 was used as an internal standard (32.78% m/m), and two reference materials were analysed – NIST SRM 612 (Pearce *et al.* 1997) for calibration and BCR-2G

(Jochum *et al.* 2005) for quality control. Reference materials were analysed twice approximately every sixteen unknown analyses. Data reduction was carried out using LAMTRACE, a Lotus 1-2-3 macro driven spreadsheet program (Jackson 2008). Time-resolved plots of the signal for each element starting from the activation of the laser were created. This allowed for selection and isolation of signal intervals identified as rim and interiors, and these were averaged and normalised to chondrite values allowing for the visual comparison of element changes. Normalised spider plots were preferred to time- or depth-resolved plots as they allow for the comparison of all of the determined REE across all of the zircon from a single sample in an organised manner. Major elements that often correlated with REE zonation include Al and Fe and were monitored through each analysis. Although resolving domains was independent of calculated $^{207}Pb/^{206}Pb$ ages, it commonly aligned with rim material, and discrete rim and core REE patterns could be resolved.

2.4 Results

2.4.1 SIMS U–Pb depth profiling

Twelve analyses on ten single-zircon crystals from rock sample 13-HSGB-12 were conducted (SI Table 2.1). Analyses of these grains were focused on the epitaxial regions of the crystal and were run for ≤ 50 mass sweeps resulting in pits that were 30 lm in lateral dimension and < 5 μm deep. MicroXAM imaging shows that the SIMS analysis pits had a flat-bottom shape (Figure 2.4). Of the twelve analyses, nine grains exhibited a homogenous age response, that is, no distinct rim characteristics and had $^{207}Pb/^{206}Pb$ ages of either *ca.* 3025 Ma or *ca.* 2940 Ma (Figure 2.6A, B). Three zircons possessed < 0.5 μm-thick rims with $^{207}Pb/^{206}Pb$ ages of *ca.* 2860 Ma with zircon interiors having $^{207}Pb/^{206}Pb$ ages of *ca.* 3025 Ma (Figure 2.6C). When all of the

individual cycles of all the grains belonging to a specific population were integrated for a weighted $^{207}Pb/^{206}Pb$ age, the interiors gave an age of 3024 ± 7 Ma (MSWD = 0.62; n = 89), the *ca.* 2940 Ma population can more accurately be described as 2941 ± 10 Ma (MSWD = 0.98; n = 75), and the rims had an age of 2861 ± 10 Ma (MSWD = 0.48; n = 30). Each age population correlated with a specific zircon morphology and surface structure. Zircon yielding a $^{207}Pb/^{206}Pb$ age of *ca.* 3025 Ma and/or rim ages of *ca.* 2860 Ma could have slightly eroded or rounded grain morphology and a mottled or irregular outer surface structure, whereas the *ca.* 2940 Ma age population came from zircons that were more prismatic with smooth crystal faces. Notably, Th/U values were low (≤ 0.1) for the younger ages (*ca.* 2860 Ma) and ranged from 0.1 to 0.3 for older zircon ages (*ca.* 2940 and 3025 Ma). Although pooling data masks the spatial (depth) resolution of this approach, it does permit intrasample correlations to be established and verified.

Of the three zircons that exhibited a positive age–depth relationship, we discuss grain 13-HSGB-12/02 as a representative that possessed a clear relationship as a result of depth profile analysis (Figure 2.7). The chemically distinct rim was 0.35 µm thick and was distinguished from interiors by young ages and lower Th/U values. The rim material yielded a U–Pb upper intercept age of 2864 ± 20 Ma (MSWD = 0.27; n = 14) with a Th/U value of 0.06. The deepest portion of the depth profile yielded a U–Pb upper intercept age of 3020 ± 15 (MSWD = 0.53; n = 13) and a Th/U value of 0.34. The concordance relationship of this sample is illustrated in Figure 2.8, which demonstrates a concordant rim (< 10% discordant) and discordant core (> 10% discordant).

Between the distinct rim and the distinct core was a 0.6µm-thick zone that is probably a transition between chemical domains; this transition is not plotted on Figure 2.8 as the data would spread between the rim and core data. A second analysis was completed on this sample

(13-HSGB-12/02@1; SI Table 2.1), which yielded statistically similar upper intercept age (2857 ± 17, MSWD = 0.98, n = 12); however, the average Th/U value was slightly higher (0.2).

2.4.2 LA-ICP-MS U–Pb depth profiling

Analyses were performed on sixteen separate zircons from the same rock specimen as our SIMS analyses (SI Table 2.3); none of the same zircons were analysed by both methods due to the available surface area on a single crystal face, as well as the inconsistent distribution of rim material that has been documented in other studies (Schneider *et al.* 2011, 2012). Analyses using the LA-ICPMS approach were targeted in the centres of the grains due to the large spot size. Each analysis lasted 60 s resulting in pits that were ~ 48 μm in lateral dimension and ~ 10 μm in depth. SEM observation showed that the bottom of the LAICP-MS U–Pb depth profile pits was flat. Of the sixteen analyses, thirteen of the grains fell into two populations: the first had $^{207}Pb/^{206}Pb$ ages of 3030–3050 Ma and the second had $^{207}Pb/^{206}Pb$ ages of *ca.* 3100 Ma. Three grains exhibited a rim age with a weighted average $^{207}Pb/^{206}Pb$ age of 2960 ± 24 Ma (MSWD = 2.6; n = 3) and an interior weighted average $^{207}Pb/^{206}Pb$ age of 3043 ± 14 Ma (MSWD = 4.6; n = 3). Several grains gave ages of *ca.* 2860 Ma that were resolved during the first 2 s of analysis; however, because of this short analytical time, these cannot be regarded with confidence. Grains lacking a younger rim signature were characterised by subrounded shapes and slightly mottled external structure, whereas zircon that possessed a younger rim had smooth, prismatic faces. Rims ranged in thickness from 1 to 3 μm and were characterised by consistently elevated average U (> 400 lg g^{-1}) relative to the core which was typically < 300 μg g^{-1}.

Of the three grains that exhibited an age–depth relationship (SI Table 2.4), grain 13-HSGB-12/19 was selected as a representative that illustrates an obvious core–rim relationship

during depth profiling analysis. Similar to the SIMS analysis, rims were distinguished from the interior by a younger $^{207}Pb/^{206}Pb$ age and an elevated U content; concordance did not vary over the analysis, remaining ~ 10% discordant throughout. In sample 13-HSGB-12/19 (Figure 2.9), the zircon had a 2µm rim that exhibited a $^{207}Pb/^{206}Pb$ age of 2957 ± 4 Ma and a U concentration of 1175 µg g^{-1}. Conversely, the zircon interior of the crystal was characterised by a $^{207}Pb/^{206}Pb$ age of 3034 ± 4 Ma and a U concentration an order of magnitude lower than the rim (164 µg g^{-1}). Between the distinct rim and interior, there was a 1-lm transition zone, characterised by gradational change in age and U content.

2.4.3 LA-ICP-MS REE depth profiling

A total of twenty-four trace element determinations were conducted on the same zircons that were dated by SIMS and LA-ICP-MS. Analyses were targeted in the centre of the grains, primarily due to the fact that epitaxial areas were reserved for the U–Pb analysis. SEM observation of the LAICP-MS REE depth profile pits showed that they were slightly deeper in the middle analysis pit. Zircon interiors revealed two apparent distinct chondrite-normalised REE trends. The first was characterised by a positive Ce anomaly and low LREE concentrations (≤ 3) relative to the HREE resulting in steep positive slopes. The second trend had notably higher (up to three orders of magnitude) LREE concentrations compared with the first and had no clear Ce anomaly (Figure 2.10B; SI Table 2.4). Figure 2.10A illustrates a time-resolved La/Yb plot of grain 4 of sample 13-HSGB-12 and demonstrates the relationship between LREE and HREE with depth into the crystal.

Of the twenty-four analyses, twenty grains exhibited a discernible change in REE pattern or concentration with depth, whereas the remaining four showed almost no change. These

changes can be categorised into two groups, which are illustrated in Figure 2.10. (a) Rims characterised by an overall increase in the total REE content (up to two orders of magnitude) relative to the interior while maintaining the same trend. (b) Rims elevated in the concentration of LREE relative to the HREE, and the LREE enrichment (up to two orders of magnitude) result in a nearly flat REE profile. Regardless of rim type, some samples showed a positive Eu anomaly. Rim thickness can range from 1 to 6 lm, but averaged a depth of 2 μm. Unlike the age domains, there was no notable correlation with the presence of a rim and the morphology or surface structure of the grain.

2.5 Discussion of results

Both SIMS and LA-ICP-MS techniques were able to produce robust $^{207}Pb/^{206}Pb$ depth profile ages by integrating subdomains of the volume analysed, which was characterised by a uniform age and geochemistry. The reproducibility of a single age from a number of grains in a sample suggests that ages are geologically significant and are probably not an artefact of analytical complexities. Within our combined data, we can resolve three distinct age domains. (a) The interior of the zircons, characterised by Th/U values of 0.1–0.3, and with $^{207}Pb/^{206}Pb$ ages of 3025–3050 Ma and *ca.* 3100 Ma. The depth profile analyses with this signature were derived from subrounded-to-rounded grains, (b) < 3μm-thick domains with a $^{207}Pb/^{206}Pb$ age of 2940–2960 Ma, characterised by Th/U values ~ 0.1 or elevated (2x) U relative to the interior often associated with prismatic zircon lacking evidence of abrasion and rounding, (c) < 0.5μm-thick domains with an age of *ca.* 2860 Ma and characterised by Th/U values of ≤ 0.1. Zircons that exhibit this age domain were often abraded and corroded on their outer surface, as well as possessing mottled and irregular crystal faces. The REE trends are more complicated to correlate

differences to distinct rim populations or morphologies, but nonetheless can readily be resolved into rim and core signatures. Based on depth profile changes in $^{207}Pb/^{206}Pb$ ages, Th/U values and REE signatures, our data demonstrate that re-equilibrated zircon U–Pb rims were < 3 μm thick, whereas REE alteration penetrated up to < 10 μm within the crystal.

From the SIMS data, the change from relatively concordant (< 10%) *ca.* 2860 Ma rim ages to discordant (> 10%) *ca.* 3025 Ma ages in the zircon interior suggests that the zircon crystal underwent pervasive Pb loss between the time of primary crystallisation and that of recrystallization of the rim material. This is consistent with other depth profile studies (Breeding *et al.* 2004, Cottle *et al.* 2009). Conversely, the zircon with 2940–2960 Ma rims and *ca.* 3025–3050 Ma interiors does not show a change in concordancy, suggesting that Pb loss did not affect the entire zircon population in the rock. Moreover, this may suggest the zircons that did undergo Pb loss after primary crystallisation were primed for subsequent recrystallization and re-equilibration, which we suggest occurred at *ca.* 2860 Ma.

Several studies have demonstrated that when zircon is out of equilibrium with a coexisting fluid phase, Zr can be mobilised by hydrothermal leaching (Rasmussen 2005, Geisler *et al.* 2007, Hay and Dempster 2009, Hay *et al.* 2009). Porosity develops in the crystalline zircon, and the Zr-saturated fluids will eventually (re-)precipitate zircon; xenotime, thorite, coffinite and other accessory phases also precipitate depending on elemental availability within the fluid. Consequently, the recrystallized zircon can undergo enrichment in 'non-formula' solvent cations (Ca, Ba, Al, Fe, Mn; Geisler *et al.* 2007) as well as REE enrichment (Hoskin 2005, Kirkland *et al.* 2009). Additional factors such microfractures along the zircon surface and radiation damage within the crystal may also increase surface area for a fluid to react with the zircon, thereby facilitating recrystallization.

The trends observed in the Th/U values of a single analysis often mirror the $^{207}Pb/^{206}Pb$ age–depth profiles, that is, significantly lower in the rim and higher in the interior with a notable transition interval between the two. Primary igneous zircon typically has Th/U values > 0.2, whereas it is possible for metamorphically derived zircon to possess Th/U values < 0.1 (Moeller *et al.* 2003). Moeller *et al.* (2003) suggested that in order for recrystallised zircon to have such low Th/U values, the zircon must have recrystallized in the presence of a Th-bearing phase (e.g., monazite or allanite) that would preferentially consume the Th relative to the U. With this in mind, the Th/U of < 0.1 in the *ca.* 2860 Ma age domain from zircon extracted from a metasediment is evidently metamorphic in origin, whereas the other two domains cannot be distinguished using Th/U values alone. However, based on the expected ages of surrounding batholiths (< 3000 Ma; Percival *et al.* 2006), we propose the *ca.* 3025–3100 Ma dates to be igneous ages.

Despite this study documenting relatively homogenous rim material for two separate analyses on a single grain (13-HSGB-12/02 vs. 13-HSGB-12/02@1), some of our other analyses as well as other studies (Schneider *et al.* 2011, 2012) demonstrate that zircon rim heterogeneity is more often the case. The evidence suggests that not all zircon in a single rock sample possesses evidence of recrystallized rim material, and even within a single zircon, the rim material is not uniformly present as a complete carapace around the inner zircon domain. One model to consider is the potential armouring of coexisting phases surrounding the zircon within the host rock. For example, if the zircon is located along a grain boundary of a mica crystal, this would probably foster more fluid activity, increasing fluid–mineral interaction along the shared zircon–mica boundary. A shielding effect may occur if the zircon is adjacent to a more refractory mineral phase. Unfortunately, because the depth profiling approach can only be resolved by

analysing unpolished zircon mineral separates, and not *in situ*, we lack the petrological context of each grain. The potential for spatial heterogeneity of the rim also means that a larger diameter analytical spot will result in an increased chance of lateral mixing of separate age domains. The smaller dimension of the SIMS analysis therefore has a reduced chance of incurring lateral mixing.

The LA-ICP-MS REE depth profiling technique successfully identified two distinct core as well as two rim trace element profiles. Considering the rock used for this study contains a detrital zircon population, more than one interior signature is expected as any particular zircon may be derived from a number of sources. The diversity of the rim signature is attributed to the degree of fluid–mineral interaction. Applying the principles of fluid–rock interaction outlined earlier, it follows that, even though the same fluid is interacting with a rock, the fingerprint it leaves as a rim can vary greatly. The REE chemistry in zircon appears to be more susceptible to reequilibration than the U–Pb system. This is evidenced by the deeper depths to which the REE chemistry has been affected in the zircon versus that of the U–Pb system (< 10 μm versus < 5 μm, respectively). In addition, the rims identified on the basis of REE concentrations of the zircons are far more pervasive in the population (20 of 24) compared with the rims identified by U–Pb age (SIMS: 3 of 12 and LA: 3 of 16). The presence of LREE relative enrichment in the rims is a poorly understood phenomenon. It may be caused by the analytical sampling of nano- to micrometer inclusions of REE-bearing phases (apatite, monazite, xenotime or rutile; Ayer *et al.* 2005). However, there is no petrographic or geochemical evidence (elevated P, Y, Ti) in our samples to support the presence of fluid or mineral inclusions. Alternatively, the REEs could be derived from fluids of nearby highly evolved magmas (Gysi and Williams-Jones 2013) or the

concomitant breakdown of LREE phases (monazite, xenotime, allanite) during these low-temperature hydrothermal events.

A schematic diagram presented in Figure 2.11 shows a self-consistent model of our observations: zircon with a primary igneous age of > 3000 Ma may undergo microfracturing and alpha-decay damage (Breeding *et al.* 2004) resulting in an increased surface area and susceptibility to fluid-induced alteration in the source area (*ca.* 2940–2960 Ma). We suggest that this event occurred in the source area, not the basin, based on the *ca.* 2860 Ma age of the greenstone belt proposed by Percival *et al.* (2006), as well as the unbraided surface of the zircon. The *ca.* 2940–2960 Ma rim may perhaps be a relic of the K-metasomatic event in the granitoids as described by Jensen (1989). As documented in several studies, a fluid will not interact with the entire zircon population as evinced by heterogeneity in each zircon and in the host rock; thus, only a subset of the population possesses a record of the event. As the primary rock is unroofed, the > 3000 Ma zircon, eroded and transported as detritus, may be sufficiently refractory to preserve the *ca.* 2940–2960 Ma rim, or may become abraded, rounded and fractured, losing the *ca.* 2940–2960 Ma rim. Not only do these zircons no longer possess a 2940–2960 Ma rim, but also they are again more susceptible to subsequent fluid interaction. Indeed, our data yield some evidence for another zircon recrystallizing event at *ca.* 2860 Ma, consistent with greenschist facies metamorphism of the greenstone belt (Percival *et al.* 2006). More surprising is that our analyses did not uncover a *ca.* 2700 Ma age population, a date we expected due to the proximity of the arkose sample directly adjacent to the *ca.* 2730 Ma feldspar porphyry granitic dyke.

A history of differential armouring, zircon damage and fluid interaction results in a detrital population with several distinct U–Pb depth profile populations. We have collected a

tantalising data set and defined a methodological approach, but additional zircon and more samples are required to satisfactorily resolve the timing of metamorphism and fluid alteration in the greenstone belt.

2.6 Discussion of methodology

All three techniques that we employed demonstrate a drilling rate capable excavating at sub-micrometer depths. This is evinced by our calculated drilling rates measured via the MicroXAM surface profilometer. The SIMS sputtered at ~ 100 nm per mass sweep with a lateral spot size of 30 μm, whereas the LA-ICP-MS (U–Pb) technique drilled at ~60 nm per pulse with a lateral spot size of 48 μm and the LA-ICP-MS (REE) technique drilled ~ 300 nm per pulse with a lateral spot size of 17 μm. Our data suggest that the LAICP-MS technique outlined is capable of producing robust ages after sampling through ~ 1 μm of material (*ca.* seventeen pulses); conversely, the SIMS U–Pb depth profiling has a depth resolution closer to 100 nm. Despite the differences in depth resolution, both the SIMS and the LA-ICP-MS approaches identified the presence of the *ca.* 2950 Ma population as well as the > 3000 Ma population, which were resolvable with confidence. When we compare the populations, it can be noted that the $^{207}Pb/^{206}Pb$ ages produced by our LA-ICP-MS depth profiling technique overlap with the 2s uncertainty of the SIMS $^{207}Pb/^{206}Pb$ ages (2960 ± 24 Ma and 2942 ± 10 Ma, respectively). Unfortunately, neither the SIMS nor LA-ICP-MS was able to independently reconcile the entire history witnessed by the zircon crystals. Although the LA-ICP-MS technique was able to identify the *ca.* 2860 Ma domain, it was measureable for < 2 s (five mass sweeps) of analytical time and could not be resolved with confidence, which we have attributed to the decreased spatial (depth and lateral) resolution compared with the SIMS analyses. Conversely, our SIMS analysis failed

to penetrate deep enough to sample the zircon interior due to the lower sputtering rate. With SIMS, it is theoretically possible to ablate to a depth that is equal to the lateral dimension of the ion beam diameter without significant fractionation (Schmitt 2011). Our ≤ 50 cycle analytical run sputtered to depths of < 5 μm and took > 40 min; while longer sputtering analysis is possible, it is probably not feasible for the collection of large data sets. A better solution would be to polish the mount after SIMS depth profile analysis and conduct conventional polished mount analyses on the exposed zircon cores.

Both laser ablation techniques were associated with a significant volume of ejecta and condensate surrounding the ablation pits; this raises concerns over the degree of surface mixing when more than one analysis spot is conducted on a single crystal face. The ejecta surrounding the LA-ICP-MS REE depth profile pits had a zircon-like chemistry (analysed via an EDS). However, the ejecta and small spheres along fractures in the U–Pb depth profiling pits (Figure 2.3) were dominantly composed of ZrO, possibly baddeleyite. It is well established that, during ablation, ZrO_2 and SiO_2 condense separately in and around the ablation crater. It is suggested that U is preferentially incorporated into the ZrO_2 structure, whereas Pb follows the SiO_2. Differential condensation and transport of these two phases is the primary causes of the well-documented problem of Pb/U fractionation in LA-ICP-MS zircon dating (Kosler *et al.* 2005, 2014, Allen and Campbell 2012). Unfortunately, this phenomenon is also poorly understood and nearly impossible to quantify at this point.

A notable difference in the two laser ablation techniques is the shape of the excavated volume: the REE pits had a hemispherical crater bottom, whereas the U–Pb pits had a more or less flat bottom, orthogonal to the crater wall. The curved shape suggests that there was more volume being ablated in the centre of the pit relative to the edges; this increases the likelihood of

mixing of different zircon domains as the laser ablates into the crystal. With a similar spot size as was used for the U–Pb approach, it would be possible to alleviate the depth mixing issue; however, the lateral size of the laser spot would be greatly increased, thus increasing the amount of lateral mixing of potentially heterogeneous rim material. The decision to compromise the lateral or depth resolution must be considered prior to analysis.

The SIMS methodologies have been published previously and are widely accepted as useful geochronological tools (Breeding *et al.* 2004, Schmitt 2011, Schneider *et al.* 2011). In an attempt to apply a new U–Pb LA-ICP-MS depth profiling technique on naturally zoned Archaean zircon, we were able to produce internally consistent results while falling within the 2s uncertainties of a SIMS U–Pb depth profile study on the same zircon population. Critiques of this method are generally focused on the presence of the smoothing device which allows for sample mixing of separate pulses before the volume is analysed (Cottle *et al.* 2012, Steely *et al.* 2014). At 2 Hz, the washout time from the S-155 cell was sufficiently fast that the SQUID was unable to smooth out individual pulses. By operating at 2.5 Hz, we operated at conditions in which each pulse was just smoothed. This was to produce a very constant signal, ensuring high precision while minimising the volume of analyte in the smoothing device at any time. Through this technique, we have demonstrated that reproducible results are possible through continuous ablation U–Pb depth profiling.

2.7 Summary

SIMS and LA-ICP-MS techniques were successfully applied to resolve sub-micrometer, isotopically distinct domains in natural zircon by resolving U–Pb and REE changes with depth in

unpolished crystals. Our data demonstrate the viability of the method and have uncovered otherwise undetectable rim material. We summarise our findings as follows:

1) Isotopic and elemental alteration of zircon appears to be concentrated along the outer margins of zircon in metamorphic and hydrothermal settings. This distinct zone is characterised by elevated LREE, U and Fe concentrations, which decreased within a few to tens of micrometers into the crystal.

2) Application of SIMS methodology revealed rim ages that were *ca.* 100–200 Myr younger than our zircon interior ages; the LA-ICP-MS U–Pb methodology revealed the same age populations; however, the youngest rim age population could not be resolved with confidence.

3) By operating the laser at the lowest repetition capable of being smoothed by the SQUID smoothing device, we ensured constant signal with high precision, while minimising the volume in the device.

4) The smaller SIMS analysis spot size has the less potential for lateral mixing, yet the LA-ICP-MS approach can complete an analysis in less than 60 s allowing for the collection of a robust data set over minimal time.

5) Only one-third of the zircons analysed possessed a rim domain; a combined SIMS and LA-ICP-MS study would be most time efficient and economical approach to resolve the nature and age of the ultra-thin zircon rims.

These techniques are greatly under-utilised as a geochronological and mineralogical tool for understanding the timing of metamorphic or hydrothermal fluid events. Both SIMS and LA-ICP-MS techniques have strengths and weaknesses; however, when both approaches are applied on a

single zircon population, a detailed history of otherwise unresolvable, yet geologically significant events, can be unravelled.

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Table 2.1: LA-ICP-MS U-Pb isotopic data of the KVT zircon isolated in 10 s intervals

sample	time (s)	duration (s)	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
			value	2 s.e	value	2 s.e	value	2 s.e		age (Ma)	2 s.e	age (Ma)	2 s.e	age (Ma)	2 s.e
KVT-9-1	10	9.9892	0.6560	0.0110	22.9300	0.4100	0.2551	0.0040	0.46	3222	17	3251	42	3216	13
KVT-9-2	20	9.9892	0.6400	0.0100	22.6800	0.3500	0.2562	0.0035	0.55	3212	15	3192	38	3223	14
KVT-9-3	30	9.9892	0.6370	0.0120	22.6500	0.3900	0.2594	0.0044	0.40	3214	17	3176	48	3241	15
KVT-9-4	40	9.9892	0.6480	0.0110	23.1300	0.4400	0.2573	0.0041	0.51	3232	18	3219	44	3231	15
KVT-9-5	50	9.9892	0.6540	0.0120	23.4500	0.4200	0.2585	0.0043	0.43	3246	17	3243	48	3237	14

Table 2.2: LA-ICP-MS $^{207}Pb/^{206}Pb$ ages and analytical settings of the long term reproducibility of the KVT zircon

date	crater ø (μm)	rep. rate Hz	ablation time (s)	meas. cycles (n)	fluence (J/cm^2)	n	$^{207}Pb/^{206}Pb$		MSWD
							age (Ma)	2 s.e	
2014-02-12	19	4	30	~130	3.5	8	3228	7	1.8
2014-02-23	19	4.5	30	~130	3.5	5	3229	9	0.73
2014-02-23	19	4.5	30	~130	3.5	4	3226	18	2.2
2014-05-30	14	4.5	35	~160	3.5	6	3227	6	0.44
2014-06-10	48	2.5	60	~450	3.5	16	3226	3	1.5
5-month weighted average (n = 42, 3 rejects)							3226	2	1.4
Reference material (FC1; Schoene et al. (2006))							3227	1	

Table 2.3: LA-ICP-MS U-Pb isotope data of zircon from depth-profiling of sample 13-HSGB-12 from the Horseshoe Lake Greenstone Belt

grain		U (ppm)	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
			value	2 s.e	value	2 s.e	value	2 s.e		age (Ma)	2 s.e	age (Ma)	2 s.e	age (Ma)	2 s.e
12		232	0.5728	0.0053	17.9900	0.2400	0.2262	0.0014	0.94	2918	22	2986	13	3028	9
13		115	0.6078	0.0022	19.2130	0.0790	0.2286	0.0008	0.71	3061	9	3052	4	3043	3
14		777	0.6375	0.0016	20.9920	0.0520	0.2385	0.0004	0.74	3179	6	3138	2	3111	2
15		320	0.5972	0.0032	18.9300	0.1100	0.2301	0.0006	0.89	3017	13	3038	6	3051	3
16		840	0.6311	0.0014	20.6550	0.0570	0.2368	0.0004	0.77	3154	6	3123	3	3097	2
17	Rim	403	0.6020	0.0160	18.1700	0.4400	0.2192	0.0054	0.42	3037	64	2998	23	2959	32
	Core	254	0.6276	0.0029	19.8450	0.0990	0.2287	0.0007	0.81	3140	11	3084	5	3042	3
18		197	0.6201	0.0034	19.4600	0.1500	0.2270	0.0016	0.41	3110	13	3065	8	3036	6
19	Rim	1175	0.5673	0.0029	16.9920	0.0770	0.2167	0.0008	0.87	2896	12	2934	4	2957	4
	Core	164	0.6062	0.0025	19.1250	0.0830	0.2273	0.0008	0.68	3057	10	3048	4	3034	4
20		385	0.6442	0.0025	20.3300	0.0860	0.2288	0.0008	0.68	3205	10	3107	4	3045	3
21		295	0.6054	0.0015	19.1080	0.0540	0.2279	0.0005	0.70	3051	6	3047	3	3037	2
22		568	0.5762	0.0017	18.2510	0.0540	0.2291	0.0004	0.79	2933	7	3003	3	3047	2
23		340	0.5956	0.0024	18.6250	0.0810	0.2259	0.0006	0.91	3012	10	3022	4	3024	2
24		1236	0.5851	0.0018	18.0000	0.0810	0.2226	0.0009	0.51	2969	7	2990	4	3001	7
25		845	0.6346	0.0016	20.8600	0.0570	0.2376	0.0005	0.68	3168	6	3132	3	3105	2
26		289	0.6388	0.0023	20.9440	0.0820	0.2372	0.0005	0.95	3183	9	3135	4	3101	2
27	Rim	636	0.5680	0.0063	16.9700	0.2500	0.2196	0.0020	0.67	2899	26	2932	14	2979	9
	Core	400	0.6217	0.0016	19.7120	0.0510	0.2292	0.0005	0.63	3116	6	3077	3	3047	2

Values presented are intergrations over the entire analysis unless other wise stated (ie: Rim or Core)

Table 2.4: LA-ICP-MS REE analytical data of zircon from depth-profiling of sample 13-HSGB-12 from the Horseshoe Lake Greenstone Belt

grain	Rim vs. Core	La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)	Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)
1	Rim	1178	5430	1325	8898	3391	1732	5310	816	5487	1389	3869	503	2939	460
	Core	50	180	29	177	66	45	121	22	191	53	187	35	285	57
2	Rim	390	1544	243	1389	676	158	951	187	1630	259	1864	540	4037	1185
	Core	5	48	3	22	12	8	35	10	113	41	200	48	466	93
3	Rim	118	326	49	301	430	7475	25335	4712	29124	8044	29412	3870	32730	7066
	Core	88	310	51	298	107	229	176	29	265	86	409	95	925	174
4	Rim	50	204	39	250	97	24	158	27	266	75	294	58	543	106
	Core	5	22	3	20	11	2	26	7	80	27	140	33	333	73
5	Rim	435	1605	248	1424	511	87	503	3139	31587	12759	63148	17320	122161	27462
	Core	1	6	0	2	1	0	4	1	18	8	43	12	124	29
6	Rim	1013	5227	820	5943	4347	3016	11567	2194	19701	4630	15348	2234	24061	3662
	Core	7	42	6	40	21	7	42	9	83	24	93	17	184	40
7	Rim	9771	25425	4101	30346	16446	2919	46207	7745	52443	10944	31512	4225	29530	4122
	Core	0	6	0	2	2	1	8	2	31	12	63	16	193	43
8	Rim	422	894	120	646	356	512	2233	299	2263	472	1676	265	2517	417
	Core	1	11	1	3	2	1	10	3	44	18	100	24	252	54
11	Rim	233	567	92	457	1467	6716	45449	11442	110214	26319	80451	12223	114333	18632
	Core	4	23	2	14	9	2	34	9	115	42	186	38	348	66
12	Rim	78	174	17	69	13	13	18	4	47	50	602	179	3289	633
	Core	1	18	0	3	2	1	7	2	26	9	51	12	127	28
13	Rim	75	146	38	1382	2050	528	5598	1284	10973	2360	6514	1028	9003	1911
	Core	5	36	6	33	17	10	36	8	83	29	140	35	279	61
14	Rim	97	1904	454	3910	2080	2750	7479	1914	20846	4929	19176	2818	20584	3359
	Core	0	14	0	3	4	1	19	6	69	24	119	25	230	44
16	Rim	704	844	132	470	89	90	2940	664	5490	1824	5254	1194	12490	2557
	Core	40	98	13	82	34	9	98	22	241	85	433	78	802	126
17	Rim	2830	14013	3719	25031	9567	4467	13606	1983	15297	3314	10778	1317	9668	1012
	Core	0	5	0	1	1	1	4	1	15	6	40	10	148	27
18	Rim	97	1904	454	3910	2080	2750	7479	1914	20846	4929	19176	2818	20584	3359
	Core	0	14	0	3	4	1	19	6	69	24	119	25	230	44
19	Rim	1000	4035	753	3396	1412	338	2027	314	2484	807	1894	260	3136	552
	Core	1	17	0	4	4	1	23	8	113	41	221	46	484	99
20	Rim	80	217	182	1254	599	1349	1799	332	2860	778	2058	300	1992	319
	Core	0	4	0	1	2	1	12	4	47	18	92	21	222	42
21	Rim	185	435	70	338	102	53	177	34	329	89	270	64	581	109
	Core	17	44	5	30	13	8	29	7	76	26	115	25	247	48
22	Rim	57	234	31	169	36	34	54	10	95	36	95	45	479	100

grain	Rim vs. Core	La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)	Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)
	Core	0	5	0	1	1	0	4	1	21	9	49	14	161	34
23	Rim	163	443	63	321	87	3849	12484	2833	23406	5687	14142	2878	22648	5354
	Core	3	30	3	19	11	4	32	8	95	35	170	41	461	96
24	Rim	22	251	71	490	236	141	687	170	1522	372	1692	339	3964	827
	Core	0	6	0	1	1	0	1	1	9	5	17	8	87	19
25	Rim	2534	14697	3632	25210	11683	2310	15583	2792	18966	4775	13980	1880	15326	2617
	Core	12	58	9	56	30	5	69	15	149	48	195	37	341	61
26	Rim	154	328	41	211	81	23	316	85	854	191	533	94	1055	172
	Core	2	14	0	1	1	0	8	3	36	16	84	18	209	43
27	Rim	4563	23143	5514	38119	12187	2943	12199	1485	8216	1594	4859	696	6277	1310
	Core	3	17	2	10	5	1	7	2	22	9	56	16	185	40

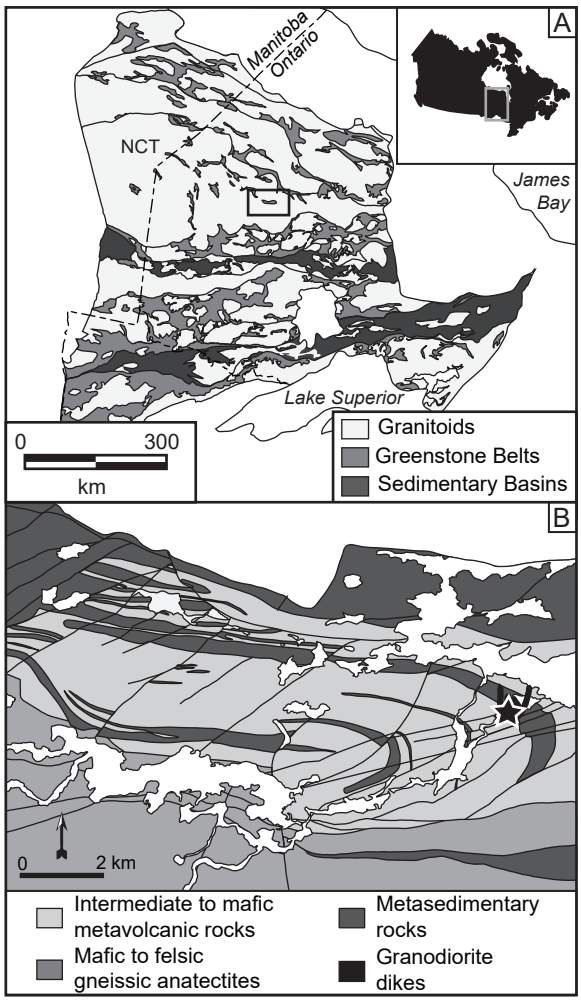

Figure 2.1: (A) Simplified geologic map of the Western Superior Province modified from Percival *et al.* (2006), with a map of Canada (inset). The box outlines the location of the Horseshoe Lake Greenstone Belt. NCT: North Caribou Terrane (B) Geologic map of the Horseshoe Lake greenstone belt, modified from Jenson (1989). Intrusive rocks in the eastern section of the map area are proximal to the hinge zone and spatially related to known Au occurrences (Jenson 1989). Sample 13-HSGB-12 was targeted adjacent to felsic intrusions in metasedimentary rocks denoted by the star.

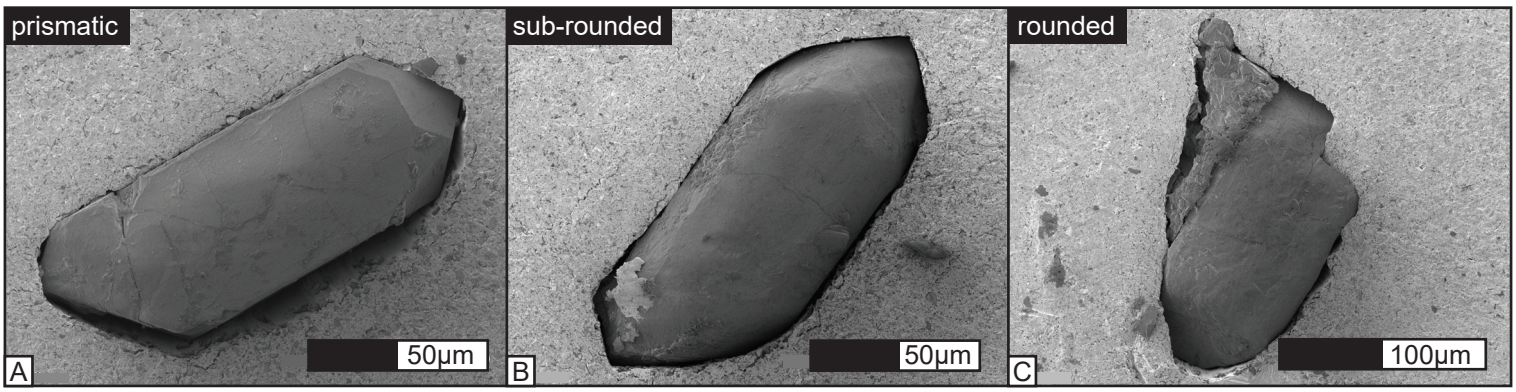

Figure 2.2: Representative SEM images of Archean zircons from metasedimentary rock sample 13-HSGB-12 from the Horseshoe Lake greenstone belt. These images were taken prior to analyses with the zircon mounted in indium and illustrate examples of terminology used for the description of zircon in this study. (A) Illustrates a prismatic zircon which has experienced little to no apparent abrasion, which differs from (B) and (C) representing sub-rounded and rounded zircons, respectively. (A) and (B) also illustrate a smooth outer structure compared to (C) which shows a mottled outer structure.

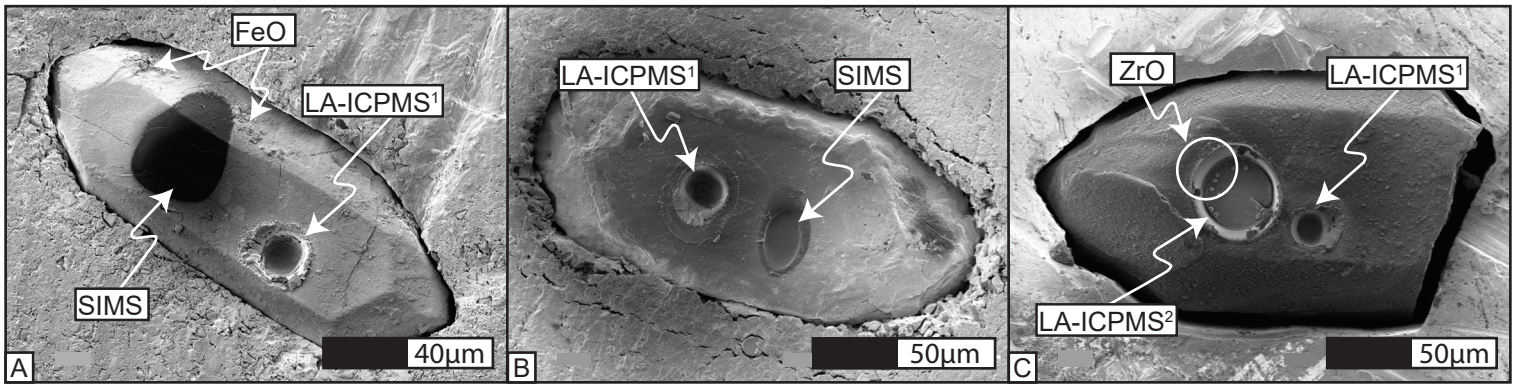

Figure 2.3: Representative SEM images of zircons from sample 13-HSGB-12 following depth-profile analyses. These images illustrate the extent of which each analytical method ablates into the zircon. LA-ICP-MS[1] (A, B, C) is the trace element depth-profile pit, which are 12 µm across and <20 µm in depth, sometimes associated with ejecta. The SIMS analysis (A, B) is ovoid in shape (30 µm long axis) and penetrates depths <5 µm. Photo (C) illustrates the difference between the LA-ICP-MS pit used for U-Pb data collection (2) and the pit used for REE analysis (1). The pits for LA-ICP-MS[2] are ~10 µm deep and 48 µm across and have ejecta, as well as spheres of ZrO.

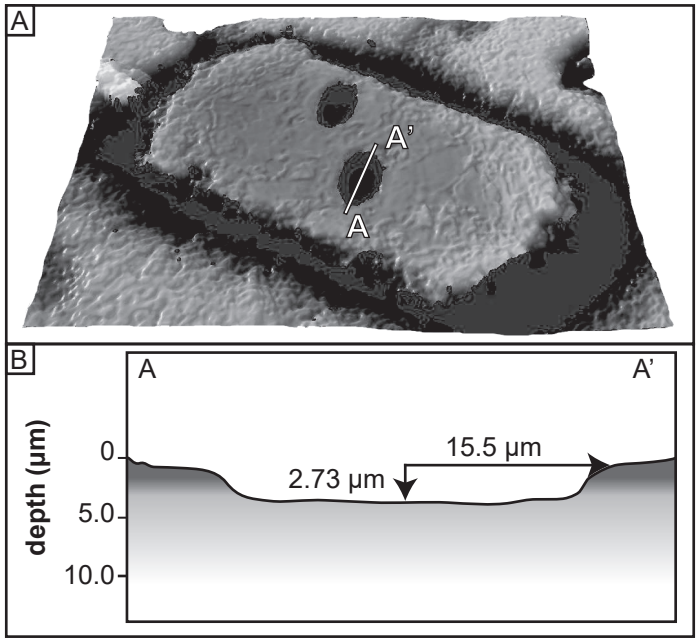

Figure 2.4: (A) Representative MicroXAM image of a zircon crystal post-SIMS analysis. Lighter grey colour represents topographically high areas whereas darker grey colours are low areas; black colour is areas of the zircon that reflected no light. The zircon has two SIMS analysis pits and a mottled surface. (B) Schematic of a SIMS pit as measured using the MicroXAM. The analysis pit is 31 µm across and 2.73 µm thick, and the pit has a flat base. Grey shaded region indicates rim material whereas the transition to white represents primary zircon interior. Note H=V.

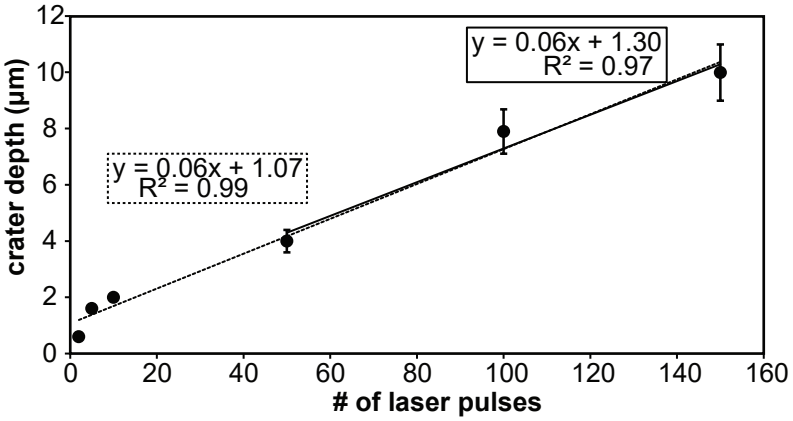

Figure 2.5: Graph of number of laser pulses versus crater depth measured using a Zeiss microscope in a contrast-enhanced mode. We measured depths of 1, 2, 5, 10, 50, 100, and 150 pulses of the laser into FC1 zircon. It is difficult to measure the depth of the pit for <5 pulses implying that the pit depth is <2 µm; the backlash on the focus drive affects the resolution. This demonstrates a near linear laser drilling rate of ~0.06 µm/pulse between 2 and 150 pulses. The linear drilling rate is evinced by the dashed line (all measured data) and the solid line (data with >50 pulses) having the same slope. See text for further discussion.

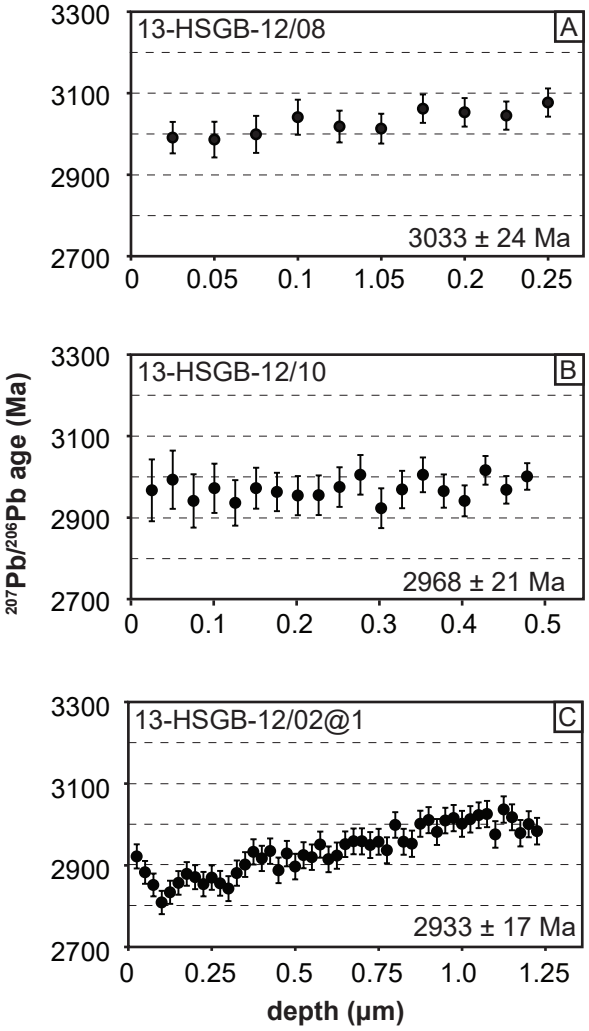

Figure 2.6: Representative SIMS U-Pb age depth-profiles with each data point on the figure representing a single mass sweep with 1σ errors. The presented integrated $^{207}Pb/^{206}Pb$ ages are weighted averages (2σ) inclusive of all mass sweeps. The number of mass sweeps is variable between samples due to prioritizing data collection on samples of interest. Graph (A) shows no obvious rim through 10 mass sweeps and yielded an age of 3033 ± 24 Ma (MSWD: 0.68; n: 10). Analysis of zircon 12/10 (B) shows no rim through 19 mass sweeps and has an age of 2973 ± 21 Ma (MSWD: 0.34; n: 19), zircon 12/02@1 (C) illustrates the presence of a rim approximately 0.35 µm deep that is more than 150 m.y. younger than the interior age.

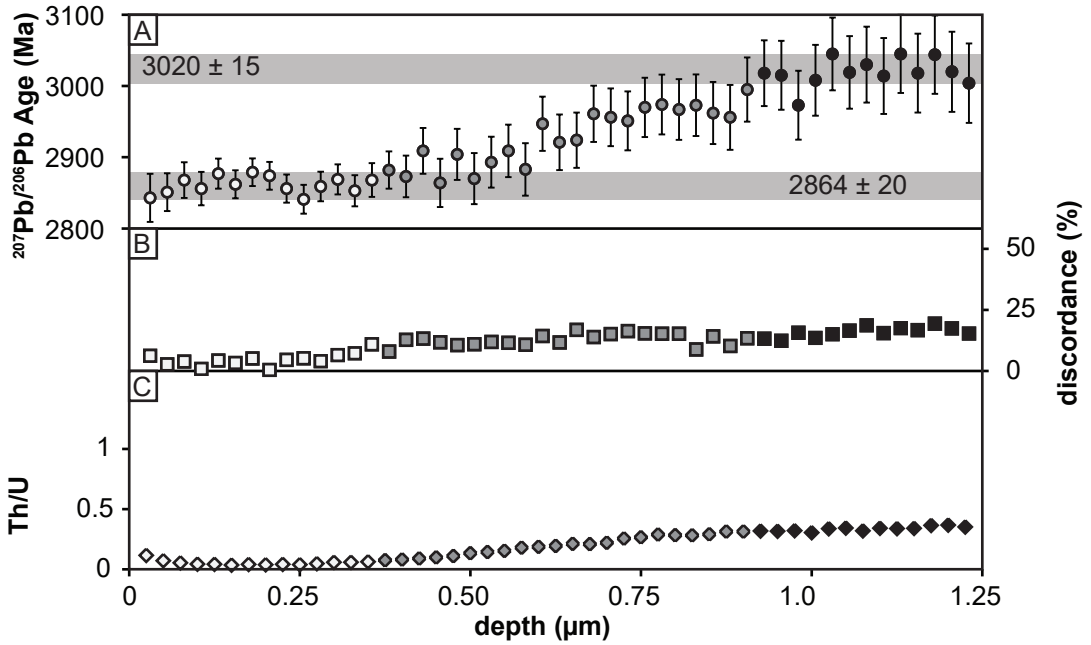

Figure 2.7: SIMS U-Pb depth-profile of zircon 13-HSGB-12/02 (note: repeat analysis of zircon from Figure 6C). Each point on the figure represents the results from a single mass sweep of a 50-cycle analysis. White data points are a chemically distinct rim material, denoted from the black interior data points. Grey data points are likely a mixing between the core and rim end members, and are not included in the age calculations. (A) $^{207}Pb/^{206}Pb$ age is plotted as a function of depth with 1σ errors. A significantly younger rim with an U-Pb upper intercept age (2σ) of 2864 ± 20 Ma (MSWD: 0.27; n: 14) can be resolved relative to a much older zircon interior (3020 ± 15 Ma; MSWD: 0.53; n: 13). Graph (B) depicts a change in age concordancy vesus depth where a concordant rim transitions to a slightly discordant interior. Graph (C) illustrates a significantly lower Th/U at the rim (~0.05) compared with the interior value (~0.33). See **SI Table 2.1** for details.

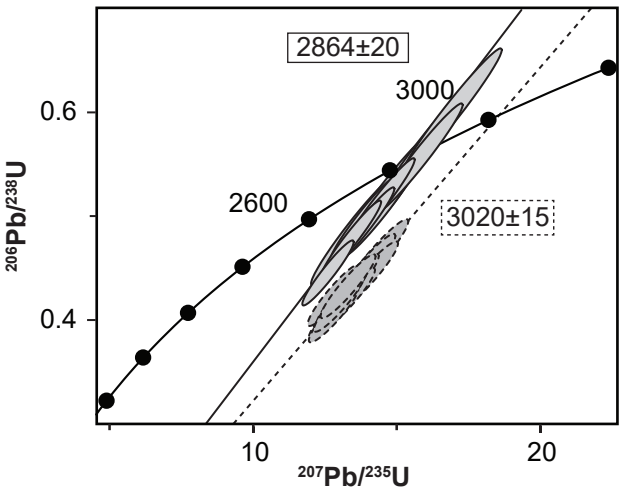

Figure 2.8: U-Pb concordia plot of zircon 13-HSGB-12/02 as analyzed using SIMS U-Pb depth-profiling methods. Each ellipse represents a single sweep with 1σ error ellipses; intercept ages are reported at 2σ. Solid ellipses represent mass sweeps from the outermost 0.35 μm identified as having an upper intercept age of 2864 ± 20 Ma (MSWD: 0.27; n: 14). The dashed ellipses represent the inner most analysis characterized by an upper intercept age of 3020 ± 15 (MSWD: 0.53; n: 13). See **Figure 2.7** and **SI Table 2.1** for additional details.

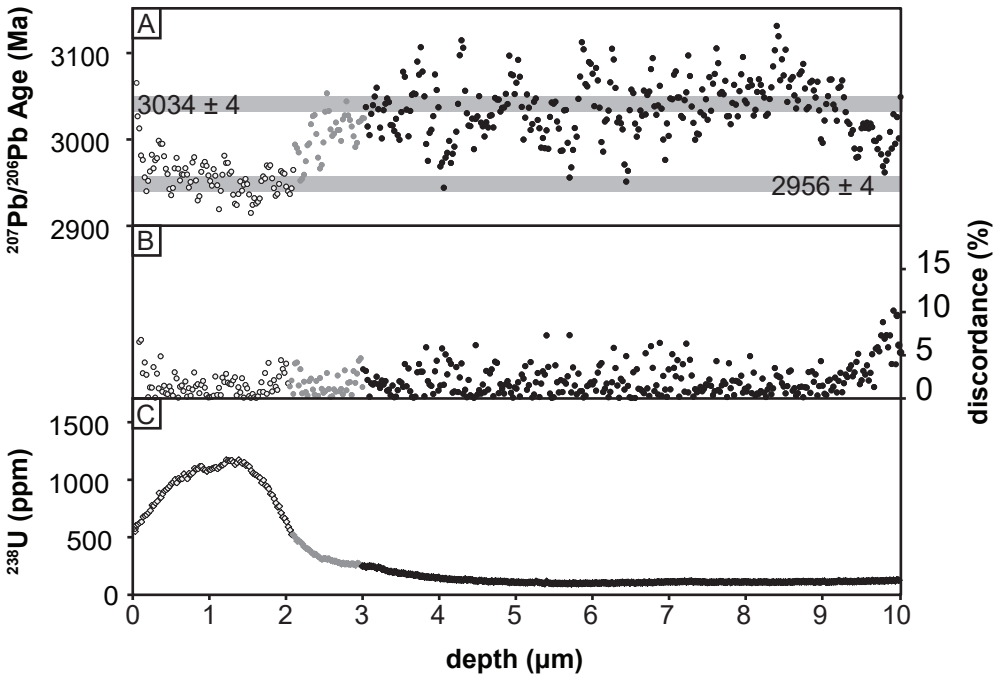

Figure 2.9: LA-ICP-MS U-Pb depth-profile of zircon 13-HSGB-12/19. Each data point on this figure represents the results from a single mass sweep (0.135 s) in a 60 s analysis, for a total of 150 pulses and ~440 sweeps, and illustrates chemical changes with depth into the crystal. White data points represent a chemically distinct rim from the zircon interior (black). Grey data points are likely a mixing between the core and rim end members, and are not included in the age calculations. Data in (A) demonstrates a change in integrated ^{207}Pb/^{206}Pb age from 2956 ± 4 Ma to 3034 ± 4 Ma. Graph (B) illustrates that the analysis remains relatively concordant (>90%) with depth into the zircon, and (C) shows that the rim age is associated with elevated U content relative to the interior. See Table 2.4 for details.

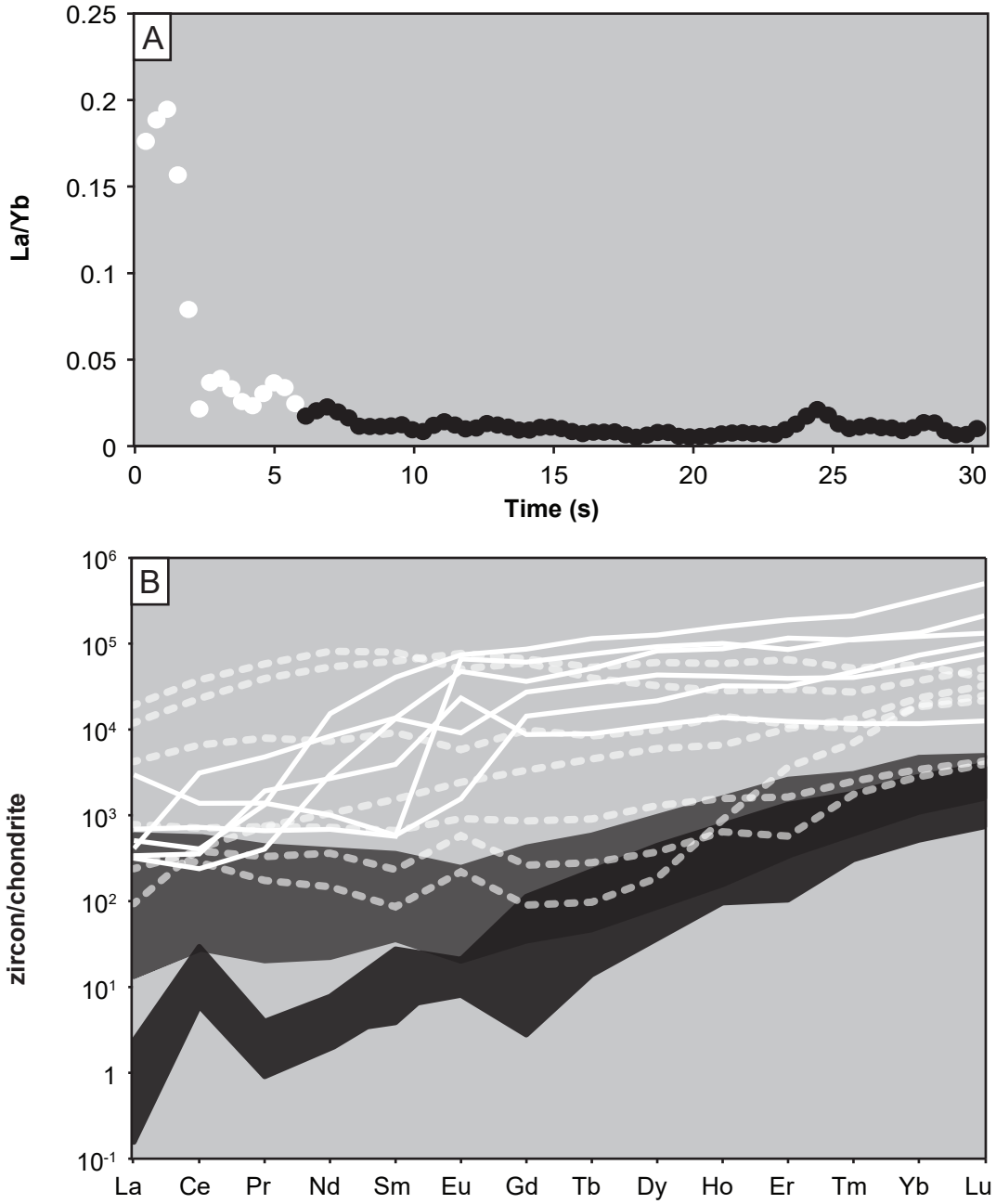

Figure 2.10: LA-ICP-MS depth-profile REE results for zircons from sample 13-HSGB-12. (A) A time-resolved La/Yb plot of grain 4 for the first 30 s of analysis, which is ~10 microns in depth. The white circles were identified as rim material while the black circles represent interior values. These data demonstrate a clear enrichment in LREE in the outermost margins of the crystal. (B) Synthesis of all REE data collected for sample 13-HSGB-12 normalized to chondrite (Sun and McDonough 1989) demonstrating the difference in concentrations for REE in rims and interiors. Gray shaded areas represent the range of interior values; two distinct patterns can be observed: dark gray represents a trend with a Ce anomaly and steep positive REE slope and the pale gray represents a trend with no Ce anomaly and much shallower REE positive slope. Rims, represented by white lines, also exhibit two distinct trends. Solid white lines characterize a profile similar to that of the interior but elevated in total REE concentration. Dashed white lines characterize a profile displaying LREE enrichment relative to HREE resulting in a flat profile. See **Table 2.4** for details.

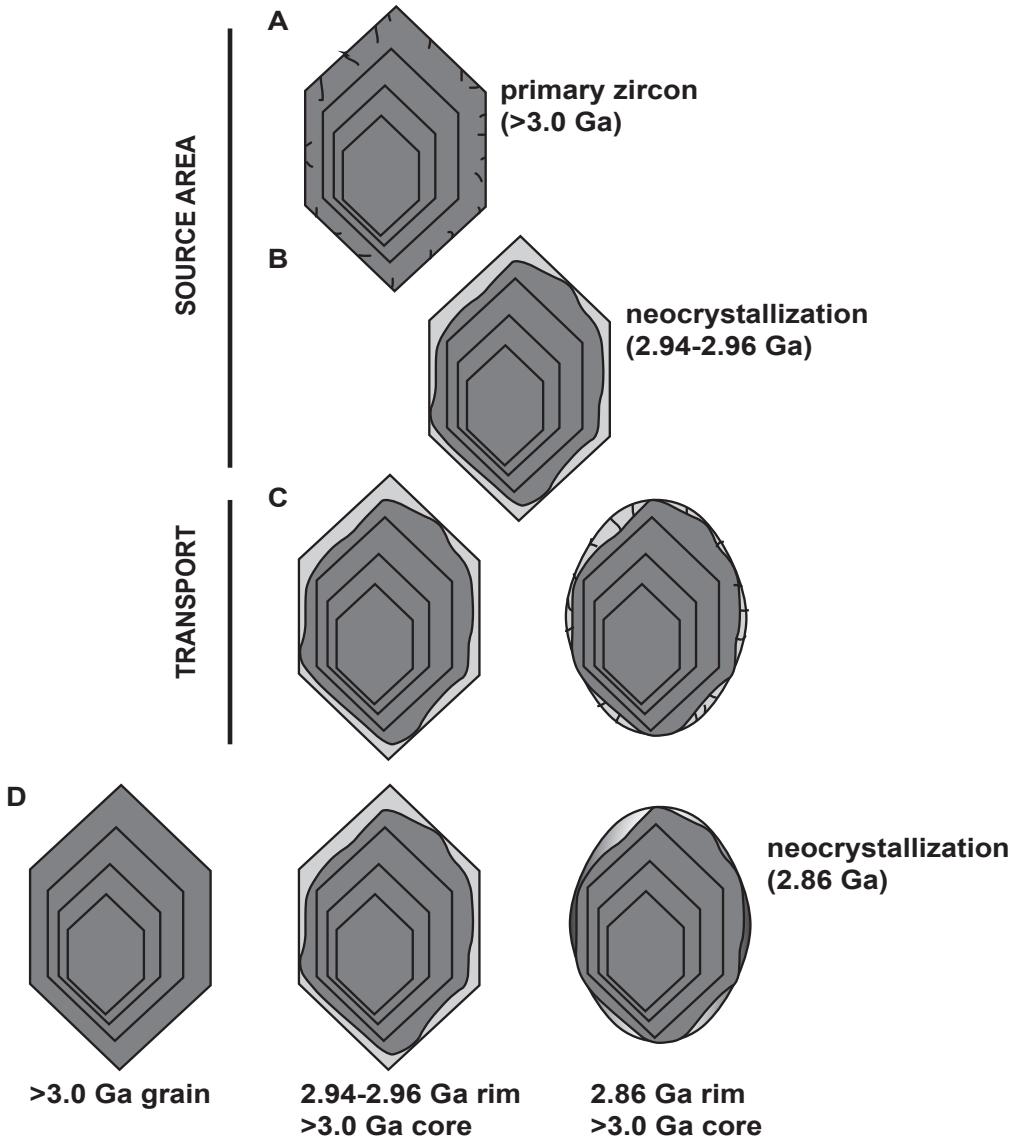

Figure 2.11: Schematic representation of the variety of zircon populations in our single Archean metasedimentary rock. (A) Primary zircon is crystallized at >3000 Ma, and may undergo radiation damage and microfracturing, which increases surface area and possibility of alteration. Although our data resolved two older zircon populations at ca. 3025 Ma and ca. 3100 Ma, we group these into the primary crystallization event. (B) A possible scenario where zircon domains affected in (A) are susceptible to neocrystallization (at 2940-2960 Ma) yet still in the primary rock. (C) During weathering, erosion, and transport, neocrystalline material may be abraded away or remain preserved. Abrasion may also induce additional microfracturing in the zircon, increasing the potential for subsequent alteration (at ca. 2860 Ma in this study). (D) Examples of possible final zircon populations present in a detrital fraction following this simplified scenario. Some of the zircon retains the primary ages and the crystal shape, others preserve the ca. 2940-2960 Ma rim and, yet others possess a rim from a post-depositional recrystallization event at ca. 2860 Ma. Our combined SIMS and LA-ICP-MS approached resolved each of these populations.

Chapter 3

Geochronology of the Horseshoe Lake greenstone belt, Superior Province, Canada: Implications for tectonic and metamorphic history

C.J. Kelly[1], D.A. Schneider[1], M.-E. Lajoie[1], S.E. Jackson[2], C.R. McFarlane[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON, K1N 6N5 Canada
[2]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada
[3]Department of Earth Sciences, University of New Brunswick, Fredericton, NB, E3B 5A3 Canada

Abstract

Depth profile techniques for U-Pb geochronology and REE geochemistry were conducted on unpolished, metasomatized Archean zircon from metasedimentary rock samples within the Horseshoe Lake greenstone belt, Western Superior Province, Canada in order to provide insight into the thermal history witnessed by the belt. Zircon rims are typically <5 µm thick and define two different $^{207}Pb/^{206}Pb$ age populations at *ca.* 2950 Ma and 2860 Ma which contrast with core ages >3000 Ma. The young $^{207}Pb/^{206}Pb$ rim ages can be temporally correlated with magmatism and to a later, potentially Au-bearing, hydrothermal event synchronous with greenschist facies metamorphism. Of interest, the zircons do not record evidence of a *ca.* 2730 Ma magmatic event manifested by the emplacement of a local quartz feldspar porphyry dike swarm. Rare Earth Element (REE) geochemical analyses on the same unpolished zircon reveal that rims are often characterized by low Th/U ratios, elevated Hf, and variable REE concentrations when compared to the interior of the grains. Variation in rim and core chemistry suggest that these elements, along with radiogenic Pb (Pb*), were mobile during fluid-zircon interaction. When properly characterized, zircon rim chemistry and age can provide constraints on the moderate to low temperature history of rocks, especially in the absence of other chronometers.

3.1 Introduction

Despite 30 years of mineral exploration (Talbot 1996) and several provincial survey publications outlining the local stratigraphy of the Horseshoe Lake greenstone belt (HSGB; Carruthers 1961; Jensen 1987; Jensen 1989), very little recent work has attempted to understand the timing of tectonic events within the belt (Kelly *et al.* 2014). Understandably, it can be difficult to resolve the timing of low to moderate temperature events in deformed Archean terranes applying traditional geochronology methods such as zircon U-Pb dating (e.g. Carson *et al.* 2002; Williams *et al.* 2007).

When it is out of equilibrium with a co-existing fluid, zircon [(Zr, REE, U) SiO_4] can be chemically altered with respect to the distribution and concentration of REE, Pb*, U, Th, and other non-formula cations (Fe, Al). This results in chemically modified micrometre thin rims (<5 μm, often termed 'hydrothermal zircon' (Geisler *et al.* 2003a; Hoskin 2005; Kelly *et al.* 2017; Kirkland *et al.* 2009; Krogh and Davis 1975; Rayner *et al.* 2005;). Laboratory experiments have effectively demonstrated that the altered material can preserve the timing and potentially the chemical signature of the fluid (Pidgeon *et al.* 1966, 1973, 1995; Sinha *et al.* 1992; Rizvanova *et al.* 2000; Geisler *et al.* 2001, 2002). We refer to this nucleation and growth of new zircon material at the expense of pre-existing crystalline zircon as recrystallization to emphasize that there is no volume gain during these processes (cf. Geisler *et al.* 2007). Two mechanisms for the recrystallization of zircon are discussed herewithin: dissolution-reprecipitation and ion-exchange (Geisler et al 2007). A third mechanism is the direct crystallization from a Zr-saturated aqueous fluid. Several authors propose that the occurrence of these rims is fostered by imperfections in the crystal structure allowing for increased fluid-mineral interaction (Breeding *et al.* 2004; Cottle *et al.* 2009; Geisler *et al.* 2007; Geisler *et al.* 2003b; Gysi and William-Jones 2013; Harlov and

Dunkley 2010; Kelly *et al.* 2014, 2017; Marsh and Stockli 2015; Putnis 2009; Schneider *et al.* 2011, 2012).

The analysis of micrometer thin rims is often beyond the spatial capabilities of conventional, polished mount analytical techniques such as Secondary Ion Mass Spectrometry (SIMS) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS). Several authors (Breeding *et al.* 2004; Carson *et al.* 2002; Cottle *et al.* 2009, 2012; Eggins *et al.* 2003; Grove and Harrison 1999; Kelly *et al.* 2014, 2017; Marsh and Stockli 2015; Mojzsis and Harrison 2002; Steely *et al.* 2014; Viete *et al.* 2015; Woodhead *et al.* 2004) have successfully resolved the age and chemistry of micrometer thin rims using these instruments but applying a depth profile technique on unpolished zircon. The results from our investigation are cross-correlated with the observations of unaltered zircon interiors and we suggest a probable physical–chemical mechanism behind their formation with respect to the geochronological history of the HSGB.

3.2 Geologic setting

The North Caribou Superterrane (NCS) is a collage of diverse tectonic assemblages that amalgamated *ca.* 2.87 Ga (Thurston *et al.* 1991) with emplacement of late orogenic granites continuing until *ca.* 2.7 Ga (Van Lankvelt *et al.* 2016). The NCS represents the core of the Archaean western Superior Province, which is comprises several east-west trending subprovinces that accreted to the NCS from the north and south (Thurston *et al.* 1991). The natural laboratory for our study is the 40 km long and 8 km wide, HSGB, located in the northern portion of the NCS (Figure 3.1). The HSGB, along with the Upper Windigo Lake greenstone (WLGB) belt and the North Caribou greenstone belt (NCGB) encircle the 100 km diameter, *ca.*

2870–2864 Ma North Caribou Pluton (Biczok *et al.* 2012; Jenson *et al.* 1989; Van Lankvelt *et al.* 2016). The occurrence of steeply dipping volcanic sequences (keels) surrounding Tonalite-Trondhjemite-Granodiorite (TTG) domes is interpreted to be the result of upward movement of the dome resulting in the downward displacement of volcanic sequences (Lin, 2005), although the major shear zones within the supracrustal belt record a different kinematic story consistant with traditional plate tectonic models (Gagnon *et al.* 2015). Domes and keels are a common occurrence in the Archean as illustrated in the East Pilbara terrane, the Barberton greenstone belt in the Kaapvaal craton, the Zimbabwe craton, the Yilgarn craton and the Yellowknife greenstone belt in the Slave craton (Thurston 2015 and references therein). Structural and lithological similarities between the HSGB, NCGB and WLGB suggest that the belts are at least partially cogenetic, having been subsequently separated by the emplacement of the North Caribou Pluton *ca*. 2860 Ma (Davis and Stott 2001; Thurston *et al.* 1991).

Few geochronological studies have been completed on the HSGB. For comparison, the supracrustal assemblages of the nearby NCGB and Red lake greenstone belt were deposited during a 150 m.y. period, commencing with volcanism at *ca.* 2980 Ma (Biczok *et al.* 2012; Thurston *et al.* 1991). The HSGB is composed of four major geological domains: Southern, Northern, Central and Calc-alkalic (Jensen 1987; Jensen 1989; Thurston *et al.* 1991). These domains are separated by major sub-vertical, east-trending shear zones, which resulted in right lateral displacement within each domain. The shear zones extend along the length of the greenstone belt (Talbot 1996), and may have been subject to reactivation during subsequent tectonism that can act as advective pathways for crustally-derived fluids (Newton 1990; Selverstone *et al.* 1991). Sampling for this study took place within the Central Domain which is composed of metavolcanic and metasedimentary successions that have been folded into a steeply

overturned plunging antiform (Figure 3.1). The volcanic and sedimentary units are lithologically similar to the platformal and oceanic volcanic assemblages of the North Caribou, Upper Windigo, and Sandy Lake greenstone belts elsewhere in the NCT (Sage and Breaks 1982).

Sparsely distributed within the nose of the antiform are 1-2 meter wide, northeast-trending, quartz-feldspar porphyry dikes (Talbot 1995; Figure 3.1). These dikes are spatially associated with Au anomalies which were reported as early as 1965 by Rio Tinto and in the 1980's by Placer Dome (Talbot *et al.* 1996). Metamorphic grade within the Central Domain is predominantly upper to middle greenschist facies (Talbot 1995) as evinced by the rare occurrence of almandine and altered chloritoid porphyroblasts in Fe-rich metasedimentary rocks. Despite moderate metamorphic conditions and large-scale folding in the Central Domain, individual metasedimentary units preserve primary sedimentary structures (Figure 3.2B, C, E, F). According to Jensen (1989), the emplacement of late potassium-rich granitoid rocks south of the HSGB is responsible for local potassic alteration. Perthite-phyric dikes extend northward and may have contributed to the potassic alteration of the supracrustal rocks along dikes and fractures. Carbonate metasomatism occurs close to the boundary between the Calc-alkaline Domain and the Central Domain. Jensen (1989) suggests that carbonatization was introduced during late faulting and shearing, based on the spatial association with strongly sheared and chloritized rocks. Sulphides (predominantly pyrite) are present in the belt and are associated with quartz veining in the Central Domain. Kelly *et al.* (2014) reported evidence of fluid activity within the HSGB at *ca.* 2960–2940 Ma and 2860 Ma as demonstrated by rims on *ca.* 3000 Ma detrital zircon grains. The North Caribou greenstone belt, which likely represents a dismembered, lateral extension of the same volcanic terrane as the HSGB, has been the subject of extensive exploration and scientific inquiry. The disparity in the exploration history between

the belts is largely due to the presence of the world class Musselwhite gold deposit. Of interest to this study, Kelly *et al.* (2017) and Van Lankvelt *et al.* (2016) document the presence of hydrothermal activity in the NCGB coincident with magmatism and metamorphism.

3.3 Sample strategy and petrographic observations

Rocks along the contact between the quartz-feldspar porphyry dikes and the folded metasedimentary assemblage of the Central Domain were sampled in an attempt to validate the hypothesis that zircon depth profiling is an appropriate technique to assess the geochemical nature of recrystallized zircon rims as a product of contact metamorphism and corresponding metasomatism.

Four samples (HSGB-08, -09, -11, -13) were collected from the quartz-feldspar porphyries (Figure 3.2D, E). The intrusions are light gray in colour. Feldspar and quartz phenocrysts increase in size away from the contacts towards the interior of the intrusion where they are commonly >10 mm. The fine-grained groundmass is siliceous and contains up to 20% biotite and sericite. The dikes are typically east-northeast trending crosscutting the stratigraphy in the regional antiform. Pyrite is present where the porphyry intrudes basalt. Metamorphism of the intrusions is recorded by the presence of garnet, sericite and pyrite (Talbot *et al.* 1996). Intrusions of this nature are of interest as they may have provided the heat and fluids required in the formation of micrometer-scale rims

Five metasedimentary samples (HSGB-5, -6, -7, -10, -12) were collected adjacent to the distinct, but irregular, contact with the porphyry (Figure 3.2E). The metasediments are buff to gray in colour and are finely-laminated subarkosic metasandstones that are interbedded with cm-wide darker pelitic beds. These rocks are fine to medium grained siliceous sediments,

compositionally dominated by feldspar and quartz with locally up to 30% lithic fragments (felsic volcanic material). Late sericite, chlorite, and biotite are present as up to 10% of the groundmass (Figure 3.3) with garnet observed locally (Jenson 1989). Accessory minerals include zircon, monazite and apatite. Quartz shows sub-grain development and rotation. Delicate primary sedimentary structures (e.g. flame structure, thin laminations) are preserved within the sediments (Figure 3.2B) despite being regionally folded and cleaved (Figure 3.2C, F). These samples were selected as they likely represent a fluid altered, zircon-bearing rock adjacent to a fluid-fostering structure.

Zircon crystals were separated from the metasedimentary and intrusive rocks using standard crushing, density and magnetic methods. Zircon sampled range in size from 100 to 250 μm (long axis) by >30 μm (short axis). Grains collected from the metasediments vary from pink to brown and scanning electron microscopy conducted at the University of Ottawa reveals that the crystals are commonly characterized by bumpy, flakey, or corrosion features (Figure 3.4) and range from euhedral or prismatic to rounded, typical morphology for detrital samples. Grains from the intrusion are transparent, pale pink in colour and are typically prismatic. Unpolished detrital grains were mounted in indium with crystal faces parallel to the surface of the mount to optimize SIMS sputter geometry, following protocols outlined in Kelly *et al.* (2014, 2017). Grain mounts were mapped using SEM techniques before and after depth profile analyses to ensure that the analyzed volume was free of any fractures or inclusions/outgrowths (e.g. xenotime, quartz, and albite) as identified through X-ray spectroscopy. Zircon crystals, which were separated from the intrusion, were mounted in a standard epoxy mount prior to polishing.

3.4 Analytical methods

3.4.1 LA-ICP-MS U-Pb analysis

A Resonetics M-50 193 nm ArF Excimer laser ablation system coupled to an Agilent 7700x quadrupole ICP-MS system (University of New Brunswick, Canada) was utilized for the polished zircon U-Pb analyses, following the protocol of McFarlane and Luo (2012). Zircon from the metasediments were analyzed with the laser operated at a repetition rate of 3 Hz, spot size of 33 μm, and pulse energy of 1.9 J/cm^2. Each analysis consisted of a 30 s ablation followed by 30 s of background. Reference material FC-1 zircon (1099 ± 0.6 Ma; Paces and Miller 1993) and KVT zircon (3227 ± 1 Ma; Schoene *et al.* 2006) were analyzed under the same conditions as the unknowns and after each set of 25 unknowns. All data were reduced offline using a combination of Iolite v2.15 (Paton *et al.* 2011) and VizualAge v2011-08-29 (Petrus and Kamber 2012) running under Wavemetrics IgorPro v6.22™.

Igneous zircons from the porphyritic dikes were mounted in a standard epoxy puck and polished. Zircon were analyzed using a 19 μm spot size and a laser repetition rate of 4.5 Hz. The energy density for each analysis was ~3 J/cm^2 with a 30 s ablation time and 40 s of background. NIST612 (Jochum *et al.* 2011) was used as an internal standard and FC-1 (1099 ± 0.6 Ma; Paces and Miller 1993) and 91500 (1065 ± 3 Ma; Wiedenbeck *et al.* 1995) were used as external reference materials.

3.4.2 SIMS U-Pb depth profiling

SIMS U-Pb depth profiling analyses were collected using the CAMECA ims1270 ion microprobe at the National Ion Microprobe Facility (University of California-Los Angeles, USA) according to the methods outlined in Kelly *et al.* (2014, 2017). The U-Pb measurements were

made with a primary O- beam accelerated at a total impact energy of 12 kV. The analyses were conducted over ≤50 mass cycles resulting in ~30 μm diameter pits that are <5 μm in depth. Profilometry calculations indicate that the sputtering rate was ~100 nm/mass sweep, consistent with the depth resolutions previously proposed (Breeding *et al.* 2004; Kelly *et al.* 2014).

Zircon reference material AS3 (U-Pb: 1099 ± 1 Ma; Paces and Miller 1993) was used as the analytical reference material that was analyzed after every five unknowns under identical conditions. U-Pb ages were calculated from measured ion intensities using UCLA's in-house ZIPS v3.0.4 software written by C.D. Coath and Isoplot v4 software (Ludwig 2012); uncertainties of single data points are reported at 1σ. Zircon U-Pb depth profile ages are presented and interpreted using $^{207}Pb/^{206}Pb$ ages, a common practice for dates older than 1.0 Ga as the $^{207}Pb/^{206}Pb$ value provides an age that is independent of the uncertainties associated with Pb/U calibrations (Ireland and Williams 2003). Integrated $^{207}Pb/^{206}Pb$ ages are reported at 2σ uncertainties.

Results are plotted as a time (i.e. depth) resolved plot, which allowed the identification of consistently younger mass cycles as well as older mass cycles that had penetrated into the grain interior and therefore can be excluded from the rim age calculation. In order to maintain internal consistency in the identification of rim material, we used four criteria (cf. Kelly *et al.* 2017): (1) Rims are defined by three or more contiguous mass cycles, comprising ≥30% of the total cycles that are younger than the interior material, as resolved via SIMS U-Pb analyses on the zircon core following polishing. This does an effective job of removing mass cycles with anomalously young ages that commonly occur at the beginning of an analysis. (2) The probability of fit of the weighted mean of the rims is >5% and (3) the ages of the outermost two mass cycles for either side of the identified rim must not be significantly different (at 2σ) than the weighted mean rim

age (six or more cycles only). These latter two criteria, when considered together, systematically and consistently remove mass cycles that have sputtered through the mixed domain between the recrystallized rim and the primary interior (cf. Breeding *et al.* 2004). The result is an age that is likely much closer to a true age as well as promotes MSWD's that are very close to unity. (4) The last criterion for the rim calculation is that any mass cycles with a discordance of >15% were not included in the age calculation (cf. Cottle *et al.* 2009; 2012). In order to calculate the $^{207}Pb/^{206}Pb$ age for the rims of an entire rock sample, which comprises many single spot analyses, a weighted average of all mass cycles of the rim material was integrated.

3.4.3 LA-ICP-MS REE depth profiling

A Photon-Machines Analyte 193 nm ArF Excimer laser ablation system coupled to an Agilent 7700x quadrupole ICP-MS system (Geological Survey of Canada, Canada) was utilized for the collection of trace element data, according to the methods of Kelly *et al.* (2014, 2017). The analyses were performed at an energy density of ~6 J/cm^2 at a repetition rate of 3 Hz. A 17 μm spot was used for the analyses and penetrations went as deep as 20 μm at a drilling rate of ~300 nm/s. Analyzed elements included the following: Al, Si, P, Ti, Fe, Sr, Y, Zr, Sn, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Th and U. Calibration was performed using NIST 612 (Jochum *et al.* 2011; considering the low concentration of ^{31}P in NIST612, limited interpretations should be made from the ^{31}P data) and Si for internal standardisation (32.78 wt%). USGS basaltic glass reference material, BCR-2G (Jochum *et al.* 2005), was used as a secondary standard for quality control. Data were processed with LAMTRACE, a Lotus 1-2-3 macro-driven spreadsheet program (Jackson 2008). The first two seconds of ablation (~0.3–0.6 μm) were accompanied by REE, P, and Y concentrations in excess of several thousand ppm. These data

were rejected under the consideration that the laser was both stabilizing during this short time interval and that there may have been surface contamination or microscopic mineral inclusions (apatite, monazite or xenotime), as documented in other studies (Geisler *et al.* 2003a; Steely *et al.* 2014; Tomaschek *et al.* 2003). The LA-ICP-MS data were resolved into rim and interior values by plotting the element concentrations versus analytical time (depth), allowing for the identification and isolation of signal intervals for rim and core. Rims are distinguished from cores by the presence of either a positive or negative step function in the elemental concentrations or the Th/U ratio. The complete data are presented as chondrite normalized spider plots as opposed to time-resolved plots because it allows us to present all of the data in an organized summary as well as directly compare the trends of similar element types (i.e. HREE vs. LREE) from a single sample.

3.5 Results

3.5.1 Ages of the quartz-feldspar porphyry

Four samples (HSGB-08, -09, -11, -13) were collected from the quartz feldspar porphyritic intrusions adjacent to the sedimentary samples. Intrusions of this nature are of interest as they may have provided the heat and fluids required in the formation of micrometer-scale rims. The cores of between 18 and 27 grains were analyzed for each of the samples with complete results tabulated in the supplementary data (SI 3.2). Upper intercept U-Pb ages range from 2741 – 2717 Ma (Figure 3.5) and Th/U ranges from 0.19 – 2.73 with a median value of 0.73.

3.5.2 Zircon geochronology

Despite being the final analyses completed on the zircon grains collected from the metasediments, polishing of the mount reveals the earliest history of the grain. LA-ICP-MS U-Pb analyses were conducted on the cores of between 14 – 23 individual zircon from each sample. The $^{207}Pb/^{206}Pb$ ages of the zircon cores are between *ca.* 3137 – 2868 Ma. Probability density plots indicate that each rock sample has a notable population of zircon with $^{207}Pb/^{206}Pb$ core ages of *ca.* 3030 Ma and between *ca.* 3125 – 3080 Ma (SI 3.3; Figure 3.6). Th/U values for the cores range from 0.07 – 2.00 with a median value of 0.49.

SIMS U-Pb depth profiling analyses were conducted on five metasedimentary samples (HSGB-5, -6, -7, -10, -12); data are summarized in SI 3.2, the complete SIMS U-Pb isotopic data can be found in SI 3.4 and detailed descriptions are outlined in SI A3.1. Typically, more than 20 zircon crystals per sample were mounted for analysis. The shape of the depth profiles can range between grains but is typically characterized by the first several (<10) mass cycles having young $^{207}Pb/^{206}Pb$ ages (<3000 Ma) and then a gradual increase in the $^{207}Pb/^{206}Pb$ dates towards the grain interior, where a single, older (>3000 Ma) date is reproduced over many cycles (Figure 3.7). Occasionally SIMS U-Pb depth profile analyses do not excavate to sufficient depths to reveal the core age of the crystal, in these circumstances the age of the core is revealed via polishing.

The number of grains analyzed ranged from 8 – 18 per sample. Rims that are *ca.* 100 m.y. younger than equivalent interiors were observed in more than >60% of all analyses. These younger rims have thicknesses which range from 0.4 – 4.4 μm. The younger $^{207}Pb/^{206}Pb$ ages of the rims from individual crystals can vary by up to 150 m.y., but over the entire dataset $^{207}Pb/^{206}Pb$ ages are dominantly present within two age populations centered at *ca.* 2855 Ma and

2920 Ma (Figure 3.8). The Th/U ratios of these younger rims ranges from 0.029 – 1.284 with typical values closer to 0.25. Our dataset demonstrates that it is possible for zircon rims to record both the *ca.* 2855 Ma and 2920 Ma ages within a single sample. This scenario presents itself in samples HSGB-10 and HSGB-05 and is visualized using probability density diagrams (Figure 3.8).

3.5.3 Trace element composition of zircon

Below we discuss the results of the LA-ICP-MS REE depth profile analyses conducted on the same five metasedimentary samples (and grains) examined via SIMS U-Pb depth profile techniques (HSGB-5, -6, -7, -10, -12). We discuss all samples as a whole in this overview and a summary of data is presented in SI 3.3. The complete LA-ICP-MS REE data table can be found in the Supplementary Information SI 3.5. A total of 52 grains were analyzed via LA-ICP-MS REE depth profile technique. In order to maintain consistency in light of the irregularity in rim trace element behavior of these zircon, only analyses which exhibit a step function (positive or negative) in REE concentration or Th/U ratios were considered as a rim (Figure 3.9).

The zircon crystal interior data presented here are an integration of all data that do not represent a well-defined rim. The REE concentrations and chondrite normalized plots are highly variable, with only ~20% of grains exhibiting a typical magmatic zircon REE pattern (positive slope with positive Ce and negative Eu anomalies; Hoskin 2005). The majority of interiors have a flat REE trend with minimized elemental anomalies, when plotted on chondrite normalized spider plots, typical of LREE enriched zircon (cf. Hoskin 2005). Inconsistant REE concentrations is evidenced by La_N/Yb_N ratios which range from ~ 0.0001 to 1.8138 with a median of 0.0159. The Th/U ratio of the interiors are typically >0.35 and are reproduced with

depth during a single analyses suggesting that the zircon core has remained largely unmodified. Hafnium concentrations are most often <1.0 wt% regardless of REE trends (magmatic or LREE enriched).

Rims range in thickness from 2.3 to ~8.0 μm while the majority of rims are <6 μm. Rims identified using trace element chemistry are present in 22 of 52 analyses. Unlike the interiors, rims appear to be characterized by higher Hf concentrations (>1.1 wt%), which gradually decrease towards the interior. Th/U ratios of the rims are typically <0.2 and are consistently lower than the interior of the crystal. Unlike the Hf concentrations, the variation in the Th/U often occurs as a step function in time resolved plots (Figure 3.9). REE trends of rims appear to be largely inconsistent across in data with many grains having higher LREE concentrations (higher La_N/Yb_N values) than the interior and shallow chondrite normalized spider plots. Other grains have lower LREE concentrations (lower La_N/Yb_N) than crystal interiors and positive chondrite normalized spider plots. The broad range of LREE concentrations, in both the cores and the rims, is evinced in Figure 3.10, which clearly illustrates the overlap in the chondrite normalized REE trends.

3.6 Discussion

3.6.1 U-Pb geochronology and trace element composition of zircon cores

The U-Pb ages of zircon interiors (Figure 3.6) as resolved via LA-ICP-MS analysis of polished zircon cores are interpreted as detrital because zircon grains were sampled from metasediments and the morphology of the crystals is strongly indicative transport. Specifically within our data, there are two dominant $^{207}Pb/^{206}Pb$ age populations at *ca.* 3100 Ma and *ca.* 3025 Ma.

Th/U values of >0.2 typically reflect primary igneous processes but can be seen in metamorphic rocks where the Th/U system was not modified (Moeller *et al.* 2003). As expected, average Th/U values for zircon cores in this study are typically >0.35. The high Th/U ratio, combined with the proposed ages of surrounding batholiths (<3000 Ma; Percival *et al.* 2006) suggest that the *ca.* 3100–3025 Ma $^{207}Pb/^{206}Pb$ ages in the cores of the grains represent primary igneous crystallization.

Typical igneous zircon chondrite-normalised REE patterns are characterized by a steep positive slope, positive Ce and negative Eu anomalies (Hoskin 2005). This pattern is the consequence of the exclusion of LREEs from the crystal structure during crystallization because of their large ionic radii (Hanchar and van Westrenen 2007). Only a minority of zircon interiors examined in our study were characterized by a typical igneous zircon REE pattern, the remaining interiors were LREE enriched (flat chondrite normalized trend). This inconsistency is observed in several other studies (Hoskin 2005; Kelly *et al.* 2017; Marsh and Stockli 2015; Skipton *et al.* 2016). Chapman *et al.* (2016) summarize numerous mechanisms that may result in LREE-enriched parent zircon, including a LREE enriched source melt (Hoskin *et al.* 2000), complex substitutions (Hoskin and Schaltegger 2003) and sampling of micro-inclusions during analysis (Hanchar and van Westrenen 2007). Any combination of these phenomena may be responsible for the generation of zircon material that deviates from the expected REE pattern (cf. Marsh and Stockli 2015).

3.6.2 U-Pb geochronology and trace element analysis of zircon rims

The SIMS U-Pb depth profile technique was able to resolve the $^{207}Pb/^{206}Pb$ ages of micrometer thin rims. The thickness of the rims is smaller than the analytical capabilities of

conventional SIMS or LA-ICP-MS analyses on polished mounts. Rims are characterized by a $^{207}Pb/^{206}Pb$ age that is *ca.* 100 m.y. younger than the material at deeper depths within the crystal. Two distinct age populations occur within the rims as resolved via SIMS U-Pb depth profiles: (1) <2.5 μm-thin rims with Th/U values typically ~0.18 and a $^{207}Pb/^{206}Pb$ age of *ca.* 2977–2915 Ma with the weighted average $^{207}Pb/^{206}Pb$ age of *ca.* 2920 Ma. These rims occur in ~45% of all analyses and account for ~65% of all rims. (2) <4 μm-thin rims with Th/U values typically ~0.28 and $^{207}Pb/^{206}Pb$ ages are between *ca.* 2809–2886 Ma with the weighted average $^{207}Pb/^{206}Pb$ age of *ca.* 2860 Ma. These rims occur in ~25% of all analyses and account for ~35% of all rims.

The Th/U signature may be used to assess the likely processes that were active during rim formation. Conventional interpretation of Th/U values of <0.2 indicates that neo- or recrystallized zircon formed under metamorphic or hydrothermal conditions in the presence of a crystallizing Th-bearing phase (i.e. monazite, apatite; Harley *et al.* 2007; Moeller *et al.* 2003; Rubatto *et al.* 2009) or by the preferential purging of the larger Th ion (relative to U) during zircon recrystallization (Hoskin and Black 2000). The Th/U values of the rims are typically <0.20 and are almost always lower than the adjacent cores. The $^{207}Pb/^{206}Pb$ ages and Th/U values of zircon rims suggest that they formed through subsequent tectonothermal activity and are not representative of an igneous overgrowth, which is consistent with the findings of Kelly *et al.* (2014, 2017) for this part of the Superior Province.

Zircon rims, identified by a positive or negative step function in the LA-ICP-MS REE depth profiles, are markedly different from the interior of the grains: low Th/U (<0.2), elevated Hf (>1.1 wt%), and variable REE composition when compared to material at greater depth within the crystal. The chemical modification of zircon, a mineral known to withstand extreme geological conditions (Ewing 1999), can be explained by the crystal having synchronously

undergone ion-exchange processes as well as coupled dissolution-reprecipitation (Hoskin 2005). Both processes are fostered by the presence of porosity and/or permeability at the crystal structure scale (Geisler *et al.* 2007). Porosity and permeability can be promoted by crystal fracturing that occurs as a result of tectonic strain or sedimentary transport, as well as crystal damage caused by radioactive decay (Breeding *et al.* 2004; Geisler *et al.* 2002; Geisler *et al.* 2007; Hay and Dempster 2009; Hay *et al.* 2010; Rasmussen 2005). Zircon which forms as the result of a low-temperature ion-exchange between a fluid, often undergoes REE enrichment and the inclusion of non-formula cations (Ca, Ba, Al, Fe, Mn; Geisler *et al.* 2007; Geisler *et al.* 2003a; Hoskin 2005; Hoskin and Black 2000; Kirkland *et al.* 2009; Krogh and Davis 1975; Romano *et al.* 2004; Rayner *et al.* 2005). Conversely zircon, which has undergone coupled dissolution-reprecipitation, may have a near endmember composition relative to the original zircon prior to modification, and may be characterized by lower trace element concentrations as well as the removal of *Pb (Tomaschek *et al.* 2003) in addition to the presence of micro-pores and/or inclusions (Geisler *et al.* 2007). Alternatively, a less favourable explanation for the observations of our REE data is that the elevated REE in the rim material are sourced entirely from within the crystal interior through diffusion. The REE enrichments observed in the rims, however, have no clear complementary depletion in the interior, suggesting that the REEs are not exclusively sourced from the zircon crystals themselves. The apparent irregular REE trends between grains suggests that recrystallization did not occur in a homogenous REE reservoir; further, the possibility that ion-exchange and coupled dissolution-reprecipitation can occur simultaneously within this reservoir further convolutes the interpretations which can be derived from the REE data. Our results demonstrate that specific trace element trends show no apparent

relationship with rim ages. However, the results are useful for distinguishing between primary zircon cores and recrystallized rims.

Elevated Hf in the rims of recrystallized zircon is observed by other studies (Kelly *et al.* 2017; Marsh and Stockli 2015; Skipton *et al.* 2015). Similarly, in this study, Hf was always elevated in the outer margins of the crystal. Unlike the trends observed in the REE data, Hf enrichment does not often occur as a step-function. Instead Hf is present at concentrations >1.1 wt% at the crystal margins, gradually rising from lower interior values (<1.0 wt%). A gradual increase in the Hf concentration towards the crystal margin is seen in all samples, regardless of the presence of a rim. This suggests that Hf was not significantly mobile during recrystallization.

3.6.3 Tectonic history

3.6.3.1 Pre-3000 Ma

Throughout the northern NCS there is a notable absence of plutonic rocks preserving a crystallization age >3000 Ma (Biczok *et al.* 2012; Van Lankvelt *et al.* 2016), however Sm-Nd isotopic studies of TTGs surrounding the HSGB indicate the recycling of *ca.* >3000 Ma sources (Biczok *et al.* 2012; Stevenson *et al.* 2009; Wyman *et al.* 2011) which is supported by minor amounts of inherited zircon in the *ca.* 3132 Ma North Caribou Batholith. These, now recycled, TTGs represent the likely provenance for the zircon cores as the source of the detritus carrying the zircon grains into the sedimentary basins of the HSGB. Interestingly, core ages in excess of 3000 Ma are rarely reported in the metasediments of the adjacent NCGB (Duff 2014; Kelly *et al.* 2015, 2017; Van Lankvelt *et al.* 2016). This suggests that despite the spatial proximity of the two belts that the detritus of the HSGB originates from an older, separate source that eluded the sedimentary basins of the NCGB, or that the HSGB is a deeper exposure of the same basin.

3.6.3.2 2970–2920 Ma

The ages of zircon rims reported in this study are commonly between *ca.* 2970–2918 Ma which corresponds with emplacement of TTGs as evinced by the Weagamow batholith and zircon cores in the metasediments of the NCGB (Biczok *et al.* 2012; Duff 2014; Kelly *et al.* 2017; Van Lankvelt *et al.* 2016). Van Lankvelt *et al.* (2016) documented inherited zircon in *ca.* 2860 Ma TTGs (described below) suggesting a history of recycling. Volcanism and sedimentation at this time is preserved in the NCS as the Balmer assemblage in the Red Lake belt (Corfu and Wallace 1986) and the Agutua Arm assemblage (de Kemp 1987) and South Rim units (Davis and Stott 2001) in the NCGB. The lack of detrital zircon grains in the HSGB with these age signatures may mean that all available accommodation space was full in the HSGB basins at *ca.* 3000 Ma, and younger sediment sources were redirected to the NCGB. Evidence of separate sedimentary basins at this time is proposed by Davis and Stott (2001) who present maximum deposition ages which differ by 130 m.y. despite initially appearing to be continuous (Breaks *et al.* 1987). Given the limited sample size, it is likely that only the dominant detrital populations are represented in our data set and the regional implications should be tentative. The presence of zircon rims dated at *ca.* 2970–2918 Ma is indicative that magmatism at this time was accompanied by fluid infiltration throughout the Central Domain of HSGB.

3.6.3.3 2860–2850 Ma

The northern NCS records a complex tectonomagmatic history from *ca.* 2890 to 2830 Ma as the proto continent (NCS) underwent final accretion and cratonization (Biczok *et al.* 2012; Thurston *et al.* 1991). The emplacement of orogenic granitoids resulted in significant crustal

growth (Biczok *et al.* 2012), specifically through the emplacement of the sizeable North Caribou pluton and the Shade Lake gneissic complex (de Kemp 1987; Stott and Biczok 2010; Van Lankvelt 2013). This orogeny is responsible for much of the deformation within the northern NCS (Thurston *et al.*, 1991). The rocks formed during this interval are chemically similar to the older TTGs with compositions between tonalite to granodiorite. Detrital zircon crystals of this age are abundant in the metasediments of the NCGB (Duff 2014; Kelly *et al.* 2017) however are not present in the samples collected in the HSGB. A population of zircon in this study contains rims with $^{207}Pb/^{206}Pb$ ages that are between *ca.* 2861–2852 Ma as determined via SIMS U-Pb depth profiles. These rims indicate that the collision and crustal thickening experienced by the NCS was accompanied by an influx of metasomatic fluids.

3.6.3.4 2740–2715 Ma

Igneous activity in the NCGB and HSGB at this time appears to be limited to the intrusion of TTGs in the Libert Lake area of the NCGB (Biczok *et al.* 2012) as well as the meter scale quartz feldspar porphyritic intrusions of the HSGB. All metasedimentary samples from the HSGB were collected along the contact of *ca.* 2741–2715 Ma quartz feldspar porphyry. Of interest, zircon rims of this age are not exhibited in any of the samples. Evidence of protracted hydrothermal activity in the nearby NCGB is evinced by a potassic alteration event at *ca.* 2760–2680 Ma in the granites surrounding the belt, as resolved from U-Pb zircon and titanite analyses (Van Lankvelt *et al.* 2016). Kelly *et al.* (2017) and Kelly and Schneider (2015) have dated hydrothermal zircon rims with ages between *ca.* 2754 Ma and 2735 Ma. Biczok *et al.* (2012) suggest that gold mineralization at the Musselwhite mine may have occurred between *ca.* 2720 Ma and 2670 Ma, as determined by Sm-Nd analyses of hydrothermal garnets believed to be

coeval with mineralization. Regionally within the North Caribou Superterrane (Thurston *et al.* 1991), and coincident with the Uchian orogeny (Percival *et al.* 2006), the Berens River Intrusive event reset zircon and apatite U-Pb ages, resulting in *ca.* 2750 Ma to 2685 Ma ages (Corfu and Stone 1998). Gold mineralization elsewhere in the NCS occurs at *ca.* 2720–2690 Ma within the Red Lake camp (Corfu and Stone 1998; Dube *et al.* 2004) and between *ca.* 2730–2700 Ma at the Pickle Lake camp (Young *et al.* 2006). Ernst and Jowitt (2013) describe the widespread Bird River large igneous province at *ca.* 2735 Ma, which may have additionally acted as a driver for the hydrothermal fluid circulation.

The absence of rims corresponding to this intrusive event within the HSGB is perhaps the result of crystal annealing (i.e. reduction of surface area) as a consequence of the high temperature of the intrusion but prior to significant fluid infiltration. Alternatively, the intrusion may have been accompanied by minimal fluids such that mineral-fluid interaction was not significant enough to mediate isotopic resetting (Kelly *et al.* 2017).

3.6.3.5 Post-2700 Ma

The last major felsic magmatic episode of the NCGB occurs as pegmatitic to aplitic dykes at *ca.* 2620 Ma (Van Lankvelt *et al.* 2016). This age is consistent with the youngest ages revealed in zircon rims of this study as identified via SIMS U-Pb depth profiles (Figure 3.8)**.** Late cross-cutting pegmatites are found throughout the Superior Province and suggest widespread, volumetrically minor, post-orogenic crustal anataxis (Percival *et al.* 2006; Wyman *et al.* 2011).

3.7 Conclusions

SIMS and LA-ICP-MS depth profiles effectively identify micrometer-thick, chemically distinct domains in natural zircon by resolving U-Pb and REE changes with depth into unpolished crystals. Zircon sampled from metasedimentary rocks of the HSGB have zircon core ages greater than *ca.* 3000 Ma, Th/U values >0.35, and have variable REE trends. Rims are >150 m.y. younger than the cores and occur in two age populations (*ca.* 2970–2918 Ma and 2861–2852 Ma) with Th/U ratios that are often <0.20. Rim ages correspond to the timing of extensive magmatism and subsequent metasomatic fluid infiltration across the western Superior Province. The preferred mechanism for zircon rim development is a combination of diffusion-reaction processes and coupled dissolution-reprecipitation in the presence of a variably LREE enriched fluid. Perhaps most fascinating, despite widespread evidence of hydrothermal activity in the NCS between *ca.* 2740–2715 Ma, and the presence of intrusions at that time, there is no evidence of a zircon rim-forming event within the HSGB. The application of SIMS U-Pb and LA-ICP-MS REE depth profiles on zircon, when used in conjunction with detailed petrography and geological mapping, provide valuable insight into the tectonothermal history of the HSGB in the absence of other chronometers.

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Table 3.1: Summary of SIMS U-Pb data of zircon rims, HSGB, NW Ontario

	Age (Ma)				Thickness (μm)			Th/U			Probability of
	Minimum	Maximum	Average	Average *	minimum	maximum	median	minimum	maximum	median	rim occurrence
HSGB-05	2839	2981	2970 ± 6	2852 ± 15	0.9	1.9	1.6	0.029	1.284	0.336	0.71
HSGB-06	2809	2928	2861 ± 9		1.0	3.8	1.7	0.040	0.375	0.209	0.64
HSGB-07	2853	2956	2923 ± 16		0.4	1.5	0.9	0.149	0.562	0.278	0.75
HSGB-10	2645	2971	2918 ± 9	2645 ± 14	0.6	4.4	1.4	0.038	0.390	0.200	0.61
HSGB-12	2820	2974	2918 ± 9		0.6	2.6	1.8	0.077	0.721	0.211	0.69

*denotes a secondary population

Table 3.2: Summary of LA-ICP-MS REE data from zircon HSGB, NW Ontario

Sample		Rim occurance	Thickness (μm)			Th/U			Hf			La_N/Yb_N		
			Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max
HSGB-6	Rims	7/(10)	2.3	3.3	7.6	0.12	0.17	0.84	8218	10599	12877	0.0015	0.0873	0.5270
	Core					0.26	0.48	0.80	7055	8755	10386	0.0008	0.0947	1.8138
	No rim					0.30	0.41	0.52	7821	8890	10582	0.0131	0.0425	0.9380
HSGB-7	Rims	2/(8)	4.8	6.7	8.6	0.14	0.20	0.26	10565	10788	11011	0.0033	0.0304	0.0576
	Core					0.28	0.31	0.34	6900	8462	10024	0.0127	0.0148	0.0169
	No rim					0.28	0.35	0.60	8286	8903	9689	0.0035	0.0384	0.1628
HSGB-10	Rims	6/(14)	3.3	5.3	7.6	0.17	0.31	0.84	8831	10275	11007	0.0001	0.0065	0.0146
	Core					0.16	0.50	0.60	5594	8275	10376	0.0003	0.0074	0.2014
	No rim					0.23	0.38	0.62	4559	8329	10435	0.0000	0.0063	0.2311
HSGB-12	Rims	3/(8)	2.3	3.7	3.7	0.12	0.19	0.20	9480	11495	11821	0.0007	0.0432	0.1025
	Core					0.24	0.40	0.43	8584	9863	10271	0.0001	0.0715	0.1269
	No rim					0.30	0.40	0.60	7355	9012	11190	0.0079	0.0169	0.0456
HSGB-5	Rims	4/(12)	4.9	5.9	6.8	0.1	0.13	0.27	10858	11486	13458	0.0000	0.0089	0.0202
	Core					0.1	0.31	0.55	9099	9699	16224	0.0000	0.0068	0.0248
	No rim					0.23	0.39	0.73	6923	9844	11937	0.0003	0.0097	0.0255

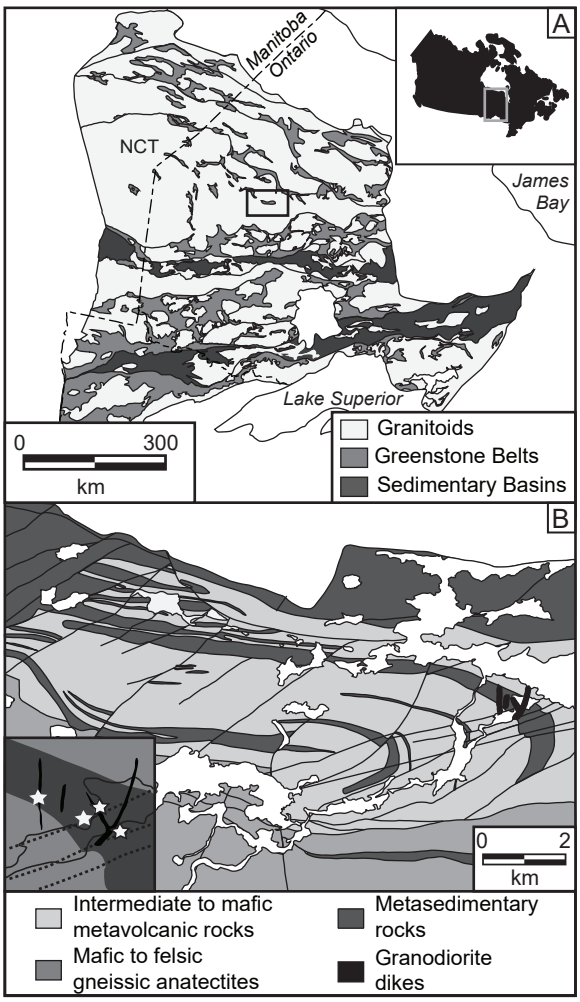

Figure 3.1: (A) Simplified geologic map of the Western Superior Province modified from Percival *et al.* (2006), with a map of Canada (inset). The box outlines the location of the Horseshoe Lake Greenstone Belt. NCT: North Caribou Terrane (B) Geologic map of the Horseshoe Lake greenstone belt, modified from Jenson (1989). Intrusive rocks in the eastern section of the map area are proximal to the hinge zone and spatially related to known Au occurrences (Jenson 1989). Sample locations (white stars) are specified in the inset box, in proximity to quartz feldspar porphyry dikes.

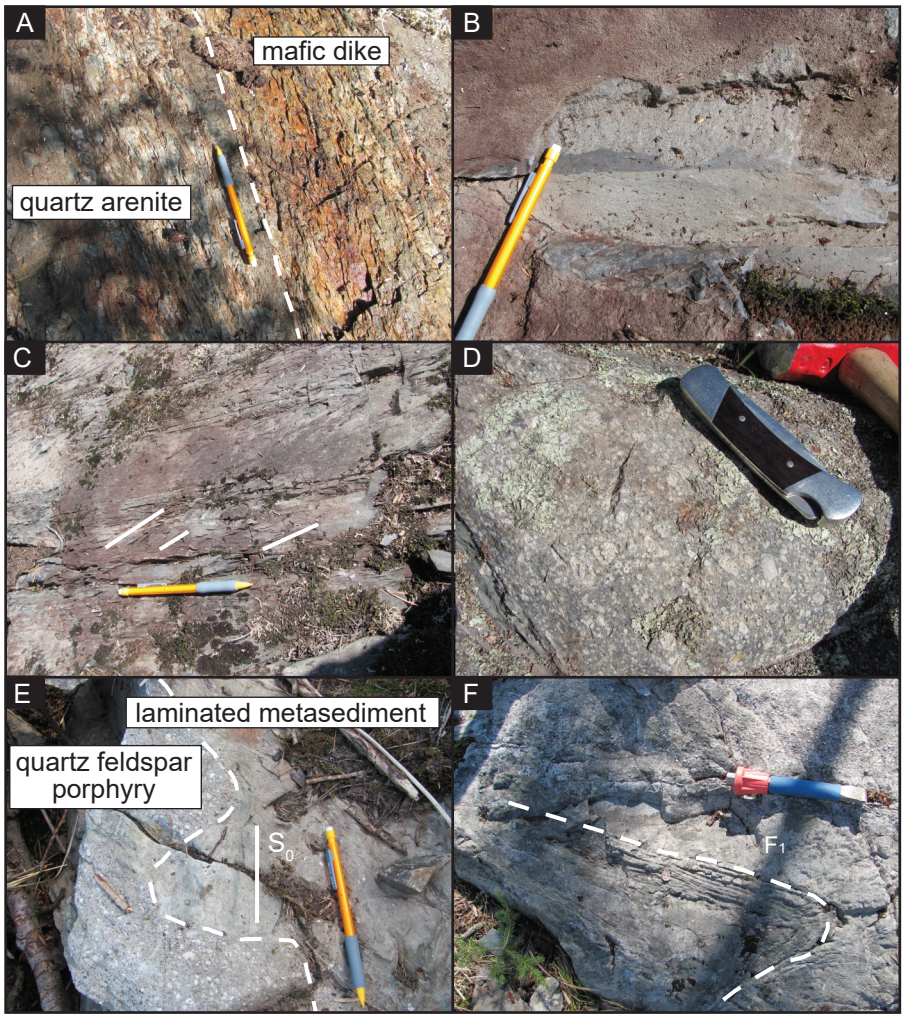

Figure 3.2: Field photographs from the sample locations; all photos are plan view. (A) Meta-subarkose (HSGB-05) adjacent to a cross-cutting altered mafic dike. The host rock is locally sheared at the mafic dike contact, illustrated by the dashed white line. Pencil for scale. (B) Grey laminated metasandstone interbedded with darker siltstone beds (HSGB-06/07). Relict sedimentary structures are still visible. Pencil for scale. (C) Laminated metasandstone with cleavage (white lines) representing the direction of the axial plane of the regional anticline. Pencil for scale. (D) Cross-cutting porphyritic plagioclase-rich felsic dike (HSGB-08) adjacent to the laminated metasandstone. The plagioclase crystals range from 0.5 – 3 cm and are euhedral. Knife for scale (E) Porphyritic plagioclase-rich felsic dike (HSGB-11) cross-cutting the laminated metasandstone (HSGB-12). Primary bedding is still visible (S0) in the laminated metasandstone. Pencil for scale. (F) Primary folding (dashed line) of the laminated metasandstone (HSGB-12). Chisel for scale.

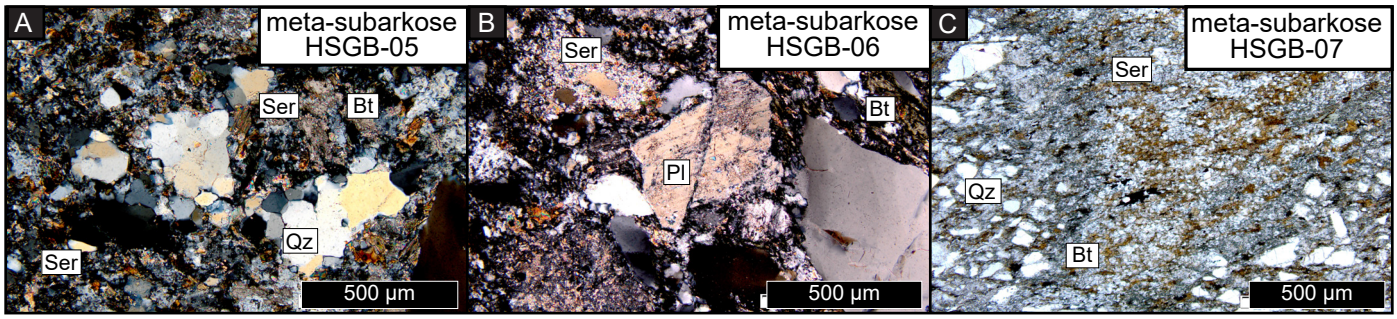

Figure 3.3: Representative photomicrographs of the sampled metasediments. (A) Cross polarized image of HSGB-05. Sample is dominated by quartz which has undergone grain boundary migration and sub grain development. Much of the feldspar has undergone sericitization and biotite is abundant in the matrix. (B) Cross polarized image of HSGB-06. Quartz has minimal deformation, however displays undulose extinction. Sericite and biotite are abundant. (C) Plain polarized image of HSGB-07. Quartz is sub-rounded and the groundmass is dominated by biotite and sericite.

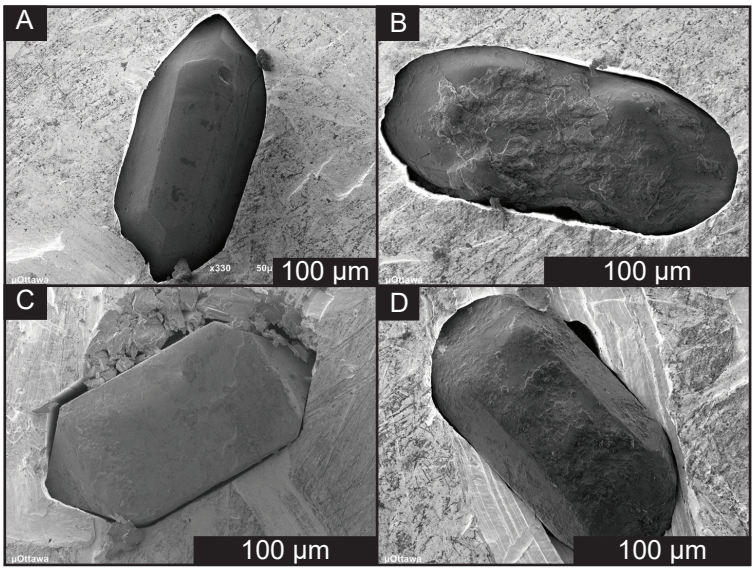

Figure 3.4: Representative SEM images of unpolished zircon. Grains (A) and (C) demonstrate a general absence of irregular surface textures whereas grains (B) and (D) preserve a "flakey" zircon crust.

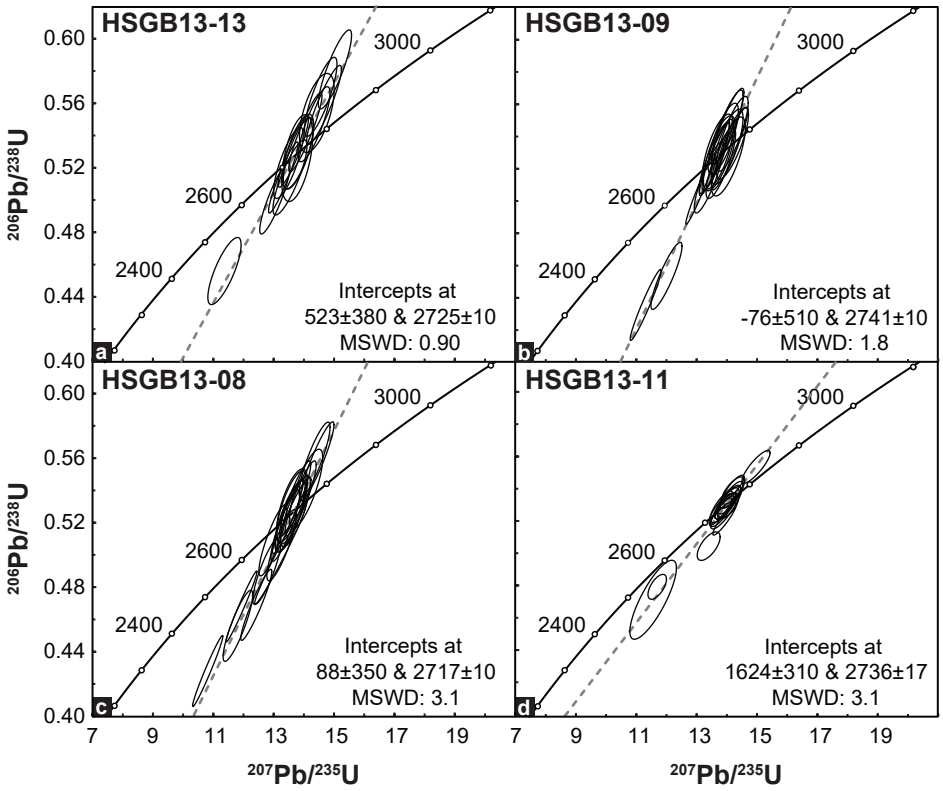

Figure 3.5: Zircon U-Pb Concordia diagram for quartz feldspar porphyry intrusive dikes. All samples are relatively concordant with a few analyses showing evidence of Pb loss. Error ellipses are 2σ. Regressed ages are interpreted to represent crystallization of the intrusion and yield a mean age of ca. 2730 Ma.

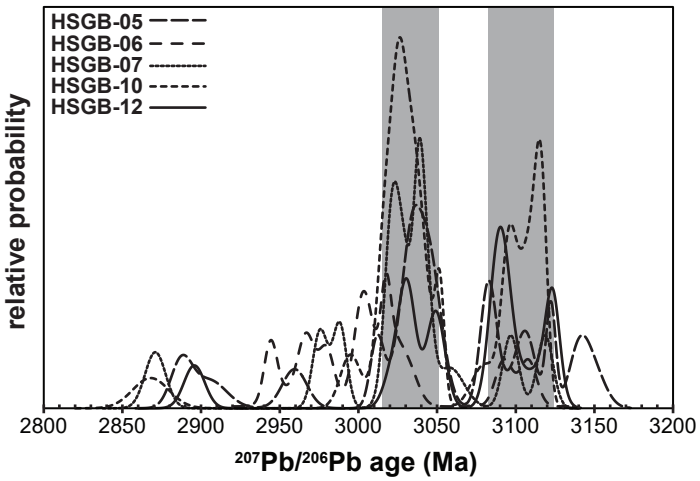

Figure 3.6: Probability density diagrams of the zircon core ages. Two clear dominant ages at ca. 3125 – 3080 Ma and ca. 3050 – 3015 Ma.

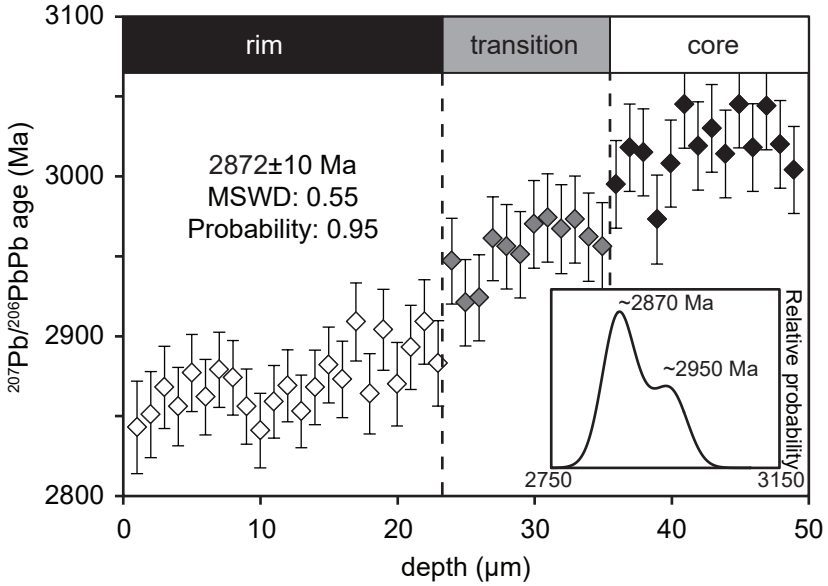

Figure 3.7: Representative SIMS U-Pb depth profile from sample HSGB-12-9, illustrating the age-depth relationship. Each diamond corresponds to a single mass cycle. Black diamonds have an age that represents the core age of the grain, which is ca. 3030 Ma as determined subsequent to polishing the mount. The white diamonds meet the criteria outlined in the text for defining a zircon rim age (weighted average age reported). The grey diamonds are interpreted as a mixing zone between the two end-members. A probability density plot of the data is also shown, which does not capture the core age resolved with the zircon interior analyses.

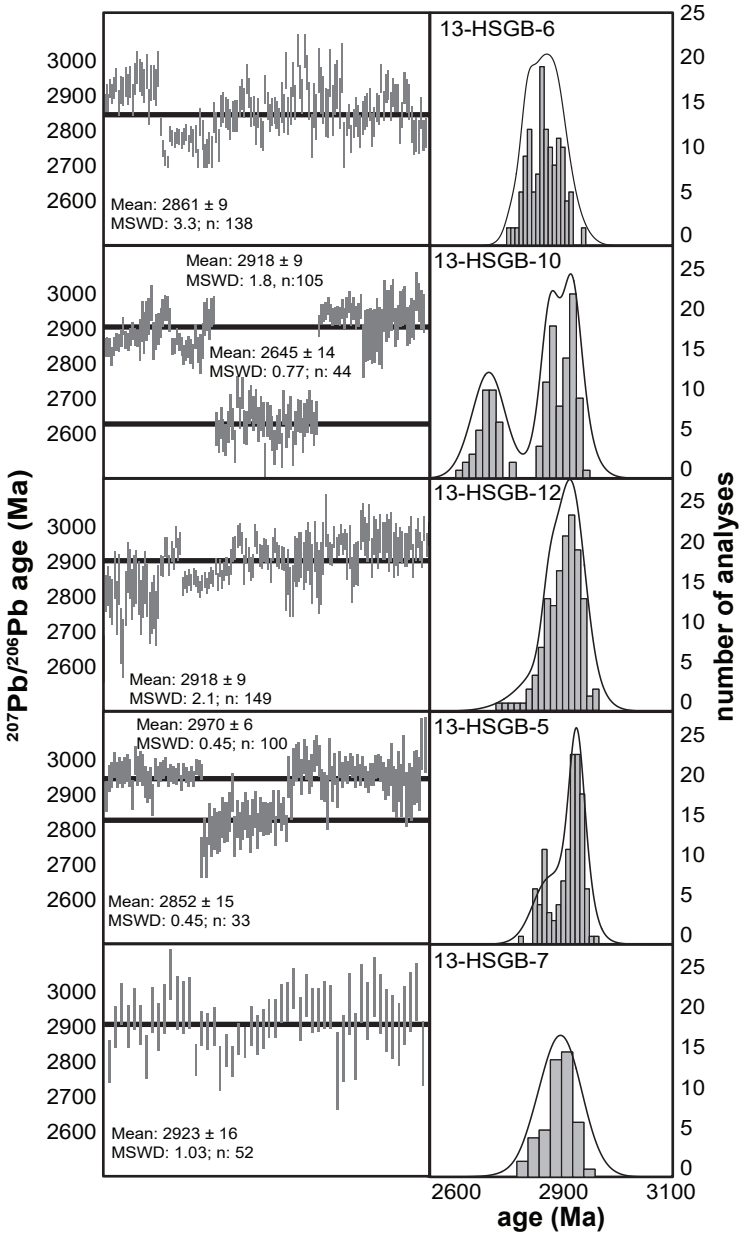

Figure 3.8: Weighted mean averages of $^{207}Pb/^{206}Pb$ ages from zircon analyzed using the U-Pb depth profile technique. Vertical gray bars represent single mass cycles which have been identified as rim material using the criteria described in the text; length of bar is 1 σ uncertainties. Rim ages are reported with uncertainties of 2σ and are presented as horizontal black bars. Probability density diagrams plot of all mass cycles identified as rim material from each sample. At least two separate generations of younger rims appear to be present in the population, occasionally within a single sample (e.g. HSGB-05 and -10).

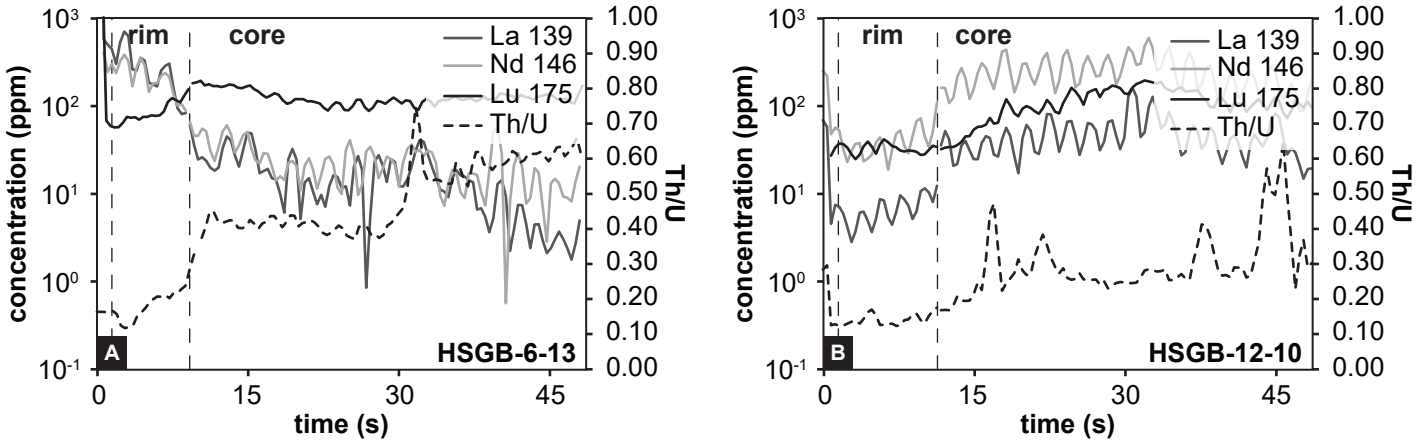

Figure 3.9: Alternative solution for the presentation of REE data as collected via LA-ICP-MS REE depth profiling for a single grain analysis. Time resolved plots effectively demonstrate the variation in specified REE concentrations with depth into the crystal. In these examples the first two seconds of analytical time (which was excluded from concentration calculations) is noted by the left most vertical dashed line. Rims are labelled as the space between dashed lines, for which all data over the interval was averaged as a representative of the REE geochemistry of rim material. The time intervals identified as rims were isolated using a notable step function in the concentration of the elements observed in the figure in addition to other non-formula elements and elemental ratios. Core concentrations were calculated by averaging the data following the rim.

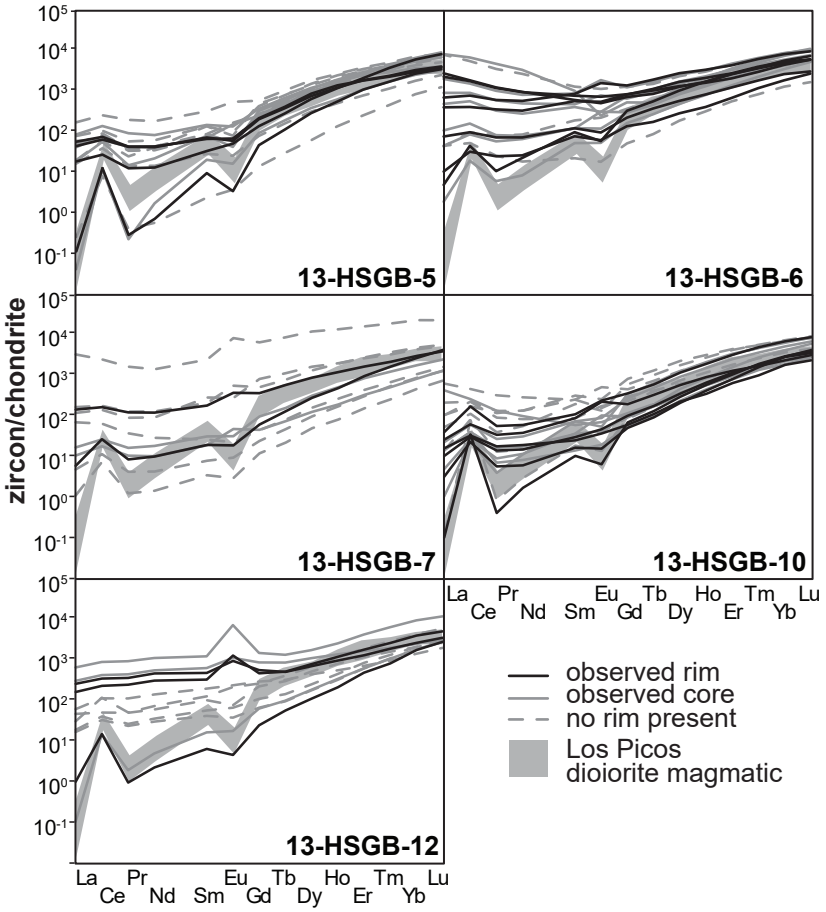

Figure 3.10: LA-ICP-MS REE spider diagrams plots for zircon from the HSGB as collected via depth profile. Data has been normalized to chondrite using the values of Sun and McDonough (1989). Gray shaded region represents a typical igneous zircon REE trend as typified by the Los Picos diorite (Ballard *et al*. 2000; cf. Hoskin 2005). Zircon interior (gray lines) and rim (black lines) were identified and separated based on concentration versus time plots (**Figure 3.6**). Dashed gray lines represent spot analyses in which no rim was identified.

Chapter 4

Insights into low- to moderate-temperature recrystallization of zircon: unpolished crystal depth profile techniques and geochemical mapping

C.J. Kelly[1], D.A. Schneider[1], S.E. Jackson[2], T. Kalbfleisch[1] & C.R. McFarlane[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON, K1N 6N5 Canada
[2]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada
[3]Department of Earth Sciences, University of New Brunswick, Fredericton, NB, E3B 5A3 Canada

Abstract

Depth profiling techniques for U-Pb geochronology and REE geochemistry were applied to unpolished, metasomatized Archean zircon from metasedimentary rock samples within the North Caribou greenstone belt, Western Superior Province, Canada. Samples were selected in order to investigate the isotopic and chemical effects of fluid interaction on zircon at temperatures between 300–700°C. Zircon rims are <5 μm thick and have $^{207}Pb/^{206}Pb$ ages between *ca.* 2788–2667 Ma, with two-thirds of rim ages ranging between 2754–2735 Ma, which is >100 Myr younger than primary crystallization (interior) ages. These dates correspond to regional tectonothermal episodes including potassic alteration, suggesting that metamorphism and regional hydrothermal fluid flow were synchronous. Similarly, REE geochemical analyses on the outer margins of the same unpolished zircon reveal that rims are characterized by variable LREE concentrations, high Hf, and low Th/U ratios, indicating that elements were mobile during fluid-zircon interaction. Unpolished zircon crystal faces were also mapped with a LA-ICP-MS technique to expose their 2-dimensional trace element variability. The patterns reveal a dendritic network or a patchy mosaic form, which is perhaps promoted by the presence of fractures, adjacent mineralogy or variations in the crystallinity of the zircon. The integration of these microanalytical techniques into the study of zircon can provide insight into the timing of low- to moderate-temperature history of rocks that do not contain other common chronometers but have witnessed significant tectonothermal events.

4.1 Introduction

Despite the presence of world-class gold deposits in the Superior Province of Canada, there is a knowledge gap with respect to the timing and duration of tectonothermal events and metallogenesis in many Archean greenstone belts. One of the main factors contributing to this is a paucity of geochronometers present in the rocks of these settings. To this end, a number of studies have reported success in the utilization of zircon to resolve the timing of crustal fluid-flow and water-rock interaction (Breeding *et al.* 2004; Cottle *et al.* 2009; Geisler *et al.* 2003a,b; Geisler *et al.* 2007; Gysi and William-Jones 2013; Harlov and Dunkley 2010; Kelly *et al.* 2014; Putnis 2009; Schneider *et al.* 2011, 2012).

Sometimes referred to as hydrothermal zircon, this is an ambiguous term that is generally applied to a zircon phase crystallized from, or altered by, an aqueous solution (Hoskin 2005). In this contribution, we focus on two zircon-forming mechanisms: dissolution-reprecipitation and ion-exchange (cf. Geisler et al 2007). A third mechanism is the direct crystallization from a Zr-saturated fluid; however, this will not be discussed in the context of our investigation. We are interested in how these systems modify the primary chemical and isotopic signature of the zircon, growing new zircon material at the expense of pre-existing crystalline zircon in a process generally referred to as recrystallization (cf. Geisler *et al.* 2007). Although there is an increased understanding of zircon recrystallization through advances in experimental mineralogy (Geisler *et al.* 2001b, 2002; Pidgeon *et al.* 1966, 1973, 1995; Rizvanova *et al.* 2000; Sinha *et al.* 1992) and in analytical techniques (Breeding *et al.* 2004; Carson *et al.* 2002; Cottle *et al.* 2009, 2012; Eggins *et al.* 2003; Grove and Harrison 1999; Kelly *et al.* 2014; Margetic *et al.* 2001; Mason and Mank 2001; Mojzsis and Harrison 2002; Steely *et al.* 2014; Viete *et al.* 2015; Woodhead *et al.* 2004), disproportionately few studies have attempted to identify the effect of zircon

recrystallization of non-metamict natural zircon at temperatures <400°C. The North Caribou greenstone belt (NCGB), which hosts the 5 Moz Musselwhite gold deposit, has been selected as the natural laboratory for this study since it allows for the application of the zircon depth profile technique to resolve the geochronology and geochemical evolution of a Neoarchean supracrustal belt with notable gold endowment (Figure 4.1). Rocks targeted for our study cover a temperature spectrum from lower greenschist facies to middle amphibolite facies conditions.

By combining secondary ion mass spectrometry (SIMS) U-Pb geochronological and laser ablation inductively coupled mass spectrometry (LA-ICP-MS) rare Earth element (REE) geochemical depth profile techniques with LA-ICP-MS 2-dimensional trace element mapping of unpolished zircon grains, we hope to gain a detailed understanding of zircon recrystallization and to resolve the timing and source of fluid flow in the absence of other suitable geochronometers. Our preliminary imaging and *in situ* U-Pb geochronology confirmed the presence of micrometer thin rims, but this approach was unable to successfully date the material due to lateral analytical spot size limitations. Moreover, several studies (e.g. Breeding *et al.* 2004; Geisler *et al.* 2007; Kelly *et al.* 2014; Schneider *et al.* 2011, 2012) note a heterogeneous nature in both the thickness and distribution of recrystallized zircon rim material, particularly when the mineral phase has witnessed low-temperature (300-400°C) alteration. Applying the depth profile approach on unpolished crystals may be an analytical solution. SIMS depth profiling has a sputtering rate of ~0.075 μm per mass sweep (Breeding *et al.* 2004; Kelly *et al.* 2014) and LA-ICP-MS depth profiling has a drilling rate of ~0.05 μm per pulse (Cottle *et al.* 2009; Kelly *et al.* 2014; Steely *et al.* 2014; Tollstrup *et al.* 2012), consequently, both techniques allow micrometer-scale analysis of rim material. In addition, we have mapped the trace element distribution of the unpolished

surface of zircon to better understand the spatial distribution across the crystal surface as well as the driving forces behind the processes of recrystallization.

4.2 Geologic setting

The NCGB lies within the *ca.* 3.0 Ga North Caribou Superterrane (NCS; Percival *et al.* 2006; Thurston *et al.* 1991) of the Western Superior Province of Canada, the nucleus of the province to which all other terranes were accreted through the Archean (Figure 4.1; Thurston *et al.* 1991). The NCGB is a doubly arcuate "z-shaped" supracrustal belt characterized by metasediments, which range from conglomerates to mudstones, and volcanic sequences dominated by pillow basalts and locally containing rhyolitic horizons. The NCGB possesses a series of near-vertical shear zones that follow its northern and eastern margins in proximity to the suture zone that demarcates the accretion of the Island Lake Domain (ILD) during tectonic assembly of the NCS (Gagnon *et al.* 2016; Percival *et al.* 2006; Thurston *et al.* 1991). Shear zones are likely subject to reactivation during subsequent tectonism, which then can act as advective pathways for crustally-derived fluids (Newton 1990; Selverstone *et al.* 1991). Field evidence for the presence of these fluids includes quartz flooding, sericitization, chloritization, gossanous outcrop and void filling sulphides. The history of the belt is punctuated by three significant tectonomagmatic episodes at >2950 Ma, 2870–2850 Ma and 2730–2710 Ma (Biczok *et al.* 2012; McNicoll *et al.* 2015; Van Lankvelt *et al.* 2016), fostering a protracted history of deformation, metamorphism and metasomatism.

A striking feature of the belt is the relatively high metamorphic grade for a greenstone belt of the Superior Province, as well as for Archean gold deposits. Metamorphic grade within the belt ranges from lower greenschist facies (chlorite zone) to upper amphibolite facies

(staurolite-sillimanite zone) with a notable increase in metamorphic grade from the southern margin to the north, as well as increasing towards the east. The metamorphic signature of the belt it also characterized by the nodal occurrence of high-temperature assemblages such as andalusite-cordierite (Breaks *et al.* 2001, Kelly *et al.* 2015; Figure 4.1), which can be correlated to local intrusions and aeromagnetic anomalies. The Musselwhite deposit is notably in amphibolite facies rocks (540–600°C; Otto 2002), characterized by garnet- and amphibole-rich assemblages. A fluid event is evinced by elevated potassium content in the whole rock geochemistry, extensive potassium feldspar overgrowths on plagioclase, and compositional zoning in titanite and amphiboles in the granitoids surrounding the belt (Van Lankvelt *et al.* 2016). Zircons in the country rock possess altered domains denoted by cathodoluminescence (CL)-bright resorption shadows with distinct chemical changes, including lower Th/U values and elevated LREE concentrations. Linking zircon structure and geochemistry with U-Pb geochronology, Van Lankvelt *et al.* (2016) conducted LA-ICP-MS analyses on the zircon rims to resolve ages of *ca.* 2760–2680 Ma on the recrystallized phase, coeval with titanite U-Pb ages in the granitoids and more notably as much as 200 Myr younger than the zircon core ages. Zircon HREE concentrations in the core and the altered rim are similar, however the LREE concentrations are highly variable with LREE enrichment often preserved in the altered rims. Biczok *et al.* (2012) attempted to resolve the timing of mineralization at the deposit through Sm-Nd geochronology of hydrothermal garnets believed to be coeval with mineralization; results indicate that gold mineralization at Musselwhite may have occurred between 2720–2670 Ma. The regional potassic alteration and local hydrothermal garnet generation broadly overlap in time and space (Figure 4.2). Our study, in part, aims to refine the timing and duration of

tectonothermal events in the greenstone belt through the application of novel geochronologic approaches.

4.3 Sample strategy

We conducted preliminary *in situ* U-Pb zircon geochronology via LA-ICP-MS methods on metasedimentary samples in order to evaluate the potential success of SIMS U-Pb depth profiling in the North Caribou greenstone belt. Six samples from upper greenschist to middle amphibolite facies rocks were selected from shear zones across the belt (SI 4.2; Figure 4.1; sample descriptions are reported in the Supplementary Information (SI 4.1). These samples were specifically targeted because of their proximity to metamorphic nodes and fluid-fostering structures in an attempt to maximize the success of identifying zircon that has interacted with fluids. Since the abundance of zircon in any rock thin section was inadequate to achieve statistically reliable U-Pb ages, five to six thick sections of each sample containing zircon were cut at spaced intervals through the rock to improve the number of targets for geochronology. A JEOL 6610LV Scanning Electron Microscope (SEM; University of Ottawa, Canada) was used to map the locations of the zircon in the sections and to identify the internal structure of the mineral or rim overgrowths on the zircon. Ultra-thin zircon rims were noted but were far too thin for the ~24 μm lateral dimension of the laser ablation spot (Figure 4.3). The structural evidence for rim material across many samples was encouraging and promoted the sampling of additional metasedimentary rocks for zircon depth profile analyses.

Eleven metasedimentary rocks were additionally collected across the NCGB, two of which were previously sampled for preliminary *in situ* analyses, to provide a broader spatial sampling within the belt, distal to the Musselwhite deposit. Samples were collected adjacent to

structures which would likely facilitate fluid flow in the belt, identified using the mapped metamorphic mineral assemblages (Breaks *et al.* 2001; Kelly *et al.* 2013; Gagnon *et al.* 2016; Figure 4.1) as well as regional aeromagnetic anomalies, which likely reflect intrusions at depth. Metamorphic rocks that were sampled include siliciclastic sedimentary units ranging from mudstones to conglomerates with metamorphic grades of lower greenschist to upper amphibolite as well as high-temperature cordierite assemblages (Table 4.1). Structurally, many of these rocks contain well-developed foliation in addition to mm- to cm-scale porphyroblasts (Figure 4.4; described in further detail below). Zircons were separated from the rock using standard crushing, density and magnetic methods. Unpolished zircons were mounted in indium with crystal faces parallel to the surface of the mount to optimize SIMS sputter geometry, following protocols outlined in Kelly *et al.* (2014).

The zircon grains that were sampled are pink in colour and range in size from 100 μm to 250 μm (long axis) and are >30 μm (short axis). Binocular and SEM microscopy reveal that the outer surfaces of zircons are commonly characterized by bumpy, flakey, corrosion features, which resemble the hydrothermal etching as described by Breeding *et al.* (2004). Zircons are often sub-rounded to rounded; however, several grains have retained distinct crystal facets. This suggests that abrasion did not occur as a result of our mineral separation techniques but rather is the result of detritus transport. Indium mounts were mapped using SEM techniques before and after depth profile analyses to ensure that the analyzed volume was free of any fractures or inclusions/outgrowths (e.g. xenotime, quartz, albite) as identified through X-ray spectroscopy used in conjunction with the SEM. In our study, small daughter crystals of zircon were noted as outgrowths on larger zircon, as well as FeO-enriched spherical outgrowths (Figure 4.5A, B), which were avoided during isotopic analysis.

4.4 Analytical methods and data reduction

4.4.1 LA-ICP-MS in situ U-Pb geochronology

A Resonetics M-50 193 nm ArF Excimer laser ablation system coupled to an Agilent 7700x quadrupole ICP-MS system (University of New Brunswick, Canada) was utilized for the *in situ* U-Pb analyses, following the protocol of McFarlane and Luo (2012). Fifty to seventy single spot analyses were completed on each rock sample with the laser operated at a repetition rate of 4.5 Hz, spot size of 24 μm, and pulse energy of 4 J/cm^2. The spot size was reduced to 17 μm for a sample of protomylonitic tonalite (NCTK10-63) in order to better target potential cores and rims. Reference material 91500 zircon (U-Pb: 1065.4 ± 0.3 Ma; Wiedenbeck *et al.* 1995) was analyzed as a standard under the same conditions as the unknowns. All data were reduced offline using a combination of Iolite v2.15 (Paton *et al.* 2011) and VizualAge v2011-08-29 (Petrus and Kamber 2012) running under Wavemetrics IgorPro v6.22™. Iolite's U-Pb geochronology data reduction scheme (DRS, Paton *et al.* 2010) performs a down-hole Pb/U fractionation correction, followed by a drift correction, reference material normalization, and uncertainty propagation. Replicate analyses of 91500 reference standard produced $^{206}Pb/^{204}Pb$ values lower than the true value. This is interpreted to be the result of an unresolved excess of ^{204}Hg and is further compounded by the fact that $^{206}Pb^*$ is low in 91500. Using a 17 μm spot size greatly reduces the signal (cps) of $^{206}Pb^*$ to a couple hundred thousand cps. In addition to our background-subtraction, we used a cut-off of $^{206}Pb/^{204}Pb$ >350 to ensure that material is largely free of common-Pb.

A secondary reference standard, Temora zircon (U-Pb: 416.8 ± 1.1 Ma; Black *et al.* 2003), was routinely analyzed to test the internal accuracy of the method. The final corrected

data were plotted using Isoplot v4 (Ludwig 2012). Upper and lower intercept ages in the concordia diagrams are reported at 2σ uncertainty, and in most samples, a few analyses are excluded because they fall far from concordia or a main discordia line and are not sufficiently abundant to define a meaningful age. Only the results that were <30% discordant were considered. This is a moderate-to-generous cut off but de-emphasizes highly discordant grains, yet does not significantly bias the dataset (cf. Gehrels 2012).

4.4.2 SIMS U-Pb depth profile and conventional geochronology

SIMS U-Pb depth profiling analyses were collected using the Cameca ims1270 ion microprobe at the National Ion Microprobe Facility (University of California-Los Angeles, USA) according to the methods outlined in Breeding *et al.* (2004) and Kelly *et al.* (2014). The U-Pb measurements were made with a primary O^- beam accelerated at a total impact energy of 12 kV. The analyses were conducted over ≤50 mass cycles resulting in ~30 μm diameter pits that are <5 μm in depth as measured using a MicroXAM surface profilometer. The MicroXAM is a non-contact surface mapping microscope capable of detecting topographic changes of ~1 nm. Profilometry calculations indicate that the sputtering rate was ~100 nm/mass sweep, consistent with the depth resolutions previously proposed (Breeding *et al.* 2004; Kelly *et al.* 2014). While the sputtering rate was relatively consistent across all analyses, the duration of analyses (or sputtering depth) was independently assessed during the data collection in order to concentrate analytical time on grains of interest.

Zircon AS3 (U-Pb: 1099 ± 1 Ma; Paces and Miller 1993) was used as the analytical reference material. Analysis of the reference material was conducted after every five unknown analyses. U-Pb ages were calculated from measured ion intensities using UCLA's in-house ZIPS

v3.0.4 software written by C.D. Coath and Isoplot v4 software (Ludwig 2012); uncertainties of single data points are reported at 1σ. Zircon U-Pb depth profile ages are presented and interpreted using $^{207}Pb/^{206}Pb$ ages, a common practice for dates older than 1.0 Ga as the $^{207}Pb/^{206}Pb$ value provides an age that is independent of the uncertainties associated with Pb/U calibrations (Ireland and Williams 2003). Integrated $^{207}Pb/^{206}Pb$ ages are reported at 2σ uncertainties.

Results were plotted as a time (i.e. depth) resolved plot, which allowed the identification of mass cycles that had penetrated into the grain interior and therefore can be excluded from rim age calculation (Figure 4.6). In order to maintain internal consistency in the identification of rim material, we used four criteria: (1) Rims are defined by three or more contiguous mass cycles, comprising ≥30% of the total cycles that are younger than the interior material. This does an effective job of removing mass cycles with anomalously young ages that commonly occur at the beginning of an analysis. (2) The probability of fit of the weighted mean of the rims is >5%, and (3) the ages of the outermost two mass cycles for either side of the identified rim must not be significantly different (at 2σ) than the weighted mean rim age (six or more cycles only). These latter two criteria, when combined, systematically and consistently remove mass cycles that have sputtered through the mixed domain between the recrystallized rim and the primary interior (cf. Breeding *et al.* 2004). The result is an age that is likely much closer to a true age as well as promotes MSWD's that are very close to unity. The last criterion (4) for the rim calculation is that any mass cycles with a discordance of >15% were not included in the age calculation (cf. Cottle *et al.* 2009; 2012).

The criteria outlined above demonstrate how we have calculated an age resulting from a single spot analysis of a crystal. In order to calculate the $^{207}Pb/^{206}Pb$ age for the rims of an entire

rock sample, which comprises many single zircon analyses, a weighted average of all mass cycles of the rim material was integrated. The reasoning behind pooling the data in this manner is that all of the rim material is interpreted to be the result of a single rim-forming event and therefore represents a single population (Cottle *et al.* 2009).

The same zircon grains that were analyzed by the depth profile techniques and trace element mapping (see below) were polished while still mounted in indium. Polished zircon were imaged and characterized via SEM methods to ensure that the cores of the grains were exposed. Conventional U-Pb SIMS analyses of the zircon cores were conducted using a ~30 μm spot size with the Cameca ims1270 at UCLA using the analytical conditions of Schmitt *et al.* (2003). Reference zircon AS3 was analyzed after every five unknowns under the same analytical conditions and data were reduced using the ZIPS software. The integrated $^{207}Pb/^{206}Pb$ ages reported were calculated with 2σ uncertainties and a cutoff of 10% was employed for discordance.

4.4.3 LA-ICP-MS REE depth profiles

A Photon-Machines Analyte 193 nm ArF Excimer laser ablation system coupled to an Agilent 7700x quadrupole ICP-MS system (Geological Survey of Canada, Canada) was utilized for the collection of trace element data, according to the methods of Kelly *et al.* (2014). The analyses were performed at an energy density of ~6 J/cm^2 at a repetition rate of 3 Hz. A 17 μm spot was used for the analyses and penetrations went as deep as 20 μm at a drilling rate of ~300 nm/s. Elements that were analyzed include: Al, Si, P, Ti, Fe, Sr, Y, Zr, Sn, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Th and U. Calibration was performed using NIST 612 (Jochum *et al.* 2011) and SiO_2 for internal standardization (32.78 wt%). USGS basaltic glass

reference material, BCR-2G (Jochum *et al.* 2005), was used as a secondary standard for quality control. Data were processed with LAMTRACE, a Lotus 1-2-3 macro-driven spreadsheet program (Jackson 2008). The first two seconds of ablation were not incorporated into the trace element concentration calculations, allowing the laser to stabilize for the 60 s of ablation as well as to reduce the likelihood of incorporating surface contamination in the data reduction. The LA-ICP-MS data were resolved into rim and interior values by plotting the element concentrations versus analytical time (depth), allowing for the identification and isolation of signal intervals for rim and core. Rims are distinguished from cores by the presence of a step function in the elemental concentrations or the Th/U ratio (Figure 4.7). Data are presented as chondrite-normalized spider plots instead of time-resolved plots because it allows us to present all of the data in an organized summary as well as directly compare the trends of similar element types (i.e. HREE vs. LREE) from a single sample.

4.4.4 LA-ICP-MS REE unpolished grain mapping

The same analytical set up as described for the collection of REE depth profiles was utilized for the 2-dimensional REE mapping of individual zircon grains, using an approach that has been successfully employed in the element mapping of polished sulphide phases (Gao *et al.* 2015). For this procedure, unpolished grains were mapped using a grid of independent but contiguous 7 μm circular spots, resulting in nearly 100% grain coverage. Analysis was performed as multiple "lines of spots," each analysis commencing with a 20 s background measurement. Each spot in the line received a single cleaning shot followed by a 1.5 s delay (flushing), followed by 30 shots at an energy density of 7.13 J/cm^2. This resulted in the outermost <3 μm being excavated and integrated at each ablation spot. This differs from

traditional mapping techniques that ablate each line as a continuous linear analysis, resulting in some lateral mixing of chemical signatures. A total of 23 elements were measured: Al, Si, P, Fe, Sr, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Th and U. Dwell times ranged from 4 ms (majors) to 30 ms (trace). For calibration, external standard (NIST 612) was analyzed twice after every sixteen lines of the unknown. When analyzing the NIST612 standard at this frequency, there is typically less than 5% drift in calibration factors between consecutive bracketing pairs of standards, the effect of which is further reduced via a linear drift correction. Thus, analyzing standards after every 16 lines of sample is sufficient for achieving reproducible (<5%) calibration across (and between) zircon grains. SiO_2 was used as an internal standard (32.78 wt. %).

Data reduction was completed using in-house software, LAMTRACE for calculation of concentrations for each spot and PixeLAte for generation of element distribution maps. The maps are produced using a colour scale comprising 16 colours (barring size limitations) ranging from black to dark blue for low concentrations, through orange and red for high concentrations. The software allows for the visualization of data using linear, logarithmic or percentile scaling functions; in this study, the percentile scaling function was employed. In addition to single element maps, the PixeLAte software allows for the creation of element ratio maps (La/Yb and Th/U).

4.5 Results

4.5.1 U-Pb geochronology of primary zircon crystallization

Detailed sample descriptions and U-Pb data of the *in situ* as well as the indium-mounted polished zircon analyses are included in SI 4.1, with supporting tables in SI 4.3 and SI 4.4,

respectively). *In situ* U-Pb ages are reported within concordia diagrams and inset probability density plots shown in Figure 4.8. The morphology and internal structure of the zircon is fairly consistent across the samples, regardless of the rock type and grade of metamorphism. All zircons observed via the *in situ* portion of our geochronology study are small (25–100 μm), most often in a matrix of quartz, feldspars, and phyllosilicates, and have rounded surfaces and smooth rounded embayments (Figure 4.3). The oscillatory zoning is truncated by fractured and embayed margins of zircon, and a weak patchy structure overprints oscillatory zoning. No well-formed outgrowths of zircon were observed. Elongate cavities are oriented parallel to zoning and to radial and concentric features. Some zircons possess cavities in the center of the crystal. Many of the zircons are fractured, broken and slightly disaggregated along foliation planes of the rock. Internal fractures are radial or perpendicular to foliation planes, indicating that the zircon witnessed deformation and dissolution (Wayne and Sinha 1992; Dempster *et al.* 2008; Hay and Dempster 2009). Sector-zoned zircons are few but present, and though some crystals appear to have a thin rim or overgrowth, the small size of the zircons made it impossible to resolve different domains with the 24 μm laser spot. *In situ* LA-ICP-MS U-Pb dating of zircon yielded $^{207}Pb/^{206}Pb$ age populations ranging from *ca.* 2877–2862 Ma with a sub-population in sample NCTK10-33 (cordierite schist) having an upper intercept age of *ca.* 2955 Ma. The Th/U ratios display an absolute range from ~0.1–1.0 with the majority of values in the ~0.2–0.6 range. A dominant SIMS $^{207}Pb/^{206}Pb$ age population at *ca.* 2860 Ma is reproduced in the epoxy-mounted polished zircon analyses, with a subordinate *ca.* 2970 Ma population.

Due to the small zircon size, the *in situ* LA-ICP-MS approach often required ablation of the entire grain. The potential for mixing of subdomains may explain the discordance of the single spot analyses, and the age dispersion and slightly inflated MSWD values of the age

populations. It is therefore important to be mindful of the potential of age domain mixing. Of interest is that despite being a detrital population of zircon, the age populations appear to be unimodal for all but one sample as evinced in the inset probability density plots (Figure 4.8).

4.5.2 SIMS U-Pb geochronological depth profile analyses

Below we discuss the results of the SIMS U-Pb geochronology depth profile analyses conducted on eleven metasedimentary samples from the NCGB. We discuss all samples in a broad context with individual samples described in detail within SI 4.2. Locations, lithology, and data summary are presented in Table 4.1 and the complete SIMS U-Pb isotopic data table can be found in the Supplementary Information (SI 4.5). Typically more than 20 zircons per sample were mounted for analysis; the analytical software allowed us to monitor the results during data acquisition and thus analytical time was concentrated on grains and samples of greater interest. This preferred sampling method resulted in variability in the number of grains analyzed (per sample) as well as the analytical duration (excavated depth) of each zircon. The shape of the depth profiles can range from grain to grain but is typically characterized by the first several (<10) mass cycles having younger $^{207}Pb/^{206}Pb$ dates (<2800 Ma) and then a gradual increase in the $^{207}Pb/^{206}Pb$ dates towards the grain interior, where a single (older) date is reproduced over many cycles (Figure 4.6). Concordancy of the U-Pb system over the duration of the analysis typically decreases from ~10% discordant in the rims, to much greater values (>30%) at depth (<5 μm). SIMS analyses, following polishing of the sample, reveal that cores yield concordant U-Pb dates, typically <10% discordant.

As many as 34 zircon per sample were analyzed using the SIMS U-Pb depth profile technique, excavating to depths of <5 μm; in samples which displayed little or no evidence for

younger ages that could be interpreted as rims, as few as four zircon were analyzed. Our U-Pb depth profiles reveal that younger $^{207}Pb/^{206}Pb$ ages occur in a single rock sample in up to ~50% of the analyses. Over our entire study, 28% of all zircon (171 grains) possessed younger rim material that ranges in $^{207}Pb/^{206}Pb$ age from *ca.* 2788–2703 Ma, with the majority of $^{207}Pb/^{206}Pb$ ages between 2761–2735 Ma (Figure 4.9). Grains that were analyzed more than once to the same depth reveal that the thickness of the rim material is typically variable. All but three samples exhibit younger rim material in at least one of the analyzed zircon. The three samples (NCGB12-13, 14, 15) that do not have rims are all within 500 m of each other in the northwestern corner of Lake Eyapimikima (Figure 4.1) and have all undergone high-temperature metamorphism as evinced by the presence of unoriented porphyroblasts of cordierite or andalusite. In the remaining samples, younger rims with thickness up to 3.3 μm were identified. Zircon rim ages within a sample have as much as 50 Myr of dispersion, resulting in ages that have MSWD's >10; however a weighted average of all mass cycles identified as rim material within an individual rock removes the sampling bias introduced by variable rim thicknesses as well as supports the hypothesis that all rims within a sample likely represent a single population. Weighted average $^{207}Pb/^{206}Pb$ ages for samples have MSWD's close to unity (0.78–3.1) and across the belt are typically within 30 Myr of each other. A single cordierite schist sample (East Eyap) yielded a $^{207}Pb/^{206}Pb$ rim age of 2703 ± 17 (MSWD: 13; n: 33). Considering the larger MSWD compared to the other samples, further interrogation using a probability density plot of the data revealed that there are in fact at least two $^{207}Pb/^{206}Pb$ age populations present within this sample (Figure 4.9). The two weighted average $^{207}Pb/^{206}Pb$ ages present in this sample are 2749 ± 15 Ma (MSWD: 4.6; n: 22) and 2667 ± 6 Ma (MSWD: 0.95; n: 11). This sample represents the only scenario in which more than one younger (<2900 Ma) age population was present within a single

sample. Zircon rims from the northeast potion of the study area are typically characterized by lower Th/U values (<0.28) compared to interiors (>0.17). The rims from samples in the southwest portion of the belt are typically characterized by Th/U values that are >0.3 and are ±0.1 of the interior values.

4.5.3 LA-ICP-MS REE geochemical depth profile analyses

Below we discuss the results of the LA-ICP-MS REE geochemistry depth profile analyses conducted on the same eleven metasedimentary samples (and same grains) examined via SIMS U-Pb depth profile techniques. We discuss all samples as a whole in this overview and a summary of data is presented in Table 4.2. The reduced LA-ICP-MS REE data is tabulated in SI Table 4.6, and the complete, unreduced data can be found in the online repository for (Kelly et al. 2017). Unlike the SIMS software, we were not able to process the results during the data acquisition sessions; this meant that a sampling bias was given to grains, and samples, which yielded positive results from the SIMS U-Pb depth profiles. Further, a few grains were lost prior to LA-ICP-MS REE analyses, resulting in several crystals which were not analyzed via both techniques. A total of 124 grains were analyzed for LA-ICP-MS REE depth profiles. The first two seconds of ablation (~0.3–0.6 μm) were accompanied by REE, P, and Y concentrations in excess of several thousand ppm (Figure 4.7). As mentioned above, these data were rejected under the consideration that the laser was both stabilizing during this short time interval and that there was surface contamination (apatite, xenotime), as documented in other studies (Geisler *et al.* 2003; Schneider *et al.* 2011; Tomaschek *et al.* 2003). Many grains are characterized by bumpy or irregular surface textures (Figure 4.5) but P+REE–rich mineral inclusions were not identified during EDS analyses prior to depth profiling, perhaps because they were beyond the

limits of EDS detection. The remaining data are interpreted to be valid and were incorporated in the reduction process.

The zircon crystal interior data presented here is an integration of all data that do not represent a well-defined rim. These data demonstrate that the chemistry of crystal interiors are highly variable (Figure 4.10) with 2/3 of grains exhibiting a typical magmatic zircon REE pattern (steeply positive slope with positive Ce and negative Eu anomalies) and other grains possessing a flat REE trend with minimized elemental anomalies when plotted on chondrite-normalized spider plots, typical of LREE enriched zircon (cf. Hoskin 2005). Variability in REE concentrations is evinced by irregular La_N/Yb_N, which ranges from 0.001 to 0.5097 with a median of 0.016. Further, over the course of a single analysis, elemental concentrations can vary with excavated depth. The Th/U values of the zircon interiors are typically >0.3 suggesting that the crystal has remained largely unmodified. Hafnium concentrations are most often <1.0 wt%, regardless of REE trends (magmatic or LREE enriched).

Rims range in thickness from <1 up to ~8 μm, and the majority of rims are <4 μm. Rims identified using trace element chemistry occur in ~60% analyses (76 of 124). Unlike the interiors, zircon rims appear to be characterized by higher Hf concentrations (>1.1 wt%), which gradually decrease towards the crystal interior. Th/U ratios of the rims are typically <0.3 and are commonly lower than the interior of the crystal. In contrast to the Hf concentration profiles, the variation in the Th/U often occurs as a step function in time resolved plots. Comparable to the interior, the REE trends of rims appear to be largely inconsistent across the data set with many grains having higher LREE concentrations (higher La_N/Yb_N values) than the interior and shallow chondrite-normalized spider plots, whereas other grains have lower LREE concentrations (lower La_N/Yb_N) than crystal interiors and steep chondrite-normalized spider plots. Over the entire

dataset, the La_N/Yb_N value of the rims is typically greater than the interior. In order to maintain consistency in light of the irregularity of rim trace element behavior in these zircon, only grains which exhibit a step function (positive or negative) in REE concentration or Th/U ratios were considered to have a rim. The broad range of LREE concentration, in both the cores and the rims, is evinced in Figure 4.10, which clearly illustrates the overlap in the chondrite-normalized REE trends. Replicate analysis of zircon (Figure 4.10E) reveals that, despite variable thickness, rims are chemically consistent across a single crystal. Of interest, two of the three samples for which our analyses were unable to resolve younger rim material contain resolvable geochemical difference compared to the interior (Figure 4.10B, C).

4.5.4 LA-ICP-MS REE geochemical mapping

A total of eighteen REE maps of unpolished zircon crystals were produced from selected samples of the NCGB samples. Grains selected for mapping cover a wide array of grains (irregular outer surface texture, size, roundness). LA-ICP-MS REE mapping revealed a complex distribution of trace elements which can be broadly expressed in two map patterns: (1) Dendritic networks of REE modification (Figure 4.11A) characterized by thin (<25 μm) bands or stringers of REE-enriched zircon material. (2) Irregular patches of REE enrichment or depletion (Figure 4.11B) exhibiting >50 μm isolated domains, either enriched or depleted relative to the bulk grain. Of the 23 elements mapped, typically sixteen elements effectively exhibit an internally consistent map pattern (Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Th). The remaining elements (Al, P, Fe, Sr, Hf, U) often displayed a less consistent map pattern, only occasionally resembling that of the other elements. The software allows for the mapping of elemental ratios (Th/U, La/Yb), which can be used in support of single elemental grain maps. Concentrations at

the interface between the zircon and indium mounting material are often distinct from elsewhere in the map. These are not interpreted as true artefacts of recrystallization; instead they are likely caused by mixing of the mounting material with the ablated zircon. In some cases, the indium is contaminated with a high abundance of the mapped element (e.g. A4.l; Figure 4.11A). Element concentrations varied by up to four orders of magnitude for a single grain. However, one to two orders of magnitude difference is more typical. Zircon grains that were analyzed more than once, resulting in multiple 3 μm depth slices, were characterized by a mappable decrease in REE content with depth resulting in slightly different map patterns.

4.6 Discussion

4.6.1 Integrated SIMS and LA-ICP-MS zircon U-Pb geochronology

We can assess the changes beyond the recrystallization front by examining the polished crystals and the cores of the situ samples, which gives insight into the primary zircon. Zircon from the *in situ* sample set are characterized as <75 μm, semi-equant crystals, aligned within the fabric, and commonly display a blurry and patchy oscillatory zoning. The homogenization and fading of original growth zoning, as observed in this study, may be attributed to subtle metamorphic recrystallization (e.g. Connelly 2001). LA-ICP-MS geochronology for all of the samples yields a unimodal age population of *ca.* 2860 Ma with a separate, single age of *ca.* 2950 Ma. These ages correlate with significant magmatism and crustal growth in the region, specifically linked to the TTG suites proximal to the belt (Biczok *et al.* 2012; McNicoll *et al.* 2015; Van Lankvelt *et al.* 2016). Separated zircon were significantly larger than the zircon population observed in the *in situ* sample set, as large as 250 μm, and often characterized by oscillatory zoning at the zircon core, typically a characteristic of igneous zircon (Dempster *et al.*

2008; Hay and Dempster 2009; Hoskin and Black 2000). The SIMS U-Pb ages from indium-mounted polished zircon have two populations at *ca.* 2970 Ma and 2860 Ma. These dates, similar to the *in situ* results, can be interpreted as detrital ages, suggesting the provenance for the xenocrystic zircon were the surrounding volcanic and plutonic rocks of the North Caribou batholiths, which were shed into into the greenstone basin. The scarcity of the 2950-2970 Ma age population in the *in situ* analyses is likely the result of insufficient sampling in order to effectively capture the complete age spectrum.

Depth profile analyses of ~200 zircon crystals from eleven metasedimentary samples from the NCGB revealed rim material which has been isotopically and chemically modified, despite often low metamorphic temperatures (<400°C). $^{207}Pb/^{206}Pb$ rim ages for the belt were between *ca.* 2788–2667 Ma with six of the nine U-Pb rim-bearing samples possessing ages between *ca.* 2754–2735 Ma. Rim thickness ranged from 0.1–3.3 μm, averaging 0.2–0.5 μm. Replicate analyses on grains revealed that the presence or thickness of the recrystallized material is variable on a single crystal, indicating that rims do not form as a homogeneous carapace over the entire crystal but rather as localized domains on the surface and within fractures (Figure 4.11). These observations are supported by the trace element mapping discussed below.

All of the $^{207}Pb/^{206}Pb$ rim ages assigned to samples in this study have MSWD's close to unity through pooling of the analytical cycles with the exception of the cordierite schist sample (East Eyap) at the eastern end of Eyapimikima Lake. A probability density plot reveals that those $^{207}Pb/^{206}Pb$ rims do not likely represent a single population and instead contain two apparent populations at *ca.* 2749 Ma and *ca.* 2667 Ma (Figure 4.9C). the presence of two age populations present in a single sample has consequences for the approach we have taken in reporting our results, which assumes that zircon rims represent a product of a single event (cf. Cottle *et al.*

2009). In order to avoid the pooling of data from separate fluid events, it is recommend that data be presented using both weighted average plots as well as probability density plots. The timing and duration of individual pulses can perhaps be constrained through a secondary study containing exhaustive analyses of additional zircon from fewer samples at strategic locations. This could be expedited through the use of LA-ICP-MS U-Pb depth profile techniques as it would allow for much faster collection of data (Cottle *et al.* 2009; Cottle *et al.* 2012; Eggins *et al.* 2003; Kelly *et al.* 2014; Margetic *et al.* 2001; Mason and Mank 2001; Steely *et al.* 2014; Viete *et al.* 2015, Woodhead *et al.* 2004).

The occurrence of relatively concordant (<10% discordant) rim ages becoming more discordant (>10%) with depth as revealed via SIMS U-Pb depth profiles, likely suggests that the zircon crystal underwent pervasive Pb loss between the time of primary crystallization and that of the recrystallization of a rim. This is evinced by the preservation of a concordant (<10% discordant) zircon core ages analyzed on the indium-mounted polished grains. Concordant rim ages becoming discordant with depth while still preserving a concordant core ages is consistent with other depth profile studies (Breeding *et al.* 2004; Cottle *et al.* 2009; Kelly *et al.* 2016) and is in harmony with our other data, which indicate that some of the samples have undergone LREE enrichment prior to the prevalent rim-forming event (discussed below).

4.6.2 Trace element characteristics from depth profiles and unpolished grain mapping

Typical igneous zircon chondrite-normalized REE patterns are characterized by a steep positive slope, and positive Ce and negative Eu anomalies (Hoskin 2005). This pattern is a consequence of the exclusion of LREE from the crystal structure during crystallization because of their large ionic radii (Hanchar *et al.* 2007). Zircon interiors examined in our study were

characterized by varying trace element concentrations, with ~2/3 of grains possessing a typical igneous zircon REE pattern supporting the notion that zircon was locally sourced from the TTG intrusions as revealed by our geochronology. Roughly 1/3 of zircon interiors are characterized by a flatter trend on chondrite-normalized spider plots. LREE enrichment in the interiors of zircon as noted in the data is observed in other studies (Hoskin 2005; Marsh and Stockli 2015; Skipton *et al.* 2016). Chapman *et al.* (2016) summarize numerous mechanisms that may result in LREE enriched parent zircon, including a LREE-enriched source melt (Hoskin *et al.* 2000), complex substitutions (Hoskin and Schaltegger 2003), sampling of micro-inclusions (Hanchar and van Westrenen 2007), and fluid modified zircon (Hoskin 2005). Any combination of these processes could have affected the zircon prior to the recrystallization event and be responsible for the generation of zircon material that deviates from the expected igneous REE pattern (cf. Marsh and Stockli 2015).

Zircon rims, identified by a positive or negative step function in the LA-ICP-MS REE depth profiles, are markedly different than the interior of the grains: notably these rims are characterized by a low Th/U, elevated Hf, and variable REE composition when compared to material at greater depth within the crystal. These observations on the chemical differences of zircon rims and cores, a mineral known to withstand extreme geological conditions (Ewing 2003), can be explained by the crystal having synchronously undergone ion-exchange and coupled dissolution-reprecipitation processes. This would involve a low-temperature ion-exchange between a fluid and partially damaged or amorphized zones of the crystal (Geisler *et al.* 2007; Hay and Dempster 2009; Hay *et al.* 2010; Rasmussen 2005). Depending on the elemental availability, recrystallized zircon material often undergoes REE enrichment (Geisler *et al.* 2007; Geisler *et al.* 2003; Hoskin 2005; Hoskin and Black 2000; Kirkland *et al.* 2009 Krogh

and Davis 1975; Romano *et al.* 2004; Rayner *et al.* 2005), as well as the inclusion of non-formula cations (Ca, Ba, Al, Fe, Mn; Geisler *et al.* 2007; Schneider *et al.* 2011, 2012). Ion-exchange can operate synchronously with coupled dissolution-reprecipitation (Hoskin 2005) and both are fostered by the presence of microporosity and/or permeability at the crystal structure scale (Geisler *et al.* 2007). Porosity and permeability in zircon, which increases surface area, can be promoted by crystal fracturing that occurs as a result of tectonic strain or sedimentary transport as well as crystal damage caused by radioactive decay (Breeding *et al.* 2004; Geisler *et al.* 2002; Geisler *et al.* 2007). Zircon which has undergone coupled dissolution-reprecipitation has a more pure zircon composition relative to the zircon prior to modification. Lower trace element concentrations as well as the removal of Pb* is predicted (Tomaschek *et al.* 2003) in addition to the presence of micro-pores and/or inclusions (Geisler *et al.* 2007). Micropores and inclusions are noted in our samples as microscopic FeO outgrowths and are inferred by the initial LA-ICP-MS REE depth profile time interval analyses demarcated by elevated P and REE concentrations, which we have attributed to submicron scale mineral inclusions. Alternatively, a less favourable explanation for the observations of our REE analyses is that the elevated REEs in the rim material are entirely sourced from within the crystal interior through diffusion. The REE enrichments observed in the rims, however, have no clear complementary depletion in the interior, suggesting that the elevated REE must be the result of open-system behaviour.

In addition to REE concentrations in zircon, the Th/U signature can be used to assess the processes that were active during (re)crystallization. Conventional interpretation of Th/U values of <0.2 indicates that neo- or recrystallized zircon formed under metamorphic or hydrothermal conditions in the presence of a crystallizing Th-bearing phase (i.e. monazite, apatite; Harley *et al.* 2007; Moeller *et al.* 2003; Rubatto *et al.* 2009; Williams *et al.* 2003) or by the preferential

purging of the larger Th ion (relative to U) during recrystallization (Hoskin and Black 2000). Th/U values >0.2 typically reflect primary igneous processes but can be seen in metamorphic rocks where Th/U system was not modified (Moeller *et al.* 2003). As expected, average Th/U values for zircon cores in this study are typically >0.3, indicative of a primary igneous composition, in agreement with the U-Pb data. The Th/U values of the rims are typically <0.25 and are almost always lower than the associated core. This suggests the preferential exclusion or removal of Th relative to U supporting the hypothesis that these rims are the result of metamorphic recrystallization.

Elevated Hf has been noted in the rims of recrystallized zircon (Marsh and Stockli 2015; Skipton *et al.* 2015) and similarly, in this study, Hf was always elevated in the rims of the crystal. Unlike the trends observed in the REE data, Hf enrichment does not often occur as a step-function. Instead Hf is present at concentrations >1.1 wt% at the crystal margins, gradually decreasing to lower values (<1.0 wt%) in the crystal interior. The 2-D trace element maps produced for Hf do not correlate well with the other elements and ratios noted to have undergone modification. This suggests Hf behavior is at least partially independent of the other elements discussed (Th, Pb*, LREE).

Heterogeneity in the three-dimensional distribution of recrystallized material is illustrated by duplicate analyses on a single grain via both SIMS U-Pb and LA-ICP-MS REE depth profiling. Both methods clearly reveal that, despite the similar composition (Figure 4.10E) and $^{207}Pb/^{206}Pb$ ages (S4.3) of recrystallized material, the thickness is variable. These observations are supported by the LA-ICP-MS element mapping which suggests that rim material does not recrystallize as a complete shell around the primary zircon but is of variable thickness. Our maps clearly demonstrate the heterogeneous nature of micrometer-thin rim material often exhibiting a

dendritic network or as irregular patches which can be interpreted to be the result of incomplete recrystallization driven by the relatively low temperatures experienced by most of the zircon in this study. The occurrence of dendritic networks of REE modified material can be interpreted as the consequence of preferential recrystallization along fractures in the zircon crystal (Figure 4.11A). The irregular patches of modified REE concentration (Figure 4.11B) may be the result of localized armouring of the zircon within the mineral assemblage of the rock; that is, the spatial heterogeneity is derived from variability in adjacent mineralogy and textural relationships that may foster or retard fluid-mineral interaction (Schneider *et al.* 2012). For example, a zircon crystal face that is adjacent to a hydrous phase (e.g. mica) will likely have a greater potential for fluid-mediated exchange than a zircon face that is adjacent to a more refractory phase (e.g. quartz). A requirement of the depth profile technique is that it zircon grains must be physically separated from the rock and remain unpolished. As a result, we have little insight into the surrounding mineral context of each zircon within the host rock except for our basic petrographic observations. An alternative hypothesis is that the surface REE patterns are caused by heterogeneities in the crystallographic structure of the zircon. As a result, domains within the zircon that have elevated U concentrations may possess decreased crystallinity due to increased alpha damage which in turn fosters recrystallization and the development of REE enriched rim material (Breeding *et al.* 2004; Geisler *et al.* 2007; Schneider *et al.* 2012). Conducting laser Raman spectroscopy prior to grain mapping would help assess the crystallinity of the mineral phase. Our trace element mapping results suggest that dendritic networks and irregular patches do not have to be mutually exclusive.

The apparent irregular REE trends between grains suggests that recrystallization did not occur in a homogenous REE reservoir; further, the possibility that ion-exchange and

coupled dissolution-reprecipitation can occur simultaneously within this reservoir further convolutes the interpretations which can be derived from the REE data. Nonetheless, our results demonstrate that trace element chemistry is useful for distinguishing between primary zircon cores and recrystallized rims.

4.6.3 Exceptions to the model

Younger $^{207}Pb/^{206}Pb$ rim ages were observed in all samples with the exception of three rocks. Samples NCGB12-13, NCGB12-14, NCGB12-15 are undeformed metasedimentary rocks which were collected proximal to each other (within <500 m) in the northwestern portion of the greenstone belt. These samples have likely witnessed contact metamorphism from an intrusion identified via aeromagnetic surveys; further evidence of contact metamorphism is the presence of unoriented high-temperature porphyroblasts (cordierite and andalusite). The high temperatures that zircon from this sampling location may have fostered crystal annealing (i.e. reduction of surface area) prior to fluid infiltration, thus minimizing the mineral-fluid interaction. An alternative hypothesis is that there was little to no fluid present at this location, however this is unlikely given the presence of REE enrichment in two of the samples. The decoupled nature of the U-Pb and REE data in these samples is evidence of the complex physicochemical processes operating during zircon recrystallization, which could perhaps be remedied through a more intensive sampling protocol and the employment of split-stream LA-ICP-MS techniques.

The discrepancy between the thicknesses of the rims when measured via the two different techniques (SIMS and LA-ICP-MS) can be the result of two of factors: (1) Our current estimate of rim thickness as measured through SIMS U-Pb depth profile represents a minimum thickness as it is calculated using only the mass cycles which met the criteria of a rim as outlined above,

meaning that mass cycles which are part of the transition (mixed) zone as well as spurious ages were not included. For example, Figure 4.6 shows the rim thickness is ~1.1 μm as compared to ~2 μm as indicated for all mass cycles which are younger than the interior. (2) Considering the LA-ICP-MS data were collected independently, and from a separate spot location than the SIMS U-Pb analysis, the correlation of results is challenging given that our 2D mapping technique confirms that rim thickness is not uniform or homogenous. Recent studies have avoided the inconsistency in measured thickness through the use of split-stream LA-ICP-MS approaches which allow for the comparison of U-Pb and REE composition from a the same analytical spot (Marsh and Stockli 2015; Stearns *et al.* 2015; Viete *et al.* 2015). Marsh and Stockli (2015) suggest that trace element equilibration can occur throughout the gradual $^{207}Pb/^{206}Pb$ transition zone prior to a step function in the element concentrations.

4.6.4 Regional implications

The $^{207}Pb/^{206}Pb$ zircon rim ages resolved through our SIMS U-Pb depth profile technique (*ca.* 2788–2667 Ma, with the majority between *ca.* 2754–2735 Ma) broadly correlate with tectonothermal events documented in the region (Figure 4.2). Van Lankvelt *et al.* (2016) identified a potassic alteration event at 2760–2680 Ma, as resolved by ages on titanite and altered zircon from granitoids external to the greenstone belt. Biczok *et al.* (2012) suggest that gold mineralization at the Musselwhite mine may have occurred between 2720 and 2670 Ma based on Sm-Nd analyses of hydrothermal garnets believed to be coeval with mineralization at the deposit. Regionally within the North Caribou Superterrane (Thurston *et al.* 1991) and coeval with the Uchian orogeny (Percival *et al.* 2006), the Berens River Intrusive event affected rocks across the Western Superior Province. Corfu and Stone (1998) reported zircon and apatite U-Pb ages of

2750 to 2685 Ma associated with hydrothermal activity in the northwestern Superior Province and Ernst and Jowitt (2013) dated the Bird River large igneous province at *ca.* 2735 Ma; this event may have acted as a driver for widespread hydrothermal fluid circulation at that time. The broad concordance of ages at 2760–2670 Ma, both locally and regionally, demonstrate the protracted low-temperature tectonothermal history of the belt as well as the NCT. We interpret the new 2754–2735 Ma zircon dates in the context of our field observations as documenting the timing of regional metamorphism of the NCGB, the first reliable estimate of peak thermal conditions for this part of the Western Superior Province. Our analytical approach was able to provide valuable insight into the tectonothermal and metallogenic history of the belt through the sampling of rocks >70 km away from the Musselwhite gold mine and in samples which have experienced metamorphic conditions less than 400°C.

4.7 Conclusions

The application of the depth profile technique on natural, unpolished zircon crystals is an effective method to resolve the age of micrometer-scale rims. Our results from an Archean greenstone belt indicate that zircon was isotopically and geochemically modified between *ca.* 2754 and 2735 Ma, >100 Myr after primary zircon crystallization. Recrystallization occurred at temperatures as low as 300–400°C. Rims yield concordant age data typically characterized by REE concentrations notably different from the interior, lower Th/U values of <0.25, and higher Hf values (>1.1 wt%) relative to the interior (>0.3 and <1.0 wt%, respectively). The preferred mechanism for rim development is a combination of ion-exchange and coupled dissolution-reprecipitation processes in the presence of a variably LREE enriched fluid. Additionally, our research demonstrates an innovative, quantifiable unpolished grain mapping method that helps

explain the spatial heterogeneity that is noted within a suite of zircons from a rock sample as analyzed via depth profile techniques. This mapping technique illustrates element behaviour in the outer most microns of the crystals. These tools, in conjunction with detailed a petrographic and geologic understanding of the region, add to our comprehension of mineral-fluid interactions that result in micron-scale recrystallized mineral domains of naturally modified zircon in potentially auriferous terranes.

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Table 4.1: Summary of samples and SIMS U-Pb depth-profile results, from NCGB, NW Superior Province

sample and coordinates	zircon with REE rims/ zircon sampled	zircon with U-Pb rims/ zircon sampled	rim			interior (polished)
			thickness† (μm)	$^{207}Pb/^{206}Pb$ age (Ma)	Th/U†	$^{207}Pb/^{206}Pb$ age (Ma)
NCGB12-10 (NAD 83, Zone 15, 627540E, 5872755N) cordierite-bearing biotite schist	8/14	10/34	0.3-1.1 (0.5)	2750±11 (MSWD: 3.1; n: 50)	0.01-0.46 (0.1)	3000 - 2850
NCGB12-13 (NAD 83, Zone 15, 627909E, 5868746N) andalusite schist	3/3	0/4		not present		2992
NCGB12-14 (NAD 83, Zone 15, 626394E, 5869259N) cordierite schist	3/6	0/18		not present		2990 - 2950
NCGB12-15 (NAD 83, Zone 15, 627540E, 5869191N) cordierite schist	0/4	0/4		not present		3015 - 2970
NCGB13-01 (NAD 83, Zone 15, 648708E, 5871865N) garnet schist	5/9	5/11	0.3-2.8 (1.0)	2754±16 (MSWD: 0.66; n: 50)	0.05-0.64 (0.28)	2836 - 2806
East Eyap (NAD 83, Zone 15, 657715E, 5868570N) cordierite schist	5/10	7/15	0.2-0.9 (0.5)	2703±17 (MSWD: 13; n: 33)*	0.05-0.27 (0.12)	3045 - 2871
Akow Lake (NAD 83, zone 15, 670288E, 5850306N) andalusite-bearing siliminite-staurolite schist	13/17	11/30	0.3-2.4 (1.0)	2761±13 (MSWD: 1.6; n: 83)	0.11-0.42 (0.21)	3045 - 2800
NCB13-9B (NAD 83, Zone 15, 688250E, 5825109N) meta-feldspathic arenite	7/16	9/17	0.3-3.3 (1.7)	2720±9 (MSWD: 1.9; n: 154)	0.16-1.22 (0.5)	2942 - 2800
NCB13-7 (NAD 83, Zone 15, 689548E, 5825474N) meta-feldspathic arenite	8/14	3/13	0.3-2.5 (1.2)	2788±12 (MSWD: 0.86; n: 35)	0.11-1.85 (0.31)	2870 - 2825
NCB13-7B (NAD 83, Zone 15, 689548E, 5825474N) meta-clast supported polymictic conglomerate	8/14	2/13	0.1-0.3 (0.2)	2735±8 (MSWD: 0.78; n: 4)	0.50-1.37 (0.85)	2967 - 2800
NCB13-5B (NAD 83, Zone 16, 300330E, 5820880N) meta-feldspathic arenite	11/17	3/17	0.1-2.7 (1.8)	2753±11 (MSWD: 0.86; n: 54)	0.16-0.64 (0.32)	2941 - 2815

* two rim populations identified; described further in text

† values are the range and (average)

Table 4.2: Summary of LA-ICP-MS REE depth-profile results, NCGB, NW Superior Province

	thickness			Th/U			Hf			La_N/Yb_N		
	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median
rim	1.6	7.7	3.6	0.10	1.67	0.25	6921	26382	10979	0.0000	0.6620	0.0190
interior	-	-	-	0.08	2.38	0.42	6794	22767	9249	0.0001	0.5097	0.0162

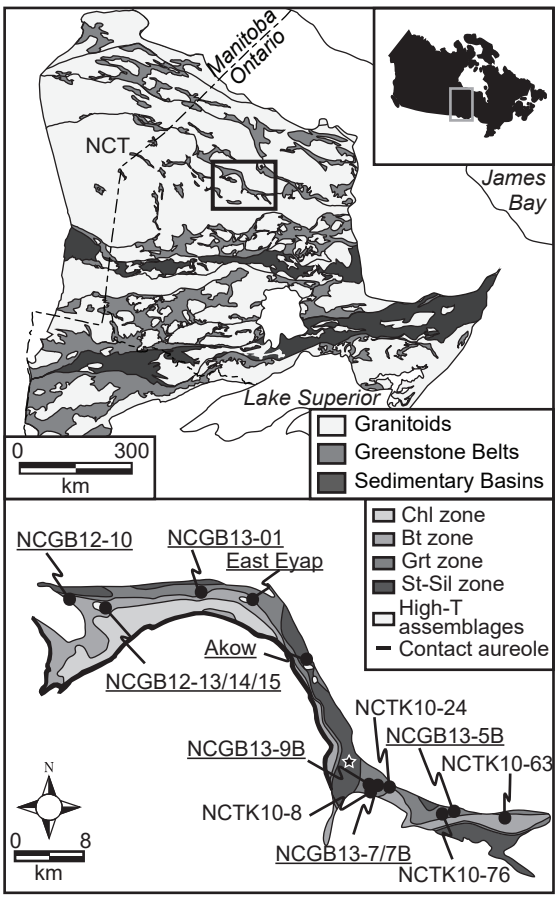


Figure 4.1: Metamorphic map of the North Caribou greenstone belt (modified from Breaks *et al.* 2001; Kelly *et al.* 2013) showing the locations of rock samples from this study. Underlined sample numbers were selected for U-Pb and REE depth profile studies whereas remaining samples were used for in situ U-Pb analyses. Metamorphic facies are variable within the belt, ranging from lower greenschist to upper amphibolite facies and apparent late high-temperature assemblages proximal to intrusions. White star represents location of Musselwhite mine. Abbreviations: And = andalusite; Bt = biotite; Chl = Chlorite; Crd = cordierite; Grt = garnet; MSWD = mean square weighted deviation; Sil = sillimanite; St = staurolite; T = temperature.

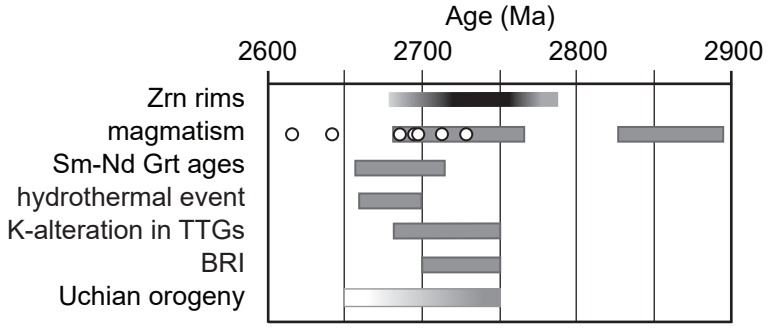


Figure 4.2: Schematic timeline of geological events and mineral dates for the North Caribou greenstone belt. Shaded horizontal bars represent the range of activity or mineral dates; white circles within the magmatism group represent zircon ages from pegmatites and felsic bands of gneissic plutons. Alteration field at 2760-2680 Ma is resolved from zircon and titanite data of Van Lankvelt *et al.* (2016). BRI: Berens River Intrusive event (2750-2710 Ma, Corfu and Stone 1998); Uchian: Uchian orogeny (2750-2690 Ma, Percival *et al.* 2006); other data from Gagnon 2015; Duff 2014; Kalbfleisch 2012; Biczok *et al.* 2012; Davis and Stott 2001; Thurston *et al.* 1991; deKemp 1987.

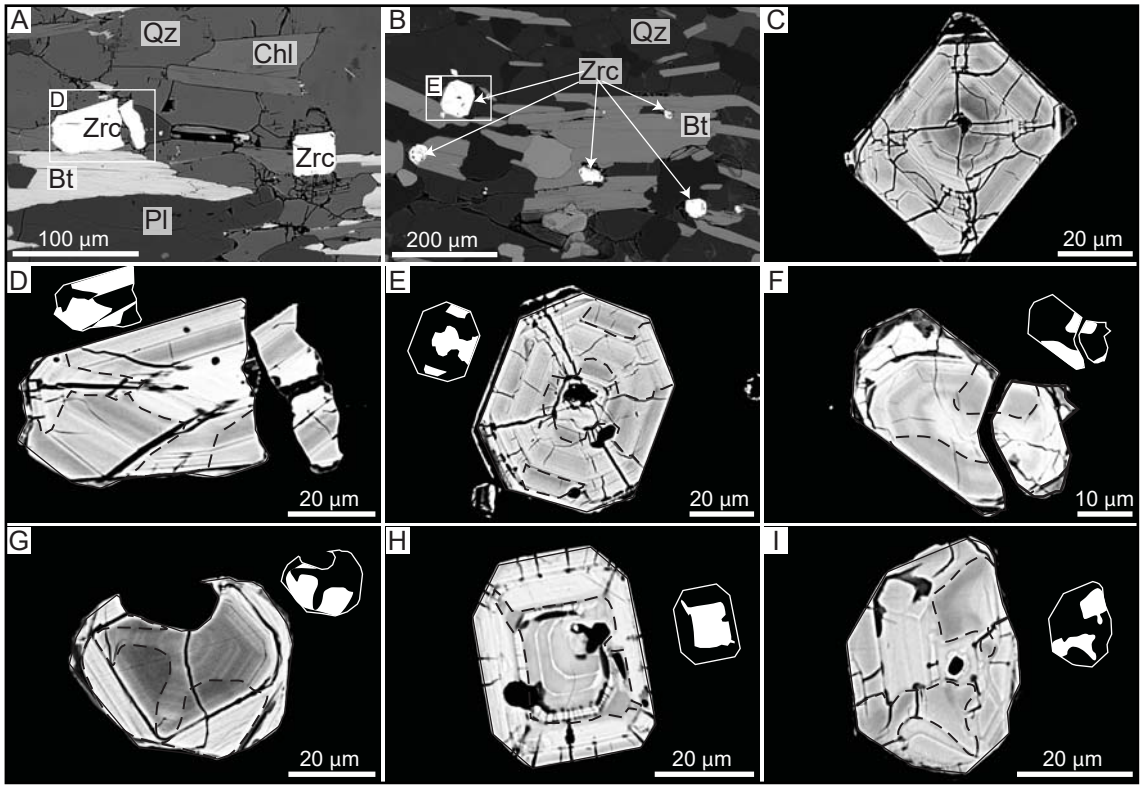


Figure 4.3: Backscatter electron images showing a variety of zircon shapes and textures representative of those analyzed via in situ U-Pb geochronology in this study. Dark patchy structure in the SEM image is outlined (dashed line) on each grain, and highlighted in white in each adjacent schematic grain drawing. Note fracture and cavities with the zircon; see text for discussion. (A) Zircons in And-St schist (NCTK10-44A) from the Akow Lake Fault Zone (ALFZ) with their long axis oriented parallel to foliation; the broken grain is magnified in D. (B) Zircons in Bt schist (NCTK10-8) from the Markop Lake Deformation Zone (MLDZ) in a similar context and the largest grain is magnified in E. (C, D) Patchy oscillatory zoning and F shows sector-type zoning in zircons from Crd schist (NCB11-33), similar to the grain in E, both have a thin and discontinuous low-U rim. (G) A sector-zoned zircon in two-mica schist (NCTK10-76) from the North Caribou Terrane Suture zone (NCTSZ). (H) A euhedral grain from protomylonitic trondhjemite (NCTK10-63) at the east end of the southeastern arm that displays a sharp boundary between core and rim. (I) A patchy-zoned grain from Bt-tonalite gneiss (NCTK10-24) north of the MLDZ.

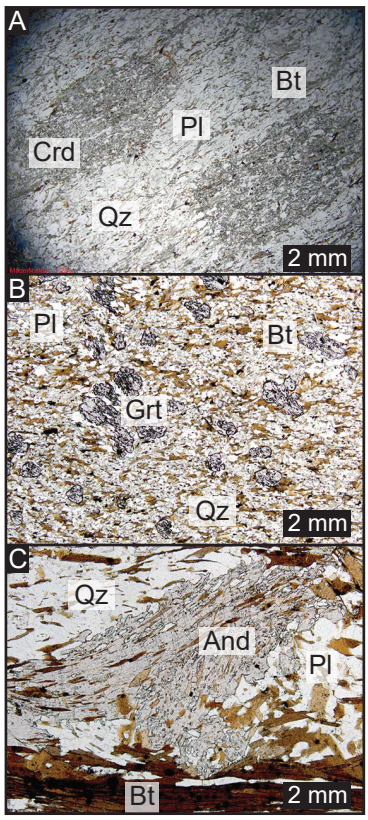


Figure 4.4: Petrographic photos illustrating the presence of fabric and porphyroblasts at the macro- and microscale. (A) Photomicrograph (plane transmitted light) of cordierite schist (East Eyap) illustrating cordierite overprinting an underlying foliation defined by biotite in a fine-grained matrix dominated by plagioclase and quartz. (B) Photomicrograph (plane transmitted light) of garnet schist (NCGB13-01). Randomly oriented, inclusion-filled garnets are often fragmented in a fine-grained matrix consisting of quartz, biotite, and plagioclase. (C) Photomicrograph (plane transmitted light) of an andalusite-bearing sillimanite-staurolite schist (Akow). Inclusion-filled andalusite porphyroblasts are rotated and elongated in the orientation of the dominant foliation defined by biotite in a fine-grained siliciclastic matrix.

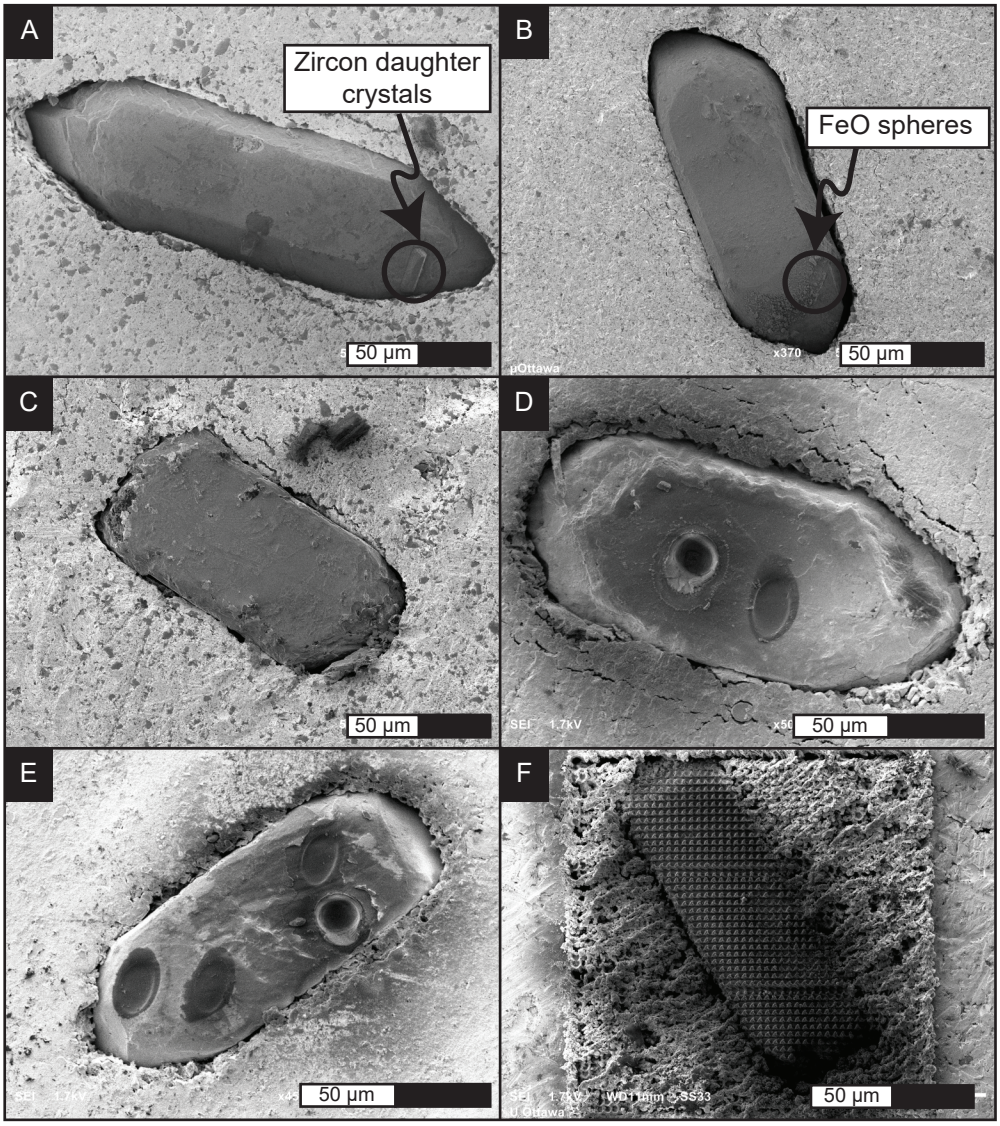


Figure 4.5: Representative SEM photographs of zircon from the NCGB. (A) Prismatic zircon crystal showing a zircon daughter crystal (as determined by SEM-EDS). (B) Very slightly rounded zircon crystal demonstrating the presence of FeO spheres (as determined by SEM-EDS) as outgrowths on the outer margins of the crystal. (C) Slightly rounded zircon crystal. (D, E) Sub rounded zircon crystals after both SIMS U-Pb and LA-ICP-MS REE depth profile analysis. The elliptical shallow spot is from the SIMS and the circular, deep pit is from the LA-ICP-MS. Note: the apparent film present in (E) is the gold coating and has no effect on the data presented. (F) Zircon crystal following the LA-ICP-MS REE mapping technique.

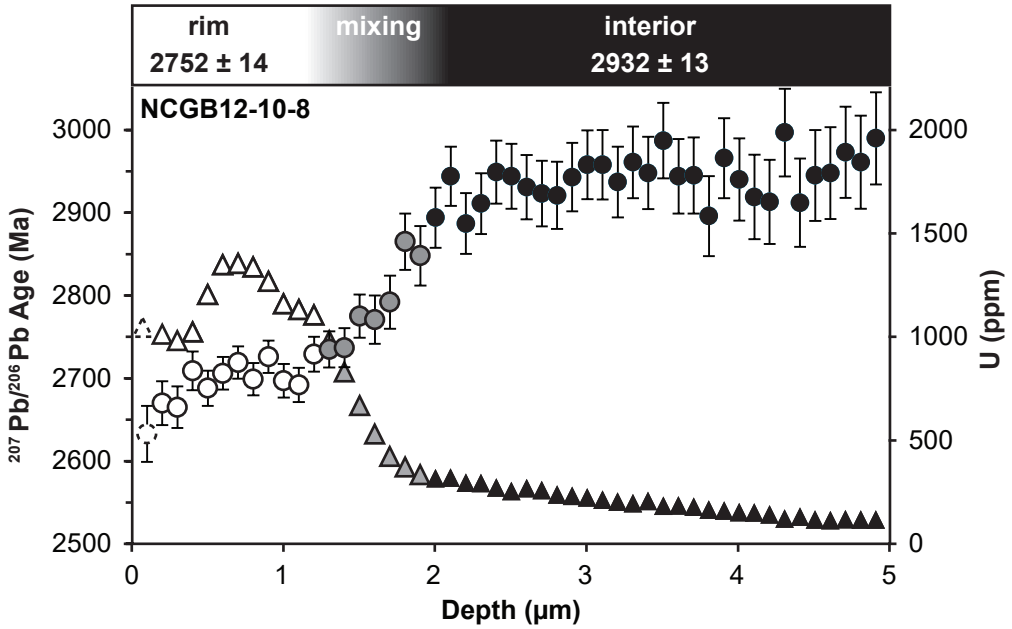


Figure 4.6: Representative SIMS U-Pb depth profile from zircon NCGB12-10-12. Zircon crystal (NCGB12-10-12) demonstrating a rim-core relationship increasing with age, and decreasing in U content. Each symbol corresponds to a single mass cycle with black circles correlating with cycles yielding a core age identified through polished SIMS U-Pb analysis. Gray and white circles represent mass cycles younger than the core age. White circles satisfy the requirements outlined in the text as rim material, while gray circles have likely sampled mixed domains at the rim-core interface. Dashed circles do not satisfy the 10% discordance limit outlined. Triangles represent the U concentrations measured within the same mass cycle. Colours correspond with the circles, and concentrations presented on the right hand axis.

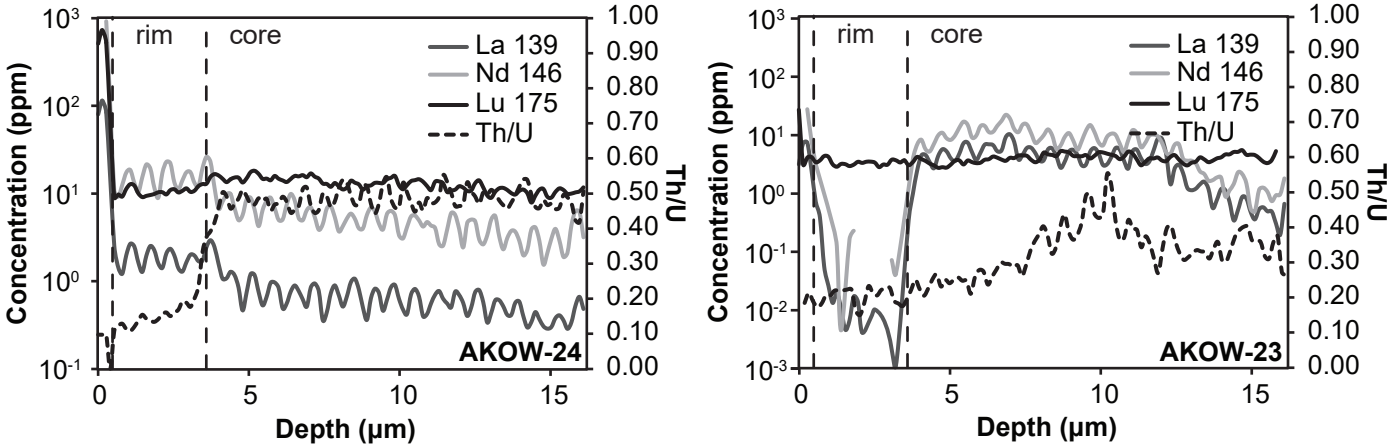


Figure 4.7: Example of depth (function of analytical time) resolved plots used to isolate rim and core values. In these examples the first two seconds of analytical time, which was excluded from concentration calculations, is noted by the left most vertical dashed line. Rims are labelled as the space between dashed lines, for which all data over the noted time interval was averaged as a representative of the REE geochemistry of rim material. Core concentrations were calculated by averaging the data following the rim and are noted as everything following the second vertical dashed line. Elements plotted cover a range ionic radii and Th/U is often used as an indicator of recrystallization. The two examples provided both demonstrate a step function in the concentration of the LREE elements while the representative HREE, Lu remains largely unchanged with depth. Th/U is lower in the rim of both samples however only follows the step function illustrated by the LREEs in one example.

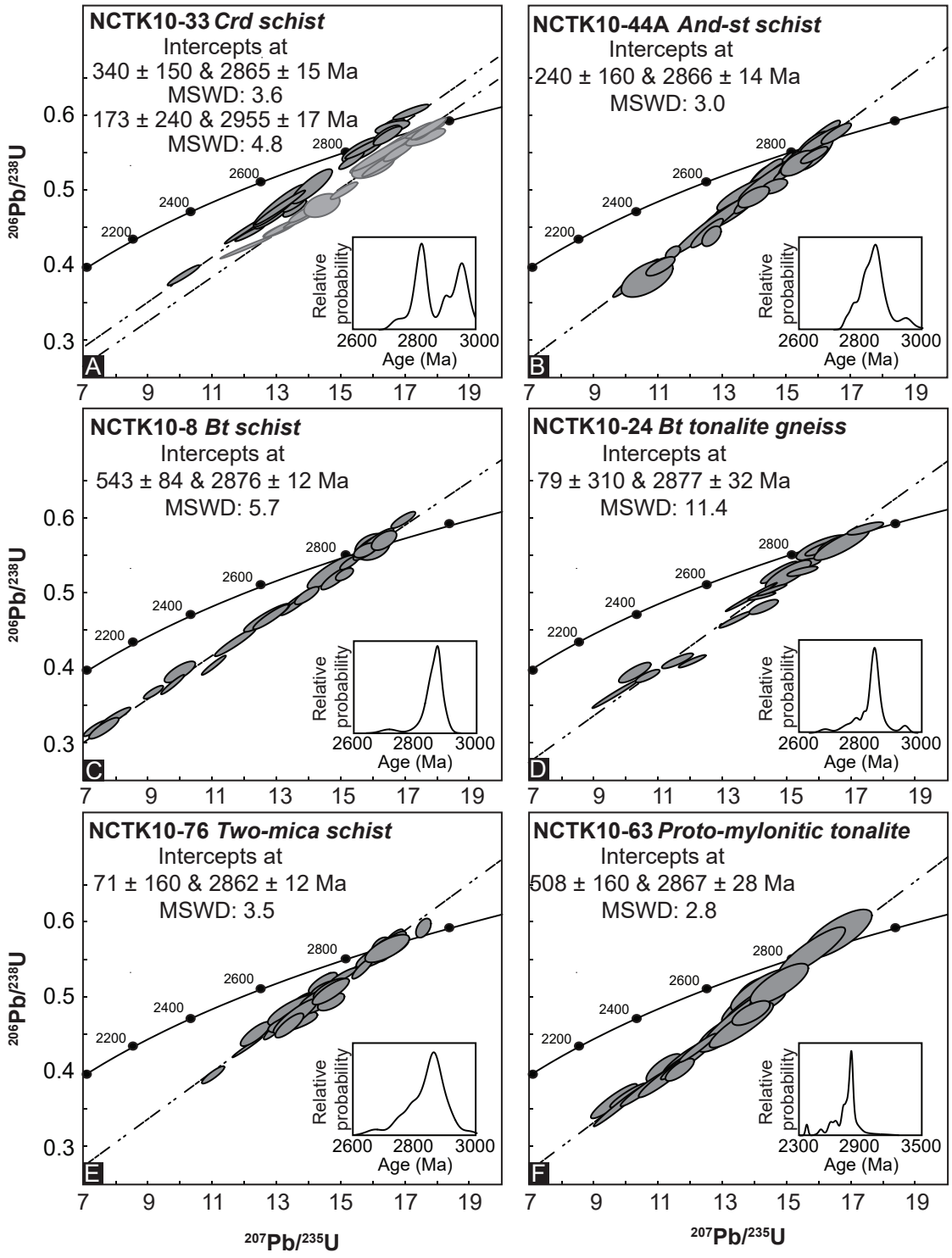


Figure 4.8: Concordia plots of U-Pb analyses of zircons from metasedimentary rocks in, and granitoid rocks marginal to, the NCGB. Error ellipses (gray) shown at 2σ. Age probability density diagrams are inset for all of all samples. Data which was largely discordant (>30%) are not plotted but are provided in (**SI Table 4.2**). An extra discordia is shown in (A) to highlight two separate age populations. Both (D) and (F) record a discord which intercepts at an age consistent with the local source of detritus.

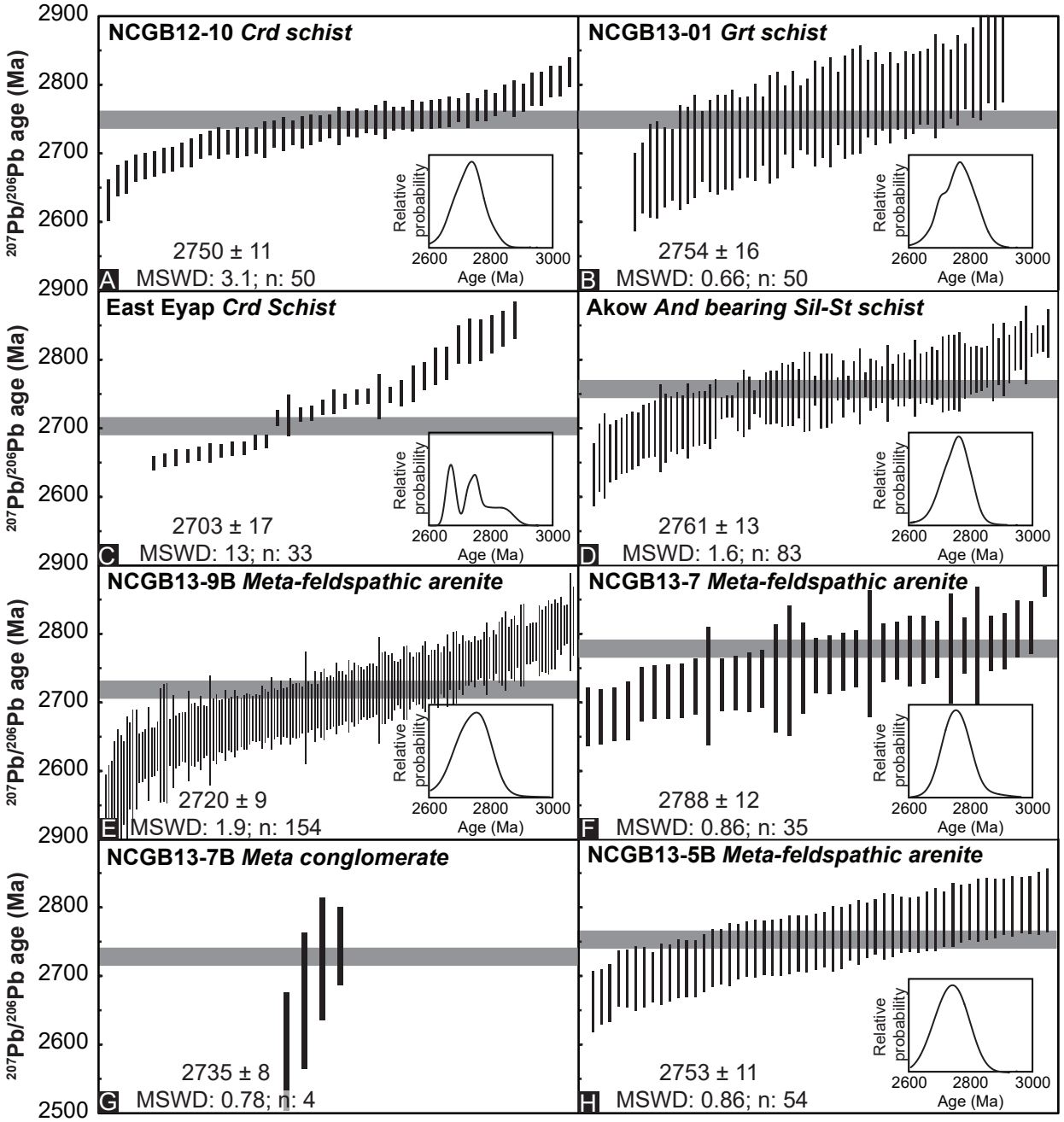


Figure 4.9: Weighted mean averages of $^{207}Pb/^{206}Pb$ ages from zircon analyzed using the U-Pb depth profile technique. Vertical black bars (2σ) represent single mass cycles which have been identified as rim material using the criteria described in the text. Resolved rim ages are reported with uncertainties of 2σ and are presented as horizontal gray bars. Insets are the probability density plots for the same rim material. Figure (C) is a sample, which may yield two age populations within the rim material at ca. 2750 Ma and ca. 2665 Ma.

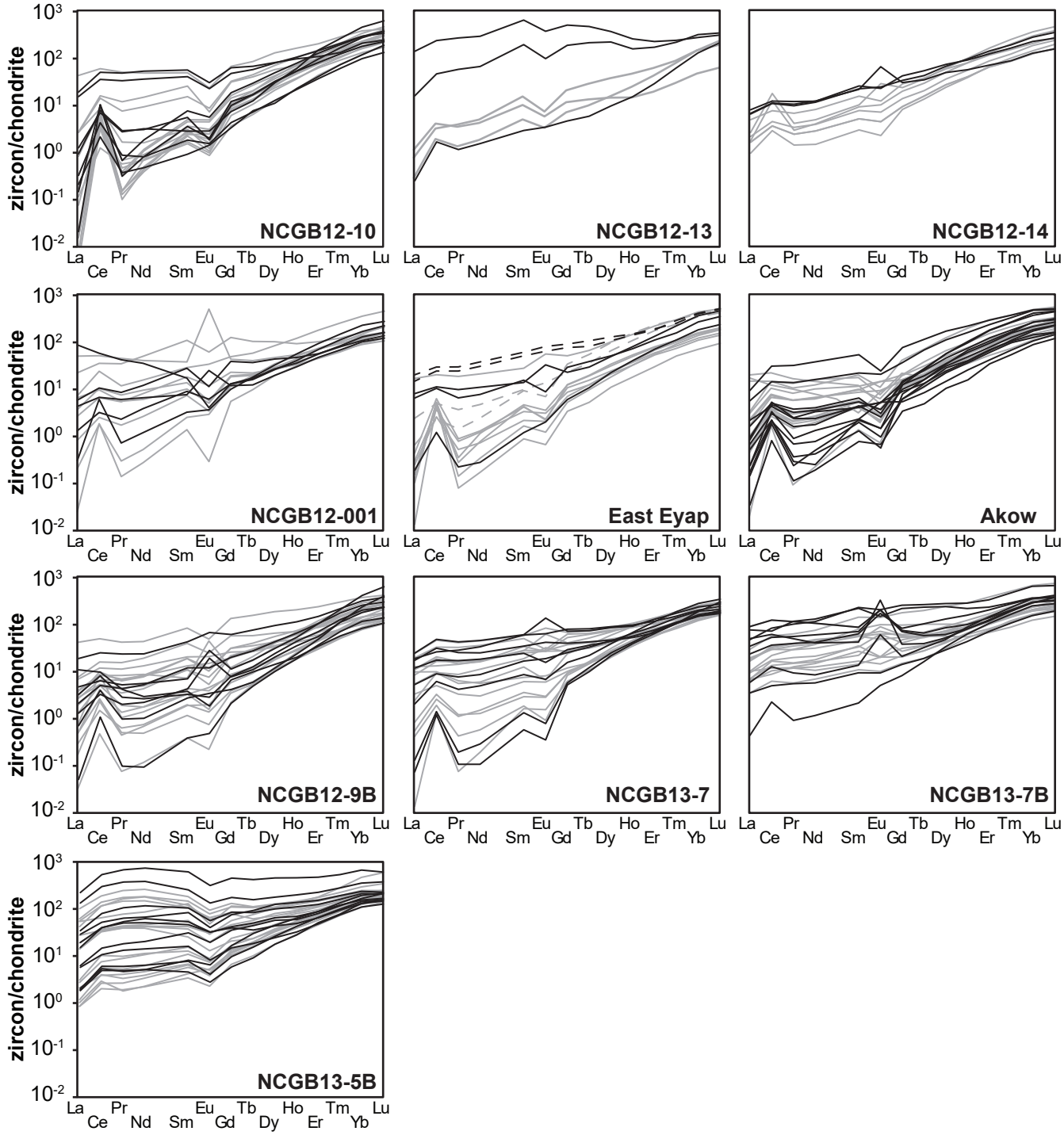
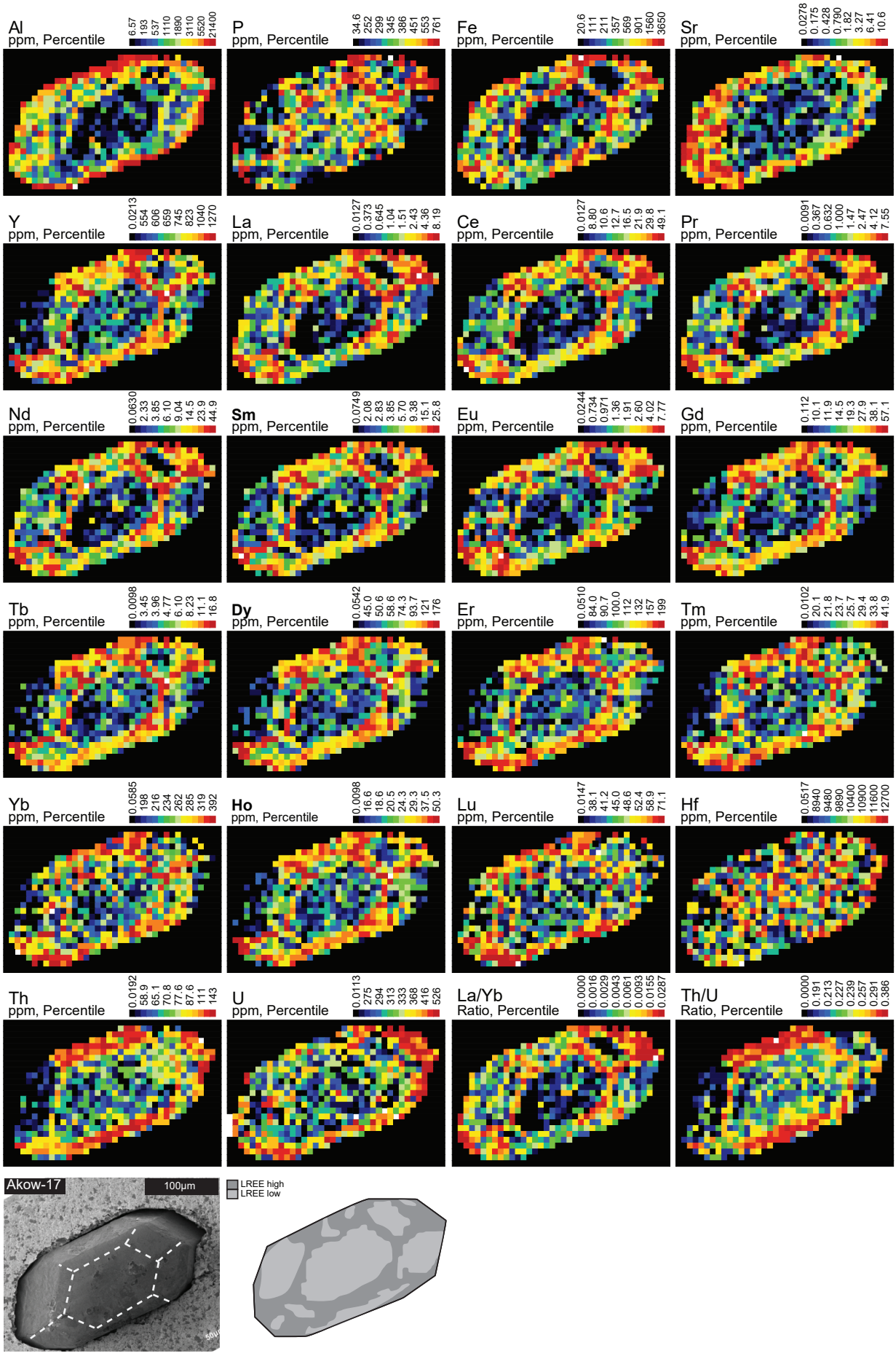


Figure 4.10: LA-ICP-MS REE chondrite-normalized spider plots for detrital zircon from the NCGB as collected via depth profile. Data has been normalized using the values of Sun and McDonough (1989). Average values for the rims and cores of each spot analysis are illustrated in black and gray solid lines, respectively. Dashed lines in East Eyap represent two analyses from the same crystal. Gray lines represent the interior while black lines. Interior and rim zones were identified and separated based on concentration versus time plots as illustrated in **Figure 4.6**.


Al
ppm, Percentile
6.57 193 537 1110 1890 3110 5520 21400
P
ppm, Percentile
34.6 252 299 345 386 451 553 761
Fe
ppm, Percentile
20.6 111 211 357 569 901 1560 3650
Sr
ppm, Percentile
0.0278 0.175 0.428 0.790 1.82 3.27 6.41 10.6
Y
ppm, Percentile
0.0213 554 606 659 745 823 1040 1270
La
ppm, Percentile
0.0127 0.373 0.645 1.04 1.51 2.43 4.36 8.19
Ce
ppm, Percentile
0.0127 8.80 10.6 12.7 16.5 21.9 29.8 49.1
Pr
ppm, Percentile
0.0091 0.367 0.632 1.000 1.47 2.47 4.12 7.55
Nd
ppm, Percentile
0.0630 2.33 3.85 6.10 9.04 14.5 23.9 44.9
Sm
ppm, Percentile
0.0749 2.08 2.83 3.85 5.70 9.38 15.1 25.8
Eu
ppm, Percentile
0.0244 0.734 0.971 1.36 1.91 2.60 4.02 7.77
Gd
ppm, Percentile
0.112 10.1 11.9 14.5 19.3 27.9 38.1 57.1
Tb
ppm, Percentile
0.0098 3.45 3.96 4.77 6.10 8.23 11.1 16.8
Dy
ppm, Percentile
0.0542 45.0 50.6 58.6 74.3 93.7 121 176
Er
ppm, Percentile
0.0510 84.0 90.7 100.0 112 132 157 199
Tm
ppm, Percentile
0.0102 20.1 21.8 23.7 25.7 29.4 33.8 41.9
Yb
ppm, Percentile
0.0585 198 216 234 262 285 319 392
Ho
ppm, Percentile
0.0098 16.6 18.6 20.5 24.3 29.3 37.5 50.3
Lu
ppm, Percentile
0.0147 38.1 41.2 45.0 48.6 52.4 58.9 71.1
Hf
ppm, Percentile
0.0517 8940 9480 9890 10400 10900 11600 12700
Th
ppm, Percentile
0.0192 58.9 65.1 70.8 77.6 87.6 111 143
U
ppm, Percentile
0.0113 275 294 313 333 368 416 526
La/Yb
Ratio, Percentile
0.0000 0.0016 0.0029 0.0043 0.0061 0.0093 0.0155 0.0287
Th/U
Ratio, Percentile
0.0000 0.191 0.213 0.227 0.239 0.257 0.291 0.386
Akow-17
100µm
LREE high
LREE low

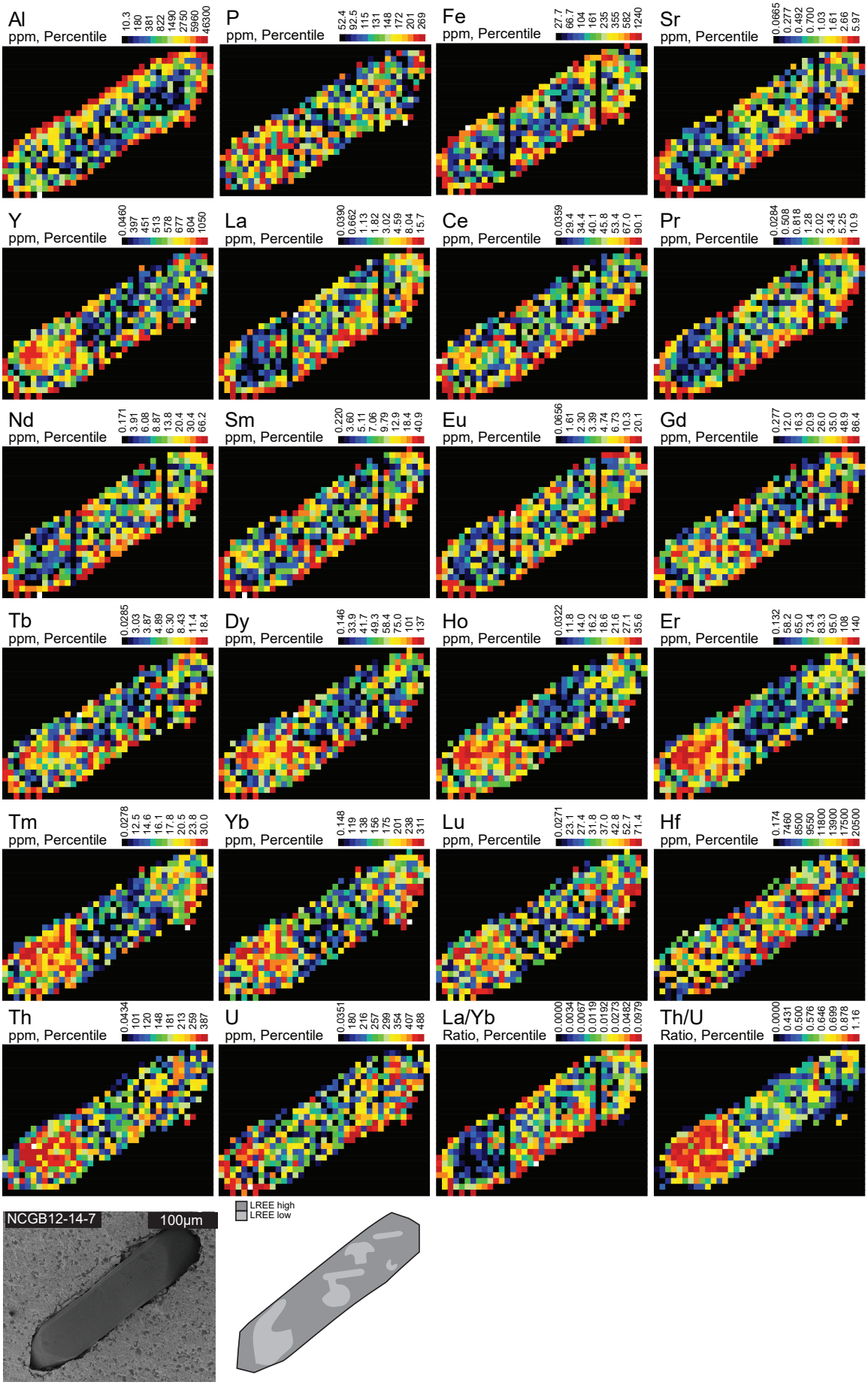

Al
ppm, Percentile
10.3 180 381 822 1490 2750 5960 46300
P
ppm, Percentile
52.4 92.5 115 131 148 172 201 269
Fe
ppm, Percentile
27.7 66.7 104 161 235 355 582 1240
Sr
ppm, Percentile
0.0665 0.277 0.492 0.700 1.03 1.61 2.66 5.97
Y
ppm, Percentile
0.0460 397 451 513 578 677 804 1050
La
ppm, Percentile
0.0390 0.662 1.13 1.82 3.02 4.59 8.04 15.7
Ce
ppm, Percentile
0.0359 29.4 34.4 40.1 45.8 53.4 67.0 90.1
Pr
ppm, Percentile
0.0284 0.508 0.818 1.28 2.02 3.43 5.25 10.9
Nd
ppm, Percentile
0.171 3.91 6.08 8.87 13.8 20.4 30.4 66.2
Sm
ppm, Percentile
0.220 3.60 5.11 7.06 9.79 12.9 18.4 40.9
Eu
ppm, Percentile
0.0656 1.61 2.30 3.39 4.74 6.73 10.3 20.1
Gd
ppm, Percentile
0.277 12.0 16.3 20.9 26.0 35.0 48.9 86.4
Tb
ppm, Percentile
0.0285 3.03 3.87 4.89 6.30 8.43 11.4 18.4
Dy
ppm, Percentile
0.146 33.9 41.7 49.3 58.4 75.0 101 137
Ho
ppm, Percentile
0.0322 11.8 14.0 16.2 18.6 21.6 27.1 35.6
Er
ppm, Percentile
0.132 58.2 65.0 73.4 83.3 95.0 108 140
Tm
ppm, Percentile
0.0278 12.5 14.6 16.1 17.8 20.5 23.8 30.0
Yb
ppm, Percentile
0.148 119 138 156 175 201 238 311
Lu
ppm, Percentile
0.0271 23.1 27.4 31.8 37.0 42.8 52.7 71.4
Hf
ppm, Percentile
0.174 7460 8500 9550 11800 13900 17500 20500
Th
ppm, Percentile
0.0434 101 120 148 181 213 259 387
U
ppm, Percentile
0.0351 180 216 257 299 354 407 488
La/Yb
Ratio, Percentile
0.0000 0.0034 0.0067 0.0119 0.0192 0.0273 0.0482 0.0979
Th/U
Ratio, Percentile
0.0000 0.431 0.500 0.576 0.646 0.699 0.878 1.16
NCGB12-14-7
100µm
LREE high
LREE low

Figure 4.11 *(previous two pages)*: Representative SEM images and LA-ICP-MS trace element 2-D grain maps of zircon from the NCGB. Trace element maps are provided for all of the measured elements as well as two ratios, Th/U and La/Yb. Concentrations are reported as ppm or ratios (where applicable) and the map is presented using a percentile scaling function. Cold colours represent lower concentrations and warm colours are higher concentrations. Surface fractures are noted using dashed black lines. Simplified schematics are provided with darker gray representing areas with higher LREE concentrations.

Chapter 5

Fluid-mediated alteration of zircon under lower greenschist conditions

C.J. Kelly[1], D.A. Schneider[1], D.E Harlov[2] & S.E. Jackson[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON K1N 6N5 Canada
[2]Deutsches GeoForschungsZentrum, Telegrafenberg, D-14473 Potsdam, Germany
[3]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada

Abstract

The application of zircon for the dating of geological processes and tectonic events has become a generally widespread process. As a result, understanding how zircon interacts with aqueous fluids during metasomatism has become increasingly important. The alteration of natural zircon is driven primarily by coupled dissolution-reprecipitation or by ion-exchange with an aqueous fluid. In this study, complete, euhedral light brown zircon crystals (100 – 250 μm in length; 2 mg) from the Oligocene Fish Canyon tuff (FCT), has been experimentally reacted with an alkali bearing reactive fluid and a REE + P source (0.5 mg $CePO_4$ or 0.5 mg YPO_4). Experiments were conducted in sealed Au capsules at 350 ºC and 100 MPa for 182 days. During the experiment the FCT zircon became colourless indicating annealing of the U damaged volume in the zircon. Two-dimensional element grain maps of unpolished zircon grain surfaces were produced via Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) mapping. The resulting element maps indicate that the surface of the zircon crystals from each experiment reacted with the fluid, such that Ce and Y concentration increased by (an order of magnitude) in the $CePO_4$-bearing and YPO_4-bearing experiments, respectively, when compared with the maps of unaltered FCT zircon grain surfaces. Incorporation of REEs on the zircon grain surface likely occurred via the coupled substitution $REE^{3+} + P^{5+} \rightarrow Zr^{4+} + Si^{4+}$. The results from these experiments imply that the surfaces of minimally metamict zircon can be chemically modified by alkali-bearing fluids via ion-exchange under lower greenschist conditions and further that the zircons can be recrystallized in alkali-bearing fluids under these P-T conditions.

5.1 Introduction

Zircon [$ZrSiO_4$] is an abundant accessory mineral in many igneous, metamorphic and sedimentary rocks and has been of vital importance in the understanding of the Earth's crustal evolution because of its frequent use in U-Pb geochronology. The rare earth element (REE) composition for magmatically-derived zircon is typified by positive slope chondrite-normalized REE patterns from La to Lu with positive Ce and negative Eu anomalies (Hoskin 2005). This makes zircon a powerful tool as a provenance indicator (Bea *et al.* 1994; Bea 1996; Belousova *et al.* 1998, 2002; Chapmen *et al.* 2016; Guo *et al.* 1996; Hinton and Upton 1991; Schaltegger *et al.* 1999). The REE composition of zircon can also be used to identify crystals that have been chemically modified by hydrothermal fluids (Hoskin 2005, Kelly *et al.* 2017; Schneider *et al.* 2012).

Despite a reputation for robustness, with the ability to survive sediment transport processes as well as retain its primary geochemistry chemically through high temperature events, zircon can be chemically and isotopically altered under low P – T conditions in the presence of aqueous fluids (Geisler 2002, 2003a, 2007; Schmidt *et al.* 2006). Innovative experiments by Pidgeon *et al.* (1966, 1973, 1995) demonstrated that radiogenic Pb (Pb*) could be leached from highly metamict zircon using alkali fluids at temperatures as low as 350 ºC. These and subsequent studies have suggested that radiation damage (metamictization) from the alpha decay of U and Th is a controlling factor in the susceptibility of zircon to undergo dissolution and selective leaching (Geisler *et al.* 2003b; Krogh and Davis, 1975; Sinha *et al.* 1992; Rizvanova *et al.* 2000) via coupled dissolution-reprecipitation (Geisler *et al.* 2007; Harlov and Dunkley 2010; Tomaschek *et al.* 2003) or ion-exchange (Geisler et al 2003a, 2007; Hoskin *et al.* 2005).

In an effort to understand how zircon may incorporate REE's at low temperature, a series of hydrothermal experiments, using a well characterized natural zircon and alkali-bearing fluids, have been conducted under lower greenschist facies conditions (350 ºC and 100 MPa) for a period of 6 months. The experiments were doped with a representative LREE (Ce) and HREE (Y) as $CePO_4$ and YPO_4, respectively. Rare earth elements were introduced as phosphates in order to provide a charge compensating species (P^{5+}), with the purpose of facilitating the coupled substitution $REE^{3+} + P^{5+} \rightarrow Zr^{4+} + Si^{4+}$ (Hanchar *et al.* 2001). The chemical and structural alteration of the experimentally metasomatized zircon grain surfaces were then compared to unaltered zircon utilizing secondary electron (SE), cathodoluminescence (CL), and back-scattered electron (BSE) imaging. Quantitative analysis of material was conducted using electron probe microanalyzer (EPMA) analysis of the interiors of unaltered zircon grains as well as the rims of the polished original unaltered zircon and experimentally-altered zircon. An innovative Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) 2-dimensional grain mapping technique for the unpolished outer surface provides a unique perspective allowing for a more robust understanding of the distribution of chemical alteration.

5.2 Experimental and analytical details

5.2.1 Starting material

Zircon used in this study was sourced from the Oligocene Fish Canyon Tuff (FCT), which has a concordia age of 28.49 ± 0.04 Ma (MSWD 1.03; Schmitz and Bowring 2001). The FCT zircon was selected as it is a readily available, well-characterized (Dobson *et al.* 2008; Reiners *et al.* 2002; Schmidt and Bowring, 2001), and minimally metamict as opposed to the highly metamict zircons normally chosen for such experiments (Geisler *et al.* 2001a, b; 2002, 2003b).

Original FCT zircon crystals, when analyzed via transmitted light microscopy, are transparent and pale brown in colour with outgrowths of albite, quartz, and apatite (Figure 5.1A, B, C). They range in size from 100 – 250 μm in length. The zircon crystals are often prismatic and have minimally rounded edges, with little evidence of corrosion pits on the crystal faces (Figure 5.2A, B). They have an elongation with a median length/width ratio of ~3. Cathodoluminescence (CL) imaging of polished zircon grain cross sections reveals that the majority of the grains (95%) exhibit a rim of broadly concentric oscillatory zonation, which mantles a large homogenous core under CL imaging (Figure 5.3A, B, C). The core occupies ~50 – 75% of the crystal width. The zircon grains often contain inclusions of apatite, quartz, and albite as identified through energy-dispersive X-ray spectroscopy (EDS). Inclusions are CL dark and occur both in the rim and in the core. Inclusions range in size from 5 – 50 μm. The remaining zircon grains are characterized by relatively homogenous CL intensity (Figure 5.3D). Few grains exhibit any notable zonation in the back scattered electron (BSE) images. The zircons were not abraded following sample separation in an attempt to preserve any crystallographic imperfections on the outer most surface of the crystal, which could be exploited by the reactive fluid during the experiments.

5.2.2 Hydrothermal experiments

One set of four experiments (Table 5.1) was run at 100 MPa and 350°C for a duration of 182 days utilizing a standard cold-seal, 6 mm bore, René metal autoclave (GFZ, Germany) with H_2O as the pressure medium. The experiments (FCT zircon + fluid) were loaded into 3 mm diameter, 1 cm long gold capsules, which were then arc-welded shut and placed in a 100 °C oven

for 12 hours to check the seals. Only those capsules that showed no weight loss were used in the experiment.

The four gold capsules were then gently flattened and placed together side by side at the end of the autoclave. During the run, the experiments were buffered at approximately Ni-NiO oxygen buffer due to the presence of Ni metal filler rods, which occupied the bore of the autoclave not occupied by the gold capsules. Temperatures were measured externally by a thermocouple whose tip was inserted into the end of autoclave in the near vicinity of the gold capsules. The thermocouples are accurate to within ±3 °C. No variation in temperature was observed over the entire length of the run. The maximum temperature gradient along the length of the gold capsules is estimated to be ~5°C. Pressure on the hydrothermal line was calibrated against a pressure transducer calibrated against a Heise gauge manometer for which the quoted pressure is accurate to ±5 MPa. The autoclaves were quenched after the run using compressed air, reaching temperatures of less than 100°C within 30 seconds. The gold capsules were then removed, weighed, and punctured. No weight loss was observed. The capsules were then dried at 100 °C overnight, after which they were opened and the zircon grains removed. The zircons were then rinsed in distilled water to dissolve and remove a white evaporate crust consisting of either NaOH or KOH and any excess YPO_4 or $CePO_4$, which formed during the drying process. The dried grains were not abraded or physically agitated in an attempt to preserve any delicate features, which could have formed as result of interaction with the fluid (1M NaOH or 1M KOH).

5.2.3 Analytical methods

The sample mount consists of a 25 mm diameter aluminium disc with five In-filled wells. The reacted zircons from each experiment were then gently pressed into a well with one experiment per well. Each well contained roughly 20 zircon grains. The zircon grains were mounted with a crystal face parallel to the mount surface to allow for the chemical mapping of the complete crystal face.

Individual zircon grains were imaged with a JEOL6610LV scanning electron microscope (SEM; University of Ottawa, Canada) using secondary electron imaging (SE) in a high vacuum with a 1.7 kV beam in an attempt to identify inclusions (apatite, quartz, albite, xenotime) and fractured crystal faces. Surface outgrowths were identified using energy-dispersive X-ray spectroscopy (EDS). Following microscopy and geochemical analysis, zircon grains were polished and cathodoluminescent (CL) and backscatter electron (BSE) imaging was performed on cross sections using the same SEM equipped with a Gatan Mini-cathodoluminescence detector. The acceleration voltage was set to 15 kV, while other parameters were adjusted to get maximal contrast on the images.

A Photon-Machines Analyte 193 nm ArF Excimer laser ablation system, coupled to an Agilent 7700x quadrupole ICP-MS system (Geological Survey of Canada, Canada), was utilized for the 2-dimensional REE mapping of individual zircon grain crystal faces. This 2-dimensional mapping approach has been successfully employed in the element mapping of polished sulphide phases (Gao *et al.* 2015) as well as unpolished zircon (Kelly *et al.* 2017). The chemical mapping technique, when applied to unpolished zircon crystal faces, allows for the investigation of chemically modified material on the surface of the altered crystal. The unpolished grains were mapped using a grid of independent but contiguous 7 μm circular spots, resulting in nearly 100%

grain coverage. Analysis was performed as multiple "lines of spots," with each analysis commencing with a 20 s background measurement. Each spot in the line received a single cleaning shot followed by a 1.5 s delay (flushing), and then by 30 shots at an energy density of 7.13 J/cm^2. This resulted in the outermost <3 μm of the crystal face being excavated and integrated at each ablation spot, absent of any surface contamination from the ablation of adjacent analyses. This present methodology differs from traditional mapping techniques that ablate each line as a continuous linear analysis, which can result in some lateral mixing of chemical signatures. A total of 23 elements were measured: Al, Si, P, Fe, Sr, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Th, and U. Dwell times ranged from 4 ms (major elements) to 30 ms (trace elements). For calibration, an external standard (NIST 612) was analyzed twice after every sixteen lines of analysis spots on the zircon crystal face. When analyzing the NIST612 standard at this frequency, there is typically less than 5% drift in the calibration factors between the consecutive bracketing pairs of the standards (Table 5.2). This effect is further reduced via a linear drift correction. Thus, analyzing standards after every 16 lines of analytical spots on the sample is sufficient for achieving a reproducible (<5%) calibration across (and between) individual zircon grains. SiO_2 was used as an internal standard (32.78 wt%). The low concentration of P present in NIST 612 means that the element map for P should be viewed as qualitative data. Data reduction was completed using in-house software, LAMTRACE, for the calculation of concentrations for each spot and PixeLAte for the generation of element distribution maps. The maps are produced using a colour scale comprised of 16 colours (barring size limitations) ranging from black to dark blue for low element concentrations, through orange and red for high element concentrations. The software allows for the visualization of the data using linear, logarithmic, or percentile scaling functions. In addition to

single element maps, the PixeLAte software allows for the creation of element ratio maps (La/Yb, Yb/Gd and Th/U).

Quantitative analyses of the primary zircon and the experimentally reacted zircon grain interiors were completed using a JEOL JXA-8230 Superprobe at the University of Ottawa (Canada) (Table 5.3). The acceleration voltage was 20 kV at 50 nA beam current. The spot size was 2 μm. Counting times per single spot analysis were 20 s for ZrLα and SiKα, 40 s for HfMα, YLα, CaKα, BaKα, MgKα, AlKα, CeLα, LaLα, LuLα and PKα, and 120 s for UMα, ThMα, KKα, and NaKα for the peak and the background, respectively. The standards were albite for Na Kα; $CePO_4$ for Ce Lα; Diopside #1 for MgKα, CaKα; Sanidine for KKα; $LaPO_4$ for LaLα; Smithsonian fluoroapatite 2 for PKα; ThO_2 for ThMα; YIG for YLα; UO_2 for UMα; zircon for ZrLα, SiKα; Hafnon for HfMα, and $LuPO_4$ for LuLα. An exponential background correction was used for P and Y, a polynomial correction was used for Mg and K, and all other background corrections were linear. Raw count data were corrected using a phi-rho-Z matrix correction routine (Armstrong *et al.* 1988). Results are the average of six points. Estimated detection limits are on the order of 0.002 – 0.032 wt% for the trace elements.

5.3 Results

5.3.1 Characterization of the starting material

Electron microprobe (EMP) point and line geochemical measurements were collected on a representative population of the starting zircon (Table 5.3). Points were placed at the center and near the edges of the polished zircon cross sections in order to determine the primary chemistry. The median ZrO_2 concentration of the unreacted zircon grain interiors (n: 46 analyses of 20 zircon crystals with the EMP) is 66.05% and the median SiO_2 content is 32.49%. Electron

microprobe analyses revealed the presence of Hf (0.83–1.5 wt%) as well as minor amounts of Na (~20 ppm), Mg (~50 ppm), P (~610 ppm), Y (~1250 ppm), La (~90 ppm), Ce (~190 ppm), Lu (~110 ppm), Th (~210 ppm) and U (~380 ppm) whereas K and Ca are rarely present in concentrations above EPMA detection limits (Table 5.3). Calcium concentrations are typically <45 ppm indicating that the sample is virtually unaltered (Geisler *et al.* 2002).

Two-dimensional element maps of unreacted zircon crystal faces, created via LA-ICP-MS methods, reveal that individual elemental concentrations can range by an order of magnitude over the dimensions of the crystal face (Figure 5.4A, B; SI 5.2). The range of concentrations for each element is relatively consistent between zircon grains. Element maps for LREE (La – Sm) and Hf show that the element distribution on the surface of the unaltered zircon is heterogeneous with concentrations apparently having little correlation between adjacent spots (Figure 5.4A, B).

Conversely, the element maps for Al, Fe, Sr, Y, MREE (Eu – Ho), HREE (Er – Lu), Th, and U commonly show domains which are irregular in shape and typically <50 μm across, but are characterized by similar elemental concentrations (i.e., similar map colours; Figure 5.4A, B). These domains are usually located near the center of the grain and occur in the same spot for all these elements. In addition to single element maps, element ratios were plotted. The maps for Th/U often resemble the same domains as seen in the majority of single element maps, with elevated values occurring where MREE, HREE, Th, and U show the highest concentration for the same area of the zircon crystal. Th/U values can range from ~0.2 to ~0.8 for a single zircon crystal face (Figure 5.4A, B). Conversely, for the same domains, the map for La/Yb indicates lower values occurring where HREE show the highest concentrations. The Yb/Gd ratio is the least predictable and the ratio ranges by multiples of 2 to 4.

5.3.2 Characterization of reacted zircons

Reacted unpolished FCT zircon grain surfaces were investigated using optical microscopy and SEM imaging methods. Over the course of the experiments, the zircon became totally transparent and lost much of their colour (Figure 5.1D, E, F). However, surface outgrowths of albite, quartz, and apatite were preserved intact as noted for the unaltered zircons. While few grains exhibit little or no mineralogical evidence of modification on the outer surface of the crystals (Figure 5.2E), the majority of grains are characterized by the presence of a spotted texture, which covers most of the crystal surface (Figure 5.2C, D). These spots, which appear darker in the SEM images, have a zircon-like chemistry as demonstrated by EDS analyses. Another texture noted in the altered zircon is a "skin-like" layer, which is commonly porous and irregularly distributed on the crystal surface (Figure 5.2F), which preserves the zircon mineral chemistry.

A sample of the reacted zircon from each experiment was mounted in an epoxy grain mount and polished down to a cross section and then investigated using CL and BSE imaging. Under BSE (Figure 5.3F) and CL imaging the interior of the altered zircons grains show no evidence of alteration when compared to the original FCT zircon grain interiors, i.e. an oscillatory zonation which mantles an unzoned, CL homogenous core (Figure 5.3B, E).

5.3.3 Incorporation of REE on zircon crystal faces

Experimentally altered FCT zircon from each of the experiments, displaying a variety of surface textures, grain size and fracturing, were selected for 2-D elemental mapping on the unpolished crystal face. Element maps of crystal faces of altered zircons from either the experiments involving 1 M KOH or 1 M NaOH showed no distinctive differences (Figures 5.4A, B and 5.4C, D, respectively). Elements, which were not added in excess to the experiment show

concentrations and ranges comparable to those of the unaltered FCT zircon grains. Notably, the domains of similar element concentrations that were observed in many of the elemental maps of unaltered zircons appear to be less pronounced in the elemental maps of the experimentally metasomatized zircon.

Reacted FCT zircon crystal faces from experiments doped with YPO_4 (ZF-67,-69), show a notable increase in the Y concentration compared to unaltered zircon grain crystal faces (Figure 5.4D, F). Typically, Y concentrations are in excess of 1500 ppm, which is a ~50% increase compared to the concentrations observed on unaltered zircon crystal faces and crystal interiors as analyzed via EPMA (Table 5.3). Zircon grains from experiments doped with $CePO_4$ (ZF-66,-68), show an order of magnitude enrichment in the concentration of Ce on the crystal face when compared with the original zircon (Figure 5.4C, D). LA-ICP-MS grain maps illustrate that the unaltered FCT zircon crystal faces contain <200 ppm Ce, compared to the elemental maps of experimentally altered grains that commonly have spot analyses in excess of 1000 ppm. The range of element ratios is in agreement with the maps produced for the unaltered FCT zircon. Electron probe microanalyser point and line analysis of zircon cross-sections were unable to resolve the chemistry of a geochemically unique rim, average element concentrations of experimentally altered zircon interiors are presented in Table 5.3 with complete analytical results in SI 5.1

5.4 Discussion

5.4.1 Hydrothermal alteration of minimally metamict zircon

The lower greenschist facies conditions of the experiments (350 ºC and 100 MPa) were selected to investigate low temperature incorporation of REEs in zircon surface chemistry. Zircon mineral chemistry can be modified by interaction with a fluid via two mechanisms

(Geisler *et al.* 2007). Tomaschek *et al.* (2003) describe zircon that formed by coupled dissolution-reprecipitation. This resulted in the zircon achieving a near end-member composition relative to the original zircon prior to recrystallization, and characterized by lower trace element concentrations as well as the removal of Pb*. Alternatively, zircon can also undergo low temperature ion-exchange with an aqueous fluid (Hay and Dempster 2009; Hay *et al.* 2010; Rasmussen 2005). Depending on the element availability, the recrystallized zircon material is often enriched in REEs as well as other non-formula elements (Mg, Al, Ca, Ti, Fe) (Geisler *et al.* 2007, 2003a, b; Hoskin 2005; Hoskin and Black 2000; Kirkland *et al.* 2009; Krogh and Davis 1975; Rayner *et al.* 2005; Romano *et al.* 2004; Schneider *et al.* 2011, 2012). These processes need not be mutually exclusive: coupled dissolution-reprecipitation can occur simultaneously with ion-exchange (Hoskin 2005). Both processes are fostered by the presence of porosity and permeability on the micron- to nano-scale (Geisler *et al.* 2007).

The fact that the zircon grains changed from a pink-brown colour to totally clear and nearly white indicates that most if not all of the radiation damage in the zircon crystallographic structure was erased through annealing (Corfu *et al.* 2003). The outer surface of the zircon further records petrographic evidence of this alteration in the form of micron-scale dark spots on the surface of the crystals, as well as the presence of a porous "skin-like" residue, which occurs as isolated patches on the surface of the crystal surface, both preserving a zircon geochemistry. Recrystallization of the zircons as well as the presence of the surficial textures described above occurs regardless of the reactive fluid used (1 M KOH or 1 M NaOH).

Quantitatively, evidence of recrystallization is seen by comparing LA-ICP- MS element maps of original zircon grain and reacted zircon grain surfaces. It appears that regardless of the reactive fluid (1M KOH or 1M NaOH), minimally metamict zircon can undergo both

recrystallization and REE surface enrichment under lower greenschist-facies P-T conditions as evidenced by the incorporation of Y and Ce in zircon during the experiments. Here Y was incorporated into zircon at the crystal faces to a lesser degree than Ce despite the fact that the atomic radius of Y^{3+} approximates that of Zr^{4+} (1.019 and 0.86 Å, respectively). One hypothesis to explain this observation is the fact that the experiments were buffered to NiO oxygen fugacity, which might allow for the oxidation of Ce^{3+} to Ce^{4+}. Ce^{4+} has an atomic radius closer to that of Zr^{4+} than Ce^{3+} (0.97 vs. 1.143 Å; Shannon *et al.* 1976), and thus easier to incorporate into the zircon structure. An alternative hypothesis is that Y^{3+} was not preferentially incorporated into the zircon structure compared to Ce^{3+}, due to a simple matter of the partitioning coefficients for the fluids used, i.e. Y^{3+} preferred to remain in the alkali-bearing solution as some sort of Y-P complex. It is likely that both Y^{3+} and Ce^{3+} were incorporated into the zircon structure via the coupled substitution ($REE^{3+} + P^{5+} = Zr^{4+} + Si^{4+}$; Belousova *et al.* 1998; Dennen and Shields 1956; Hanchar *et al.* 2001; Wopenka *et al.* 1996). The inability to quantify P^{5+}, due to its low concentration in the NIST standard has hindered our capability to determine whether this is the case.

Despite being present in large amounts, neither Na nor K was incorporated in any detectable amount on the crystal faces of FCT zircon during the experiment. Hanchar *et al.* (2001) demonstrated that zircon can incorporate Li^{+}, which was sourced from the flux. Lithium is incorporated in an interstitial site in the zircon structure through an "excess REE"-type substitution ($Zr^{4+} \rightarrow REE^{3+} + Li^{+}$) (Hanchar *et al*. 2001). The lack of K^{+} or Na^{+} incorporation into zircon suggests that the atomic radii of these elements (1.18 and 1.51 Å, respectively) is too large, compared to that of Li^{+} (0.92 Å; Shannon *et al.* 1976), for either cation to be incorporated interstitially into zircon. Further, there is no evidence that "excess REE"-type substitutions (Zr^{4+}

→ $REE^{3+} + Li^{+}$) would be required. Instead, the observed alteration characteristics (mainly the incorporation of Ce and Y) are more attuned with ion-exchange occurring between the zircon grain surface and the alkali-bearing fluid (e.g. Rayner *et al.* 2004; Geisler *et al.* 2003a).

In addition to REE concentrations in zircon, the Th/U signature is a tool often used by geochronologists to assess which processes (metasomatic or otherwise) were active during (re)crystallization. Conventional interpretation of Th/U values of ~0.2 indicates that neo- or recrystallized zircon formed under metamorphic or hydrothermal conditions in the presence of a crystallizing Th-bearing phase (i.e. monazite, apatite; Harley *et al.* 2007; Moeller *et al.* 2003; Rubatto *et al.* 2009) or by the preferential purging of the larger Th ion (relative to U) during recrystallization (Hoskin and Black 2000). Th/U values >0.2 typically reflect primary igneous processes but can be seen in metamorphic rocks where the Th/U system was not modified (Moeller *et al.* 2003). Given the controlled environment in which these experiments were conducted, it is interesting to note that the reacted zircon grain surface preserved a Th/U ratio approximately the same as the value of the unreacted igneous FCT zircon grain surface despite the fact that at the same time the zircons also experienced enrichment in Ce4+ and Y4+. This suggests that Th was not mobile under the P-T-X conditions of the experiments.

5.4.2 Limitations of the data set and experimental parameters

Despite presenting evidence of the incorporation of REEs on zircon crystal faces sourced directly from an aqueous fluid under greenschist-facies the results of this study could be further augmented by the use of an older zircon for the same experiments (Table 5.1). The degree of metamictization is a controlling factor with respect to the amount of fluid-mineral interaction observed (Geisler *et al.* 2003a). Sufficient structural damage can occur at the crystalline level in

zircon to foster chemical modification over *ca.* 100 m.y., while the zircon still remains largely crystalline (Hoskin 2005, Kelly *et al.* 2017, Skipton *et al.* 2016).

Unlike open metasomatic systems commonly found in nature, the experiments presented here are closed systems. The preservation of zircon crystallinity throughout the experiment due to limited incorporation of Ce^{4+} and Y^{4+} means that under CL imaging the metasomatically altered zircon basically resembles the unaltered zircon (Figure 5.3). Without a clear boundary between altered and unaltered zircon, as demarcated by a distinct CL response, it is difficult to quantify the depth to which chemical modification occurred. This is compounded by analytical limitations of the EPMA, given the fact that chemical modification only occurred within a micron or two of the surface, line analyses would not be capable of resolving the rim thickness. The depth to which chemical modification occurred could be calculated through the application of LA-ICP-MS REE depth profile techniques (Kelly et al. 2014, 2017; Marsh and Stockli 2015; Skipton et al. 2016) and Transmission Electron Microscopy (TEM; Manning et al. 1980).

5.5 Implications and conclusions

This study of trace element behaviour in zircon has shown that minimally metamict zircon crystal surfaces that are experimentally metasomatized under lower greenschist conditions can undergo chemical modification via the coupled substitution reaction of $REE^{3+} + P^{5+} \rightarrow Zr^{4+} + Si^{4+}$. This substitution is evidenced by the increased concentrations of Y and Ce in experimentally altered grains compared to the unaltered FCT zircon, regardless of the reactive fluid chemistry (1 M KOH or 1 M NaOH). Further, variation in the element concentration of the rims is derived primarily from an external source and is not the result diffusion out of the crystal or coupled dissolution-reprecipitation processes. The LA-ICP-MS unpolished grain mapping technique can illustrate the spatial heterogeneity of the zircon composition at the crystal surfaces

for both altered and unaltered zircon alike. LA-ICP-MS mapping is able to resolve the trace element chemistry of the zircon crystal surface despite the absence of a clear cathodoluminescent response. This technique shows promise for continued application on naturally metasomatized rocks (Kelly *et al.* 2017), capable of elucidating tectonothermal events which commonly evade analytical techniques applied to polished zircon.

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Table 5.1: Summary of experimental conditions

Experiment	P (MPa)	T (°C)	Time (days)	FCT zircon (mg)	$CePO_4$ (mg)	YPO_4 (mg)	1 M NaOH (mg)	1 M KOH (mg)
ZF-66	100	350	182	1.98	0.58			2.03
ZF-67	100	350	182	2.14		0.36		2.02
ZF-68	100	350	182	1.97	0.7		1.9	
ZF-69	100	350	182	2.1		0.41	1.98	

Table 5.2: Mean background-corrected signal intensities for the NIST612 glass

Analysis	Time/Date	Si (cps)	Sr (cps)	Sr/Si (ratio)	Sr/Si (relative)	La (cps)	La/Si (ratio)	La/Si (relative)	Th (cps)	Th/Si (ratio)	Th/Si (relative)
AP11A002	1:39:01 PM, 11/04/2016	223,022	12,475	0.0559		8,049	0.0361		7,185	0.0322	
AP11A020	2:45:55 PM, 11/04/2016	217,244	12,448	0.0573	2.40%	8,430	0.0388	7.20%	8,135	0.0374	15.00%
AP11A038	4:16:27 PM, 11/04/2016	212,109	12,047	0.0568	0.90%	8,090	0.0381	1.70%	7,390	0.0348	7.20%
AP11A056	5:46:51 PM, 11/04/2016	219,367	12,467	0.0568	0.10%	8,311	0.0379	0.70%	7,857	0.0358	2.80%
AP11A074	7:17:32 PM, 11/04/2016	213,494	12,428	0.0582	2.40%	8,421	0.0394	4.00%	7,971	0.0373	4.10%
AP11A092	8:47:55 PM, 11/04/2016	209,608	12,011	0.0573	1.60%	8,108	0.0387	2.00%	7,730	0.0369	1.20%
AP11A110	10:27:30 PM, 11/04/2016	200,296	11,662	0.0582	1.60%	7,915	0.0395	2.10%	7,555	0.0377	2.20%
AP11A128	12:06:53 AM, 12/04/2016	184,629	11,093	0.0601	3.10%	7,554	0.0409	3.50%	7,357	0.0399	5.50%
AP11A146	1:45:53 AM, 12/04/2016	184,539	11,081	0.06	0.10%	7,685	0.0416	1.80%	7,553	0.0409	2.70%
AP11A164	3:24:39 AM, 12/04/2016	184,552	11,283	0.0611	1.80%	7,619	0.0413	0.90%	7,483	0.0405	0.90%
AP11A182	4:44:43 AM, 12/04/2016	172,522	10,386	0.0602	1.50%	7,308	0.0424	2.60%	7,419	0.043	5.90%
AP11A200	6:04:46 AM, 12/04/2016	166,805	10,004	0.06	0.40%	7,086	0.0425	0.30%	7,084	0.0425	1.30%
AP11A218	7:59:08 AM, 12/04/2016	176,398	10,835	0.0614	2.40%	7,613	0.0432	1.60%	7,880	0.0447	5.10%
AP11A236	9:54:20 AM, 12/04/2016	180,242	10,848	0.0602	2.00%	7,686	0.0426	1.20%	7,853	0.0436	2.50%
AP11A254	11:50:02 AM, 12/04/2016	197,784	11,896	0.0601	0.10%	8,597	0.0435	1.90%	8,719	0.0441	1.20%
	mean	**196,174**	**11,531**	**0.0589**	**1.50%**	**7898**	**0.0404**	**2.20%**	**7678**	**0.0394**	**4.10%**
	std dev	**18,124**	**779**	**0.0017**		**424**	**0.0022**		**400**	**0.0036**	
	rsd	**9.20%**	**6.80%**	**2.90%**		**5.40%**	**5.30%**		**5.20%**	**9.20%**	

Table 5.3: Average starting compositions obtained by electron microprobe and representative analyses from each experiment (in wt%)

Experiment	Starting material	66	67	68	69
Solution added		1 M KOH $CePO_4$	1 M KOH YPO_4	1 M NaOH $CePO_4$	1 M NaOH YPO_4
ZrO_2	66.05	66.14	65.49	65.43	65.70
SiO_2	32.49	32.12	31.91	32.02	32.12
HfO_2	1.244	1.134	1.315	1.267	1.413
Y_2O_3	0.125	0.229	0.121	0.178	0.118
ThO_2	0.021	0.027	0.019	0.022	0.027
UO_2	0.038	0.039	0.041	0.041	0.054
P_2O_5	0.061	0.082	0.059	0.072	0.048
MgO	0.005	0.008	0.006	0.008	0.005
CaO	0.002	0.000	0.004	0.009	0.002
Ce_2O_3	0.019	0.013	0.005	0.016	0.016
La_2O_3	0.009	0.007	0.016	0.016	0.014
Lu_2O_3	0.011	0.013	0.004	0.006	0.013
Na_2O	0.002	0.002	0.003	0.003	0.003
K_2O	0.000	0.000	0.002	0.001	0.000
Total	100.082	99.811	98.997	99.089	99.537
H_2O*		0.189	1.003	0.911	0.463

* calculated by difference

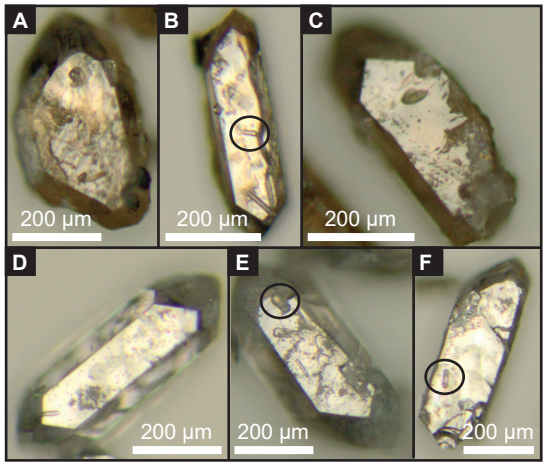


Figure 5.1: Photomicrograph of both unaltered and experimentally altered FCT zircon. (A, B, C) Representative unaltered zircon crystals characterized by a clear, pale brown colour and the presence of albite outgrowths (circled). (D, E, F) Representative examples of experimentally altered zircon crystals characterized as relatively clear and colourless, while preserving outgrowths of albite and apatite (circled).

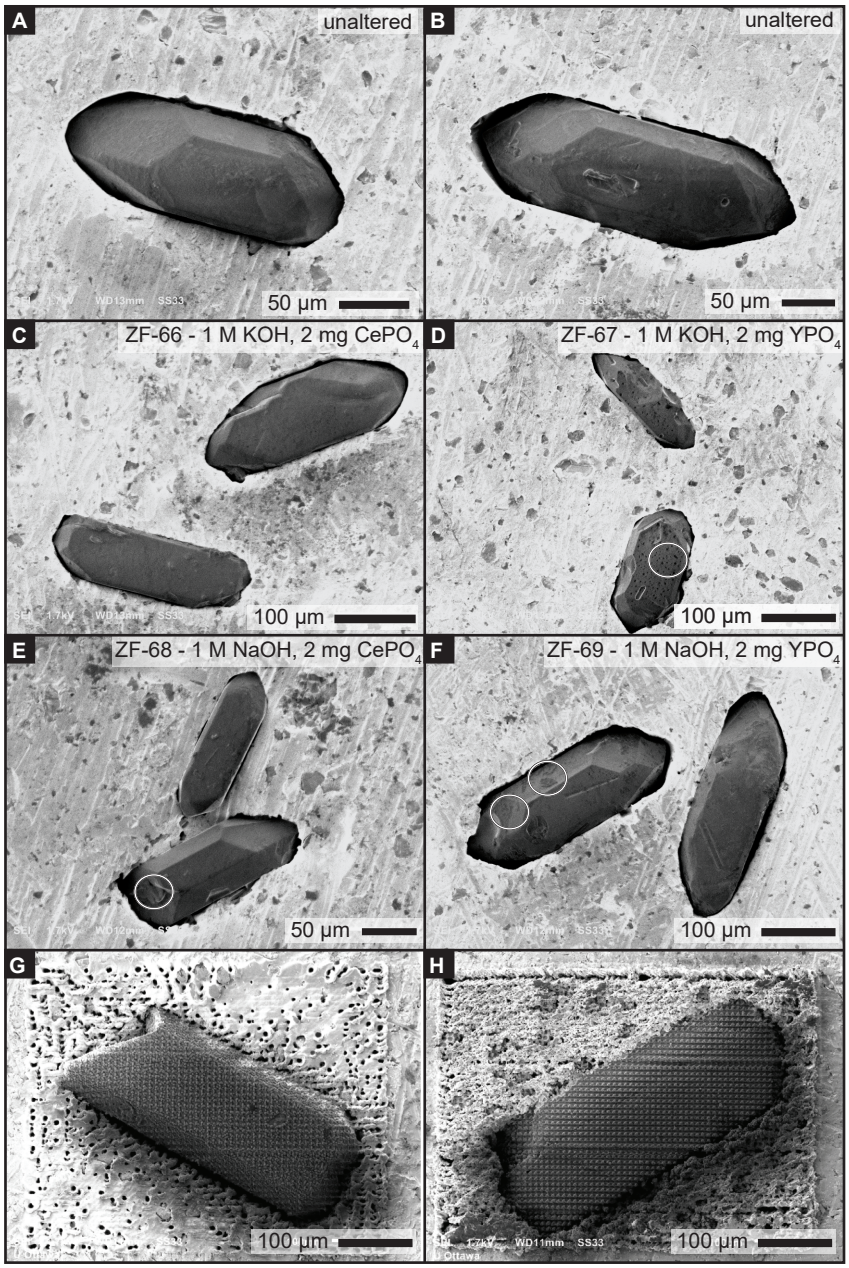


Figure 5.2: Representative SE images of both unaltered (A, B) and experimentally altered (C, D, E, F) zircon crystals embedded in indium. Note the preservation of crystal facets as well as relatively sharp crystal edges. Zircon crystals are typically elongate with a length/width median value of ~3. Reactive fluid concentrations are noted for each zircon, where applicable. (A, B, C) The zircon has a smooth crystal surface that occasionally has crystal outgrowths. (D) The zircon is characterized by the presence of dark spots on the crystal surface (circled) under SEM imaging as well as mineral inclusions of albite. (E and F) Irregular patches of slightly porous "skin-like" surfaces with a zircon-like chemistry (circled). (G, H) Representative zircon following LA-ICP-MS mapping.

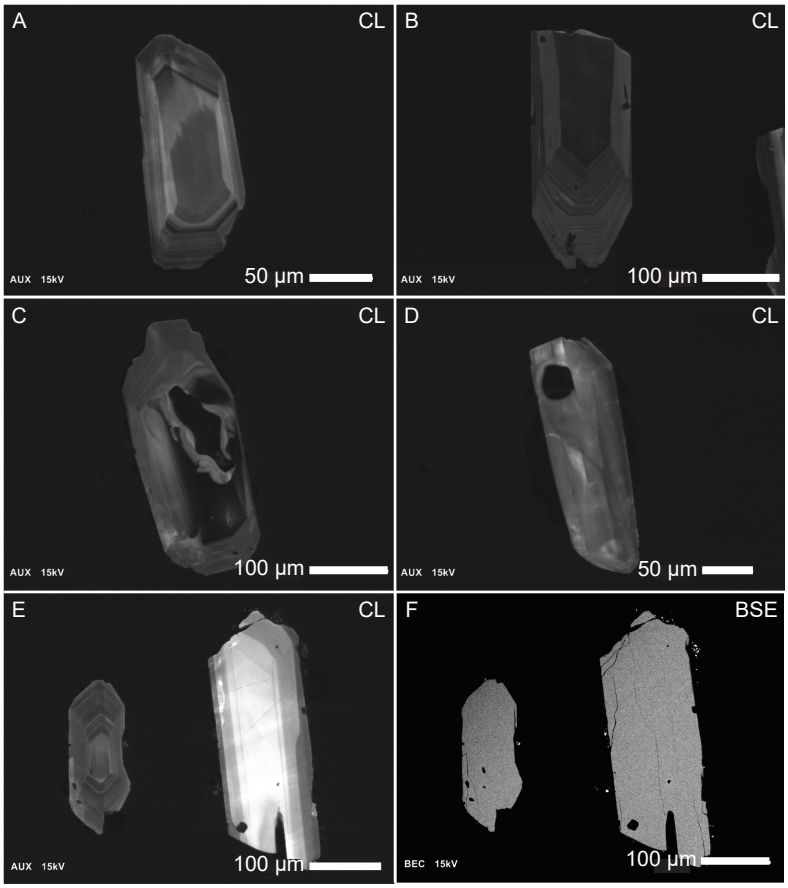
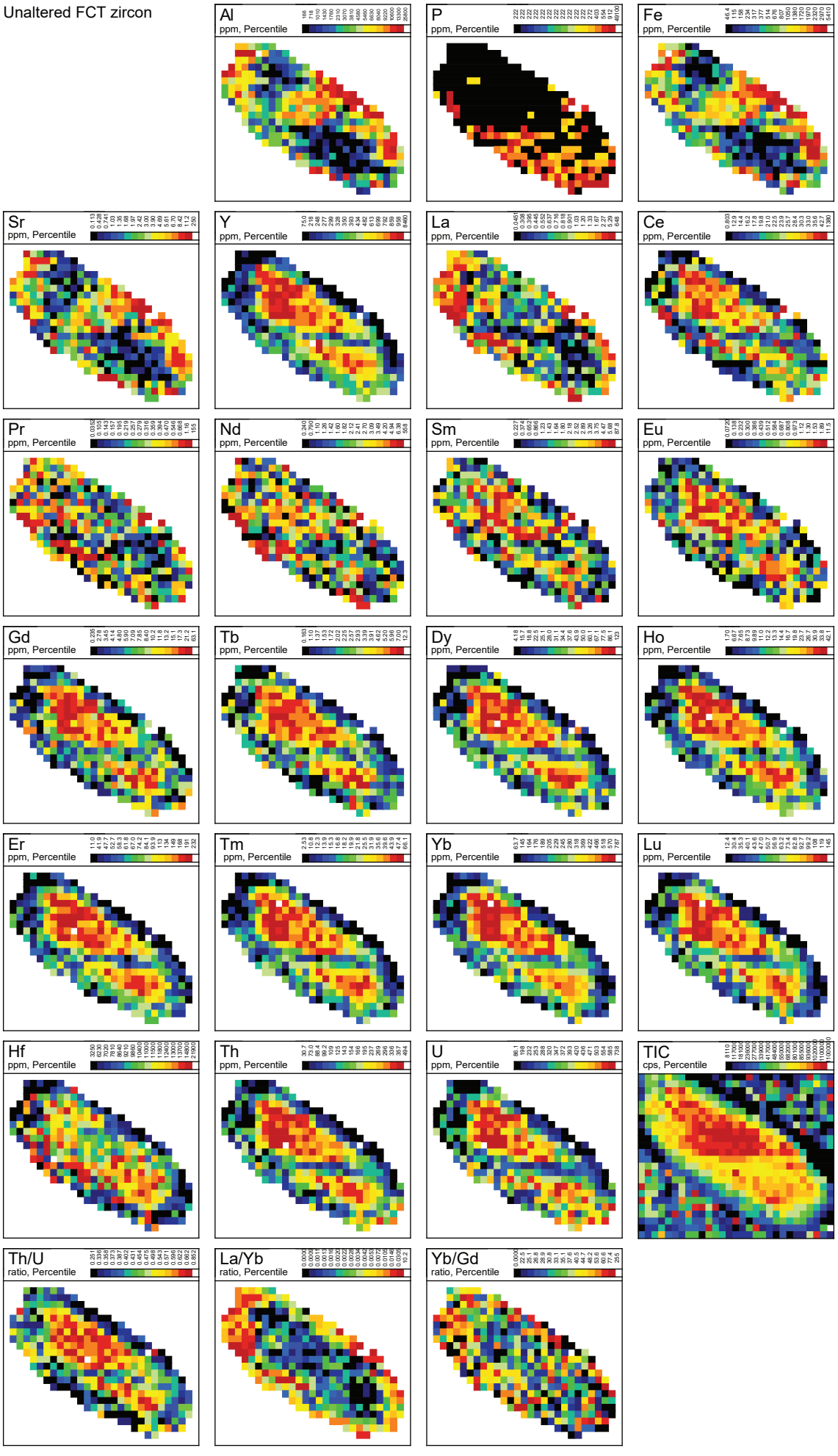
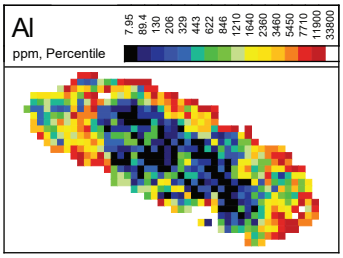


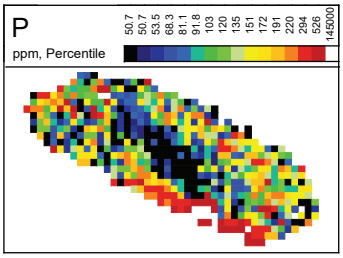
Figure 5.3: Representative CL and BSE images of both unaltered and experimentally altered zircon crystals. (A, B, C) CL images of representative unaltered zircon grains characterized by the presence of oscillatory zonation around a CL homogenous core. Inclusions of albite, apatite, and quartz may be present. (D) Representative unaltered zircon grain more or less homogenous under CL imaging. (E) SEM-CL and (F) BSE images for representative experimentally altered zircon. The leftmost grain contains thin oscillatory zonation while the grain on the right shows a broad zonation in CL. Under BSE imaging no obvious zoning is present.

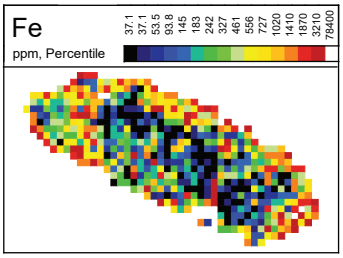
Unaltered FCT zircon

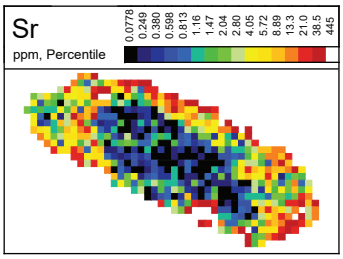


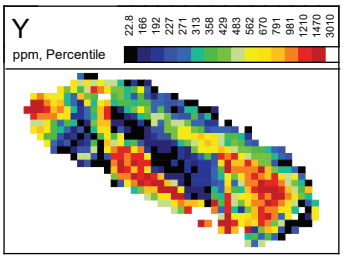
Unaltered FCT zircon

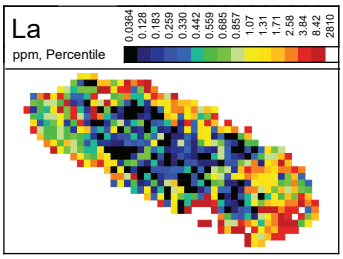


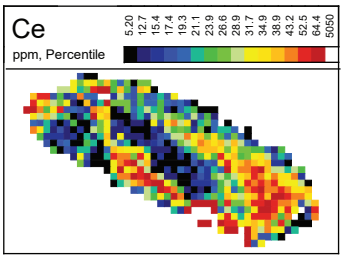


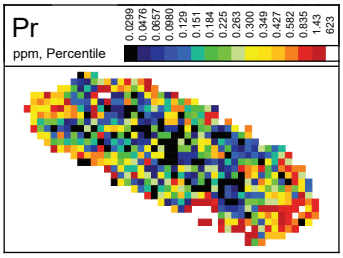


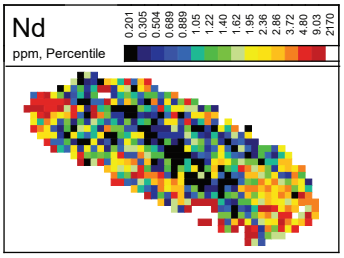


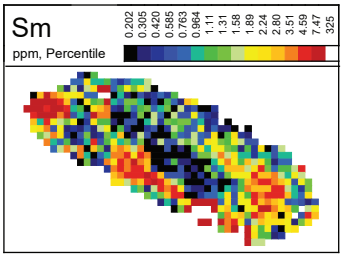


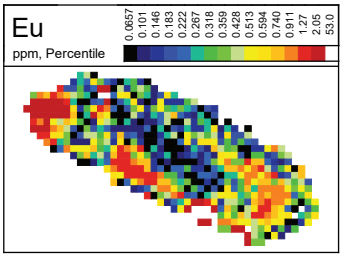


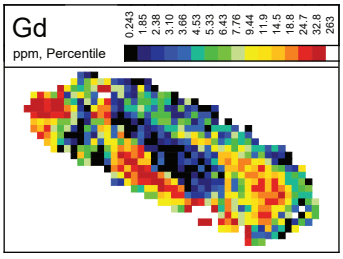


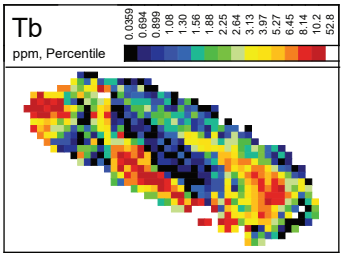


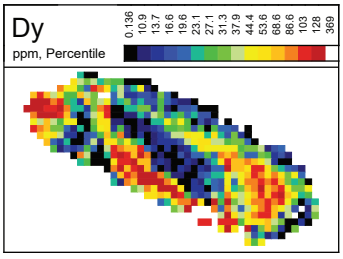


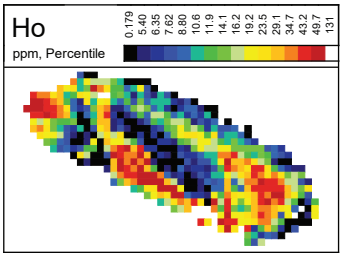


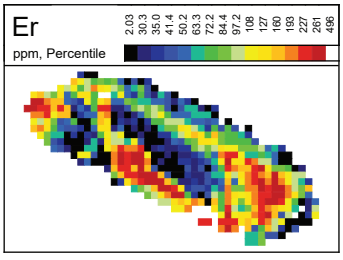


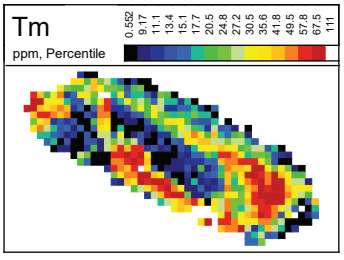


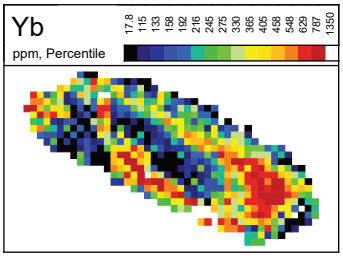


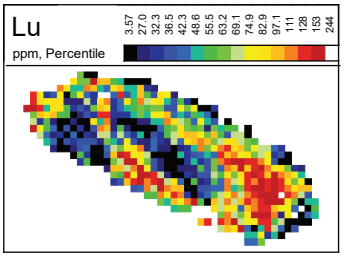


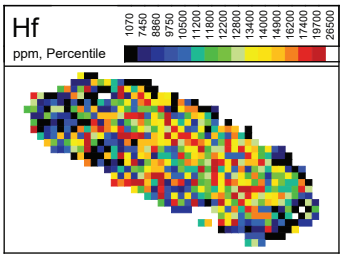


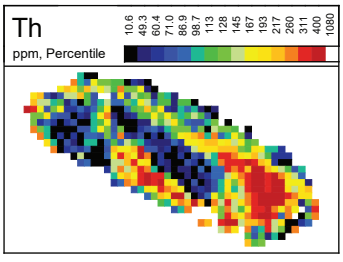


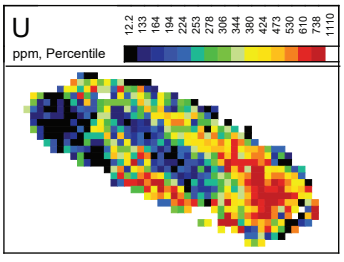


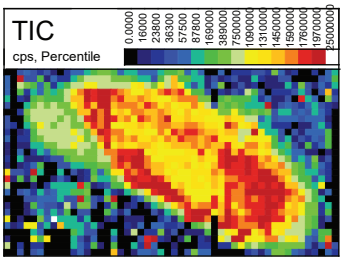


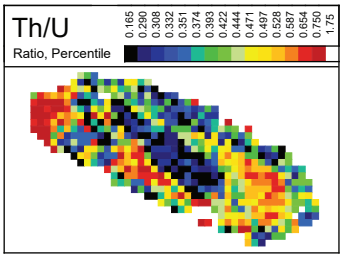


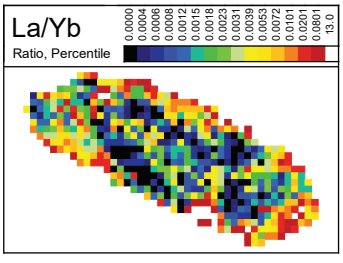


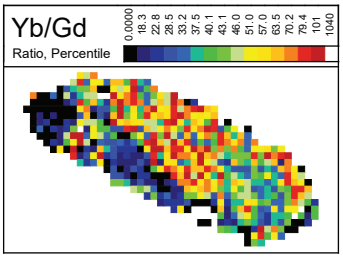




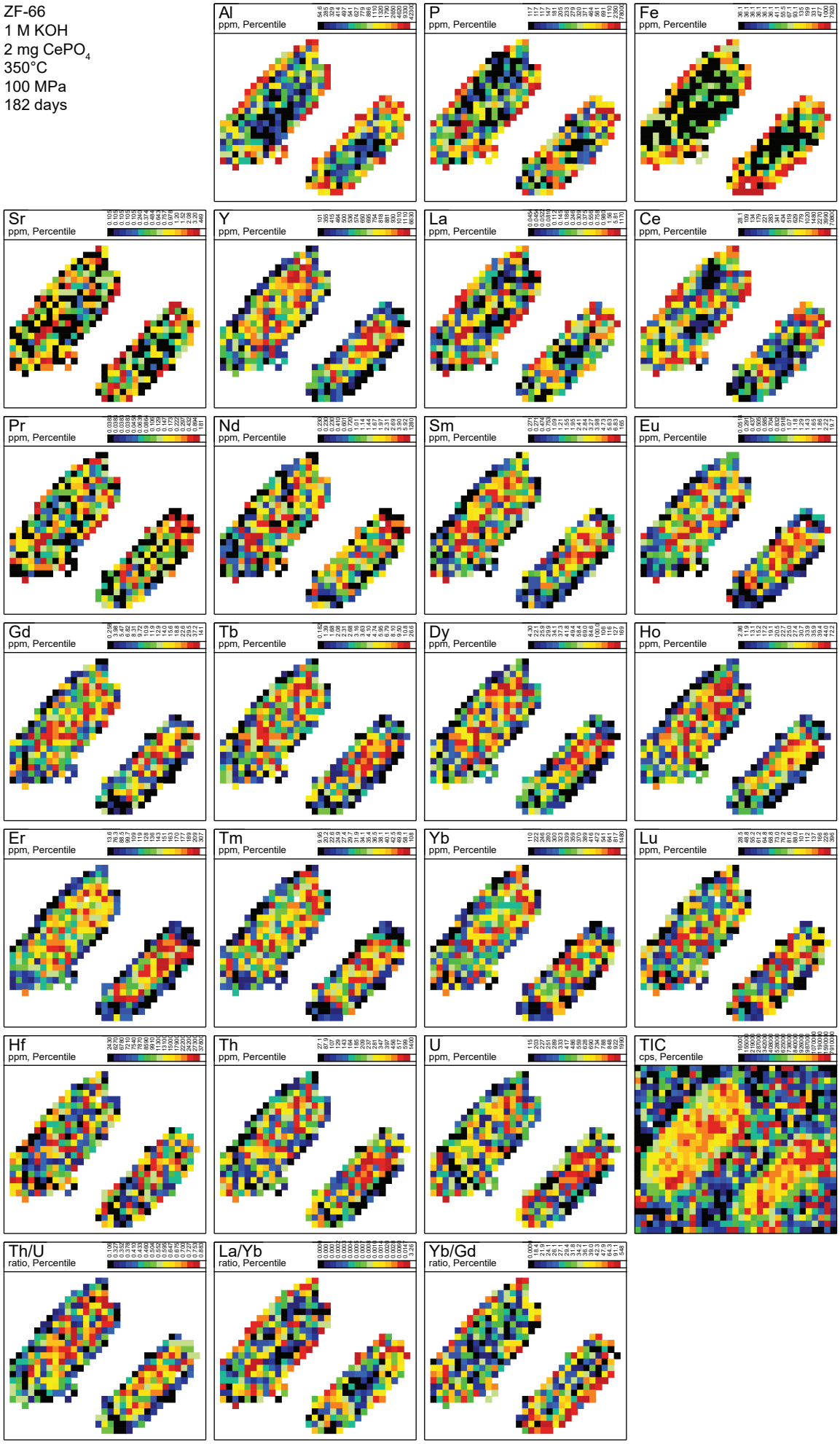




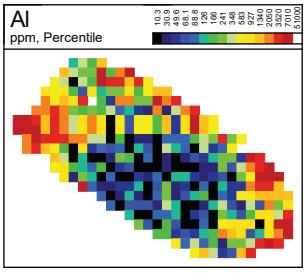


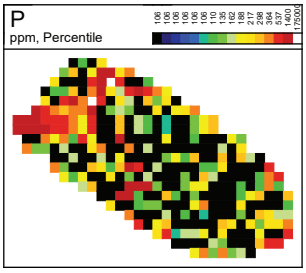


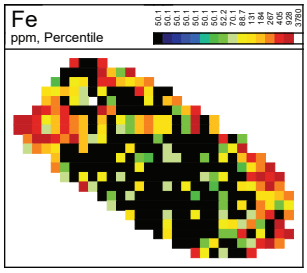
ZF-66
1 M KOH
2 mg $CePO_4$
350°C
100 MPa
182 days

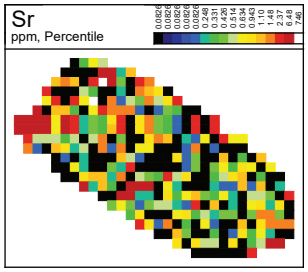


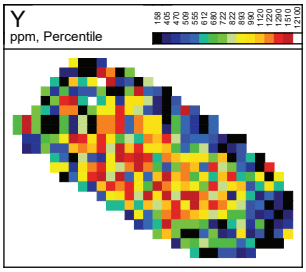
ZF-67
1 M KOH
2 mg YPO_4
350°C
100 MPa
182 days

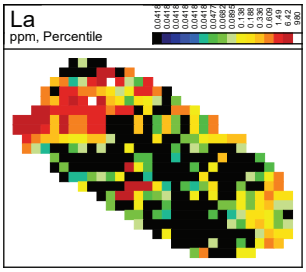


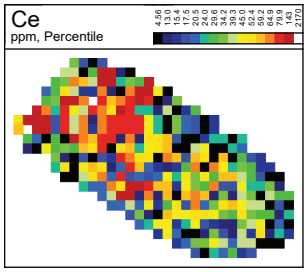


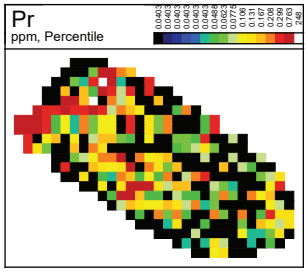


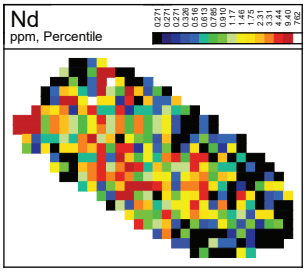


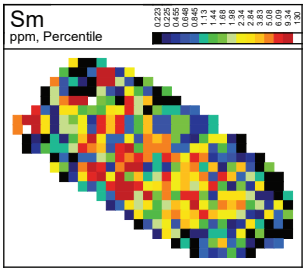


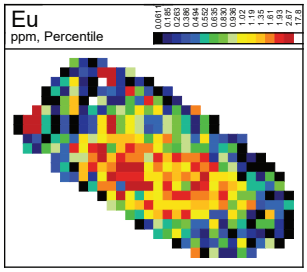


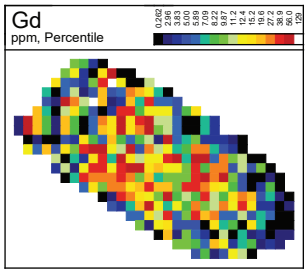


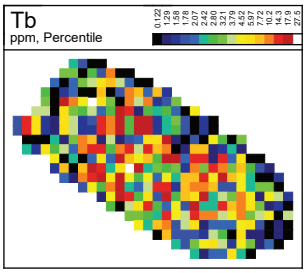


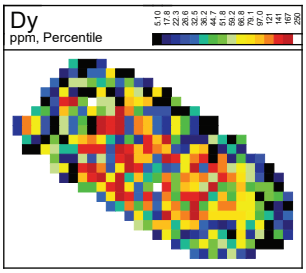


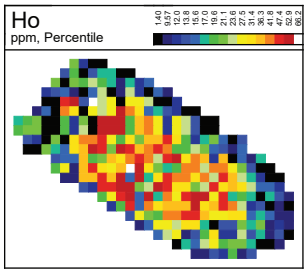


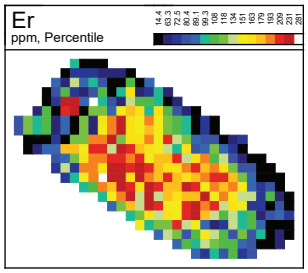


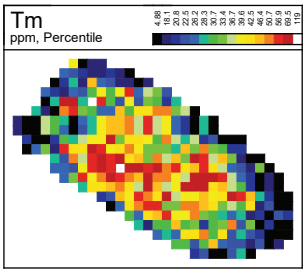


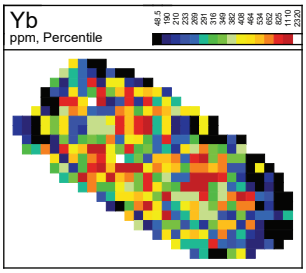


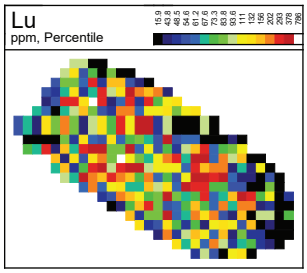


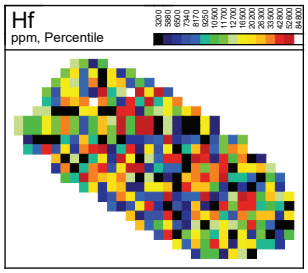


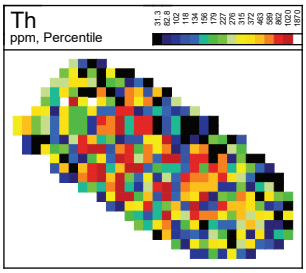


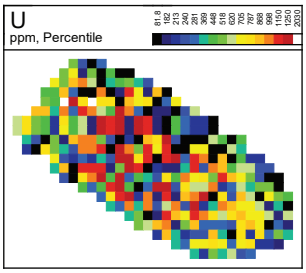


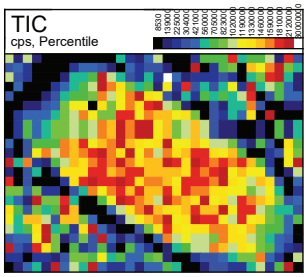


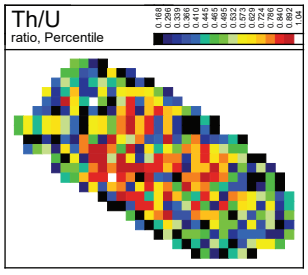


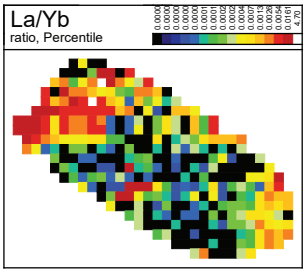


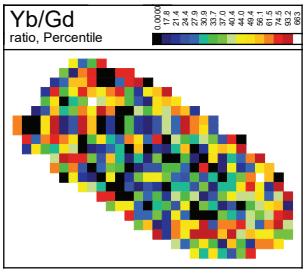




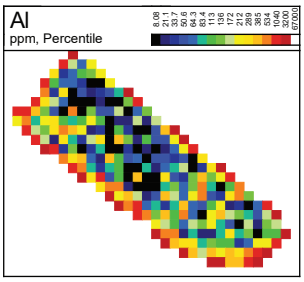


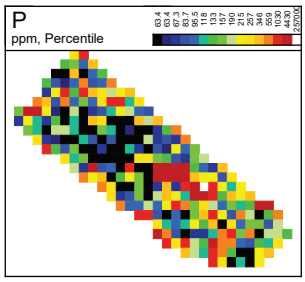


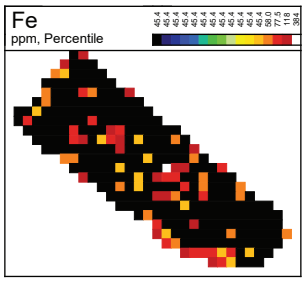


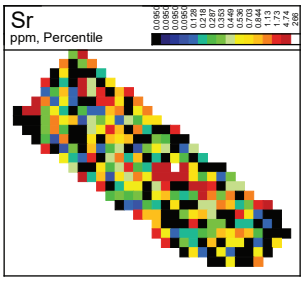


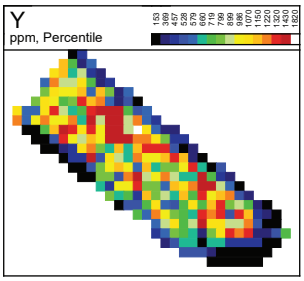
ZF-68
1 M NaOH
2 mg $CePO_4$
350°C
100 MPa
182 days

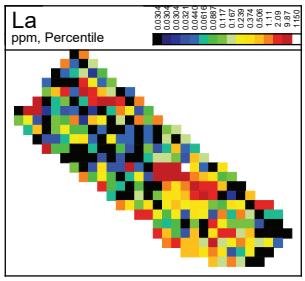


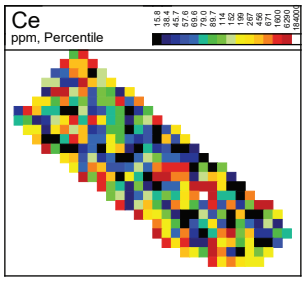


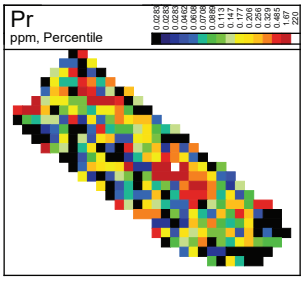


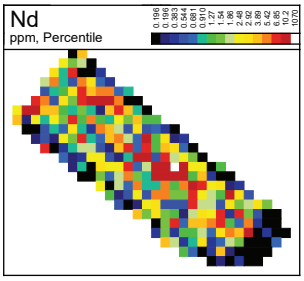


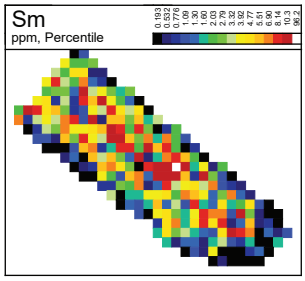


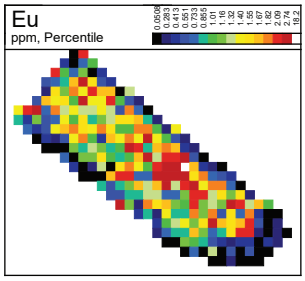


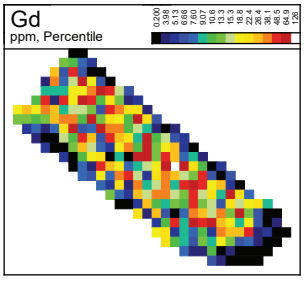


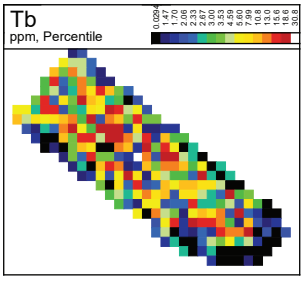


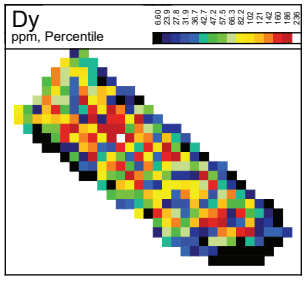


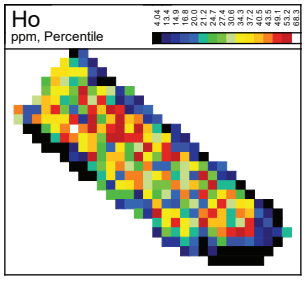


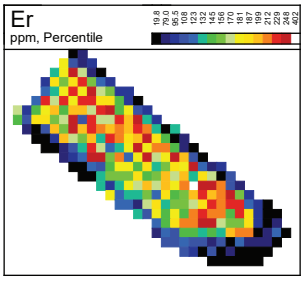


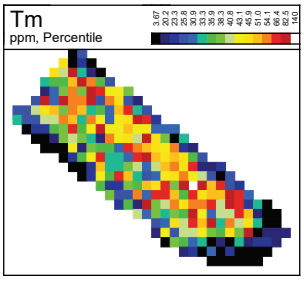


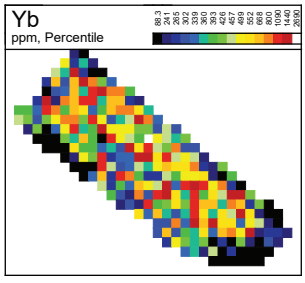


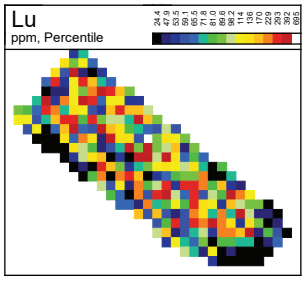


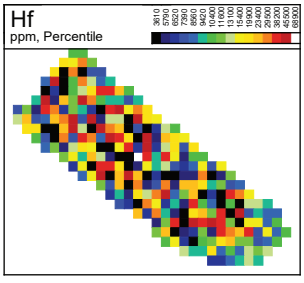


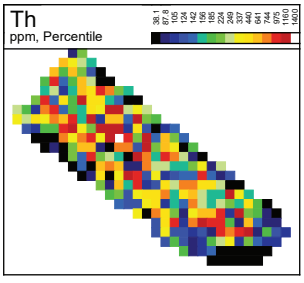


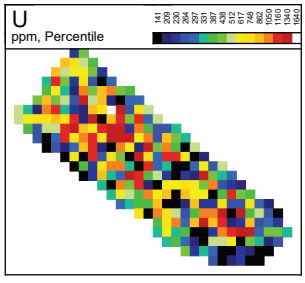


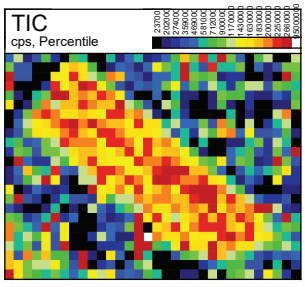


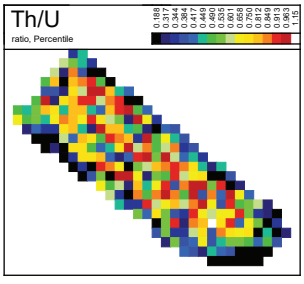


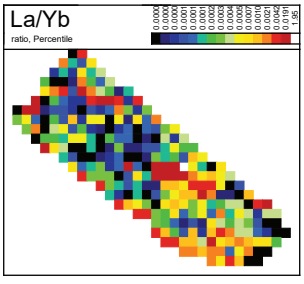


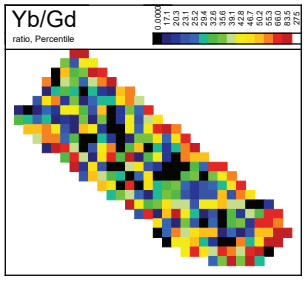




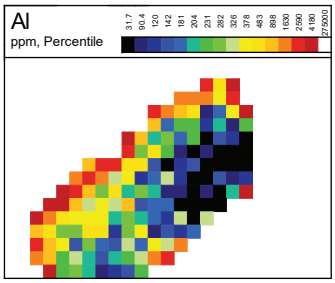


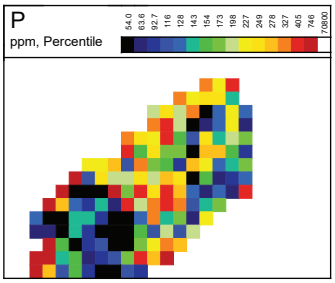


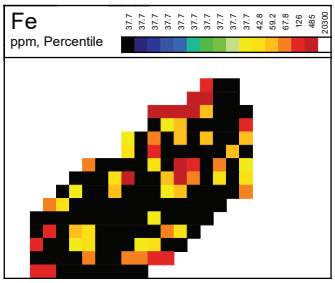


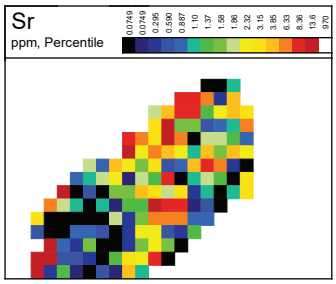


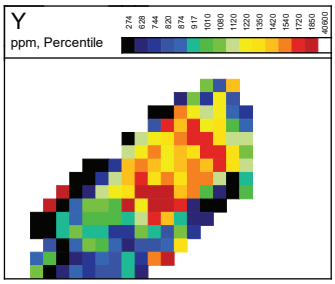
ZF-67
1 M NaOH
2 mg YPO_4
350°C
100 MPa
182 days

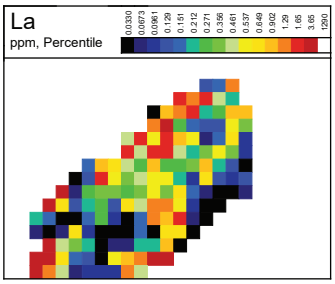


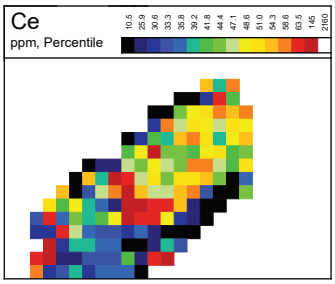


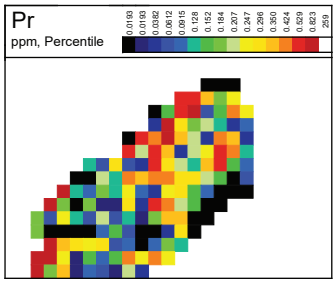


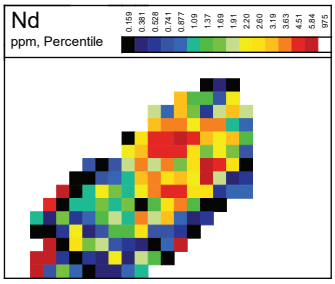


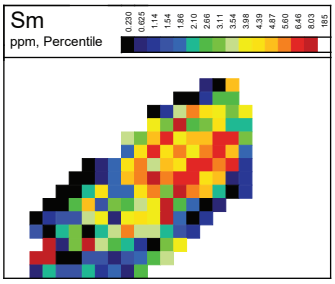


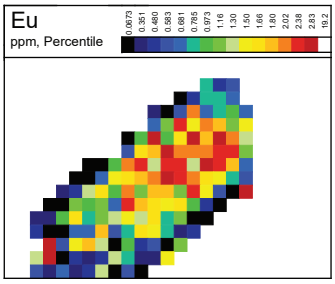


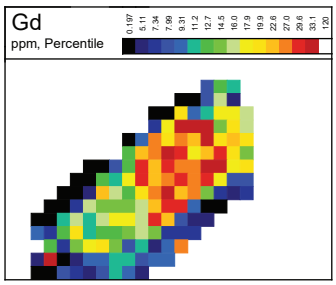


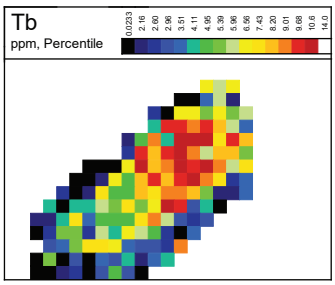


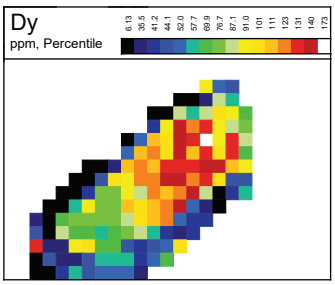


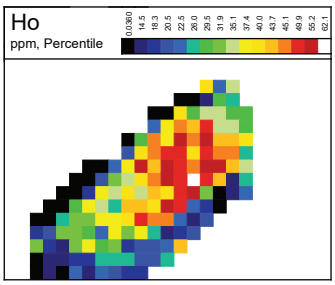


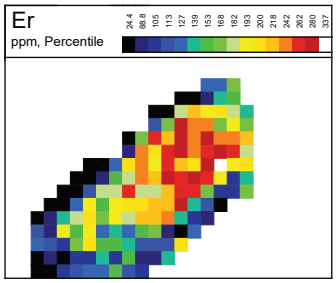


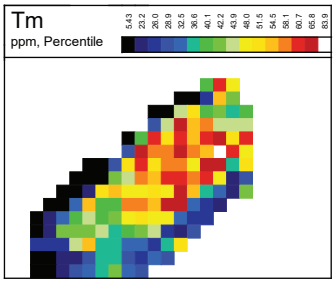


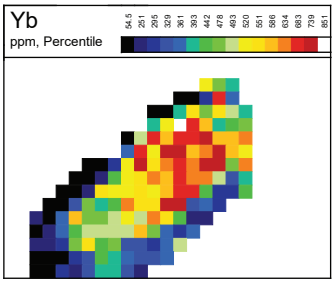


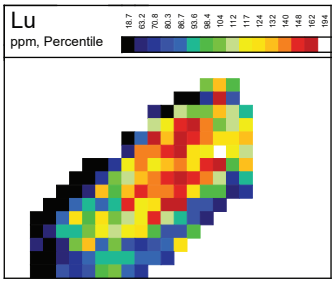


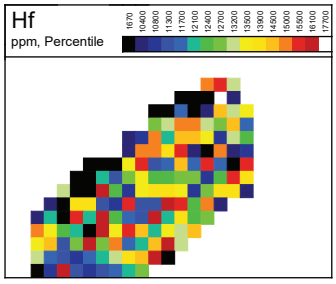


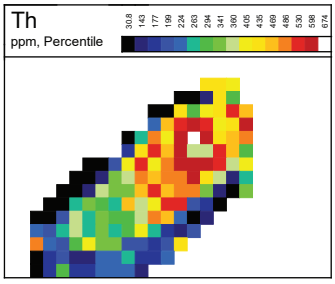


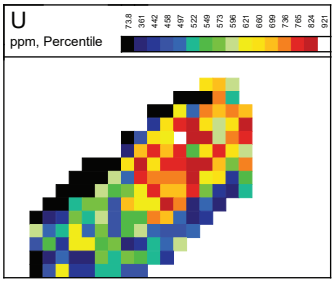


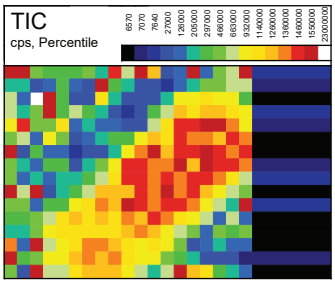


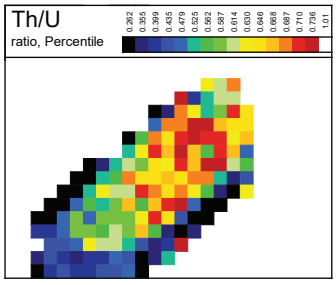


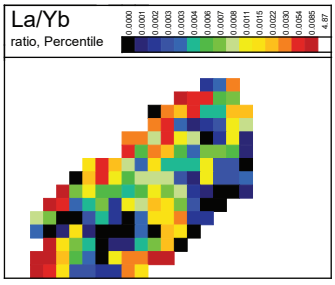












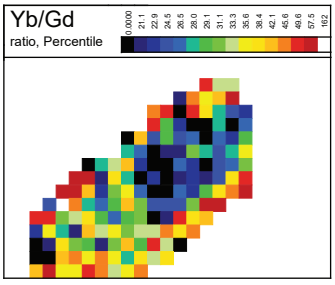


Figure 5.4 *(previous 6 pages)*: Representative LA-ICP-MS trace element 2-D grain maps of both unaltered and experimentally altered unpolished FCT zircon grain surfaces. Trace element maps are provided for all of the measured elements as well as three ratios, Th/U, La/Yb and Yb/Gd. Concentrations are reported as ppm or ratios (where applicable) and the map is presented using a percentile scaling function. Cold colours represent lower concentrations and warm colours are higher concentrations.

Chapter 6

Conclusions

The use Secondary Ion Mass Spectrometry (SIMS) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) micro-beam techniques applied to over 375 individual zircon from the 16 metasedimentary samples in this thesis has resulted in a clearer understanding of the isotopic and geochemical behaviour of the low temperature alteration of zircon. Analytical results were combined with petrography and regional geologic interpretations to elucidate the tectonothermal histories experienced by deformed metasediments in Archean supercrustal belts.

The SIMS U-Pb depth profile technique introduced in Chapter Two was able to resolve the age of micrometer scale rims of zircon which formed at temperatures as low as 400 ºC, in both the HSGB and the NCGB (Chapters Three and Four). In order to maintain internal consistency in the identification of rim material characterized by a younger $^{207}Pb/^{206}Pb$ age, four criteria were determined to be relevant: (1) Rims are defined by three or more contiguous mass cycles, comprising ≥30% of the total cycles, that are younger than the interior material. This does an effective job of removing mass cycles with anomalously young ages that commonly occur at the beginning of an analysis. (2) The probability of fit of the weighted mean of the rims is >5%, and (3) the ages of the outermost two mass cycles for either side of the identified rim must not be significantly different (at 2σ) than the weighted mean rim age (six or more cycles only). These latter two criteria, when combined, systematically and consistently remove mass cycles that have sputtered through the mixed domain between the recrystallized rim and the primary interior. The result is an age that is likely much closer to a true age as well as promotes MSWD's that are very close to unity. The last criterion (4) for the rim calculation is that any mass cycles with a discordance of >15% were not included in the age calculation. Zircon rims were >100 m.y. younger than xenocrystic cores and interpreted to be the result of the interaction of crystalline

zircon with an aqueous fluid. The ages of rims correspond to regional tectonothermal episodes including potassic alteration that has been independently documented, suggesting that metamorphism and regional hydrothermal fluid flow were synchronous. Of note, the timing of fluid flow throughout the NCGB (ca. 2788–2667 Ma) is coeval with the timing of gold mineralization at the Musselwhite deposit, despite the absence of additional gold deposits within the belt.

An innovative, continuous ablation LA-ICP-MS U-Pb depth profile technique is presented in Chapter Two using a 193 nm laser with a 48 μm beam diameter at a repetition rate of 2.5 Hz, the slowest rate capable of being smoothed into a steady signal by the SQUID smoothing device employed. This technique was able to produce internally consistent U-Pb results that overlap the 2σ uncertainties of a SIMS U–Pb depth profile study on the same zircon population. Although the smaller SIMS spot size (30 μm) was subject to less lateral mixing than the LA-ICP-MS spot size, the LA-ICP-MS approach was much more rapid. The development of LA-ICP-MS depth profile techniques will continue to be refined, as the required ablated volume needed for U-Pb analyses using the readily available LA-ICP-MS is minimized.

The LA-ICP-MS REE depth profile technique was able to demonstrate chemical modification in the outer most 10 μm of recrystallized zircon. Chemically modified rims were isolated by plotting data as time-resolved plots. For consistency, I proposed that only grains which exhibit a step function (positive or negative) in REE concentration or Th/U ratios are considered to have a rim. Zircon rims were characterized by variable LREE concentrations, and low Th/U ratios compared to the crystal interior, indicating that the metasomatic fluid, in both the HSGB and NCGB, was variably enriched in LREEs and that elements were incorporated into

the zircon structure through the crystal simultaneously experiencing coupled dissolution-reprecipitation and ion-exchange.

All three depth profile techniques presented in this thesis (SIMS and LA-ICP-MS U-Pb and LA-ICP-MS REE) demonstrated inconsistency in the reproduction of results at separate analytical spots on a single zircon face. Although elemental concentrations and isotopic ratios were often similar, the depths to which the crystal had been chemically modified ranged by several microns. In Chapter Four, I applied a LA-ICP-MS 2-dimensional single element grain mapping technique that allowed for the visualization of recrystallized material on the surface of zircon. This was achieved by covering the outer surface of an unpolished zircon in a contiguous grid of adjacent 7 μm spots and integrating the chemistry of the outer most 3 μm of the zircon crystal. The single element grain map patterns revealed a dendritic network or a patchy mosaic of trace element variability on the crystal surfaces of naturally altered zircon. These patterns were promoted by the presence of fractures, adjacent mineralogy in the host rock or variations in the crystallinity of the zircon. The development of this technique is timely, as it coincides with the advancement of numerous split stream (SS) laser ablation depth profile techniques, which are often derived from the LA-ICP-MS U-Pb depth profile method presented in Chapter Two. The SS-LA-ICP-MS techniques utilize the simultaneous collection of both U-Pb isotopes as well as REEs from a single analytical spot. Future depth-profile studies will employ this technique as the depths of isotopic and REE geochemistry can be directly correlated.

By experimentally altering zircon under lower greenschist conditions (350 ºC and 100 MPa) in an alkaline fluid for 6 months I was able to simulate the conditions experienced by naturally metasomatized zircon of the NCS. These experiments allowed us to gain a valuable perspective of the recrystallization processes which operate in natural systems in the absence of

unknown variables. The Fish Canyon tuff zircon was selected as the primary material for these experiments as it is a readily available, well-characterized, and minimally metamict. Following the experiments, zircon has become transparent and nearly white indicating that the zircon had been annealed and that radiation damage had largely been erased from the crystals lattice. The LA-ICP-MS 2-dimensional element mapping was able to resolve the chemistry of micrometer-scale rims on zircon exteriors despite inconsistency in electron microprobe (EMP) results and the absence of an obvious cathodoluminescent (CL) response in polished grain mounts. The presence of patchy mosaic forms in the experimentally altered zircon grains suggests that the trace element at the surface of the grain is principally the result of zircon crystallinity as compared to adjacent mineralogy. These experiments illustrate that under lower greenschist conditions, minimally metamict zircon can undergo chemical modification under short time scales.

This thesis has addressed knowledge gaps regarding zircon recrystallization and applied the findings to the regional tectonothermal histories of Archean greenstone belts in the western Superior Province. Objectives were achieved by: (1) developing a LA-ICP-MS U-Pb depth profile technique; (2) characterizing the rims of chemically modified zircon from deformed Archean metasediments; (3) developing a 2-dimensional single element grain mapping technique for use on unpolished zircon grains; and (4) conducting experiments under similar conditions to those experienced by the naturally metasomatized zircon and evaluating the low-temperature potential for substitution reactions. Future work with respect to this project should be focused on attempting to understand the microstructure of the thin rims of the mineral zircon (using Raman, FTIR, TEM, etc.).

Appendices

Supplementary Information – Chapter 2

Dating Micrometer-Thin Rims Using a LA-ICP-MS Depth-Profiling Technique on Zircon from an Archean Metasediment: Comparison with the SIMS Depth Profiling Method

C.J. Kelly[1], C.R.M. McFarlane[2], D.A. Schneider[1] & S.E. Jackson[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON, K1N 6N5 Canada
[2]Department. of Earth Sciences, University of New Brunswick, Fredericton, NB, E3B 5A3 Canada
[3]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada

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SI 2.1: SIMS U-Pb isotope data of zircon from depth-profiling of sample 13-HSGB-12 from the Horseshoe Lake Greenstone Belt

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
1	1	2208	578	0.342	0.2065	0.0125	5.5200	0.3480	0.1940	0.0041	0.94	98.6	94.4	1210	67	1903	54	2774	35
	2	1907	425	0.292	0.3261	0.0245	9.2400	0.7030	0.2050	0.0038	0.97	99.5	98.1	1819	119	2362	70	2870	30
	3	1344	247	0.240	0.3261	0.0192	9.4100	0.5650	0.2090	0.0039	0.95	99.6	98.5	1820	93	2379	55	2900	30
	4	1130	147	0.171	0.3704	0.0215	10.8000	0.6350	0.2110	0.0037	0.95	99.8	99.4	2031	101	2503	55	2912	29
	5	1077	107	0.129	0.4498	0.0286	13.0000	0.8370	0.2100	0.0037	0.96	99.9	99.5	2394	127	2682	61	2907	29
	6	1027	83	0.106	0.4783	0.0319	14.4000	0.9660	0.2180	0.0038	0.97	99.8	99.3	2520	139	2773	64	2963	28
	7	909	74	0.107	0.4727	0.0310	14.2000	0.9390	0.2170	0.0039	0.96	99.8	99.1	2495	136	2761	63	2962	29
	8	848	72	0.111	0.4408	0.0269	12.8000	0.7910	0.2110	0.0039	0.96	99.8	99.1	2354	120	2665	58	2910	30
	9	842	71	0.111	0.4303	0.0265	12.8000	0.7970	0.2160	0.0039	0.96	99.8	99.2	2307	119	2666	59	2950	29
	10	780	65	0.109	0.4527	0.0294	13.3000	0.8740	0.2130	0.0040	0.96	99.7	98.8	2407	130	2700	62	2928	31
	11	762	76	0.131	0.4170	0.0255	12.7000	0.7900	0.2220	0.0042	0.95	99.9	99.7	2247	116	2661	58	2992	31
	12	679	56	0.108	0.4736	0.0329	14.2000	0.9930	0.2170	0.0043	0.96	99.9	99.6	2499	144	2760	67	2957	32
	13	625	59	0.123	0.4252	0.0277	12.8000	0.8470	0.2190	0.0044	0.95	99.9	99.7	2284	125	2669	62	2975	33
2	1	972	86	0.116	0.4863	0.0349	13.5000	0.9850	0.2020	0.0036	0.97	99.5	97.9	2554	152	2719	69	2843	29
	2	949	52	0.072	0.5253	0.0359	14.7000	1.0100	0.2030	0.0033	0.97	99.8	99.0	2722	152	2797	66	2851	27
	3	946	39	0.054	0.5161	0.0322	14.6000	0.9180	0.2050	0.0032	0.97	99.9	99.6	2683	137	2790	60	2868	26
	4	1026	34	0.043	0.5680	0.0380	16.0000	1.0700	0.2040	0.0031	0.97	100.0	100.0	2900	156	2874	64	2856	25
	5	1045	34	0.042	0.5136	0.0303	14.6000	0.8670	0.2060	0.0031	0.97	100.0	100.0	2672	129	2790	56	2877	24
	6	1136	31	0.035	0.5999	0.0408	16.9000	1.1600	0.2040	0.0030	0.98	100.0	100.0	3029	164	2930	65	2862	24
	7	1151	36	0.041	0.5054	0.0288	14.4000	0.8260	0.2070	0.0030	0.97	100.0	100.0	2637	123	2776	54	2879	23
	8	1194	35	0.038	0.5564	0.0345	15.8000	0.9860	0.2060	0.0029	0.97	100.0	99.9	2852	143	2865	60	2874	23
	9	1151	37	0.042	0.5058	0.0279	14.2000	0.7890	0.2040	0.0029	0.97	99.9	99.7	2639	119	2763	53	2856	23
	10	1142	34	0.039	0.4963	0.0266	13.8000	0.7470	0.2020	0.0029	0.96	100.0	99.8	2598	115	2737	51	2841	23
	11	1240	45	0.047	0.5127	0.0285	14.4000	0.8070	0.2040	0.0028	0.97	100.0	100.0	2668	121	2778	53	2859	23
	12	1257	56	0.058	0.4887	0.0258	13.8000	0.7360	0.2050	0.0028	0.97	100.0	100.0	2565	112	2739	50	2869	23
	13	1201	54	0.059	0.4779	0.0245	13.4000	0.6940	0.2030	0.0028	0.96	100.0	99.9	2518	107	2708	49	2853	23
	14	1137	55	0.063	0.4453	0.0207	12.6000	0.5910	0.2050	0.0029	0.95	100.0	99.9	2375	92	2650	44	2868	23
	15	1114	64	0.075	0.4764	0.0233	13.6000	0.6730	0.2070	0.0030	0.96	100.0	99.8	2512	102	2722	47	2882	24
	16	1085	66	0.080	0.4297	0.0194	12.2000	0.5570	0.2060	0.0030	0.95	100.0	99.8	2304	87	2620	43	2873	24
	17	992	68	0.090	0.4320	0.0193	12.5000	0.5650	0.2100	0.0032	0.94	100.0	100.0	2315	87	2645	42	2909	24
	18	923	69	0.098	0.4367	0.0195	12.3000	0.5570	0.2050	0.0032	0.94	100.0	99.9	2336	87	2630	42	2864	25
	19	912	76	0.109	0.4555	0.0211	13.2000	0.6180	0.2100	0.0033	0.94	100.0	99.8	2420	94	2692	44	2904	25
	20	866	88	0.133	0.4449	0.0198	12.6000	0.5690	0.2050	0.0033	0.94	100.0	99.8	2373	88	2650	42	2870	26

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	21	842	92	0.143	0.4417	0.0197	12.7000	0.5720	0.2080	0.0034	0.93	100.0	100.0	2358	88	2657	42	2893	26
	22	820	96	0.153	0.4477	0.0204	13.0000	0.6010	0.2100	0.0034	0.94	100.0	99.8	2385	91	2679	44	2909	26
	23	789	108	0.179	0.4494	0.0204	12.8000	0.5900	0.2070	0.0034	0.93	99.9	99.8	2393	91	2667	43	2883	27
	24	760	108	0.186	0.4300	0.0186	12.8000	0.5600	0.2150	0.0036	0.93	100.0	99.9	2306	84	2663	41	2947	27
	25	771	114	0.194	0.4490	0.0201	13.1000	0.5940	0.2120	0.0035	0.93	100.0	100.0	2391	89	2689	43	2921	27
	26	797	129	0.212	0.4038	0.0166	11.8000	0.4950	0.2120	0.0035	0.92	100.0	100.0	2187	76	2591	39	2924	27
	27	822	131	0.209	0.4360	0.0194	13.1000	0.5900	0.2170	0.0035	0.93	100.0	99.9	2333	87	2684	43	2961	26
	28	778	131	0.220	0.4248	0.0186	12.7000	0.5620	0.2170	0.0035	0.93	100.0	100.0	2282	84	2657	42	2956	26
	29	739	144	0.254	0.4132	0.0175	12.3000	0.5280	0.2160	0.0036	0.92	100.0	100.0	2230	80	2628	40	2951	27
	30	701	142	0.265	0.4253	0.0185	12.8000	0.5640	0.2190	0.0037	0.92	100.0	99.9	2284	84	2666	41	2970	27
	31	711	157	0.289	0.4270	0.0190	12.9000	0.5810	0.2190	0.0037	0.93	99.9	99.8	2292	86	2672	42	2974	28
	32	707	153	0.283	0.4254	0.0188	12.8000	0.5730	0.2180	0.0038	0.92	100.0	99.9	2285	85	2665	42	2967	28
	33	758	163	0.281	0.4870	0.0249	14.7000	0.7600	0.2190	0.0037	0.95	100.0	99.9	2558	108	2796	49	2973	27
	34	704	156	0.290	0.4338	0.0199	13.0000	0.6050	0.2170	0.0037	0.93	100.0	99.9	2323	89	2680	44	2962	28
	35	710	170	0.313	0.4701	0.0232	14.0000	0.7010	0.2170	0.0037	0.94	99.9	99.7	2484	102	2753	47	2956	28
	36	725	173	0.313	0.4477	0.0214	13.7000	0.6630	0.2220	0.0038	0.94	100.0	100.0	2385	95	2730	46	2995	28
	37	758	185	0.319	0.4545	0.0224	14.1000	0.7040	0.2250	0.0038	0.94	100.0	99.9	2415	99	2757	47	3018	27
	38	750	182	0.317	0.4620	0.0231	14.3000	0.7250	0.2250	0.0038	0.94	100.0	100.0	2448	102	2771	48	3015	27
	39	686	169	0.321	0.4237	0.0195	12.8000	0.5980	0.2190	0.0038	0.93	100.0	100.0	2277	88	2664	44	2973	28
	40	757	177	0.305	0.4493	0.0222	13.9000	0.6920	0.2240	0.0038	0.94	100.0	100.0	2392	99	2740	47	3008	27
	41	728	188	0.337	0.4430	0.0215	14.0000	0.6870	0.2290	0.0039	0.94	100.0	100.0	2364	96	2749	47	3045	27
	42	714	187	0.343	0.4251	0.0196	13.2000	0.6170	0.2250	0.0039	0.93	100.0	99.8	2283	89	2694	44	3019	28
	43	723	177	0.320	0.4082	0.0183	12.8000	0.5800	0.2270	0.0039	0.93	100.0	99.9	2207	84	2663	43	3030	27
	44	732	191	0.342	0.4328	0.0204	13.4000	0.6410	0.2250	0.0038	0.94	100.0	99.8	2318	92	2709	45	3014	27
	45	764	198	0.339	0.4208	0.0193	13.3000	0.6190	0.2290	0.0039	0.93	100.0	99.9	2264	88	2700	44	3045	27
	46	761	198	0.341	0.4228	0.0192	13.1000	0.6030	0.2250	0.0039	0.93	100.0	100.0	2273	87	2689	43	3018	27
	47	750	209	0.365	0.4055	0.0179	12.8000	0.5730	0.2290	0.0039	0.93	100.0	100.0	2194	82	2665	42	3044	27
	48	749	211	0.368	0.4171	0.0188	13.0000	0.5910	0.2250	0.0038	0.93	100.0	100.0	2247	85	2677	43	3020	27
	49	748	201	0.352	0.4324	0.0203	13.3000	0.6320	0.2230	0.0038	0.94	100.0	100.0	2316	91	2701	45	3004	27
3	1	949	929	1.280	0.2733	0.0177	8.3000	0.5510	0.2200	0.0047	0.95	99.1	96.8	1557	89	2265	60	2983	34
	2	863	434	0.657	0.3118	0.0180	9.5700	0.5630	0.2220	0.0043	0.95	99.7	98.9	1750	89	2394	54	2999	31
	3	874	256	0.383	0.3728	0.0222	11.4000	0.6840	0.2210	0.0040	0.95	99.9	99.7	2043	104	2553	56	2988	29
	4	953	208	0.285	0.3554	0.0188	11.2000	0.6000	0.2280	0.0040	0.94	99.9	99.8	1960	90	2537	50	3036	28
	5	990	197	0.261	0.3496	0.0172	10.8000	0.5410	0.2240	0.0040	0.94	99.9	99.5	1933	82	2508	46	3013	28

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	6	942	167	0.231	0.3722	0.0190	11.6000	0.5970	0.2250	0.0039	0.94	99.9	99.8	2040	89	2569	48	3017	28
	7	912	160	0.229	0.3517	0.0165	11.1000	0.5280	0.2280	0.0039	0.93	99.9	99.8	1942	79	2530	44	3042	28
	8	903	143	0.207	0.3556	0.0164	11.2000	0.5250	0.2280	0.0039	0.93	100.0	99.9	1961	78	2538	44	3039	27
4	1	662	258	0.509	0.4642	0.0331	13.3000	0.9700	0.2070	0.0048	0.95	98.8	95.5	2458	146	2699	69	2885	38
	2	607	130	0.281	0.5055	0.0384	14.8000	1.1400	0.2120	0.0047	0.96	99.6	98.4	2638	164	2801	73	2922	36
	3	584	93	0.208	0.4617	0.0321	13.8000	0.9730	0.2170	0.0047	0.95	99.8	99.4	2447	142	2736	67	2957	35
	4	641	73	0.150	0.4929	0.0359	14.8000	1.0900	0.2170	0.0046	0.96	99.6	98.7	2583	155	2800	70	2960	34
	5	701	69	0.128	0.4459	0.0288	13.6000	0.8950	0.2220	0.0046	0.95	99.6	98.6	2377	129	2725	62	2993	33
	6	721	60	0.108	0.4505	0.0283	13.8000	0.8800	0.2230	0.0044	0.95	99.7	99.0	2398	126	2738	60	2999	32
	7	769	55	0.093	0.4665	0.0292	14.1000	0.8960	0.2190	0.0042	0.95	99.8	99.1	2468	129	2757	60	2976	31
	8	776	45	0.076	0.4180	0.0229	13.0000	0.7200	0.2250	0.0042	0.94	99.9	99.5	2251	104	2677	52	3016	30
	9	849	46	0.070	0.4608	0.0277	14.2000	0.8660	0.2240	0.0040	0.96	99.8	99.3	2443	123	2764	58	3008	29
	10	818	37	0.060	0.4335	0.0238	13.6000	0.7580	0.2280	0.0040	0.95	99.8	99.2	2321	107	2723	53	3036	28
	11	858	35	0.054	0.4108	0.0213	12.9000	0.6790	0.2280	0.0039	0.95	99.9	99.6	2219	98	2673	50	3038	28
	12	937	38	0.053	0.4248	0.0226	13.3000	0.7150	0.2270	0.0038	0.95	100.0	99.8	2282	102	2702	51	3033	27
	13	883	32	0.048	0.3903	0.0190	12.3000	0.6060	0.2290	0.0039	0.94	99.9	99.6	2124	88	2628	46	3043	27
	14	839	28	0.044	0.3806	0.0179	11.9000	0.5680	0.2270	0.0039	0.93	100.0	99.8	2079	83	2599	45	3034	27
	15	842	25	0.038	0.4692	0.0268	14.8000	0.8520	0.2290	0.0039	0.96	99.9	99.7	2480	117	2802	55	3043	27
	16	791	30	0.049	0.4059	0.0197	12.6000	0.6210	0.2250	0.0040	0.94	99.9	99.5	2196	90	2651	46	3019	28
	17	810	29	0.046	0.3964	0.0190	12.6000	0.6160	0.2310	0.0041	0.93	100.0	99.9	2152	88	2653	46	3061	28
	18	773	31	0.053	0.3697	0.0166	11.7000	0.5330	0.2290	0.0041	0.92	100.0	99.9	2028	78	2579	43	3046	28
	19	755	28	0.048	0.3858	0.0179	12.1000	0.5700	0.2270	0.0040	0.93	99.9	99.6	2103	83	2611	44	3032	29
5	1	1173	58	0.065	0.5627	0.0448	16.2000	1.3300	0.2090	0.0055	0.95	98.2	93.2	2878	185	2890	78	2898	43
	2	1162	70	0.079	0.5665	0.0445	16.9000	1.3500	0.2160	0.0050	0.96	98.8	95.6	2893	183	2928	77	2951	37
	3	1175	68	0.076	0.5834	0.0464	17.1000	1.3800	0.2130	0.0046	0.96	99.3	97.3	2962	189	2943	77	2929	35
	4	1170	86	0.096	0.5719	0.0451	16.5000	1.3200	0.2100	0.0044	0.97	99.1	96.6	2916	185	2908	77	2902	34
	5	1153	67	0.076	0.5899	0.0475	17.1000	1.4000	0.2100	0.0044	0.97	98.9	95.9	2989	193	2941	78	2908	34
	6	1133	74	0.086	0.5620	0.0424	17.2000	1.3100	0.2220	0.0044	0.97	99.5	98.1	2875	175	2947	73	2997	32
	7	1075	76	0.093	0.5133	0.0353	15.5000	1.0800	0.2190	0.0044	0.96	99.6	98.6	2671	151	2849	67	2977	32
	8	1048	81	0.101	0.5239	0.0366	15.5000	1.0900	0.2140	0.0043	0.96	99.7	98.7	2716	155	2846	67	2939	33
	9	985	81	0.108	0.4969	0.0332	14.7000	0.9930	0.2140	0.0044	0.95	99.5	98.3	2601	143	2794	64	2936	33
	10	989	78	0.103	0.5116	0.0351	15.3000	1.0600	0.2160	0.0045	0.96	99.5	98.1	2664	150	2832	66	2954	33
	11	926	82	0.116	0.5266	0.0376	15.7000	1.1300	0.2160	0.0045	0.96	99.6	98.6	2727	159	2858	69	2952	33
	12	857	73	0.111	0.4658	0.0300	13.7000	0.9000	0.2140	0.0046	0.95	99.3	97.3	2465	132	2731	62	2934	35

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	13	847	66	0.101	0.5079	0.0351	14.6000	1.0300	0.2090	0.0045	0.95	99.3	97.4	2647	150	2791	67	2896	35
	14	824	61	0.097	0.4993	0.0339	14.9000	1.0300	0.2170	0.0046	0.95	99.7	98.8	2611	146	2811	66	2957	34
	15	760	52	0.090	0.4138	0.0238	12.6000	0.7400	0.2200	0.0048	0.93	99.5	98.0	2232	109	2648	55	2982	35
	16	790	58	0.096	0.4948	0.0327	14.6000	0.9830	0.2150	0.0046	0.95	99.5	98.2	2591	141	2793	64	2941	35
	17	798	61	0.100	0.4533	0.0276	13.4000	0.8290	0.2140	0.0045	0.94	99.6	98.5	2410	123	2706	59	2935	34
	18	804	54	0.088	0.4566	0.0278	13.4000	0.8300	0.2140	0.0044	0.94	99.8	99.1	2425	123	2711	58	2932	34
	19	786	64	0.106	0.4144	0.0228	12.2000	0.6820	0.2130	0.0045	0.93	99.6	98.5	2235	104	2618	53	2928	34
6	1	400	142	0.465	0.3450	0.0194	10.2000	0.6210	0.2150	0.0078	0.81	98.1	92.9	1911	93	2457	56	2946	59
	2	205	61	0.391	0.6488	0.0514	18.8000	1.5300	0.2100	0.0080	0.89	99.3	97.2	3224	201	3032	78	2908	61
	3	183	62	0.444	0.5366	0.0414	16.0000	1.2600	0.2170	0.0080	0.89	99.6	98.5	2769	174	2878	75	2955	60
	4	234	68	0.378	0.5191	0.0427	15.5000	1.3000	0.2160	0.0071	0.92	99.7	98.7	2695	181	2846	80	2954	53
	5	248	67	0.351	0.5267	0.0426	16.2000	1.3400	0.2230	0.0070	0.93	99.6	98.7	2727	180	2889	79	3004	50
	6	265	70	0.345	0.4478	0.0315	13.8000	0.9910	0.2240	0.0067	0.91	99.6	98.7	2386	140	2736	68	3006	48
	7	311	77	0.326	0.5455	0.0449	16.9000	1.4200	0.2250	0.0063	0.94	99.6	98.4	2807	187	2931	80	3018	45
	8	314	77	0.322	0.5211	0.0402	16.3000	1.2800	0.2270	0.0062	0.94	99.9	99.6	2704	170	2897	75	3033	43
	9	303	83	0.359	0.5126	0.0377	16.1000	1.2000	0.2270	0.0062	0.93	99.9	99.6	2668	161	2880	71	3033	43
	10	331	83	0.329	0.5036	0.0366	15.5000	1.1400	0.2230	0.0059	0.93	99.9	99.7	2629	157	2844	70	3001	43
	11	336	77	0.302	0.5554	0.0433	17.5000	1.3800	0.2290	0.0060	0.94	100.0	99.9	2848	179	2963	76	3042	42
	12	314	76	0.318	0.5183	0.0372	16.1000	1.1700	0.2250	0.0060	0.93	99.9	99.6	2692	158	2881	70	3016	43
	13	328	78	0.310	0.5791	0.0459	18.3000	1.4700	0.2300	0.0060	0.95	99.9	99.6	2945	187	3008	77	3050	42
	14	314	74	0.307	0.5063	0.0354	16.3000	1.1600	0.2340	0.0062	0.93	99.9	99.8	2641	152	2896	68	3079	42
	15	333	80	0.313	0.4914	0.0342	15.5000	1.1000	0.2290	0.0060	0.93	100.0	100.0	2577	148	2849	67	3048	42
	16	340	81	0.310	0.4861	0.0330	15.1000	1.0400	0.2250	0.0059	0.93	100.0	100.0	2554	143	2821	66	3018	42
	17	336	81	0.315	0.5063	0.0354	15.6000	1.1000	0.2230	0.0058	0.93	100.0	100.0	2641	151	2852	68	3004	42
	18	331	77	0.304	0.4674	0.0309	15.1000	1.0100	0.2350	0.0061	0.92	99.9	99.8	2472	136	2825	64	3087	41
	19	331	82	0.323	0.5307	0.0386	16.9000	1.2500	0.2310	0.0060	0.94	99.8	99.3	2744	163	2931	71	3062	41
	20	333	71	0.280	0.5018	0.0351	15.9000	1.1300	0.2300	0.0060	0.93	99.9	99.5	2622	151	2873	68	3054	42
7	1	321	409	1.665	0.5228	0.0459	16.0000	1.4400	0.2220	0.0066	0.94	98.6	94.8	2711	195	2877	86	2996	48
	2	353	217	0.804	0.5770	0.0507	18.3000	1.6300	0.2300	0.0061	0.96	99.2	97.2	2936	207	3005	86	3052	42
	3	354	138	0.510	0.5489	0.0424	17.1000	1.3400	0.2250	0.0057	0.95	99.5	98.3	2821	177	2938	75	3020	41
	4	349	112	0.419	0.6372	0.0531	19.9000	1.6700	0.2270	0.0056	0.96	99.8	99.1	3178	209	3087	81	3028	40
	5	347	91	0.341	0.5257	0.0357	16.4000	1.1300	0.2260	0.0055	0.94	99.9	99.6	2723	151	2901	66	3027	39
	6	375	77	0.267	0.5311	0.0353	16.7000	1.1300	0.2280	0.0054	0.94	99.9	99.7	2746	149	2918	65	3039	38

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	7	391	63	0.211	0.6780	0.0519	21.1000	1.6300	0.2260	0.0053	0.95	99.8	99.2	3337	199	3143	75	3022	37
	8	476	64	0.177	0.5132	0.0308	16.2000	0.9850	0.2290	0.0049	0.94	99.9	99.5	2670	131	2887	58	3043	34
	9	566	58	0.133	0.5125	0.0303	16.8000	1.0100	0.2380	0.0046	0.95	99.9	99.8	2667	129	2925	57	3107	31
8	1	484	229	0.619	0.4800	0.0418	14.6000	1.2900	0.2210	0.0053	0.96	99.9	99.6	2527	182	2793	84	2991	39
	2	292	81	0.362	0.6485	0.0599	19.7000	1.8400	0.2210	0.0060	0.96	99.9	99.5	3222	234	3078	90	2986	44
	3	267	47	0.228	0.9718	0.1220	29.8000	3.7500	0.2220	0.0063	0.97	99.9	99.4	4377	398	3481	124	2999	45
	4	290	56	0.250	0.6701	0.0598	21.1000	1.9000	0.2280	0.0061	0.96	100.0	99.9	3306	231	3144	87	3041	43
	5	359	76	0.278	0.5431	0.0405	16.9000	1.2700	0.2250	0.0055	0.95	99.9	99.7	2796	169	2927	72	3018	39
	6	408	95	0.304	0.5439	0.0390	16.8000	1.2200	0.2250	0.0051	0.95	100.0	99.8	2800	163	2926	70	3013	37
	7	459	108	0.307	0.5389	0.0373	17.2000	1.2000	0.2310	0.0050	0.95	100.0	100.0	2779	156	2946	67	3062	35
	8	448	117	0.342	0.5598	0.0385	17.8000	1.2300	0.2300	0.0050	0.95	100.0	100.0	2866	159	2977	67	3053	35
	9	461	111	0.314	0.5172	0.0331	16.3000	1.0600	0.2290	0.0049	0.94	100.0	100.0	2688	141	2896	62	3045	35
	10	452	124	0.358	0.4789	0.0285	15.4000	0.9300	0.2340	0.0051	0.93	100.0	100.0	2522	124	2842	57	3077	35
9	1	562	56	0.131	0.3836	0.0285	10.7000	0.9220	0.2030	0.0083	0.88	91.9	73.5	2093	133	2499	80	2848	67
	2	415	39	0.123	0.5074	0.0457	14.6000	1.4400	0.2080	0.0083	0.91	92.9	76.7	2646	196	2787	94	2891	65
	3	316	33	0.138	0.5581	0.0571	15.5000	1.7200	0.2010	0.0088	0.92	93.5	77.7	2859	236	2845	106	2834	71
	4	244	27	0.147	0.4076	0.0342	11.3000	1.0700	0.2010	0.0090	0.88	94.9	81.9	2204	157	2549	88	2837	73
	5	228	24	0.140	0.3775	0.0329	11.1000	1.0400	0.2130	0.0087	0.90	97.2	89.9	2065	154	2531	87	2929	66
	6	218	25	0.150	0.3451	0.0312	10.1000	0.9860	0.2120	0.0091	0.90	97.1	89.5	1911	150	2441	90	2918	70
	7	202	31	0.198	0.3629	0.0357	10.7000	1.1200	0.2140	0.0093	0.91	97.6	91.1	1996	169	2497	97	2935	70
	8	190	32	0.218	0.3385	0.0318	10.0000	0.9750	0.2150	0.0086	0.91	99.3	97.4	1879	153	2436	90	2940	65
	9	193	24	0.162	0.3465	0.0349	10.0000	1.0600	0.2100	0.0088	0.92	98.9	95.9	1918	167	2439	97	2908	68
	10	174	22	0.165	0.3506	0.0370	10.3000	1.1600	0.2140	0.0100	0.91	97.6	91.4	1937	177	2466	104	2936	76
	11	173	22	0.166	0.2806	0.0250	8.4300	0.7920	0.2180	0.0095	0.89	98.9	95.9	1594	126	2278	85	2964	70
	12	163	22	0.181	0.3581	0.0388	10.5000	1.2000	0.2130	0.0099	0.91	98.3	93.9	1973	184	2483	106	2932	75
	13	149	17	0.147	0.2729	0.0248	7.8000	0.7960	0.2070	0.0110	0.86	97.0	89.1	1556	126	2208	92	2885	85
	14	151	20	0.173	0.2908	0.0275	8.7400	0.8700	0.2180	0.0098	0.89	98.9	96.1	1645	137	2311	91	2965	73
	15	146	24	0.211	0.3064	0.0306	8.8400	0.9470	0.2090	0.0100	0.89	98.2	93.3	1723	151	2321	98	2899	79
	16	148	18	0.155	0.2853	0.0280	8.0500	0.8940	0.2050	0.0110	0.86	96.4	86.8	1618	140	2236	100	2863	91
	17	138	19	0.181	0.2589	0.0234	7.4100	0.7620	0.2080	0.0110	0.84	96.9	88.7	1484	120	2163	92	2888	89
	18	136	20	0.189	0.3268	0.0345	9.7800	1.0800	0.2170	0.0100	0.91	99.1	96.7	1823	167	2414	101	2958	75
	19	130	17	0.170	0.2605	0.0239	8.2000	0.7980	0.2280	0.0110	0.88	98.8	95.8	1493	122	2253	88	3039	76
09@1	1	469	72	0.200	0.4033	0.0392	11.9000	1.2500	0.2140	0.0089	0.92	95.1	83.5	2184	180	2597	99	2937	67
	2	445	73	0.213	0.4199	0.0406	12.6000	1.3000	0.2180	0.0084	0.93	96.2	87.0	2260	184	2651	97	2965	62

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	3	393	47	0.157	0.5037	0.0547	14.3000	1.6400	0.2060	0.0083	0.94	96.1	85.9	2630	235	2768	109	2870	65
	4	360	45	0.164	0.4847	0.0502	14.1000	1.5300	0.2110	0.0080	0.94	97.1	89.6	2548	218	2755	103	2910	61
	5	345	46	0.176	0.5073	0.0543	14.8000	1.6500	0.2120	0.0080	0.94	97.2	89.8	2645	232	2802	106	2917	62
	6	330	40	0.158	0.4052	0.0363	11.8000	1.1300	0.2120	0.0083	0.91	96.8	88.7	2193	167	2590	90	2917	64
	7	313	49	0.207	0.3979	0.0350	12.3000	1.1300	0.2240	0.0079	0.92	98.5	94.7	2160	162	2629	86	3013	57
	8	307	40	0.169	0.4160	0.0373	13.0000	1.2000	0.2270	0.0077	0.93	99.2	97.1	2242	170	2683	87	3034	55
	9	309	43	0.181	0.4342	0.0408	13.3000	1.2900	0.2220	0.0077	0.93	98.8	95.6	2325	183	2700	92	2994	56
	10	302	46	0.201	0.3877	0.0329	11.7000	1.0300	0.2190	0.0075	0.92	99.2	97.1	2112	153	2582	82	2976	55
	11	332	42	0.165	0.4516	0.0446	14.2000	1.4300	0.2280	0.0075	0.95	99.3	97.5	2402	198	2761	96	3035	53
	12	303	40	0.174	0.3879	0.0330	11.4000	1.0100	0.2140	0.0076	0.92	98.7	95.2	2113	153	2558	83	2933	57
	13	303	46	0.201	0.3281	0.0248	10.0000	0.7950	0.2220	0.0077	0.90	98.8	95.8	1829	121	2439	73	2996	56
	14	301	46	0.200	0.4333	0.0404	13.2000	1.2700	0.2210	0.0076	0.93	99.0	96.2	2320	182	2694	91	2987	55
	15	285	37	0.171	0.3054	0.0216	9.1400	0.6780	0.2170	0.0076	0.89	99.1	96.7	1718	107	2352	68	2959	56
	16	307	50	0.214	0.3475	0.0274	10.7000	0.8750	0.2230	0.0076	0.91	99.0	96.3	1923	131	2497	76	3004	55
	17	285	45	0.205	0.3727	0.0304	11.3000	0.9510	0.2200	0.0074	0.92	99.3	97.4	2042	143	2549	78	2981	54
	18	288	42	0.189	0.3502	0.0268	10.6000	0.8410	0.2200	0.0074	0.91	99.2	97.1	1936	128	2491	74	2981	54
	19	298	43	0.190	0.3060	0.0213	9.4100	0.6890	0.2230	0.0077	0.88	98.8	95.8	1721	105	2379	67	3002	55
10	1	139	23	0.215	0.7153	0.0794	21.5000	2.4900	0.2180	0.0100	0.9148	96.9	89.0	3478	298	3162	113	2967	76
	2	143	17	0.160	0.8709	0.1190	26.6000	3.7100	0.2220	0.0099	0.95	98.0	93.0	4038	410	3370	137	2993	72
	3	160	15	0.124	0.7376	0.0892	21.8000	2.6800	0.2150	0.0087	0.95	99.1	96.7	3562	331	3176	119	2941	65
	4	177	12	0.092	0.7364	0.0872	22.2000	2.6700	0.2190	0.0082	0.95	99.2	97.1	3557	324	3193	117	2972	61
	5	206	13	0.085	0.6646	0.0685	19.6000	2.0500	0.2140	0.0074	0.94	99.4	97.8	3285	265	3072	101	2936	56
	6	265	18	0.087	0.4679	0.0367	14.1000	1.1300	0.2190	0.0068	0.92	99.5	98.1	2474	161	2757	76	2972	50
	7	298	19	0.084	0.4969	0.0396	14.9000	1.2100	0.2180	0.0063	0.93	99.8	99.1	2601	171	2809	77	2963	47
	8	280	16	0.073	0.4557	0.0323	13.6000	0.9890	0.2160	0.0064	0.91	99.4	97.6	2420	143	2722	69	2954	48
	9	280	15	0.070	0.5382	0.0421	16.1000	1.2800	0.2170	0.0065	0.93	99.2	97.1	2776	176	2881	76	2955	49
	10	261	18	0.089	0.5532	0.0430	16.7000	1.3200	0.2190	0.0066	0.93	99.6	98.4	2839	178	2919	76	2975	49
	11	248	16	0.087	0.5003	0.0350	15.4000	1.1000	0.2230	0.0068	0.91	99.6	98.6	2615	150	2841	68	3005	49
	12	255	11	0.054	0.5076	0.0345	14.9000	1.0300	0.2120	0.0064	0.90	99.6	98.4	2646	148	2806	66	2923	49
	13	296	17	0.076	0.4946	0.0323	14.9000	0.9920	0.2180	0.0062	0.91	99.7	98.8	2591	139	2809	63	2969	46
	14	326	15	0.060	0.4803	0.0296	14.8000	0.9280	0.2230	0.0059	0.91	99.8	99.3	2528	129	2802	60	3005	43
	15	347	20	0.075	0.4760	0.0279	14.3000	0.8540	0.2180	0.0055	0.91	99.8	99.2	2510	122	2770	57	2965	41
	16	416	20	0.063	0.4602	0.0256	13.6000	0.7730	0.2150	0.0050	0.91	99.8	99.2	2440	113	2723	54	2941	38
	17	457	23	0.066	0.5058	0.0290	15.7000	0.9120	0.2250	0.0049	0.93	100.0	99.8	2639	124	2858	55	3016	35

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	18	511	30	0.077	0.5052	0.0281	15.2000	0.8560	0.2180	0.0046	0.93	99.9	99.7	2636	120	2828	54	2968	34
	19	559	32	0.074	0.4728	0.0241	14.5000	0.7510	0.2230	0.0045	0.92	99.8	99.3	2496	105	2784	49	3001	33
02@1	1	1300	228	0.229	0.4525	0.0271	13.2000	0.8080	0.2120	0.0039	0.95	99.0	96.3	2406	120	2696	58	2921	30
	2	1325	213	0.210	0.4766	0.0261	13.6000	0.7560	0.2070	0.0036	0.95	99.3	97.3	2512	114	2722	53	2882	28
	3	1290	189	0.191	0.4862	0.0259	13.6000	0.7380	0.2030	0.0035	0.95	99.4	97.5	2554	112	2723	51	2851	28
	4	1258	161	0.168	0.4964	0.0274	13.5000	0.7610	0.1980	0.0035	0.95	99.3	97.2	2598	118	2718	53	2808	29
	5	1195	152	0.166	0.4821	0.0261	13.3000	0.7350	0.2010	0.0035	0.95	99.6	98.4	2536	114	2704	52	2833	28
	6	1065	128	0.157	0.4344	0.0208	12.2000	0.5950	0.2040	0.0036	0.93	99.7	98.7	2326	93	2620	46	2856	29
	7	973	109	0.146	0.4538	0.0227	12.9000	0.6550	0.2070	0.0037	0.94	99.8	99.1	2412	101	2674	48	2878	29
	8	930	109	0.154	0.4982	0.0264	14.1000	0.7590	0.2050	0.0037	0.94	99.8	99.4	2606	114	2757	51	2870	29
	9	899	116	0.169	0.4738	0.0240	13.3000	0.6850	0.2030	0.0037	0.94	99.8	99.1	2500	105	2700	49	2853	30
	10	836	98	0.153	0.4970	0.0263	14.1000	0.7550	0.2050	0.0038	0.94	99.8	99.1	2601	113	2754	51	2869	30
	11	835	114	0.179	0.4752	0.0239	13.3000	0.6830	0.2040	0.0038	0.93	99.8	99.1	2506	105	2704	48	2855	30
	12	838	123	0.193	0.5256	0.0290	14.6000	0.8200	0.2020	0.0038	0.94	99.7	98.7	2723	123	2792	53	2842	31
	13	783	120	0.200	0.4398	0.0205	12.5000	0.5940	0.2070	0.0039	0.92	99.8	99.0	2350	92	2646	45	2880	31
	14	792	140	0.231	0.5213	0.0280	15.1000	0.8180	0.2090	0.0039	0.94	99.9	99.4	2705	119	2818	52	2901	30
	15	729	120	0.215	0.4733	0.0229	13.9000	0.6870	0.2140	0.0041	0.92	99.7	99.0	2498	100	2745	47	2932	31
	16	793	138	0.228	0.4455	0.0207	13.0000	0.6140	0.2110	0.0041	0.92	99.8	99.2	2375	92	2678	45	2916	31
	17	768	137	0.234	0.4731	0.0230	13.9000	0.6890	0.2140	0.0041	0.92	99.8	99.1	2497	101	2746	47	2934	31
	18	762	132	0.226	0.4517	0.0214	12.9000	0.6250	0.2080	0.0040	0.92	99.7	98.6	2403	95	2675	46	2887	31
	19	732	145	0.259	0.4356	0.0200	12.8000	0.5990	0.2130	0.0041	0.91	99.8	99.1	2331	90	2664	44	2928	31
	20	707	137	0.253	0.4441	0.0206	12.8000	0.6040	0.2090	0.0040	0.91	99.9	99.4	2369	92	2664	45	2896	31
	21	702	136	0.254	0.4077	0.0178	11.9000	0.5330	0.2120	0.0042	0.90	99.7	98.9	2204	82	2599	42	2924	32
	22	774	165	0.279	0.4387	0.0207	12.8000	0.6150	0.2120	0.0041	0.92	99.8	99.1	2345	93	2666	45	2919	31
	23	675	142	0.275	0.3831	0.0160	11.4000	0.4850	0.2160	0.0043	0.89	99.9	99.6	2091	74	2556	40	2950	32
	24	681	148	0.284	0.4335	0.0203	12.6000	0.6010	0.2110	0.0041	0.91	99.9	99.4	2322	91	2652	45	2914	32
	25	659	155	0.307	0.3771	0.0159	11.0000	0.4750	0.2120	0.0042	0.89	99.8	99.2	2063	74	2527	40	2923	32
	26	694	155	0.291	0.4252	0.0197	12.7000	0.5970	0.2160	0.0042	0.91	99.9	99.6	2284	89	2655	44	2951	31
	27	657	147	0.292	0.4163	0.0187	12.4000	0.5690	0.2170	0.0043	0.91	99.9	99.7	2244	85	2639	43	2958	32
	28	637	166	0.340	0.3771	0.0158	11.3000	0.4810	0.2170	0.0043	0.89	100.0	99.9	2063	74	2546	40	2958	32
	29	692	173	0.326	0.3808	0.0162	11.3000	0.4910	0.2160	0.0042	0.90	99.9	99.6	2080	76	2551	40	2949	32
	30	677	179	0.345	0.3810	0.0162	11.4000	0.4930	0.2170	0.0043	0.89	99.9	99.6	2081	75	2556	40	2957	32
	31	684	185	0.353	0.3912	0.0169	11.5000	0.5100	0.2140	0.0042	0.90	99.9	99.6	2128	79	2568	41	2936	32
	32	692	181	0.341	0.3994	0.0176	12.2000	0.5500	0.2220	0.0044	0.90	99.9	99.6	2166	81	2623	42	2998	31

grain	cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	33	671	185	0.361	0.3921	0.0169	11.7000	0.5170	0.2170	0.0043	0.90	99.9	99.5	2133	78	2583	41	2957	32
	34	690	190	0.360	0.3772	0.0159	11.2000	0.4860	0.2160	0.0043	0.89	99.7	99.0	2063	75	2543	40	2952	32
	35	702	209	0.390	0.3805	0.0163	11.7000	0.5110	0.2230	0.0044	0.89	99.7	98.9	2079	76	2580	41	3001	32
	36	665	200	0.392	0.3776	0.0159	11.7000	0.5010	0.2240	0.0045	0.89	100.0	99.8	2065	75	2578	40	3010	32
	37	684	185	0.353	0.3744	0.0157	11.4000	0.4850	0.2200	0.0044	0.89	99.9	99.8	2050	73	2553	40	2981	32
	38	721	209	0.378	0.4159	0.0192	12.8000	0.6020	0.2240	0.0044	0.91	99.9	99.6	2242	87	2668	44	3009	32
	39	660	198	0.393	0.3956	0.0174	12.3000	0.5500	0.2250	0.0045	0.90	99.9	99.7	2149	80	2624	42	3015	32
	40	672	195	0.379	0.4007	0.0180	12.3000	0.5610	0.2230	0.0044	0.90	100.0	99.8	2172	83	2628	43	3001	32
	41	653	207	0.415	0.3802	0.0163	11.8000	0.5150	0.2240	0.0045	0.89	99.9	99.5	2077	76	2586	41	3012	32
	42	672	216	0.420	0.3972	0.0178	12.4000	0.5640	0.2260	0.0045	0.90	99.9	99.7	2156	82	2632	43	3022	32
	43	672	214	0.417	0.4003	0.0179	12.5000	0.5690	0.2260	0.0045	0.90	99.9	99.7	2170	83	2641	43	3025	32
	44	659	204	0.405	0.3944	0.0174	11.9000	0.5370	0.2190	0.0044	0.90	99.8	99.2	2143	80	2598	42	2975	33
	45	617	206	0.436	0.3758	0.0159	11.8000	0.5100	0.2280	0.0046	0.89	99.8	99.4	2057	74	2588	40	3036	32
	46	661	207	0.410	0.4436	0.0216	13.8000	0.6820	0.2250	0.0045	0.92	99.8	99.3	2367	96	2734	47	3017	32
	47	649	198	0.399	0.3971	0.0175	12.0000	0.5390	0.2200	0.0044	0.90	99.9	99.6	2156	81	2606	42	2978	33
	48	663	196	0.386	0.3941	0.0174	12.1000	0.5430	0.2230	0.0044	0.90	100.0	99.8	2142	80	2612	42	3000	32
	49	619	189	0.398	0.3820	0.0162	11.6000	0.5030	0.2200	0.0045	0.89	99.9	99.6	2085	76	2573	41	2983	33

Supplementary information – Chapter 3

Geochronology of the Horseshoe Lake greenstone belt, Superior Province Canada: Implications for tectonic and metamorphic history

C.J. Kelly[1], D.A. Schneider[1], M.-E. Lajoie[1], S.E. Jackson[2], C.R. McFarlane[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON, K1N 6N5 Canada
[2]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada
[3]Department of Earth Sciences, University of New Brunswick, Fredericton, NB, E3B 5A3 Canada

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SI 3.1: Summary of SIMS U-Pb depth profile data

A total of 14 grains were analyzed from subarkose sample HSGB-05 (NAD 83, Zone 15, 652153E 5785785N). Five of the grains display no evidence of younger ages in the outer margins of the crystal, with ages resembling those revealed during polished analysis. The remaining ten samples all demonstrate rim material which ranges in thickness from 1 – >2 μm. Th/U in the rims ranges from 0.029 – 0.481 with a single age having a value of 1.281. Average Th/U for the sample is 0.369 however when the value is 1.281 is not included the average falls to a more representative 0.157. Rims vary in $^{207}Pb/^{206}Pb$ age from 2839 – 2981 Ma however a probability density plot reveals that there are in fact two age populations in the sample, the weighted mean average $^{207}Pb/^{206}Pb$ age of the older rim age is 2970 ± 6 Ma (MSWD: 0.45; n: 100) and the younger age of 2852 ± 15 Ma (MSWD: 0.45; n: 33).

A total of 11 grains were analyzed from subarkose sample HSGB-06 (NAD 83, Zone 15, 652257E 5785888N). Four of the grains display no evidence of younger ages in the outer margins of the crystal. The remaining seven samples all demonstrate rim material which ranges in thickness from 1 – > 3.8 μm. Th/U in the rims ranges from 0.04 – 0.375 with an average Th/U for the sample of 0.208. Rims are vary in $^{207}Pb/^{206}Pb$ age from 2809 – 2928 Ma with a weighted mean average $^{207}Pb/^{206}Pb$ age of 2861 ± 9 Ma (MSWD: 3.3; n: 138).

A total of eight grains were analyzed from subarkose sample HSGB-07 (NAD 83, Zone 15, 652257E 5785888N). Two of the grains display no evidence of younger ages in the outer margins of the crystal, with ages resembling those revealed during polished analysis. The remaining six samples all demonstrate rim material which ranges in thickness from 0.4 – >1.5 μm. Th/U in the rims ranges from 0.149 – 0.562 with an average Th/U for the sample of 0.277.

Rims vary in $^{207}Pb/^{206}Pb$ age from 2853 – 2956 Ma with a weighted $^{207}Pb/^{206}$ age of 2923 ± 16 Ma (MSWD: 1.03; n: 52).

A total of 18 grains were analyzed from subarkose sample HSGB-10 (NAD 83, Zone 15, 651949E 5785825N). Seven of the grains display no evidence of younger ages in the outer margins of the crystal, with ages resembling those revealed during polished analysis. The remaining eleven samples all demonstrate rim material which ranges in thickness from 0.6 – > 4.4 μm. Th/U in the rims ranges from 0.038 – 0.39 with an average Th/U for the sample of 0.199. Rims vary in $^{207}Pb/^{206}Pb$ age from 2645 – 2971 Ma however a probability density plot reveals that there are in fact two age populations in the sample, the weighted mean average $^{207}Pb/^{206}Pb$ age of the older rim is 2918 ± 9 Ma (MSWD: 1.8; n: 105) and a younger age of 2645 ± 14 Ma (MSWD: 0.77; n: 44).

A total of 13 grains were analyzed from subarkose sample HSGB-12 (NAD 83, Zone 15, 652396E 5785751N). Four of the grains display no evidence of younger ages in the outer margins of the crystal, with ages resembling those revealed during polished analysis. The remaining nine samples all demonstrate rim material which ranges in thickness from 0.6 – > 2.6 μm. Th/U in the rims ranges from 0.077 – 0.721 with an average Th/U for the sample of 0.213. Rims vary in $^{207}Pb/^{206}Pb$ age from 2820 – 2974 Ma with a weighted $^{207}Pb/^{206}$ age of 2918 ± 9 Ma (MSWD: 2.1; n: 149).

SI 3.2: LA-ICP-MS U-Pb data for polished zircon, quartz feldspar porphyry, HSGB, NW Ontario

sample	Th/U	$^{206*}Pb/^{204}Pb$	$^{207}Pb*/^{206}Pb*$		$^{207}Pb*/^{235}U$		$^{206}Pb*/^{238}U$		Err. Corr.	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e		age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
HSGB13-13 (NAD 83, Zone 15U, 652257E, 5785888N)															
13-85	0.90	867	0.1894	0.0019	13.8100	0.4200	0.5300	0.0190	0.70	2738	17	2737	27	2741	78
13-84	2.01	2947	0.1818	0.0028	11.3700	0.4500	0.4560	0.0170	0.78	2671	28	2554	47	2423	81
13-83	0.73	1020	0.1877	0.0019	13.4900	0.4000	0.5230	0.0180	0.80	2721	16	2715	29	2712	76
13-82	0.82	654	0.1899	0.0021	14.4300	0.4700	0.5540	0.0200	0.59	2740	19	2779	33	2841	85
13-81	1.32	937	0.1879	0.0019	14.5600	0.4400	0.5640	0.0200	0.83	2723	16	2786	29	2883	81
13-80	0.89	314	0.1878	0.0021	13.7400	0.4100	0.5400	0.0190	0.67	2722	18	2731	29	2783	80
13-78	0.79	850	0.1868	0.0018	13.6500	0.4100	0.5300	0.0180	0.91	2713	16	2725	28	2739	78
13-77	0.43	1570	0.1867	0.0019	13.3200	0.4000	0.5140	0.0180	0.94	2714	16	2701	29	2673	77
13-76	1.40	860	0.1891	0.0020	14.3400	0.4300	0.5470	0.0190	0.83	2734	17	2774	27	2813	80
13-75	0.60	238	0.1925	0.0021	11.6500	0.3600	0.4370	0.0150	0.80	2764	19	2577	28	2337	68
13-74	0.66	475	0.1899	0.0066	13.7800	0.4200	0.5260	0.0220	0.53	2742	48	2734	30	2723	99
13-73	0.65	572	0.1866	0.0019	15.0300	0.4500	0.5810	0.0200	0.86	2712	17	2818	28	2953	83
13-72	0.67	392	0.1885	0.0020	14.6700	0.4700	0.5590	0.0200	0.90	2729	17	2795	30	2862	83
13-71	0.73	598	0.1870	0.0019	13.8200	0.4100	0.5290	0.0180	0.76	2716	17	2736	28	2738	77
13-70	1.06	416	0.1863	0.0020	13.0400	0.4100	0.5010	0.0180	0.89	2711	18	2683	29	2617	77
13-66	0.55	772	0.1908	0.0021	13.5400	0.4600	0.5140	0.0190	0.84	2748	19	2722	31	2676	82
13-65	1.40	1283	0.1874	0.0019	14.0500	0.4500	0.5420	0.0200	0.92	2719	16	2752	30	2790	81
13-64	0.36	289	0.2017	0.0027	14.2600	0.4800	0.5100	0.0190	0.82	2839	22	2767	31	2659	78
HSGB13-09 (NAD 83, Zone 15U, 651949E, 5785825N)															
09-36	0.57	43	0.2350	0.0640	22.0000	54.0000	0.6700	0.4700	0.05	3070	200	3160	340	3290	800
09-35	0.46	768	0.1874	0.0019	14.0900	0.4300	0.5460	0.0190	0.89	2720	17	2757	28	2809	80
09-34	0.49	242	0.1917	0.0021	13.9700	0.4300	0.5250	0.0190	0.91	2761	18	2750	30	2722	78
09-33	0.70	454	0.1876	0.0019	14.0600	0.4300	0.5450	0.0190	0.87	2720	17	2754	29	2806	80
09-32	0.66	571	0.1870	0.0019	13.9300	0.4100	0.5380	0.0180	0.77	2717	17	2745	27	2774	77
09-31	1.76	2562	0.1874	0.0018	13.6400	0.4100	0.5260	0.0190	0.93	2719	16	2724	28	2725	78
09-30	0.77	317	0.1876	0.0021	12.2800	0.3800	0.4730	0.0170	0.84	2721	18	2625	29	2495	73
09-29	0.62	475	0.1894	0.0020	13.7500	0.4200	0.5300	0.0190	0.68	2736	18	2734	29	2741	78
09-28	0.83	630	0.1879	0.0019	13.6300	0.4100	0.5260	0.0180	0.87	2723	17	2726	28	2725	76
09-27	0.53	420	0.1875	0.0020	13.7300	0.4100	0.5280	0.0180	0.90	2719	18	2730	29	2730	78
09-26	0.72	453	0.1882	0.0019	14.0600	0.4300	0.5330	0.0190	0.76	2728	17	2755	29	2752	79
09-25	0.53	300	0.1875	0.0019	13.8200	0.4100	0.5300	0.0190	0.76	2720	17	2736	28	2739	78

sample	Th/U	$^{206*}Pb/^{204}Pb$	$^{207}Pb*/^{206}Pb*$		$^{207}Pb*/^{235}U$		$^{206}Pb*/^{238}U$		Err. Corr.	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e		age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
09-24	0.57	358	0.1880	0.0020	14.2300	0.4300	0.5410	0.0190	0.83	2724	17	2765	29	2788	77
09-23	0.82	1150	0.1885	0.0018	13.8500	0.4000	0.5230	0.0180	0.82	2729	16	2739	28	2710	75
09-22	1.59	1908	0.1846	0.0018	13.1800	0.4000	0.5070	0.0180	0.97	2695	16	2690	28	2642	75
09-21	0.81	373	0.1889	0.0020	14.1500	0.4900	0.5320	0.0210	0.93	2734	17	2754	34	2746	89
09-20	0.44	151	0.1872	0.0039	13.5000	1.4000	0.5100	0.0490	0.96	2719	31	2700	70	2640	180
09-19	0.67	493	0.1882	0.0020	14.2400	0.4300	0.5350	0.0180	0.81	2729	17	2764	28	2763	77
09-18	0.73	256	0.1917	0.0023	14.3400	0.4300	0.5350	0.0180	0.53	2755	19	2773	29	2762	77
09-17	0.69	397	0.1901	0.0022	14.1000	0.4600	0.5270	0.0200	0.74	2742	18	2755	30	2730	81
09-16	0.61	448	0.1885	0.0023	12.0500	0.4200	0.4530	0.0170	0.89	2729	18	2607	31	2412	74
09-15	0.59	778	0.1860	0.0019	13.4600	0.4000	0.5140	0.0180	0.86	2706	16	2712	28	2675	75
09-13	0.68	469	0.1871	0.0020	11.3600	0.4200	0.4350	0.0180	0.96	2716	18	2551	33	2326	78
09-12	0.61	324	0.1928	0.0020	13.5600	0.4000	0.5030	0.0170	0.76	2765	17	2721	28	2628	75
09-10	0.53	444	0.1872	0.0020	13.8000	0.4300	0.5290	0.0190	0.72	2718	17	2737	29	2738	79
HSGB13-08 (NAD 83, Zone 15U, 652396E, 5785751N)															
08-63	1.31	1414	0.1870	0.0018	13.3700	0.3900	0.5190	0.0180	0.87	2716	16	2707	28	2695	76
08-62	1.22	618	0.1885	0.0024	13.6600	0.4600	0.5260	0.0190	0.92	2727	21	2722	31	2724	79
08-61	1.35	691	0.1882	0.0019	13.7100	0.4000	0.5280	0.0180	0.80	2728	17	2730	28	2734	76
08-59	1.59	1218	0.1860	0.0018	12.9600	0.3800	0.5100	0.0180	0.87	2708	16	2679	28	2654	75
08-58	1.20	2126	0.1865	0.0019	11.9200	0.4200	0.4690	0.0180	0.98	2711	17	2589	37	2481	84
08-57	2.20	1236	0.1867	0.0018	14.3400	0.4200	0.5600	0.0190	0.87	2713	16	2773	28	2865	80
08-56	1.89	892	0.1877	0.0019	13.5900	0.4200	0.5310	0.0190	0.68	2724	17	2721	28	2745	80
08-55	0.57	394	0.1867	0.0021	13.5700	0.4000	0.5310	0.0180	0.75	2712	18	2719	27	2747	76
08-54	0.72	599	0.1904	0.0020	13.2500	0.4000	0.5070	0.0180	0.86	2745	17	2698	28	2643	75
08-53	1.11	268	0.1899	0.0022	14.5500	0.5000	0.5590	0.0210	0.92	2742	19	2790	32	2861	86
08-52	0.68	693	0.1854	0.0019	13.7000	0.4200	0.5360	0.0190	0.91	2702	17	2727	30	2766	80
08-51	1.81	433	0.1883	0.0020	13.8800	0.4200	0.5360	0.0190	0.89	2726	17	2741	29	2767	80
08-49	0.66	589	0.1840	0.0180	11.3000	5.3000	0.4450	0.0720	0.88	2690	110	2550	170	2370	260
08-48	0.71	721	0.1883	0.0019	12.7600	0.3800	0.4910	0.0170	0.85	2727	16	2662	28	2574	73
08-46	1.06	516	0.1901	0.0034	13.2000	0.6900	0.5010	0.0250	0.98	2742	33	2685	66	2610	110
08-45	0.75	558	0.1864	0.0019	13.4600	0.4200	0.5250	0.0190	0.94	2711	17	2710	30	2718	79
08-44	1.02	841	0.1862	0.0019	11.8000	0.4000	0.4570	0.0180	0.87	2708	17	2588	30	2423	76
08-43	0.81	639	0.1872	0.0019	14.4200	0.4600	0.5590	0.0200	0.92	2717	17	2775	30	2861	83
08-42	1.14	1099	0.1838	0.0018	10.8000	0.4100	0.4290	0.0180	0.98	2688	17	2499	36	2297	81

sample	Th/U	$^{206*}Pb/^{204}Pb$	$^{207}Pb*/^{206}Pb*$		$^{207}Pb*/^{235}U$		$^{206}Pb*/^{238}U$		Err. Corr.	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e		age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
08-41	0.68	288	0.1928	0.0021	12.7100	0.4000	0.4750	0.0170	0.88	2766	18	2658	30	2504	74
08-40	0.55	366	0.1918	0.0020	12.4100	0.4200	0.4700	0.0180	0.94	2757	17	2634	29	2482	78
08-39	0.77	157	0.2031	0.0025	15.9700	0.4700	0.5730	0.0200	0.39	2853	21	2876	30	2920	79
08-38	0.87	953	0.1881	0.0019	14.0600	0.4500	0.5420	0.0200	0.78	2725	16	2754	29	2792	82
08-37	0.52	375	0.1873	0.0021	13.5400	0.4100	0.5250	0.0180	0.79	2718	18	2718	27	2721	77
HSGB13-11 (NAD 83, Zone 15U, 653159E, 5786848N)															
11-144	0.82	605	0.1899	0.0022	13.9300	0.2900	0.5308	0.0061	0.56	2741	19	2744	19	2744	25
11-143	0.63	312	0.1911	0.0024	13.5200	0.3200	0.5108	0.0081	0.94	2751	20	2711	20	2658	34
11-142	1.21	897	0.1883	0.0024	13.7700	0.3500	0.5291	0.0075	0.79	2730	20	2733	21	2737	31
11-140	0.71	572	0.1884	0.0022	13.9500	0.3000	0.5320	0.0079	0.65	2727	19	2747	20	2749	33
11-139	1.62	577	0.1878	0.0022	13.8300	0.2800	0.5295	0.0057	0.81	2722	19	2737	19	2738	24
11-138	0.72	350	0.1883	0.0023	13.8400	0.2800	0.5305	0.0057	0.75	2726	20	2741	20	2743	24
11-136	0.48	910	0.1925	0.0024	14.2600	0.9300	0.5318	0.0470	0.50	2763	21	2767	42	2748	120
11-135	1.81	1748	0.1885	0.0020	14.1170	0.2700	0.5382	0.0050	0.41	2729	18	2757.4	19	2776	21
11-133	0.70	655	0.1882	0.0022	13.9300	0.2700	0.5319	0.0053	0.74	2727	20	2745.2	18	2749	22
11-132	0.95	613	0.1884	0.0022	14.0000	0.3000	0.5359	0.0059	0.77	2729	19	2749	20	2766	25
11-130	0.66	438	0.1873	0.0022	13.9000	0.3000	0.5334	0.0072	0.39	2718	19	2743.4	20	2755	30
11-129	1.18	892	0.1885	0.0021	13.3000	0.3100	0.5054	0.0072	0.65	2729	18	2701	21	2637	30
11-128	2.73	941	0.1747	0.0023	11.4600	0.6300	0.4722	0.0200	0.81	2602	21	2561	42	2493	81
11-127	0.76	1905	0.1930	0.0024	14.8700	0.3800	0.5546	0.0083	0.85	2767	20	2805	23	2844	33
11-125	0.67	268	0.1883	0.0041	11.1300	1.0000	0.4232	0.0210	0.70	2726	31	2535	47	2274	85
11-124	0.19	1244	0.1865	0.0021	14.1400	0.2700	0.5422	0.0059	0.83	2711.1	18	2759	19	2792	25
11-123	1.81	2059	0.1867	0.0020	13.7100	0.2900	0.5270	0.0068	0.91	2713	18	2731	20	2728	29
11-122	0.60	525	0.1900	0.0022	13.8300	0.3200	0.5222	0.0081	0.92	2743.3	18	2735	22	2709	34
11-121	1.01	277	0.1922	0.0022	14.3900	0.3300	0.5421	0.0072	0.60	2760	19	2775	21	2792	30
11-120	0.72	186	0.1889	0.0026	13.4000	0.3200	0.5079	0.0071	0.54	2731	22	2707	22	2647	30
11-119	0.52	841	0.1882	0.0022	13.9000	0.4400	0.5308	0.0120	0.85	2727.2	19	2742	22	2744	46
11-112	1.68	5067	0.1746	0.0019	11.5950	0.2500	0.4802	0.0063	0.62	2602.3	18	2572	20	2528	28
11-111	0.60	439	0.1890	0.0023	14.0300	0.2900	0.5356	0.0055	0.77	2736	21	2752	19	2764	23
11-108	0.69	571	0.1897	0.0022	14.1100	0.3100	0.5399	0.0069	0.71	2738	18	2756	20	2782	29
11-107	1.11	1809	0.1890	0.0021	13.8600	0.2800	0.5301	0.0066	0.76	2733.2	18	2740	19	2744	27
11-106	0.61	293	0.1885	0.0023	13.7000	0.2700	0.5259	0.0053	0.60	2728	21	2728	19	2724	23
11-105	0.80	720	0.1880	0.0022	13.7200	0.3300	0.5285	0.0089	0.75	2724	19	2731.3	24	2735	38

SI 3.3: LA-ICP-MS U-Pb data for polished metasedimentary zircon, HSGB, NW Ontario

sample	Th/U	$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
		value	1 s.e	value	1 s.e		value	1 s.e	age (Ma)	2 s.e	age (Ma)	2 s.e	age (Ma)	2 s.e
HSGB13-05														
1	0.36	20.63	0.53	0.6602	0.0130	0.91	0.2260	0.0020	3024	15	3121	30	3268	54
11	0.29	20.38	0.25	0.6332	0.0070	0.84	0.2332	0.0014	3074	10	3109	12	3162	28
12	0.33	18.07	0.25	0.6067	0.0073	0.84	0.2163	0.0020	2955	15	2995	13	3056	29
13	0.45	18.83	0.26	0.6010	0.0085	0.66	0.2272	0.0025	3034	17	3034	13	3033	34
15	0.36	21.07	0.32	0.6567	0.0110	0.95	0.2330	0.0014	3073	10	3141	16	3253	45
16	0.63	18.27	0.31	0.5946	0.0095	0.92	0.2234	0.0012	3005	8	3003	16	3007	39
17	0.49	19.8	0.4	0.6330	0.0140	0.97	0.2265	0.0013	3027	9	3079	20	3157	55
18	0.40	20.4	0.12	0.6198	0.0049	0.80	0.2387	0.0009	3111	6	3111	6	3109	20
19	0.50	18.99	0.26	0.6123	0.0081	0.95	0.2256	0.0017	3021	12	3042	13	3078	33
2	0.26	20.99	0.24	0.6342	0.0077	0.79	0.2413	0.0019	3128	12	3138	11	3166	31
20	2.46	15.98	0.26	0.5551	0.0089	0.85	0.2098	0.0027	2903	21	2876	15	2846	36
3	0.36	20.16	0.18	0.6223	0.0053	0.82	0.2364	0.0017	3096	11	3101	9	3119	21
4	0.34	20.33	0.28	0.6292	0.0084	0.66	0.2354	0.0031	3090	21	3108	13	3146	31
5	0.60	19.04	0.23	0.6124	0.0066	0.78	0.2275	0.0015	3034	11	3047	12	3079	26
6	0.23	15.79	0.29	0.5592	0.0072	0.95	0.2076	0.0019	2886	13	2863	15	2863	29
7	0.70	18.86	0.16	0.6007	0.0060	0.95	0.2279	0.0021	3038	15	3033	8	3031	24
8	0.22	19.4	0.16	0.6192	0.0061	0.87	0.2284	0.0018	3041	13	3061	8	3106	24
9	0.65	21.8	0.33	0.6543	0.0110	0.88	0.2423	0.0022	3137	15	3174	17	3244	45
HSGB13-06														
1	0.46	20.25	0.17	0.6458	0.0065	0.84	0.2272	0.0018	3032	13	3103	8	3211	25
10	0.78	17.44	0.22	0.5821	0.0084	0.84	0.2199	0.0014	2980	10	2959	12	2957	34
12	0.52	21.4	0.29	0.6509	0.0086	0.89	0.2386	0.0017	3110	11	3156	13	3231	34
13	0.62	18.88	0.23	0.6097	0.0078	0.91	0.2239	0.0017	3010	13	3035	12	3071	31
14	0.51	18.78	0.22	0.6149	0.0061	0.80	0.2230	0.0018	3002	13	3030	12	3090	25
2	0.35	18.87	0.32	0.6215	0.0110	0.70	0.2180	0.0031	2963	23	3037	16	3119	41
3	0.07	20.55	0.13	0.6624	0.0058	0.91	0.2252	0.0009	3018	6	3117	6	3276	22
5	0.62	19.68	0.17	0.6325	0.0059	0.65	0.2260	0.0016	3023	11	3076	8	3159	23
6	0.58	20.41	0.29	0.6588	0.0100	0.83	0.2232	0.0014	3003	10	3111	13	3262	39
7	0.62	18.09	0.45	0.6040	0.0120	0.96	0.2182	0.0013	2967	10	2993	26	3046	49
8	0.44	16.88	0.28	0.5761	0.0098	0.97	0.2151	0.0011	2944	8	2930	17	2932	40
9	0.43	20.87	0.28	0.6412	0.0082	0.92	0.2362	0.0016	3095	11	3134	13	3193	33
HSGB13-07														
1	1.11	18.96	0.18	0.6038	0.0062	0.82	0.2287	0.0012	3043	8	3039	9	3048	25
10	0.40	19.04	0.17	0.6123	0.0072	0.82	0.2269	0.0015	3030	10	3044	9	3079	29
11	0.48	21.74	0.18	0.6595	0.0057	0.63	0.2397	0.0016	3118	10	3173	8	3265	22
13	0.40	20.27	0.23	0.6262	0.0077	0.90	0.2365	0.0015	3096	10	3104	11	3134	31
14	0.44	19.22	0.29	0.6144	0.0090	0.86	0.2282	0.0015	3040	10	3053	15	3087	36
15	1.06	17.64	0.4	0.5839	0.0120	0.95	0.2212	0.0012	2989	9	2971	22	2969	48
2	0.64	19.62	0.35	0.6330	0.0110	0.92	0.2261	0.0016	3024	11	3072	18	3160	43
3	0.60	19.62	0.28	0.6219	0.0072	0.76	0.2306	0.0025	3058	18	3072	14	3117	29
5	0.71	18.896	0.098	0.6018	0.0048	0.60	0.2281	0.0009	3039	6	3037	5	3038	19
6	0.25	18.92	0.17	0.6080	0.0075	0.71	0.2261	0.0020	3024	13	3038	8	3062	30
7	0.69	16.13	0.23	0.5698	0.0086	0.90	0.2059	0.0017	2873	13	2884	14	2906	35
8	0.35	18.39	0.26	0.6133	0.0084	0.92	0.2195	0.0013	2977	9	3010	13	3083	33
9	0.35	19.68	0.17	0.6319	0.0065	0.90	0.2256	0.0012	3021	8	3075	9	3157	26
HSGB13-10														
1	0.29	19.09	0.17	0.6051	0.0060	0.88	0.2300	0.0009	3052	6	3046	9	3050	24
11	0.64	19.05	0.19	0.6145	0.0062	0.69	0.2259	0.0022	3023	16	3045	10	3088	25
12	0.50	19.37	0.27	0.6325	0.0081	0.80	0.2254	0.0020	3019	14	3060	14	3159	32
13	0.53	19.46	0.19	0.6247	0.0069	0.81	0.2275	0.0019	3036	13	3065	10	3128	28
14	0.68	19.25	0.21	0.6184	0.0076	0.83	0.2277	0.0017	3035	12	3054	11	3103	30
15	0.70	18.72	0.19	0.6090	0.0064	0.81	0.2249	0.0013	3016	9	3027	10	3066	26
16	0.59	19.12	0.21	0.6148	0.0077	0.80	0.2262	0.0014	3025	10	3048	11	3089	31
17	0.45	18.83	0.15	0.6101	0.0063	0.64	0.2257	0.0015	3022	11	3033	8	3070	25

18	0.60	19.53	0.12	0.6280	0.0061	0.71	0.2263	0.0011	3026	8	3069	6	3141	24
19	0.46	19.75	0.19	0.6357	0.0068	0.80	0.2268	0.0016	3033	11	3079	10	3172	27
2	0.47	20.5	0.17	0.6291	0.0064	0.75	0.2365	0.0013	3097	9	3115	8	3146	27
20	0.51	20.66	0.21	0.6356	0.0068	0.80	0.2378	0.0015	3105	10	3124	10	3171	27
21	0.61	20.26	0.15	0.6268	0.0067	0.90	0.2362	0.0014	3094	9	3104	7	3137	27
22	0.39	21.24	0.23	0.6535	0.0080	0.75	0.2380	0.0018	3106	12	3149	11	3241	31
23	0.45	19.35	0.37	0.6240	0.0110	0.96	0.2273	0.0017	3033	12	3058	21	3124	43
3	0.71	19.42	0.2	0.6084	0.0110	0.77	0.2341	0.0023	3080	16	3063	10	3063	44
4	0.58	21.011	0.14	0.6377	0.0062	0.74	0.2397	0.0011	3118	7	3139	7	3180	24
5	0.53	16.1	0.33	0.5701	0.0110	0.63	0.2054	0.0029	2868	23	2883	20	2908	44
6	0.31	18.11	0.18	0.5938	0.0062	0.74	0.2220	0.0018	2995	13	2995	9	3005	25
7	0.58	21.04	0.26	0.6427	0.0094	0.73	0.2388	0.0012	3112	8	3140	12	3199	35
8	0.78	19.97	0.25	0.6364	0.0078	0.84	0.2287	0.0015	3043	10	3089	12	3180	32
9	0.55	20.79	0.16	0.6369	0.0062	0.88	0.2394	0.0010	3116	7	3130	8	3177	25
HSGB13-12														
11	0.76	21.11	0.19	0.6378	0.0068	0.80	0.2402	0.0017	3121	12	3143	9	3182	27
12	0.58	16.5	0.21	0.5679	0.0098	0.89	0.2090	0.0017	2897	13	2906	12	2899	40
13	0.31	20.95	0.22	0.6363	0.0073	0.76	0.2381	0.0025	3107	17	3136	10	3176	29
14	0.14	20.79	0.3	0.6484	0.0069	0.86	0.2357	0.0018	3091	12	3135	14	3222	27
15	0.42	20.49	0.35	0.6321	0.0095	0.84	0.2360	0.0018	3092	12	3114	17	3157	40
17	0.49	21.04	0.16	0.6386	0.0058	0.73	0.2402	0.0012	3122	8	3140	7	3185	23
2	0.52	20.52	0.29	0.6392	0.0081	0.95	0.2350	0.0015	3088	11	3118	14	3185	32
3	0.31	19.7	0.18	0.6129	0.0066	0.65	0.2349	0.0018	3087	12	3077	9	3081	27
5	0.44	18.82	0.17	0.6075	0.0065	0.79	0.2259	0.0016	3023	12	3034	9	3060	26
6	0.58	19.8	0.34	0.6315	0.0090	0.88	0.2295	0.0016	3049	11	3081	17	3165	40
7	0.29	19.21	0.17	0.6152	0.0058	0.71	0.2274	0.0014	3033	10	3052	9	3093	23
8	0.37	19.54	0.19	0.6229	0.0064	0.82	0.2293	0.0018	3048	12	3068	10	3121	26
9	1.04	19.13	0.17	0.6130	0.0054	0.76	0.2267	0.0013	3030	9	3048	9	3082	22

SI 3.4: SIMS U-Pb depth-profile data for unpolished metasedimentary zircon, HSGB, NW Ontario

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
HSGB-06-1	1	0.32	0.2070	0.0026	10.8000	0.5490	0.3796	0.0190	0.97	99.3	97.3	2880	21	2508	47	2074	89
	2	0.20	0.1990	0.0022	9.9200	0.4640	0.3619	0.0167	0.97	99.6	98.1	2817	18	2428	43	1991	79
	3	0.18	0.1970	0.0021	10.3000	0.4660	0.3809	0.0170	0.97	99.7	98.9	2801	18	2466	42	2081	79
	4	0.18	0.1970	0.0021	11.0000	0.4810	0.4037	0.0175	0.97	99.8	99.0	2803	18	2521	41	2186	81
	5	0.17	0.1990	0.0022	11.9000	0.5380	0.4344	0.0194	0.97	99.8	99.1	2820	18	2599	42	2325	87
	6	0.18	0.2030	0.0023	12.1000	0.5150	0.4306	0.0182	0.96	99.8	99.3	2853	19	2610	40	2309	82
	7	0.18	0.2110	0.0025	12.8000	0.5490	0.4414	0.0187	0.96	99.9	99.5	2913	19	2668	40	2357	84
	8	0.17	0.2120	0.0026	12.7000	0.5290	0.4327	0.0179	0.96	99.9	99.6	2924	20	2656	39	2318	80
	9	0.18	0.2110	0.0028	12.7000	0.5370	0.4381	0.0183	0.95	100.0	99.9	2911	21	2660	40	2342	82
	10	0.16	0.2130	0.0031	13.2000	0.5800	0.4520	0.0196	0.95	99.9	99.8	2925	23	2697	41	2404	87
	11	0.17	0.2150	0.0033	14.1000	0.6840	0.4779	0.0229	0.95	99.9	99.8	2941	25	2759	46	2518	100
	12	0.19	0.2080	0.0035	13.9000	0.6910	0.4837	0.0238	0.94	99.9	99.8	2891	27	2741	47	2543	103
	13	0.18	0.2120	0.0039	13.1000	0.6190	0.4474	0.0208	0.92	99.9	99.4	2920	30	2685	45	2384	93
	14	0.20	0.2120	0.0041	13.0000	0.6500	0.4468	0.0219	0.92	99.9	99.4	2917	31	2682	47	2381	98
	15	0.17	0.2140	0.0043	13.5000	0.6950	0.4567	0.0232	0.92	100.0	99.8	2937	32	2714	49	2425	103
	16	0.18	0.2120	0.0044	12.2000	0.5960	0.4192	0.0200	0.91	99.9	99.6	2920	33	2624	46	2257	91
	17	0.19	0.2140	0.0046	11.5000	0.5360	0.3897	0.0178	0.89	99.8	99.4	2938	34	2565	44	2121	82
	18	0.19	0.2090	0.0044	12.8000	0.6650	0.4434	0.0227	0.92	99.9	99.7	2899	34	2664	49	2366	101
	19	0.17	0.2150	0.0046	11.7000	0.5670	0.3954	0.0188	0.90	100.0	99.9	2943	35	2582	45	2148	87
	20	0.18	0.2180	0.0047	11.5000	0.5460	0.3823	0.0177	0.89	99.9	99.5	2969	35	2566	44	2087	83
	21	0.17	0.2160	0.0047	13.0000	0.6810	0.4354	0.0225	0.91	99.9	99.7	2952	35	2678	49	2330	101
	22	0.18	0.2150	0.0048	11.6000	0.5740	0.3926	0.0190	0.90	100.0	99.9	2944	36	2576	46	2135	88
	23	0.15	0.2130	0.0048	11.2000	0.5470	0.3821	0.0182	0.89	99.9	99.7	2929	36	2542	45	2086	85
	24	0.17	0.2170	0.0050	11.9000	0.5940	0.3982	0.0194	0.89	99.9	99.6	2959	37	2598	47	2161	90
	25	0.19	0.2070	0.0049	10.4000	0.4930	0.3640	0.0168	0.87	99.8	99.2	2883	38	2470	44	2001	79
	26	0.18	0.2140	0.0050	11.0000	0.5330	0.3725	0.0176	0.88	99.9	99.4	2936	38	2523	45	2041	83
	27	0.18	0.2140	0.0050	12.2000	0.6370	0.4124	0.0212	0.90	99.9	99.7	2935	38	2617	49	2226	97
	28	0.19	0.2130	0.0051	10.7000	0.5190	0.3657	0.0172	0.87	99.8	99.3	2926	39	2499	45	2009	81
	29	0.18	0.2180	0.0052	11.2000	0.5550	0.3717	0.0181	0.88	99.9	99.7	2965	38	2537	46	2037	85
HSGB-06-1@1	1	0.15	0.2020	0.0024	12.2000	0.7620	0.4393	0.0272	0.98	99.6	98.4	2839	19	2621	59	2348	122
	2	0.13	0.1960	0.0021	12.1000	0.7360	0.4471	0.0271	0.98	99.8	99.1	2793	18	2611	57	2382	121
	3	0.14	0.1940	0.0020	11.6000	0.6510	0.4348	0.0242	0.98	99.8	99.3	2773	17	2573	52	2327	109
	4	0.14	0.1920	0.0020	12.0000	0.6400	0.4545	0.0241	0.98	99.9	99.6	2759	17	2607	50	2415	107
	5	0.13	0.2000	0.0021	12.9000	0.6660	0.4683	0.0240	0.98	100.0	99.8	2824	17	2672	49	2476	106
	6	0.14	0.1990	0.0021	12.7000	0.6290	0.4639	0.0228	0.98	99.9	99.8	2815	17	2658	47	2457	101
	7	0.14	0.1980	0.0021	12.0000	0.5460	0.4382	0.0199	0.97	99.9	99.6	2811	17	2602	43	2342	89
	8	0.14	0.1990	0.0021	12.7000	0.5890	0.4611	0.0213	0.97	99.9	99.8	2820	17	2655	44	2444	94
	9	0.14	0.1990	0.0021	12.2000	0.5320	0.4436	0.0192	0.97	100.0	99.8	2818	17	2617	41	2367	86
	10	0.15	0.1980	0.0022	12.0000	0.5030	0.4378	0.0183	0.97	99.9	99.7	2810	18	2601	39	2341	82
	11	0.14	0.1990	0.0022	12.3000	0.5340	0.4488	0.0193	0.97	100.0	99.8	2819	18	2629	41	2390	86
	12	0.16	0.2000	0.0022	11.3000	0.4420	0.4083	0.0158	0.96	99.9	99.5	2827	18	2545	37	2207	73
	13	0.16	0.1970	0.0022	11.5000	0.4660	0.4223	0.0170	0.96	99.9	99.4	2803	18	2563	38	2271	77
	14	0.15	0.2000	0.0022	11.1000	0.4490	0.4040	0.0162	0.96	99.9	99.6	2824	18	2534	38	2187	74
	15	0.16	0.2020	0.0024	11.5000	0.4530	0.4128	0.0161	0.95	99.9	99.5	2839	19	2562	37	2228	74
	16	0.16	0.2010	0.0026	12.1000	0.4850	0.4359	0.0173	0.95	100.0	99.9	2838	21	2613	38	2332	78
	17	0.15	0.2040	0.0028	12.0000	0.4680	0.4258	0.0165	0.94	99.9	99.8	2856	22	2601	37	2287	74
	18	0.16	0.2090	0.0030	12.1000	0.4680	0.4197	0.0160	0.93	99.9	99.8	2897	23	2611	36	2259	73
	19	0.16	0.2090	0.0031	12.0000	0.4680	0.4170	0.0160	0.93	100.0	99.9	2900	24	2607	36	2247	73
	20	0.14	0.2060	0.0032	11.8000	0.4580	0.4172	0.0159	0.92	100.0	99.8	2873	25	2592	36	2248	72
	21	0.16	0.2060	0.0033	12.0000	0.4730	0.4217	0.0163	0.92	99.9	99.6	2878	26	2605	37	2268	74
	22	0.17	0.2080	0.0034	11.8000	0.4620	0.4099	0.0158	0.91	100.0	99.8	2890	27	2585	37	2214	72
	23	0.17	0.2110	0.0036	11.6000	0.4440	0.3974	0.0150	0.90	99.9	99.6	2915	27	2570	36	2157	69
	24	0.19	0.2090	0.0036	11.7000	0.4640	0.4073	0.0158	0.90	99.9	99.4	2894	28	2582	37	2202	73
	25	0.18	0.2090	0.0037	10.9000	0.4090	0.3785	0.0138	0.88	99.8	99.3	2900	29	2517	35	2069	65
	26	0.16	0.2130	0.0037	11.9000	0.4750	0.4067	0.0159	0.90	99.9	99.8	2926	28	2599	37	2200	73
	27	0.18	0.2130	0.0037	12.3000	0.4990	0.4187	0.0167	0.90	99.9	99.7	2927	28	2626	38	2255	76
	28	0.16	0.2100	0.0038	11.3000	0.4330	0.3901	0.0146	0.89	99.9	99.6	2907	29	2548	36	2123	68
	29	0.17	0.2100	0.0037	12.2000	0.4970	0.4206	0.0168	0.90	100.0	99.9	2908	29	2620	38	2263	76
HSGB-06-5	1	0.18	0.2130	0.0067	20.0000	2.1600	0.6811	0.0727	0.96	99.3	97.4	2926	51	3090	105	3348	279
	2	0.22	0.2180	0.0069	19.6000	1.9700	0.6499	0.0648	0.95	99.8	99.1	2968	51	3070	97	3228	253
	3	0.23	0.2210	0.0070	15.4000	1.2900	0.5034	0.0416	0.93	99.9	99.6	2990	51	2837	80	2628	178
	4	0.23	0.2300	0.0073	16.0000	1.3400	0.5049	0.0418	0.93	99.9	99.5	3051	51	2877	80	2635	179
	5	0.25	0.2240	0.0074	12.4000	0.8690	0.4016	0.0273	0.89	99.6	98.4	3012	53	2636	66	2176	126
	6	0.21	0.2250	0.0073	14.8000	1.1800	0.4776	0.0371	0.92	99.7	98.7	3020	52	2805	75	2517	162
	7	0.26	0.2200	0.0070	14.8000	1.2000	0.4884	0.0389	0.92	99.9	99.6	2984	51	2805	77	2564	169
	8	0.20	0.2290	0.0073	13.2000	0.9580	0.4181	0.0297	0.90	99.9	99.7	3046	51	2695	68	2252	135
	9	0.22	0.2270	0.0075	15.4000	1.2300	0.4908	0.0386	0.91	99.8	99.3	3034	53	2840	76	2574	167
	10	0.29	0.2240	0.0076	12.9000	0.9290	0.4174	0.0295	0.89	100.0	100.0	3009	54	2671	68	2249	134

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	11	0.20	0.2130	0.0073	13.3000	1.0200	0.4514	0.0341	0.90	100.0	99.8	2929	55	2698	73	2401	152
	12	0.30	0.2220	0.0076	12.6000	0.9180	0.4120	0.0293	0.89	99.9	99.6	2995	55	2651	68	2224	134
	13	0.26	0.2260	0.0077	12.6000	0.9030	0.4033	0.0284	0.89	100.0	100.0	3023	55	2647	68	2184	131
	14	0.23	0.2180	0.0074	13.6000	1.0600	0.4511	0.0347	0.90	99.9	99.6	2967	55	2720	74	2400	154
	15	0.23	0.2140	0.0075	12.5000	0.9280	0.4215	0.0305	0.89	99.7	98.8	2940	57	2640	70	2267	139
	16	0.28	0.2230	0.0079	11.9000	0.8330	0.3869	0.0263	0.87	99.7	99.0	3003	57	2596	66	2109	122
	17	0.29	0.2170	0.0077	11.4000	0.7910	0.3814	0.0257	0.87	99.7	99.0	2957	57	2557	65	2083	120
	18	0.25	0.2230	0.0078	13.4000	1.0200	0.4358	0.0322	0.89	99.6	98.4	3005	56	2710	72	2332	144
	19	0.25	0.2200	0.0077	12.2000	0.8760	0.4031	0.0281	0.88	99.7	98.8	2980	56	2622	67	2183	129
	20	0.25	0.2130	0.0074	10.9000	0.7410	0.3712	0.0244	0.87	99.8	99.2	2932	56	2517	63	2035	115
	21	0.25	0.2230	0.0075	13.0000	0.9390	0.4223	0.0300	0.89	100.0	99.8	3001	54	2678	68	2271	136
	22	0.24	0.2170	0.0074	11.4000	0.7580	0.3793	0.0246	0.87	99.9	99.6	2962	55	2554	62	2073	115
	23	0.24	0.2190	0.0073	11.6000	0.7810	0.3847	0.0253	0.87	100.0	99.8	2973	54	2574	63	2098	118
	24	0.27	0.2160	0.0072	10.4000	0.6590	0.3493	0.0215	0.86	99.9	99.4	2951	54	2471	59	1931	103
	25	0.22	0.2090	0.0071	12.1000	0.8290	0.4191	0.0281	0.87	99.9	99.6	2899	55	2611	64	2256	128
	26	0.24	0.2210	0.0075	10.7000	0.6670	0.3507	0.0213	0.85	99.9	99.5	2985	55	2494	58	1938	102
	27	0.28	0.2150	0.0072	10.7000	0.6840	0.3627	0.0223	0.86	99.7	98.9	2942	55	2501	59	1995	106
	28	0.21	0.2220	0.0074	10.9000	0.6670	0.3556	0.0213	0.85	100.0	100.0	2993	53	2512	57	1961	101
	29	0.25	0.2110	0.0069	11.4000	0.7440	0.3903	0.0249	0.87	99.8	99.3	2915	53	2554	61	2124	115
HSGB-06-6	1	0.26	0.2060	0.0031	12.7000	0.7290	0.4484	0.0254	0.97	99.6	98.3	2874	24	2660	54	2388	113
	2	0.24	0.2030	0.0029	11.9000	0.5930	0.4254	0.0209	0.96	99.6	98.5	2852	23	2598	47	2285	95
	3	0.23	0.2000	0.0027	10.7000	0.4920	0.3885	0.0175	0.96	99.6	98.2	2828	22	2500	43	2116	81
	4	0.23	0.1840	0.0024	10.5000	0.4810	0.4129	0.0187	0.96	99.5	97.6	2691	21	2479	43	2228	85
	5	0.24	0.1890	0.0023	10.5000	0.4620	0.4034	0.0174	0.96	99.4	97.4	2737	20	2483	41	2185	80
	6	0.27	0.1810	0.0022	9.7600	0.4090	0.3907	0.0161	0.96	99.4	97.3	2663	20	2412	39	2126	75
	7	0.27	0.1860	0.0021	9.1500	0.3870	0.3566	0.0149	0.96	99.6	98.2	2708	19	2353	39	1966	71
	8	0.29	0.1860	0.0021	9.3500	0.3930	0.3643	0.0151	0.96	99.7	98.7	2708	18	2373	39	2003	71
	9	0.33	0.1810	0.0020	9.0600	0.3800	0.3631	0.0150	0.96	99.6	98.4	2661	18	2344	38	1997	71
	10	0.34	0.1820	0.0020	8.2000	0.3060	0.3264	0.0120	0.96	99.5	97.8	2673	18	2253	34	1821	58
	11	0.33	0.1740	0.0019	11.0000	0.5640	0.4578	0.0233	0.98	99.5	97.5	2597	18	2522	48	2430	103
	12	0.36	0.1730	0.0019	8.2600	0.3340	0.3454	0.0138	0.96	99.6	97.9	2591	18	2260	37	1913	66
	13	0.36	0.1710	0.0018	7.9100	0.3150	0.3351	0.0131	0.96	99.5	97.8	2570	18	2221	36	1863	63
	14	0.38	0.1700	0.0018	7.8100	0.3170	0.3329	0.0133	0.97	99.4	97.3	2559	18	2209	36	1852	64
	15	0.40	0.1710	0.0018	7.7700	0.3010	0.3297	0.0126	0.96	99.4	97.3	2566	18	2204	35	1837	61
	16	0.39	0.1700	0.0018	7.6500	0.3010	0.3266	0.0126	0.96	99.5	97.7	2557	17	2191	35	1822	61
	17	0.39	0.1710	0.0018	7.8500	0.3060	0.3321	0.0127	0.96	99.5	97.5	2572	17	2214	35	1848	62
	18	0.36	0.1650	0.0017	7.3900	0.2740	0.3253	0.0119	0.96	99.6	97.9	2506	17	2160	33	1816	58
	19	0.35	0.1660	0.0017	7.7500	0.3000	0.3393	0.0129	0.97	99.5	97.7	2515	17	2203	35	1883	62
	20	0.33	0.1650	0.0016	7.8600	0.3060	0.3453	0.0132	0.97	99.5	97.6	2508	17	2215	35	1912	63
	21	0.35	0.1660	0.0016	7.5700	0.2740	0.3305	0.0118	0.96	99.6	98.0	2519	16	2182	32	1841	57
	22	0.33	0.1650	0.0016	7.9200	0.2960	0.3489	0.0129	0.97	99.6	97.9	2504	16	2222	34	1930	61
	23	0.33	0.1610	0.0016	8.0600	0.3010	0.3626	0.0134	0.97	99.6	98.1	2469	16	2238	34	1994	63
	24	0.33	0.1620	0.0016	8.2500	0.3110	0.3693	0.0137	0.97	99.6	97.9	2476	16	2258	34	2026	65
	25	0.35	0.1710	0.0016	8.4900	0.3060	0.3611	0.0128	0.96	99.6	98.1	2563	16	2285	33	1987	61
	26	0.35	0.1660	0.0016	8.7200	0.3250	0.3807	0.0140	0.97	99.6	98.2	2520	16	2309	34	2079	65
	27	0.33	0.1720	0.0016	8.9500	0.3230	0.3775	0.0135	0.97	99.6	98.1	2576	16	2333	33	2064	63
	28	0.32	0.1730	0.0017	9.0600	0.3230	0.3799	0.0134	0.96	99.6	97.9	2587	16	2344	33	2076	63
	29	0.31	0.1720	0.0017	9.5400	0.3540	0.4025	0.0147	0.97	99.5	97.8	2577	16	2392	34	2180	68
	30	0.32	0.1770	0.0017	9.4800	0.3200	0.3889	0.0129	0.96	99.6	98.2	2624	16	2386	31	2118	60
	31	0.29	0.1730	0.0017	9.7500	0.3550	0.4098	0.0147	0.96	99.8	98.9	2583	17	2412	34	2214	67
	32	0.28	0.1740	0.0018	9.6500	0.3420	0.4015	0.0140	0.96	99.8	98.9	2600	17	2402	33	2176	65
	33	0.28	0.1760	0.0018	10.1000	0.3580	0.4139	0.0146	0.96	99.8	99.0	2618	17	2440	33	2233	66
	34	0.29	0.1800	0.0019	9.8200	0.3390	0.3951	0.0135	0.95	99.7	98.8	2655	17	2418	32	2147	62
HSGB-06-6@1	1	0.22	0.1980	0.0029	6.0700	0.2980	0.2226	0.0105	0.96	97.6	90.8	2807	24	1985	43	1296	56
	2	0.22	0.1980	0.0026	9.2800	0.4440	0.3393	0.0159	0.96	98.8	95.0	2813	21	2366	44	1883	77
	3	0.23	0.1900	0.0023	10.4000	0.4780	0.3959	0.0179	0.96	99.1	96.3	2743	20	2469	43	2150	83
	4	0.22	0.1910	0.0022	10.4000	0.4610	0.3949	0.0172	0.97	99.5	97.9	2753	19	2472	41	2145	80
	5	0.25	0.1860	0.0021	9.5600	0.3850	0.3732	0.0148	0.96	99.6	98.1	2706	19	2394	37	2044	70
	6	0.24	0.1860	0.0020	9.4300	0.3740	0.3686	0.0144	0.96	99.6	98.0	2703	18	2381	36	2023	68
	7	0.25	0.1830	0.0021	9.3000	0.3530	0.3682	0.0138	0.96	99.6	98.0	2682	19	2368	35	2021	65
	8	0.25	0.1890	0.0021	9.9800	0.3710	0.3833	0.0140	0.95	99.7	98.5	2732	19	2433	34	2092	65
	9	0.26	0.1920	0.0022	11.1000	0.4360	0.4209	0.0163	0.96	99.7	98.7	2755	19	2533	37	2265	74
	10	0.27	0.1920	0.0023	10.8000	0.4030	0.4078	0.0150	0.95	99.8	99.0	2758	19	2505	35	2205	69
	11	0.28	0.1910	0.0023	11.1000	0.4160	0.4213	0.0156	0.95	99.8	99.1	2752	20	2532	35	2266	71
	12	0.29	0.1930	0.0023	10.8000	0.3880	0.4037	0.0144	0.94	99.8	98.9	2770	20	2503	34	2186	66
	13	0.29	0.1960	0.0024	10.8000	0.3950	0.3996	0.0144	0.94	99.7	98.6	2791	20	2505	34	2167	66
	14	0.32	0.1970	0.0024	10.3000	0.3530	0.3773	0.0128	0.94	99.7	98.8	2806	20	2460	32	2064	60
	15	0.30	0.1940	0.0024	10.5000	0.3660	0.3915	0.0135	0.94	99.8	99.2	2774	20	2476	32	2130	62
	16	0.31	0.1990	0.0025	10.8000	0.3650	0.3925	0.0131	0.93	99.8	99.2	2822	21	2506	31	2134	60

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	17	0.31	0.1980	0.0026	11.4000	0.4140	0.4167	0.0149	0.94	99.9	99.4	2811	21	2555	34	2246	68
	18	0.31	0.1950	0.0026	11.2000	0.3930	0.4153	0.0144	0.93	99.9	99.4	2786	21	2538	33	2239	66
	19	0.32	0.1950	0.0025	10.8000	0.3850	0.4012	0.0141	0.93	99.8	99.1	2782	21	2503	33	2174	65
	20	0.35	0.1940	0.0025	10.3000	0.3580	0.3840	0.0132	0.93	99.8	99.1	2778	21	2461	32	2095	61
	21	0.36	0.1870	0.0023	10.0000	0.3540	0.3885	0.0135	0.94	99.8	98.9	2719	20	2438	33	2116	63
	22	0.40	0.1850	0.0023	9.3500	0.3040	0.3663	0.0116	0.93	99.7	98.5	2700	21	2373	30	2012	55
	23	0.42	0.1830	0.0022	9.1800	0.3030	0.3648	0.0118	0.93	99.6	98.2	2676	20	2356	30	2005	56
	24	0.46	0.1820	0.0022	8.7700	0.2810	0.3504	0.0109	0.92	99.5	97.6	2667	20	2315	29	1937	52
	25	0.54	0.1800	0.0022	8.4200	0.2690	0.3394	0.0105	0.92	99.4	97.2	2652	21	2277	29	1884	51
	26	0.60	0.1770	0.0023	8.0800	0.2620	0.3321	0.0104	0.92	99.2	96.2	2621	21	2241	29	1849	50
	27	0.77	0.1780	0.0024	7.2900	0.2260	0.2977	0.0088	0.90	98.9	94.9	2631	22	2148	28	1680	44
	28	0.85	0.1750	0.0024	6.9700	0.2290	0.2890	0.0090	0.91	98.6	93.5	2604	23	2107	29	1637	45
	29	0.91	0.1800	0.0025	6.1000	0.1980	0.2462	0.0075	0.90	98.4	93.0	2649	23	1990	28	1419	39
	30	0.89	0.1690	0.0025	4.7000	0.1500	0.2019	0.0059	0.89	98.2	91.5	2545	25	1767	27	1186	32
	31	0.83	0.1730	0.0026	4.2800	0.1380	0.1793	0.0053	0.88	97.8	90.1	2589	25	1690	27	1063	29
	32	0.82	0.1830	0.0028	4.0500	0.1310	0.1602	0.0047	0.88	97.5	89.5	2684	25	1645	26	958	26
	33	0.83	0.1720	0.0028	3.3300	0.1040	0.1401	0.0038	0.86	97.5	89.0	2580	27	1488	24	845	22
	34	0.86	0.1740	0.0029	3.2400	0.1010	0.1351	0.0036	0.85	97.3	88.4	2597	27	1467	24	817	21
	35	0.88	0.1780	0.0029	3.7000	0.1150	0.1507	0.0041	0.85	97.6	89.5	2638	27	1572	25	905	23
	36	0.89	0.1780	0.0029	4.6000	0.1450	0.1876	0.0053	0.86	97.7	90.1	2633	27	1749	26	1109	29
	37	0.79	0.1830	0.0030	5.5100	0.1770	0.2186	0.0064	0.86	97.9	91.2	2677	27	1902	28	1275	34
	38	0.78	0.1840	0.0030	6.4600	0.2110	0.2546	0.0078	0.87	98.5	93.7	2689	27	2040	29	1462	40
	39	0.69	0.1880	0.0030	6.7100	0.2210	0.2583	0.0080	0.87	98.8	95.1	2728	27	2074	29	1481	41
	40	0.68	0.1880	0.0032	6.4300	0.2150	0.2480	0.0077	0.87	98.6	93.9	2725	28	2036	29	1428	40
	41	0.60	0.1880	0.0031	6.8400	0.2390	0.2638	0.0087	0.88	99.0	95.8	2726	27	2091	31	1509	45
	42	0.59	0.1890	0.0033	7.0500	0.2480	0.2710	0.0091	0.87	99.1	96.3	2730	29	2117	31	1546	46
	43	0.49	0.1940	0.0034	8.0300	0.3030	0.3001	0.0109	0.89	99.4	97.3	2777	29	2235	34	1692	54
	44	0.48	0.1970	0.0036	7.6700	0.2700	0.2821	0.0096	0.86	99.6	98.2	2802	30	2193	32	1602	48
	45	0.48	0.1960	0.0036	8.0000	0.2950	0.2958	0.0106	0.87	99.8	98.9	2794	30	2231	33	1670	53
	46	0.47	0.1980	0.0037	8.0900	0.2980	0.2965	0.0105	0.86	99.7	98.6	2809	31	2241	33	1674	52
	47	0.44	0.1970	0.0037	8.8100	0.3530	0.3248	0.0126	0.88	99.6	98.2	2799	31	2319	37	1813	61
	48	0.42	0.1990	0.0038	8.1200	0.3050	0.2959	0.0107	0.87	99.6	98.4	2817	31	2244	34	1671	53
	49	0.41	0.2010	0.0039	8.4000	0.3190	0.3030	0.0111	0.87	99.7	98.9	2834	31	2275	34	1706	55
HSGB-06-7	1	4.70	0.1770	0.0054	9.3300	0.5280	0.3828	0.0174	0.84	88.1	61.3	2623	51	2371	52	2089	81
	2	3.65	0.1880	0.0046	10.1000	0.5050	0.3896	0.0168	0.87	91.2	70.1	2721	40	2442	46	2121	78
	3	2.71	0.1720	0.0042	10.1000	0.5340	0.4263	0.0199	0.89	92.9	73.1	2577	41	2445	49	2289	90
	4	2.01	0.1830	0.0039	11.2000	0.5710	0.4458	0.0208	0.91	94.7	79.9	2676	35	2541	47	2377	93
	5	1.64	0.1830	0.0037	10.4000	0.4910	0.4141	0.0180	0.91	96.0	84.1	2678	33	2474	44	2234	82
	6	1.39	0.1830	0.0035	9.9300	0.4450	0.3924	0.0164	0.90	96.8	87.0	2685	32	2428	41	2134	76
	7	1.35	0.1920	0.0035	10.2000	0.4490	0.3860	0.0160	0.91	97.3	89.4	2761	30	2456	41	2104	74
	8	1.24	0.1900	0.0036	11.0000	0.5040	0.4185	0.0181	0.91	97.1	88.4	2741	31	2519	43	2254	82
	9	1.01	0.1940	0.0035	12.6000	0.6320	0.4717	0.0228	0.93	98.0	91.8	2776	30	2651	47	2491	100
	10	1.02	0.1930	0.0036	10.9000	0.4910	0.4110	0.0176	0.91	98.2	92.5	2766	30	2517	42	2219	81
	11	0.79	0.1990	0.0036	12.3000	0.5880	0.4455	0.0206	0.93	98.4	93.6	2822	30	2624	45	2375	92
	12	0.65	0.1970	0.0036	11.8000	0.5450	0.4349	0.0193	0.92	98.5	94.0	2804	30	2591	43	2328	87
	13	0.54	0.1980	0.0037	11.8000	0.5490	0.4308	0.0193	0.92	98.5	93.8	2813	30	2588	44	2309	87
	14	0.50	0.1920	0.0036	11.3000	0.5250	0.4254	0.0191	0.92	98.6	94.3	2762	30	2546	43	2285	86
	15	0.45	0.2030	0.0038	11.8000	0.5440	0.4213	0.0187	0.92	98.5	94.1	2850	30	2587	43	2266	85
	16	0.46	0.2000	0.0039	10.4000	0.4420	0.3796	0.0153	0.89	98.3	93.1	2823	32	2475	39	2074	71
	17	0.45	0.1930	0.0038	11.1000	0.5190	0.4178	0.0186	0.91	98.4	93.3	2771	32	2535	43	2250	85
	18	0.44	0.1950	0.0039	11.5000	0.5520	0.4292	0.0196	0.91	98.2	92.6	2781	33	2566	45	2302	89
	19	0.42	0.1960	0.0041	11.1000	0.5190	0.4104	0.0182	0.90	97.9	91.6	2795	34	2532	44	2217	83
	20	0.40	0.1950	0.0040	11.2000	0.5350	0.4160	0.0189	0.90	98.0	92.2	2785	34	2539	45	2242	86
	21	0.37	0.2040	0.0042	11.0000	0.5160	0.3916	0.0174	0.90	98.1	92.6	2861	33	2526	44	2130	81
	22	0.37	0.2020	0.0041	10.2000	0.4540	0.3664	0.0155	0.89	98.3	93.5	2839	33	2452	41	2013	73
	23	0.37	0.1970	0.0042	10.9000	0.5310	0.4030	0.0184	0.90	97.3	89.4	2800	35	2518	45	2183	84
	24	0.36	0.2060	0.0043	11.0000	0.5130	0.3862	0.0170	0.90	97.2	89.7	2874	34	2520	44	2105	79
	25	0.35	0.2070	0.0042	11.6000	0.5620	0.4062	0.0188	0.91	97.8	91.8	2881	33	2571	45	2197	86
	26	0.34	0.2060	0.0042	11.5000	0.5490	0.4040	0.0185	0.91	98.1	92.7	2872	33	2561	45	2188	85
	27	0.36	0.2050	0.0042	10.8000	0.4950	0.3824	0.0166	0.90	98.1	92.9	2867	33	2507	43	2088	77
	28	0.33	0.2020	0.0042	11.3000	0.5460	0.4055	0.0187	0.91	98.1	92.7	2844	34	2548	45	2194	86
	29	0.33	0.2040	0.0042	11.1000	0.5460	0.3928	0.0185	0.91	98.2	93.1	2862	33	2529	46	2136	86
	30	0.35	0.2050	0.0043	10.3000	0.4770	0.3651	0.0160	0.89	98.0	92.4	2863	34	2462	43	2006	76
	31	0.38	0.2050	0.0043	10.3000	0.4660	0.3637	0.0156	0.89	98.1	92.6	2863	34	2459	42	2000	74
	32	0.35	0.2090	0.0042	10.5000	0.4790	0.3655	0.0159	0.90	98.6	94.6	2894	33	2481	42	2008	75
	33	0.37	0.2110	0.0042	10.2000	0.4550	0.3517	0.0150	0.89	98.5	94.4	2910	33	2454	41	1943	71
	34	0.38	0.2080	0.0041	11.0000	0.5200	0.3829	0.0174	0.91	98.6	94.7	2892	32	2523	44	2090	81
	35	0.32	0.2150	0.0042	10.4000	0.4590	0.3513	0.0149	0.90	98.9	96.0	2943	31	2472	41	1941	71
	36	0.28	0.2110	0.0041	10.7000	0.5000	0.3676	0.0165	0.91	98.7	94.9	2914	32	2497	43	2018	78

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	37	0.31	0.2060	0.0041	9.6200	0.4180	0.3393	0.0141	0.89	98.8	95.5	2871	32	2399	40	1883	68
	38	0.30	0.2060	0.0040	10.0000	0.4330	0.3527	0.0146	0.89	99.0	96.0	2875	32	2437	40	1948	70
	39	0.29	0.2010	0.0040	8.9700	0.3660	0.3242	0.0127	0.88	99.1	96.2	2832	32	2335	37	1810	62
	40	0.30	0.2050	0.0040	8.7800	0.3530	0.3103	0.0119	0.88	99.0	96.2	2869	32	2316	37	1742	59
	41	0.28	0.2000	0.0039	8.9200	0.3640	0.3236	0.0126	0.88	99.1	96.4	2826	32	2330	37	1807	61
	42	0.28	0.1990	0.0039	8.3700	0.3280	0.3047	0.0114	0.87	99.1	96.2	2821	32	2272	36	1715	56
	43	0.27	0.2120	0.0040	9.0900	0.3550	0.3114	0.0116	0.88	99.0	96.3	2920	31	2348	36	1748	57
	44	0.30	0.2070	0.0039	9.4800	0.3910	0.3312	0.0132	0.90	99.1	96.5	2886	30	2385	38	1844	64
	45	0.31	0.2040	0.0038	8.6700	0.3270	0.3081	0.0112	0.88	99.4	97.5	2859	30	2304	34	1731	55
	46	0.28	0.2060	0.0038	9.0300	0.3470	0.3181	0.0118	0.88	99.5	98.0	2873	30	2341	35	1780	58
	47	0.26	0.2060	0.0037	9.0700	0.3510	0.3190	0.0120	0.89	99.6	98.4	2876	29	2345	35	1785	59
	48	0.30	0.2050	0.0038	8.2400	0.2970	0.2914	0.0101	0.86	99.3	97.3	2866	30	2257	33	1649	50
	49	0.27	0.2030	0.0038	8.5800	0.3280	0.3068	0.0112	0.88	99.1	96.6	2850	30	2295	35	1725	55
HSGB-06-13	1	0.17	0.1720	0.0089	13.1000	1.1900	0.5516	0.0386	0.82	84.1	52.4	2581	87	2688	86	2832	161
	2	0.15	0.1550	0.0087	12.4000	1.1800	0.5772	0.0418	0.81	85.5	52.5	2404	95	2632	90	2937	171
	3	0.16	0.1730	0.0080	12.8000	1.1200	0.5378	0.0383	0.85	88.3	61.2	2585	77	2666	82	2774	161
	4	0.16	0.1830	0.0081	11.5000	0.9320	0.4574	0.0298	0.84	88.8	63.7	2677	73	2566	76	2428	132
	5	0.16	0.1830	0.0083	11.8000	0.9940	0.4664	0.0319	0.84	88.6	63.1	2679	75	2585	79	2468	140
	6	0.16	0.1850	0.0076	13.6000	1.2300	0.5348	0.0421	0.89	91.0	69.3	2698	68	2725	85	2762	177
	7	0.16	0.1810	0.0079	9.9800	0.7930	0.3991	0.0257	0.84	90.7	68.1	2665	72	2433	73	2165	118
	8	0.18	0.1970	0.0079	10.9000	0.8460	0.4005	0.0263	0.86	91.3	71.5	2798	65	2510	72	2171	121
	9	0.19	0.1920	0.0075	10.4000	0.7750	0.3920	0.0247	0.85	92.3	73.6	2763	64	2471	69	2132	114
	10	0.17	0.1890	0.0075	10.9000	0.8640	0.4187	0.0283	0.87	92.2	72.9	2735	65	2516	74	2254	128
	11	0.16	0.1880	0.0073	10.8000	0.8390	0.4172	0.0278	0.87	92.8	74.4	2725	64	2507	72	2248	126
	12	0.17	0.1890	0.0071	10.3000	0.7700	0.3959	0.0254	0.86	93.3	76.0	2735	62	2464	69	2150	117
	13	0.19	0.2010	0.0066	10.5000	0.7080	0.3788	0.0227	0.87	94.8	81.5	2836	53	2480	62	2071	106
	14	0.17	0.2040	0.0062	12.1000	0.8500	0.4302	0.0277	0.90	95.6	84.2	2862	50	2614	66	2307	125
	15	0.17	0.2040	0.0059	11.8000	0.8030	0.4211	0.0265	0.91	96.2	86.1	2855	47	2590	64	2266	120
	16	0.18	0.2060	0.0059	9.3500	0.5270	0.3295	0.0166	0.86	95.9	85.4	2873	47	2373	52	1836	81
	17	0.20	0.2080	0.0057	10.5000	0.6270	0.3658	0.0200	0.89	95.9	85.4	2892	44	2480	55	2010	94
	18	0.15	0.2050	0.0053	10.1000	0.5740	0.3568	0.0186	0.89	96.4	86.8	2868	42	2443	53	1967	89
	19	0.15	0.2170	0.0053	10.4000	0.5670	0.3468	0.0175	0.90	96.6	88.1	2961	39	2470	51	1919	84
	20	0.14	0.2050	0.0051	9.7900	0.5280	0.3468	0.0172	0.89	96.5	87.3	2864	41	2415	50	1919	82
	21	0.14	0.2070	0.0052	9.5100	0.4940	0.3325	0.0157	0.88	96.2	86.4	2885	41	2389	48	1851	76
	22	0.14	0.2150	0.0049	10.4000	0.5480	0.3521	0.0174	0.90	97.2	90.0	2943	37	2474	49	1945	83
	23	0.13	0.2080	0.0048	9.8700	0.5040	0.3434	0.0164	0.89	97.5	90.8	2893	37	2422	47	1903	79
	24	0.13	0.2240	0.0049	11.0000	0.5830	0.3569	0.0180	0.91	97.8	92.2	3006	35	2523	49	1968	86
	25	0.15	0.2140	0.0048	10.0000	0.4920	0.3399	0.0157	0.89	97.6	91.3	2936	36	2437	45	1886	75
	26	0.16	0.2100	0.0048	10.5000	0.5430	0.3610	0.0176	0.90	97.3	90.0	2905	37	2476	48	1987	83
	27	0.14	0.2230	0.0050	11.2000	0.5820	0.3630	0.0179	0.90	97.5	91.3	3005	36	2538	49	1996	85
	28	0.16	0.2170	0.0051	10.2000	0.5180	0.3419	0.0162	0.89	97.4	90.7	2957	38	2455	47	1896	78
	29	0.18	0.2090	0.0052	10.1000	0.5270	0.3496	0.0169	0.88	96.9	88.7	2895	40	2440	48	1933	81
	30	0.17	0.2200	0.0053	11.4000	0.6190	0.3762	0.0192	0.90	97.3	90.6	2982	39	2558	51	2059	90
HSGB-06-14	1	0.15	0.2010	0.0053	9.5400	0.6970	0.3449	0.0243	0.93	99.0	95.9	2832	43	2392	67	1910	116
	2	0.10	0.1940	0.0053	11.4000	0.8900	0.4263	0.0323	0.94	99.3	96.9	2778	45	2557	73	2289	146
	3	0.16	0.1940	0.0054	11.6000	0.8730	0.4338	0.0319	0.93	99.7	98.8	2776	45	2573	70	2323	144
	4	0.22	0.1950	0.0055	12.3000	0.9650	0.4571	0.0353	0.93	99.9	99.5	2782	47	2625	74	2427	156
	5	0.26	0.1990	0.0058	11.9000	0.9230	0.4333	0.0330	0.93	99.9	99.4	2819	47	2597	73	2321	148
	6	0.30	0.2080	0.0062	12.0000	0.9120	0.4191	0.0312	0.92	99.9	99.4	2886	49	2604	71	2256	142
	7	0.28	0.2040	0.0061	12.0000	0.9510	0.4273	0.0331	0.93	99.9	99.6	2862	49	2608	74	2294	149
	8	0.33	0.2170	0.0065	13.4000	1.1000	0.4471	0.0362	0.93	100.0	100.0	2961	49	2708	78	2382	161
	9	0.34	0.2120	0.0066	11.4000	0.8470	0.3915	0.0284	0.91	100.0	100.0	2919	50	2559	69	2130	132
	10	0.35	0.2090	0.0067	9.9800	0.6840	0.3464	0.0231	0.89	99.9	99.6	2898	52	2433	63	1917	111
	11	0.34	0.2060	0.0067	11.1000	0.8530	0.3909	0.0293	0.91	99.8	99.1	2872	53	2530	72	2127	136
	12	0.40	0.2050	0.0066	10.0000	0.7160	0.3536	0.0247	0.90	100.0	99.8	2868	53	2435	66	1952	117
	13	0.44	0.2170	0.0070	12.6000	1.0200	0.4226	0.0336	0.92	99.8	99.4	2956	52	2652	76	2272	152
	14	0.44	0.2060	0.0069	9.9900	0.7090	0.3513	0.0242	0.89	99.8	99.3	2876	54	2434	66	1941	116
	15	0.43	0.2120	0.0071	10.2000	0.7230	0.3480	0.0240	0.89	99.9	99.5	2921	54	2451	66	1925	115
	16	0.42	0.2140	0.0070	11.5000	0.9080	0.3902	0.0302	0.91	100.0	100.0	2932	53	2564	74	2124	140
	17	0.40	0.2080	0.0070	9.9200	0.7230	0.3457	0.0246	0.89	100.0	100.0	2890	54	2427	67	1914	118
	18	0.44	0.2180	0.0073	10.5000	0.7520	0.3482	0.0244	0.89	100.0	100.0	2968	54	2478	67	1926	117
	19	0.46	0.1960	0.0067	10.1000	0.7670	0.3741	0.0277	0.90	100.0	100.0	2795	56	2446	70	2049	130
HSGB-06-10	1	0.04	0.1920	0.0026	8.6200	0.4250	0.3253	0.0158	0.96	99.5	97.7	2760	22	2298	45	1816	77
	2	0.03	0.1900	0.0026	9.7000	0.4470	0.3693	0.0167	0.96	99.6	98.4	2746	22	2407	42	2026	79
	3	0.04	0.1970	0.0028	13.0000	0.6670	0.4786	0.0242	0.96	99.6	98.5	2804	23	2681	48	2521	106
	4	0.03	0.2020	0.0031	13.0000	0.5960	0.4664	0.0211	0.94	99.8	99.2	2845	25	2681	43	2468	93
	5	0.04	0.2040	0.0033	16.6000	0.9610	0.5884	0.0338	0.96	99.8	99.4	2862	26	2911	56	2983	137
	6	0.04	0.1980	0.0036	14.9000	0.7990	0.5429	0.0288	0.94	99.9	99.4	2814	29	2806	51	2795	120
	7	0.04	0.2030	0.0038	14.1000	0.7500	0.5045	0.0265	0.94	99.8	99.2	2848	31	2756	50	2633	113

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	8	0.04	0.2060	0.0041	13.9000	0.7460	0.4891	0.0259	0.93	99.9	99.6	2871	32	2740	51	2567	112
	9	0.04	0.2030	0.0043	13.4000	0.7220	0.4776	0.0253	0.92	99.9	99.5	2853	34	2708	51	2517	111
	10	0.04	0.2000	0.0044	14.0000	0.8140	0.5082	0.0290	0.93	99.8	99.3	2829	35	2752	55	2649	124
	11	0.05	0.2040	0.0045	16.2000	1.0300	0.5750	0.0361	0.94	99.9	99.7	2860	36	2888	61	2928	148
	12	0.04	0.2050	0.0046	12.3000	0.6490	0.4342	0.0225	0.91	100.0	99.9	2870	37	2628	50	2325	101
	13	0.04	0.2060	0.0046	11.9000	0.6120	0.4180	0.0211	0.91	100.0	99.8	2877	36	2596	48	2251	96
	14	0.05	0.2080	0.0045	12.1000	0.6470	0.4227	0.0222	0.91	100.0	99.8	2889	35	2613	50	2273	101
	15	0.04	0.2010	0.0045	12.2000	0.6670	0.4385	0.0236	0.92	99.9	99.5	2834	36	2616	52	2344	106
HSGB-06-15	1	0.18	0.1960	0.0039	11.6000	0.7390	0.4311	0.0268	0.95	99.0	96.1	2791	33	2575	59	2311	121
	2	0.15	0.2030	0.0040	15.2000	1.0000	0.5419	0.0352	0.96	99.5	97.8	2850	32	2826	63	2792	147
	3	0.15	0.2070	0.0040	16.3000	1.0700	0.5705	0.0370	0.96	99.8	99.1	2882	31	2893	63	2910	152
	4	0.14	0.2060	0.0040	14.8000	0.8820	0.5221	0.0306	0.94	99.9	99.6	2876	32	2805	57	2708	130
	5	0.13	0.2150	0.0041	16.4000	1.0200	0.5545	0.0340	0.95	99.9	99.7	2944	31	2903	59	2844	141
	6	0.14	0.2080	0.0041	13.6000	0.7180	0.4764	0.0247	0.93	99.9	99.7	2886	32	2725	50	2512	108
	7	0.14	0.2120	0.0041	16.1000	0.9640	0.5507	0.0326	0.95	100.0	99.8	2924	31	2885	57	2828	135
	8	0.12	0.2130	0.0042	14.3000	0.7440	0.4860	0.0249	0.93	99.9	99.7	2931	31	2770	49	2553	108
	9	0.13	0.2070	0.0040	14.0000	0.7400	0.4891	0.0256	0.93	99.9	99.7	2883	31	2748	50	2567	111
	10	0.14	0.2110	0.0040	14.0000	0.7050	0.4813	0.0239	0.93	99.9	99.8	2914	31	2750	48	2533	104
	11	0.12	0.2100	0.0039	14.5000	0.7600	0.5026	0.0260	0.94	99.9	99.8	2903	30	2785	50	2625	111
	12	0.13	0.2100	0.0038	14.1000	0.7050	0.4876	0.0241	0.93	100.0	100.0	2903	29	2756	47	2560	104
	13	0.12	0.2010	0.0036	12.5000	0.5720	0.4507	0.0203	0.92	100.0	99.8	2832	29	2641	43	2398	90
	14	0.13	0.2050	0.0035	14.4000	0.7310	0.5108	0.0255	0.94	99.9	99.7	2866	28	2779	48	2660	109
	15	0.11	0.2000	0.0034	12.6000	0.5810	0.4589	0.0208	0.93	100.0	99.8	2825	28	2654	43	2435	92
	16	0.12	0.2060	0.0034	12.7000	0.5670	0.4479	0.0197	0.93	100.0	99.9	2873	27	2659	42	2386	88
HSGB-10-2	1	0.26	0.1640	0.0056	9.1800	0.6090	0.4058	0.0223	0.86	90.2	64.7	2498	58	2356	61	2196	102
	2	0.21	0.1870	0.0046	13.4000	0.8200	0.5189	0.0294	0.92	94.4	79.2	2714	41	2706	58	2695	125
	3	0.14	0.1890	0.0044	14.7000	0.9020	0.5638	0.0326	0.93	95.5	82.9	2734	38	2796	58	2882	134
	4	0.12	0.1980	0.0042	14.8000	0.8380	0.5435	0.0293	0.93	96.7	87.4	2808	35	2804	54	2798	122
	5	0.10	0.2020	0.0040	12.9000	0.6300	0.4646	0.0216	0.91	97.6	90.8	2842	33	2675	46	2460	95
	6	0.09	0.2030	0.0037	14.5000	0.7540	0.5197	0.0262	0.94	98.4	93.8	2847	30	2784	49	2698	111
	7	0.08	0.2020	0.0036	12.9000	0.5990	0.4611	0.0208	0.92	98.5	94.0	2845	29	2670	44	2444	92
	8	0.08	0.2050	0.0035	13.6000	0.6430	0.4818	0.0222	0.93	98.6	94.5	2863	28	2722	45	2535	96
	9	0.07	0.2040	0.0034	12.6000	0.5460	0.4476	0.0189	0.92	99.0	96.0	2861	27	2651	41	2385	84
	10	0.07	0.2010	0.0033	12.7000	0.5570	0.4587	0.0196	0.93	99.1	96.4	2836	27	2659	41	2434	87
	11	0.06	0.2050	0.0033	12.8000	0.5500	0.4545	0.0191	0.93	99.1	96.6	2863	26	2667	40	2415	84
	12	0.08	0.2060	0.0033	13.0000	0.5470	0.4558	0.0188	0.93	99.2	96.7	2877	26	2677	40	2421	83
	13	0.08	0.2060	0.0032	12.5000	0.4960	0.4390	0.0171	0.92	99.5	97.9	2874	25	2640	37	2346	77
	14	0.08	0.2080	0.0032	12.6000	0.5090	0.4388	0.0174	0.93	99.3	97.1	2888	25	2648	38	2345	78
	15	0.10	0.2120	0.0032	13.0000	0.5160	0.4431	0.0173	0.93	99.4	97.6	2922	25	2677	38	2364	77
	16	0.09	0.2070	0.0031	12.6000	0.5000	0.4428	0.0172	0.92	99.4	97.5	2882	25	2653	37	2363	77
	17	0.10	0.2060	0.0031	12.2000	0.4660	0.4285	0.0160	0.92	99.4	97.5	2876	25	2619	36	2299	72
	18	0.09	0.2080	0.0032	12.1000	0.4610	0.4213	0.0157	0.92	99.3	97.4	2890	25	2611	36	2267	71
	19	0.10	0.2100	0.0032	12.0000	0.4490	0.4150	0.0152	0.92	99.4	97.7	2907	25	2606	35	2238	69
	20	0.10	0.2080	0.0031	11.8000	0.4390	0.4126	0.0150	0.92	99.6	98.3	2891	24	2592	35	2227	68
	21	0.11	0.2070	0.0031	12.3000	0.4720	0.4302	0.0162	0.92	99.7	98.6	2886	24	2628	36	2307	73
HSGB-10-3	1	0.27	0.1930	0.0083	8.3800	0.8280	0.3150	0.0281	0.90	96.2	85.3	2767	70	2273	90	1765	138
	2	0.25	0.2070	0.0076	9.1900	0.8010	0.3217	0.0262	0.91	97.8	91.6	2884	60	2357	80	1798	128
	3	0.24	0.2140	0.0077	9.3800	0.7960	0.3181	0.0252	0.91	97.6	91.3	2935	58	2376	78	1781	123
	4	0.25	0.2100	0.0076	9.8000	0.8620	0.3394	0.0279	0.91	97.4	90.5	2902	59	2417	81	1884	134
	5	0.25	0.2140	0.0074	7.8600	0.5650	0.2660	0.0176	0.88	97.8	92.0	2938	56	2215	65	1521	90
	6	0.21	0.2160	0.0070	8.8100	0.6590	0.2961	0.0209	0.90	98.4	94.0	2950	52	2319	68	1672	104
	7	0.24	0.2210	0.0070	8.1100	0.5380	0.2663	0.0166	0.88	98.6	94.9	2988	51	2244	60	1522	84
	8	0.22	0.2240	0.0067	9.1500	0.6390	0.2958	0.0198	0.91	99.0	96.5	3011	48	2353	64	1671	98
	9	0.23	0.2160	0.0068	7.7500	0.4990	0.2602	0.0156	0.88	98.4	94.2	2951	51	2202	58	1491	80
	10	0.24	0.2200	0.0066	8.5100	0.5590	0.2805	0.0175	0.89	98.8	95.8	2981	49	2287	60	1594	88
	11	0.23	0.2250	0.0065	8.8000	0.5650	0.2842	0.0175	0.89	99.3	97.5	3014	47	2317	59	1612	88
	12	0.23	0.2260	0.0065	8.3600	0.5130	0.2682	0.0158	0.89	99.3	97.4	3025	46	2271	56	1532	80
	13	0.21	0.2170	0.0063	8.7400	0.5730	0.2924	0.0183	0.90	99.0	96.3	2957	47	2311	60	1654	91
	14	0.24	0.2170	0.0065	7.7200	0.4580	0.2581	0.0145	0.87	99.0	96.1	2958	48	2199	53	1480	74
	15	0.23	0.2240	0.0066	8.3700	0.5100	0.2707	0.0156	0.88	98.9	96.0	3013	47	2272	55	1544	79
	16	0.18	0.2200	0.0065	8.2100	0.5060	0.2705	0.0158	0.88	98.8	95.6	2981	47	2254	56	1543	80
	17	0.25	0.2210	0.0067	8.3000	0.5130	0.2721	0.0158	0.88	98.6	94.9	2989	48	2264	56	1552	80
	18	0.21	0.2220	0.0067	7.4100	0.4200	0.2417	0.0128	0.85	98.9	95.9	2998	48	2162	51	1396	67
	19	0.22	0.2290	0.0065	8.9800	0.5490	0.2851	0.0168	0.89	99.5	98.2	3042	45	2336	56	1617	84
HSGB-10-4	1	0.17	0.2070	0.0068	15.1000	1.6600	0.5312	0.0569	0.95	98.7	94.9	2880	53	2824	105	2746	240
	2	0.11	0.2100	0.0065	19.6000	2.3900	0.6769	0.0813	0.97	99.0	96.3	2906	50	3072	118	3332	313
	3	0.09	0.2110	0.0060	18.4000	2.0100	0.6317	0.0685	0.97	99.7	98.8	2914	46	3010	106	3156	271
	4	0.06	0.2140	0.0055	15.0000	1.3400	0.5101	0.0451	0.96	99.8	99.4	2932	42	2816	85	2657	193
	5	0.07	0.2170	0.0053	17.9000	1.7400	0.5988	0.0577	0.97	99.8	99.3	2960	39	2986	93	3025	233

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	6	0.05	0.2190	0.0050	16.0000	1.3300	0.5293	0.0436	0.96	99.9	99.8	2974	37	2876	79	2739	184
	7	0.06	0.2190	0.0047	15.9000	1.3000	0.5284	0.0426	0.96	100.0	99.9	2972	35	2873	78	2735	180
	8	0.06	0.2150	0.0045	14.9000	1.1300	0.5042	0.0380	0.96	100.0	99.8	2940	34	2810	72	2632	163
HSGB-10-5	1	0.37	0.1160	0.0017	16.1000	0.9140	1.0020	0.0561	0.97	99.3	95.4	1902	27	2882	54	4474	181
	2	0.40	0.2050	0.0029	12.6000	0.6640	0.4456	0.0233	0.96	99.8	99.1	2864	23	2648	50	2376	104
	3	0.38	0.2050	0.0029	14.9000	0.8930	0.5259	0.0314	0.97	99.9	99.7	2866	23	2806	57	2724	133
	4	0.37	0.2080	0.0030	14.7000	0.8450	0.5108	0.0292	0.97	99.9	99.7	2892	24	2794	55	2660	125
	5	0.36	0.2060	0.0031	14.0000	0.7790	0.4916	0.0271	0.96	99.9	99.6	2877	25	2749	53	2577	117
	6	0.36	0.2050	0.0032	13.5000	0.7540	0.4783	0.0265	0.96	99.9	99.6	2864	26	2715	53	2520	115
	7	0.36	0.2020	0.0034	12.8000	0.7260	0.4592	0.0258	0.96	99.9	99.7	2840	27	2663	54	2436	114
	8	0.35	0.2030	0.0036	16.4000	1.2000	0.5860	0.0425	0.97	99.9	99.6	2853	29	2902	70	2973	173
	9	0.32	0.2050	0.0039	20.1000	1.8300	0.7128	0.0644	0.98	100.0	99.9	2863	31	3096	88	3469	242
	10	0.32	0.2030	0.0043	15.0000	1.0500	0.5347	0.0372	0.95	99.9	99.5	2851	35	2813	67	2761	156
	11	0.30	0.2010	0.0044	17.6000	1.5400	0.6366	0.0552	0.97	99.8	99.4	2835	35	2971	84	3176	217
	12	0.31	0.2080	0.0046	15.8000	1.2100	0.5488	0.0419	0.96	100.0	100.0	2893	35	2863	74	2820	174
	13	0.31	0.2030	0.0045	14.2000	1.0300	0.5056	0.0363	0.95	100.0	100.0	2853	36	2761	69	2638	155
HSGB-10-7	1	0.50	0.1840	0.0079	11.0000	1.1700	0.4338	0.0425	0.92	96.3	85.2	2688	71	2523	99	2323	191
	2	0.52	0.1890	0.0077	12.4000	1.4500	0.4760	0.0525	0.94	97.0	87.9	2735	67	2637	110	2510	229
	3	0.55	0.2020	0.0070	13.5000	1.5000	0.4854	0.0525	0.95	98.6	94.3	2842	56	2716	105	2551	228
	4	0.45	0.2070	0.0065	13.2000	1.3600	0.4619	0.0467	0.95	99.3	97.2	2881	51	2692	98	2448	206
	5	0.41	0.2150	0.0063	13.2000	1.2100	0.4440	0.0399	0.95	99.5	98.1	2943	47	2691	86	2369	178
	6	0.41	0.2170	0.0062	13.5000	1.1900	0.4518	0.0391	0.95	99.3	97.3	2955	46	2715	84	2403	173
	7	0.35	0.2130	0.0058	13.7000	1.1400	0.4651	0.0383	0.95	99.6	98.5	2928	44	2726	79	2462	169
	8	0.29	0.2170	0.0055	22.7000	2.7700	0.7575	0.0918	0.98	99.7	98.7	2960	41	3214	119	3635	337
	9	0.27	0.2180	0.0053	15.0000	1.1500	0.4974	0.0378	0.95	99.8	99.1	2968	39	2814	73	2603	163
	10	0.23	0.2250	0.0050	16.3000	1.2400	0.5245	0.0395	0.96	99.9	99.7	3015	36	2892	73	2718	167
	11	0.22	0.2310	0.0048	15.3000	1.0300	0.4808	0.0321	0.95	100.0	99.8	3058	33	2834	64	2531	140
	12	0.15	0.2270	0.0045	16.5000	1.1400	0.5271	0.0361	0.96	100.0	99.9	3030	32	2905	66	2729	153
	13	0.15	0.2270	0.0043	15.1000	0.9410	0.4845	0.0298	0.95	99.9	99.6	3029	31	2824	59	2547	129
	14	0.15	0.2280	0.0042	15.6000	0.9800	0.4984	0.0309	0.96	99.8	99.4	3036	30	2855	60	2607	133
	15	0.13	0.2340	0.0042	15.3000	0.8970	0.4745	0.0275	0.95	99.9	99.6	3079	29	2834	56	2503	120
HSGB-10-9	1	0.13	0.1770	0.0051	9.5000	0.8710	0.3886	0.0350	0.95	100.0	100.0	2627	48	2387	84	2116	163
	2	0.16	0.1750	0.0049	8.1200	0.6060	0.3363	0.0245	0.93	100.0	100.0	2608	46	2245	67	1869	118
	3	0.18	0.1790	0.0048	9.3000	0.7600	0.3767	0.0302	0.95	100.0	100.0	2645	45	2368	75	2061	142
	4	0.24	0.1750	0.0048	7.1400	0.4680	0.2952	0.0188	0.91	100.0	100.0	2610	46	2129	58	1667	94
	5	0.19	0.1740	0.0047	9.3000	0.7420	0.3876	0.0303	0.94	100.0	100.0	2597	45	2368	73	2112	141
	6	0.21	0.1780	0.0049	7.7100	0.5220	0.3141	0.0207	0.92	100.0	100.0	2635	45	2198	61	1761	102
	7	0.23	0.1830	0.0050	7.5300	0.5050	0.2979	0.0194	0.92	100.0	100.0	2683	45	2176	60	1681	97
	8	0.22	0.1790	0.0049	8.0100	0.5680	0.3249	0.0225	0.93	100.0	100.0	2642	45	2232	64	1814	109
	9	0.24	0.1720	0.0047	6.3700	0.3810	0.2684	0.0155	0.89	100.0	100.0	2578	46	2028	52	1533	79
	10	0.24	0.1890	0.0051	7.4400	0.4690	0.2855	0.0175	0.90	100.0	99.8	2733	45	2165	56	1619	88
	11	0.20	0.1820	0.0050	6.8700	0.4280	0.2731	0.0164	0.90	99.9	99.6	2675	46	2095	55	1556	83
	12	0.25	0.1890	0.0052	6.5200	0.3810	0.2504	0.0141	0.88	100.0	100.0	2732	46	2049	51	1441	73
	13	0.21	0.1780	0.0050	6.9800	0.4510	0.2847	0.0178	0.90	100.0	100.0	2633	47	2109	57	1615	89
	14	0.24	0.1780	0.0052	6.0400	0.3640	0.2463	0.0143	0.88	100.0	100.0	2632	48	1981	53	1419	74
	15	0.23	0.1840	0.0054	6.2700	0.3790	0.2470	0.0144	0.88	100.0	100.0	2690	48	2014	53	1423	74
	16	0.23	0.1860	0.0055	6.5200	0.4030	0.2543	0.0152	0.88	100.0	100.0	2706	48	2048	55	1460	78
	17	0.23	0.1820	0.0054	6.5100	0.4110	0.2594	0.0158	0.89	100.0	100.0	2672	49	2048	56	1487	81
	18	0.25	0.1840	0.0055	6.2000	0.3740	0.2439	0.0142	0.88	100.0	100.0	2693	49	2005	53	1407	73
	19	0.26	0.1790	0.0053	6.3300	0.3810	0.2570	0.0149	0.87	100.0	100.0	2641	49	2023	53	1475	76
	20	0.27	0.1820	0.0054	5.9600	0.3470	0.2374	0.0133	0.87	100.0	100.0	2673	49	1971	51	1373	69
	21	0.28	0.1800	0.0054	5.5000	0.3050	0.2211	0.0117	0.85	100.0	100.0	2656	49	1900	48	1288	62
	22	0.23	0.1680	0.0051	5.0600	0.2740	0.2184	0.0113	0.84	100.0	100.0	2538	51	1829	46	1273	60
	23	0.28	0.1800	0.0053	5.8200	0.3310	0.2344	0.0128	0.86	100.0	100.0	2655	49	1950	49	1358	67
	24	0.27	0.1790	0.0053	5.5700	0.3050	0.2253	0.0118	0.85	100.0	100.0	2647	49	1912	47	1310	62
	25	0.26	0.1760	0.0052	5.8400	0.3330	0.2408	0.0132	0.86	100.0	99.8	2614	49	1952	50	1391	68
	26	0.23	0.1720	0.0051	5.4500	0.3090	0.2303	0.0124	0.86	99.9	99.5	2575	50	1893	49	1336	65
	27	0.25	0.1760	0.0052	5.2300	0.2780	0.2149	0.0109	0.84	100.0	100.0	2619	49	1857	45	1255	58
	28	0.24	0.1780	0.0053	5.2900	0.2890	0.2153	0.0112	0.85	100.0	100.0	2636	49	1867	47	1257	59
	29	0.23	0.1710	0.0051	5.2600	0.2890	0.2232	0.0117	0.85	100.0	100.0	2567	50	1863	47	1299	62
	30	0.28	0.1840	0.0054	5.3200	0.2780	0.2094	0.0104	0.83	100.0	100.0	2691	49	1871	45	1226	56
	31	0.26	0.1770	0.0052	5.4900	0.2960	0.2254	0.0116	0.85	100.0	100.0	2623	49	1900	46	1310	61
	32	0.27	0.1800	0.0053	5.0800	0.2610	0.2051	0.0100	0.83	100.0	100.0	2651	49	1833	44	1203	54
	33	0.25	0.1820	0.0053	5.8300	0.3140	0.2317	0.0120	0.85	100.0	100.0	2675	48	1951	47	1344	63
	34	0.28	0.1720	0.0050	4.9900	0.2520	0.2108	0.0101	0.82	100.0	100.0	2574	49	1818	43	1233	54
	35	0.27	0.1780	0.0052	5.3800	0.2760	0.2199	0.0107	0.83	100.0	100.0	2630	48	1882	44	1282	57
	36	0.27	0.1820	0.0052	5.6100	0.2890	0.2238	0.0110	0.84	100.0	100.0	2668	47	1917	44	1302	58
	37	0.27	0.1810	0.0051	6.1400	0.3370	0.2460	0.0130	0.86	100.0	99.8	2663	47	1996	48	1418	67
	38	0.29	0.1750	0.0052	4.5300	0.2150	0.1872	0.0083	0.79	99.9	99.6	2610	49	1736	39	1106	45

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	39	0.29	0.1800	0.0051	5.5900	0.2820	0.2248	0.0108	0.83	100.0	100.0	2655	47	1914	43	1307	57
	40	0.29	0.1810	0.0052	5.6500	0.2850	0.2260	0.0109	0.83	100.0	99.8	2665	48	1924	44	1314	57
	41	0.29	0.1840	0.0053	5.6800	0.2870	0.2236	0.0108	0.83	99.9	99.6	2690	48	1928	44	1301	57
	42	0.25	0.1810	0.0052	5.7300	0.2920	0.2295	0.0112	0.84	100.0	100.0	2663	47	1936	44	1332	59
	43	0.28	0.1770	0.0051	5.5700	0.2860	0.2276	0.0111	0.83	100.0	100.0	2629	48	1911	44	1322	59
	44	0.30	0.1810	0.0052	5.8900	0.3050	0.2360	0.0117	0.84	100.0	100.0	2661	48	1959	45	1366	61
HSGB-10-14	1	2.72	0.2100	0.0042	12.1000	0.8520	0.4175	0.0290	0.96	99.3	97.4	2902	33	2609	66	2249	132
	2	1.63	0.2170	0.0042	13.1000	0.8000	0.4375	0.0264	0.95	99.8	99.1	2957	31	2685	58	2340	118
	3	0.82	0.2170	0.0042	17.7000	1.3100	0.5907	0.0435	0.97	99.7	98.9	2958	31	2972	72	2992	177
	4	0.55	0.2230	0.0045	17.4000	1.2000	0.5677	0.0385	0.96	99.8	99.3	3000	33	2959	66	2898	158
	5	0.39	0.2250	0.0046	17.1000	1.1400	0.5506	0.0365	0.95	99.9	99.8	3015	33	2938	64	2828	152
	6	0.35	0.2200	0.0048	16.7000	1.1000	0.5495	0.0358	0.95	99.9	99.8	2983	35	2917	63	2823	149
	7	0.30	0.2250	0.0050	17.5000	1.2100	0.5643	0.0385	0.95	99.9	99.7	3019	36	2964	66	2884	159
	8	0.29	0.2240	0.0053	15.6000	0.9630	0.5054	0.0307	0.93	99.9	99.5	3012	38	2854	59	2637	131
	9	0.25	0.2320	0.0053	16.3000	1.0400	0.5113	0.0323	0.93	100.0	99.8	3065	37	2897	61	2662	138
	10	0.27	0.2260	0.0052	16.4000	1.0500	0.5256	0.0335	0.94	100.0	100.0	3024	37	2899	62	2723	141
	11	0.26	0.2220	0.0051	14.2000	0.8160	0.4616	0.0262	0.92	100.0	99.8	2998	37	2760	55	2447	116
	12	0.26	0.2290	0.0053	15.1000	0.8800	0.4761	0.0274	0.92	99.9	99.6	3048	37	2819	56	2510	120
	13	0.26	0.2260	0.0052	15.5000	0.9420	0.4979	0.0298	0.93	100.0	99.9	3027	37	2849	58	2605	128
	14	0.27	0.2260	0.0052	14.4000	0.8100	0.4616	0.0256	0.92	99.9	99.7	3021	37	2774	54	2447	113
	15	0.25	0.2250	0.0052	14.7000	0.8440	0.4716	0.0268	0.92	100.0	99.8	3019	37	2793	55	2490	117
	16	0.27	0.2280	0.0054	13.1000	0.6720	0.4148	0.0210	0.89	100.0	100.0	3041	38	2684	49	2237	95
	17	0.27	0.2280	0.0053	14.7000	0.8320	0.4668	0.0260	0.92	100.0	100.0	3041	37	2796	54	2470	115
	18	0.26	0.2280	0.0053	15.2000	0.8810	0.4839	0.0276	0.92	100.0	100.0	3040	37	2830	55	2544	120
	19	0.24	0.2330	0.0054	13.9000	0.7410	0.4317	0.0227	0.90	100.0	100.0	3074	37	2742	51	2313	102
HSGB-10-18	1	0.19	0.2180	0.0077	14.9000	1.5100	0.4952	0.0480	0.94	97.3	90.3	2969	56	2810	96	2593	207
	2	0.19	0.2120	0.0068	17.2000	1.8800	0.5883	0.0628	0.96	98.4	94.0	2918	52	2944	105	2983	255
	3	0.21	0.2270	0.0069	19.8000	2.2100	0.6344	0.0698	0.96	99.2	97.2	3028	49	3083	108	3167	275
	4	0.22	0.2250	0.0070	17.8000	1.7600	0.5728	0.0558	0.95	99.3	97.5	3020	50	2979	95	2919	229
	5	0.20	0.2200	0.0069	22.1000	2.7000	0.7297	0.0881	0.97	99.4	97.7	2977	51	3188	119	3532	328
	6	0.20	0.2300	0.0071	20.7000	2.3100	0.6528	0.0722	0.96	99.9	99.6	3055	49	3127	108	3239	282
	7	0.20	0.2290	0.0072	18.7000	1.9200	0.5922	0.0601	0.95	99.7	99.0	3042	51	3025	99	2998	243
	8	0.21	0.2290	0.0075	14.4000	1.2100	0.4576	0.0377	0.92	99.8	99.2	3044	52	2779	80	2429	167
HSGB-10-13	1	0.09	0.2120	0.0040	13.5000	0.8740	0.4622	0.0294	0.96	99.6	98.4	2923	30	2717	61	2449	130
	2	0.10	0.2170	0.0036	15.5000	1.0300	0.5189	0.0341	0.97	99.8	99.2	2957	27	2847	63	2695	145
	3	0.14	0.2170	0.0035	15.2000	0.9500	0.5070	0.0314	0.97	99.9	99.5	2960	26	2826	60	2644	135
	4	0.23	0.2180	0.0034	15.8000	0.9950	0.5265	0.0329	0.97	99.9	99.7	2966	25	2867	60	2727	139
	5	0.27	0.2200	0.0034	15.1000	0.8690	0.4978	0.0284	0.96	99.9	99.7	2980	25	2821	55	2604	122
	6	0.29	0.2170	0.0034	16.5000	1.0300	0.5520	0.0342	0.97	99.9	99.5	2959	25	2908	60	2834	142
	7	0.31	0.2160	0.0034	14.1000	0.7760	0.4733	0.0258	0.96	99.8	99.4	2949	25	2755	52	2498	113
	8	0.33	0.2160	0.0034	14.5000	0.8020	0.4856	0.0266	0.96	99.9	99.7	2952	26	2781	53	2552	116
	9	0.33	0.2160	0.0035	14.3000	0.8040	0.4806	0.0267	0.96	100.0	99.8	2954	26	2772	53	2530	116
	10	0.34	0.2160	0.0036	14.6000	0.8420	0.4904	0.0280	0.96	99.9	99.6	2949	27	2788	55	2573	121
	11	0.34	0.2190	0.0038	14.5000	0.8210	0.4797	0.0269	0.95	99.9	99.6	2972	28	2781	54	2526	117
	12	0.34	0.2150	0.0039	13.2000	0.7070	0.4450	0.0235	0.94	100.0	99.9	2945	29	2694	51	2373	105
	13	0.37	0.2190	0.0041	14.3000	0.8190	0.4742	0.0268	0.95	100.0	99.9	2976	30	2773	54	2502	117
	14	0.37	0.2210	0.0042	13.6000	0.7520	0.4452	0.0243	0.94	100.0	100.0	2990	31	2721	52	2374	109
	15	0.39	0.2170	0.0043	12.9000	0.7100	0.4324	0.0235	0.94	100.0	100.0	2956	32	2673	52	2316	106
	16	0.37	0.2190	0.0044	12.6000	0.6850	0.4184	0.0223	0.93	100.0	99.9	2973	33	2652	51	2253	102
	17	0.42	0.2150	0.0045	12.9000	0.7210	0.4330	0.0239	0.93	100.0	99.8	2946	34	2669	53	2319	108
	18	0.37	0.2160	0.0045	13.9000	0.8540	0.4675	0.0283	0.94	100.0	99.9	2953	34	2746	58	2473	124
	19	0.40	0.2190	0.0048	12.4000	0.6920	0.4111	0.0225	0.92	99.9	99.7	2977	35	2638	52	2220	103
HSGB-10-16	1	0.18	0.1980	0.0098	16.5000	1.8800	0.6034	0.0627	0.90	93.9	78.6	2809	81	2904	109	3043	252
	2	0.12	0.2030	0.0096	13.5000	1.2700	0.4837	0.0413	0.87	96.0	85.4	2851	77	2719	89	2544	180
	3	0.10	0.2090	0.0094	16.4000	1.7600	0.5709	0.0578	0.91	97.1	89.3	2895	73	2902	102	2912	237
	4	0.08	0.2090	0.0094	14.4000	1.4100	0.4989	0.0465	0.89	98.1	92.9	2898	73	2775	93	2609	200
	5	0.06	0.2090	0.0094	16.2000	1.7700	0.5618	0.0591	0.91	98.4	94.1	2900	73	2889	104	2874	244
	6	0.09	0.2080	0.0097	12.0000	1.1000	0.4193	0.0367	0.86	98.9	95.8	2891	76	2607	86	2257	167
	7	0.07	0.2090	0.0098	14.7000	1.5900	0.5118	0.0534	0.90	99.0	96.2	2895	76	2797	103	2664	228
	8	0.08	0.2130	0.0100	13.1000	1.2900	0.4461	0.0424	0.88	99.4	97.6	2926	77	2686	93	2378	189
	9	0.08	0.2090	0.0110	15.7000	1.8000	0.5454	0.0601	0.90	98.5	94.3	2894	82	2858	110	2806	251
	10	0.02	0.2070	0.0110	12.8000	1.2700	0.4487	0.0421	0.85	98.6	94.6	2885	85	2667	93	2390	188
	11	0.06	0.2200	0.0100	15.3000	1.6000	0.5047	0.0513	0.90	99.1	96.8	2979	74	2833	100	2634	220
	12	0.10	0.2160	0.0099	13.8000	1.2500	0.4643	0.0406	0.87	99.3	97.4	2951	74	2738	86	2459	179
	13	0.06	0.2170	0.0091	13.6000	1.1500	0.4544	0.0374	0.87	99.7	98.7	2958	68	2722	80	2415	166
	14	0.06	0.2190	0.0088	12.8000	0.9850	0.4224	0.0315	0.86	99.5	98.0	2974	65	2662	73	2271	143
	15	0.05	0.2220	0.0084	12.8000	0.9250	0.4197	0.0293	0.86	99.5	98.2	2995	61	2669	68	2259	133
	16	0.06	0.2190	0.0078	12.5000	0.8390	0.4129	0.0270	0.86	99.7	98.9	2973	57	2640	63	2228	123
	17	0.03	0.2220	0.0072	14.2000	0.9910	0.4628	0.0318	0.89	100.0	100.0	2997	52	2762	66	2452	140

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	18	0.06	0.2240	0.0072	12.9000	0.8070	0.4184	0.0256	0.87	100.0	99.9	3010	51	2674	59	2253	116
	19	0.04	0.2250	0.0068	13.2000	0.8250	0.4259	0.0260	0.88	99.8	99.3	3015	49	2694	59	2287	118
HSGB-10-19	1	0.37	0.2150	0.0050	17.7000	1.3900	0.5980	0.0459	0.96	98.2	93.5	2941	37	2974	75	3022	185
	2	0.26	0.2200	0.0041	14.4000	0.8600	0.4747	0.0279	0.95	99.4	97.8	2978	30	2775	57	2504	122
	3	0.16	0.2230	0.0039	14.6000	0.8350	0.4747	0.0268	0.95	99.7	99.1	3001	28	2788	54	2504	117
	4	0.17	0.2270	0.0041	15.0000	0.8060	0.4808	0.0255	0.94	99.9	99.6	3028	29	2817	51	2531	111
	5	0.17	0.2230	0.0043	16.3000	0.9480	0.5302	0.0305	0.95	99.9	99.6	3003	31	2895	56	2743	128
	6	0.23	0.2220	0.0046	17.2000	1.0300	0.5605	0.0332	0.94	99.9	99.7	2996	34	2944	57	2869	137
	7	0.21	0.2280	0.0051	15.3000	0.8510	0.4876	0.0267	0.92	99.9	99.5	3035	36	2834	53	2560	116
	8	0.21	0.2270	0.0052	16.8000	1.0600	0.5378	0.0333	0.93	99.9	99.7	3032	37	2926	60	2774	140
HSGB-10-20	1	0.18	0.2150	0.0083	19.3000	3.2000	0.6508	0.1050	0.97	97.2	90.0	2947	62	3059	160	3231	412
	2	0.16	0.2190	0.0071	18.7000	2.7400	0.6203	0.0894	0.98	98.8	95.7	2975	52	3029	141	3111	356
	3	0.18	0.2330	0.0071	19.2000	2.5800	0.5965	0.0795	0.97	99.2	97.2	3072	49	3050	130	3016	321
	4	0.17	0.2210	0.0065	20.3000	2.9300	0.6645	0.0951	0.98	99.7	98.9	2991	47	3105	140	3285	368
	5	0.20	0.2270	0.0067	20.5000	2.8500	0.6550	0.0905	0.98	99.5	98.3	3029	48	3114	135	3248	353
	6	0.19	0.2210	0.0065	16.0000	1.8200	0.5265	0.0591	0.97	99.7	98.7	2986	47	2878	109	2726	250
	7	0.19	0.2260	0.0066	17.9000	2.1900	0.5743	0.0696	0.97	99.6	98.4	3026	47	2985	118	2925	285
	8	0.19	0.2290	0.0068	20.1000	2.7000	0.6349	0.0846	0.98	99.4	97.7	3048	48	3096	130	3169	334
	9	0.20	0.2280	0.0068	14.3000	1.4200	0.4539	0.0445	0.95	99.5	98.3	3040	48	2769	95	2413	197
	10	0.21	0.2270	0.0066	18.6000	2.3200	0.5938	0.0735	0.97	99.6	98.4	3029	47	3019	120	3005	297
HSGB-10-23	1	0.36	0.1880	0.0083	15.4000	1.8900	0.5938	0.0678	0.93	94.2	78.7	2723	73	2839	117	3005	274
	2	0.23	0.2110	0.0072	10.1000	0.8120	0.3469	0.0258	0.91	96.8	88.5	2917	55	2445	74	1920	124
	3	0.21	0.2140	0.0065	11.8000	0.9340	0.4006	0.0305	0.92	98.6	94.7	2933	49	2589	74	2172	140
	4	0.23	0.2190	0.0068	12.6000	0.9640	0.4189	0.0308	0.91	98.8	95.6	2972	50	2653	72	2255	140
	5	0.28	0.2190	0.0071	14.0000	1.1200	0.4618	0.0358	0.92	98.9	95.9	2975	52	2747	76	2448	158
	6	0.26	0.2200	0.0074	14.5000	1.1800	0.4762	0.0377	0.91	98.9	95.9	2983	54	2781	78	2510	165
	7	0.27	0.2120	0.0072	12.6000	0.9670	0.4316	0.0319	0.90	99.0	96.2	2921	55	2652	72	2313	144
	8	0.25	0.2130	0.0073	13.9000	1.1400	0.4738	0.0374	0.91	99.0	96.0	2927	56	2743	77	2500	164
	9	0.26	0.2150	0.0076	12.3000	0.9270	0.4143	0.0298	0.89	98.6	94.9	2946	57	2628	71	2234	136
	10	0.24	0.2150	0.0074	14.4000	1.2300	0.4870	0.0402	0.92	98.7	95.2	2941	56	2777	81	2558	174
	11	0.25	0.2250	0.0077	13.2000	1.0000	0.4243	0.0311	0.90	98.9	96.2	3020	55	2693	72	2280	141
	12	0.27	0.2210	0.0076	12.2000	0.8930	0.4008	0.0282	0.89	99.0	96.5	2989	55	2621	69	2173	130
	13	0.24	0.2180	0.0075	11.8000	0.8390	0.3931	0.0268	0.88	99.2	97.0	2969	55	2592	66	2137	124
	14	0.28	0.2170	0.0074	12.5000	0.9170	0.4174	0.0295	0.89	99.1	96.7	2959	55	2642	69	2249	134
HSGB-12-1	1	0.73	0.1870	0.0071	5.8000	0.4360	0.2251	0.0145	0.86	95.8	83.9	2715	62	1946	65	1309	76
	2	0.78	0.2010	0.0065	8.6800	0.7640	0.3139	0.0260	0.93	97.6	90.8	2831	53	2305	80	1760	128
	3	0.77	0.2030	0.0070	12.3000	1.3300	0.4410	0.0459	0.95	98.2	93.0	2851	56	2631	101	2355	205
	4	0.71	0.1990	0.0073	12.7000	1.3800	0.4631	0.0490	0.94	99.3	97.0	2821	59	2660	102	2453	216
	5	0.78	0.1970	0.0078	12.2000	1.4000	0.4481	0.0499	0.94	99.3	97.1	2805	65	2620	108	2387	222
	6	0.77	0.2070	0.0087	8.3000	0.7150	0.2905	0.0239	0.88	99.4	97.8	2883	68	2264	78	1644	119
	7	0.69	0.1950	0.0091	11.0000	1.2900	0.4080	0.0454	0.92	98.5	93.9	2787	77	2522	109	2206	208
	8	0.66	0.2050	0.0092	9.4000	0.9330	0.3321	0.0315	0.89	99.2	97.0	2869	73	2378	91	1849	152
	9	0.77	0.1860	0.0090	8.4500	0.8540	0.3292	0.0311	0.88	98.8	94.9	2709	80	2281	92	1835	151
	10	0.60	0.1820	0.0092	9.0100	0.9800	0.3588	0.0362	0.89	98.3	92.6	2672	83	2339	99	1976	172
	11	0.76	0.1990	0.0095	7.8300	0.7210	0.2861	0.0243	0.86	98.6	94.3	2815	79	2212	83	1622	122
	12	0.75	0.2100	0.0094	8.5200	0.7540	0.2941	0.0250	0.87	99.7	98.7	2906	72	2288	80	1662	125
	13	0.68	0.2080	0.0091	9.0200	0.8320	0.3152	0.0280	0.88	99.7	98.7	2886	71	2340	84	1766	137
	14	0.64	0.2000	0.0089	8.6000	0.7810	0.3120	0.0272	0.88	99.7	98.7	2826	73	2297	83	1750	134
	15	0.74	0.2050	0.0093	8.2200	0.7320	0.2907	0.0246	0.87	99.4	97.5	2867	74	2256	81	1645	123
	16	0.69	0.2070	0.0098	8.0500	0.7090	0.2828	0.0232	0.85	98.8	95.4	2878	77	2237	80	1605	117
	17	0.67	0.2020	0.0095	8.8900	0.8220	0.3187	0.0278	0.87	99.1	96.2	2845	76	2326	84	1783	136
	18	0.78	0.1960	0.0093	7.2900	0.6120	0.2704	0.0212	0.83	99.2	96.5	2789	78	2148	75	1543	107
	19	0.67	0.2010	0.0092	7.3800	0.6000	0.2665	0.0205	0.83	99.5	97.9	2834	75	2159	73	1523	104
	20	0.78	0.2060	0.0095	7.3000	0.5790	0.2570	0.0193	0.82	99.6	98.4	2875	75	2149	71	1474	99
	21	0.70	0.2020	0.0094	7.4800	0.6200	0.2692	0.0210	0.83	99.4	97.5	2838	76	2171	74	1537	107
	22	0.70	0.1920	0.0087	7.9200	0.6940	0.2989	0.0249	0.86	99.5	97.8	2760	74	2221	79	1686	123
	23	0.71	0.1960	0.0088	7.9300	0.6770	0.2941	0.0238	0.85	99.5	97.9	2789	74	2223	77	1662	119
	24	0.79	0.1980	0.0093	7.1300	0.5800	0.2620	0.0198	0.82	99.1	96.3	2806	77	2128	72	1500	101
	25	0.67	0.1920	0.0091	7.0700	0.5830	0.2674	0.0204	0.82	99.1	96.2	2757	78	2120	73	1527	104
	26	0.74	0.2010	0.0096	6.7000	0.5190	0.2417	0.0174	0.80	99.2	96.7	2835	77	2073	68	1396	90
HSGB-12-6	1	0.34	0.1940	0.0041	5.5100	0.3450	0.2062	0.0123	0.94	98.6	94.4	2774	35	1902	54	1209	66
	2	0.29	0.2050	0.0038	9.1800	0.6900	0.3242	0.0240	0.97	99.5	98.1	2870	30	2356	69	1810	117
	3	0.24	0.2090	0.0039	9.4100	0.5610	0.3263	0.0191	0.95	99.6	98.5	2900	30	2379	55	1821	93
	4	0.17	0.2110	0.0037	10.8000	0.6310	0.3707	0.0214	0.95	99.8	99.4	2912	29	2504	54	2033	101
	5	0.13	0.2100	0.0037	13.0000	0.8290	0.4494	0.0283	0.96	99.9	99.5	2907	29	2682	60	2393	126
	6	0.11	0.2180	0.0038	14.3000	0.9540	0.4774	0.0315	0.97	99.8	99.3	2963	28	2771	63	2516	137
	7	0.11	0.2170	0.0039	14.2000	0.9280	0.4721	0.0306	0.96	99.8	99.1	2962	29	2760	62	2493	134
	8	0.11	0.2110	0.0039	12.8000	0.7840	0.4411	0.0266	0.95	99.8	99.1	2910	30	2666	58	2355	119
	9	0.11	0.2160	0.0039	12.8000	0.7900	0.4305	0.0262	0.96	99.8	99.2	2950	29	2666	58	2308	118

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	10	0.11	0.2130	0.0040	13.3000	0.8650	0.4524	0.0291	0.96	99.7	98.8	2928	31	2700	61	2406	129
	11	0.13	0.2220	0.0042	12.8000	0.7840	0.4174	0.0253	0.95	99.9	99.7	2992	31	2662	58	2249	115
	12	0.11	0.2170	0.0043	14.1000	0.9810	0.4729	0.0325	0.96	99.9	99.6	2957	32	2759	66	2496	142
	13	0.12	0.2190	0.0044	12.9000	0.8390	0.4254	0.0274	0.95	99.9	99.7	2975	33	2669	61	2285	124
HSGB-12-9	1	0.12	0.2020	0.0036	13.5000	0.9690	0.4843	0.0343	0.97	99.5	97.9	2843	29	2715	68	2546	149
	2	0.07	0.2030	0.0033	14.7000	0.9990	0.5236	0.0353	0.97	99.8	99.0	2851	27	2794	65	2715	150
	3	0.05	0.2050	0.0032	14.6000	0.9080	0.5154	0.0318	0.97	99.9	99.6	2868	26	2788	59	2680	135
	4	0.04	0.2040	0.0031	15.9000	1.0600	0.5662	0.0374	0.97	100.0	100.0	2856	25	2871	64	2892	154
	5	0.04	0.2060	0.0031	14.6000	0.8600	0.5133	0.0300	0.97	100.0	100.0	2877	24	2790	56	2671	128
	6	0.04	0.2040	0.0030	16.8000	1.1400	0.5975	0.0401	0.98	100.0	100.0	2862	24	2926	65	3020	162
	7	0.04	0.2070	0.0030	14.4000	0.8190	0.5053	0.0285	0.97	100.0	100.0	2879	23	2776	54	2637	122
	8	0.04	0.2060	0.0029	15.8000	0.9750	0.5553	0.0341	0.97	100.0	99.9	2874	23	2863	59	2847	141
	9	0.04	0.2040	0.0029	14.2000	0.7840	0.5061	0.0277	0.97	99.9	99.7	2856	23	2764	52	2640	119
	10	0.04	0.2020	0.0029	13.8000	0.7430	0.4968	0.0264	0.96	100.0	99.8	2841	23	2738	51	2600	114
	11	0.05	0.2040	0.0028	14.4000	0.8010	0.5128	0.0283	0.97	100.0	100.0	2859	23	2778	53	2668	120
	12	0.06	0.2050	0.0028	13.9000	0.7320	0.4892	0.0256	0.97	100.0	100.0	2869	23	2740	50	2567	111
	13	0.06	0.2030	0.0028	13.4000	0.6910	0.4787	0.0244	0.96	100.0	99.9	2853	23	2710	49	2522	106
	14	0.06	0.2050	0.0029	12.6000	0.5910	0.4470	0.0207	0.95	100.0	99.9	2868	23	2654	44	2382	92
	15	0.07	0.2070	0.0030	13.6000	0.6710	0.4778	0.0233	0.96	100.0	99.8	2882	24	2725	47	2518	102
	16	0.08	0.2060	0.0030	12.3000	0.5570	0.4316	0.0194	0.95	100.0	99.8	2873	24	2624	43	2313	87
	17	0.09	0.2100	0.0032	12.6000	0.5660	0.4341	0.0193	0.94	100.0	100.0	2909	24	2650	42	2324	87
	18	0.10	0.2050	0.0032	12.4000	0.5580	0.4389	0.0195	0.94	100.0	99.9	2864	25	2634	42	2346	87
	19	0.11	0.2100	0.0033	13.2000	0.6180	0.4576	0.0211	0.94	100.0	99.8	2904	25	2697	44	2429	93
	20	0.13	0.2050	0.0033	12.7000	0.5700	0.4474	0.0199	0.94	100.0	99.8	2870	26	2656	42	2384	88
	21	0.14	0.2080	0.0034	12.8000	0.5730	0.4442	0.0197	0.93	100.0	100.0	2893	26	2662	42	2369	88
	22	0.15	0.2100	0.0034	13.1000	0.6010	0.4500	0.0204	0.94	100.0	99.8	2909	26	2684	43	2395	91
	23	0.18	0.2070	0.0034	12.9000	0.5910	0.4519	0.0204	0.93	99.9	99.8	2883	27	2673	43	2403	91
	24	0.19	0.2150	0.0036	12.9000	0.5610	0.4327	0.0186	0.93	100.0	99.9	2947	27	2669	41	2318	84
	25	0.19	0.2120	0.0035	13.2000	0.5950	0.4516	0.0201	0.93	100.0	100.0	2921	27	2694	43	2403	89
	26	0.21	0.2120	0.0035	11.9000	0.4970	0.4067	0.0167	0.92	100.0	100.0	2924	27	2597	39	2200	77
	27	0.21	0.2170	0.0035	13.1000	0.5910	0.4385	0.0195	0.93	100.0	99.9	2961	26	2690	42	2344	87
	28	0.22	0.2170	0.0035	12.8000	0.5630	0.4273	0.0186	0.93	100.0	100.0	2956	26	2662	42	2294	84
	29	0.25	0.2160	0.0036	12.4000	0.5300	0.4160	0.0175	0.92	100.0	100.0	2951	27	2634	40	2242	80
	30	0.27	0.2190	0.0037	12.9000	0.5660	0.4281	0.0185	0.92	100.0	99.9	2970	27	2672	41	2297	84
	31	0.29	0.2190	0.0037	13.0000	0.5820	0.4296	0.0190	0.93	99.9	99.8	2974	28	2678	42	2304	86
	32	0.28	0.2180	0.0038	12.9000	0.5740	0.4281	0.0188	0.92	100.0	99.9	2967	28	2671	42	2297	85
	33	0.28	0.2190	0.0037	14.8000	0.7580	0.4888	0.0248	0.95	100.0	99.9	2973	27	2800	49	2565	108
	34	0.29	0.2170	0.0037	13.1000	0.6060	0.4363	0.0199	0.93	100.0	99.9	2962	28	2686	44	2334	89
	35	0.31	0.2170	0.0037	14.1000	0.7000	0.4722	0.0231	0.94	99.9	99.7	2956	28	2757	47	2493	101
	36	0.31	0.2220	0.0038	13.8000	0.6630	0.4500	0.0214	0.94	100.0	100.0	2995	28	2734	46	2395	95
	37	0.32	0.2250	0.0038	14.2000	0.7030	0.4565	0.0224	0.94	100.0	99.9	3018	27	2762	47	2424	99
	38	0.32	0.2250	0.0038	14.4000	0.7240	0.4639	0.0231	0.94	100.0	100.0	3015	27	2775	48	2457	102
	39	0.32	0.2190	0.0038	12.9000	0.5980	0.4261	0.0195	0.93	100.0	100.0	2973	28	2670	44	2288	88
	40	0.30	0.2240	0.0038	13.9000	0.6910	0.4513	0.0222	0.94	100.0	100.0	3008	27	2744	47	2401	98
	41	0.34	0.2290	0.0039	14.1000	0.6860	0.4452	0.0215	0.94	100.0	100.0	3045	27	2754	46	2374	96
	42	0.34	0.2250	0.0039	13.3000	0.6180	0.4275	0.0196	0.93	100.0	99.8	3019	28	2700	44	2294	89
	43	0.32	0.2270	0.0039	12.8000	0.5810	0.4107	0.0183	0.93	100.0	99.9	3030	27	2669	43	2218	84
	44	0.34	0.2250	0.0038	13.5000	0.6410	0.4351	0.0204	0.93	100.0	99.8	3014	27	2714	45	2329	92
	45	0.34	0.2290	0.0039	13.4000	0.6190	0.4232	0.0194	0.93	100.0	99.9	3045	27	2706	44	2275	88
	46	0.34	0.2250	0.0039	13.2000	0.6040	0.4253	0.0192	0.93	100.0	100.0	3018	27	2694	43	2284	87
	47	0.37	0.2290	0.0039	12.9000	0.5750	0.4080	0.0180	0.93	100.0	100.0	3044	27	2671	42	2206	82
	48	0.37	0.2250	0.0038	13.0000	0.5920	0.4196	0.0188	0.93	100.0	100.0	3020	27	2683	43	2259	85
	49	0.35	0.2230	0.0038	13.4000	0.6320	0.4346	0.0203	0.94	100.0	100.0	3004	27	2706	45	2327	91
HSGB-12-10	1	1.28	0.2200	0.0047	8.3000	0.5460	0.2730	0.0175	0.95	99.1	96.8	2983	34	2264	60	1556	88
	2	0.66	0.2220	0.0043	9.5800	0.5600	0.3124	0.0179	0.94	99.7	98.9	2999	31	2395	54	1752	88
	3	0.38	0.2210	0.0040	11.4000	0.6790	0.3732	0.0220	0.95	99.9	99.7	2988	29	2554	56	2044	103
	4	0.29	0.2280	0.0040	11.2000	0.5980	0.3565	0.0188	0.94	99.9	99.8	3036	28	2539	50	1965	89
	5	0.26	0.2240	0.0040	10.9000	0.5410	0.3512	0.0172	0.94	99.9	99.5	3013	28	2512	46	1940	82
	6	0.23	0.2250	0.0039	11.6000	0.5960	0.3735	0.0189	0.94	99.9	99.8	3017	28	2572	48	2046	89
	7	0.23	0.2280	0.0039	11.1000	0.5280	0.3534	0.0165	0.93	99.9	99.8	3042	28	2534	44	1951	79
	8	0.21	0.2280	0.0039	11.2000	0.5250	0.3575	0.0165	0.93	100.0	99.9	3039	27	2543	44	1970	78
HSGB-12-11	1	0.51	0.2070	0.0048	13.3000	0.9590	0.4638	0.0327	0.95	98.8	95.5	2885	38	2698	68	2456	144
	2	0.28	0.2120	0.0047	14.8000	1.1200	0.5045	0.0378	0.96	99.6	98.4	2922	36	2800	72	2633	162
	3	0.21	0.2170	0.0047	13.8000	0.9630	0.4617	0.0318	0.95	99.8	99.4	2957	35	2736	66	2447	140
	4	0.15	0.2170	0.0046	14.7000	1.0800	0.4922	0.0354	0.96	99.6	98.7	2960	34	2799	69	2580	153
	5	0.13	0.2220	0.0046	13.6000	0.8870	0.4463	0.0286	0.95	99.6	98.6	2993	33	2725	61	2379	127
	6	0.11	0.2230	0.0044	13.8000	0.8730	0.4510	0.0281	0.95	99.7	99.0	2999	32	2739	60	2400	125
	7	0.09	0.2190	0.0042	14.1000	0.8880	0.4668	0.0290	0.95	99.8	99.1	2976	31	2758	60	2470	127
	8	0.08	0.2250	0.0042	13.0000	0.7170	0.4193	0.0228	0.94	99.9	99.5	3016	30	2680	52	2257	104

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	9	0.07	0.2240	0.0040	14.2000	0.8590	0.4611	0.0275	0.96	99.8	99.3	3008	29	2765	57	2445	121
	10	0.06	0.2280	0.0040	13.6000	0.7550	0.4345	0.0237	0.95	99.8	99.2	3036	28	2725	52	2326	107
	11	0.05	0.2280	0.0039	13.0000	0.6770	0.4122	0.0213	0.94	99.9	99.6	3038	28	2677	49	2225	97
	12	0.05	0.2270	0.0038	13.3000	0.7120	0.4260	0.0225	0.95	100.0	99.8	3033	27	2705	50	2288	102
	13	0.05	0.2290	0.0039	12.4000	0.6060	0.3921	0.0189	0.94	99.9	99.6	3043	27	2632	46	2132	88
	14	0.04	0.2270	0.0039	12.0000	0.5680	0.3826	0.0179	0.93	100.0	99.8	3034	27	2604	44	2088	83
	15	0.04	0.2290	0.0039	14.8000	0.8470	0.4700	0.0266	0.96	99.9	99.7	3043	27	2804	54	2483	117
	16	0.05	0.2250	0.0040	12.7000	0.6210	0.4079	0.0197	0.93	99.9	99.5	3019	28	2656	46	2205	90
	17	0.05	0.2310	0.0041	12.7000	0.6160	0.3984	0.0190	0.93	100.0	99.9	3061	28	2658	46	2162	88
	18	0.05	0.2290	0.0041	11.8000	0.5340	0.3720	0.0166	0.92	100.0	99.9	3046	28	2585	43	2039	78
	19	0.05	0.2270	0.0040	12.2000	0.5700	0.3880	0.0179	0.93	99.9	99.6	3032	29	2616	44	2114	83
HSGB-12-14	1	0.06	0.2090	0.0055	16.2000	1.3100	0.5619	0.0441	0.95	98.2	93.2	2898	43	2888	77	2874	182
	2	0.08	0.2160	0.0050	16.8000	1.3300	0.5650	0.0438	0.96	98.8	95.6	2951	37	2925	76	2887	180
	3	0.08	0.2130	0.0046	17.1000	1.3600	0.5812	0.0456	0.96	99.3	97.3	2929	35	2939	76	2954	186
	4	0.10	0.2100	0.0044	16.5000	1.3000	0.5695	0.0443	0.96	99.1	96.6	2902	34	2904	76	2906	182
	5	0.08	0.2100	0.0044	17.0000	1.3700	0.5870	0.0466	0.97	98.9	95.9	2908	34	2936	77	2977	189
	6	0.09	0.2220	0.0044	17.2000	1.2900	0.5602	0.0417	0.96	99.5	98.1	2997	32	2944	72	2868	172
	7	0.09	0.2190	0.0044	15.5000	1.0700	0.5128	0.0349	0.96	99.6	98.6	2977	32	2848	66	2669	149
	8	0.10	0.2140	0.0043	15.5000	1.0800	0.5233	0.0361	0.96	99.7	98.7	2939	33	2845	67	2713	153
	9	0.11	0.2140	0.0044	14.7000	0.9830	0.4970	0.0328	0.95	99.5	98.3	2936	33	2794	64	2601	141
	10	0.10	0.2160	0.0045	15.3000	1.0500	0.5114	0.0347	0.95	99.5	98.1	2954	33	2832	66	2663	148
	11	0.12	0.2160	0.0045	15.7000	1.1200	0.5259	0.0371	0.96	99.6	98.6	2952	33	2857	68	2724	157
	12	0.11	0.2140	0.0046	13.7000	0.8930	0.4664	0.0297	0.94	99.3	97.3	2934	35	2732	62	2468	131
	13	0.10	0.2090	0.0045	14.6000	1.0200	0.5077	0.0347	0.95	99.3	97.4	2896	35	2791	66	2647	149
	14	0.10	0.2170	0.0046	14.9000	1.0200	0.4994	0.0336	0.95	99.7	98.8	2957	34	2811	65	2611	144
	15	0.09	0.2200	0.0048	12.6000	0.7370	0.4153	0.0238	0.93	99.5	98.0	2982	35	2651	55	2239	108
	16	0.10	0.2150	0.0046	14.7000	0.9740	0.4953	0.0324	0.95	99.5	98.2	2941	35	2793	63	2593	140
	17	0.10	0.2140	0.0045	13.4000	0.8240	0.4544	0.0275	0.94	99.6	98.5	2935	34	2708	58	2415	122
	18	0.09	0.2140	0.0044	13.5000	0.8250	0.4577	0.0276	0.94	99.8	99.1	2932	34	2713	58	2429	122
	19	0.11	0.2130	0.0045	12.2000	0.6810	0.4163	0.0227	0.93	99.6	98.5	2928	34	2622	52	2243	103
HSGB-12-15	1	0.47	0.2150	0.0078	10.3000	0.6250	0.3487	0.0196	0.81	98.1	92.9	2946	59	2467	56	1928	94
	2	0.39	0.2100	0.0080	18.9000	1.5300	0.6534	0.0513	0.89	99.3	97.2	2908	61	3039	78	3241	200
	3	0.44	0.2170	0.0080	16.1000	1.2600	0.5404	0.0414	0.89	99.6	98.5	2955	60	2885	75	2785	173
	4	0.38	0.2160	0.0071	15.5000	1.2900	0.5208	0.0424	0.92	99.7	98.7	2954	53	2849	79	2703	180
	5	0.35	0.2230	0.0070	16.3000	1.3300	0.5282	0.0423	0.93	99.6	98.7	3004	50	2892	78	2734	178
	6	0.34	0.2240	0.0067	13.9000	0.9880	0.4500	0.0313	0.91	99.6	98.7	3006	48	2741	67	2395	139
	7	0.33	0.2250	0.0063	16.9000	1.4000	0.5458	0.0443	0.94	99.6	98.4	3018	45	2932	79	2808	185
	8	0.32	0.2270	0.0062	16.4000	1.2600	0.5220	0.0398	0.94	99.9	99.6	3033	43	2898	74	2708	169
	9	0.36	0.2270	0.0062	16.1000	1.1900	0.5139	0.0374	0.93	99.9	99.6	3033	43	2883	71	2673	159
	10	0.33	0.2230	0.0059	15.5000	1.1300	0.5049	0.0363	0.93	99.9	99.7	3001	43	2847	70	2635	156
	11	0.30	0.2290	0.0060	17.5000	1.3600	0.5560	0.0428	0.94	100.0	99.9	3042	42	2964	75	2850	177
	12	0.32	0.2250	0.0060	16.1000	1.1600	0.5198	0.0369	0.93	99.9	99.6	3016	43	2884	69	2698	157
	13	0.31	0.2300	0.0060	18.3000	1.4500	0.5795	0.0454	0.94	99.9	99.6	3050	42	3008	76	2947	185
	14	0.31	0.2340	0.0062	16.4000	1.1500	0.5081	0.0352	0.93	99.9	99.8	3079	42	2900	67	2648	151
	15	0.31	0.2290	0.0060	15.6000	1.0900	0.4930	0.0340	0.93	100.0	100.0	3048	42	2853	67	2584	147
	16	0.31	0.2250	0.0059	15.2000	1.0300	0.4880	0.0328	0.93	100.0	100.0	3018	42	2825	65	2562	142
	17	0.32	0.2230	0.0058	15.6000	1.1000	0.5080	0.0352	0.93	100.0	100.0	3004	42	2855	67	2648	150
	18	0.30	0.2350	0.0061	15.2000	1.0100	0.4694	0.0307	0.92	99.9	99.8	3087	41	2829	63	2481	135
	19	0.32	0.2310	0.0060	17.0000	1.2400	0.5318	0.0383	0.94	99.8	99.3	3062	41	2933	70	2749	161
	20	0.28	0.2300	0.0060	16.0000	1.1200	0.5034	0.0348	0.93	99.9	99.5	3054	42	2876	67	2628	149
HSGB-12-17	1	1.67	0.2220	0.0066	16.0000	1.4200	0.5221	0.0452	0.94	98.6	94.8	2996	48	2876	85	2708	192
	2	0.80	0.2300	0.0061	18.2000	1.6000	0.5755	0.0498	0.95	99.2	97.2	3052	42	3003	85	2930	204
	3	0.51	0.2250	0.0057	17.1000	1.3200	0.5490	0.0419	0.95	99.5	98.3	3020	41	2938	74	2821	175
	4	0.42	0.2270	0.0056	19.9000	1.6500	0.6361	0.0523	0.96	99.8	99.1	3028	40	3085	80	3174	206
	5	0.34	0.2260	0.0055	16.5000	1.1200	0.5272	0.0355	0.94	99.9	99.6	3027	39	2904	65	2729	150
	6	0.27	0.2280	0.0054	16.8000	1.1200	0.5326	0.0351	0.94	99.9	99.7	3039	38	2921	64	2752	148
	7	0.21	0.2260	0.0053	21.1000	1.6100	0.6778	0.0513	0.95	99.8	99.2	3022	37	3143	74	3336	197
	8	0.18	0.2290	0.0049	16.2000	0.9800	0.5149	0.0307	0.94	99.9	99.5	3043	34	2891	58	2678	131
	9	0.13	0.2380	0.0046	16.9000	1.0000	0.5138	0.0301	0.95	99.9	99.8	3107	31	2927	57	2673	128
HSGB-12-13	1	0.62	0.2210	0.0053	14.6000	1.2700	0.4780	0.0410	0.96	99.9	99.6	2991	39	2789	82	2518	179
	2	0.36	0.2210	0.0060	19.7000	1.8100	0.6468	0.0588	0.96	99.9	99.5	2986	44	3076	89	3216	230
	3	0.23	0.2220	0.0063	29.5000	3.6300	0.9620	0.1180	0.97	99.9	99.4	2999	45	3471	121	4345	387
	4	0.25	0.2280	0.0061	21.1000	1.8700	0.6690	0.0588	0.95	100.0	99.9	3041	43	3142	86	3302	227
	5	0.28	0.2250	0.0055	16.9000	1.2600	0.5434	0.0401	0.95	99.9	99.7	3018	39	2927	72	2798	167
	6	0.30	0.2250	0.0051	16.8000	1.2100	0.5442	0.0386	0.95	100.0	99.8	3013	37	2926	69	2801	161
	7	0.31	0.2310	0.0050	17.2000	1.1900	0.5393	0.0370	0.95	100.0	100.0	3062	35	2946	66	2781	155
	8	0.34	0.2300	0.0050	17.8000	1.2200	0.5604	0.0381	0.95	100.0	100.0	3053	35	2978	66	2868	158
	9	0.31	0.2290	0.0049	16.4000	1.0500	0.5185	0.0329	0.94	100.0	100.0	3045	35	2898	61	2693	140
	10	0.36	0.2340	0.0051	15.5000	0.9260	0.4807	0.0284	0.93	100.0	100.0	3077	35	2846	57	2530	124

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
HSGB-12-4	1	0.13	0.2030	0.0083	10.7000	0.9150	0.3839	0.0282	0.88	91.9	73.5	2848	67	2500	79	2094	131
	2	0.12	0.2080	0.0083	14.5000	1.4200	0.5062	0.0449	0.91	92.9	76.7	2891	65	2784	93	2640	192
	3	0.14	0.2010	0.0088	15.4000	1.6900	0.5559	0.0560	0.92	93.5	77.7	2834	71	2841	105	2850	232
	4	0.15	0.2010	0.0090	11.3000	1.0600	0.4087	0.0339	0.88	94.9	81.9	2837	73	2552	87	2209	155
	5	0.14	0.2130	0.0087	11.1000	1.0300	0.3784	0.0326	0.90	97.2	89.9	2929	66	2533	86	2069	152
	6	0.15	0.2120	0.0091	10.1000	0.9770	0.3456	0.0309	0.90	97.1	89.5	2918	70	2443	89	1914	148
	7	0.20	0.2140	0.0093	10.7000	1.1100	0.3631	0.0353	0.91	97.6	91.1	2935	70	2498	96	1997	167
	8	0.22	0.2150	0.0086	10.0000	0.9660	0.3392	0.0315	0.91	99.3	97.4	2940	65	2438	89	1883	152
	9	0.16	0.2100	0.0088	10.1000	1.0400	0.3467	0.0345	0.92	98.9	95.9	2908	68	2439	96	1919	165
	10	0.16	0.2140	0.0100	10.3000	1.1500	0.3506	0.0364	0.91	97.6	91.4	2936	76	2466	103	1937	174
	11	0.17	0.2180	0.0095	8.4600	0.7880	0.2817	0.0248	0.89	98.9	95.9	2964	70	2282	85	1600	125
	12	0.18	0.2130	0.0099	10.5000	1.1900	0.3581	0.0383	0.91	98.3	93.9	2932	75	2483	105	1973	182
	13	0.15	0.2070	0.0110	7.8400	0.7930	0.2741	0.0247	0.86	97.0	89.1	2885	85	2212	91	1562	125
	14	0.17	0.2180	0.0098	8.7700	0.8640	0.2918	0.0273	0.89	98.9	96.1	2965	73	2314	90	1650	136
	15	0.21	0.2090	0.0100	8.8600	0.9390	0.3072	0.0303	0.89	98.2	93.3	2899	79	2324	97	1727	150
	16	0.16	0.2050	0.0110	8.0700	0.8890	0.2862	0.0277	0.86	96.4	86.8	2863	91	2239	100	1622	139
	17	0.18	0.2080	0.0110	7.4500	0.7610	0.2603	0.0233	0.84	96.9	88.7	2888	89	2168	91	1491	119
	18	0.19	0.2170	0.0100	9.7900	1.0600	0.3275	0.0341	0.91	99.1	96.7	2958	75	2416	100	1826	166
	19	0.17	0.2280	0.0110	8.2400	0.7950	0.2619	0.0238	0.87	98.8	95.8	3039	76	2257	87	1499	121
HSGB-05-1	1	0.67	0.2070	0.0093	10.6000	1.7300	0.3717	0.0584	0.96	97.0	88.8	2882	73	2489	152	2038	274
	2	0.62	0.2140	0.0082	6.6100	0.6280	0.2236	0.0198	0.91	98.1	93.0	2939	62	2061	84	1301	104
	3	0.77	0.2190	0.0086	9.3300	0.9740	0.3083	0.0305	0.93	98.0	92.8	2976	63	2371	96	1733	150
	4	0.75	0.2140	0.0082	21.8000	3.6100	0.7398	0.1210	0.97	98.9	96.0	2935	62	3175	161	3570	448
	5	0.84	0.2220	0.0083	13.5000	1.1500	0.4434	0.0368	0.90	99.4	97.9	2992	60	2718	81	2366	164
	6	0.52	0.2240	0.0068	12.8000	0.9660	0.4154	0.0304	0.92	99.2	97.0	3006	49	2665	71	2239	139
	7	0.36	0.2260	0.0057	11.0000	0.6670	0.3542	0.0209	0.91	99.7	98.9	3022	40	2525	56	1955	100
	8	0.24	0.2270	0.0051	10.9000	0.6040	0.3493	0.0189	0.92	99.9	99.5	3028	36	2516	51	1931	90
	9	0.22	0.2280	0.0050	11.7000	0.6530	0.3721	0.0204	0.92	99.8	99.3	3035	35	2578	52	2039	96
	10	0.25	0.2300	0.0051	11.7000	0.6260	0.3686	0.0194	0.91	99.9	99.6	3049	36	2578	50	2023	91
	11	0.28	0.2260	0.0053	12.2000	0.6930	0.3908	0.0218	0.91	99.9	99.5	3026	38	2620	53	2127	101
	12	0.32	0.2320	0.0057	14.0000	0.8670	0.4353	0.0266	0.92	99.9	99.8	3069	39	2747	59	2330	120
	13	0.35	0.2250	0.0058	14.6000	0.9900	0.4728	0.0315	0.93	100.0	99.9	3014	41	2792	64	2496	138
	14	0.32	0.2330	0.0060	15.5000	1.1100	0.4836	0.0343	0.94	99.9	99.6	3069	41	2847	69	2543	149
	15	0.33	0.2270	0.0061	13.6000	0.8990	0.4332	0.0282	0.92	99.9	99.7	3033	43	2720	63	2320	127
	16	0.37	0.2370	0.0064	13.1000	0.8290	0.3997	0.0249	0.91	100.0	99.9	3099	43	2683	60	2168	115
	17	0.32	0.2300	0.0063	11.8000	0.7190	0.3708	0.0222	0.90	99.9	99.7	3053	44	2586	57	2033	104
	18	0.31	0.2270	0.0063	13.4000	0.9070	0.4276	0.0285	0.92	100.0	100.0	3030	44	2706	64	2295	129
HSGB-05-2	1	0.10	0.2110	0.0049	11.0000	0.7250	0.3792	0.0237	0.93	96.7	88.1	2913	38	2526	61	2072	111
	2	0.08	0.2170	0.0045	11.9000	0.7000	0.3964	0.0225	0.94	97.8	92.2	2957	34	2593	55	2152	104
	3	0.09	0.2180	0.0044	12.3000	0.6920	0.4095	0.0223	0.93	98.6	94.7	2968	32	2629	53	2212	102
	4	0.08	0.2210	0.0044	13.1000	0.7570	0.4302	0.0242	0.94	98.7	95.4	2991	32	2689	54	2307	109
	5	0.08	0.2180	0.0043	12.5000	0.6840	0.4152	0.0222	0.93	99.2	97.1	2967	32	2642	52	2238	101
	6	0.07	0.2200	0.0044	12.4000	0.6530	0.4094	0.0211	0.92	99.5	98.2	2978	33	2635	49	2212	96
	7	0.07	0.2180	0.0044	13.0000	0.7070	0.4307	0.0231	0.93	99.7	99.0	2967	33	2676	51	2309	104
	8	0.09	0.2200	0.0046	13.1000	0.7100	0.4324	0.0230	0.93	99.8	99.1	2978	34	2687	51	2316	104
	9	0.09	0.2210	0.0047	13.3000	0.7450	0.4387	0.0240	0.93	99.6	98.5	2985	34	2704	53	2345	108
	10	0.08	0.2190	0.0047	12.6000	0.6920	0.4164	0.0224	0.92	99.5	98.2	2973	35	2648	52	2244	102
	11	0.11	0.2110	0.0048	11.1000	0.5560	0.3796	0.0185	0.89	99.5	98.0	2916	37	2529	47	2075	86
	12	0.10	0.2230	0.0050	12.8000	0.7090	0.4156	0.0225	0.92	99.5	98.3	3002	36	2663	52	2241	103
	13	0.11	0.2190	0.0051	11.7000	0.6100	0.3872	0.0196	0.90	99.5	98.3	2976	37	2581	49	2110	91
	14	0.14	0.2210	0.0052	13.6000	0.8110	0.4471	0.0261	0.92	99.5	98.0	2987	38	2723	56	2382	116
	15	0.15	0.2200	0.0053	11.3000	0.5920	0.3724	0.0189	0.89	99.5	98.0	2980	39	2548	49	2041	89
	16	0.15	0.2160	0.0052	11.8000	0.6510	0.3980	0.0213	0.90	99.6	98.5	2949	39	2592	51	2160	98
	17	0.19	0.2140	0.0053	11.4000	0.6150	0.3869	0.0203	0.89	99.7	98.7	2937	40	2559	50	2109	94
	18	0.20	0.2160	0.0053	11.6000	0.6310	0.3914	0.0207	0.90	99.7	98.9	2948	39	2576	51	2129	96
	19	0.24	0.2100	0.0050	9.8600	0.4910	0.3410	0.0164	0.88	99.6	98.3	2904	39	2422	46	1892	79
HSGB-05-4	1	0.04	0.2200	0.0037	14.9000	0.8500	0.4924	0.0277	0.96	99.7	98.7	2982	27	2812	54	2581	120
	2	0.03	0.2180	0.0034	15.6000	0.8470	0.5185	0.0280	0.96	99.9	99.6	2964	25	2850	52	2693	119
	3	0.03	0.2190	0.0033	16.0000	0.8380	0.5299	0.0275	0.96	100.0	99.9	2974	24	2877	50	2741	116
	4	0.03	0.2200	0.0032	17.3000	0.9320	0.5713	0.0305	0.96	100.0	99.9	2980	24	2953	52	2913	125
	5	0.03	0.2210	0.0032	16.1000	0.7820	0.5279	0.0255	0.96	100.0	99.9	2987	23	2881	47	2733	108
	6	0.03	0.2170	0.0030	15.3000	0.7270	0.5109	0.0241	0.96	100.0	99.9	2961	23	2835	45	2661	103
	7	0.03	0.2190	0.0030	15.9000	0.7650	0.5274	0.0251	0.96	100.0	99.8	2973	22	2872	46	2730	106
	8	0.03	0.2180	0.0029	15.4000	0.6980	0.5132	0.0230	0.96	100.0	99.9	2968	22	2843	43	2670	98
	9	0.02	0.2180	0.0028	14.8000	0.6640	0.4916	0.0219	0.96	100.0	100.0	2964	20	2800	43	2578	95
	10	0.03	0.2200	0.0027	13.7000	0.5600	0.4541	0.0183	0.95	100.0	100.0	2977	20	2732	39	2413	81
	11	0.03	0.2160	0.0027	13.4000	0.5140	0.4504	0.0171	0.95	100.0	100.0	2948	20	2708	36	2397	76
	12	0.02	0.2200	0.0026	14.1000	0.5630	0.4646	0.0184	0.95	100.0	100.0	2978	19	2754	38	2460	81
	13	0.03	0.2180	0.0026	12.8000	0.4660	0.4249	0.0153	0.95	100.0	100.0	2967	19	2664	34	2283	69

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	14	0.03	0.2170	0.0025	12.9000	0.4820	0.4299	0.0160	0.95	100.0	100.0	2957	19	2669	35	2305	72
	15	0.03	0.2190	0.0026	13.2000	0.4910	0.4364	0.0161	0.95	100.0	100.0	2970	19	2691	35	2334	72
	16	0.03	0.2170	0.0026	12.8000	0.4720	0.4287	0.0156	0.95	100.0	99.9	2958	19	2667	35	2300	70
	17	0.03	0.2210	0.0026	13.4000	0.5090	0.4403	0.0166	0.95	100.0	100.0	2987	19	2709	36	2352	74
	18	0.03	0.2200	0.0027	12.7000	0.4560	0.4176	0.0148	0.94	100.0	100.0	2984	19	2657	34	2250	67
	19	0.03	0.2190	0.0027	13.6000	0.5170	0.4486	0.0170	0.95	100.0	100.0	2975	20	2719	36	2389	75
HSGB-05-16	1	0.21	0.2180	0.0046	14.4000	0.9850	0.4795	0.0320	0.95	98.3	93.7	2966	34	2777	65	2525	139
	2	0.13	0.2150	0.0043	13.8000	0.8270	0.4642	0.0272	0.94	99.0	96.2	2946	32	2735	57	2458	120
	3	0.09	0.2150	0.0042	14.3000	0.8580	0.4832	0.0285	0.95	99.3	97.4	2942	31	2771	57	2541	124
	4	0.08	0.2210	0.0042	14.4000	0.8320	0.4718	0.0268	0.95	99.5	98.2	2992	30	2777	55	2492	118
	5	0.08	0.2180	0.0041	14.2000	0.7960	0.4723	0.0262	0.94	99.8	99.1	2962	30	2761	53	2494	115
	6	0.09	0.2190	0.0042	13.2000	0.6630	0.4366	0.0216	0.93	99.8	99.2	2971	31	2691	48	2335	97
	7	0.07	0.2230	0.0042	14.5000	0.7850	0.4730	0.0252	0.94	99.8	99.1	3001	30	2785	51	2497	110
	8	0.09	0.2190	0.0042	12.9000	0.6300	0.4295	0.0205	0.92	99.8	99.3	2971	31	2676	46	2303	93
	9	0.07	0.2200	0.0040	14.6000	0.7940	0.4804	0.0258	0.94	99.9	99.5	2984	30	2790	52	2529	112
HSGB-05-16@1	1	0.12	0.2160	0.0037	16.9000	1.0800	0.5670	0.0360	0.96	99.7	99.0	2949	28	2927	61	2896	148
	2	0.14	0.2220	0.0038	16.0000	0.9610	0.5236	0.0310	0.96	99.6	98.5	2995	28	2879	57	2715	131
	3	0.17	0.2150	0.0037	15.7000	0.9480	0.5271	0.0316	0.96	99.6	98.4	2947	27	2856	58	2729	133
	4	0.17	0.2200	0.0037	18.0000	1.2000	0.5935	0.0392	0.97	99.7	98.8	2977	27	2988	64	3004	158
	5	0.17	0.2170	0.0037	16.5000	1.0200	0.5510	0.0337	0.96	99.5	98.0	2956	28	2904	59	2829	140
	6	0.20	0.2160	0.0037	15.6000	0.9350	0.5234	0.0309	0.96	99.3	97.4	2953	28	2853	57	2713	131
	7	0.21	0.2230	0.0037	17.7000	1.1400	0.5739	0.0367	0.97	99.6	98.4	3004	27	2972	62	2924	150
	8	0.20	0.2210	0.0037	15.3000	0.8870	0.5022	0.0288	0.96	99.6	98.3	2985	27	2833	55	2623	124
	9	0.24	0.2190	0.0037	17.9000	1.1900	0.5932	0.0392	0.97	99.7	99.0	2972	27	2984	64	3002	159
HSGB-05-6	1	1.48	0.1810	0.0037	4.6400	0.2380	0.1860	0.0091	0.92	99.3	96.9	2662	34	1757	43	1100	49
	2	1.09	0.1810	0.0038	6.6800	0.3580	0.2679	0.0139	0.92	99.6	98.1	2661	35	2070	47	1530	70
	3	0.87	0.1830	0.0042	7.7000	0.4170	0.3052	0.0160	0.91	99.9	99.3	2680	38	2197	49	1717	79
	4	0.78	0.1940	0.0047	8.1900	0.4540	0.3069	0.0165	0.90	99.9	99.6	2772	40	2252	50	1725	82
	5	0.70	0.1900	0.0051	9.1100	0.5720	0.3474	0.0212	0.91	99.8	99.2	2743	44	2349	57	1922	102
	6	0.55	0.1980	0.0058	8.9400	0.5550	0.3274	0.0196	0.89	99.6	98.4	2810	48	2332	57	1826	95
	7	0.55	0.1920	0.0059	9.8400	0.6830	0.3713	0.0249	0.90	99.7	98.6	2761	50	2420	64	2036	117
	8	0.55	0.2020	0.0064	8.9700	0.5660	0.3219	0.0197	0.87	99.9	99.6	2844	51	2335	58	1799	96
	9	0.47	0.1990	0.0062	9.0000	0.5820	0.3287	0.0207	0.88	100.0	100.0	2814	51	2338	59	1832	100
	10	0.40	0.2010	0.0063	9.5800	0.6440	0.3459	0.0226	0.89	99.9	99.6	2833	52	2395	62	1915	108
	11	0.37	0.2000	0.0063	9.2700	0.6100	0.3370	0.0215	0.88	99.8	99.2	2822	52	2365	60	1872	104
	12	0.40	0.2000	0.0062	9.7600	0.6450	0.3543	0.0228	0.89	100.0	100.0	2825	50	2413	61	1955	109
	13	0.39	0.2040	0.0063	9.6100	0.6090	0.3411	0.0210	0.88	100.0	99.8	2861	51	2398	58	1892	101
	14	0.34	0.2030	0.0063	9.4900	0.6060	0.3395	0.0210	0.88	99.8	99.2	2848	51	2387	59	1884	101
	15	0.36	0.2030	0.0062	9.6100	0.6060	0.3436	0.0210	0.88	99.8	99.1	2850	50	2398	58	1904	101
	16	0.33	0.2060	0.0063	9.2300	0.5510	0.3251	0.0188	0.87	99.9	99.6	2874	50	2362	55	1815	92
	17	0.31	0.2120	0.0063	10.4000	0.6450	0.3540	0.0215	0.88	99.9	99.7	2923	48	2467	58	1954	102
	18	0.33	0.1980	0.0061	9.0000	0.5210	0.3291	0.0184	0.85	99.8	99.3	2813	50	2338	53	1834	89
	19	0.28	0.2040	0.0059	9.1700	0.5380	0.3265	0.0186	0.88	100.0	100.0	2856	47	2355	54	1822	91
HSGB-05-6@1	1	0.61	0.2000	0.0057	17.2000	1.5100	0.6223	0.0540	0.95	99.8	99.1	2828	47	2945	84	3119	215
	2	0.58	0.2030	0.0059	14.7000	1.1800	0.5257	0.0414	0.93	99.8	99.0	2851	47	2797	76	2723	175
	3	0.59	0.2070	0.0060	14.9000	1.1700	0.5221	0.0403	0.93	99.8	99.4	2878	47	2807	75	2708	171
	4	0.51	0.2040	0.0058	15.4000	1.2500	0.5463	0.0438	0.94	99.8	99.3	2858	47	2838	78	2810	183
	5	0.60	0.1990	0.0057	16.0000	1.4000	0.5822	0.0500	0.95	99.4	97.4	2819	47	2875	84	2958	204
	6	0.48	0.2040	0.0058	16.7000	1.4600	0.5947	0.0509	0.95	99.3	97.3	2860	46	2920	84	3008	206
	7	0.52	0.2070	0.0058	12.9000	0.8790	0.4528	0.0301	0.91	99.6	98.3	2880	45	2673	64	2408	134
	8	0.48	0.2000	0.0054	17.4000	1.5200	0.6315	0.0541	0.95	99.7	98.6	2828	44	2959	83	3156	214
	9	0.49	0.2050	0.0054	13.7000	0.9580	0.4855	0.0333	0.93	99.9	99.5	2868	43	2732	66	2551	144
	10	0.51	0.2040	0.0052	14.1000	0.9850	0.5001	0.0345	0.93	100.0	99.9	2858	41	2754	66	2614	148
	11	0.53	0.2040	0.0050	14.3000	0.9920	0.5104	0.0348	0.94	99.9	99.8	2857	40	2773	66	2658	149
	12	0.49	0.2040	0.0049	15.2000	1.0700	0.5409	0.0376	0.94	99.9	99.7	2858	39	2828	67	2787	157
	13	0.45	0.2040	0.0048	16.5000	1.2200	0.5859	0.0428	0.95	99.8	99.1	2861	38	2907	71	2973	174
	14	0.41	0.2080	0.0048	16.1000	1.1300	0.5592	0.0388	0.95	99.8	99.0	2893	37	2881	67	2863	161
	15	0.46	0.2000	0.0045	12.9000	0.7600	0.4679	0.0270	0.92	99.8	99.0	2827	37	2673	55	2474	119
	16	0.41	0.2090	0.0045	15.0000	0.9600	0.5222	0.0330	0.94	99.9	99.6	2894	35	2816	61	2709	140
	17	0.36	0.2040	0.0042	17.5000	1.2800	0.6224	0.0449	0.96	100.0	99.8	2862	34	2965	70	3120	179
	18	0.36	0.2060	0.0043	14.0000	0.7960	0.4918	0.0276	0.93	99.9	99.6	2876	34	2749	54	2579	119
	19	0.29	0.2010	0.0041	15.5000	0.9730	0.5609	0.0346	0.95	99.7	98.9	2833	34	2849	60	2870	143
HSGB-05-7	1	2.36	0.1980	0.0036	9.5900	0.4790	0.3513	0.0171	0.93	99.4	97.4	2810	30	2396	46	1941	81
	2	1.88	0.2030	0.0048	12.2000	0.7110	0.4363	0.0248	0.92	99.6	98.2	2851	38	2621	55	2334	111
	3	1.40	0.2150	0.0060	13.9000	0.9290	0.4680	0.0306	0.91	99.5	98.2	2944	45	2742	63	2475	134
	4	0.98	0.2210	0.0069	13.4000	0.9110	0.4404	0.0291	0.89	99.4	97.9	2989	50	2710	64	2352	130
	5	0.74	0.2190	0.0069	14.1000	1.0300	0.4678	0.0335	0.90	99.7	99.0	2973	51	2758	69	2474	147
	6	0.59	0.2220	0.0072	11.8000	0.7900	0.3855	0.0251	0.88	99.6	98.6	2992	52	2587	63	2102	117
	7	0.46	0.2140	0.0068	13.1000	1.0200	0.4458	0.0338	0.91	99.6	98.3	2933	52	2689	73	2376	151

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	8	0.49	0.2210	0.0071	10.7000	0.7090	0.3508	0.0226	0.88	99.8	99.3	2986	52	2495	62	1939	108
	9	0.42	0.2230	0.0071	12.3000	0.9220	0.4009	0.0293	0.91	99.7	99.0	3003	51	2630	70	2173	135
	10	0.43	0.2240	0.0073	11.6000	0.8450	0.3766	0.0267	0.90	99.9	99.6	3010	52	2575	68	2060	125
	11	0.36	0.2280	0.0073	12.1000	0.9030	0.3848	0.0282	0.91	100.0	100.0	3037	51	2612	70	2099	131
	12	0.38	0.2230	0.0073	11.6000	0.8430	0.3767	0.0268	0.90	100.0	99.8	3005	52	2572	68	2061	125
	13	0.34	0.2250	0.0073	11.6000	0.8390	0.3726	0.0264	0.90	99.9	99.6	3018	52	2570	68	2041	124
	14	0.39	0.2320	0.0075	11.6000	0.8150	0.3635	0.0250	0.89	100.0	100.0	3064	51	2574	66	1999	118
	15	0.34	0.2210	0.0073	10.3000	0.6860	0.3397	0.0219	0.87	100.0	99.8	2987	53	2466	61	1885	106
	16	0.33	0.2260	0.0072	12.1000	0.9010	0.3881	0.0283	0.91	99.9	99.6	3025	51	2612	70	2114	131
	17	0.31	0.2210	0.0072	11.0000	0.7510	0.3596	0.0240	0.88	100.0	99.8	2989	53	2520	64	1980	114
	18	0.34	0.2200	0.0072	11.1000	0.7660	0.3653	0.0246	0.88	99.9	99.6	2981	53	2530	64	2007	116
	19	0.29	0.2210	0.0074	10.4000	0.6840	0.3422	0.0219	0.87	100.0	99.8	2986	54	2472	61	1897	105
HSGB-05-11	1	3.09	0.1590	0.0110	7.9900	0.8440	0.3639	0.0269	0.76	89.7	62.5	2448	118	2230	95	2001	127
	2	2.80	0.1950	0.0089	9.6800	0.8000	0.3600	0.0250	0.83	93.8	78.0	2785	75	2405	76	1982	119
	3	3.08	0.1920	0.0086	10.1000	0.8220	0.3813	0.0264	0.83	94.1	78.8	2758	74	2443	75	2082	123
	4	2.47	0.1960	0.0082	11.2000	0.9170	0.4131	0.0297	0.86	94.5	80.3	2795	69	2538	76	2229	135
	5	2.43	0.2050	0.0080	9.9600	0.7130	0.3519	0.0219	0.84	95.0	82.6	2869	63	2431	66	1944	105
	6	2.09	0.2050	0.0077	10.4000	0.7410	0.3671	0.0231	0.85	95.3	83.3	2870	61	2471	66	2016	109
	7	1.73	0.2030	0.0073	9.7700	0.6640	0.3483	0.0210	0.85	95.9	85.2	2853	58	2413	63	1927	101
	8	1.63	0.2180	0.0070	10.5000	0.6660	0.3496	0.0204	0.86	96.9	89.3	2962	52	2479	59	1933	97
	9	1.56	0.2100	0.0066	10.5000	0.6900	0.3626	0.0220	0.88	97.1	89.4	2906	51	2480	61	1995	104
	10	1.45	0.2210	0.0064	9.5000	0.5480	0.3121	0.0168	0.87	97.9	92.5	2987	47	2388	53	1751	82
	11	1.41	0.2220	0.0063	9.6100	0.5490	0.3135	0.0168	0.87	98.2	93.5	2998	45	2398	53	1758	82
	12	1.36	0.2230	0.0061	10.8000	0.6580	0.3514	0.0204	0.89	98.6	95.1	3004	44	2507	57	1941	97
	13	1.36	0.2170	0.0059	12.1000	0.8280	0.4025	0.0266	0.92	98.6	94.7	2961	44	2609	64	2181	122
	14	1.48	0.2240	0.0061	9.7800	0.5520	0.3162	0.0170	0.88	98.9	96.1	3012	44	2414	52	1771	83
	15	1.38	0.2220	0.0058	9.6700	0.5430	0.3156	0.0170	0.89	99.2	97.0	2997	42	2404	52	1768	83
	16	1.30	0.2180	0.0056	10.5000	0.6360	0.3515	0.0205	0.91	99.4	97.7	2963	42	2484	56	1942	98
	17	1.24	0.2200	0.0056	10.6000	0.6260	0.3490	0.0200	0.91	99.4	97.8	2978	41	2486	55	1930	96
	18	1.18	0.2250	0.0056	11.2000	0.6650	0.3607	0.0209	0.91	99.6	98.6	3015	40	2538	55	1986	99
	19	1.17	0.2270	0.0055	11.0000	0.6200	0.3506	0.0194	0.91	99.9	99.5	3028	39	2519	53	1938	93
	20	1.24	0.2230	0.0055	9.4100	0.4780	0.3058	0.0150	0.88	99.5	98.2	3003	39	2379	47	1720	74
	21	1.11	0.2150	0.0051	10.3000	0.5750	0.3480	0.0188	0.91	99.4	97.6	2943	38	2463	52	1925	90
	22	1.02	0.2140	0.0050	10.5000	0.5950	0.3566	0.0195	0.91	99.4	97.7	2938	37	2483	52	1966	93
	23	1.02	0.2100	0.0049	8.9000	0.4380	0.3068	0.0146	0.89	99.5	98.0	2909	38	2328	45	1725	72
	24	0.94	0.2080	0.0046	9.4800	0.4890	0.3302	0.0165	0.90	99.5	98.1	2892	36	2386	47	1839	80
HSGB-05-12	1	0.22	0.2200	0.0097	21.0000	2.7000	0.6909	0.0859	0.94	97.3	90.4	2983	71	3138	125	3386	327
	2	0.22	0.2200	0.0110	21.2000	2.9400	0.7001	0.0937	0.94	97.2	90.3	2978	79	3148	135	3421	355
	3	0.26	0.2280	0.0110	15.8000	1.8200	0.5024	0.0560	0.91	98.7	95.4	3040	78	2865	110	2624	240
	4	0.35	0.2110	0.0110	15.1000	1.9400	0.5196	0.0636	0.92	98.0	92.6	2915	84	2824	122	2698	270
	5	0.35	0.2130	0.0110	14.2000	1.7000	0.4831	0.0557	0.91	98.6	94.6	2925	83	2760	114	2541	242
	6	0.40	0.2160	0.0110	14.5000	1.7900	0.4865	0.0579	0.92	98.4	94.2	2950	81	2782	118	2555	251
	7	0.41	0.2220	0.0110	12.0000	1.2200	0.3913	0.0380	0.88	98.8	95.7	2994	80	2602	95	2129	176
	8	0.37	0.2320	0.0110	12.7000	1.2700	0.3961	0.0384	0.88	99.3	97.4	3064	76	2654	94	2151	177
	9	0.37	0.2310	0.0110	12.2000	1.1700	0.3828	0.0356	0.88	99.5	98.2	3060	74	2620	90	2089	166
	10	0.42	0.2230	0.0100	15.7000	1.7800	0.5107	0.0565	0.92	99.3	97.5	3004	73	2860	108	2659	241
	11	0.44	0.2160	0.0100	9.8600	0.8150	0.3304	0.0261	0.84	99.4	97.7	2954	75	2422	76	1840	127
	12	0.41	0.2270	0.0100	11.8000	1.0300	0.3761	0.0314	0.87	99.0	96.4	3033	71	2587	82	2058	147
	13	0.35	0.2340	0.0098	11.3000	0.8970	0.3510	0.0268	0.86	99.5	98.1	3083	67	2552	74	1939	128
	14	0.42	0.2170	0.0090	11.6000	0.9510	0.3869	0.0304	0.87	99.0	96.4	2958	67	2570	77	2108	141
	15	0.38	0.2250	0.0091	11.7000	0.9230	0.3767	0.0282	0.86	98.7	95.3	3019	65	2581	74	2061	132
	16	0.41	0.2230	0.0084	11.4000	0.8550	0.3696	0.0268	0.87	99.4	97.9	3003	60	2554	70	2027	126
	17	0.42	0.2290	0.0085	11.9000	0.8710	0.3775	0.0268	0.87	99.7	98.9	3045	59	2598	68	2064	125
	18	0.40	0.2310	0.0084	11.7000	0.8280	0.3692	0.0253	0.86	99.7	98.8	3057	58	2585	66	2026	119
	19	0.38	0.2290	0.0082	11.9000	0.8290	0.3762	0.0256	0.87	99.8	99.4	3048	57	2597	65	2059	120
	20	0.35	0.2340	0.0082	13.2000	0.9780	0.4100	0.0295	0.89	99.5	98.3	3080	56	2696	70	2215	135
	21	0.44	0.2250	0.0080	11.8000	0.8170	0.3792	0.0255	0.87	99.4	97.9	3016	57	2585	65	2073	119
	22	0.44	0.2210	0.0078	11.1000	0.7460	0.3636	0.0236	0.86	99.3	97.5	2987	57	2530	63	1999	111
	23	0.41	0.2320	0.0080	11.4000	0.7420	0.3554	0.0225	0.85	99.5	98.2	3064	55	2553	61	1960	107
	24	0.45	0.2240	0.0078	11.0000	0.7140	0.3562	0.0223	0.85	99.6	98.3	3012	55	2525	60	1964	106
HSGB-05-13	1	0.31	0.2090	0.0087	30.4000	4.6800	1.0540	0.1590	0.96	97.8	91.7	2898	68	3499	151	4640	500
	2	0.24	0.2240	0.0072	21.2000	2.1900	0.6870	0.0697	0.95	99.1	96.6	3007	52	3147	100	3371	267
	3	0.14	0.2150	0.0059	21.5000	2.1400	0.7268	0.0716	0.96	99.8	99.0	2944	45	3164	96	3522	267
	4	0.08	0.2200	0.0054	17.5000	1.3500	0.5765	0.0437	0.95	99.7	99.0	2983	40	2963	74	2934	179
	5	0.07	0.2120	0.0049	16.8000	1.2000	0.5728	0.0404	0.95	99.8	99.2	2922	37	2921	68	2919	166
	6	0.04	0.2220	0.0046	19.3000	1.4400	0.6301	0.0467	0.96	99.9	99.6	2994	33	3055	72	3150	185
	7	0.05	0.2180	0.0044	16.3000	0.9810	0.5415	0.0323	0.94	99.9	99.7	2967	32	2894	58	2790	135
	8	0.03	0.2200	0.0041	16.4000	0.9620	0.5403	0.0314	0.95	99.9	99.7	2983	30	2901	56	2785	131
	9	0.02	0.2190	0.0038	15.6000	0.8840	0.5183	0.0290	0.95	100.0	100.0	2972	28	2855	54	2692	123

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	10	0.03	0.2220	0.0038	13.6000	0.6570	0.4446	0.0212	0.94	100.0	99.9	2994	27	2722	46	2371	95
	11	0.02	0.2210	0.0036	14.5000	0.7480	0.4777	0.0243	0.95	99.9	99.8	2987	26	2786	49	2517	106
	12	0.02	0.2170	0.0036	13.2000	0.6180	0.4389	0.0204	0.94	100.0	99.9	2961	26	2691	44	2346	91
	13	0.01	0.2220	0.0037	14.8000	0.7370	0.4838	0.0239	0.94	100.0	100.0	2993	27	2802	47	2544	104
	14	0.01	0.2180	0.0037	13.8000	0.6550	0.4588	0.0215	0.94	100.0	100.0	2966	27	2735	45	2434	95
	15	0.01	0.2210	0.0037	14.0000	0.6690	0.4601	0.0217	0.94	100.0	99.8	2987	27	2750	45	2440	96
	16	0.01	0.2180	0.0037	13.6000	0.6520	0.4542	0.0215	0.94	100.0	99.8	2963	27	2724	45	2414	95
	17	0.01	0.2160	0.0037	13.7000	0.6520	0.4612	0.0216	0.94	100.0	100.0	2949	27	2731	45	2445	95
	18	0.01	0.2180	0.0037	13.9000	0.6550	0.4615	0.0215	0.93	100.0	100.0	2967	28	2742	45	2446	95
	19	0.01	0.2180	0.0037	12.9000	0.5760	0.4283	0.0189	0.93	100.0	100.0	2969	27	2672	42	2298	85
HSGB-05-14	1	0.31	0.2070	0.0036	12.9000	0.7420	0.4528	0.0250	0.95	95.7	84.6	2878	28	2672	54	2408	111
	2	0.17	0.2210	0.0030	13.8000	0.6840	0.4527	0.0219	0.96	97.5	91.1	2989	22	2736	47	2407	97
	3	0.13	0.2260	0.0028	15.2000	0.7180	0.4875	0.0227	0.96	98.4	94.5	3022	20	2827	45	2560	98
	4	0.11	0.2310	0.0027	16.2000	0.7540	0.5101	0.0235	0.97	99.1	96.7	3056	19	2890	44	2657	100
	5	0.09	0.2290	0.0027	15.7000	0.7000	0.4973	0.0220	0.97	99.3	97.5	3045	19	2859	43	2602	95
	6	0.07	0.2240	0.0027	14.9000	0.6170	0.4817	0.0197	0.96	99.2	97.0	3012	19	2809	39	2535	86
	7	0.08	0.2280	0.0027	14.2000	0.5510	0.4509	0.0173	0.95	99.3	97.4	3040	19	2763	37	2399	77
	8	0.08	0.2230	0.0027	13.1000	0.4710	0.4265	0.0151	0.94	99.3	97.6	3005	19	2689	34	2290	68
	9	0.07	0.2300	0.0027	14.1000	0.5200	0.4438	0.0162	0.95	99.5	98.1	3054	19	2756	35	2368	72
	10	0.07	0.2260	0.0026	13.5000	0.4830	0.4316	0.0153	0.95	99.5	98.1	3026	19	2713	34	2313	69
	11	0.07	0.2300	0.0027	13.1000	0.4420	0.4131	0.0138	0.94	99.6	98.6	3050	19	2686	32	2229	63
	12	0.07	0.2270	0.0026	14.0000	0.5070	0.4467	0.0160	0.95	99.6	98.6	3032	18	2749	34	2381	71
	13	0.07	0.2290	0.0026	13.3000	0.4490	0.4215	0.0141	0.94	99.7	99.0	3042	18	2700	32	2267	64
	14	0.08	0.2270	0.0026	12.7000	0.4210	0.4082	0.0133	0.94	99.7	98.9	3028	18	2661	31	2207	61
	15	0.07	0.2290	0.0026	13.3000	0.4520	0.4214	0.0142	0.94	99.7	98.8	3045	18	2702	32	2267	64
	16	0.07	0.2280	0.0026	12.7000	0.4040	0.4037	0.0127	0.93	99.8	99.2	3037	19	2656	30	2186	58
	17	0.07	0.2290	0.0026	12.9000	0.4200	0.4097	0.0132	0.94	99.8	99.3	3042	18	2673	31	2214	60
	18	0.07	0.2290	0.0026	12.2000	0.3700	0.3857	0.0116	0.93	99.8	99.2	3042	19	2616	29	2103	54
	19	0.07	0.2280	0.0026	12.5000	0.3930	0.3993	0.0123	0.93	99.8	99.1	3038	19	2646	29	2166	57
HSGB-05-18	1	0.35	0.2050	0.0150	10.9000	1.3600	0.3836	0.0359	0.82	84.2	56.9	2869	116	2511	116	2093	167
	2	0.27	0.2160	0.0120	14.1000	1.6100	0.4709	0.0456	0.87	88.6	67.0	2954	91	2753	109	2487	200
	3	0.26	0.2150	0.0110	12.4000	1.2000	0.4185	0.0348	0.86	91.7	74.0	2941	80	2634	91	2253	158
	4	0.29	0.2190	0.0100	14.6000	1.4500	0.4843	0.0426	0.88	92.4	76.2	2974	75	2791	94	2546	185
	5	0.24	0.2190	0.0091	13.6000	1.2100	0.4524	0.0363	0.88	94.3	81.3	2971	67	2725	84	2406	161
	6	0.23	0.2290	0.0084	15.2000	1.3000	0.4820	0.0385	0.91	95.6	85.7	3048	58	2830	82	2536	167
	7	0.23	0.2210	0.0078	13.0000	0.9730	0.4266	0.0293	0.88	95.7	85.7	2988	57	2680	71	2290	132
	8	0.27	0.2290	0.0077	11.5000	0.7260	0.3650	0.0210	0.85	96.5	88.4	3046	54	2567	59	2006	99
	9	0.22	0.2260	0.0069	13.0000	0.8420	0.4161	0.0254	0.88	97.2	90.4	3025	49	2678	61	2243	115
	10	0.23	0.2360	0.0069	11.9000	0.6990	0.3663	0.0201	0.87	97.2	90.9	3093	47	2598	55	2012	95
	11	0.22	0.2340	0.0067	12.4000	0.7290	0.3834	0.0213	0.88	97.6	91.9	3081	46	2634	55	2092	99
	12	0.23	0.2300	0.0069	10.8000	0.5890	0.3394	0.0171	0.84	97.0	90.1	3051	48	2502	51	1884	82
	13	0.21	0.2340	0.0067	14.8000	0.9600	0.4577	0.0284	0.90	97.4	91.4	3079	46	2800	62	2430	125
	14	0.19	0.2300	0.0068	11.5000	0.6480	0.3627	0.0190	0.86	97.2	90.7	3052	47	2564	53	1995	90
	15	0.22	0.2200	0.0067	10.8000	0.6200	0.3573	0.0187	0.85	96.7	88.6	2978	49	2508	53	1969	89
	16	0.22	0.2230	0.0067	12.5000	0.7770	0.4069	0.0235	0.88	96.8	89.2	3002	49	2643	58	2201	108
	17	0.23	0.2270	0.0071	10.7000	0.5890	0.3410	0.0172	0.83	96.9	89.6	3033	50	2496	51	1891	83
	18	0.21	0.2280	0.0069	12.2000	0.7240	0.3871	0.0215	0.86	97.2	90.5	3038	48	2617	56	2109	100
	19	0.24	0.2250	0.0068	11.2000	0.6430	0.3625	0.0192	0.85	97.2	90.4	3017	49	2544	53	1994	91
HSGB-05-19	1	0.10	0.2210	0.0041	15.9000	1.0200	0.5211	0.0329	0.96	99.3	97.2	2986	30	2868	61	2704	139
	2	0.11	0.2210	0.0041	15.5000	0.9160	0.5084	0.0296	0.95	99.6	98.6	2989	30	2846	56	2650	127
	3	0.09	0.2200	0.0043	18.1000	1.2500	0.5958	0.0406	0.96	99.6	98.7	2981	32	2994	66	3013	164
	4	0.13	0.2170	0.0047	15.2000	0.9650	0.5076	0.0316	0.94	99.6	98.3	2962	35	2829	60	2646	135
	5	0.15	0.2150	0.0054	19.0000	1.5200	0.6411	0.0503	0.95	99.4	97.5	2945	41	3043	77	3193	198
	6	0.19	0.2170	0.0062	19.1000	1.6100	0.6378	0.0531	0.94	99.6	98.4	2960	46	3047	82	3180	209
	7	0.22	0.2220	0.0073	16.9000	1.4000	0.5538	0.0446	0.92	99.2	97.1	2993	53	2931	79	2841	185
	8	0.24	0.2130	0.0076	19.3000	1.9600	0.6550	0.0651	0.94	99.2	96.8	2932	57	3056	98	3248	254
	9	0.25	0.2120	0.0079	16.4000	1.5500	0.5616	0.0516	0.92	99.2	96.9	2920	60	2901	90	2873	213
	10	0.23	0.2180	0.0085	16.5000	1.6100	0.5508	0.0520	0.92	98.7	95.3	2962	63	2907	93	2829	216
	11	0.27	0.2130	0.0086	13.9000	1.2200	0.4728	0.0398	0.89	98.6	94.8	2929	66	2742	83	2496	174
	12	0.33	0.2230	0.0088	16.4000	1.5800	0.5333	0.0498	0.91	98.8	95.7	3003	64	2901	92	2756	209
	13	0.29	0.2100	0.0088	14.0000	1.2700	0.4821	0.0416	0.89	98.3	93.6	2905	68	2747	86	2537	181
	14	0.26	0.2130	0.0088	12.8000	1.0600	0.4353	0.0345	0.87	99.0	96.4	2930	67	2665	78	2329	155
	15	0.28	0.2120	0.0088	13.2000	1.1400	0.4521	0.0373	0.88	98.8	95.3	2919	67	2694	81	2405	166
	16	0.30	0.2170	0.0090	11.9000	0.9330	0.3981	0.0298	0.86	98.9	96.0	2959	67	2598	73	2160	137
	17	0.27	0.2180	0.0089	15.7000	1.4900	0.5225	0.0480	0.90	98.5	94.6	2963	66	2857	91	2710	203
	18	0.30	0.2150	0.0088	12.6000	1.0600	0.4236	0.0338	0.88	98.4	94.2	2944	66	2647	79	2277	153
	19	0.29	0.2290	0.0092	14.5000	1.2300	0.4584	0.0378	0.89	99.0	96.5	3044	64	2781	81	2432	167
HSGB-07-1	1	0.12	0.1800	0.0041	9.4900	0.5700	0.3829	0.0219	0.92	98.3	92.6	2650	38	2386	55	2090	102
	2	0.13	0.1760	0.0045	12.9000	0.9660	0.5304	0.0384	0.94	98.3	92.6	2614	42	2669	71	2743	162

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	3	0.15	0.1840	0.0053	15.0000	1.2600	0.5928	0.0481	0.94	98.3	92.8	2689	48	2817	80	3001	195
	4	0.17	0.1880	0.0060	18.3000	1.9400	0.7063	0.0734	0.95	98.6	94.2	2722	52	3005	102	3445	277
	5	0.15	0.2000	0.0070	16.0000	1.6100	0.5813	0.0567	0.94	98.3	93.3	2823	58	2877	96	2954	231
	6	0.23	0.2110	0.0074	14.0000	1.2500	0.4804	0.0416	0.92	99.3	97.1	2917	57	2750	84	2529	181
	7	0.23	0.2200	0.0076	13.9000	1.2200	0.4601	0.0391	0.92	99.3	97.4	2980	56	2746	83	2440	173
	8	0.28	0.2120	0.0075	13.3000	1.1400	0.4549	0.0379	0.91	99.1	96.5	2919	58	2700	81	2417	168
	9	0.28	0.2180	0.0075	14.2000	1.2200	0.4733	0.0395	0.92	99.2	97.1	2965	56	2764	81	2498	173
	10	0.28	0.2190	0.0075	12.9000	1.0200	0.4269	0.0326	0.90	99.0	96.5	2977	55	2674	74	2292	147
	11	0.31	0.2200	0.0073	12.4000	0.9160	0.4092	0.0292	0.90	99.2	97.2	2983	53	2637	69	2211	133
	12	0.32	0.2270	0.0072	13.5000	1.0000	0.4301	0.0312	0.91	99.4	98.0	3030	51	2712	70	2306	141
	13	0.34	0.2170	0.0068	14.2000	1.1300	0.4751	0.0367	0.92	99.2	97.0	2961	51	2765	75	2506	160
	14	0.39	0.2230	0.0068	14.4000	1.0900	0.4691	0.0347	0.92	99.3	97.5	3000	49	2777	72	2480	152
	15	0.37	0.2220	0.0067	14.4000	1.0800	0.4704	0.0345	0.92	99.5	98.3	2996	49	2777	71	2485	151
	16	0.41	0.2260	0.0067	13.8000	0.9840	0.4425	0.0309	0.91	99.6	98.6	3023	48	2735	68	2362	138
	17	0.43	0.2300	0.0068	13.9000	0.9750	0.4397	0.0301	0.91	99.6	98.6	3051	47	2745	66	2349	135
	18	0.43	0.2270	0.0067	13.6000	0.9390	0.4343	0.0293	0.91	99.4	98.0	3030	47	2721	65	2325	132
	19	0.46	0.2230	0.0066	14.3000	1.0200	0.4639	0.0323	0.91	99.3	97.6	3003	48	2768	68	2457	142
HSGB-07-3	1	1.07	0.1880	0.0047	6.2300	0.3210	0.2408	0.0114	0.88	98.4	93.4	2722	41	2009	45	1391	59
	2	0.91	0.1910	0.0050	8.2000	0.4720	0.3120	0.0170	0.89	98.8	94.8	2748	43	2254	52	1751	83
	3	0.81	0.1910	0.0055	10.9000	0.7690	0.4151	0.0280	0.91	98.8	95.1	2750	47	2517	66	2238	128
	4	0.74	0.2020	0.0061	11.5000	0.8400	0.4134	0.0293	0.91	99.5	98.0	2842	49	2565	68	2230	134
	5	0.73	0.2120	0.0070	12.4000	0.9810	0.4240	0.0327	0.91	99.5	98.2	2922	53	2635	74	2279	148
	6	0.68	0.2010	0.0072	13.0000	1.2000	0.4696	0.0420	0.92	99.4	97.5	2837	59	2682	87	2482	184
	7	0.66	0.2170	0.0083	13.9000	1.3300	0.4631	0.0433	0.92	99.4	97.6	2962	61	2742	91	2453	191
	8	0.65	0.2120	0.0084	12.9000	1.2200	0.4436	0.0409	0.91	99.8	99.1	2918	64	2676	89	2367	182
	9	0.52	0.2180	0.0090	13.4000	1.2900	0.4460	0.0419	0.91	99.8	99.4	2966	66	2708	91	2377	187
	10	0.46	0.2310	0.0098	14.3000	1.3900	0.4489	0.0428	0.90	99.8	99.1	3058	68	2769	92	2390	191
	11	0.54	0.2200	0.0099	12.4000	1.1600	0.4098	0.0369	0.88	99.3	97.4	2981	72	2638	88	2214	169
	12	0.38	0.2180	0.0096	14.2000	1.4500	0.4706	0.0470	0.91	99.6	98.3	2968	71	2761	97	2486	206
	13	0.44	0.2200	0.0095	14.1000	1.4200	0.4656	0.0458	0.91	99.8	99.3	2981	70	2758	95	2464	202
	14	0.43	0.2280	0.0098	13.2000	1.2200	0.4193	0.0380	0.89	100.0	100.0	3039	69	2693	87	2257	173
	15	0.34	0.2240	0.0096	14.9000	1.5300	0.4823	0.0485	0.91	100.0	100.0	3013	68	2811	97	2537	211
	16	0.38	0.2260	0.0095	13.3000	1.2500	0.4272	0.0394	0.90	100.0	100.0	3027	67	2704	89	2293	178
	17	0.34	0.2380	0.0099	14.6000	1.4100	0.4452	0.0423	0.91	100.0	100.0	3105	66	2789	92	2374	189
	18	0.40	0.2190	0.0095	11.3000	0.9640	0.3750	0.0311	0.87	100.0	100.0	2976	70	2552	79	2053	146
	19	0.32	0.2250	0.0094	14.8000	1.4700	0.4747	0.0465	0.91	99.9	99.7	3020	67	2799	95	2504	203
HSGB-07-9	1	0.25	0.2110	0.0046	12.0000	0.6840	0.4100	0.0226	0.93	98.4	94.1	2916	35	2601	54	2215	104
	2	0.16	0.2210	0.0043	12.9000	0.7430	0.4256	0.0239	0.94	99.3	97.6	2986	31	2676	54	2286	108
	3	0.14	0.2200	0.0041	12.5000	0.6910	0.4116	0.0224	0.94	99.7	98.7	2981	30	2642	52	2222	102
	4	0.12	0.2220	0.0042	13.5000	0.7710	0.4406	0.0248	0.94	99.7	98.9	2994	31	2713	54	2353	111
	5	0.13	0.2250	0.0044	16.0000	1.0300	0.5154	0.0328	0.95	99.8	99.2	3019	32	2877	62	2680	140
	6	0.13	0.2210	0.0046	17.8000	1.2700	0.5825	0.0411	0.96	99.8	99.1	2988	33	2976	69	2959	168
	7	0.13	0.2270	0.0050	15.1000	0.9570	0.4833	0.0301	0.94	99.7	98.8	3031	35	2823	60	2542	131
	8	0.13	0.2300	0.0050	18.1000	1.3700	0.5699	0.0428	0.96	99.8	99.2	3052	35	2994	73	2907	176
	9	0.14	0.2240	0.0050	17.5000	1.3300	0.5672	0.0428	0.96	99.9	99.7	3010	36	2964	73	2896	176
	10	0.13	0.2240	0.0050	16.7000	1.2400	0.5393	0.0396	0.95	99.9	99.5	3012	36	2917	71	2781	166
	11	0.17	0.2270	0.0051	16.8000	1.2600	0.5386	0.0399	0.95	99.8	99.1	3030	36	2926	72	2778	167
	12	0.14	0.2310	0.0053	15.5000	1.0600	0.4860	0.0329	0.94	99.8	99.4	3057	36	2844	65	2553	143
	13	0.16	0.2260	0.0052	14.7000	0.9800	0.4706	0.0310	0.94	99.9	99.7	3026	37	2795	63	2486	136
	14	0.14	0.2320	0.0052	18.6000	1.5400	0.5811	0.0479	0.96	99.8	99.3	3063	36	3019	80	2953	195
	15	0.15	0.2230	0.0052	15.5000	1.1200	0.5051	0.0359	0.95	99.9	99.6	3000	37	2847	69	2636	154
	16	0.15	0.2260	0.0052	15.1000	1.0600	0.4853	0.0336	0.94	99.8	99.4	3020	37	2821	67	2550	146
	17	0.16	0.2250	0.0053	15.6000	1.1200	0.5010	0.0355	0.95	99.8	99.3	3019	38	2850	68	2618	152
	18	0.17	0.2230	0.0052	15.1000	1.0700	0.4922	0.0344	0.94	99.7	99.0	3002	38	2823	68	2580	149
	19	0.16	0.2250	0.0053	14.9000	1.0500	0.4811	0.0332	0.94	99.7	99.1	3018	37	2811	67	2532	145
HSGB-07-10	1	0.12	0.1970	0.0048	12.5000	0.7240	0.4588	0.0252	0.91	97.5	90.4	2801	40	2639	55	2434	112
	2	0.13	0.2000	0.0053	16.8000	1.2200	0.6096	0.0429	0.93	98.7	94.8	2827	43	2925	69	3069	172
	3	0.15	0.2110	0.0060	18.8000	1.5300	0.6452	0.0515	0.94	99.4	97.6	2913	46	3030	78	3209	202
	4	0.20	0.2100	0.0063	20.6000	2.0300	0.7105	0.0692	0.95	99.4	97.8	2904	49	3118	96	3460	261
	5	0.30	0.2120	0.0067	18.9000	1.7800	0.6492	0.0602	0.94	99.6	98.6	2918	52	3039	91	3225	235
	6	0.34	0.2260	0.0071	17.7000	1.5600	0.5680	0.0495	0.94	100.0	99.8	3027	50	2975	85	2900	203
	7	0.44	0.2260	0.0069	20.4000	2.0400	0.6549	0.0646	0.95	99.8	99.3	3025	49	3112	96	3247	252
	8	0.49	0.2230	0.0070	17.0000	1.4600	0.5544	0.0467	0.93	99.6	98.7	3000	51	2936	82	2843	194
	9	0.49	0.2160	0.0068	16.4000	1.4100	0.5501	0.0465	0.93	99.5	98.3	2953	50	2900	82	2826	194
	10	0.43	0.2230	0.0068	20.7000	2.0600	0.6721	0.0662	0.95	99.8	99.3	3002	49	3123	96	3314	255
	11	0.48	0.2350	0.0071	19.3000	1.7800	0.5950	0.0542	0.95	99.9	99.5	3088	48	3057	89	3010	219
	12	0.53	0.2210	0.0070	15.2000	1.2100	0.4961	0.0387	0.92	99.6	98.5	2991	51	2825	76	2597	167
	13	0.49	0.2250	0.0070	19.6000	1.9400	0.6307	0.0616	0.95	99.6	98.5	3020	50	3072	96	3152	244
	14	0.53	0.2280	0.0075	16.8000	1.4300	0.5336	0.0445	0.92	99.5	98.3	3039	52	2922	81	2757	187

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	15	0.51	0.2220	0.0075	16.0000	1.3500	0.5216	0.0430	0.92	99.4	97.6	2997	54	2876	81	2706	182
	16	0.52	0.2270	0.0077	17.9000	1.6700	0.5718	0.0523	0.93	99.4	97.7	3032	54	2985	90	2915	215
	17	0.52	0.2230	0.0077	16.0000	1.3900	0.5197	0.0442	0.92	99.6	98.6	3002	56	2875	83	2698	188
	18	0.47	0.2240	0.0079	16.7000	1.5100	0.5426	0.0480	0.92	99.5	98.2	3008	57	2920	87	2795	201
	19	0.44	0.2240	0.0078	23.2000	2.8200	0.7511	0.0903	0.96	99.5	98.3	3010	56	3235	118	3612	333
HSGB-07-13	1	0.31	0.1970	0.0073	5.8100	0.3170	0.2136	0.0101	0.74	97.6	90.8	2804	61	1948	47	1248	54
	2	0.21	0.2030	0.0055	7.5100	0.3580	0.2681	0.0118	0.83	98.5	94.1	2853	44	2175	43	1531	60
	3	0.19	0.2000	0.0050	11.2000	0.6140	0.4072	0.0214	0.89	99.0	96.1	2823	41	2541	51	2202	98
	4	0.17	0.2070	0.0054	13.0000	0.7700	0.4546	0.0261	0.90	99.1	96.4	2885	42	2680	56	2416	116
	5	0.16	0.2060	0.0053	15.4000	1.0900	0.5421	0.0377	0.93	99.6	98.5	2876	41	2841	68	2792	158
	6	0.15	0.2180	0.0058	11.7000	0.6680	0.3894	0.0216	0.89	99.6	98.5	2965	43	2580	53	2120	100
	7	0.14	0.2190	0.0056	13.4000	0.8740	0.4440	0.0284	0.92	99.7	98.9	2970	41	2707	62	2369	127
	8	0.11	0.2170	0.0057	11.1000	0.6330	0.3697	0.0206	0.89	99.7	98.8	2962	42	2530	53	2028	97
	9	0.16	0.2260	0.0058	12.9000	0.8150	0.4132	0.0256	0.92	99.7	98.8	3024	41	2671	60	2230	117
	10	0.12	0.2220	0.0056	14.1000	0.9760	0.4601	0.0313	0.93	99.8	99.2	2996	41	2756	66	2440	138
	11	0.16	0.2240	0.0057	12.0000	0.7290	0.3890	0.0231	0.91	99.8	99.1	3007	41	2604	57	2118	107
	12	0.13	0.2240	0.0057	12.6000	0.8080	0.4091	0.0257	0.92	99.8	99.4	3010	41	2653	60	2211	117
	13	0.13	0.2220	0.0056	12.7000	0.8210	0.4135	0.0263	0.92	99.8	99.1	2995	41	2654	61	2231	120
	14	0.15	0.2290	0.0059	12.7000	0.7980	0.4014	0.0248	0.92	99.8	99.3	3048	41	2657	59	2176	114
	15	0.13	0.2290	0.0059	13.2000	0.8690	0.4187	0.0270	0.92	99.6	98.7	3045	41	2695	62	2255	123
	16	0.15	0.2180	0.0058	10.7000	0.6050	0.3544	0.0196	0.89	99.8	99.1	2966	43	2494	53	1956	93
	17	0.15	0.2220	0.0057	12.7000	0.8230	0.4131	0.0264	0.92	99.9	99.6	2998	41	2655	61	2229	120
	18	0.17	0.2240	0.0059	11.9000	0.7240	0.3865	0.0230	0.91	99.9	99.5	3009	42	2599	57	2106	107
	19	0.15	0.2240	0.0060	10.9000	0.6310	0.3531	0.0198	0.89	99.6	98.4	3010	43	2516	54	1950	94
HSGB-07-15	1	0.16	0.2130	0.0110	20.4000	1.8500	0.6930	0.0598	0.83	97.3	90.3	2931	85	3110	88	3394	228
	2	0.16	0.2140	0.0091	18.6000	1.5100	0.6322	0.0493	0.86	98.3	93.9	2935	69	3024	78	3158	195
	3	0.09	0.2150	0.0077	16.6000	1.3400	0.5607	0.0436	0.90	98.7	95.0	2946	58	2915	77	2869	180
	4	0.11	0.2250	0.0071	15.3000	1.1800	0.4908	0.0373	0.92	99.6	98.5	3020	51	2832	74	2574	161
	5		0.2270	0.0070	17.8000	1.5600	0.5701	0.0494	0.94	99.8	99.4	3029	49	2980	84	2908	203
	6	0.07	0.2210	0.0068	15.3000	1.2400	0.5027	0.0402	0.93	99.8	99.1	2986	49	2834	78	2626	172
	7	0.07	0.2180	0.0069	14.0000	1.0700	0.4644	0.0348	0.91	99.7	99.0	2968	51	2748	73	2459	153
	8	0.06	0.2270	0.0071	14.1000	1.1200	0.4492	0.0350	0.92	99.6	98.4	3034	50	2755	76	2392	156
	9	0.07	0.2230	0.0071	14.0000	1.1600	0.4561	0.0369	0.92	99.7	99.1	3004	51	2752	78	2422	164
	10	0.08	0.2290	0.0078	16.2000	1.5100	0.5115	0.0471	0.93	99.6	98.7	3047	55	2887	90	2663	201
	11	0.08	0.2290	0.0085	14.0000	1.2200	0.4442	0.0382	0.91	99.9	99.8	3042	59	2750	83	2369	170
	12	0.10	0.2270	0.0093	18.2000	2.0700	0.5799	0.0651	0.94	99.7	98.9	3034	65	2999	110	2948	266
	13	0.12	0.2360	0.0100	16.7000	1.8900	0.5128	0.0569	0.93	99.6	98.7	3095	69	2918	108	2669	243
	14	0.08	0.2270	0.0110	13.9000	1.4700	0.4459	0.0461	0.90	99.9	99.6	3029	75	2746	100	2377	206
	15	0.15	0.2330	0.0110	15.7000	1.8800	0.4893	0.0572	0.92	99.8	99.2	3074	78	2861	114	2568	248
	16	0.11	0.2250	0.0110	13.8000	1.6100	0.4438	0.0510	0.91	100.0	100.0	3018	79	2735	111	2368	228
	17	0.18	0.2260	0.0120	15.7000	2.0100	0.5035	0.0632	0.91	99.8	99.1	3027	85	2860	122	2629	271
	18	0.13	0.2120	0.0120	12.3000	1.4700	0.4223	0.0485	0.88	99.3	97.3	2921	92	2631	112	2271	220
	19	0.15	0.2250	0.0120	13.0000	1.5700	0.4183	0.0493	0.89	99.6	98.4	3016	88	2678	114	2253	224
HSGB-07-7	1	0.45	0.1910	0.0070	16.7000	0.9850	0.6331	0.0344	0.79	96.3	85.8	2751	60	2916	57	3162	136
	2	0.33	0.1870	0.0065	16.7000	1.0400	0.6491	0.0373	0.83	96.4	85.8	2712	57	2918	60	3225	146
	3	0.30	0.1960	0.0066	18.8000	1.3500	0.6951	0.0474	0.88	97.3	89.5	2796	55	3033	69	3402	180
	4	0.31	0.2050	0.0071	18.0000	1.3700	0.6364	0.0465	0.89	97.7	91.2	2864	56	2988	74	3175	183
	5	0.30	0.2030	0.0068	16.3000	1.2700	0.5830	0.0435	0.90	98.4	93.9	2851	55	2896	74	2961	177
	6	0.27	0.2120	0.0069	16.2000	1.2600	0.5533	0.0417	0.91	98.3	93.8	2920	53	2886	75	2839	173
	7	0.28	0.2080	0.0068	14.1000	1.0500	0.4890	0.0346	0.90	97.8	91.9	2894	53	2753	71	2566	150
	8	0.27	0.2110	0.0069	12.9000	0.8990	0.4439	0.0292	0.88	97.8	91.8	2910	53	2672	66	2368	130
	9	0.24	0.2140	0.0070	17.4000	1.5200	0.5878	0.0495	0.93	97.3	90.3	2939	52	2956	84	2981	201
	10	0.27	0.2140	0.0070	14.1000	1.0500	0.4766	0.0338	0.90	97.8	91.9	2939	52	2756	71	2512	147
	11	0.30	0.2200	0.0072	14.8000	1.1000	0.4877	0.0347	0.90	98.0	92.9	2981	53	2802	71	2561	150
	12	0.30	0.2210	0.0073	16.9000	1.3900	0.5553	0.0439	0.92	97.7	91.9	2985	53	2929	79	2847	182
	13	0.32	0.2250	0.0077	13.6000	0.9790	0.4392	0.0299	0.88	98.0	92.9	3020	55	2726	68	2347	134
	14	0.33	0.2140	0.0078	12.3000	0.8890	0.4172	0.0281	0.86	97.7	91.5	2939	59	2630	68	2248	128
	15	0.29	0.2230	0.0080	14.9000	1.2200	0.4849	0.0377	0.90	97.8	92.4	3003	58	2810	78	2549	164
	16	0.37	0.2170	0.0081	13.5000	1.0700	0.4510	0.0337	0.88	97.9	92.5	2961	60	2716	75	2400	150
	17	0.36	0.2180	0.0080	17.1000	1.6200	0.5705	0.0520	0.92	98.0	92.6	2962	59	2941	91	2910	213
	18	0.40	0.2190	0.0087	12.1000	0.9120	0.4016	0.0281	0.85	97.5	91.1	2975	64	2615	71	2176	129
	19	0.30	0.2190	0.0080	16.1000	1.4900	0.5325	0.0474	0.92	98.1	93.0	2972	59	2881	88	2752	199
HSGB-07-12	1	0.13	0.1790	0.0170	7.7500	1.0700	0.3145	0.0273	0.74	84.0	53.2	2642	157	2203	125	1763	134
	2	0.11	0.1930	0.0140	10.6000	1.3100	0.3974	0.0374	0.81	88.1	63.5	2772	120	2489	115	2157	172
	3	0.14	0.1910	0.0140	9.4500	1.1000	0.3581	0.0305	0.79	88.0	62.9	2755	119	2383	107	1973	145
	4	0.12	0.1730	0.0150	9.8600	1.3200	0.4128	0.0391	0.78	86.6	57.5	2590	141	2422	123	2228	179
	5	0.12	0.1960	0.0130	10.4000	1.1500	0.3826	0.0335	0.81	90.6	69.7	2797	105	2468	103	2088	156
	6	0.11	0.2040	0.0110	13.3000	1.5200	0.4746	0.0472	0.87	93.0	76.6	2859	90	2705	107	2504	206
	7	0.15	0.2200	0.0110	14.3000	1.5500	0.4707	0.0456	0.88	93.3	78.7	2979	83	2767	103	2487	200

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	8	0.14	0.2050	0.0110	11.3000	1.1600	0.4021	0.0347	0.84	92.6	75.5	2863	90	2552	96	2179	159
	9	0.12	0.2240	0.0110	13.1000	1.2900	0.4245	0.0372	0.87	93.8	80.4	3008	79	2686	93	2281	168
	10	0.15	0.2170	0.0100	15.7000	1.7700	0.5262	0.0541	0.90	94.3	81.3	2959	78	2862	107	2725	229
	11	0.12	0.2260	0.0110	12.5000	1.2200	0.4015	0.0340	0.86	92.9	78.1	3026	80	2645	91	2176	156
	12	0.17	0.2200	0.0110	12.4000	1.2100	0.4102	0.0346	0.86	93.0	77.9	2979	81	2637	91	2216	158
	13	0.15	0.2140	0.0110	12.2000	1.1800	0.4131	0.0343	0.84	92.8	76.8	2935	84	2618	91	2229	156
	14	0.16	0.2110	0.0110	14.5000	1.6000	0.4959	0.0480	0.88	91.8	74.1	2916	86	2780	105	2596	207
	15	0.16	0.2090	0.0110	12.7000	1.2800	0.4414	0.0383	0.86	92.4	75.4	2897	85	2659	95	2357	171
	16	0.15	0.2160	0.0110	12.4000	1.1600	0.4153	0.0338	0.85	93.5	78.8	2949	79	2631	88	2239	154
	17	0.17	0.2210	0.0110	11.9000	1.0800	0.3917	0.0305	0.84	93.0	78.0	2985	80	2597	85	2131	141
	18	0.19	0.2240	0.0110	13.8000	1.3700	0.4480	0.0391	0.87	93.1	78.4	3010	78	2739	93	2386	174
	19	0.17	0.2020	0.0110	12.5000	1.2700	0.4492	0.0391	0.85	92.6	75.4	2844	86	2645	96	2392	174
HSGB-10-1	1	0.08	0.2010	0.0070	14.1000	1.4100	0.5076	0.0492	0.94	98.2	93.1	2834	57	2754	95	2646	211
	2	0.09	0.2230	0.0068	12.7000	0.9950	0.4132	0.0315	0.92	99.4	97.7	3005	49	2659	74	2229	144
	3	0.10	0.2140	0.0064	13.0000	1.0300	0.4408	0.0342	0.93	99.4	97.7	2933	48	2678	75	2354	153
	4	0.10	0.2130	0.0062	14.3000	1.2200	0.4855	0.0406	0.94	99.6	98.4	2930	47	2768	81	2551	176
	5	0.14	0.2140	0.0063	14.4000	1.2200	0.4869	0.0406	0.94	99.6	98.6	2935	47	2774	81	2557	176
	6	0.12	0.2120	0.0063	11.9000	0.8810	0.4068	0.0295	0.92	99.7	98.7	2917	49	2594	70	2200	135
	7	0.17	0.2220	0.0068	12.9000	0.9920	0.4221	0.0317	0.92	99.7	98.7	2996	49	2674	72	2270	144
	8	0.14	0.2160	0.0067	13.6000	1.1200	0.4566	0.0368	0.93	99.9	99.4	2955	50	2724	78	2425	163
	9	0.14	0.2200	0.0070	11.5000	0.8290	0.3784	0.0266	0.90	99.7	99.0	2981	51	2563	67	2069	125
	10	0.17	0.2160	0.0069	11.0000	0.7830	0.3699	0.0255	0.90	99.6	98.6	2951	52	2524	66	2029	120
	11	0.16	0.2220	0.0070	12.2000	0.9000	0.3981	0.0287	0.91	99.7	98.9	2993	51	2617	69	2160	133
	12	0.17	0.2200	0.0070	10.7000	0.7210	0.3512	0.0230	0.88	99.5	98.1	2981	52	2494	63	1940	110
	13	0.16	0.2260	0.0070	11.9000	0.8290	0.3827	0.0260	0.90	99.8	99.3	3025	50	2599	65	2089	121
	14	0.17	0.2220	0.0066	12.8000	0.9290	0.4182	0.0297	0.91	100.0	99.8	2999	48	2667	68	2252	135
	15	0.17	0.2250	0.0067	11.7000	0.7660	0.3779	0.0241	0.89	99.8	99.4	3015	48	2582	61	2067	113
	16	0.17	0.2240	0.0065	12.6000	0.8560	0.4083	0.0271	0.91	99.8	99.2	3009	47	2651	64	2207	124
	17	0.14	0.2260	0.0064	13.1000	0.8810	0.4212	0.0277	0.91	99.7	98.8	3021	45	2687	63	2266	126
	18	0.14	0.2250	0.0062	14.5000	1.0200	0.4672	0.0323	0.92	99.4	97.9	3015	44	2782	67	2471	142
	19	0.14	0.2220	0.0059	12.0000	0.7210	0.3935	0.0230	0.90	99.8	99.4	2995	43	2608	56	2139	107
HSGB-10-6	1	0.04	0.2140	0.0051	21.9000	2.0600	0.7438	0.0691	0.97	99.3	97.2	2935	38	3180	91	3585	255
	2	0.02	0.2190	0.0052	20.8000	1.6400	0.6889	0.0538	0.95	99.7	99.0	2971	39	3128	76	3378	205
	3	0.04	0.2210	0.0050	21.0000	1.7600	0.6882	0.0573	0.96	99.8	99.2	2989	37	3138	81	3376	219
	4	0.05	0.2170	0.0052	19.9000	1.5100	0.6648	0.0499	0.95	99.8	99.3	2959	38	3086	73	3286	193
	5	0.04	0.2210	0.0052	21.6000	1.7700	0.7083	0.0575	0.96	99.7	98.9	2987	38	3164	80	3452	217
	6	0.04	0.2200	0.0052	16.6000	1.1500	0.5478	0.0372	0.94	99.7	98.9	2982	38	2914	66	2816	155
	7	0.05	0.2230	0.0054	21.5000	1.8400	0.7012	0.0595	0.96	99.8	99.1	3001	39	3163	83	3425	225
	8	0.06	0.2220	0.0058	22.2000	1.9700	0.7236	0.0636	0.96	99.7	98.9	2996	42	3191	86	3509	238
	9	0.06	0.2240	0.0063	20.8000	1.8000	0.6724	0.0574	0.95	99.7	98.7	3012	45	3129	84	3315	221
	10	0.08	0.2240	0.0066	18.8000	1.5600	0.6081	0.0497	0.94	99.8	99.3	3012	47	3032	80	3062	199
	11	0.07	0.2270	0.0068	23.7000	2.4700	0.7576	0.0781	0.96	99.9	99.5	3032	48	3257	101	3636	286
	12	0.10	0.2210	0.0071	22.1000	2.3000	0.7265	0.0749	0.95	99.8	99.3	2985	51	3188	101	3520	280
	13	0.11	0.2310	0.0077	19.2000	1.8000	0.6032	0.0558	0.94	99.7	99.1	3061	54	3054	91	3043	224
	14	0.11	0.2260	0.0079	23.8000	2.7500	0.7623	0.0872	0.95	99.8	99.4	3026	56	3260	113	3653	319
	15	0.14	0.2280	0.0084	18.0000	1.6800	0.5723	0.0529	0.92	99.9	99.6	3035	59	2988	90	2917	217
	16	0.15	0.2270	0.0083	23.5000	2.8600	0.7521	0.0906	0.95	99.9	99.6	3030	59	3249	119	3615	334
	17	0.17	0.2240	0.0087	19.8000	2.1200	0.6401	0.0676	0.93	99.6	98.6	3010	63	3080	104	3190	266
	18	0.15	0.2220	0.0088	19.7000	2.1700	0.6448	0.0697	0.93	99.5	98.3	2995	64	3078	106	3208	273
	19	0.22	0.2360	0.0096	18.8000	1.9400	0.5767	0.0583	0.92	99.4	98.0	3096	65	3032	99	2935	238
HSGB-10-12	1	0.34	0.2160	0.0069	18.0000	1.6600	0.6016	0.0542	0.94	98.5	94.5	2955	51	2987	89	3036	218
	2	0.24	0.2210	0.0062	16.6000	1.2600	0.5442	0.0404	0.93	99.4	97.8	2989	45	2912	72	2801	169
	3	0.21	0.2390	0.0063	17.7000	1.2500	0.5357	0.0374	0.93	99.8	99.2	3113	42	2971	68	2766	157
	4	0.20	-0.0147	-0.0008	-1.0500	0.0839	0.5175	0.0333	-0.74	99.9	105.3	-1	0	NaN	-1727	2689	142
	5	0.19	0.2250	0.0060	14.5000	0.8650	0.4684	0.0274	0.90	99.9	99.7	3016	43	2785	57	2477	120
	6	0.20	0.2210	0.0057	15.9000	1.0400	0.5217	0.0335	0.92	99.9	99.8	2991	42	2873	62	2707	142
	7	0.19	0.2270	0.0060	16.8000	1.1200	0.5378	0.0354	0.92	100.0	100.0	3031	43	2925	64	2774	148
	8	0.22	0.2210	0.0062	14.4000	0.8780	0.4732	0.0284	0.89	100.0	99.9	2986	45	2776	58	2498	124
	9	0.18	0.2240	0.0064	16.1000	1.1000	0.5214	0.0351	0.91	99.9	99.6	3012	46	2884	65	2705	149
	10	0.21	0.2340	0.0069	16.7000	1.1600	0.5183	0.0354	0.91	99.9	99.6	3076	47	2917	66	2692	150
	11	0.21	0.2280	0.0069	16.3000	1.1500	0.5179	0.0360	0.91	99.9	99.7	3037	49	2893	68	2690	153
	12	0.24	0.2290	0.0073	15.8000	1.1100	0.5007	0.0344	0.90	100.0	100.0	3048	51	2867	67	2617	148
	13	0.23	0.2210	0.0072	14.4000	0.9860	0.4723	0.0317	0.88	100.0	99.9	2991	52	2777	65	2494	139
	14	0.21	0.2290	0.0073	17.5000	1.3700	0.5538	0.0429	0.92	99.9	99.7	3042	51	2960	75	2841	178
	15	0.26	0.2310	0.0078	14.2000	0.9600	0.4442	0.0295	0.87	100.0	99.9	3062	54	2762	64	2370	132
	16	0.22	0.2300	0.0077	18.4000	1.5300	0.5796	0.0477	0.92	99.9	99.7	3053	54	3011	80	2947	195
	17	0.22	0.2270	0.0081	15.3000	1.1500	0.4893	0.0360	0.89	100.0	100.0	3030	57	2834	71	2568	156
	18	0.24	0.2280	0.0084	14.3000	1.0400	0.4545	0.0325	0.87	100.0	99.8	3042	59	2771	69	2415	144
	19	0.22	0.2280	0.0084	15.4000	1.2000	0.4892	0.0373	0.89	99.9	99.6	3039	59	2839	74	2567	162

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
HSGB-10-21	1	0.23	0.2250	0.0019	12.1000	0.9900	0.3897	0.0313	0.99	99.4	97.7	3015	14	2611	77	2122	145
	2	0.29	0.2290	0.0021	11.2000	0.6620	0.3549	0.0230	0.99	99.7	99.0	3047	15	2542	55	1958	109
	3	0.33	0.2260	0.0030	9.8100	0.4520	0.3144	0.0141	0.96	99.8	99.1	3026	21	2417	43	1763	69
	4	0.31	0.2240	0.0021	9.6300	0.4590	0.3111	0.0141	0.98	99.8	99.4	3012	15	2400	44	1746	69
HSGB-12-4@1	1	0.20	0.2140	0.0089	11.9000	1.2300	0.4022	0.0385	0.92	95.1	83.5	2937	67	2595	97	2179	177
	2	0.21	0.2180	0.0084	12.6000	1.2800	0.4188	0.0398	0.92	96.2	87.0	2965	62	2649	95	2255	181
	3	0.16	0.2060	0.0083	14.2000	1.6000	0.5009	0.0535	0.93	96.1	85.9	2870	65	2763	107	2618	230
	4	0.16	0.2110	0.0080	14.0000	1.5000	0.4829	0.0492	0.94	97.1	89.6	2910	61	2751	101	2540	214
	5	0.18	0.2120	0.0080	14.7000	1.6200	0.5051	0.0531	0.94	97.2	89.8	2917	62	2798	105	2636	228
	6	0.16	0.2120	0.0083	11.8000	1.1200	0.4054	0.0359	0.91	96.8	88.7	2917	64	2591	89	2194	164
	7	0.21	0.2240	0.0079	12.3000	1.1100	0.3983	0.0346	0.92	98.5	94.7	3013	57	2630	85	2161	160
	8	0.17	0.2270	0.0077	13.1000	1.1900	0.4163	0.0369	0.93	99.2	97.1	3034	55	2683	86	2244	168
	9	0.18	0.2220	0.0077	13.3000	1.2700	0.4340	0.0402	0.93	98.8	95.6	2994	56	2699	90	2324	181
	10	0.20	0.2190	0.0075	11.7000	1.0200	0.3884	0.0326	0.92	99.2	97.1	2976	55	2584	81	2115	151
	11	0.16	0.2280	0.0075	14.1000	1.4100	0.4506	0.0439	0.94	99.3	97.5	3035	53	2759	94	2398	195
	12	0.17	0.2140	0.0076	11.4000	1.0000	0.3886	0.0327	0.92	98.7	95.2	2933	57	2560	82	2116	152
	13	0.20	0.2220	0.0077	10.1000	0.7920	0.3295	0.0247	0.90	98.8	95.8	2996	56	2443	72	1836	120
	14	0.20	0.2210	0.0076	13.2000	1.2500	0.4331	0.0399	0.93	99.0	96.2	2987	55	2693	89	2320	179
	15	0.17	0.2170	0.0076	9.1900	0.6760	0.3071	0.0215	0.88	99.1	96.7	2959	56	2357	67	1726	106
	16	0.21	0.2230	0.0076	10.7000	0.8700	0.3486	0.0272	0.91	99.0	96.3	3004	55	2500	75	1928	130
	17	0.21	0.2200	0.0074	11.3000	0.9430	0.3737	0.0301	0.92	99.3	97.4	2981	54	2552	78	2047	141
	18	0.19	0.2200	0.0074	10.7000	0.8370	0.3516	0.0266	0.90	99.2	97.1	2981	54	2494	73	1942	127
	19	0.19	0.2230	0.0077	9.4600	0.6880	0.3078	0.0213	0.88	98.8	95.8	3002	55	2384	67	1730	105
HSGB-12-5	1	0.22	0.2180	0.0100	21.6000	2.4700	0.7169	0.0785	0.91	96.9	89.0	2967	76	3164	111	3484	295
	2	0.16	0.2220	0.0099	26.5000	3.6400	0.8680	0.1160	0.95	98.0	93.0	2993	72	3366	134	4028	402
	3	0.12	0.2150	0.0087	21.8000	2.6400	0.7363	0.0875	0.94	99.1	96.7	2941	65	3174	118	3557	325
	4	0.09	0.2190	0.0082	22.1000	2.6200	0.7343	0.0855	0.95	99.2	97.1	2972	61	3190	115	3549	318
	5	0.09	0.2140	0.0074	19.6000	2.0200	0.6639	0.0674	0.94	99.4	97.8	2936	56	3071	100	3282	261
	6	0.09	0.2190	0.0068	14.2000	1.1300	0.4693	0.0365	0.92	99.5	98.1	2972	50	2760	75	2480	160
	7	0.08	0.2180	0.0063	14.9000	1.2000	0.4978	0.0392	0.93	99.8	99.1	2963	47	2811	76	2604	169
	8	0.07	0.2160	0.0064	13.7000	0.9850	0.4576	0.0321	0.91	99.4	97.6	2954	48	2726	68	2429	142
	9	0.07	0.2170	0.0065	16.1000	1.2700	0.5396	0.0417	0.93	99.2	97.1	2955	49	2883	76	2782	175
	10	0.09	0.2190	0.0066	16.8000	1.3100	0.5550	0.0427	0.92	99.6	98.4	2975	49	2922	75	2846	177
	11	0.09	0.2230	0.0068	15.5000	1.1000	0.5030	0.0349	0.91	99.6	98.6	3005	49	2846	68	2627	150
	12	0.05	0.2120	0.0064	14.9000	1.0300	0.5105	0.0345	0.90	99.6	98.4	2923	49	2812	66	2659	147
	13	0.08	0.2180	0.0062	15.0000	0.9910	0.4975	0.0322	0.91	99.7	98.8	2969	46	2814	63	2603	139
	14	0.06	0.2230	0.0059	14.9000	0.9270	0.4831	0.0296	0.91	99.8	99.3	3005	43	2808	59	2541	129
	15	0.07	0.2180	0.0055	14.4000	0.8540	0.4789	0.0279	0.91	99.8	99.2	2965	41	2775	56	2523	122
	16	0.06	0.2150	0.0050	13.7000	0.7720	0.4629	0.0256	0.91	99.8	99.2	2941	38	2729	53	2452	113
	17	0.07	0.2250	0.0049	15.8000	0.9090	0.5082	0.0289	0.93	100.0	99.8	3016	35	2862	55	2649	124
	18	0.08	0.2180	0.0046	15.3000	0.8540	0.5076	0.0280	0.93	99.9	99.7	2968	34	2833	53	2646	120
	19	0.07	0.2230	0.0045	14.6000	0.7510	0.4756	0.0241	0.92	99.8	99.3	3001	33	2790	49	2508	105
HSGB-10-9@1	1	0.18	0.2200	0.0073	9.2200	0.7320	0.3037	0.0227	0.91	97.9	92.6	2981	53	2360	73	1710	112
	2	0.19	0.2160	0.0063	11.8000	0.9690	0.3948	0.0314	0.94	98.6	94.9	2951	47	2585	77	2145	145
	3	0.19	0.2200	0.0059	13.3000	1.1100	0.4386	0.0359	0.95	99.0	96.4	2979	43	2701	79	2344	161
	4	0.21	0.2220	0.0057	10.8000	0.6990	0.3517	0.0222	0.92	99.4	98.0	2998	41	2505	60	1943	106
	5	0.20	0.2260	0.0057	12.8000	0.9170	0.4091	0.0287	0.94	99.3	97.6	3027	41	2663	68	2211	131
	6	0.20	0.2180	0.0055	14.2000	1.1100	0.4734	0.0364	0.95	99.6	98.3	2967	41	2766	74	2498	159
	7	0.21	0.2210	0.0056	11.5000	0.7330	0.3763	0.0235	0.92	99.6	98.3	2988	41	2562	60	2059	110
	8	0.20	0.2260	0.0056	12.3000	0.8110	0.3940	0.0255	0.93	99.7	98.8	3021	40	2624	62	2141	118
	9	0.21	0.2250	0.0057	13.6000	0.9780	0.4369	0.0309	0.94	99.5	98.1	3017	40	2719	68	2337	139
	10	0.23	0.2230	0.0058	10.7000	0.6360	0.3471	0.0200	0.90	99.4	97.8	3002	42	2495	55	1921	96
	11	0.19	0.2220	0.0057	11.9000	0.7710	0.3901	0.0246	0.92	99.6	98.6	2996	41	2600	60	2123	114
	12	0.19	0.2220	0.0057	11.4000	0.7080	0.3715	0.0225	0.91	99.5	98.3	2997	42	2555	58	2036	106
	13	0.19	0.2250	0.0057	12.4000	0.8070	0.3976	0.0254	0.92	99.8	99.1	3020	41	2632	61	2158	117
	14	0.24	0.2200	0.0057	10.2000	0.5750	0.3351	0.0184	0.89	99.8	99.4	2984	42	2452	52	1863	89
	15	0.20	0.2270	0.0058	12.4000	0.8130	0.3967	0.0255	0.92	99.7	99.0	3030	41	2636	62	2154	118
	16	0.20	0.2230	0.0057	11.1000	0.6700	0.3617	0.0213	0.91	99.9	99.5	3006	41	2535	56	1990	101
	17	0.23	0.2190	0.0057	11.5000	0.7110	0.3815	0.0230	0.91	100.0	99.9	2977	42	2568	58	2083	107
	18	0.20	0.2220	0.0058	11.1000	0.6590	0.3612	0.0211	0.90	99.9	99.7	2995	42	2528	56	1988	100
	19	0.23	0.2230	0.0059	11.0000	0.6500	0.3587	0.0207	0.90	99.8	99.3	3000	42	2524	55	1976	98
HSGB-12-9@1	1	0.23	0.2120	0.0039	13.2000	0.8020	0.4527	0.0269	0.95	99.0	96.3	2921	30	2697	57	2407	119
	2	0.21	0.2070	0.0036	13.6000	0.7530	0.4775	0.0259	0.95	99.3	97.3	2882	28	2724	52	2517	113
	3	0.19	0.2030	0.0035	13.7000	0.7350	0.4875	0.0258	0.95	99.4	97.5	2851	28	2726	51	2560	112
	4	0.17	0.1980	0.0035	13.6000	0.7570	0.4974	0.0272	0.95	99.3	97.2	2808	29	2720	53	2602	117
	5	0.17	0.2010	0.0035	13.4000	0.7310	0.4833	0.0260	0.95	99.6	98.4	2833	28	2707	52	2541	113
	6	0.16	0.2040	0.0036	12.3000	0.5950	0.4366	0.0208	0.93	99.7	98.7	2856	29	2625	46	2335	93
	7	0.15	0.2070	0.0037	13.0000	0.6550	0.4559	0.0226	0.94	99.8	99.1	2878	29	2678	48	2421	100
	8	0.15	0.2050	0.0037	14.2000	0.7560	0.4999	0.0263	0.94	99.8	99.4	2870	29	2761	51	2614	113

sample	Mass cycle	Th/U	$^{207}Pb^*/^{206}Pb^*$		$^{207}Pb^*/^{235}U$		$^{206}Pb^*/^{238}U$		correlation of concordia ellipses	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
			value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e
	9	0.17	0.2030	0.0037	13.3000	0.6840	0.4759	0.0240	0.94	99.8	99.1	2853	30	2704	48	2510	105
	10	0.15	0.2050	0.0038	14.1000	0.7530	0.4989	0.0262	0.94	99.8	99.1	2869	30	2758	51	2609	113
	11	0.18	0.2040	0.0038	13.4000	0.6820	0.4775	0.0239	0.93	99.8	99.1	2855	30	2708	48	2516	104
	12	0.19	0.2020	0.0038	14.7000	0.8170	0.5273	0.0289	0.94	99.7	98.7	2842	31	2795	53	2730	122
	13	0.20	0.2070	0.0039	12.6000	0.5950	0.4426	0.0205	0.92	99.8	99.0	2880	31	2652	44	2362	92
	14	0.23	0.2090	0.0039	15.1000	0.8160	0.5233	0.0279	0.94	99.9	99.4	2901	30	2822	51	2713	118
	15	0.22	0.2140	0.0041	14.0000	0.6870	0.4761	0.0230	0.92	99.7	99.0	2932	31	2751	46	2510	100
	16	0.23	0.2110	0.0041	13.1000	0.6150	0.4484	0.0207	0.92	99.8	99.2	2916	31	2684	44	2388	92
	17	0.23	0.2140	0.0041	14.0000	0.6890	0.4760	0.0230	0.92	99.8	99.1	2934	31	2751	47	2510	100
	18	0.23	0.2080	0.0040	13.0000	0.6260	0.4545	0.0214	0.92	99.7	98.6	2887	31	2680	45	2415	95
	19	0.26	0.2130	0.0041	12.9000	0.6000	0.4386	0.0201	0.91	99.8	99.1	2928	31	2670	44	2344	90
	20	0.25	0.2090	0.0040	12.9000	0.6050	0.4471	0.0207	0.91	99.9	99.4	2896	31	2670	44	2382	92
	21	0.25	0.2120	0.0042	12.0000	0.5350	0.4109	0.0179	0.90	99.7	98.9	2924	32	2607	42	2219	82
	22	0.28	0.2120	0.0041	12.9000	0.6160	0.4416	0.0207	0.92	99.8	99.1	2919	31	2672	45	2358	93
	23	0.28	0.2160	0.0043	11.5000	0.4870	0.3864	0.0160	0.89	99.9	99.6	2950	32	2564	40	2106	75
	24	0.28	0.2110	0.0041	12.7000	0.6020	0.4364	0.0203	0.91	99.9	99.4	2914	32	2658	45	2335	91
	25	0.31	0.2120	0.0042	11.1000	0.4770	0.3803	0.0159	0.89	99.8	99.2	2923	32	2535	40	2078	74
	26	0.29	0.2160	0.0042	12.7000	0.5990	0.4281	0.0198	0.91	99.9	99.6	2951	31	2661	44	2297	89
	27	0.29	0.2170	0.0043	12.5000	0.5710	0.4194	0.0188	0.91	99.9	99.7	2958	32	2646	43	2258	85
	28	0.34	0.2170	0.0043	11.4000	0.4840	0.3803	0.0159	0.89	100.0	99.9	2958	32	2554	40	2078	74
	29	0.33	0.2160	0.0042	11.4000	0.4940	0.3840	0.0163	0.89	99.9	99.6	2949	32	2558	40	2095	76
	30	0.35	0.2170	0.0043	11.5000	0.4950	0.3842	0.0162	0.89	99.9	99.6	2957	32	2563	40	2096	76
	31	0.35	0.2140	0.0042	11.6000	0.5120	0.3943	0.0170	0.90	99.9	99.6	2936	32	2576	41	2143	79
	32	0.34	0.2220	0.0044	12.3000	0.5520	0.4025	0.0177	0.90	99.9	99.6	2998	31	2631	42	2180	81
	33	0.36	0.2170	0.0043	11.8000	0.5190	0.3953	0.0170	0.90	99.9	99.5	2957	32	2590	41	2147	79
	34	0.36	0.2160	0.0043	11.3000	0.4880	0.3804	0.0160	0.89	99.7	99.0	2952	32	2551	40	2078	75
	35	0.39	0.2230	0.0044	11.8000	0.5140	0.3836	0.0163	0.89	99.7	98.9	3001	32	2588	41	2093	76
	36	0.39	0.2240	0.0045	11.8000	0.5040	0.3808	0.0160	0.89	100.0	99.8	3010	32	2586	40	2080	75
	37	0.35	0.2200	0.0044	11.5000	0.4870	0.3777	0.0157	0.89	99.9	99.8	2981	32	2561	40	2065	74
	38	0.38	0.2240	0.0044	12.9000	0.6040	0.4188	0.0192	0.91	99.9	99.6	3009	32	2675	44	2255	87
	39	0.39	0.2250	0.0045	12.4000	0.5520	0.3988	0.0175	0.90	99.9	99.7	3015	32	2632	42	2163	81
	40	0.38	0.2230	0.0044	12.4000	0.5630	0.4038	0.0180	0.90	100.0	99.8	3001	32	2635	43	2186	83
	41	0.41	0.2240	0.0045	11.9000	0.5170	0.3834	0.0164	0.89	99.9	99.5	3012	32	2594	41	2092	76
	42	0.42	0.2260	0.0045	12.5000	0.5650	0.4003	0.0178	0.90	99.9	99.7	3022	32	2639	43	2170	82
	43	0.42	0.2260	0.0045	12.6000	0.5710	0.4034	0.0180	0.90	99.9	99.7	3025	32	2649	43	2185	83
	44	0.41	0.2190	0.0044	12.0000	0.5390	0.3975	0.0175	0.90	99.8	99.2	2975	33	2605	42	2158	81
	45	0.44	0.2280	0.0046	11.9000	0.5120	0.3791	0.0160	0.89	99.8	99.4	3036	32	2596	40	2072	75
	46	0.41	0.2250	0.0045	13.9000	0.6820	0.4464	0.0216	0.92	99.8	99.3	3017	32	2740	47	2379	96
	47	0.40	0.2200	0.0044	12.1000	0.5410	0.4004	0.0175	0.90	99.9	99.6	2978	33	2614	42	2171	81
	48	0.39	0.2230	0.0044	12.2000	0.5450	0.3973	0.0174	0.90	100.0	99.8	3000	32	2620	42	2156	80
	49	0.40	0.2200	0.0045	11.7000	0.5050	0.3853	0.0163	0.89	99.9	99.6	2983	33	2581	40	2101	76
HSGB-06-13@1	1	0.31	0.2090	0.0046	7.3900	0.4650	0.2569	0.0153	0.94	97.0	89.0	2894	36	2159	56	1474	78
	2	0.26	0.2100	0.0043	8.5900	0.5110	0.2966	0.0169	0.94	98.1	93.0	2905	33	2295	54	1674	84
	3	0.21	0.2100	0.0041	10.7000	0.7010	0.3696	0.0237	0.96	98.9	95.6	2905	31	2497	61	2028	111
	4	0.23	0.2130	0.0044	9.8800	0.5470	0.3362	0.0180	0.93	98.8	95.4	2930	33	2424	51	1868	87
	5	0.24	0.2120	0.0045	9.9700	0.5660	0.3405	0.0186	0.93	98.7	95.1	2923	35	2432	52	1889	90
	6	0.25	0.2100	0.0047	9.9800	0.6010	0.3448	0.0200	0.93	98.5	94.2	2906	36	2433	56	1910	96
	7	0.29	0.2080	0.0050	8.2100	0.4420	0.2855	0.0144	0.90	97.8	91.8	2894	39	2254	49	1619	72
	8	0.30	0.2020	0.0050	7.1200	0.3670	0.2552	0.0120	0.88	97.5	90.4	2845	40	2126	46	1465	62
	9	0.29	0.1990	0.0045	6.6100	0.3210	0.2411	0.0109	0.88	98.4	93.8	2816	37	2060	43	1392	57
	10	0.30	0.2000	0.0046	6.1300	0.2870	0.2225	0.0095	0.87	98.1	92.6	2824	38	1995	41	1295	50
	11	0.31	0.1990	0.0045	6.1900	0.2870	0.2255	0.0097	0.88	98.3	93.2	2818	37	2002	41	1311	51
	12	0.31	0.2050	0.0043	6.0100	0.2520	0.2123	0.0083	0.87	98.7	95.0	2869	34	1978	37	1241	44
	13	0.30	0.1990	0.0040	6.2500	0.2720	0.2272	0.0093	0.89	99.0	96.1	2821	33	2011	38	1320	49
	14	0.29	0.2000	0.0040	6.2400	0.2610	0.2264	0.0090	0.88	99.1	96.3	2826	32	2010	37	1316	47
	15	0.30	0.1920	0.0038	5.6600	0.2250	0.2137	0.0080	0.87	99.0	95.8	2761	32	1926	34	1249	42
	16	0.34	0.2170	0.0041	7.1000	0.2800	0.2376	0.0088	0.88	98.5	94.6	2957	30	2124	35	1374	46
	17	0.32	0.2090	0.0038	6.9800	0.2780	0.2424	0.0091	0.89	98.6	94.5	2896	30	2108	35	1399	47
	18	0.31	0.1920	0.0036	5.8100	0.2260	0.2191	0.0080	0.88	98.6	94.4	2763	31	1948	34	1277	42
	19	0.31	0.1840	0.0034	5.1000	0.1870	0.2014	0.0069	0.87	98.9	95.1	2687	30	1837	31	1183	37

SI 3.5: LA-ICP-MS REE depth-profile data for unpolished metasedimentary zircon, HSGB, NW Ontario

sample #	time (s)	depth (μm)		Al 27 (ppm)	P 31* (ppm)	Ti 49 (ppm)	Fe 57 (ppm)	Sr 88 (ppm)	Y 89 (ppm)	Sn 118 (ppm)	La 139 (ppm)	Ce 140 (ppm)	Pr 141 (ppm)	Nd 146 (ppm)	Sm 147 (ppm)	Eu 151 (ppm)	Gd 157 (ppm)	Tb 159 (ppm)	Dy 163 (ppm)	Ho 165 (ppm)	Er 167 (ppm)	Tm 169 (ppm)	Yb 173 (ppm)	Lu 175 (ppm)	Hf 177 (ppm)	Th 232 (ppm)	U 238 (ppm)	Th/U	La_N/Yb_N
HSGB-05-1			Total	730	118	17	50	1	516	0	2	14	1	4	3	1	9	3	44	16	71	16	166	34	9999	94	257	0.37	0.0098
HSGB-05-2	15.2	5.1	Rim	199	184	8	102	1	1167	0	6	22	2	11	6	2	23	8	105	38	167	33	302	55	10858	59	493	0.14	0.0144
			Core	411	206	15	113	2	1873	0	12	51	5	23	14	5	45	15	177	59	239	43	356	58	9319	132	317	0.41	0.0248
HSGB-05-4	20.0	6.7	Rim	2	324	-1	19	0	552	0	0	5	0	0	1	0	6	2	41	17	98	24	248	47	11482	23	223	0.11	0.0000
			Core	2	355	2	11	0	690	0	0	5	0	1	2	1	12	4	57	21	106	25	246	47	10080	38	175	0.21	0.0000
HSGB-05-6			Total	3081	366	106	1563	14	2389	1	23	87	10	48	27	17	66	21	253	80	339	69	642	109	11937	374	959	0.38	0.0255
HSGB-05-7			Total	316	185	50	216	1	1934	0	3	21	1	11	12	3	55	17	193	68	283	58	520	95	6923	265	392	0.73	0.0038
HSGB-05-11			Total	324	224	186	211	3	1442	0	6	28	2	12	8	5	30	10	129	45	205	45	444	87	10845	236	716	0.33	0.0092
HSGB-05-12			Total	501	239	22	80	1	1529	0	7	28	2	9	7	2	30	11	149	52	224	45	394	70	8791	160	324	0.51	0.0120
HSGB-05-13			Total	29	64	6	14	0	143	0	0	3	0	0	0	0	2	1	9	4	23	6	78	17	9844	43	187	0.23	0.0003
HSGB-05-14	20.4	6.8	Rim	67	505	6	192	3	1199	0	3	10	1	4	3	2	16	6	89	37	187	51	545	110	13458	119	1081	0.11	0.0034
			Core	161	586	16	430	11	1656	0	9	24	2	12	7	5	31	11	149	51	251	61	635	128	16224	146	1252	0.12	0.0098
HSGB-05-16	14.8	4.9	Rim	96	113	5	66	1	1317	0	8	26	2	12	6	2	25	9	121	43	164	31	274	52	11489	108	405	0.27	0.0202
			Core	48	235	3	34	1	1881	0	3	21	1	6	7	2	40	13	170	63	275	59	532	98	9099	243	445	0.55	0.0038
HSGB-05-18			Total	396	269	18	81	3	2272	0	11	37	3	16	12	3	49	16	209	75	310	62	566	102	8841	225	563	0.39	0.0135
HSGB-05-19			Total	398	448	24	131	4	1770	0	7	32	2	10	8	2	31	11	153	58	251	53	492	92	10629	231	544	0.42	0.0096
HSGB-06-1	9.6	3.2	Rim	86	189	4	141	1	596	0	2	16	2	10	9	3	22	5	53	17	79	20	209	44	10599	91	637	0.15	0.0076
			Core	33	438	4	18	0	1069	0	0	10	1	4	7	2	25	7	89	32	154	37	379	83	8032	171	549	0.31	0.0008
HSGB-06-5	10.8	3.6	Rim	216	159	9	33	3	988	0	14	47	5	27	14	4	34	10	104	33	139	31	290	50	9443	93	394	0.23	0.0357
			Core	1034	378	14	132	3	1599	0	9	42	4	25	14	5	45	12	148	50	233	53	503	93	9518	229	618	0.37	0.0124
HSGB-06-6	14.0	4.7	Rim	1678	1158	87	485	52	3431	4	116	332	41	190	91	61	192	48	457	122	455	97	844	146	9779	706	1437	0.47	0.0985
			Core	1985	927	43	325	12	2512	0	82	244	23	96	45	13	106	28	290	85	354	72	621	119	8593	600	755	0.80	0.0947
HSGB-06-7			Total	3608	840	119	700	50	3427	3	1147	2097	215	809	134	45	179	38	388	111	469	99	877	157	7821	801	1509	0.52	0.9380
HSGB-06-8	7.6	2.5	Rim	2971	392	30	354	28	2237	1	68	180	25	113	62	23	118	29	287	79	295	65	563	96	10700	133	911	0.15	0.0873
			Core	2035	1336	71	535	68	3664	5	312	629	66	263	92	72	172	42	421	117	493	103	889	158	10386	421	1491	0.26	0.2513
HSGB-06-10	6.8	2.3	Rim	887	324	44	188	12	1868	0	351	720	77	303	82	30	120	27	228	61	226	49	478	94	11236	94	720	0.12	0.5270
			Core	732	667	40	305	28	2535	1	148	381	40	165	52	32	94	25	254	81	359	80	768	151	8755	772	1239	0.62	0.1382
HSGB-06-13	10.0	3.3	Rim	976	585	310	367	22	2078	0	423	751	80	308	65	21	103	22	221	64	282	61	598	114	12877	242	1343	0.17	0.5072
			Core	595	865	17	420	11	2421	1	20	74	6	29	14	13	45	15	206	77	380	89	855	167	9845	796	1681	0.48	0.0166
HSGB-06-14	22.7	7.6	Rim	20	283	5	8	0	1841	0	1	23	1	9	12	3	49	15	180	65	285	59	521	94	8218	224	267	0.84	0.0015
			Core	25	411	15	7	214	1591	0	1176	2540	280	994	107	11	77	14	160	54	241	51	465	91	7055	158	214	0.73	1.8138
HSGB-06-14A			Total	814	150	19	96	1	408	0	9	26	2	7	3	1	9	3	36	13	66	15	149	28	8890	46	115	0.41	0.0425
HSGB-06-15			Total	662	321	29	245	3	1619	0	8	47	6	31	22	10	55	16	166	54	236	50	460	86	10582	234	778	0.30	0.0131
HSGB-07-1			Total	7	88	4	11	0	172	0	0	6	0	1	1	0	3	1	14	5	27	7	77	18	8648	83	256	0.32	0.0035
HSGB-07-3			Total	336	155	10	175	0	344	0	1	9	1	3	2	1	6	2	26	10	51	13	138	30	8475	54	143	0.38	0.0077
HSGB-07-7			Total	2419	820	40	730	10	3063	0	40	112	13	64	33	31	101	27	304	97	394	80	680	119	9158	453	735	0.60	0.0426
HSGB-07-9			Total	2339	1040	26	181	3	3054	0	30	90	9	46	44	16	156	39	370	99	377	71	621	111	8286	303	647	0.46	0.0343
HSGB-07-10	14.4	4.8	Rim	2463	170	36	412	10	1335	0	25	74	9	42	20	15	52	15	147	44	173	34	313	60	10565	223	781	0.26	0.0576
			Core	215	160	9	98	2	542	0	4	19	2	8	5	4	15	4	48	16	78	18	189	43	10024	292	1058	0.28	0.0169
HSGB-07-12			Total	5290	8786	199	1942	129	18141	14	663	1311	138	595	325	384	1091	260	2396	599	2040	367	2920	435	9689	936	3388	0.28	0.1628
HSGB-07-13	25.9	8.6	Rim	52	215	5	131	0	674	0	1	13	1	4	2	1	10	4	50	19	104	27	282	64	11011	87	621	0.14	0.0033
			Core	4026	323	12	840	1	1267	0	7	27	3	15	8	3	31	9	115	40	188	41	386	78	6900	137	409	0.34	0.0127
HSGB-07-15			Total	48	152	4	1685	1	469	0	18	43	4	16	5	2	10	3	42	15	70	16	167	37	9629	37	120	0.31	0.0775
HSGB-10-2			Total	1519	228	23	761	2	2253	0	7	31	3	18	15	5	59	18	229	75	319	63	549	99	7578	266	585	0.45	0.0088
HSGB-10-3			Total	6715	118	148	2135	4	569	0	50	91	9	41	11	3	19	5	53	17	74	16	156	31	7776	79	222	0.36	0.2311
HSGB-10-4	14.4	4.8	Rim	60	150	1	55	0	550	0	1	11	0	2	2	1	8	3	37	16	85	25	287	61	11007	121	721	0.17	0.0017
			Core	409	193	12	39	1	679	0	3	19	1	7	4	2	14	4	54	21	98	23	224	47	8308	97	331	0.29	0.0088
HSGB-10-5			Total	10269	378	20	614	11	794	0	15	41	2	10	4	3	14	5	66	24	117	27	265	50	4559	230	323	0.62	0.0402
HSGB-10-5a	20.0	6.7	Rim	2182	798	14	1232	4	2110	0	7	73	4	21	12	9	49	14	184	66	309	72	654	121	8831	681	769	0.84	0.0079
			Core	4323	811	75	2425	1	756	0	67	108	9	33	7	3	17	5	63	23	104	24	237	44	5594	182	279	0.60	0.2014
HSGB-10-7			Total	263	376	11	184	15	1533	1	7	41	3	18	12	10	30	9	120	45	223	53	522	106	9492	291	830	0.37	0.0091
HSGB-10-9			Total	9	161	6	7	0	338	0	0	5	0	1	1	0	4	2	23	10	55	13	138	29	8881	59	250	0.23	0.0011
HSGB-10-13	22.7	7.6	Rim	3	255	2	16	0	716	0	0	16	0	1	1	0	10	3	51	21	108	29	293	58	10048	160	344	0.48	0.0001
			Core	234	249	9	31	0	563	1	3	19	1	3	2	1	8	3	41	17	84	21	192	41	9131	112	219	0.52	0.0104
HSGB-10-14			Total	74	149	2	11	0	405	0	1	13	0	1	1	1	5	2	27	11	59	16	163	36	10435	103	262	0.40	0.0030
HSGB-10-16	12.8	4.3	Rim	864	137	3	396	1	469	0	3	15	1	7	3	2	9	3	39	13	69	16	186	35	10004	62	214	0.29	0.0117
			Core	1811	334	14	432	2	1664	0	4	28	2	11	8	4	37	12	148	53	245	54	498	97	8243	242	495	0.47	0.0061
HSGB-10-18	10.0	3.3	Rim	71	128	5	30	1	756	0	2	14	1	6	4	2	15	5	60	24	119	28	282	52	10501	91	279	0.33	0.0051
			Core	11	368	3	39	0	2127	0	0	11	0	4	8	2	47	15	196	72	326	69	602	118	7560	234	402	0.57	0.0003
HSGB-10-19			Total	1	167	4	9	0	385	0	0	12	0	0	1	0	5	2	27	11	59	17	161	36	9917	108	313	0.34	0.0000

sample #	time (s)	depth (μm)		Al 27 (ppm)	P 31* (ppm)	Ti 49 (ppm)	Fe 57 (ppm)	Sr 88 (ppm)	Y 89 (ppm)	Sn 118 (ppm)	La 139 (ppm)	Ce 140 (ppm)	Pr 141 (ppm)	Nd 146 (ppm)	Sm 147 (ppm)	Eu 151 (ppm)	Gd 157 (ppm)	Tb 159 (ppm)	Dy 163 (ppm)	Ho 165 (ppm)	Er 167 (ppm)	Tm 169 (ppm)	Yb 173 (ppm)	Lu 175 (ppm)	Hf 177 (ppm)	Th 232 (ppm)	U 238 (ppm)	Th/U	La_N/Yb_N
HSGB-10-20			Total	45	359	7	29	1	1977	0	3	19	1	6	9	2	41	14	175	64	301	64	577	110	7752	255	519	0.49	0.0039
HSGB-10-23	17.6	5.9	Rim	680	237	12	169	4	995	0	5	28	3	14	10	9	28	8	95	32	132	26	237	47	10556	83	468	0.20	0.0146
			Core	55	697	10	262	1	1023	1	1	13	1	4	4	4	14	5	77	31	160	41	405	85	10376	170	1034	0.16	0.0018
HSGB-12-01			Total	409	199	14	128	0	895	0	8	22	3	20	11	3	31	8	89	30	129	27	233	46	7355	75	187	0.42	0.0240
HSGB-12-06	11.2	3.7	Rim	1157	219	40	567	14	1186	0	41	142	23	145	49	36	77	13	118	36	141	31	289	57	11821	84	450	0.19	0.1025
			Core	2235	285	37	883	14	1786	0	50	180	29	178	67	45	123	22	193	53	188	35	285	57	10271	162	413	0.40	0.1269
HSGB-12-09			Total	1000	354	27	153	7	1452	1	5	50	3	24	13	9	37	10	116	43	209	48	475	97	11190	473	805	0.60	0.0079
HSGB-12-10	11.2	3.7	Rim	3964	276	25	960	18	1354	1	26	95	16	97	34	49	64	13	133	44	193	43	434	82	9480	106	869	0.12	0.0432
			Core	2434	1179	179	1058	41	3362	8	107	373	61	356	128	282	209	34	304	98	474	110	1072	201	9863	498	2089	0.24	0.0715
HSGB-12-13			Total	99	164	7	58	1	595	0	3	18	2	12	6	3	16	4	44	17	94	22	235	50	8647	101	336	0.30	0.0098
HSGB-12-14			Total	469	141	29	150	2	443	0	3	14	2	10	5	2	10	2	31	12	69	18	202	46	9995	60	387	0.19	0.0102
HSGB-12-15			Total	618	115	669	217	1	675	0	10	48	7	45	21	9	41	8	76	21	79	16	160	33	9377	120	321	0.37	0.0456
HSGB-12-17	6.8	2.3	Rim	6	118	4	43	0	302	0	0	6	0	1	1	0	4	1	19	8	53	14	194	46	11495	127	651	0.20	0.0007
			Core	2	121	2	15	0	453	0	0	7	0	2	2	1	9	3	33	13	71	19	212	49	8584	189	451	0.43	0.0001
HSGB-05-1			Total	730	118	17	50	1	516	0	2	14	1	4	3	1	9	3	44	16	71	16	166	34	9999	94	257	0.37	0.0098
HSGB-05-2	15.2	5.1	Rim	199	184	8	102	1	1167	0	6	22	2	11	6	2	23	8	105	38	167	33	302	55	10858	59	493	0.14	0.0144
			Core	411	206	15	113	2	1873	0	12	51	5	23	14	5	45	15	177	59	239	43	356	58	9319	132	317	0.41	0.0248
HSGB-05-4	20.0	6.7	Rim	2	324	-1	19	0	552	0	0	5	0	0	1	0	6	2	41	17	98	24	248	47	11482	23	223	0.11	0.0000
			Core	2	355	2	11	0	690	0	0	5	0	1	2	1	12	4	57	21	106	25	246	47	10080	38	175	0.21	0.0000
HSGB-05-6			Total	3081	366	106	1563	14	2389	1	23	87	10	48	27	17	66	21	253	80	339	69	642	109	11937	374	959	0.38	0.0255
HSGB-05-7			Total	316	185	50	216	1	1934	0	3	21	1	11	12	3	55	17	193	68	283	58	520	95	6923	265	392	0.73	0.0038
HSGB-05-11			Total	324	224	186	211	3	1442	0	6	28	2	12	8	5	30	10	129	45	205	45	444	87	10845	236	716	0.33	0.0092
HSGB-05-12			Total	501	239	22	80	1	1529	0	7	28	2	9	7	2	30	11	149	52	224	45	394	70	8791	160	324	0.51	0.0120
HSGB-05-13			Total	29	64	6	14	0	143	0	0	3	0	0	0	0	2	1	9	4	23	6	78	17	9844	43	187	0.23	0.0003
HSGB-05-14	20.4	6.8	Rim	67	505	6	192	3	1199	0	3	10	1	4	3	2	16	6	89	37	187	51	545	110	13458	119	1081	0.11	0.0034
			Core	161	586	16	430	11	1656	0	9	24	2	12	7	5	31	11	149	51	251	61	635	128	16224	146	1252	0.12	0.0098
HSGB-05-16	14.8	4.9	Rim	96	113	5	66	1	1317	0	8	26	2	12	6	2	25	9	121	43	164	31	274	52	11489	108	405	0.27	0.0202
			Core	48	235	3	34	1	1881	0	3	21	1	6	7	2	40	13	170	63	275	59	532	98	9099	243	445	0.55	0.0038
HSGB-05-18			Total	396	269	18	81	3	2272	0	11	37	3	16	12	3	49	16	209	75	310	62	566	102	8841	225	563	0.39	0.0135
HSGB-05-19			Total	398	448	24	131	4	1770	0	7	32	2	10	8	2	31	11	153	58	251	53	492	92	10629	231	544	0.42	0.0096

*P31 is of low concentration in the referenace material used.

Supplementary Information – Chapter 4

Insights into low- to moderate-temperature recrystallization of zircon: unpolished crystal depth profile techniques and geochemical mapping

C.J. Kelly[1], D.A. Schneider[1], S.E. Jackson[2], T.Kalbfleisch[1], C.R. Macfarlane[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON, K1N 6N5 Canada
[2]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada
[3]Department of Earth Sciences, University of New Brunswick, Fredericton, NB, E3B 5A3 Canada

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SI 4.1: Sample description and *in situ* U-Pb geochronology results

Throughout detailed petrography and microstructural analysis, special attention was given to those rocks bearing quartz affected by dynamic recrystallization or dissolution-precipitation creep, an abundance of fabric-forming minerals and/or amphibolite facies index minerals, occurring within or in proximity to zones of high strain. Samples were carefully selected for *in situ* geochronological analyses to assess potential success of SIMS U-Pb depth profiling in the North Caribou greenstone belt and determine the necessary mineralogical and geochemical characteristics required for additional targets.

All zircons from tectonites in our study are small (25-100 μm), most often in a matrix of quartz, feldspars, and phyllosilicates, and have rounded surfaces and smooth rounded embayments. The oscillatory zoning is truncated by fractured and embayed margins of zircon and a weak patchy structure overprints commonly oscillatory zoning (Figure 4.3). No well-shaped outgrowths of zircon are observed. Elongate cavities are oriented parallel to zoning and radial and concentric features; some zircons possess cavities in the center of their crystal. Many of the zircon are fractured, broken and slightly disaggregated along foliation planes. Internal fractures are radial or perpendicular to foliation planes, indicating they witnessed deformation and dissolution (Wayne and Sinha, 1992; Dempster *et al.*, 2008; Hay and Dempster, 2009). Sector-zoned zircons are few but present, and though some crystals appear to have a thin rim or overgrowth, the small size of the zircons make it nearly impossible to resolve different domains with the lateral dimensions of the laser spot. We therefore need to be mindful of the potential of age domain mixing, which may explain the occasional multiplicity of closely spaced discordia lines, from which it is hard to determine a single robust age.

NCB11-33 Crd schist (resampled as East Eyap; 657319 m E, 586742 m N, zone 15)

This sample of cordierite schist is situated in the contact metamorphic aureole at the southern border of the western arm with the North Caribou Lake batholith. Both granitic and aplitic mafic dikes cut through the metasedimentary rocks in the outcrop and mm- to cm-scale cordierite nodules resist weathering in proximal surfaces of the host rock. Retrograde chlorite alteration is concentrated in pseudomorphs of the fabric-elongate (2-3 mm x 5 mm) cordierite poikiloblasts. The matrix is fine-grained and foliated through weak alignment of fibrous chlorite and blocky biotite in planes that anastomose through variably recrystallized quartz grains and ribbons, as well as around the occasional albite poikiloblast.

Zircons in a sample of the schist are mostly asymmetrical and subhedral, although a euhedral prismatic variety is present dominantly in the coarser-size fraction (~45-80 μm). Oscillatory zoning is prevalent (e.g. Figure 4.3C), but sometimes patchy or faint, and sector zoning is also present to a much lesser extent (e.g. Figure 4.3F). It is the only sample for which two distinct age populations are clearly discernible. A young discordia trend defined by 20 single spot analyses on 17 zircons yields an upper intercept age of 2865 ± 15 Ma (MSWD: 3.6) and an older discordia trend defined by 17 single spot analyses on 16 zircons yields an upper intercept age, with a few discrete single ages clustering on Concordia at 2955 ± 17 Ma (MSWD: 4.8, Figure 4.9A). The oldest single age (2989 Ma) does not plot on the older discord.

NCTK10-44A And-St schist (resampled as Akow; 670289 m E, 5850342 m N, zone 15)

This sample is an andalusite-staurolite schist is located within a 40 km long deformation zone. On the outcrop scale, porphyroblastic staurolite and andalusite are localized in tightly folded bands that crosscut bedding and/or axial-planar foliation. Andalusite is poikiloblastic,

containing many small inclusions of quartz, and locally books of biotite and euhedral staurolite. Biotite is the dominant phyllosilicate in this sample, followed by white mica and both define the foliation that for the most part wraps around poikiloblasts. Chlorite is very minor and slightly replacing biotite in the foliation and rare fibrolite wraps around euhedral matrix-bound staurolite poikiloblasts.

Zircons in the schist are dominantly euhedral and oscillatory-zoned, and where the c-axis is not perpendicular to the direction of principal strain, the grains are often fractured and slightly extended along the plane of foliation. Geochronologic analysis yields 38 single ages for 36 zircons. The three oldest single ages (2957-2986 Ma) define a discord but are not abundant enough to draw a meaningful age. An upper intercept age of 2866 ± 14 Ma (MSWD: 3.0) results from the remaining spot analyses (Figure 4.8B).

NCTK10-8 Bt schist (689866 m E, 5820991 m N, zone 15)

A sample of biotite schist situated within the projected termination a large deformation zone near its contact with the surrounding granitoids was sampled, and is thought to be of sedimentary origin based on unpublished geochemistry of a similar sample <100 m away (pers. comm. A. Van Lankvelt, 2013). Foliated intensely, this sample is marked by a crenulation that dissipates in surrounding samples marked by increased levels of strain.

Most of the zircons contained in the schist are euhedral prismatic, oscillatory zoning is common, and small cores are observed in some grains (Figure 4.3B, E). Similar to the zircons in sample NCTK10-44A, the c-axis is often in the plane of the fabric and roughly perpendicular to a lineation defined by preferential orientation of the blocky biotite in this sample. Six single spot analyses yield a Concordia age of 2876 ± 12 Ma (MSWD: 5.7, Figure 4.8B). Ten of the youngest

single ages (2614-2808, 2836, and 2844 Ma) are >12% discordant, do not fall on the dominant discord, and do not define a separate discord.

NCTK10-24 Bt gneiss (694245 m E, 5824386 m N, zone 15)

A biotite-tonalite gneiss with banding observed from the thin section scale to the outcrop-scale through segregation of biotite-rich from biotite-poor fabrics. Where biotite is abundant, microlithons of quartz and sericite-altered plagioclase are finer-grained and segregated by discontinuous foliation planes.

Zircons in the gneiss are mostly subhedral and often display weak oscillatory zoning. Though commonly in contact with biotite, a preferred orientation is less evident in this least deformed of all samples analyzed for *in situ* U-Pb geochronology. Eleven single spot analyses on ten zircons yield ages that are >30% discordant (2647-2798 and 2891-2902 Ma) and do not plot along a discord. Nineteen single spot analyses on 17 zircons are up to 30% discordant and define a discordia trend that intercepts Concordia at 2877 ± 22 Ma with an MSWD of 11.4 (Figure 4.8D).

NCTK10-76 Mica schist (7028014 m E, 5821125 m N, zone 15)

This sample is a two-mica schist marked by anastomosing foliation planes defined by sinuous bundles of white mica, biotite, and chlorite, as well as more blocky micas, quartz and sericite-altered plagioclase are segregated into fairly evenly spaced finer-grained microlithons and less commonly coarser-grained quartz ribbons throughout.

The schist contains subhedral to slightly rounded prismatic zircons that tend to align with foliation planes and are most often associated with fabric forming biotite, muscovite, and

chlorite, and not in the microlithons of dynamically recrystallized quartz. Whereas the zircons are most commonly oscillatory zoned, some also display a patchy sector zoning (Figure 4.3G) and others a small distinct core. Thirty single spot analyses on 26 zircons define a discordia trend with an upper intercept age of 2862 ± 12 Ma (MSWD: 3.5; Figure 4.8E). The six youngest (1694-2782 Ma) and three oldest (2904-2916 Ma) single ages do not plot on the dominant discordia trend and fail to define a significant discord of their own.

NCTK10-63 Mylonitic trondhjemite (657319 m E, 5867427 m N, zone 15)

A sample of proto-mylonitic trondhjemite is banded through strain-induced segregation of mm-scale layers of biotite and mafic minerals from plagioclase-rich microlithons. Biotite is locally replaced by chlorite and aligned with hornblende and orthopyroxene in an anastomosing foliation that locally wraps around heavily altered poikiloblastic potassium feldspar and forms augen-shaped pods of alteration.

The rock contains zircons in predominantly plagioclase-rich matrix with a locally observed orientation parallel to the biotite- and mafic-mineral rich foliation. A common feature of these zircons is a weakly zoned core with a distinctly more strongly zoned and complex rim (Figure 4.3H) and whereas a few grains are euhedral prismatic, most are subhedral with slightly rounded edges. Geochronologic analysis of 29 single spots on 24 zircons yields a discord with an upper intercept age of 2867 ± 28 Ma (MSWD: 2.8, Figure 4.8F). In most cases, where the rim was large enough to ablate separately, single spot analysis of the rim yields a 40 to 150 m.y. older age than single spot analysis of the core. Analyses can yield an apparent older age when there is an abundance of common Pb. Only one analyzed core-rim pair yields a rim that is younger than the core, by about 50 m.y. (Table A4.2). Seven of the youngest single spot ages (2529-2686 and

2758 Ma) and five of the oldest single spot ages (2859, 2861, and 2903-2946 Ma) do not plot on the dominant discord and do not define consistent discordia trends.

SI 4.2: Sample description and SIMS U-Pb and LA-ICP-MS REE depth-profiling results

NCGB12-10 Cordierite bearing biotite schist (NAD 83, Zone 15, 627540E, 5872755N)

A cordierite-bearing biotite schist was collected from the northeastern shore of Miskeesik Lake located near the north-western limit of the NCGB. Porphyroblasts of cordierite (~0.5 cm) are distributed throughout the sample with no preferred orientation. Transmitted light microscopy revealed that zircons are located throughout the sample along the micaceous mineral bands defining the foliation. A total of 27 zircon grains were picked and mounted. SEM analyses revealed that morphology ranges from prismatic to rounded with the outer surface of zircon characterized as smooth to abraded.

Of the 35 SIMS U-Pb depth profile analyses completed on 27 grains, ten analyses exhibit rim material with distinct U-Pb ages. These rims range in thickness from 0.3 μm to 1.1 μm with an average thickness of 0.5 μm. The $^{207}Pb/^{206}Pb$ ages of individual rims range from *ca.* 2806 Ma to 2702 Ma and the weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2750 ± 11 Ma (MSWD: 3.0; n: 50; Figure 4.9A). A total of eight replicate analyses were completed using the SIMS technique on different locations on grains. Comparing the data from these analyses, rims varied in thickness (up to 0.5 μm), age and in some cases, occurrence. Th/U values in the rims range from 0.01–0.45, with an average value of 0.1 for the entire sample. Interior $^{207}Pb/^{206}Pb$ ages, as calculated from the depth profile results, range from *ca.* 3000 Ma to 2850 Ma. After polishing the mount, SEM analyses revealed faint oscillatory zoning in most grains. SIMS geochronology on the polished zircon reveals that $^{207}Pb/^{206}Pb$ ages in this sample range from *ca.*

2990 Ma to 2840 Ma, with the majority of ages at *ca.* 2960 Ma. The Th/U values for the cores range from 0.06–1.07 with an average value of 0.53.

NCGB12-13 Andalusite Schist (NAD 83, Zone 15, 627909E, 5868746N)

An andalusite schist was collected from the western end of Eyapimikima Lake located within a mapped high temperature assemblage (cordierite zone; Breaks *et al.* 2001) above a magnetic high. Foliation is defined by biotite, whereas andalusite is stretched parallel to it. Transmitted light microscopy revealed that zircons are not abundant in this sample, however can be found throughout the rock, within the foliation (adjacent to biotite) as well as within the clastic (quartz/feldspar) fraction. A total of seven zircon grains was sampled and mounted for analysis. SEM analyses revealed that morphologies range from prismatic to rounded with outer surfaces being smooth to abraded.

Of the five SIMS U-Pb depth profile analyses conducted on this sample, no analyses exhibit younger rim material. The U-Pb depth profile suggests interior $^{207}Pb/^{206}Pb$ ages for this sample are all *ca.* 2950 Ma. After polishing the mount, U-Pb geochronology on three grains resulted in two discordant ages (>15% discordance) and a single concordant $^{207}Pb/^{206}Pb$ age of *ca.* 2992 Ma with a Th/U value of 0.61.

NCGB12-14 Cordierite schist (NAD 83, Zone 15, 626394E, 5869259N)

A cordierite schist was collected from the western end of Eyapimikima Lake located within a mapped high temperature assemblage (cordierite zone; Breaks *et al.* 2001) above a magnetic high. This sample was characterized by a weak foliation defined by biotite which wraps around the cordierite. Transmitted light microscopy revealed that zircons were located throughout the

sample. A total of 38 zircon grains were sampled and SEM analyses revealed that zircon are prismatic in shape and the surface texture ranges from smooth to abraded.

Of the eighteen SIMS U-Pb depth profile analyses conducted from this sample, no analyses exhibit younger rim material. The U-Pb depth profile suggests interior $^{207}Pb/^{206}Pb$ ages for this sample are all *ca.* 2950 Ma. Polishing the zircon reveals oscillatory zoning and core $^{207}Pb/^{206}Pb$ ages between *ca.* 2990–2950 Ma. The Th/U for the interior ranges from 0.1–0.66 with an average value of 0.24.

NCGB12-15 Cordierite schist (NAD 83, Zone 15, 627540E, 5869191N)

A schist, with relicts of either cordierite or andalusite, was collected from the western end of Eyapimikima Lake located within a mapped high temperature assemblage (cordierite zone; Breaks *et al.* 2001) above a magnetic high. Transmitted light microscopy revealed zircons throughout the sample, present in the weak foliation defined by biotite and the stretching of relicts as well as within the clastic (quartz/feldspar) fraction. A total of ten zircon grains were selected and mounted. SEM analyses revealed morphologies ranging from prismatic to subrounded and rounded with surface textures varying from smooth to abraded.

A total of six U-Pb depth profile analyses were completed on four grains with none yielding evidence of an age rim. The interior $^{207}Pb/^{206}Pb$ ages of this sample as calculated through the depth profile technique are between 2850–3000 Ma. Polishing the zircon revealed faint oscillatory zoning and core $^{207}Pb/^{206}Pb$ ages between 3015–2970 Ma. The Th/U values for the interior range from 0.5–0.6.

NCGB13-01 Garnet schist (NAD 83, Zone 15, 648708E, 5871865N)

A garnet schist was collected from a 1 km^2 sliver of metasediments located east of McGruer Lake. This sample was selected based on the garnet-bearing metamorphic assemblages identified by Breaks *et al.* (2001). The rocks were characterized by an east-west foliation parallel to the interbedding of mafic volcanics and sediments. Transmitted light microscopy revealed that zircon are located along foliation within and surrounded by the mi*ca.* A total of twelve zircons were sampled and mounted. SEM analyses revealed that morphologies range from prismatic to sub-rounded with surface texture ranges from smooth to abraded.

A total of fourteen U-Pb depth profile analyses were completed on eleven grains with five grains exhibiting age rim material. These rims range in thickness from 0.3 μm to 2.8 μm with an average thickness of 1 μm. The $^{207}Pb/^{206}Pb$ ages of individual rims range from *ca.* 2770 Ma to 2731 Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2754 ± 16 Ma (MSWD: 0.66; n: 50; Figure 4.9B). Duplicate analyses on three grains revealed that rim thickness can vary by 0.5 μm on a single grain in this sample. The Th/U values in the rim ranges from 0.05–0.64 with an average value of 0.28. Interior $^{207}Pb/^{206}Pb$ ages, as calculated from the depth profile technique, range from *ca.* 3000 Ma to 2850 Ma. The core $^{207}Pb/^{206}Pb$ ages (collected after polishing) from six zircons in this sample range from *ca.* 2836 Ma to 2806 Ma with the majority of ages at *ca.* 2,830 Ma. Th/U values range from 0.51–0.58 with an average of 0.55.

East Eyap Cordierite schist (NAD 83, Zone 15, 657715E, 5868570N)

A cordierite schist was collected from the eastern shore of Eyapimikima Lake. This sample was chosen based on the high temperature assemblages (cordierite facies) identified by Breaks *et al.* (2001). The schist is characterized by a weak north-south foliation defined by biotite and weakly elongated cordierite porphyroblasts. Transmitted light microscopy revealed that zircons

are located along foliation. A total of nineteen zircons were sampled and mounted. SEM analyses revealed that morphologies range from prismatic to sub-rounded with surface texture ranges from smooth to abraded.

A total of twenty U-Pb depth profile analyses were completed on fifteen grains with seven grains displaying younger rim material. These rims range in thickness from 0.2 μm to 0.9 μm with an average thickness of 0.5 μm. Ages of individual rims range from *ca.* 2832 Ma to 2662 Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2703 ± 17 Ma (MSWD: 13; n: 33; Figure 4.9C). A probability density plot of the results reveals that there are in fact at least two $^{207}Pb/^{206}Pb$ rim populations present (Figure 4.9). The two weighted average $^{207}Pb/^{206}Pb$ rim ages present in this sample are 2749 ± 15 Ma (MSWD: 4.6; n: 22) and 2667 ± 6 Ma (MSWD: 0.95; n: 11). Th/U in the rims ranges from 0.07–0.27 (average: 0.14) and 0.05–0.14 (average: 0.08), respectively. Duplicate analyses on five grains reveal that rim thickness can vary by 0.4 μm on a single grain in this sample. Interior $^{207}Pb/^{206}Pb$ ages, as calculated from the depth profile technique, range from *ca.* 3000 Ma to 2850 Ma whereas core ages collected after polishing for six zircon in this sample range from *ca.* 3045 Ma to 2871 Ma with the majority of ages at *ca.* 2960 Ma. The Th/U values ranged from 0.16–0.60 with an average of 0.35.

Akow Andalusite bearing siliminite-staurolite schist (NAD 83, zone 15, 670288E, 5850306N)

An andalusite bearing sillimanite-staurolite schist was collected from the western shores of Akow Lake located at a high temperature assemblage as mapped by Breaks *et al.* (2001). This sample is characterized by a pervasive foliation defined by micaceous minerals as well as aligned porphyroblasts. Transmitted light microscopy revealed that zircons are located along foliation planes. A total of 33 zircons were sampled and mounted. SEM analyses revealed that

morphologies range from prismatic to sub-rounded and rounded with surface texture ranges from smooth to abraded.

A total of 27 U-Pb depth profile analyses were completed on 25 grains with eight grains displaying younger rim material. These rims range in thickness from 0.2 μm to 0.9 μm with an average thickness of 0.5 μm. Ages of individual rims range from *ca.* 2828 Ma to 2709 Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2761 ± 13 Ma (MSWD: 1.6; n: 83; Figure 4.9D), whereas interiors as calculated from the depth profile technique range from *ca.* 3,000 Ma to 2850 Ma. The Th/U values in the rim ranged from 0.11–0.42 with an average value of 0.21. Duplicate analyses on two grains revealed that rim thickness can vary by 0.7 μm for a single grain in this sample. The zircon core ages collected after polishing this sample range from *ca.* 3000 Ma to 2850 Ma with the majority of ages at *ca.* 2850 Ma. Th/U values range from 0.07–0.29 with an average of 0.17.

NCGB13-9B Meta-feldspathic aranite (NAD 83, Zone 15, 688250E, 5825109N)

A meta-feldspathic arenite was collected two km from the shore of the Pipestone River, in sedimentary rocks adjacent to felsic volcanics. This sample is characterized by relict sedimentary bedding on the cm-scale. Zircons were located throughout this sample. A total of 25 zircon grains were picked and mounted and SEM analyses revealed that morphology ranges from prismatic to sub-rounded and rounded with the outer surface of zircon characterized as smooth to abraded.

A total of twenty U-Pb depth profile analyses were completed on seventeen grains with nine grains displaying younger rim material. These rims ranged in thickness from 0.3 μm to 3.3 μm with an average thickness of 1.7 μm. Ages of individual rims range from *ca.* 2785 Ma to 2626

Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2720 ± 9 Ma (MSWD: 1.9; n: 154; Figure 4.9E), whereas interiors as calculated from the depth profile technique range from *ca.* 2950 Ma to 2850 Ma. The Th/U values in the rim ranges from 0.16–1.22 with an average value of 0.5. Replicate analyses on three grains revealed that rim thickness can vary by 1.7 μm for a single grain in this sample. The core ages collected after polishing the fourteen zircon in this sample range from *ca.* 2942 Ma to 2800 Ma with the majority of ages at *ca.* 2860 Ma. The Th/U values range from 0.33–0.96 with an average of 0.55. As revealed by SEM analysis, despite being polished, several of the fourteen grains did not have clearly exposed cores.

NCGB13-7 Meta-feldspathic aranite (NAD 83, Zone 15, 689548E, 5825474N)

A meta-feldspathic arenite was collected close to the shores of the Pipestone River proximal to a gabbroic intrusion. This sample is characterized by relict sedimentary bedding on the cm-scale. Zircons were found throughout the sample and a total of 21 zircon grains were selected and mounted. SEM analyses revealed that morphology ranged from prismatic to sub-rounded with surface texture ranging from smooth to abraded.

A total of fourteen U-Pb depth profile analyses were completed on thirteen grains with three grains exhibiting younger rim material. These rims ranged in thickness from 0.3 μm to 2.5 μm with an average thickness of 1.2 μm. Ages of individual rims range from *ca.* 2820 Ma to 2785 Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2788 ± 12 Ma (MSDW: 0.86; n: 35; Figure 4.9F), with Th/U ranging from 0.11–1.85 with an average value of 0.31. Interiors as calculated from the depth profile technique range from *ca.* 2880 Ma to 2830 Ma. The core ages collected after polishing ranged from *ca.* 2870 Ma to 2825 Ma with the majority of ages at *ca.* 2860 Ma. The Th/U values ranged from 0.20–0.52 with an average of 0.40.

NCGB13-7B Meta-clast supported polymictic conglomerate (NAD 83, Zone 15, 689548E, 5825474N)

A meta-clast-supported polymictic conglomerate was collected from adjacent to NCGB13-7 proximal to the Pipestone River. This sample is characterized by heterolithic clasts of variable size. Zircons are located throughout the sample, with particular abundance within the matrix. A total of 22 zircon grains were selected and mounted. SEM analyses revealed that morphology ranged from prismatic to sub-rounded. The outer surface morphology of the zircon is variable from smooth to abraded.

A total of fourteen U-Pb depth profile analyses were completed on thirteen grains with two grains exhibiting younger rim material. These rims ranged in thickness from 0.1 μm to 0.3 μm with an average thickness of 0.2 μm. Ages of individual rims range from *ca.* 2784 Ma to 2689 Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2735 ± 8 Ma (MSWD: 0.78; n: 4; Figure 4.9G), with Th/U ranging from 0.5–1.37 and an average value of 0.85. Interior ages as calculated from the depth profile technique, suggest $^{207}Pb/^{206}Pb$ ages of *ca.* 2860 Ma. A single duplicate analysis revealed no change in rim thickness. The core ages collected after polishing, ranged from *ca.* 2967 Ma to 2800 Ma with the majority of ages at *ca.* 2860 Ma. The Th/U values range from 0.17–0.49 with an average of 0.33.

NCGB13-5B Meta-feldspathic arenite (NAD 83, Zone 16, 300330E, 5820880N)

A meta-feldspathic arenite was collected proximal to Luraas Lake and crosscut by a m-scale granitic intrusion. This sample is characterized by cm-scale relict sedimentary bedding structures and zircon was found throughout this sample. A total of 32 zircon were picked and mounted and

SEM analysis revealed that morphologies vary from prismatic to sub-rounded with outer surface textures ranging from smooth to abraded.

A total of seventeen U-Pb depth profile analyses were completed on seventeen grains with three grains displaying younger rim material. These rims ranged in thickness from 0.1 μm to 2.7 μm with an average thickness of 1.8 μm. Ages of individual rims range from *ca.* 2759 Ma to 2703 Ma. The weighted average $^{207}Pb/^{206}Pb$ rim age for this sample is 2753 ± 11 Ma (MSWD: 0.86; n: 54; Figure 4.9G), with Th/U ranging from 0.16–0.64 and an average value of 0.32. The interior $^{207}Pb/^{206}Pb$ ages calculated from the depth profile technique suggest ages of *ca.* 2950–2800 Ma. The core ages collected after polishing range from *ca.* 2941 Ma to 2815 Ma with the majority of ages at *ca.* 2850 Ma. The Th/U values ranged from 0.19–0.56 with an average of 0.38.

SI 4.3: In-situ LA-ICP-MS U-Pb data for zircon in metasedimentary and metagranitoid rocks, NCGB, NW Ontario

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
NCTK10-8 Bt schist NAD27, zone 15: 689866E, 5820991N															
8-1-z21	0.53	3840	0.2040	0.0018	15.73	0.2600	0.5573	0.0095	0.4903	2861	18	2859	16	2663	100
8-1-z28	0.46	4300	0.2051	0.0013	15.83	0.2700	0.5586	0.0096	0.7845	2867	13	2866	17	3072	110
8-1-z11	0.59	2520	0.2056	0.0017	15.82	0.2900	0.5582	0.0100	0.5739	2870	15	2865	18	2239	100
8-1-z4b	0.97	9400	0.2064	0.0009	15.87	0.2700	0.5609	0.0097	0.9136	2877	8	2868	16	2882	100
8-1-z8	0.64	3110	0.2068	0.0029	15.78	0.3000	0.5563	0.0077	0.7906	2879	19	2865	19	2695	96
8-1-z22	0.51	2800	0.2074	0.0019	15.86	0.2200	0.5583	0.0080	0.5238	2884	17	2870	13	2635	110
8-1-z26<	0.76	4040	0.2006	0.0021	14.44	0.6000	0.5187	0.0190	0.8620	2831	19	2778	49	2460	150
8-1-z7a<	0.39	3150	0.2023	0.0029	15.61	0.3400	0.5560	0.0099	0.6790	2846	26	2853	21	3095	120
8-1-z23a<	0.53	3810	0.2025	0.0013	15.61	0.3800	0.5570	0.0140	0.9259	2846	13	2851	25	2910	120
8-1-z13c<	0.48	4290	0.2032	0.0013	13.41	0.3400	0.4790	0.0110	0.9205	2851	18	2707	23	2389	140
8-1-z7b<	0.48	5260	0.2034	0.0021	15.77	0.3500	0.5571	0.0110	0.7591	2855	15	2860	21	2929	120
8-1-z17<	0.42	2760	0.2036	0.0029	15.69	0.4500	0.5580	0.0130	0.8507	2856	25	2852	27	2999	120
8-1-z4a<	0.48	2900	0.2042	0.0019	15.68	0.4300	0.5535	0.0150	0.3234	2859	17	2857	29	3102	150
8-1-z1c<	0.75	2520	0.2046	0.0018	13.31	0.3400	0.4719	0.0110	0.9275	2862	14	2704	23	1978	87
8-1-z15<	0.42	3530	0.2046	0.0021	15.60	0.3300	0.5560	0.0110	0.7993	2865	21	2853	21	3419	130
8-1-z5b<	0.33	2690	0.2051	0.0028	14.57	0.3700	0.5100	0.0130	0.8564	2868	23	2791	24	2522	110
8-1-z14<	0.60	3420	0.2048	0.0016	14.99	0.2400	0.5316	0.0079	0.8080	2868	13	2814	15	2615	98
8-1-z9<	0.41	3770	0.2050	0.0025	16.61	0.3000	0.5910	0.0093	0.8450	2868	22	2911	18	3233	120
8-1-z1b<	0.42	2160	0.2060	0.0019	15.71	0.5000	0.5570	0.0180	0.8891	2873	18	2857	32	2330	170
8-1-z5c<	0.70	2680	0.2060	0.0024	13.69	0.3000	0.4858	0.0100	0.7979	2873	18	2729	21	1917	80
8-1-z13b<	0.48	3720	0.2061	0.0011	15.72	0.3600	0.5560	0.0130	0.9651	2875	8	2858	21	2932	120
8-1-z5a<	0.49	3270	0.2057	0.0021	15.46	0.2800	0.5487	0.0084	0.5675	2877	19	2845	17	2851	110
8-1-z10<	0.54	2640	0.2070	0.0017	16.03	0.3100	0.5624	0.0110	0.5678	2881	17	2878	18	2866	110
8-1-z1a<	0.54	2040	0.2087	0.0019	14.83	0.2200	0.5153	0.0071	0.6171	2895	15	2804	15	2709	100
8-1-z12>	0.54	3020	0.1761	0.0030	7.28	0.2800	0.3012	0.0089	0.8933	2614	33	2152	43	1674	72
8-1-z2>	0.56	4470	0.1793	0.0023	7.89	0.3800	0.3169	0.0110	0.9215	2646	15	2217	37	1426	97
8-1-z16>	1.01	6240	0.1824	0.0028	7.55	0.3700	0.3015	0.0120	0.8565	2672	30	2175	39	1466	79
8-1-z1d>	0.42	4300	0.1871	0.0025	9.85	0.3800	0.3797	0.0120	0.7698	2715	26	2419	31	2231	100
8-1-z20>	0.89	4750	0.1882	0.0018	9.05	0.2400	0.3514	0.0075	0.8449	2731	15	2342	23	1526	64
8-1-z23b>	0.65	5060	0.1932	0.0011	9.63	0.2900	0.3622	0.0110	0.9522	2770	9	2399	25	1804	110
8-1-z24b>	0.71	6130	0.1978	0.0026	11.53	0.5100	0.4210	0.0160	0.9515	2806	23	2565	44	2076	97
8-1-z18>	0.91	7400	0.1977	0.0027	12.48	0.5700	0.4550	0.0160	0.9181	2808	25	2632	41	2291	160

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
8-1-z6>	0.62	4480	0.2015	0.0023	12.60	0.4400	0.4560	0.0140	0.9238	2836	23	2648	33	2171	91
8-1-z13a>	0.60	2580	0.2023	0.0016	10.88	0.3000	0.3890	0.0110	0.9571	2844	13	2516	27	1662	89
8-1-zfp3b*	0.04	177	0.1762	0.0038	11.03	0.3000	0.4519	0.0099	0.4832	2616	37	2522	25	8810	880
8-1-zfp3a*	0.04	183	0.1794	0.0034	11.91	0.2500	0.4806	0.0085	0.3796	2658	30	2598	21	6690	700
8-1-zfp1c*	0.03	192	0.1750	0.0026	11.00	0.2300	0.4574	0.0080	0.4595	2603	26	2521	20	8480	780
8-1-zfp4b*	0.09	192	0.1770	0.0031	11.44	0.3000	0.4715	0.0093	0.6220	2620	30	2562	23	4960	430
8-1-zfp3c*	0.03	192	0.1757	0.0034	11.44	0.2700	0.4697	0.0088	0.3918	2612	32	2559	22	7890	790
8-1-zfp3d*	0.06	198	0.1798	0.0039	11.97	0.3100	0.4788	0.0092	0.6029	2650	36	2604	24	9640	710
8-1-z3b*	0.09	196	0.1845	0.0065	12.58	1.2000	0.4990	0.0300	0.5787	2697	62	2654	69	8110	510
8-1-zfp5b*	0.04	200	0.1759	0.0033	10.98	0.3400	0.4560	0.0110	0.3896	2622	34	2519	28	6710	880
8-1-zfp4a*	0.16	208	0.1817	0.0039	12.04	0.2800	0.4837	0.0087	0.2708	2663	35	2605	22	7230	890
8-1-zfp5a*	0.04	217	0.1798	0.0040	12.39	0.9100	0.4950	0.0260	0.8282	2655	43	2628	58	8400	2100
8-1-z27*	0.08	246	0.1778	0.0046	11.57	0.4100	0.4723	0.0120	0.3453	2624	47	2567	30	5580	690
8-1-zfp7*	0.07	256	0.1761	0.0061	11.60	0.5500	0.4784	0.0260	0.5072	2610	49	2569	49	6880	670
8-1-zfp6*	0.03	284	0.1745	0.0043	11.74	0.3900	0.4800	0.0120	0.4668	2597	36	2581	29	13200	1100
8-1-zfp3e*	0.75	281	0.1963	0.0055	15.24	0.8500	0.5580	0.0320	0.7781	2793	44	2833	53	6210	750
8-1-zfp1a*	0.26	309	0.1864	0.0027	15.52	0.4500	0.6080	0.0160	0.8346	2708	25	2846	29	8640	830
8-1-zfp2*	0.20	358	0.1735	0.0029	11.07	0.2400	0.4642	0.0071	0.4113	2588	28	2534	20	3590	320
8-1-zfp1b*	0.24	369	0.1878	0.0037	13.31	1.9000	0.5190	0.0640	0.8928	2725	36	2696	95	7900	650
8-1-z24a*	0.61	1530	0.2120	0.0160	14.03	1.5000	0.4960	0.0150	0.4661	2916	40	2755	75	2210	550
NCTK10-24A Bt-tonalite gneiss† NAD27, zone 15: 694245E, 5824386N															
24-2-z19c	0.16	4070	0.1974	0.0049	14.47	0.4600	0.5250	0.0130	0.9063	2804	15	2780	33	2721	55
24-2-z13	0.40	3150	0.2049	0.0055	15.80	0.6600	0.5610	0.0150	0.7483	2864	20	2863	36	2869	63
24-2-z26	0.41	2650	0.2059	0.0052	15.79	0.4300	0.5604	0.0092	0.8579	2873	11	2864	26	2867	38
24-2-z27	0.29	1680	0.2062	0.0053	15.30	0.3600	0.5382	0.0059	0.6201	2875	15	2833	23	2775	25
24-2-z24c	0.44	2610	0.2072	0.0052	16.26	0.5000	0.5644	0.0130	0.6649	2882	27	2895	32	2884	53
24-2-z17c	0.29	1100	0.2069	0.0055	16.38	0.6900	0.5660	0.0190	0.8565	2883	19	2890	41	2885	77
24-2-z15c	0.26	2310	0.2075	0.0058	14.75	0.5700	0.5220	0.0170	0.8217	2885	24	2803	41	2708	78
24-2-z17r	0.40	1790	0.2077	0.0054	15.18	0.3800	0.5265	0.0058	0.7487	2886	17	2825	24	2726	25
24-2-z18	0.21	3260	0.2082	0.0055	17.10	0.4500	0.5889	0.0075	0.7735	2890	20	2939	25	2984	31
24-2-z29c<	0.34	1140	0.1914	0.0051	10.07	0.4000	0.3790	0.0120	0.8178	2750	42	2436	44	2072	60
24-2-z1<	0.38	1650	0.1988	0.0140	9.48	0.5800	0.3480	0.0170	0.9853	2816	17	2377	55	1920	82
24-2-z7<	0.25	3540	0.2010	0.0049	13.62	0.6400	0.4890	0.0170	0.9911	2835	8	2717	41	2558	73
24-2-z23<	0.23	1680	0.2059	0.0053	10.46	0.3000	0.3740	0.0076	0.8098	2871	27	2479	26	2048	35

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
24-2-z15r<	0.50	3790	0.2062	0.0052	13.13	0.4000	0.4561	0.0097	0.9455	2877	14	2686	28	2420	42
24-2-z12<	0.33	2280	0.2069	0.0051	13.94	0.3400	0.4902	0.0045	0.8728	2884	21	2744	24	2571	20
24-2-z21c<	0.41	1790	0.2073	0.0055	11.37	0.3900	0.3961	0.0090	0.8592	2885	19	2551	32	2154	41
24-2-z6<	0.46	4240	0.2083	0.0051	14.24	0.3700	0.4992	0.0067	0.9271	2892	11	2768	25	2609	29
24-1-z2<	0.24	1120	0.2124	0.0026	14.00	0.3600	0.4746	0.0087	0.7768	2927	19	2752	23	2502	38
24-2-z8<	0.59	623	0.2165	0.0054	11.82	0.3400	0.3955	0.0075	0.9242	2954	12	2588	27	2147	35
24-2-z16>	0.17	2090	0.1795	0.0045	7.58	0.4700	0.3081	0.0160	0.9370	2647	20	2180	47	1730	73
24-2-z25c>	0.21	2880	0.1815	0.0048	7.33	0.4600	0.2900	0.0140	0.9766	2665	18	2135	47	1637	66
24-2-z19r>	0.12	5290	0.1819	0.0047	11.50	0.3500	0.4680	0.0095	0.8232	2669	24	2568	31	2473	43
24-2-z29r>	0.08	2580	0.1902	0.0052	11.61	0.3600	0.4384	0.0072	0.8445	2742	22	2571	29	2342	32
24-2-z2>	0.23	956	0.1966	0.0049	7.32	0.3600	0.2700	0.0130	0.9861	2798	12	2151	51	1537	68
24-2-z11>	0.41	1140	0.2077	0.0053	8.49	0.2700	0.2944	0.0081	0.9034	2891	15	2285	29	1663	40
24-2-z4>	0.23	1020	0.2095	0.0064	3.60	0.1800	0.1238	0.0076	0.9899	2902	12	1563	36	752	43
24-2-z24r>	0.22	1210	0.1815	0.0055	6.31	0.6200	0.2470	0.0190	0.9611	2667	15	2013	60	1420	86
24-2-z25r>	0.12	3040	0.1839	0.0048	7.24	0.4600	0.2850	0.0150	0.9695	2692	18	2140	56	1611	74
24-2-z3>	0.41	1077	0.1879	0.0047	5.61	0.1700	0.2185	0.0047	0.9183	2723	18	1915	27	1273	25
24-2-z21r>	0.11	656	0.1878	0.0048	8.78	0.3500	0.3350	0.0100	0.9562	2722	20	2308	41	1861	51
24-2-z20r^	0.06	2380	0.1857	0.0053	6.50	0.9100	0.2553	0.0260	0.9019	2704	19	2045	79	1466	120
24-2-z20c^	0.04	2440	0.1971	0.0087	14.35	2.5000	0.5250	0.0420	0.9249	2802	17	2772	95	2720	160
24-1-z19^	0.33	322	0.2178	0.0059	15.47	0.8500	0.5120	0.0200	0.7325	2962	45	2841	52	2662	87
24-1-z22^	0.13	470	0.2244	0.0021	18.43	1.0000	0.6020	0.0300	0.9314	3013	15	3010	54	3040	120
24-1-z6r*	0.21	5710	0.1372	0.0012	3.97	0.1000	0.2099	0.0044	0.8622	2191	16	1627	21	1228	23
24-1-z1*	0.16	4530	0.1465	0.0018	4.42	0.2300	0.2171	0.0088	0.9732	2304	21	1714	44	1266	47
24-1-z12*	0.09	1540	0.1486	0.0017	4.91	0.1600	0.2401	0.0054	0.8561	2329	19	1806	26	1387	28
24-1-z14b*	0.16	1980	0.1576	0.0014	5.32	0.2300	0.2472	0.0094	0.9632	2429	15	1870	37	1421	48
24-1-z6c*	0.22	5970	0.1618	0.0012	5.95	0.1900	0.2661	0.0059	0.9372	2475	13	1967	27	1521	30
24-1-z24c*	0.50	4520	0.1618	0.0012	5.97	0.1800	0.2700	0.0065	0.9478	2474	13	1973	27	1540	33
24-1-z6r*	0.15	10900	0.1667	0.0008	6.73	0.1400	0.2920	0.0041	0.9101	2524	8	2077	19	1651	20
24-1-z23*	0.19	3370	0.1691	0.0018	6.67	0.1900	0.2909	0.0071	0.9439	2551	19	2068	25	1645	35
24-1-z24r*	0.32	2370	0.1741	0.0027	6.22	0.2300	0.2618	0.0059	0.9213	2593	27	2005	32	1498	30
24-1-z20*	0.08	707	0.1770	0.0015	4.70	0.2100	0.1935	0.0066	0.9783	2625	14	1770	35	1140	36
24-1-z18*	0.15	664	0.1795	0.0023	8.13	0.3700	0.3220	0.0120	0.9353	2647	21	2252	40	1798	56
24-1-z10*	0.08	1370	0.1802	0.0013	7.28	0.2700	0.2945	0.0099	0.9816	2654	12	2146	33	1661	49
24-1-z16*	0.10	4910	0.1805	0.0014	9.15	0.3100	0.3666	0.0092	0.9600	2657	13	2355	32	2011	43

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
24-1-z9*	0.08	922	0.1832	0.0011	7.14	0.2000	0.2841	0.0062	0.9704	2682	10	2127	24	1611	31
24-1-z21*	0.15	2130	0.1859	0.0013	8.46	0.1900	0.3322	0.0053	0.8730	2706	11	2280	20	1849	26
24-1-z14a*	0.17	1750	0.1871	0.0013	7.75	0.2800	0.3000	0.0110	0.9755	2716	11	2195	34	1689	54
24-1-z11*	0.32	974	0.1906	0.0024	9.33	0.3000	0.3549	0.0076	0.8727	2746	21	2367	29	1957	36
24-1-z7*	0.20	1910	0.1932	0.0020	12.26	0.3000	0.4597	0.0070	0.8242	2769	17	2624	23	2438	31
24-1-z15r*	0.21	1390	0.1991	0.0036	15.17	0.5600	0.5520	0.0160	0.8393	2824	27	2820	35	2830	68
24-1-z4c*	0.15	1680	0.2054	0.0018	12.55	0.3500	0.4430	0.0110	0.8994	2869	14	2644	27	2362	51
24-1-z4r*	0.29	1640	0.2055	0.0021	16.24	0.6900	0.5680	0.0190	0.9786	2870	17	2886	44	2895	80
24-1-z17*	0.27	1000	0.2067	0.0027	15.83	0.4400	0.5508	0.0110	0.7451	2879	21	2871	24	2828	46
24-1-z8r*	0.24	1700	0.2073	0.0013	12.79	0.3600	0.4464	0.0110	0.9546	2884	10	2661	27	2377	48
24-1-z5*	0.30	1920	0.2074	0.0018	16.22	0.4700	0.5630	0.0150	0.9249	2885	14	2888	28	2891	61
24-1-z8c*	0.24	1260	0.2098	0.0018	13.40	0.3500	0.4609	0.0082	0.8654	2903	14	2707	24	2448	35
NCB11-33 Crd schist NAD27, zone 15: 657319E, 5867427N															
33-1-z5	0.47	3060	0.1947	0.0035	11.38	0.5200	0.4200	0.0160	0.9808	2784	14	2543	43	2258	75
33-2-z24	0.51	1850	0.1961	0.0055	9.37	0.4400	0.3510	0.0130	0.9511	2793	20	2376	46	1936	65
33-3-z5	0.44	2860	0.1978	0.0038	12.95	0.3400	0.4670	0.0097	0.9463	2808	16	2646	71	2439	130
33-2-z19a	0.39	2440	0.2018	0.0051	11.58	0.4000	0.4165	0.0100	0.9471	2840	11	2571	33	2242	47
33-1-z26	0.46	2020	0.2025	0.0037	13.13	0.6700	0.4750	0.0200	0.9807	2846	13	2686	49	2510	88
33-1-z1	0.36	2840	0.2028	0.0039	12.32	0.4500	0.4410	0.0140	0.9207	2847	18	2625	35	2353	63
33-2-z32	0.64	5600	0.2030	0.0052	15.36	0.5600	0.5478	0.0160	0.7804	2850	13	2837	40	2816	68
33-1-z28	0.65	2600	0.2029	0.0038	16.35	0.3600	0.5817	0.0120	0.5968	2851	16	2897	22	2958	50
33-2-z20a	0.36	2780	0.2038	0.0053	16.36	0.4700	0.5828	0.0083	0.6161	2856	13	2897	28	2960	34
33-2-z12	0.54	2870	0.2039	0.0054	13.34	0.7300	0.4770	0.0240	0.9782	2857	16	2699	64	2513	110
33-2-z19b	0.46	3880	0.2040	0.0052	16.98	0.4900	0.6064	0.0096	0.8810	2858	10	2933	28	3055	39
33-1-z30	0.54	4290	0.2040	0.0034	14.99	0.3400	0.5304	0.0110	0.8763	2858	10	2814	22	2743	46
33-2-z20b	0.40	2940	0.2039	0.0052	15.40	0.5100	0.5490	0.0130	0.9441	2859	10	2838	33	2819	54
33-1-z17	0.43	3320	0.2043	0.0035	16.18	0.3600	0.5722	0.0110	0.7752	2860	12	2887	21	2917	46
33-1-z23	0.57	4100	0.2060	0.0036	16.20	0.3900	0.5690	0.0120	0.8314	2874	12	2887	23	2903	49
33-3-z3b	0.20	5400	0.2014	0.0050	13.09	0.3200	0.4558	0.0110	0.8205	2837	23	2736	64	2625	110
33-3-z3a	0.27	2210	0.2055	0.0052	13.08	0.3100	0.4617	0.0096	0.8870	2869	24	2558	82	2175	180
33-3-z12	0.35	1890	0.2182	0.0018	12.58	0.7100	0.4600	0.0270	0.9313	2966	13	2956	15	2942	36
33-3-z9	0.28	2600	0.2175	0.0034	13.66	0.5600	0.4901	0.0220	0.8588	2966	50	2745	38	2458	70
33-3-z11	0.29	3520	0.2128	0.0024	12.60	0.6900	0.4570	0.0220	0.9791	2925	21	2949	51	2956	120
33-2-z17/	0.42	1800	0.2081	0.0074	11.41	0.7000	0.3990	0.0140	0.9880	2881	39	2542	46	2162	63

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
33-2-z5/	0.28	1730	0.2126	0.0057	12.53	0.4400	0.4272	0.0100	0.8922	2924	19	2650	34	2291	48
33-2-z36/	1.09	2540	0.2117	0.0053	12.56	0.4400	0.4288	0.0110	0.9382	2919	9	2647	32	2300	50
33-2-z27/	0.55	2860	0.2155	0.0055	13.24	0.4600	0.4430	0.0110	0.9680	2949	10	2693	32	2362	48
33-3-z6a/	0.35	3480	0.2023	0.0019	13.36	0.4100	0.4530	0.0120	0.8892	2847	12	2726	34	2570	61
33-3-z6b/	0.80	1830	0.2018	0.0053	13.96	0.4900	0.4650	0.0150	0.4059	2839	36	2688	49	2469	68
33-1-z24/	0.40	2240	0.2179	0.0037	14.70	0.3700	0.4881	0.0110	0.8962	2964	11	2799	23	2566	49
33-3-z2/	0.55	2110	0.2170	0.0260	15.22	0.2600	0.5245	0.0073	0.8163	2963	29	2693	130	2331	140
33-1-z29/	0.32	2070	0.2114	0.0040	16.74	0.7500	0.5690	0.0210	0.9674	2920	17	2908	45	2895	87
33-2-z4/	0.43	1800	0.2187	0.0058	15.67	0.5800	0.5259	0.0150	0.6246	2970	18	2856	41	2724	66
33-1-z18/	0.25	3120	0.2181	0.0040	16.04	0.6000	0.5320	0.0180	0.9557	2966	14	2872	36	2746	77
33-1-z11/	0.54	6200	0.2109	0.0045	15.96	0.7900	0.5460	0.0220	0.9659	2911	16	2883	50	2802	90
33-1-z25/	0.68	2420	0.2173	0.0038	16.51	0.4000	0.5486	0.0120	0.8686	2960	13	2908	23	2818	49
33-2-z30b/	0.42	2160	0.2198	0.0056	17.43	0.5400	0.5718	0.0110	0.7593	2979	11	2958	32	2915	46
33-3-z1/	0.38	2410	0.2146	0.0150	17.37	0.2600	0.5785	0.0088	0.8370	2940	11	2647	160	2286	250
33-2-z8/	0.22	3470	0.2176	0.0055	17.41	0.5300	0.5820	0.0098	0.9117	2964	11	2956	30	2956	40
33-1-z9/	0.48	2520	0.2172	0.0038	17.53	0.4800	0.5850	0.0140	0.9229	2960	10	2962	26	2969	58
33-2-z3^	0.51	3410	0.2212	0.0057	16.02	0.5800	0.5210	0.0140	0.9114	2989	16	2876	37	2703	61
33-2-z9*	0.55	1520	0.2097	0.0058	10.59	0.7300	0.3638	0.0220	0.5958	2901	23	2486	52	1999	96
33-1-z31*	0.54	1010	0.2184	0.0042	10.70	0.4000	0.3528	0.0140	0.9288	2967	18	2494	32	1947	65
33-3-z10*	0.85	1580	0.2048	0.0025	6.72	0.6000	0.2350	0.0210	0.9877	2863	20	2040	79	1350	110
33-3-z7*	0.35	650	0.2740	0.0210	8.75	0.5100	0.3366	0.0110	0.7526	3116	99	3450	210	3850	390
33-2-z28*	0.49	870	0.2105	0.0056	12.01	0.4000	0.4160	0.0091	0.8717	2908	20	2603	30	2239	41
33-1-z12*	0.44	1010	0.2019	0.0037	10.66	0.2900	0.3851	0.0089	0.9072	2843	16	2494	24	2099	42
33-2-z34*	0.60	1055	0.2027	0.0054	11.72	0.4200	0.4196	0.0099	0.9084	2853	16	2578	33	2257	44
33-2-z30a*	0.23	1150	0.2024	0.0053	10.61	0.5000	0.3799	0.0150	0.7488	2845	20	2488	38	2075	67
33-3-z4*	0.78	1360	0.1988	0.0470	17.42	0.3300	0.5864	0.0084	0.7499	2815	37	2444	240	2044	260
33-2-z23*	0.80	1480	0.2089	0.0067	11.93	0.5400	0.4160	0.0200	0.9451	2896	14	2606	45	2248	92
33-1-z15*	0.31	1420	0.2086	0.0038	11.82	0.3100	0.4136	0.0100	0.8590	2894	14	2594	26	2230	49
33-2-z7*	0.85	1620	0.2057	0.0054	12.50	0.4900	0.4440	0.0130	0.9279	2871	13	2636	36	2362	58
33-2-z37*	0.57	1460	0.2244	0.0058	18.27	0.7000	0.5933	0.0170	0.4593	3012	22	3004	42	3002	71
33-1-z13*	0.22	1520	0.2169	0.0037	15.03	0.3400	0.5021	0.0110	0.8625	2958	10	2816	21	2622	45
33-1-z21*	0.51	1680	0.2042	0.0040	11.65	0.3900	0.4080	0.0150	0.9215	2858	20	2576	33	2209	68
NCTK10-44A And-st schist NAD83, zone 15: 670289E, 5850342N															
44-1-z2	0.38	6660	0.1983	0.0047	12.52	0.4500	0.4520	0.0140	0.9759	2813	11	2638	35	2398	65

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
44-2-z19	0.44	2530	0.1994	0.0013	12.53	0.1900	0.4562	0.0110	0.9321	2822	11	2644	14	2422	46
44-2-z12	0.71	4060	0.1992	0.0022	13.70	0.2700	0.5009	0.0130	0.8061	2822	20	2728	18	2617	55
44-3-z28	0.43	2000	0.1997	0.0060	10.89	0.2800	0.3912	0.0072	0.6852	2824	21	2511	24	2131	33
44-3-z29	0.29	2430	0.1996	0.0063	10.14	0.5400	0.3720	0.0200	0.9665	2825	25	2446	54	2034	95
44-2-z18	0.47	2550	0.2003	0.0012	14.36	0.2400	0.5188	0.0130	0.8966	2828	14	2773	17	2693	58
44-3-z35	0.31	2890	0.2020	0.0062	13.82	0.4500	0.5030	0.0190	0.8848	2841	24	2735	30	2586	60
44-2-z26	0.34	4540	0.2025	0.0020	15.43	0.5000	0.5540	0.0190	0.9254	2845	23	2840	35	2838	84
44-2-z1	0.35	1820	0.2031	0.0031	15.28	0.4900	0.5390	0.0200	0.6790	2848	35	2830	35	2778	87
44-3-z15	0.38	3470	0.2028	0.0058	14.43	0.3400	0.5159	0.0092	0.7680	2848	15	2778	22	2681	39
44-3-z10	0.53	3670	0.2024	0.0060	14.72	0.3800	0.5197	0.0094	0.7951	2848	18	2795	25	2697	40
44-2-z16	0.48	6400	0.2026	0.0032	13.44	0.8000	0.4839	0.0200	0.8707	2849	17	2709	40	2543	82
44-1-z16	0.41	3090	0.2027	0.0056	12.82	0.6200	0.4570	0.0180	0.8959	2849	25	2667	50	2435	80
44-3-z1	0.32	2790	0.2027	0.0061	15.55	0.5400	0.5540	0.0150	0.9239	2850	20	2845	34	2839	64
44-3-z32	0.40	5170	0.2032	0.0063	13.99	0.7200	0.5010	0.0230	0.9433	2850	24	2744	51	2612	96
44-3-z34	0.44	4500	0.2036	0.0057	12.30	0.8600	0.4410	0.0300	0.9725	2857	11	2622	69	2370	130
44-1-z8	0.40	4200	0.2040	0.0048	11.22	0.1800	0.4058	0.0064	0.5275	2858	13	2541	16	2196	29
44-2-z31	0.50	4670	0.2042	0.0020	14.57	0.2500	0.5209	0.0130	0.8613	2858	16	2785	16	2702	53
44-1-z13	0.32	2050	0.2038	0.0060	10.49	0.6300	0.3727	0.0190	0.6084	2859	34	2475	72	2041	96
44-1-z9	0.41	3440	0.2050	0.0048	14.47	0.2700	0.5105	0.0089	0.8796	2866	13	2782	18	2658	38
44-1-z7	0.42	2430	0.2053	0.0049	15.95	0.3600	0.5617	0.0110	0.8591	2868	17	2872	23	2873	44
44-2-z47b	0.38	2990	0.2054	0.0023	13.41	0.3300	0.4738	0.0130	0.8780	2873	18	2708	23	2498	55
44-3-z36	0.37	4170	0.2052	0.0068	10.87	0.3500	0.3884	0.0100	0.7706	2873	28	2517	33	2124	45
44-1-z17	0.50	2490	0.2066	0.0058	14.18	0.3200	0.4936	0.0077	0.5867	2879	25	2760	20	2586	33
44-1-z18	0.50	1910	0.2065	0.0057	13.57	0.3800	0.4790	0.0110	0.6833	2879	43	2715	27	2519	46
44-2-z47a	0.43	4690	0.2064	0.0026	12.22	0.3800	0.4320	0.0150	0.9015	2879	20	2620	29	2319	65
44-1-z11a	0.30	4460	0.2074	0.0059	14.84	0.4100	0.5230	0.0130	0.6545	2882	34	2802	27	2709	57
44-2-z42	0.41	2920	0.2071	0.0035	12.37	0.2300	0.4288	0.0100	0.5160	2884	27	2631	18	2300	46
44-1-z11b	0.46	2530	0.2077	0.0052	15.33	0.3300	0.5343	0.0089	0.8347	2888	17	2834	21	2759	38
44-3-z7^	0.43	3890	0.1915	0.0053	10.59	0.2900	0.3968	0.0092	0.9532	2755	10	2486	26	2153	43
44-2-z38^	0.26	3470	0.1938	0.0026	9.30	0.4100	0.3530	0.0160	0.9383	2775	22	2365	41	1943	76
44-2-z29^	0.28	4680	0.1942	0.0019	11.38	0.3500	0.4230	0.0140	0.9134	2777	18	2556	30	2273	67
44-2-z14^	0.52	1920	0.1943	0.0025	10.62	0.2100	0.3966	0.0093	0.8912	2779	10	2492	14	2153	43
44-2-z13^	0.73	2290	0.1959	0.0023	13.46	0.2800	0.4949	0.0120	0.7850	2793	19	2712	20	2590	52
44-1-z12^	0.45	4800	0.1987	0.0054	10.64	0.4200	0.3960	0.0150	0.9234	2817	22	2498	38	2156	71

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
44-3-z19^	0.26	2040	0.2170	0.0066	16.86	0.5100	0.5680	0.0130	0.7822	2957	21	2925	29	2898	52
44-2-z36^	0.42	4000	0.2183	0.0023	16.20	0.2700	0.5420	0.0120	0.7897	2967	17	2887	17	2791	51
44-3-z8^	0.28	4250	0.2206	0.0080	15.40	0.5200	0.5083	0.0100	0.4945	2986	38	2837	32	2648	44
44-3-z2*	0.30	930	0.2060	0.0120	14.80	0.8700	0.5170	0.0270	0.6712	2865	82	2815	48	2720	130
44-2-z25*	0.41	1050	0.2011	0.0490	12.74	24.0000	0.4630	0.2400	0.9244	2835	17	2660	320	2452	650
44-3-z18*	0.31	1110	0.2009	0.0062	11.91	0.4800	0.4280	0.0170	0.9179	2837	24	2590	40	2303	76
44-3-z13*	0.38	1070	0.2126	0.0083	12.47	0.4700	0.4285	0.0100	0.7150	2920	45	2637	35	2298	46
44-3-z14*	0.31	1290	0.2050	0.0059	17.17	0.3900	0.6047	0.0100	0.5461	2865	16	2945	21	3048	41
44-1-z4*	0.55	1420	0.2039	0.0049	10.16	0.2900	0.3637	0.0100	0.8992	2857	13	2446	28	1998	50
44-3-z33*	0.26	1590	0.2032	0.0060	10.74	0.6700	0.3860	0.0250	0.9791	2851	18	2485	59	2100	120
44-2-z20*	0.28	1460	0.1844	0.0080	8.22	2.0000	0.3240	0.0510	0.9821	2691	23	2260	120	1810	210
44-2-z34*	0.18	1660	0.1987	0.0029	12.00	1.0000	0.4400	0.0320	0.9441	2814	20	2598	59	2345	130
44-2-z23*	0.47	1780	0.1979	0.0070	12.68	1.2000	0.4630	0.0280	0.8770	2808	17	2655	74	2452	120
44-2-z8*	0.32	5700	0.1907	0.0061	7.06	1.1000	0.2670	0.0290	0.9855	2751	18	2112	96	1525	130
44-2-z46*	0.32	2910	0.1952	0.0051	8.07	0.9900	0.3010	0.0250	0.9744	2785	28	2227	81	1693	120
44-3-z22*	0.31	1940	0.1980	0.0058	9.00	0.3000	0.3261	0.0091	0.9039	2808	17	2341	29	1824	46
44-2-z4*	0.25	2870	0.1944	0.0250	13.04	6.2000	0.4870	0.0900	0.9305	2779	14	2680	200	2556	310
44-2-z45*	0.39	6500	0.2041	0.0100	13.50	2.9000	0.4825	0.0610	0.5785	2856	31	2714	120	2537	230
NCTK10-63 Protomylonitic trondhjemite† NAD83, zone 16: 308451E, 5816070N															
63-3-z25r	0.41	3580	0.1874	0.0031	9.49	0.5500	0.3720	0.0170	0.9145	2717	20	2393	56	2043	76
63-2-z5c	0.58	1880	0.1880	0.0038	9.91	0.4400	0.3790	0.0120	0.9257	2724	20	2430	46	2068	59
63-3-z21c	0.13	2010	0.1926	0.0027	9.63	0.6000	0.3660	0.0200	0.9823	2764	10	2401	57	2034	97
63-2-z11r	0.47	3110	0.1935	0.0025	10.93	0.3400	0.4114	0.0110	0.8123	2771	12	2515	29	2220	51
63-1-z14c	0.41	5440	0.1966	0.0042	13.59	0.4400	0.5040	0.0140	0.6043	2792	30	2718	31	2628	61
63-2-z2c	0.71	1960	0.1963	0.0025	10.94	0.4200	0.4116	0.0140	0.7413	2795	20	2518	41	2222	68
63-2-z15	0.36	1930	0.1983	0.0043	11.55	0.5200	0.4240	0.0160	0.9269	2806	42	2553	46	2291	77
63-3-z20r	0.16	2040	0.1974	0.0036	10.46	0.6400	0.3890	0.0190	0.9650	2807	20	2471	62	2116	90
63-2-z4c	0.80	5600	0.1982	0.0030	11.27	0.4400	0.4120	0.0140	0.9135	2810	28	2542	43	2220	68
63-3-z19r	0.38	1950	0.1992	0.0030	13.49	0.7100	0.4950	0.0230	0.8973	2821	14	2713	50	2590	97
63-3-z13c	0.80	3940	0.1993	0.0029	10.95	0.6100	0.3998	0.0190	0.9413	2822	13	2519	49	2166	86
63-3-z8	0.34	3500	0.2001	0.0029	11.58	0.6000	0.4200	0.0180	0.9577	2827	16	2566	52	2257	80
63-3-z16r	0.35	2880	0.2021	0.0034	13.80	0.7500	0.5058	0.0210	0.7872	2842	21	2734	51	2638	89
63-3-z12c	0.38	5380	0.2023	0.0032	15.99	0.8100	0.5732	0.0240	0.7557	2846	18	2874	48	2919	97
63-3-z14	0.32	2600	0.2024	0.0031	13.55	0.7300	0.4900	0.0220	0.9198	2846	15	2718	52	2568	97

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
63-2-z6c	0.24	4640	0.2028	0.0035	12.58	0.5400	0.4520	0.0170	0.7565	2846	24	2646	40	2401	77
63-3-z15c	0.50	4100	0.2027	0.0029	13.06	0.7500	0.4750	0.0250	0.9650	2849	13	2681	56	2498	110
63-2-z4r	0.39	3490	0.2031	0.0031	11.40	0.3400	0.4097	0.0110	0.7600	2850	19	2555	28	2213	51
63-2-z2r	0.12	2040	0.2026	0.0027	11.92	0.4400	0.4360	0.0140	0.9541	2851	18	2602	39	2333	64
63-2-z1r	0.43	3510	0.2033	0.0028	14.07	0.3800	0.5054	0.0110	0.6861	2852	15	2754	26	2636	48
63-2-z16r	0.58	5070	0.2036	0.0038	13.94	0.4400	0.4939	0.0120	0.6630	2855	26	2745	30	2586	53
63-3-z20c	0.57	3260	0.2032	0.0033	15.24	0.7900	0.5520	0.0240	0.8772	2856	22	2829	54	2834	100
63-3-z13r	0.40	2610	0.2038	0.0029	14.29	0.6900	0.5130	0.0200	0.7724	2856	11	2769	46	2669	88
63-2-z3r	0.43	3800	0.2047	0.0033	13.19	0.7600	0.4633	0.0220	0.8835	2864	20	2693	52	2454	95
63-2-z5r	0.35	2550	0.2062	0.0036	13.47	0.4500	0.4780	0.0120	0.6865	2879	39	2712	32	2529	54
63-3-z12r^	0.19	2290	0.1672	0.0028	11.51	0.6900	0.4960	0.0270	0.9861	2529	20	2581	74	2590	130
63-2-z17c^	0.20	13400	0.1781	0.0039	10.13	0.5700	0.4100	0.0190	0.9300	2634	19	2443	66	2210	93
63-3-z16c^	0.20	7000	0.1791	0.0039	11.28	0.7500	0.4540	0.0250	0.9311	2643	30	2552	62	2405	110
63-2-z7^	0.10	3360	0.1797	0.0053	9.25	0.3500	0.3780	0.0140	0.8929	2655	27	2364	35	2080	66
63-2-z9c^	0.23	16700	0.1815	0.0034	9.00	0.5800	0.3560	0.0200	0.9420	2665	25	2334	54	1959	91
63-3-z7^	0.55	3460	0.1834	0.0032	8.69	0.5000	0.3391	0.0160	0.9438	2686	19	2301	51	1880	75
63-3-z29r^	0.52	5190	0.1920	0.0032	14.86	0.9600	0.5570	0.0290	0.9640	2758	16	2806	67	2849	120
63-2-z10r^	0.26	2060	0.2038	0.0028	11.16	0.3400	0.3949	0.0099	0.6582	2859	17	2536	30	2145	46
63-2-z10c^	0.30	2070	0.2044	0.0026	12.44	0.4600	0.4360	0.0170	0.9593	2861	13	2635	34	2332	74
63-3-z6c^	0.19	2300	0.2099	0.0039	13.43	0.7800	0.4650	0.0240	0.7379	2903	26	2713	64	2460	110
63-2-z1c^	0.96	3320	0.2107	0.0036	11.51	0.5900	0.3901	0.0250	0.9171	2910	14	2565	42	2123	110
63-2-z9r^	0.32	2860	0.2157	0.0039	13.32	0.5100	0.4520	0.0150	0.8019	2946	31	2699	40	2403	67
63-3-z31r*	0.14	230	0.2580	0.0220	27.60	3.8000	0.7070	0.0880	0.8123	3170	130	3290	150	3450	330
63-3-z23a*	0.04	470	0.1872	0.0081	7.17	0.4900	0.2880	0.0180	0.8738	2702	66	2118	60	1626	92
63-3-z29r2*	0.23	470	0.2740	0.0280	27.40	4.3000	0.6080	0.0770	0.7171	3140	120	3180	170	2960	290
63-3-z18c*	0.11	510	0.2460	0.0190	28.70	7.0000	0.7300	0.1100	0.9799	2966	61	3210	190	3420	350
63-3-z27r*	0.24	560	0.2290	0.0130	19.20	2.4000	0.5800	0.0350	0.8894	3006	78	2994	100	2930	140
63-1-z4*	0.46	690	0.1947	0.0038	7.14	0.6400	0.2603	0.0230	0.6396	2779	37	2127	66	1491	110
63-2-z14*	0.29	631	0.2034	0.0059	12.27	0.5000	0.4420	0.0150	0.6119	2854	46	2624	39	2355	69
63-3-z24*	0.51	830	0.1952	0.0044	5.50	0.5000	0.2120	0.0170	0.9299	2781	31	1914	81	1229	90
63-3-z15r*	0.25	830	0.2117	0.0320	12.40	3.2000	0.4210	0.0440	0.9715	2916	37	2620	140	2250	180
63-3-z10*	0.53	930	0.1949	0.0044	7.40	0.6700	0.2700	0.0200	0.9802	2783	17	2138	76	1548	100
63-3-z26r*	0.42	1030	0.1965	0.0027	11.13	0.5800	0.4080	0.0180	0.9501	2798	12	2534	49	2204	81
63-3-z22*	0.55	1140	0.1838	0.0032	7.13	0.5100	0.2820	0.0190	0.9478	2685	21	2114	65	1591	95

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
63-3-z26c*	0.12	1180	0.2021	0.0031	15.26	0.9000	0.5499	0.0280	0.7616	2842	20	2830	67	2824	130
63-3-z28*	0.54	1360	0.1759	0.0067	6.19	0.5000	0.2600	0.0200	0.8332	2615	59	1983	72	1480	100
63-3-z30c*	0.62	1280	0.2044	0.0033	14.79	0.7500	0.5143	0.0210	0.8431	2860	17	2803	47	2674	91
63-3-z30c*	0.62	1280	0.2044	0.0033	14.79	0.7500	0.5143	0.0210	0.8431	2860	17	2803	47	2674	91
63-3-z11r*	0.34	1420	0.1916	0.0032	6.91	0.3700	0.2594	0.0120	0.9520	2755	15	2103	45	1486	60
63-3-z6r*	0.08	1430	0.1889	0.0066	9.38	1.7000	0.3570	0.0410	0.8598	2738	37	2373	110	1968	180
63-2-z13*	0.30	1600	0.2014	0.0041	8.42	0.3700	0.3101	0.0110	0.8506	2832	29	2292	36	1754	53
63-3-z12r*	0.60	1530	0.2049	0.0047	15.72	0.9800	0.5533	0.0260	0.8529	2865	22	2859	67	2838	110
63-3-z23c*	0.11	2000	0.1654	0.0045	4.97	0.5800	0.2200	0.0220	0.9894	2519	41	1780	100	1270	110
63-3-z23b*	0.22	2380	0.1845	0.0035	7.80	0.6000	0.3100	0.0200	0.9742	2691	24	2204	71	1730	98
63-3-z11c*	0.13	2280	0.1761	0.0028	6.29	0.3700	0.2580	0.0130	0.9489	2616	20	2013	52	1477	66
63-1-z1*	0.65	7260	0.1528	0.0026	4.32	0.2600	0.2015	0.0097	0.9230	2377	14	1696	47	1183	51
63-3-z27c*	0.65	7240	0.1531	0.0038	4.33	0.9500	0.2015	0.0300	0.9162	2380	14	1698	76	1183	130
63-3-z6r*	0.45	2490	0.2039	0.0044	13.79	1.0000	0.4940	0.0300	0.6421	2854	38	2735	58	2585	120
63-3-z9*	0.15	4900	0.1852	0.0045	12.54	1.1000	0.4910	0.0400	0.9077	2697	25	2648	98	2580	180
63-3-z32*	0.70	2010	0.2016	0.0058	12.71	2.2000	0.4490	0.0600	0.6138	2850	40	2657	110	2386	240
NCTK10-76 2-mica schist NAD27, zone 15: 702814E, 5821125N															
76-2-z15	0.07	6100	0.1951	0.0027	11.79	0.3600	0.4210	0.0120	0.9854	2787	14	2580	35	2259	56
76-1-uns2	0.55	3160	0.1978	0.0030	14.09	0.1400	0.5136	0.0097	0.7869	2808	12	2755	10	2671	43
76-2-z16	0.21	1930	0.1983	0.0027	13.70	0.3100	0.4878	0.0110	0.8062	2812	14	2729	22	2561	50
76-2-z8b	0.75	2290	0.1998	0.0047	15.66	0.3300	0.5590	0.0110	0.8662	2822	25	2852	29	2860	51
76-1-z4	0.09	3200	0.1998	0.0035	13.31	0.3500	0.4819	0.0130	0.8244	2824	15	2701	25	2535	56
76-2-z8a	0.54	3260	0.2009	0.0031	12.03	0.3600	0.4394	0.0140	0.8158	2830	22	2609	30	2353	64
76-2-z14a	0.56	2030	0.2015	0.0027	10.79	0.2700	0.3817	0.0100	0.8901	2838	17	2505	23	2091	47
76-2-z13	0.45	3170	0.2020	0.0026	14.00	0.3400	0.5112	0.0120	0.7718	2842	14	2751	23	2661	52
76-3-z11b	0.22	4760	0.2026	0.0035	13.64	0.2900	0.4899	0.0067	0.5740	2845	20	2726	21	2573	29
76-3-z7	0.57	2660	0.2034	0.0050	13.16	0.6300	0.4733	0.0180	0.7891	2851	22	2689	38	2497	77
76-3-z22a	0.60	3080	0.2033	0.0033	14.60	0.3200	0.5213	0.0092	0.8992	2851	17	2788	21	2703	39
76-1-z11	0.35	4640	0.2037	0.0041	15.73	0.2600	0.5583	0.0140	0.2844	2852	36	2863	16	2859	60
76-1-z8	0.31	2430	0.2031	0.0032	16.05	0.2500	0.5721	0.0120	0.7866	2853	16	2883	15	2921	51
76-1-z1	0.46	3750	0.2043	0.0034	12.71	0.3600	0.4510	0.0160	0.9291	2862	16	2662	27	2402	69
76-2-z5c	0.35	2300	0.2049	0.0030	15.55	0.4700	0.5493	0.0140	0.7710	2865	14	2848	29	2821	56
76-3-z16	0.50	1750	0.2039	0.0033	14.04	0.3100	0.5040	0.0085	0.7631	2866	17	2756	21	2630	37
76-2-z5b	0.76	4620	0.2050	0.0021	16.03	0.3300	0.5679	0.0130	0.7847	2867	11	2882	20	2898	51

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
76-3-z6	0.63	2280	0.2054	0.0055	13.12	0.5900	0.4560	0.0120	0.6905	2868	28	2693	39	2422	55
76-2-z1b	0.43	2640	0.2061	0.0047	13.84	0.4600	0.4859	0.0150	0.6714	2871	29	2736	33	2551	62
76-2-z12	0.45	2740	0.2057	0.0023	14.24	0.3200	0.4845	0.0100	0.6036	2871	19	2767	22	2547	45
76-1-z7	0.59	2880	0.2059	0.0033	13.46	0.2200	0.4735	0.0110	0.8399	2873	13	2711	16	2498	47
76-2-z1c	0.39	2980	0.2057	0.0034	15.98	0.4400	0.5631	0.0130	0.5871	2873	25	2875	27	2878	54
76-3-z11a	0.30	4960	0.2061	0.0033	15.86	0.3500	0.5609	0.0086	0.7547	2874	17	2867	21	2874	35
76-2-z11b	0.58	3410	0.2065	0.0038	14.20	0.3900	0.5029	0.0120	0.7558	2875	26	2763	28	2630	52
76-1-z12	0.38	3670	0.2067	0.0038	13.20	0.5300	0.4645	0.0200	0.8869	2880	13	2693	29	2459	84
76-1-z10a	0.35	3760	0.2069	0.0033	15.16	0.2500	0.5318	0.0120	0.8608	2881	13	2825	16	2748	51
76-3-z10b	0.32	3140	0.2073	0.0034	15.88	0.5300	0.5597	0.0160	0.7246	2882	26	2868	37	2865	67
76-2-z1a	0.30	2180	0.2074	0.0042	14.23	0.4400	0.4990	0.0150	0.8189	2883	19	2765	28	2616	64
76-1-z6	0.54	1990	0.2079	0.0034	16.94	0.1800	0.5885	0.0110	0.4626	2888	15	2931	10	2983	45
76-1-z9a	0.33	1990	0.2079	0.0036	13.02	0.3400	0.4513	0.0140	0.8097	2891	23	2679	24	2400	60
76-2-z7^	0.20	5200	0.1852	0.0054	9.91	0.3900	0.3880	0.0120	0.8375	2694	36	2430	39	2111	58
76-2-z5a^	0.39	5120	0.1865	0.0021	11.79	0.2600	0.4520	0.0099	0.8670	2710	20	2586	21	2403	45
76-2-z3^	0.56	4580	0.1917	0.0055	12.31	0.4200	0.4714	0.0140	0.5429	2750	45	2631	35	2488	59
76-2-z14b^	0.79	6600	0.1930	0.0020	10.51	0.4400	0.3880	0.0140	0.9831	2767	11	2478	39	2112	67
76-1-z5a^	0.20	2280	0.1938	0.0033	12.50	0.2700	0.4659	0.0130	0.8830	2773	18	2646	21	2464	52
76-3-z20^	0.52	4250	0.1948	0.0031	11.11	0.2700	0.4140	0.0069	0.7915	2782	18	2534	22	2233	31
76-2-z10a^	0.51	2580	0.2115	0.0067	15.51	0.5500	0.5313	0.0120	0.2610	2904	45	2841	34	2746	52
76-1-z10b^	0.40	3900	0.2099	0.0032	16.08	0.5800	0.5641	0.0220	0.6123	2912	26	2881	44	2883	97
76-3-z19^	0.66	2100	0.2117	0.0037	15.21	0.3200	0.5187	0.0073	0.8146	2916	20	2826	20	2692	31
76-3-z14a*	0.82	167	0.2620	0.0067	15.68	0.6900	0.4380	0.0210	0.9332	3258	13	2854	49	2341	100
76-3-z3*	0.74	1520	0.1938	0.0031	8.44	0.3900	0.3200	0.0150	0.9475	2772	21	2272	46	1785	74
76-3-z17*	0.68	1100	0.2055	0.0048	9.63	0.3300	0.3464	0.0120	0.4130	2860	69	2396	32	1916	57
76-1-z3*	0.58	1570	0.1875	0.0160	6.73	2.2000	0.2540	0.0380	0.9658	2714	43	2046	110	1451	150
76-3-z14b*	1.48	589	0.2110	0.0062	8.57	0.7000	0.2904	0.0240	0.6776	2912	32	2308	130	1643	130
76-1-z9b*	1.95	1220	0.2142	0.0039	6.51	0.3400	0.2206	0.0120	0.8793	2935	31	2053	41	1284	61
76-2-z11c*	1.51	739	0.2078	0.0056	5.39	0.2000	0.1860	0.0068	0.9599	2889	29	1865	36	1116	38
76-3-z22b*	2.07	400	0.2302	0.0032	5.70	0.3100	0.1780	0.0085	0.9778	3054	43	1880	18	1060	36
76-3-z5*	1.65	110	0.2618	0.0068	7.30	0.7800	0.2140	0.0220	0.9854	3252	52	2080	120	1220	130
76-3-z9*	1.01	114	0.2190	0.0270	1.68	0.4200	0.0539	0.0140	0.8401	2980	130	990	120	338	84
76-3-z10a*	0.92	229	0.2433	0.0042	3.76	0.4900	0.1132	0.0140	0.9791	3141	27	1575	75	690	81
76-3-z13*	0.54	394	0.2290	0.0041	16.62	0.4400	0.5332	0.0094	0.8045	3042	21	2910	25	2753	39

		isotopic ratios								ages (Ma)					
	Th/U	$^{206*}Pb/^{204}Pb$	$^{207*}Pb/^{206*}Pb$	2s	$^{207*}Pb/^{235}U$	2s	$^{206*}Pb/^{238}U$	2s	Err. Corr.	$^{207*}Pb/^{206*}Pb$	1s	$^{207*}Pb/^{235}U$	1s	$^{206*}Pb/^{238}U$	1s
76-3-z12b*	2.22	662	0.2189	0.0037	16.32	0.5500	0.5410	0.0160	0.8155	2976	19	2900	36	2786	69
76-2-z9b*	0.93	760	0.2041	0.0042	12.47	0.3700	0.4475	0.0120	0.6944	2858	28	2649	28	2382	54
76-3-z12a*	1.14	815	0.2121	0.0038	13.43	0.4100	0.4553	0.0086	0.4597	2921	17	2710	27	2419	38
76-1-z2*	0.49	1100	0.1957	0.0160	13.10	9.3000	0.4833	0.1700	0.2875	2798	39	2685	220	2541	520
76-3-z15*	0.87	1070	0.2062	0.0030	10.86	0.2600	0.3814	0.0078	0.9132	2875	15	2510	22	2082	36
76-2-z4*	0.48	1160	0.1870	0.0075	9.83	0.4600	0.3910	0.0110	0.6691	2707	63	2414	43	2126	51
76-2-z11a*	0.46	1340	0.2062	0.0039	11.74	0.3600	0.4180	0.0130	0.8572	2874	23	2580	28	2250	60
76-3-z21*	0.61	1410	0.2082	0.0037	12.50	0.3400	0.4370	0.0110	0.8251	2890	18	2640	25	2351	48
76-2-z2a*	1.34	1280	0.2077	0.0040	13.69	0.6800	0.4900	0.0210	0.8987	2884	27	2731	46	2562	91
76-2-z9a*	0.54	1430	0.2010	0.0051	10.99	0.4100	0.3950	0.0110	0.7583	2827	35	2514	34	2144	52
76-2-z2b*	0.23	1450	0.1991	0.0029	13.49	0.3200	0.4924	0.0110	0.7720	2817	18	2713	23	2580	48
76-3-z18*	0.21	1560	0.2094	0.0032	15.13	0.8100	0.5330	0.0290	0.9314	2900	20	2821	67	2749	130
76-1-z5b*	0.51	1540	0.2101	0.0035	15.79	0.2400	0.5425	0.0140	0.7573	2905	17	2862	14	2797	58
76-2-z10b*	0.72	1610	0.2151	0.0053	16.94	0.5400	0.5470	0.0130	0.7015	2944	31	2934	32	2816	54
76-3-z1*	0.14	4280	0.1927	0.0150	11.91	5.6000	0.4489	0.1100	0.8092	2765	17	2596	180	2390	360
76-3-z8*	0.83	2270	0.1975	0.0043	12.24	4.7000	0.4500	0.1600	0.7235	2811	32	2621	150	2396	450

[*] Refers to radiogenic Pb (corrected from common Pb).

Italics denote results applied to obtain upper intercept age or Concordia age.

> Denotes results omitted from NCTK10-8 at >12% discordance, and from NCTK10-24 at >30% discordance.

< Denotes results applied to upper intercept in NCTK10-8 at <12% discordance, or that push the MSWD to 10.9 in NCTK10-24 at >8%.

* Denotes results omitted with $^{206}Pb/^{204}Pb$ <350.

^ Denotes results omitted from metasediment samples, final % discordance >30.

[†] c: core, r: rim.

/ Denotes results applied to older age population in NCB11-33.

SI 4.4: SIMS U-Pb isotopic data of polished zircon interiors from NCGB, NW Ontario

grain	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$		discordance (%)
				value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e	
NCGB12-10 (NAD 83, Zone 15, 627540E, 5872755N)																			
NCGB12-10_2	145	155	1.07	0.562	0.021	16.880	0.592	0.218	0.001	0.99	100	99	2873	85	2928	34	2966	8	1.9
NCGB12-10_3	210	124	0.59	0.544	0.013	16.490	0.395	0.220	0.001	0.97	99	95	2801	53	2906	23	2979	10	3.7
NCGB12-10_7	106	80	0.76	0.626	0.027	19.040	0.823	0.221	0.001	1.00	100	100	3134	106	3044	42	2985	6	2.9
NCGB12-10_8	90	39	0.43	0.610	0.036	18.560	1.150	0.221	0.001	1.00	100	99	3070	146	3019	60	2986	8	1.7
NCGB12-10_9	1587	95	0.06	0.533	0.009	15.620	0.316	0.213	0.001	0.98	100	100	2752	40	2854	19	2927	8	3.6
NCGB12-10_15	1362	673	0.49	0.585	0.012	17.730	0.343	0.220	0.000	1.00	100	100	2970	47	2975	19	2979	3	0.2
NCGB12-10_16	158	83	0.52	0.583	0.020	17.410	0.589	0.217	0.001	1.00	100	99	2959	81	2958	33	2956	4	0.0
NCGB12-10_22	258	25	0.10	0.574	0.019	16.950	0.509	0.214	0.001	0.99	100	99	2924	76	2932	29	2938	9	0.3
NCGB12-10_21*	224	55	0.25	0.430	0.012	11.990	0.355	0.202	0.001	0.98	99	97	2306	55	2604	28	2844	9	12.1
NCGB12-10_27	233	157	0.67	0.568	0.027	17.100	0.820	0.219	0.001	1.00	100	100	2899	112	2941	46	2969	6	1.4
NCGB12-10_29	495	278	0.56	0.589	0.012	17.840	0.369	0.220	0.001	0.99	100	100	2986	50	2981	20	2978	6	0.2
NCGB12-10_20	110	90	0.82	0.582	0.047	17.720	1.470	0.221	0.001	1.00	100	100	2958	191	2975	80	2986	9	0.6
NCGB12-10_19	719	364	0.51	0.601	0.014	17.570	0.418	0.212	0.000	1.00	100	99	3034	58	2966	23	2921	3	2.3
NCGB12-10_32	344	110	0.32	0.575	0.015	17.290	0.430	0.218	0.001	0.99	100	99	2928	61	2951	24	2967	7	0.8
NCGB12-10_25	192	119	0.62	0.578	0.015	17.310	0.449	0.217	0.001	0.98	100	100	2940	60	2952	25	2960	8	0.4
NCGB12-10_24	219	37	0.17	0.611	0.036	18.260	1.060	0.217	0.001	1.00	100	99	3074	144	3004	56	2957	6	2.3
NCGB12-10_30	695	200	0.29	0.583	0.013	17.630	0.396	0.219	0.001	0.99	100	100	2961	54	2970	22	2975	5	0.3
NCGB12-10_23	113	84	0.74	0.591	0.025	17.720	0.751	0.218	0.002	0.98	100	99	2991	101	2975	41	2963	14	0.5
NCGB12-10_17	170	67	0.40	0.574	0.014	17.360	0.451	0.220	0.001	0.99	100	100	2922	56	2955	25	2978	8	1.1
NCGB12-10_18	125	86	0.69	0.608	0.026	18.340	0.763	0.219	0.002	0.99	100	99	3061	103	3008	40	2972	11	1.7
NCGB12-10_11	189	144	0.76	0.588	0.017	17.690	0.491	0.218	0.001	0.97	100	100	2982	68	2973	27	2967	11	0.3
NCGB12-10_12	306	176	0.58	0.638	0.018	19.230	0.533	0.219	0.001	0.99	99	98	3181	71	3054	27	2971	6	4.1
NCGB12-10_13	219	128	0.58	0.620	0.025	18.600	0.742	0.218	0.001	0.99	100	100	3109	98	3021	38	2964	8	2.9
NCGB12-10_10	276	96	0.35	0.579	0.014	17.450	0.422	0.219	0.001	0.99	100	99	2946	59	2960	23	2970	5	0.5
NCGB12-10_4	254	148	0.59	0.596	0.024	18.090	0.785	0.220	0.001	1.00	100	100	3014	95	2995	42	2982	8	0.6
NCGB12-10_6	136	109	0.80	0.587	0.016	17.670	0.506	0.218	0.001	0.98	100	100	2977	67	2972	28	2969	9	0.2
NCGB12-13 (NAD 83, Zone 15, 627909E, 5868746N)																			
NCGB12-13-1*	248	38	0.15	0.470	0.026	14.110	0.819	0.218	0.001	1.00	100	99	2485	114	2757	55	2963	8	10
NCGB12-13-2	128	78	0.61	0.542	0.023	16.560	0.715	0.222	0.002	0.98	100	99	2792	97	2909	41	2992	14	4
NCGB12-13-3*	216	43	0.20	0.138	0.006	4.127	0.185	0.216	0.003	0.96	99	95	835.7	33	1660	37	2953	19	66
NCGB12-14 (NAD 83, Zone 15, 626394E, 5869259N)																			
NCGB12-14-1	515	79	0.15	0.536	0.031	16.050	0.934	0.217	0.002	0.99	99	96	2764	128	2880	56	2962	12	4
NCGB12-14-4	452	115	0.26	0.568	0.026	17.200	0.771	0.220	0.001	1.00	100	100	2900	105	2946	43	2978	7	2
NCGB12-14-9	191	17	0.09	0.552	0.028	16.670	0.825	0.219	0.001	0.99	100	99	2832	115	2916	47	2975	10	3
NCGB12-14-11	688	169	0.25	0.522	0.025	15.140	0.701	0.210	0.001	0.99	100	100	2709	106	2824	44	2907	10	4
NCGB12-14-12	561	84	0.15	0.525	0.023	15.830	0.704	0.219	0.001	1.00	100	99	2718	98	2866	43	2972	6	5
NCGB12-14-14	313	63	0.20	0.570	0.026	17.020	0.776	0.217	0.001	1.00	100	99	2906	106	2936	44	2957	7	1
NCGB12-14-17	190	126	0.66	0.554	0.025	16.670	0.741	0.218	0.001	0.99	100	100	2841	102	2916	43	2968	10	3
NCGB12-14-19	224	37	0.17	0.539	0.027	16.250	0.810	0.219	0.002	0.99	99	97	2781	111	2891	48	2969	12	4
NCGB12-14-21	22	3	0.14	0.592	0.040	17.440	1.280	0.214	0.003	0.98	99	98	2997	164	2959	71	2933	22	1
NCGB12-14-23	116	12	0.10	0.600	0.035	18.060	1.020	0.218	0.001	1.00	100	99	3030	140	2993	54	2968	8	1
NCGB12-14-26	356	90	0.25	0.546	0.025	16.650	0.751	0.221	0.001	1.00	100	100	2808	103	2915	43	2989	5	4
NCGB12-14-27*	2982	1381	0.46	0.303	0.016	7.047	0.533	0.169	0.005	0.94	100	99	1704	81	2117	67	2547	51	22
NCGB12-14-30	312	50	0.16	0.566	0.024	17.090	0.730	0.219	0.001	1.00	100	100	2891	100	2940	41	2973	5	2
NCGB12-14-32	120	28	0.23	0.539	0.027	16.310	0.806	0.219	0.001	0.99	100	99	2781	114	2895	47	2976	9	4
NCGB12-14-33	472	65	0.14	0.601	0.031	17.880	0.918	0.216	0.001	1.00	100	99	3033	125	2983	49	2950	6	2
NCGB12-14-34	178	24	0.13	0.597	0.025	18.120	0.745	0.220	0.001	1.00	100	100	3018	100	2996	40	2982	5	1
NCGB12-14-37	103	62	0.60	0.522	0.024	15.740	0.780	0.219	0.002	0.98	100	100	2709	102	2861	47	2970	15	5
NCGB12-14-38	121	26	0.21	0.471	0.020	13.990	0.606	0.215	0.002	0.98	100	98	2489	88	2749	41	2946	13	10
NCGB12-15 (NAD 83, Zone 15, 627540E, 5869191N)																			

grain	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$		discordance (%)
				value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e	
NCGB12-15_1	126	56	0.45	0.508	0.019	15.310	0.650	0.219	0.002	0.99	100	99	2649	82	2834	41	2969	11	6.7
NCGB12-15_2	308	71	0.23	0.539	0.013	16.680	0.391	0.224	0.001	0.99	99	97	2779	53	2917	22	3013	6	4.8
NCGB12-15_3	319	81	0.25	0.601	0.019	18.150	0.585	0.219	0.001	1.00	100	99	3034	75	2998	31	2974	5	1.2
NCGB13-01 (NAD 83, Zone 15, 648708E, 5871865N)																			
NCGB13-01_8	1154	152	0.13	0.555	0.015	15.370	0.402	0.201	0.001	0.99	100	100	2844	61	2839	25	2835	5	0
NCGB13-01_7	223	101	0.45	0.564	0.014	15.550	0.389	0.200	0.001	0.98	100	99	2885	59	2850	24	2825	8	1
NCGB13-01_10	430	131	0.31	0.558	0.015	15.500	0.397	0.201	0.001	0.99	100	100	2860	61	2846	25	2836	5	0
NCGB13-01_12	367	111	0.30	0.541	0.014	15.000	0.411	0.201	0.001	0.99	100	99	2788	59	2815	26	2834	6	1
NCGB13-01_9	395	95	0.24	0.545	0.015	15.080	0.417	0.201	0.001	1.00	100	100	2805	64	2820	26	2831	4	1
NCGB13-01_11	272	71	0.26	0.508	0.013	13.840	0.351	0.198	0.001	0.986	99	98	2648	54	2739	24	2806	7	3
East eyap (NAD 83, Zone 15, 657715E, 5868570N)																			
East Eyap-2	165	99	0.60	0.548	0.022	16.440	0.656	0.218	0.002	0.98	100	100	2817	90	2903	38	2963	11	3
East Eyap-3*	70	34	0.49	0.448	0.029	12.960	0.899	0.210	0.004	0.95	99	97	2388	129	2677	65	2903	34	11
East Eyap-5	255	46	0.18	0.551	0.022	15.610	0.590	0.206	0.002	0.98	100	100	2828	91	2853	36	2871	13	1
East Eyap-6	270	43	0.16	0.549	0.023	16.620	0.688	0.220	0.001	1.00	100	100	2820	94	2913	40	2978	6	3
East Eyap-9	180	67	0.37	0.564	0.027	17.850	0.883	0.230	0.001	0.99	100	100	2883	112	2982	48	3049	9	3
East Eyap-10	81	26	0.32	0.562	0.024	16.800	0.740	0.217	0.001	0.99	100	100	2875	99	2923	42	2957	10	2
East Eyap-11	356	200	0.56	0.578	0.018	17.390	0.540	0.218	0.001	0.99	100	100	2940	73	2957	30	2968	5	1
East Eyap-12	246	84	0.34	0.560	0.019	16.790	0.566	0.218	0.001	1.00	100	100	2865	80	2923	32	2963	6	2
East Eyap-13	398	145	0.37	0.486	0.014	14.010	0.397	0.209	0.001	0.98	100	98	2551	59	2751	27	2900	9	8
East Eyap-14	289	64	0.22	0.547	0.019	16.310	0.567	0.216	0.001	0.99	100	100	2813	78	2895	33	2953	8	3
East Eyap-15	167	30	0.18	0.551	0.025	16.640	0.750	0.219	0.001	0.99	100	100	2831	105	2915	43	2973	10	3
East Eyap-16	2052	326	0.16	0.519	0.017	16.180	0.517	0.226	0.001	1.00	100	100	2695	70	2887	31	3024	4	7
East Eyap-19	92	46	0.49	0.572	0.031	17.240	0.854	0.219	0.002	0.99	100	100	2915	126	2948	48	2971	12	1
East Eyap-18	479	140	0.29	0.568	0.019	17.920	0.604	0.229	0.001	0.99	100	100	2898	78	2985	32	3045	6	3
East Eyap-17	136	66	0.48	0.577	0.023	17.550	0.696	0.221	0.001	1.00	100	100	2936	96	2965	38	2985	6	1
Akow Lake (NAD 83, zone 15, 670288E, 5850306N)																			
Akow-1	400	61	0.15	0.574	0.024	15.520	0.639	0.196	0.001	1.00	100	99	2922	96	2848	39	2795	5	3
Akow-3	325	36	0.11	0.580	0.027	16.410	0.760	0.205	0.001	0.99	99	98	2950	109	2901	44	2867	9	2
Akow-5	462	85	0.18	0.501	0.019	14.150	0.551	0.205	0.001	0.99	100	99	2617	82	2760	37	2866	7	5
Akow-6	287	70	0.24	0.574	0.028	16.200	0.780	0.205	0.001	0.99	100	99	2926	113	2889	46	2863	11	1
Akow-7	237	68	0.29	0.547	0.024	14.550	0.658	0.193	0.001	0.99	100	99	2814	102	2786	43	2766	11	1
Akow-8	439	51	0.12	0.532	0.023	15.100	0.654	0.206	0.001	1.00	100	99	2752	96	2822	41	2872	6	3
Akow-9	102	20	0.20	0.572	0.030	15.660	0.803	0.199	0.001	0.99	99	98	2914	122	2856	49	2815	12	2
Akow-10*	763	150	0.20	0.433	0.023	12.140	0.644	0.203	0.001	1.00	100	99	2321	102	2616	50	2852	8	12
Akow-11	272	39	0.15	0.585	0.030	16.520	0.837	0.205	0.001	1.00	100	100	2968	123	2908	49	2866	7	2
Akow-13*	162	52	0.32	0.339	0.012	9.179	0.363	0.196	0.002	0.97	100	99	1881	60	2356	36	2797	15	22
Akow-15	254	36	0.14	0.569	0.026	16.120	0.726	0.205	0.001	0.99	100	99	2904	106	2884	43	2870	9	1
Akow-17	155	28	0.18	0.594	0.040	16.580	1.060	0.203	0.002	0.99	100	99	3005	163	2911	61	2847	13	3
Akow-20	449	51	0.11	0.572	0.029	16.070	0.809	0.204	0.001	1.00	100	99	2917	120	2881	48	2856	6	1
Akow-22	773	173	0.22	0.583	0.026	16.480	0.739	0.205	0.000	1.00	100	100	2961	107	2905	43	2867	4	2
Akow-23	260	40	0.15	0.528	0.023	14.940	0.616	0.205	0.001	0.99	100	99	2734	95	2812	39	2868	10	3
Akow-24	650	45	0.07	0.618	0.028	19.540	0.875	0.229	0.000	1.00	100	100	3102	110	3069	43	3047	3	1
Akow-26	255	36	0.14	0.570	0.024	16.100	0.677	0.205	0.001	0.99	100	99	2909	98	2883	40	2864	9	1
Akow-25	579	73	0.13	0.539	0.032	15.270	0.878	0.205	0.001	1.00	100	99	2780	135	2832	55	2869	7	2
Akow_2	82	32	0.39	0.501	0.028	14.340	0.785	0.208	0.001	0.99	100	100	2618	118	2772	52	2887	10	5.7
Akow_6	624	174	0.28	0.570	0.024	16.140	0.646	0.205	0.001	1.00	100	100	2909	99	2885	38	2869	6	0.8
Akow_a	309	76	0.25	0.556	0.022	15.710	0.592	0.205	0.001	1.00	100	100	2848	90	2860	36	2868	6	0.4
Akow_10	242	39	0.16	0.571	0.016	15.890	0.445	0.202	0.001	0.99	100	100	2913	66	2870	27	2840	7	1.5
Akow_f*	192	52	0.27	0.387	0.013	10.890	0.358	0.204	0.001	1.00	100	99	2111	60	2513	31	2857	5	17.4
Akow_15	111	26	0.24	0.514	0.023	14.350	0.637	0.202	0.001	0.99	100	99	2674	97	2773	42	2845	10	3.6
Akow_13	453	74	0.16	0.587	0.025	16.690	0.693	0.206	0.001	1.00	100	100	2977	101	2917	40	2876	4	2.0
NCB13-9B (NAD 83, Zone 15, 688250E, 5825109N)																			
NCGB13-9B_4	552	477	0.86	0.517	0.013	13.430	0.341	0.189	0.001	0.98	100	100	2685	56	2711	24	2730	7	1
NCGB13-9B_5	186	100	0.54	0.572	0.019	17.230	0.598	0.219	0.002	0.97	100	99	2914	80	2948	33	2971	14	1

grain	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		correlation of concordia	radiogenic ^{206}Pb (%)	radiogenic ^{207}Pb (%)	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$		discordance (%)
				value	1 s.e	value	1 s.e	value	1 s.e				age (Ma)	1 s.e	age (Ma)	1 s.e	age (Ma)	1 s.e	
NCGB13-9B_8	1034	612	0.59	0.535	0.014	14.550	0.371	0.197	0.001	1.00	100	99	2761	58	2786	24	2804	4	1
NCGB13-9B_7	647	283	0.44	0.547	0.013	15.210	0.379	0.202	0.001	0.99	100	100	2811	56	2829	24	2841	4	1
NCGB13-9B_11	971	357	0.37	0.564	0.016	16.210	0.471	0.208	0.000	1.00	100	100	2884	67	2889	28	2893	4	0
NCGB13-9B_12*	1462	524	0.36	0.352	0.009	7.953	0.237	0.164	0.001	0.98	100	100	1945	45	2226	27	2495	11	13
NCGB13-9B_13	1288	471	0.37	0.409	0.020	9.838	0.555	0.174	0.002	0.99	100	100	2212	91	2420	52	2600	17	9
NCGB13-9B_10	598	242	0.41	0.503	0.014	12.990	0.379	0.187	0.000	1.00	100	100	2625	62	2679	28	2719	4	2
NCGB13-9B_14	224	73	0.33	0.545	0.015	15.480	0.445	0.206	0.001	0.99	100	99	2805	64	2845	27	2873	5	1
NCGB13-9B_15	682	453	0.66	0.509	0.013	13.180	0.325	0.188	0.000	1.00	100	100	2651	54	2692	23	2723	3	2
NCGB13-9B_17	1395	635	0.46	0.416	0.009	10.290	0.226	0.179	0.000	0.99	100	99	2242	40	2461	20	2647	4	9
NCGB13-9B_18	328	316	0.96	0.516	0.012	14.710	0.336	0.207	0.001	0.99	100	99	2684	50	2797	22	2879	6	4
NCGB13-9B_23	479	364	0.76	0.545	0.014	16.120	0.409	0.215	0.000	1.00	100	99	2802	58	2884	24	2942	4	3
NCGB13-9B_24	85	88	1.03	0.445	0.033	11.120	1.570	0.181	0.020	0.64	93	74	2374	148	2533	131	2663	182	6
NCB13-7 (NAD 83, Zone 15, 689548E, 5825474N)																			
NCGB13-7_3*	137	152	1.10	0.422	0.012	11.810	0.374	0.203	0.002	0.94	97	90	2269	56	2590	30	2851	18	13
NCGB13-7_5	216	53	0.25	0.538	0.013	15.090	0.365	0.204	0.001	0.97	100	99	2773	54	2821	23	2855	9	2
NCGB13-7_9*	993	112	0.11	0.386	0.016	10.280	0.500	0.193	0.002	0.99	99	97	2106	73	2461	45	2769	17	16
NCGB13-7_10	550	112	0.20	0.465	0.012	12.880	0.342	0.201	0.001	0.99	99	98	2459	54	2671	25	2835	6	8
NCGB13-7_7	204	91	0.45	0.538	0.014	14.880	0.374	0.201	0.001	0.99	100	98	2775	57	2808	24	2831	6	1
NCGB13-7_8	333	172	0.52	0.511	0.018	14.270	0.520	0.202	0.001	0.99	99	97	2662	77	2768	35	2846	10	4
NCGB13-7_11	582	155	0.27	0.517	0.013	14.570	0.356	0.204	0.001	0.99	100	99	2687	55	2787	23	2860	7	4
NCGB13-7_14	298	165	0.55	0.496	0.018	13.720	0.491	0.201	0.001	0.99	100	98	2596	77	2731	34	2832	6	5
NCGB13-7_16	1034	313	0.30	0.514	0.011	14.290	0.321	0.202	0.000	1.00	100	99	2674	48	2769	21	2839	3	3
NCGB13-7_18*	854	322	0.38	0.249	0.030	7.436	1.060	0.216	0.009	0.96	100	99	1435	154	2165	127	2954	69	41
NCGB13-7_19	216	96	0.44	0.504	0.018	13.890	0.494	0.200	0.001	0.98	99	95	2631	78	2742	34	2825	11	4
NCGB13-7_22	326	131	0.40	0.501	0.014	13.950	0.408	0.202	0.001	0.98	99	97	2618	60	2746	28	2842	10	5
NCGB13-7_21	553	143	0.26	0.528	0.023	14.960	0.595	0.205	0.001	0.99	100	100	2734	98	2813	38	2870	10	3
NCB13-7B (NAD 83, Zone 15, 689548E, 5825474N)																			
NCGB13-7B_1	661	145	0.22	0.463	0.010	12.310	0.278	0.193	0.001	0.98	100	98	2451	45	2628	21	2768	7	7
NCGB13-7B_2	395	176	0.45	0.530	0.022	14.880	0.572	0.204	0.001	0.99	99	96	2740	93	2807	37	2856	8	2
NCGB13-7B_3	357	57	0.16	0.575	0.016	16.140	0.431	0.204	0.001	0.99	100	99	2927	65	2885	26	2856	6	1
NCGB13-7B_5	348	165	0.47	0.550	0.016	15.490	0.464	0.204	0.001	0.99	100	99	2826	66	2846	29	2861	7	1
NCGB13-7B_7	414	203	0.49	0.597	0.016	16.890	0.451	0.205	0.001	0.99	100	100	3018	64	2929	26	2867	4	3
NCGB13-7B_6	630	279	0.44	0.425	0.012	10.900	0.372	0.186	0.002	0.96	100	99	2281	52	2514	32	2708	18	10
NCGB13-7B_9	542	173	0.32	0.590	0.018	16.410	0.492	0.202	0.001	0.99	100	99	2991	75	2901	29	2839	7	3
NCGB13-7B_15	392	66	0.17	0.513	0.014	13.930	0.379	0.197	0.001	0.99	100	99	2671	58	2745	26	2800	6	3
NCGB13-7B_13	531	108	0.20	0.621	0.016	18.690	0.471	0.218	0.001	1.00	100	100	3115	63	3026	24	2967	4	3
NCB13-5B (NAD 83, Zone 16, 300330E, 5820880N)																			
NCGB13-5B_4	122	26	0.22	0.561	0.019	15.660	0.511	0.202	0.001	0.98	99	95	2871	77	2856	31	2846	12	1
NCGB13-5B_5	454	150	0.33	0.600	0.021	17.030	0.570	0.206	0.001	0.99	100	100	3028	85	2936	32	2874	8	3
NCGB13-5B_8*	254	199	0.78	0.440	0.011	13.030	0.420	0.215	0.004	0.76	92	74	2351	48	2682	30	2941	34	13
NCGB13-5B_10*	114	33	0.29	0.398	0.011	11.240	0.300	0.205	0.002	0.94	99	94	2158	52	2544	25	2867	16	16
NCGB13-5B_16	340	122	0.36	0.553	0.014	15.400	0.700	0.202	0.006	0.73	88	63	2836	58	2840	43	2843	52	0
NCGB13-5B_14	272	128	0.47	0.513	0.037	14.270	0.937	0.202	0.001	1.00	100	99	2668	156	2768	62	2842	9	4
NCGB13-5B_27	127	33	0.26	0.567	0.020	16.200	0.584	0.207	0.001	0.99	100	100	2896	81	2889	35	2883	7	0
NCGB13-5B_28	180	74	0.41	0.466	0.015	13.340	0.714	0.208	0.007	0.80	97	90	2468	67	2704	51	2886	54	9
NCGB13-5B_29	192	107	0.56	0.562	0.014	15.800	0.410	0.204	0.001	0.98	100	98	2875	56	2865	25	2858	8	0
NCGB13-5B_26	643	191	0.30	0.444	0.011	12.150	0.292	0.199	0.001	0.98	99	96	2367	47	2616	23	2815	9	10
NCGB13-5B_25	439	118	0.27	0.557	0.014	15.550	0.407	0.202	0.001	0.99	100	98	2855	60	2849	25	2845	6	0
NCGB13-5B_11	423	82	0.19	0.555	0.022	15.770	0.636	0.206	0.001	0.99	99	97	2845	91	2863	39	2875	11	1

*>10% disc.

SI 4.5: SIMS U-Pb depth-profile data, NCGB, NW Ontario

sample / grain #	mass cycle	U (est ppm)	Th (est ppm)	Th/U	$^{206}Pb^*/^{238}U$		$^{207}Pb^*/^{235}U$		$^{207}Pb^*/^{206}Pb^*$		% $^{206}Pb^*$	% $^{207}Pb^*$	discordance (%)	correlation of concordia ellipses	$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$	
					value	1 s.e.	value	1 s.e.	value	1 s.e.					age (Ma)	1 s.e.	age (Ma)	1 s.e.	age (Ma)	1 s.e.
Cordierite-bearing biotite schist (NCGB12-10; NAD 83, Zone 15, 627540E, 5872755N)																				
NCGB12-10-11	1	571	167	0.23	0.461	0.024	13.590	0.716	0.214	0.002	100	99	11	0.98	2443	107	2722	50	2936	18
	2	515	205	0.31	0.467	0.026	14.100	0.780	0.219	0.003	100	99	11	0.98	2470	113	2756	53	2973	19
	3	384	193	0.39	0.525	0.032	16.140	0.990	0.223	0.003	100	100	6	0.98	2722	136	2885	59	3000	22
	4	292	185	0.50	0.484	0.029	14.690	0.871	0.220	0.003	100	99	9	0.97	2543	124	2795	56	2983	25
	5	238	171	0.56	0.476	0.030	14.490	0.905	0.221	0.004	100	99	10	0.96	2511	129	2782	59	2985	27
	6	183	130	0.55	0.459	0.028	14.160	0.885	0.224	0.004	100	99	13	0.95	2435	126	2760	59	3008	31
	7	165	114	0.54	0.451	0.029	13.620	0.899	0.219	0.005	100	98	13	0.95	2398	131	2723	62	2974	34
	8	152	92	0.47	0.501	0.036	15.530	1.139	0.225	0.005	100	99	8	0.96	2616	157	2848	70	3017	34
	9	146	99	0.53	0.433	0.028	13.380	0.877	0.224	0.005	100	99	15	0.94	2321	127	2707	62	3009	35
	10	140	97	0.54	0.396	0.024	12.280	0.756	0.225	0.005	100	100	20	0.94	2149	112	2626	58	3017	35
	11	149	99	0.52	0.505	0.039	15.730	1.215	0.226	0.005	100	99	8	0.96	2636	166	2861	74	3023	34
	12	150	108	0.56	0.467	0.034	14.670	1.061	0.228	0.005	100	99	12	0.96	2470	147	2794	69	3037	34
	13	150	122	0.64	0.396	0.025	12.450	0.782	0.228	0.005	100	100	20	0.94	2152	114	2639	59	3037	34
	14	160	120	0.59	0.500	0.039	15.860	1.233	0.230	0.005	100	100	9	0.96	2613	166	2869	74	3053	33
	15	155	129	0.65	0.421	0.028	13.210	0.879	0.227	0.005	100	99	17	0.95	2266	126	2695	63	3034	34
NCGB12-10-2	1	672	113	0.13	0.286	0.018	7.422	0.491	0.188	0.005	97	88	29	0.93	1622	90	2164	59	2726	40
	2	511	79	0.12	0.347	0.024	9.065	0.663	0.190	0.005	98	91	20	0.94	1919	117	2345	67	2739	40
	3	490	90	0.14	0.370	0.029	10.240	0.802	0.201	0.004	99	96	19	0.96	2031	134	2457	72	2831	36
	4	425	58	0.11	0.387	0.030	10.600	0.844	0.199	0.005	99	96	17	0.96	2109	141	2489	74	2815	39
	5	432	61	0.11	0.454	0.042	13.130	1.214	0.210	0.005	100	98	11	0.97	2414	185	2689	87	2902	36
	6	425	73	0.13	0.351	0.026	10.000	0.756	0.207	0.005	99	97	23	0.96	1939	125	2435	70	2880	37
	7	401	67	0.13	0.466	0.043	13.550	1.253	0.211	0.005	99	98	10	0.97	2467	188	2719	87	2912	37
	8	387	65	0.13	0.404	0.032	11.650	0.929	0.209	0.005	99	98	16	0.96	2187	146	2576	75	2899	38
	9	388	61	0.12	0.454	0.040	13.410	1.190	0.214	0.005	99	97	12	0.97	2413	177	2709	84	2937	37
	10	394	51	0.10	0.430	0.035	12.440	1.030	0.210	0.005	99	96	13	0.96	2307	158	2638	78	2903	38
	11	408	50	0.10	0.479	0.042	13.700	1.201	0.208	0.005	99	97	8	0.97	2521	181	2729	83	2887	36
	12	406	54	0.10	0.458	0.037	13.470	1.103	0.213	0.004	100	98	11	0.97	2430	164	2713	77	2931	34
	13	436	54	0.10	0.509	0.044	14.720	1.296	0.210	0.004	100	99	5	0.97	2650	190	2797	84	2905	33
	14	454	54	0.09	0.432	0.032	12.760	0.944	0.214	0.004	99	98	14	0.96	2315	142	2662	70	2938	33
	15	469	59	0.10	0.525	0.045	14.890	1.278	0.206	0.004	99	97	3	0.97	2721	189	2808	82	2872	32
	16	480	61	0.10	0.422	0.029	12.250	0.841	0.211	0.004	99	98	15	0.96	2267	130	2623	65	2911	32
	17	535	49	0.07	0.507	0.040	14.740	1.177	0.211	0.004	100	99	6	0.97	2645	172	2799	76	2912	30
	18	541	62	0.09	0.480	0.035	14.110	1.029	0.213	0.004	100	99	9	0.97	2527	151	2757	69	2930	29
	19	618	72	0.09	0.539	0.043	15.440	1.238	0.208	0.004	100	0	2	0.98	2779	180	2843	77	2888	28
NCGB12-10-6	1	2076	499	0.19	0.492	0.027	13.680	0.754	0.202	0.002	100	100	6	0.99	2581	117	2728	52	2839	14
	2	1169	351	0.23	0.598	0.036	17.130	1.044	0.208	0.002	100	100	3	0.98	3023	147	2942	59	2887	18
	3	619	187	0.24	0.550	0.030	15.460	0.859	0.204	0.003	100	100	1	0.97	2824	126	2844	53	2858	24
	4	470	119	0.20	0.513	0.030	14.590	0.846	0.206	0.003	100	100	4	0.96	2671	126	2789	55	2876	27
	5	404	117	0.23	0.450	0.024	13.000	0.705	0.210	0.004	100	100	11	0.95	2396	108	2680	51	2902	29
	6	392	113	0.22	0.467	0.027	13.530	0.775	0.210	0.004	100	100	10	0.95	2468	117	2718	54	2909	29
	7	385	114	0.23	0.452	0.025	13.230	0.747	0.212	0.004	100	100	11	0.95	2404	113	2696	53	2923	30
	8	436	131	0.23	0.426	0.024	12.520	0.715	0.213	0.004	100	100	14	0.95	2287	109	2644	54	2930	28
	9	356	113	0.25	0.514	0.033	14.990	0.964	0.212	0.004	100	100	5	0.96	2672	140	2815	61	2919	30
	10	305	106	0.27	0.455	0.027	13.520	0.817	0.215	0.004	100	100	12	0.95	2418	121	2716	57	2946	32
	11	265	85	0.25	0.488	0.032	14.310	0.949	0.213	0.005	100	100	8	0.95	2560	139	2771	63	2927	34
	12	212	76	0.28	0.460	0.030	13.490	0.873	0.213	0.005	100	100	11	0.94	2440	131	2714	61	2926	38
	13	195	70	0.28	0.464	0.032	13.600	0.933	0.213	0.005	100	100	10	0.94	2459	139	2723	65	2925	39
	14	182	67	0.29	0.473	0.033	13.940	0.982	0.214	0.005	100	100	9	0.94	2499	145	2746	67	2933	41

	15	160	56	0.27	0.420	0.027	12.110	0.794	0.209	0.006	100	100	14	0.92	2260	124	2613	62	2898	44
	16	166	65	0.30	0.512	0.040	15.160	1.205	0.215	0.006	100	100	6	0.94	2667	173	2825	76	2940	44
	17	141	54	0.30	0.444	0.031	12.810	0.912	0.209	0.006	100	100	12	0.92	2369	140	2666	67	2899	47
	18	151	58	0.30	0.427	0.030	12.230	0.866	0.208	0.006	100	100	13	0.92	2294	135	2622	66	2886	46
	19	139	68	0.38	0.527	0.042	15.140	1.226	0.208	0.006	100	100	3	0.93	2730	179	2824	77	2892	48
NCGB12-10-18	1	1013	38	0.03	0.320	0.014	8.157	0.358	0.185	0.002	100	98	23	0.96	1789	68	2249	40	2698	21
	2	987	31	0.02	0.356	0.016	9.078	0.416	0.185	0.002	100	99	18	0.97	1964	77	2346	42	2697	20
	3	996	41	0.03	0.355	0.016	9.236	0.411	0.189	0.002	100	99	19	0.97	1960	75	2362	41	2730	19
	4	993	84	0.07	0.347	0.015	8.947	0.378	0.187	0.002	100	99	20	0.96	1918	70	2333	39	2718	19
	5	1011	107	0.08	0.353	0.014	9.107	0.374	0.187	0.002	100	99	19	0.96	1949	69	2349	38	2717	19
	6	1019	130	0.10	0.362	0.015	9.543	0.397	0.191	0.002	100	100	18	0.96	1992	71	2392	38	2752	19
	7	1077	152	0.11	0.319	0.012	8.383	0.310	0.190	0.002	100	100	24	0.95	1787	57	2273	34	2745	18
	8	1172	219	0.15	0.312	0.011	8.288	0.307	0.193	0.002	100	100	26	0.96	1750	56	2263	34	2766	18
	9	1025	229	0.17	0.354	0.014	9.515	0.387	0.195	0.002	100	100	20	0.96	1956	68	2389	37	2782	18
	10	864	234	0.21	0.325	0.013	8.654	0.343	0.193	0.002	100	100	24	0.95	1812	62	2302	36	2771	20
	11	558	201	0.28	0.359	0.015	9.640	0.410	0.195	0.003	100	100	19	0.94	1975	72	2401	39	2785	24
	12	354	111	0.24	0.373	0.017	10.110	0.475	0.197	0.004	100	100	18	0.92	2043	81	2445	43	2798	30
	13	250	74	0.23	0.376	0.020	10.200	0.552	0.197	0.004	100	99	17	0.92	2059	94	2453	50	2798	36
	14	185	61	0.26	0.409	0.026	11.410	0.720	0.202	0.005	100	100	14	0.92	2212	117	2557	59	2844	41
	15	156	54	0.27	0.344	0.020	9.742	0.582	0.206	0.006	100	99	23	0.90	1904	97	2411	55	2872	44
	16	153	64	0.33	0.331	0.020	9.309	0.561	0.204	0.006	100	100	25	0.89	1843	95	2369	55	2858	45
	17	140	59	0.33	0.300	0.017	8.557	0.487	0.207	0.006	100	100	30	0.87	1689	83	2292	52	2883	46
	18	145	71	0.38	0.355	0.022	10.270	0.652	0.210	0.006	100	100	23	0.90	1959	106	2460	59	2904	46
	19	136	74	0.43	0.296	0.016	8.501	0.475	0.208	0.006	100	100	31	0.86	1673	81	2286	51	2891	47
	20	146	98	0.52	0.335	0.020	9.636	0.582	0.209	0.006	100	99	25	0.89	1863	96	2401	56	2895	46
	21	135	89	0.52	0.300	0.016	8.736	0.480	0.211	0.006	100	99	31	0.86	1690	80	2311	50	2916	47
	22	155	104	0.53	0.349	0.021	10.120	0.607	0.211	0.006	100	99	24	0.89	1928	99	2446	55	2910	45
	23	150	111	0.57	0.304	0.016	8.998	0.482	0.215	0.006	100	100	31	0.87	1709	79	2338	49	2943	44
	24	155	130	0.65	0.305	0.016	9.046	0.481	0.215	0.006	100	100	31	0.87	1715	79	2343	49	2945	44
	25	168	129	0.60	0.359	0.021	10.850	0.629	0.219	0.006	100	100	24	0.90	1977	98	2510	54	2975	42
	26	172	132	0.60	0.329	0.018	9.853	0.538	0.217	0.006	100	100	28	0.89	1835	86	2421	50	2959	42
	27	171	144	0.65	0.342	0.019	10.230	0.571	0.217	0.006	100	100	26	0.89	1895	90	2456	52	2960	41
	28	166	127	0.60	0.311	0.016	9.185	0.481	0.214	0.006	100	100	30	0.88	1748	79	2357	48	2935	42
	29	175	143	0.64	0.338	0.019	9.991	0.555	0.214	0.005	100	100	26	0.90	1878	89	2434	51	2938	41
NCGB12-10-4	1	1008	150	0.12	0.441	0.032	12.500	0.929	0.206	0.003	99	95	12	0.98	2355	145	2643	70	2871	27
	2	702	108	0.12	0.478	0.037	14.050	1.104	0.213	0.004	99	96	9	0.97	2519	162	2753	75	2929	29
	3	482	94	0.15	0.465	0.035	13.760	1.033	0.215	0.004	99	98	10	0.96	2462	152	2733	71	2940	33
	4	409	107	0.21	0.552	0.051	16.540	1.531	0.217	0.005	100	98	3	0.97	2833	211	2908	89	2961	35
	5	357	110	0.24	0.600	0.062	18.040	1.864	0.218	0.005	100	99	1	0.98	3031	249	2992	99	2966	37
	6	278	100	0.28	0.489	0.041	14.080	1.202	0.209	0.005	100	98	7	0.95	2568	179	2755	81	2895	42
	7	282	92	0.25	0.499	0.044	15.120	1.352	0.220	0.005	100	99	8	0.96	2607	191	2823	85	2981	40
	8	307	106	0.27	0.451	0.036	13.630	1.106	0.219	0.005	100	99	13	0.96	2400	161	2724	77	2975	39
	9	303	112	0.29	0.425	0.031	12.340	0.921	0.211	0.005	100	99	14	0.95	2282	142	2631	70	2911	39
	10	291	121	0.32	0.510	0.044	15.460	1.340	0.220	0.005	100	100	7	0.96	2658	188	2844	83	2978	39
	11	272	127	0.36	0.447	0.035	13.510	1.080	0.220	0.006	100	99	13	0.95	2380	158	2716	76	2977	41
	12	238	104	0.34	0.445	0.035	13.760	1.108	0.224	0.006	100	98	14	0.94	2374	158	2734	76	3011	43
	13	219	99	0.35	0.513	0.047	15.330	1.410	0.217	0.006	100	99	6	0.96	2669	200	2836	88	2957	44
	14	223	98	0.34	0.655	0.077	19.550	2.298	0.217	0.006	100	99	6	0.97	3246	298	3069	114	2956	45
	15	204	104	0.40	0.504	0.046	15.390	1.423	0.222	0.006	100	99	8	0.95	2630	198	2839	88	2992	47
NCGB12-10-7	1	1509	66	0.03	0.385	0.020	11.430	0.609	0.215	0.002	99	95	20	0.98	2099	95	2559	50	2947	18
	2	1310	64	0.04	0.438	0.024	13.110	0.731	0.217	0.002	99	97	14	0.98	2341	109	2688	53	2961	18
	3	1091	76	0.05	0.549	0.035	16.560	1.052	0.219	0.003	100	98	3	0.98	2820	145	2910	61	2973	19
	4	912	68	0.06	0.533	0.031	15.770	0.934	0.215	0.003	100	99	4	0.98	2754	132	2863	57	2941	20
	5	989	77	0.06	0.529	0.033	15.860	0.979	0.218	0.003	100	99	5	0.98	2736	137	2869	59	2963	19

	6	1027	80	0.06	0.538	0.033	16.280	1.010	0.219	0.003	100	99	4	0.98	2776	140	2893	59	2976	19
	7	934	86	0.07	0.562	0.035	16.970	1.067	0.219	0.003	100	99	2	0.98	2876	145	2933	60	2973	19
	8	914	84	0.07	0.591	0.039	17.730	1.179	0.217	0.003	100	98	1	0.98	2995	159	2975	64	2962	20
	9	881	90	0.08	0.515	0.029	15.630	0.887	0.220	0.003	99	98	6	0.98	2676	124	2854	54	2982	20
	10	856	89	0.08	0.585	0.037	17.890	1.125	0.222	0.003	99	96	1	0.98	2968	149	2984	61	2995	21
	11	869	125	0.11	0.588	0.038	17.650	1.137	0.218	0.003	99	94	0	0.98	2980	153	2971	62	2965	21
	12	884	114	0.10	0.520	0.030	15.540	0.918	0.217	0.003	99	95	5	0.98	2699	129	2849	56	2957	21
	13	850	105	0.10	0.547	0.034	16.550	1.024	0.220	0.003	99	98	3	0.98	2811	140	2909	59	2977	21
	14	748	82	0.08	0.504	0.029	15.450	0.904	0.222	0.003	100	98	8	0.97	2630	126	2843	56	2998	22
	15	632	89	0.11	0.551	0.034	16.450	1.029	0.217	0.003	99	97	3	0.97	2830	142	2903	60	2955	24
NCGB12-10-8	1	1100	10	0.01	0.435	0.028	10.660	0.707	0.178	0.004	98	90	7	0.95	2328	126	2494	62	2633	34
	2	1012	9	0.01	0.520	0.036	13.030	0.916	0.182	0.003	99	97	1	0.97	2698	153	2682	66	2670	27
	3	981	11	0.01	0.532	0.036	13.290	0.912	0.181	0.003	99	98	2	0.98	2749	152	2701	65	2665	25
	4	1024	9	0.01	0.552	0.038	14.170	0.986	0.186	0.003	100	98	3	0.98	2833	159	2761	66	2709	23
	5	1204	18	0.01	0.559	0.039	14.180	1.001	0.184	0.002	100	99	4	0.98	2864	163	2762	67	2688	21
	6	1348	24	0.01	0.465	0.027	11.920	0.706	0.186	0.002	100	99	5	0.98	2461	121	2598	56	2706	20
	7	1354	20	0.01	0.468	0.027	12.100	0.701	0.187	0.002	100	99	5	0.98	2477	119	2612	54	2719	19
	8	1337	24	0.01	0.532	0.034	13.590	0.882	0.185	0.002	100	100	1	0.98	2751	145	2721	61	2699	20
	9	1268	39	0.02	0.485	0.029	12.570	0.758	0.188	0.002	100	100	4	0.98	2548	126	2648	57	2726	20
	10	1160	39	0.03	0.481	0.029	12.270	0.734	0.185	0.002	100	100	4	0.98	2533	125	2625	56	2697	20
	11	1131	42	0.03	0.516	0.034	13.100	0.858	0.184	0.002	100	99	0	0.98	2680	143	2687	62	2692	21
	12	1106	56	0.04	0.446	0.026	11.580	0.676	0.189	0.002	100	99	8	0.98	2376	115	2571	55	2729	21
	13	981	62	0.05	0.464	0.028	12.100	0.743	0.189	0.003	100	100	6	0.98	2457	125	2612	58	2735	22
	14	830	67	0.06	0.476	0.030	12.420	0.790	0.189	0.003	100	100	5	0.97	2508	131	2637	60	2737	24
	15	667	63	0.07	0.427	0.026	11.410	0.686	0.194	0.003	100	100	11	0.97	2291	115	2557	56	2775	26
	16	530	76	0.11	0.507	0.037	13.520	0.992	0.193	0.003	100	100	3	0.97	2645	158	2717	69	2771	29
	17	422	95	0.18	0.525	0.042	14.170	1.145	0.196	0.004	100	99	2	0.97	2719	178	2761	77	2792	32
	18	371	110	0.23	0.448	0.033	12.650	0.930	0.205	0.004	100	99	11	0.96	2387	146	2654	69	2865	34
	19	334	128	0.30	0.455	0.034	12.730	0.949	0.203	0.004	100	99	9	0.96	2419	149	2660	70	2848	36
	20	317	140	0.34	0.435	0.032	12.510	0.917	0.209	0.005	100	99	13	0.95	2329	142	2644	69	2894	36
	21	319	139	0.34	0.475	0.038	14.070	1.145	0.215	0.005	100	99	10	0.96	2504	168	2755	77	2944	36
	22	294	147	0.39	0.457	0.035	13.080	1.020	0.208	0.005	100	100	10	0.96	2426	157	2685	74	2887	37
	23	293	160	0.43	0.443	0.034	12.860	0.990	0.211	0.005	100	100	12	0.96	2362	151	2669	73	2911	37
	24	272	154	0.44	0.390	0.027	11.610	0.806	0.216	0.005	100	100	19	0.94	2125	125	2574	65	2949	38
	25	255	153	0.47	0.386	0.027	11.460	0.800	0.215	0.005	100	100	19	0.94	2106	124	2561	65	2944	39
	26	269	144	0.42	0.418	0.032	12.280	0.936	0.213	0.005	100	100	15	0.95	2250	144	2626	72	2931	39
	27	259	153	0.46	0.422	0.033	12.340	0.961	0.212	0.005	100	100	15	0.95	2269	148	2631	73	2923	40
	28	238	128	0.42	0.409	0.031	11.950	0.914	0.212	0.005	100	100	16	0.95	2209	142	2600	72	2921	41
	29	231	138	0.47	0.448	0.037	13.280	1.114	0.215	0.005	100	99	12	0.95	2387	166	2700	79	2943	41
	30	224	127	0.44	0.380	0.028	11.370	0.851	0.217	0.006	100	99	21	0.94	2077	131	2554	70	2958	42
	31	214	138	0.50	0.416	0.033	12.420	0.994	0.217	0.006	100	100	16	0.95	2240	150	2637	75	2958	42
	32	204	135	0.52	0.385	0.029	11.360	0.859	0.214	0.006	100	100	19	0.94	2100	134	2553	71	2937	43
	33	197	129	0.51	0.390	0.030	11.680	0.901	0.217	0.006	100	100	19	0.94	2122	138	2579	72	2961	43
	34	207	131	0.49	0.410	0.033	12.180	0.993	0.216	0.006	100	100	17	0.95	2214	152	2618	77	2948	44
	35	183	130	0.56	0.323	0.022	9.835	0.670	0.221	0.006	100	100	29	0.91	1804	106	2419	63	2987	46
	36	185	111	0.47	0.365	0.028	10.830	0.832	0.215	0.006	100	100	22	0.93	2006	131	2508	71	2944	45
	37	178	113	0.49	0.397	0.033	11.760	0.974	0.215	0.006	100	100	18	0.94	2153	150	2586	77	2945	46
	38	164	99	0.47	0.345	0.025	9.941	0.743	0.209	0.006	100	99	24	0.92	1913	122	2429	69	2896	48
	39	161	105	0.51	0.358	0.028	10.760	0.841	0.218	0.007	100	100	24	0.93	1972	131	2502	73	2966	48
	40	153	91	0.46	0.330	0.025	9.765	0.737	0.215	0.007	100	100	27	0.92	1839	119	2413	70	2940	50
	41	151	87	0.45	0.382	0.032	11.150	0.946	0.212	0.007	100	100	19	0.93	2085	150	2535	79	2919	51
	42	142	74	0.41	0.461	0.046	13.400	1.358	0.211	0.007	100	100	10	0.95	2442	205	2708	96	2913	51
	43	122	68	0.44	0.333	0.026	10.190	0.796	0.222	0.007	100	100	28	0.91	1851	124	2452	72	2997	53
	44	130	72	0.43	0.361	0.030	10.490	0.884	0.211	0.007	100	100	22	0.92	1987	143	2479	78	2912	53

	45	117	63	0.42	0.336	0.027	9.976	0.800	0.215	0.007	100	100	26	0.91	1868	129	2433	74	2945	55
	46	114	62	0.42	0.350	0.029	10.410	0.858	0.216	0.007	100	100	24	0.91	1935	136	2472	76	2948	55
	47	119	61	0.40	0.332	0.026	10.010	0.810	0.219	0.007	100	100	28	0.91	1846	128	2435	75	2973	55
	48	117	58	0.39	0.345	0.029	10.330	0.867	0.217	0.008	100	99	25	0.91	1910	137	2465	78	2961	56
	49	117	72	0.48	0.365	0.032	11.150	0.975	0.221	0.008	100	100	23	0.92	2008	149	2536	82	2990	56
NCGB12-10-9	1	901	32	0.03	0.457	0.026	12.330	0.716	0.196	0.003	100	98	8	0.98	2425	117	2630	55	2791	21
	2	805	26	0.03	0.470	0.026	13.180	0.724	0.203	0.003	100	99	8	0.97	2485	113	2693	52	2853	21
	3	835	43	0.04	0.463	0.024	13.490	0.694	0.211	0.003	100	100	10	0.97	2454	105	2714	49	2914	20
	4	987	58	0.05	0.456	0.023	13.350	0.668	0.212	0.002	100	100	11	0.97	2422	101	2705	47	2923	19
	5	1152	81	0.05	0.466	0.023	13.880	0.692	0.216	0.002	100	100	10	0.98	2468	102	2741	47	2950	17
	6	1212	99	0.06	0.482	0.024	14.450	0.733	0.217	0.002	100	100	9	0.98	2537	106	2780	48	2961	17
	7	1197	86	0.06	0.485	0.024	14.700	0.742	0.220	0.002	100	100	9	0.98	2547	106	2796	48	2981	16
	8	1215	107	0.07	0.497	0.026	14.860	0.766	0.217	0.002	100	100	8	0.98	2601	110	2807	49	2958	16
	9	1178	109	0.07	0.462	0.022	14.000	0.670	0.220	0.002	100	100	12	0.98	2450	97	2750	45	2978	17
	10	1187	115	0.08	0.509	0.027	15.260	0.821	0.217	0.002	100	100	7	0.98	2653	117	2832	51	2962	17
	11	1151	108	0.07	0.507	0.027	15.160	0.806	0.217	0.002	100	100	7	0.98	2643	115	2825	51	2958	17
	12	1108	110	0.08	0.494	0.026	14.970	0.790	0.220	0.002	100	100	8	0.98	2587	112	2813	50	2979	17
	13	1041	104	0.08	0.515	0.028	15.600	0.857	0.220	0.002	100	100	6	0.98	2680	120	2853	52	2977	17
	14	1000	105	0.08	0.476	0.024	14.210	0.727	0.217	0.002	100	100	10	0.98	2510	106	2764	49	2955	18
	15	982	100	0.08	0.463	0.023	14.030	0.705	0.220	0.002	100	100	12	0.98	2451	102	2751	48	2980	18
NCGB12-10-17	1	1019	83	0.06	0.531	0.034	13.600	0.900	0.186	0.005	98	91	1	0.92	2747	143	2723	63	2704	43
	2	1257	84	0.05	0.681	0.049	18.440	1.333	0.196	0.004	99	95	11	0.96	3348	187	3013	70	2797	32
	3	1323	104	0.06	0.507	0.027	14.120	0.763	0.202	0.003	99	98	4	0.96	2643	116	2758	51	2843	26
	4	1270	121	0.07	0.510	0.026	14.620	0.742	0.208	0.003	100	99	5	0.97	2658	110	2791	48	2888	22
	5	1284	139	0.08	0.464	0.021	13.540	0.627	0.212	0.003	100	100	10	0.97	2458	94	2718	44	2918	20
	6	1349	169	0.10	0.504	0.025	14.690	0.729	0.211	0.002	100	100	6	0.97	2631	107	2795	47	2916	19
	7	1303	203	0.12	0.501	0.024	14.800	0.714	0.215	0.002	100	100	7	0.97	2616	103	2803	46	2940	18
	8	1271	216	0.13	0.455	0.020	13.570	0.592	0.216	0.002	100	100	12	0.97	2419	88	2721	41	2953	18
	9	1242	229	0.14	0.501	0.024	15.060	0.721	0.218	0.002	100	100	7	0.97	2618	103	2819	46	2966	18
	10	1127	224	0.16	0.476	0.021	14.250	0.645	0.217	0.002	100	100	10	0.97	2510	94	2766	43	2958	18
	11	1044	225	0.17	0.483	0.022	14.380	0.663	0.216	0.002	100	100	9	0.97	2542	97	2775	44	2950	19
	12	968	227	0.18	0.468	0.021	13.820	0.627	0.214	0.003	100	100	10	0.97	2473	93	2738	43	2939	19
	13	870	222	0.20	0.474	0.022	14.160	0.667	0.217	0.003	100	100	10	0.97	2502	97	2761	45	2955	20
	14	752	201	0.21	0.419	0.018	12.580	0.534	0.218	0.003	100	100	16	0.95	2257	80	2648	40	2963	21
	15	710	198	0.22	0.455	0.021	13.680	0.648	0.218	0.003	100	100	12	0.96	2417	95	2728	45	2967	22
NCGB12-10-22	1	608	125	0.16	0.362	0.019	10.050	0.537	0.202	0.004	99	95	20	0.94	1990	89	2439	49	2839	30
	2	427	48	0.09	0.458	0.029	13.110	0.829	0.208	0.004	100	98	10	0.96	2429	127	2688	60	2889	30
	3	393	27	0.05	0.402	0.024	11.640	0.704	0.210	0.004	100	99	17	0.95	2178	111	2576	57	2906	30
	4	366	17	0.04	0.472	0.033	13.920	0.981	0.214	0.004	100	100	10	0.96	2493	145	2744	67	2935	31
	5	348	21	0.05	0.478	0.034	14.220	1.024	0.216	0.004	100	100	9	0.97	2518	149	2765	68	2950	31
	6	347	9	0.02	0.462	0.032	13.750	0.969	0.216	0.004	100	99	11	0.96	2449	143	2733	67	2950	31
	7	338	13	0.03	0.442	0.029	13.200	0.879	0.217	0.004	100	100	13	0.96	2360	131	2694	63	2955	31
	8	350	11	0.02	0.515	0.039	15.270	1.173	0.215	0.004	100	100	6	0.97	2678	167	2832	73	2944	31
	9	360	12	0.03	0.499	0.037	15.080	1.122	0.219	0.004	100	100	8	0.97	2610	159	2820	71	2974	31
	10	332	11	0.03	0.430	0.027	12.730	0.808	0.215	0.004	100	100	14	0.95	2303	122	2660	60	2943	31
	11	340	11	0.02	0.429	0.027	12.940	0.830	0.219	0.004	100	100	15	0.96	2299	123	2675	60	2973	31
	12	328	12	0.03	0.455	0.030	13.720	0.915	0.219	0.004	100	100	12	0.96	2416	134	2730	63	2972	31
	13	326	11	0.03	0.483	0.034	14.490	1.017	0.217	0.004	100	100	9	0.96	2542	147	2782	67	2961	31
	14	328	10	0.02	0.444	0.029	13.580	0.890	0.222	0.004	100	100	14	0.96	2368	129	2721	62	2994	31
	15	327	10	0.02	0.501	0.036	15.040	1.099	0.218	0.004	100	100	7	0.97	2617	156	2818	70	2965	31
	16	316	9	0.02	0.444	0.029	13.290	0.858	0.217	0.004	100	100	13	0.96	2370	127	2700	61	2958	31
	17	324	9	0.02	0.431	0.027	12.760	0.809	0.215	0.004	100	100	14	0.95	2311	122	2662	60	2942	31
NCGB12-10-23	1	478	167	0.27	0.441	0.021	11.810	0.578	0.194	0.002	100	99	9	0.97	2356	96	2590	46	2778	19
	2	354	142	0.31	0.529	0.031	14.320	0.831	0.197	0.003	100	99	1	0.97	2735	129	2771	55	2797	22

	3	277	139	0.39	0.452	0.023	12.580	0.653	0.202	0.003	100	99	10	0.96	2405	103	2648	49	2840	24
	4	251	147	0.46	0.446	0.024	12.310	0.659	0.200	0.003	100	99	10	0.96	2379	106	2628	50	2826	25
	5	231	139	0.47	0.509	0.031	14.510	0.887	0.207	0.003	100	100	5	0.97	2653	132	2784	58	2880	26
	6	217	134	0.48	0.450	0.025	13.030	0.738	0.210	0.003	100	100	11	0.96	2397	113	2682	53	2904	26
	7	277	187	0.53	0.286	0.013	8.205	0.378	0.208	0.003	100	99	33	0.95	1622	66	2254	42	2890	24
	8	23	14	0.48	2.114	0.203	63.880	6.149	0.219	0.012	100	100	53	0.84	7323	420	4237	96	2974	88
	9	211	125	0.46	0.370	0.039	9.845	1.056	0.193	0.012	100	98	18	0.83	2030	182	2420	99	2768	101
	10	203	135	0.52	0.346	0.034	10.130	0.997	0.212	0.012	100	100	24	0.83	1916	161	2446	91	2922	94
	11	195	163	0.65	0.321	0.029	9.130	0.837	0.206	0.012	100	99	27	0.80	1794	140	2351	84	2877	92
	12	174	139	0.62	0.325	0.028	8.992	0.799	0.201	0.011	100	99	25	0.81	1814	137	2337	81	2831	88
	13	186	129	0.54	0.406	0.038	11.610	1.111	0.208	0.010	100	100	16	0.87	2197	176	2574	89	2886	80
	14	168	150	0.70	0.321	0.027	9.175	0.772	0.207	0.011	100	99	27	0.81	1795	129	2356	77	2884	84
	15	188	133	0.55	0.328	0.027	9.411	0.799	0.208	0.010	100	98	26	0.83	1830	132	2379	78	2889	80
	16	192	160	0.65	0.370	0.032	10.210	0.894	0.200	0.010	100	100	19	0.85	2030	150	2454	81	2827	79
	17	180	140	0.61	0.376	0.032	10.480	0.921	0.202	0.010	100	99	19	0.85	2057	152	2478	82	2844	79
	18	176	131	0.58	0.365	0.031	10.470	0.898	0.208	0.010	100	100	21	0.84	2007	146	2477	80	2889	77
	19	183	148	0.63	0.378	0.033	10.640	0.935	0.204	0.010	100	98	19	0.85	2068	152	2492	82	2858	78
NCGB12-10-23@1	1	486	138	0.22	0.475	0.025	12.320	0.669	0.188	0.003	99	95	5	0.97	2503	111	2629	51	2728	22
	2	389	123	0.25	0.512	0.030	13.530	0.812	0.192	0.003	99	97	2	0.97	2664	130	2718	57	2758	23
	3	312	109	0.27	0.476	0.027	12.680	0.723	0.193	0.003	99	97	6	0.96	2510	117	2656	54	2770	26
	4	273	124	0.36	0.486	0.029	13.290	0.787	0.198	0.003	100	98	6	0.96	2554	124	2701	56	2812	27
	5	253	131	0.40	0.459	0.026	12.550	0.727	0.198	0.003	100	98	8	0.96	2435	116	2647	55	2813	28
	6	237	123	0.40	0.486	0.030	13.330	0.832	0.199	0.003	100	98	6	0.96	2551	130	2704	59	2819	28
	7	220	116	0.41	0.451	0.026	12.590	0.741	0.203	0.004	100	98	10	0.96	2398	117	2650	55	2847	29
	8	218	117	0.42	0.511	0.034	14.300	0.946	0.203	0.004	100	99	4	0.97	2662	143	2770	63	2850	28
	9	219	125	0.44	0.551	0.039	15.410	1.096	0.203	0.004	100	98	0	0.97	2828	162	2841	68	2849	29
	10	207	129	0.49	0.408	0.022	11.630	0.636	0.207	0.004	100	98	16	0.95	2204	101	2575	51	2882	29
	11	215	126	0.46	0.495	0.032	14.040	0.919	0.206	0.004	100	99	6	0.96	2594	139	2752	62	2870	28
	12	209	124	0.46	0.479	0.030	13.640	0.851	0.207	0.004	100	99	8	0.96	2523	129	2725	59	2879	28
	13	211	126	0.46	0.477	0.030	13.740	0.864	0.209	0.004	100	100	8	0.96	2513	130	2732	60	2898	28
	14	210	133	0.49	0.484	0.031	13.940	0.889	0.209	0.004	100	99	8	0.96	2545	133	2746	60	2897	28
	15	207	122	0.46	0.480	0.030	13.560	0.866	0.205	0.004	100	99	7	0.96	2527	133	2720	60	2866	29
	16	203	128	0.49	0.456	0.027	12.810	0.779	0.204	0.004	100	99	10	0.96	2421	122	2666	57	2858	29
	17	204	124	0.47	0.451	0.027	12.950	0.792	0.208	0.004	100	99	11	0.96	2402	122	2676	58	2891	29
	18	193	121	0.49	0.462	0.028	13.210	0.815	0.208	0.004	100	100	10	0.96	2447	125	2695	58	2886	29
	19	186	106	0.44	0.448	0.027	12.710	0.774	0.206	0.004	100	99	11	0.96	2387	121	2659	57	2872	30
NCGB12-10-24	1	1148	96	0.07	0.461	0.034	12.470	0.921	0.196	0.003	99	97	8	0.98	2444	149	2641	69	2795	24
	2	976	86	0.07	0.655	0.065	17.960	1.788	0.199	0.003	99	97	8	0.99	3247	253	2988	96	2817	24
	3	829	83	0.08	0.575	0.048	15.890	1.336	0.200	0.003	99	97	2	0.98	2929	197	2870	80	2829	25
	4	804	84	0.08	0.636	0.058	17.860	1.645	0.204	0.003	99	98	6	0.99	3171	230	2982	89	2858	25
	5	793	98	0.10	0.627	0.057	17.830	1.627	0.206	0.003	100	98	5	0.99	3139	226	2980	88	2875	24
	6	797	133	0.13	0.587	0.050	16.850	1.430	0.208	0.003	100	99	2	0.99	2978	202	2927	81	2891	24
	7	792	151	0.15	0.694	0.070	20.150	2.050	0.211	0.003	100	98	9	0.99	3398	268	3099	98	2910	25
	8	768	167	0.17	0.578	0.049	16.950	1.443	0.213	0.003	100	99	0	0.98	2940	200	2932	82	2927	25
	9	717	186	0.20	0.613	0.056	17.590	1.605	0.208	0.003	100	99	4	0.99	3083	223	2968	88	2891	26
	10	658	196	0.23	0.564	0.048	16.520	1.417	0.212	0.003	100	99	1	0.98	2885	199	2907	82	2923	27
	11	614	211	0.27	0.547	0.046	15.880	1.337	0.211	0.004	100	98	2	0.98	2813	191	2870	80	2910	28
	12	591	236	0.31	0.550	0.046	16.230	1.374	0.214	0.004	100	98	2	0.98	2825	193	2890	81	2936	28
	13	577	264	0.36	0.519	0.042	15.510	1.263	0.217	0.004	100	99	5	0.98	2695	179	2847	78	2957	28
	14	566	251	0.35	0.581	0.053	17.190	1.568	0.215	0.004	100	99	0	0.98	2951	215	2945	88	2942	29
	15	540	276	0.40	0.556	0.049	16.540	1.458	0.216	0.004	100	99	2	0.98	2850	202	2909	84	2950	30
	16	502	269	0.42	0.477	0.036	14.160	1.085	0.215	0.004	100	98	9	0.97	2514	158	2760	73	2946	31
	17	491	287	0.46	0.535	0.046	15.620	1.353	0.212	0.004	100	98	3	0.97	2761	193	2854	83	2920	32
	18	472	301	0.50	0.578	0.053	16.810	1.561	0.211	0.004	99	98	1	0.98	2942	218	2924	89	2912	33

	19	470	314	0.52	0.484	0.039	14.290	1.147	0.214	0.004	100	98	8	0.97	2546	168	2769	76	2936	33
NCGB12-10-29	1	701	422	0.47	0.389	0.017	11.720	0.535	0.219	0.003	97	89	20	0.97	2116	81	2582	43	2971	19
	2	967	682	0.55	0.402	0.020	12.280	0.615	0.221	0.002	99	96	19	0.98	2179	92	2626	47	2991	14
	3	744	517	0.54	0.586	0.035	17.740	1.069	0.219	0.002	100	99	0	0.99	2975	143	2976	58	2976	15
	4	565	364	0.50	0.545	0.030	16.210	0.882	0.216	0.002	100	99	3	0.98	2804	123	2889	52	2949	17
	5	548	324	0.46	0.499	0.027	15.160	0.826	0.221	0.002	100	99	8	0.98	2608	116	2825	52	2985	17
	6	497	305	0.48	0.520	0.029	15.720	0.888	0.220	0.002	100	99	6	0.98	2697	124	2860	54	2977	18
	7	407	253	0.48	0.514	0.027	15.420	0.820	0.218	0.003	100	99	6	0.97	2674	116	2842	51	2963	20
	8	400	248	0.48	0.581	0.035	17.520	1.071	0.219	0.003	100	99	0	0.98	2953	144	2963	59	2971	20
	9	398	233	0.46	0.553	0.031	16.490	0.920	0.216	0.003	100	99	2	0.98	2837	128	2905	53	2953	20
	10	490	295	0.47	0.551	0.032	16.570	0.956	0.218	0.002	100	99	3	0.98	2829	132	2910	55	2968	18
	11	619	379	0.48	0.479	0.026	14.660	0.789	0.222	0.002	100	100	10	0.98	2521	112	2793	51	2996	16
	12	606	380	0.49	0.502	0.027	15.340	0.828	0.222	0.002	100	99	8	0.98	2623	116	2836	52	2991	16
	13	524	315	0.47	0.533	0.029	15.880	0.870	0.216	0.002	100	99	4	0.98	2754	122	2869	52	2951	17
	14	455	260	0.45	0.512	0.027	15.440	0.814	0.219	0.002	100	99	7	0.98	2664	115	2843	50	2973	18
	15	396	223	0.44	0.621	0.038	18.550	1.137	0.217	0.003	100	99	3	0.98	3115	151	3019	59	2955	19
NCGB12-10-25	1	1433	163	0.09	0.420	0.023	12.520	0.681	0.216	0.003	100	99	16	0.97	2260	103	2644	51	2953	20
	2	1577	176	0.09	0.420	0.022	12.560	0.675	0.217	0.002	100	99	16	0.98	2259	102	2647	51	2959	18
	3	1629	184	0.09	0.424	0.023	12.780	0.688	0.219	0.002	100	100	16	0.98	2276	103	2664	51	2973	17
	4	1530	196	0.10	0.406	0.021	12.360	0.635	0.221	0.002	100	100	18	0.98	2197	95	2632	48	2986	17
	5	1421	195	0.11	0.412	0.022	12.570	0.666	0.221	0.002	100	100	17	0.98	2226	99	2648	50	2989	18
	6	1174	175	0.12	0.463	0.027	14.040	0.815	0.220	0.003	100	100	11	0.98	2453	118	2752	55	2980	20
	7	959	158	0.13	0.458	0.026	13.920	0.797	0.221	0.003	100	100	12	0.97	2430	115	2744	54	2985	22
	8	793	160	0.16	0.502	0.032	14.920	0.941	0.216	0.003	100	100	7	0.97	2622	135	2810	60	2948	24
	9	714	135	0.15	0.523	0.036	15.550	1.065	0.216	0.003	100	100	5	0.98	2710	151	2849	65	2949	25
	10	682	142	0.16	0.467	0.030	14.300	0.919	0.222	0.003	100	100	11	0.97	2469	131	2770	61	2997	25
	11	668	139	0.16	0.536	0.039	16.010	1.180	0.217	0.003	100	100	4	0.98	2768	165	2877	71	2954	25
	12	631	131	0.16	0.491	0.033	14.620	0.995	0.216	0.004	100	99	8	0.97	2575	144	2791	65	2951	26
	13	619	136	0.17	0.480	0.033	14.820	1.010	0.224	0.004	100	99	10	0.97	2528	142	2804	65	3009	26
	14	640	168	0.21	0.430	0.027	13.050	0.821	0.220	0.004	100	100	15	0.97	2307	121	2683	59	2980	26
	15	620	161	0.20	0.416	0.025	12.620	0.776	0.220	0.004	100	100	17	0.97	2244	116	2651	58	2979	26
NCGB12-10-10	1	3191	278	0.07	0.329	0.016	8.515	0.405	0.188	0.001	100	99	22	0.99	1833	76	2288	43	2723	9
	2	3033	276	0.07	0.378	0.017	9.603	0.443	0.184	0.001	100	100	15	0.99	2066	81	2397	42	2693	9
	3	3009	375	0.10	0.375	0.017	9.774	0.453	0.189	0.001	100	100	16	0.99	2054	81	2414	43	2733	8
	4	2349	342	0.11	0.453	0.022	12.380	0.590	0.198	0.001	100	100	9	0.99	2408	96	2634	45	2812	9
	5	1864	302	0.13	0.471	0.022	13.330	0.632	0.205	0.001	100	100	8	0.99	2488	98	2704	45	2869	10
	6	1508	279	0.14	0.481	0.022	13.810	0.641	0.208	0.001	100	100	8	0.99	2530	97	2737	44	2893	11
	7	1301	266	0.16	0.471	0.021	13.590	0.613	0.209	0.001	100	100	9	0.99	2489	93	2722	43	2899	11
	8	1144	259	0.18	0.473	0.021	13.690	0.618	0.210	0.002	100	100	9	0.99	2498	93	2729	43	2904	12
	9	988	237	0.19	0.470	0.021	13.740	0.605	0.212	0.002	100	100	10	0.98	2484	91	2732	42	2921	13
	10	877	212	0.19	0.453	0.020	13.200	0.574	0.212	0.002	100	100	11	0.98	2407	87	2694	41	2918	13
	11	780	194	0.19	0.453	0.019	13.280	0.573	0.213	0.002	100	100	11	0.98	2407	86	2700	41	2927	14
	12	699	176	0.20	0.461	0.020	13.510	0.584	0.213	0.002	100	100	11	0.98	2442	88	2716	41	2926	15
	13	631	158	0.19	0.449	0.019	13.180	0.551	0.213	0.002	100	100	12	0.97	2389	83	2692	40	2928	16
	14	607	152	0.20	0.455	0.020	13.300	0.572	0.212	0.002	100	100	11	0.97	2419	86	2701	41	2920	16
	15	578	147	0.20	0.441	0.018	12.930	0.538	0.213	0.002	100	100	13	0.97	2357	82	2675	39	2925	16
	16	574	153	0.21	0.440	0.018	12.790	0.536	0.211	0.002	100	100	13	0.97	2349	82	2664	40	2913	16
	17	555	149	0.21	0.489	0.022	14.320	0.635	0.212	0.002	100	100	8	0.97	2568	94	2771	42	2923	16
	18	595	171	0.22	0.447	0.019	13.260	0.551	0.215	0.002	100	100	12	0.97	2384	83	2698	39	2943	16
	19	724	258	0.28	0.431	0.019	12.730	0.550	0.214	0.002	100	100	14	0.98	2311	84	2660	41	2937	15
NCGB12-10-12	1	881	55	0.05	0.408	0.021	10.650	0.549	0.190	0.003	100	98	12	0.97	2204	95	2493	48	2739	22
	2	918	29	0.02	0.421	0.021	11.070	0.550	0.191	0.002	100	99	11	0.97	2265	94	2529	46	2748	21
	3	954	33	0.03	0.412	0.019	10.890	0.514	0.192	0.002	100	99	12	0.97	2224	88	2513	44	2756	20
	4	1042	28	0.02	0.426	0.020	11.050	0.532	0.188	0.002	100	99	10	0.97	2288	92	2527	45	2725	20

	5	1043	37	0.03	0.475	0.025	12.440	0.645	0.190	0.002	100	99	5	0.97	2504	107	2638	49	2742	19
	6	1056	30	0.02	0.492	0.026	12.970	0.683	0.191	0.002	100	99	4	0.98	2580	111	2677	50	2752	19
	7	1076	38	0.03	0.490	0.025	13.020	0.664	0.193	0.002	100	100	4	0.97	2571	108	2681	48	2765	19
	8	1155	39	0.03	0.475	0.023	12.710	0.623	0.194	0.002	100	100	6	0.97	2504	101	2659	46	2779	18
	9	1198	42	0.03	0.423	0.018	11.670	0.496	0.200	0.002	100	100	13	0.97	2272	81	2579	40	2829	18
	10	1236	94	0.06	0.480	0.022	13.160	0.615	0.199	0.002	100	100	6	0.97	2527	97	2692	44	2817	17
	11	1293	85	0.05	0.477	0.022	13.460	0.633	0.205	0.002	100	100	8	0.98	2516	98	2713	44	2863	17
	12	1238	113	0.07	0.493	0.023	14.040	0.653	0.206	0.002	100	100	6	0.98	2585	99	2752	44	2877	17
	13	1178	138	0.09	0.431	0.018	12.360	0.527	0.208	0.002	100	100	13	0.97	2310	83	2632	40	2890	17
	14	1107	171	0.12	0.468	0.022	13.550	0.633	0.210	0.002	100	100	9	0.97	2475	96	2719	44	2905	18
	15	931	177	0.15	0.469	0.022	13.900	0.641	0.215	0.003	100	100	10	0.97	2479	94	2743	44	2944	19
	16	716	211	0.23	0.570	0.031	16.410	0.892	0.209	0.003	100	100	0	0.97	2908	127	2901	52	2896	22
	17	571	216	0.29	0.460	0.021	13.540	0.631	0.213	0.003	100	100	11	0.95	2441	94	2718	44	2931	24
	18	514	223	0.34	0.525	0.029	15.460	0.857	0.214	0.003	100	100	4	0.96	2721	122	2844	53	2932	26
	19	428	219	0.40	0.502	0.027	14.750	0.804	0.213	0.004	100	100	6	0.95	2623	117	2799	52	2928	28
	20	396	196	0.39	0.459	0.024	13.750	0.725	0.217	0.004	100	100	11	0.95	2436	106	2733	50	2960	28
	21	384	202	0.41	0.439	0.022	13.200	0.673	0.218	0.004	100	100	14	0.94	2346	100	2694	48	2966	29
	22	380	202	0.41	0.458	0.024	13.510	0.727	0.214	0.004	100	100	11	0.94	2428	108	2716	51	2938	30
	23	363	202	0.43	0.484	0.027	14.420	0.819	0.216	0.004	100	100	9	0.95	2544	119	2778	54	2952	30
	24	330	197	0.47	0.457	0.025	13.540	0.738	0.215	0.004	100	100	11	0.94	2428	110	2718	52	2941	31
	25	319	193	0.47	0.471	0.027	13.900	0.786	0.214	0.004	100	100	10	0.94	2490	116	2743	54	2935	31
	26	306	188	0.48	0.434	0.023	12.930	0.690	0.216	0.004	100	100	14	0.93	2323	103	2674	50	2952	32
	27	312	188	0.47	0.482	0.028	14.040	0.829	0.211	0.004	100	100	8	0.94	2536	123	2753	56	2916	32
	28	294	186	0.49	0.444	0.025	13.260	0.740	0.217	0.004	100	100	13	0.93	2367	110	2698	53	2957	33
	29	272	184	0.53	0.444	0.025	13.080	0.737	0.214	0.004	100	100	13	0.93	2369	111	2685	53	2932	34
NCGB12-10-13	1	257	6	0.02	0.859	0.101	21.430	2.528	0.181	0.004	100	99	23	0.98	3997	350	3158	114	2662	36
	2	203	8	0.03	0.689	0.068	18.580	1.836	0.196	0.005	100	100	11	0.97	3380	259	3020	95	2789	38
	3	286	13	0.03	0.508	0.036	14.800	1.055	0.211	0.004	100	100	6	0.96	2648	154	2802	68	2916	32
	4	407	42	0.08	0.390	0.021	11.790	0.627	0.219	0.004	100	100	20	0.95	2123	96	2588	50	2975	27
	5	473	77	0.13	0.414	0.022	12.420	0.669	0.218	0.003	100	100	17	0.96	2232	101	2637	51	2964	25
	6	438	85	0.15	0.488	0.029	14.620	0.886	0.217	0.003	100	100	9	0.97	2561	127	2791	58	2962	26
	7	375	69	0.14	0.537	0.036	15.990	1.077	0.216	0.004	100	100	4	0.97	2770	151	2876	64	2952	28
	8	327	74	0.18	0.510	0.034	15.260	1.024	0.217	0.004	100	100	6	0.96	2658	145	2832	64	2957	30
	9	302	79	0.20	0.502	0.034	14.950	1.022	0.216	0.004	100	100	7	0.96	2621	147	2812	65	2952	31
	10	289	69	0.19	0.469	0.031	14.150	0.928	0.219	0.004	100	100	11	0.96	2477	134	2760	62	2973	31
	11	294	76	0.20	0.528	0.039	15.850	1.162	0.218	0.004	100	100	5	0.96	2731	162	2868	70	2966	32
	12	297	74	0.20	0.520	0.038	15.910	1.180	0.222	0.004	100	100	6	0.97	2698	163	2871	71	2995	31
	13	275	77	0.22	0.469	0.031	14.260	0.954	0.221	0.004	100	100	11	0.96	2477	137	2767	64	2986	32
	14	279	81	0.23	0.532	0.040	16.020	1.201	0.218	0.004	100	100	5	0.96	2751	167	2878	72	2968	32
	15	254	77	0.24	0.406	0.024	12.570	0.750	0.225	0.005	100	100	19	0.94	2198	110	2648	56	3013	33
NCGB12-10-15	1	931	98	0.08	0.469	0.025	13.620	0.733	0.211	0.003	100	98	9	0.97	2481	110	2724	51	2910	20
	2	1158	86	0.06	0.383	0.017	11.320	0.507	0.214	0.002	100	99	20	0.97	2092	80	2550	42	2937	18
	3	1473	70	0.04	0.399	0.018	12.080	0.558	0.220	0.002	100	100	19	0.98	2165	85	2610	43	2977	15
	4	1506	75	0.04	0.401	0.017	12.090	0.523	0.219	0.002	100	100	18	0.98	2173	80	2611	41	2971	15
	5	1449	63	0.03	0.427	0.019	12.880	0.579	0.219	0.002	100	100	15	0.98	2294	87	2671	42	2971	15
	6	1431	60	0.03	0.456	0.022	13.650	0.650	0.217	0.002	100	100	12	0.98	2422	96	2726	45	2959	15
	7	1392	64	0.04	0.440	0.020	13.220	0.607	0.218	0.002	100	100	14	0.98	2352	90	2696	43	2964	15
	8	1335	65	0.04	0.451	0.021	13.500	0.629	0.217	0.002	100	100	12	0.98	2398	93	2715	44	2961	16
	9	1290	59	0.04	0.463	0.022	13.890	0.673	0.218	0.002	100	100	11	0.98	2453	99	2742	46	2962	16
	10	1174	60	0.04	0.451	0.021	13.380	0.629	0.215	0.002	100	100	12	0.98	2398	94	2707	44	2947	17
	11	1002	57	0.04	0.425	0.019	12.840	0.587	0.220	0.002	100	100	16	0.97	2281	88	2668	43	2977	18
	12	847	52	0.05	0.478	0.025	14.360	0.763	0.218	0.003	100	100	10	0.98	2520	110	2774	50	2964	19
	13	573	77	0.10	0.548	0.032	16.200	0.943	0.214	0.003	100	100	2	0.97	2818	132	2889	56	2938	23
	14	420	89	0.17	0.495	0.027	14.660	0.812	0.215	0.004	100	100	7	0.96	2592	118	2793	53	2942	27

	15	380	135	0.28	0.450	0.025	13.410	0.738	0.216	0.004	100	100	12	0.95	2393	109	2709	52	2954	29
NCGB12-10-19	1	903	268	0.23	0.578	0.061	15.610	1.683	0.196	0.005	95	82	3	0.97	2939	247	2853	103	2793	43
	2	813	300	0.29	0.499	0.044	14.640	1.315	0.213	0.005	97	88	7	0.96	2610	188	2792	85	2926	39
	3	790	295	0.29	0.638	0.072	18.400	2.117	0.209	0.005	97	89	5	0.98	3180	285	3011	111	2900	39
	4	729	316	0.34	0.448	0.036	12.890	1.063	0.209	0.005	98	92	11	0.96	2388	161	2672	78	2894	37
	5	763	346	0.35	0.478	0.042	13.840	1.230	0.210	0.005	98	92	8	0.97	2520	182	2739	84	2905	38
	6	752	322	0.33	0.444	0.037	12.870	1.085	0.210	0.005	98	93	12	0.96	2368	164	2670	79	2907	38
	7	740	337	0.35	0.469	0.041	13.520	1.183	0.209	0.005	99	96	9	0.97	2481	178	2717	83	2897	36
	8	749	330	0.34	0.497	0.045	14.600	1.341	0.213	0.005	100	99	7	0.97	2602	195	2790	87	2928	34
	9	748	322	0.34	0.473	0.042	13.660	1.229	0.209	0.005	99	97	9	0.97	2498	185	2726	85	2900	35
	10	697	304	0.34	0.449	0.038	13.020	1.110	0.210	0.005	99	96	11	0.97	2390	168	2681	80	2908	37
	11	682	305	0.35	0.481	0.043	13.860	1.242	0.209	0.005	99	97	8	0.97	2533	186	2740	85	2897	36
	12	660	292	0.35	0.443	0.037	12.720	1.069	0.208	0.005	99	96	12	0.96	2365	164	2659	79	2892	38
	13	667	294	0.34	0.491	0.045	13.960	1.308	0.206	0.005	99	96	7	0.97	2574	197	2747	89	2877	37
	14	634	269	0.33	0.523	0.050	15.310	1.483	0.212	0.005	100	98	5	0.97	2710	213	2835	92	2924	36
	15	581	254	0.34	0.438	0.037	12.720	1.074	0.211	0.005	99	97	13	0.96	2341	164	2659	79	2911	38
NCGB12-10-27	1	817	150	0.14	0.414	0.018	11.290	0.498	0.198	0.003	100	98	13	0.95	2232	82	2547	41	2808	24
	2	698	197	0.22	0.452	0.022	12.690	0.637	0.204	0.003	100	99	10	0.96	2404	100	2657	47	2856	25
	3	596	202	0.26	0.418	0.020	12.230	0.584	0.212	0.003	100	99	15	0.94	2249	90	2622	45	2924	26
	4	529	229	0.34	0.449	0.023	13.190	0.678	0.213	0.004	100	99	12	0.95	2392	102	2694	49	2928	28
	5	444	215	0.38	0.447	0.023	13.220	0.696	0.215	0.004	100	99	12	0.94	2381	104	2696	50	2941	30
	6	375	181	0.38	0.462	0.026	13.560	0.757	0.213	0.004	100	99	10	0.94	2449	113	2719	53	2927	32
	7	338	175	0.40	0.451	0.025	13.420	0.752	0.216	0.004	100	99	12	0.93	2400	111	2710	53	2949	33
	8	342	200	0.46	0.481	0.029	14.420	0.863	0.218	0.005	100	100	9	0.94	2531	124	2778	57	2962	34
	9	340	202	0.46	0.466	0.028	13.750	0.828	0.214	0.005	100	99	10	0.94	2468	122	2733	57	2935	34
	10	310	193	0.49	0.424	0.023	12.640	0.699	0.216	0.005	100	100	15	0.92	2277	105	2653	52	2954	35
	11	330	199	0.47	0.497	0.032	14.890	0.974	0.217	0.005	100	100	8	0.95	2602	139	2808	62	2960	34
	12	312	202	0.51	0.468	0.029	14.140	0.877	0.219	0.005	100	100	11	0.94	2473	126	2759	59	2976	35
	13	309	199	0.50	0.532	0.036	15.700	1.084	0.214	0.005	100	100	4	0.95	2749	154	2859	66	2937	36
	14	285	195	0.53	0.441	0.026	13.190	0.791	0.217	0.005	100	100	13	0.93	2356	117	2693	57	2957	36
	15	280	229	0.64	0.443	0.027	13.080	0.792	0.214	0.005	100	99	13	0.93	2364	119	2686	57	2938	37
NCGB12-10-3	1	539	156	0.23	0.496	0.029	14.680	0.881	0.215	0.003	99	96	7	0.97	2594	127	2795	57	2942	25
	2	390	119	0.24	0.487	0.030	14.700	0.910	0.219	0.004	99	97	9	0.96	2559	129	2796	59	2971	29
	3	269	99	0.29	0.500	0.033	14.750	0.977	0.214	0.004	99	97	7	0.95	2613	141	2799	63	2936	34
	4	226	80	0.28	0.517	0.039	15.400	1.171	0.216	0.005	99	97	6	0.95	2687	165	2840	73	2951	38
	5	177	82	0.36	0.489	0.038	14.550	1.147	0.216	0.006	99	98	8	0.95	2564	165	2786	75	2952	42
	6	144	59	0.32	0.431	0.032	13.030	0.985	0.219	0.006	99	96	15	0.93	2310	144	2682	71	2976	46
	7	149	60	0.31	0.537	0.051	16.410	1.577	0.222	0.006	99	96	5	0.96	2770	214	2901	92	2993	46
	8	139	62	0.35	0.451	0.037	13.890	1.170	0.224	0.007	99	95	13	0.94	2398	166	2742	80	3006	48
	9	133	61	0.36	0.455	0.038	13.890	1.193	0.221	0.007	99	96	13	0.94	2417	170	2742	81	2991	49
	10	128	62	0.38	0.400	0.031	12.200	0.957	0.221	0.007	99	96	19	0.92	2167	141	2620	74	2991	50
	11	124	52	0.33	0.375	0.028	11.070	0.833	0.214	0.007	99	96	21	0.91	2054	129	2529	70	2936	51
	12	133	60	0.35	0.474	0.042	13.780	1.256	0.211	0.007	99	95	9	0.94	2501	185	2735	86	2911	51
	13	117	68	0.46	0.393	0.030	11.920	0.913	0.220	0.007	99	97	19	0.91	2138	137	2598	72	2979	51
	14	124	56	0.35	0.427	0.035	13.130	1.095	0.223	0.007	99	97	16	0.93	2294	158	2689	79	3001	50
	15	121	58	0.37	0.462	0.040	14.450	1.267	0.227	0.007	99	97	13	0.94	2449	176	2780	83	3029	49
NCGB12-10-20	1	846	171	0.16	0.501	0.028	13.750	0.771	0.199	0.002	100	100	4	0.98	2619	120	2733	53	2818	20
	2	913	349	0.30	0.462	0.024	13.030	0.670	0.205	0.002	100	100	9	0.97	2447	104	2682	49	2864	19
	3	887	478	0.42	0.550	0.032	15.950	0.936	0.210	0.002	100	100	2	0.98	2825	134	2874	56	2908	19
	4	817	571	0.54	0.501	0.027	14.750	0.785	0.214	0.003	100	100	7	0.97	2616	114	2799	51	2934	20
	5	793	597	0.59	0.497	0.027	14.770	0.799	0.215	0.003	100	100	7	0.97	2602	115	2801	51	2947	20
	6	709	579	0.64	0.665	0.045	19.860	1.350	0.217	0.003	100	100	6	0.98	3286	175	3084	66	2955	21
	7	597	500	0.65	0.640	0.039	19.110	1.180	0.217	0.003	100	100	5	0.98	3190	155	3048	60	2955	22
	8	707	573	0.63	0.566	0.032	16.940	0.974	0.217	0.003	100	100	1	0.98	2890	133	2932	55	2960	21

	9	854	686	0.63	0.584	0.034	17.510	1.026	0.217	0.003	100	100	0	0.98	2965	139	2963	56	2962	19
	10	1012	848	0.65	0.532	0.028	16.230	0.860	0.221	0.002	100	100	5	0.98	2749	118	2890	51	2991	17
	11	1094	950	0.68	0.589	0.033	17.790	0.993	0.219	0.002	100	100	0	0.98	2986	133	2978	54	2973	17
	12	1218	1108	0.71	0.583	0.032	17.580	0.951	0.219	0.002	100	100	0	0.98	2962	128	2967	52	2970	16
	13	1295	1253	0.75	0.545	0.027	16.370	0.809	0.218	0.002	100	100	3	0.98	2803	112	2899	47	2966	15
	14	1410	1396	0.77	0.553	0.028	16.670	0.835	0.218	0.002	100	100	3	0.98	2839	115	2916	48	2969	15
	15	1493	1519	0.79	0.587	0.031	17.700	0.923	0.219	0.002	100	100	0	0.99	2975	124	2974	50	2973	14
NCGB12-10-16	1	532	62	0.09	0.553	0.035	15.680	0.992	0.206	0.003	100	98	1	0.97	2839	144	2858	60	2871	26
	2	487	96	0.15	0.511	0.032	15.050	0.952	0.214	0.004	100	99	6	0.97	2660	137	2818	60	2933	27
	3	445	94	0.16	0.570	0.042	17.020	1.262	0.217	0.004	100	100	1	0.97	2909	173	2936	71	2955	28
	4	321	84	0.20	0.601	0.045	17.910	1.356	0.216	0.004	100	99	2	0.97	3034	182	2985	73	2952	32
	5	303	124	0.32	0.546	0.041	16.140	1.214	0.215	0.004	100	100	3	0.96	2807	170	2885	72	2940	33
	6	316	148	0.36	0.697	0.067	21.070	2.036	0.219	0.004	100	100	8	0.98	3408	255	3142	94	2976	33
	7	291	184	0.49	0.474	0.033	14.400	1.003	0.220	0.005	100	100	10	0.96	2503	144	2776	66	2982	33
	8	272	195	0.56	0.607	0.052	18.190	1.572	0.217	0.005	100	100	2	0.97	3059	210	3000	83	2960	34
	9	242	170	0.55	0.559	0.046	16.810	1.379	0.218	0.005	100	100	2	0.96	2864	189	2924	79	2966	36
	10	227	155	0.53	0.538	0.043	15.960	1.290	0.215	0.005	100	100	4	0.96	2774	181	2874	77	2945	37
	11	223	152	0.53	0.556	0.047	16.640	1.428	0.217	0.005	100	99	2	0.96	2852	197	2914	82	2957	38
	12	212	127	0.47	0.612	0.059	17.940	1.727	0.213	0.005	100	100	3	0.97	3079	234	2987	93	2925	39
	13	192	124	0.50	0.551	0.049	16.560	1.477	0.218	0.005	100	100	3	0.96	2828	203	2910	85	2967	40
	14	185	116	0.49	0.477	0.038	14.210	1.148	0.216	0.006	100	99	9	0.95	2514	167	2764	77	2951	42
	15	187	105	0.44	0.700	0.079	20.870	2.354	0.216	0.006	100	100	9	0.97	3421	298	3132	109	2952	42
NCGB12-10-30	1	938	109	0.09	0.553	0.039	15.650	1.096	0.205	0.002	100	99	1	0.99	2838	160	2856	67	2869	19
	2	877	127	0.11	0.547	0.037	16.130	1.094	0.214	0.003	100	99	2	0.99	2814	154	2885	65	2934	19
	3	826	148	0.14	0.585	0.041	17.230	1.203	0.214	0.003	100	100	1	0.99	2967	166	2947	67	2934	20
	4	816	150	0.14	0.602	0.043	17.870	1.292	0.215	0.003	100	100	2	0.99	3037	175	2983	70	2946	19
	5	820	175	0.17	0.656	0.050	19.430	1.475	0.215	0.003	100	100	6	0.99	3250	194	3063	73	2943	19
	6	829	164	0.15	0.680	0.054	20.360	1.617	0.217	0.003	100	100	7	0.99	3344	207	3109	77	2960	19
	7	787	177	0.18	0.565	0.037	17.120	1.111	0.220	0.003	100	100	2	0.98	2887	151	2942	62	2979	19
	8	831	188	0.18	0.579	0.039	17.540	1.175	0.220	0.003	100	100	1	0.99	2944	158	2965	64	2979	19
	9	887	217	0.19	0.615	0.043	18.520	1.282	0.218	0.002	100	100	2	0.99	3091	170	3017	67	2968	18
	10	904	229	0.20	0.618	0.043	18.570	1.292	0.218	0.002	100	100	3	0.99	3101	171	3020	67	2966	18
	11	951	237	0.19	0.675	0.051	20.300	1.523	0.218	0.002	100	100	7	0.99	3325	195	3106	73	2967	18
	12	919	245	0.21	0.586	0.037	17.470	1.109	0.216	0.002	100	100	0	0.99	2973	151	2961	61	2953	18
	13	920	252	0.21	0.567	0.035	17.160	1.067	0.220	0.002	100	100	2	0.98	2894	145	2944	60	2978	18
	14	920	243	0.21	0.599	0.039	18.040	1.182	0.219	0.002	100	100	1	0.99	3024	158	2992	63	2970	18
	15	910	246	0.21	0.616	0.041	18.610	1.247	0.219	0.002	100	100	2	0.99	3094	164	3022	65	2975	18
NCGB12-10-18@1	1	678	21	0.02	0.427	0.024	10.980	0.610	0.186	0.003	100	98	9	0.97	2293	106	2521	52	2710	24
	2	610	20	0.03	0.421	0.022	10.910	0.581	0.188	0.003	100	99	10	0.96	2267	101	2516	50	2723	24
	3	585	33	0.04	0.486	0.029	12.770	0.759	0.190	0.003	100	99	4	0.97	2555	125	2663	56	2746	25
	4	571	50	0.07	0.426	0.022	11.390	0.592	0.194	0.003	100	99	11	0.96	2287	99	2556	49	2776	24
	5	627	59	0.07	0.463	0.025	12.330	0.679	0.193	0.003	100	99	7	0.97	2451	112	2630	52	2771	23
	6	669	62	0.07	0.442	0.022	12.000	0.609	0.197	0.003	100	99	10	0.96	2361	100	2604	48	2799	23
	7	798	103	0.10	0.409	0.020	11.290	0.545	0.200	0.003	100	99	14	0.97	2209	90	2547	45	2829	21
	8	883	127	0.11	0.402	0.019	11.110	0.535	0.201	0.002	100	100	15	0.97	2178	89	2532	45	2831	20
	9	913	174	0.15	0.423	0.022	11.710	0.608	0.201	0.002	100	99	13	0.97	2273	99	2581	49	2833	19
	10	793	181	0.18	0.437	0.023	12.230	0.648	0.203	0.003	100	99	11	0.97	2337	103	2622	50	2850	21
	11	604	152	0.20	0.508	0.030	13.960	0.832	0.199	0.003	100	99	4	0.97	2648	129	2747	57	2821	24
	12	501	140	0.22	0.509	0.032	14.310	0.897	0.204	0.003	100	99	4	0.97	2651	136	2771	60	2859	25
	13	437	134	0.24	0.501	0.032	14.230	0.905	0.206	0.003	100	100	6	0.97	2616	136	2765	60	2875	27
	14	386	127	0.26	0.457	0.027	13.090	0.785	0.208	0.004	100	100	10	0.96	2427	120	2686	57	2887	28
	15	357	124	0.27	0.503	0.033	14.610	0.959	0.211	0.004	100	99	6	0.96	2625	141	2790	62	2912	29
	16	303	124	0.32	0.449	0.027	13.190	0.796	0.213	0.004	100	99	12	0.95	2393	120	2694	57	2928	31
	17	272	122	0.35	0.499	0.033	14.350	0.945	0.209	0.004	100	100	6	0.95	2608	140	2773	63	2895	33

	18	258	119	0.36	0.440	0.027	12.960	0.799	0.214	0.004	100	100	13	0.94	2351	121	2677	58	2933	33
	19	254	114	0.35	0.503	0.035	14.650	1.031	0.211	0.004	100	100	6	0.96	2627	151	2793	67	2915	34
	20	231	109	0.37	0.453	0.029	13.330	0.866	0.214	0.005	100	100	12	0.94	2407	129	2703	61	2933	35
	21	220	94	0.33	0.471	0.032	14.200	0.960	0.219	0.005	100	100	10	0.95	2488	139	2763	64	2971	36
	22	229	101	0.34	0.568	0.044	16.610	1.298	0.212	0.005	100	99	0	0.96	2899	181	2912	75	2922	36
	23	235	105	0.35	0.431	0.026	12.410	0.767	0.209	0.005	100	99	13	0.94	2309	119	2636	58	2898	36
	24	237	99	0.33	0.448	0.028	13.310	0.834	0.216	0.005	100	100	12	0.94	2385	124	2702	59	2948	34
	25	245	108	0.34	0.434	0.027	13.060	0.809	0.218	0.005	100	100	14	0.94	2323	120	2684	58	2968	33
	26	243	119	0.38	0.516	0.036	15.670	1.107	0.220	0.005	100	100	6	0.96	2682	154	2857	67	2983	34
	27	231	116	0.39	0.435	0.027	12.950	0.806	0.216	0.005	100	100	14	0.94	2328	121	2676	59	2950	35
	28	223	117	0.41	0.476	0.032	14.270	0.968	0.218	0.005	100	100	10	0.95	2510	140	2768	64	2962	35
	29	216	140	0.51	0.438	0.028	13.050	0.830	0.216	0.005	100	100	14	0.94	2342	124	2683	60	2951	36
NCGB12-10-12	1	1210	47	0.03	0.433	0.022	11.470	0.592	0.192	0.002	100	99	10	0.98	2320	100	2562	48	2759	18
	2	1172	57	0.04	0.450	0.023	11.950	0.612	0.193	0.002	100	99	8	0.98	2396	102	2601	48	2765	18
	3	1164	102	0.07	0.470	0.024	12.650	0.648	0.195	0.002	100	99	7	0.98	2482	105	2654	48	2788	18
	4	1198	128	0.08	0.455	0.022	12.560	0.612	0.200	0.002	100	100	9	0.98	2417	98	2647	46	2828	18
	5	1276	138	0.08	0.446	0.021	12.560	0.603	0.204	0.002	100	100	11	0.98	2376	95	2647	45	2861	17
	6	1187	196	0.13	0.438	0.020	12.420	0.560	0.206	0.002	100	100	12	0.97	2343	88	2637	42	2871	17
	7	1061	186	0.14	0.466	0.022	13.450	0.625	0.209	0.002	100	100	10	0.97	2466	95	2712	44	2901	18
	8	1019	207	0.16	0.468	0.022	13.640	0.653	0.212	0.002	100	100	10	0.97	2473	98	2725	45	2918	18
	9	933	211	0.18	0.488	0.024	14.420	0.722	0.214	0.002	100	100	8	0.97	2561	106	2778	48	2939	19
	10	776	213	0.21	0.466	0.022	13.600	0.648	0.212	0.003	100	100	10	0.96	2465	97	2723	45	2919	21
	11	672	210	0.24	0.536	0.031	16.080	0.920	0.218	0.003	100	100	4	0.97	2766	128	2881	55	2963	22
	12	548	222	0.32	0.488	0.026	14.320	0.764	0.213	0.003	100	100	8	0.96	2562	112	2771	51	2927	25
	13	509	223	0.34	0.534	0.033	16.080	0.990	0.218	0.003	100	100	4	0.97	2758	138	2882	59	2969	26
	14	453	226	0.39	0.515	0.031	15.470	0.949	0.218	0.004	100	100	6	0.96	2677	134	2845	59	2966	27
	15	415	234	0.44	0.464	0.026	13.800	0.776	0.216	0.004	100	100	11	0.95	2456	114	2736	53	2951	28
	16	431	274	0.50	0.487	0.029	14.820	0.899	0.221	0.004	100	100	9	0.96	2557	127	2804	58	2986	27
	17	420	250	0.46	0.523	0.033	15.710	1.010	0.218	0.004	100	100	5	0.97	2711	142	2859	61	2965	28
	18	414	264	0.50	0.530	0.034	16.180	1.052	0.221	0.004	100	100	5	0.97	2743	145	2887	62	2990	28
	19	397	264	0.52	0.465	0.027	14.110	0.812	0.220	0.004	100	100	11	0.95	2461	117	2757	55	2981	28
	20	417	257	0.48	0.563	0.038	16.890	1.154	0.218	0.004	100	100	2	0.97	2879	158	2929	66	2963	28
	21	418	267	0.50	0.486	0.029	14.620	0.884	0.218	0.004	100	100	9	0.96	2553	127	2791	57	2968	28
	22	405	279	0.54	0.494	0.030	14.730	0.890	0.216	0.004	100	100	8	0.96	2589	128	2798	58	2952	28
	23	421	287	0.53	0.507	0.031	15.180	0.945	0.217	0.004	100	99	7	0.96	2643	134	2826	59	2960	28
	24	410	271	0.51	0.517	0.033	15.770	0.996	0.221	0.004	100	100	6	0.96	2688	138	2863	60	2989	28
	25	385	265	0.54	0.473	0.027	14.080	0.808	0.216	0.004	100	100	10	0.95	2497	118	2755	54	2950	28
	26	418	290	0.54	0.487	0.029	14.590	0.873	0.217	0.004	100	100	9	0.96	2556	126	2789	57	2962	28
	27	418	289	0.54	0.525	0.033	16.110	1.031	0.222	0.004	100	100	6	0.96	2721	141	2883	61	2998	27
	28	390	279	0.56	0.408	0.021	12.380	0.628	0.220	0.004	100	100	18	0.94	2206	94	2634	48	2981	28
	29	410	289	0.55	0.485	0.029	14.680	0.870	0.219	0.004	100	100	9	0.96	2551	124	2795	56	2976	28
NCGB12-10-24	1	841	43	0.04	0.451	0.020	11.950	0.525	0.192	0.003	100	99	8	0.94	2398	87	2600	41	2762	24
	2	738	72	0.08	0.451	0.020	12.010	0.535	0.193	0.003	100	99	8	0.95	2399	89	2605	42	2770	22
	3	599	93	0.12	0.609	0.034	16.250	0.916	0.194	0.003	100	99	6	0.97	3065	137	2892	54	2773	23
	4	496	71	0.11	0.537	0.027	14.450	0.740	0.195	0.003	100	99	0	0.95	2771	115	2779	49	2786	25
	5	493	86	0.14	0.542	0.030	14.910	0.821	0.200	0.003	100	99	1	0.96	2790	124	2810	52	2824	25
	6	453	82	0.14	0.495	0.026	13.840	0.738	0.203	0.003	100	99	6	0.96	2591	113	2739	50	2850	26
	7	414	91	0.17	0.566	0.035	16.180	1.010	0.207	0.003	100	99	0	0.96	2892	145	2888	60	2885	27
	8	393	100	0.20	0.534	0.033	15.230	0.958	0.207	0.004	100	100	3	0.96	2760	140	2830	60	2880	28
	9	355	116	0.25	0.569	0.038	16.560	1.121	0.211	0.004	100	100	0	0.97	2903	157	2910	65	2914	29
	10	322	122	0.30	0.458	0.026	13.170	0.751	0.209	0.004	100	100	10	0.95	2430	115	2692	54	2895	30
	11	331	156	0.37	0.525	0.034	15.090	0.994	0.209	0.004	100	99	4	0.96	2720	145	2821	63	2894	30
	12	305	158	0.40	0.461	0.028	13.390	0.810	0.211	0.004	100	99	10	0.95	2442	122	2707	57	2912	31
	13	271	167	0.48	0.441	0.026	13.210	0.785	0.217	0.004	100	100	13	0.94	2357	116	2695	56	2959	32

	14	268	192	0.56	0.465	0.030	13.640	0.879	0.213	0.004	100	99	10	0.95	2460	131	2725	61	2928	33
	15	246	189	0.60	0.462	0.030	13.700	0.887	0.215	0.005	100	100	11	0.95	2450	131	2729	61	2943	35
	16	249	214	0.67	0.470	0.031	14.030	0.932	0.217	0.005	100	100	10	0.95	2484	136	2752	63	2955	34
	17	237	194	0.64	0.451	0.028	13.820	0.879	0.222	0.005	100	100	13	0.94	2400	127	2738	60	2997	34
	18	216	211	0.76	0.358	0.019	10.660	0.560	0.216	0.005	100	100	23	0.91	1975	88	2494	49	2950	36
	19	236	208	0.69	0.434	0.026	12.960	0.792	0.217	0.005	100	100	14	0.94	2322	118	2677	58	2957	35
NCGB12-10-10@1	1	585	50	0.07	0.432	0.025	12.980	0.752	0.218	0.004	100	100	15	0.96	2313	112	2678	55	2967	26
	2	539	56	0.08	0.472	0.030	14.070	0.889	0.216	0.004	100	100	10	0.96	2492	130	2755	60	2953	27
	3	526	53	0.08	0.481	0.032	14.520	0.970	0.219	0.004	100	100	10	0.97	2529	139	2784	64	2975	28
	4	492	67	0.11	0.451	0.029	13.690	0.897	0.220	0.004	100	100	13	0.96	2402	131	2729	62	2981	29
	5	450	60	0.10	0.490	0.034	14.530	1.017	0.215	0.004	100	100	8	0.96	2572	148	2785	67	2943	30
	6	388	53	0.11	0.558	0.041	16.500	1.232	0.215	0.004	100	100	2	0.97	2857	172	2906	72	2940	32
	7	474	85	0.14	0.520	0.038	15.550	1.130	0.217	0.004	100	100	5	0.97	2699	160	2850	69	2958	29
	8	576	128	0.17	0.457	0.029	13.700	0.874	0.217	0.004	100	100	12	0.97	2427	128	2729	60	2961	27
	9	689	166	0.19	0.500	0.034	15.330	1.050	0.222	0.003	100	100	8	0.98	2614	147	2836	65	2998	25
	10	654	167	0.20	0.396	0.021	12.180	0.657	0.223	0.003	100	100	20	0.96	2152	98	2619	51	3003	25
	11	603	166	0.22	0.476	0.030	14.300	0.901	0.218	0.003	100	100	10	0.97	2510	130	2770	60	2965	25
	12	515	145	0.22	0.480	0.030	14.400	0.907	0.218	0.004	100	100	9	0.96	2529	131	2777	60	2962	27
	13	489	138	0.22	0.507	0.034	15.210	1.038	0.218	0.004	100	100	7	0.97	2643	147	2829	65	2964	28
	14	451	116	0.20	0.469	0.030	14.070	0.896	0.218	0.004	100	100	11	0.96	2477	130	2755	60	2965	29
	15	494	135	0.21	0.455	0.029	13.840	0.888	0.221	0.004	100	100	12	0.96	2417	129	2739	61	2986	28
	16	483	138	0.22	0.464	0.029	14.010	0.871	0.219	0.004	100	100	11	0.96	2456	126	2750	59	2975	28
	17	503	141	0.22	0.454	0.028	13.620	0.830	0.217	0.004	100	100	12	0.96	2415	122	2724	58	2961	28
	18	495	130	0.21	0.572	0.041	17.180	1.243	0.218	0.004	100	100	1	0.97	2916	169	2945	69	2965	27
	19	573	177	0.24	0.425	0.024	12.780	0.719	0.218	0.003	100	100	15	0.96	2281	108	2663	53	2968	26
NCGB12-10-8@1	1	803	37	0.04	0.376	0.021	10.130	0.590	0.195	0.004	99	96	17	0.94	2057	101	2447	54	2788	32
	2	525	52	0.08	0.451	0.027	12.200	0.750	0.196	0.004	100	99	9	0.95	2401	122	2620	58	2793	33
	3	418	88	0.17	0.476	0.032	13.320	0.911	0.203	0.004	100	99	7	0.95	2512	141	2702	65	2848	34
	4	332	111	0.26	0.444	0.030	12.800	0.868	0.209	0.005	100	99	12	0.94	2369	133	2665	64	2898	37
	5	277	124	0.35	0.559	0.048	16.210	1.387	0.210	0.005	100	99	1	0.96	2862	197	2889	82	2908	40
	6	240	148	0.48	0.523	0.044	15.780	1.328	0.219	0.006	100	99	5	0.95	2713	185	2864	80	2971	42
	7	227	144	0.50	0.453	0.035	13.760	1.068	0.220	0.006	100	100	13	0.94	2410	155	2733	74	2982	43
	8	231	158	0.53	0.474	0.038	14.070	1.148	0.215	0.006	100	100	10	0.95	2500	168	2754	77	2946	43
	9	225	149	0.51	0.542	0.049	16.570	1.512	0.222	0.006	100	100	4	0.96	2790	206	2910	87	2995	43
	10	236	168	0.55	0.527	0.048	16.010	1.469	0.221	0.006	100	100	5	0.96	2727	203	2878	88	2985	43
	11	231	176	0.59	0.485	0.042	14.460	1.265	0.217	0.006	100	100	9	0.95	2547	183	2781	83	2955	44
	12	220	166	0.59	0.518	0.048	15.870	1.475	0.222	0.006	100	100	6	0.96	2691	203	2869	89	2996	44
	13	193	165	0.67	0.411	0.032	12.610	0.978	0.223	0.006	100	100	18	0.93	2217	144	2651	73	3001	46
	14	191	160	0.66	0.491	0.044	14.780	1.331	0.218	0.006	100	99	8	0.95	2575	190	2801	86	2968	46
	15	184	145	0.61	0.420	0.033	13.200	1.050	0.228	0.007	100	100	18	0.93	2259	151	2694	75	3039	46
	16	195	152	0.61	0.450	0.038	13.730	1.161	0.222	0.006	100	100	13	0.94	2394	168	2731	80	2991	46
	17	185	149	0.63	0.410	0.032	12.490	0.982	0.221	0.006	100	100	18	0.93	2216	146	2642	74	2987	47
	18	189	149	0.62	0.492	0.045	14.790	1.352	0.218	0.006	100	100	8	0.95	2578	193	2802	87	2967	46
	19	179	158	0.69	0.402	0.031	12.250	0.946	0.221	0.006	100	100	18	0.93	2180	142	2624	73	2986	47
NCGB12-10-13@1	1	897	24	0.02	0.424	0.021	10.720	0.542	0.183	0.002	99	94	9	0.97	2279	96	2500	47	2684	22
	2	717	16	0.02	0.468	0.027	12.140	0.708	0.188	0.003	99	97	6	0.97	2474	119	2615	55	2727	23
	3	538	18	0.03	0.449	0.025	11.760	0.669	0.190	0.003	100	98	8	0.96	2390	112	2586	53	2743	26
	4	469	37	0.06	0.449	0.027	12.410	0.756	0.200	0.003	100	99	10	0.96	2392	121	2636	57	2828	27
	5	383	40	0.08	0.561	0.042	15.520	1.158	0.201	0.004	100	99	1	0.97	2870	172	2848	71	2832	29
	6	347	43	0.10	0.528	0.039	14.850	1.107	0.204	0.004	99	97	3	0.97	2733	165	2806	71	2858	32
	7	287	44	0.12	0.559	0.043	16.080	1.254	0.209	0.004	99	97	1	0.96	2864	179	2881	75	2894	34
	8	307	66	0.17	0.526	0.041	15.440	1.202	0.213	0.004	100	98	4	0.97	2724	172	2843	74	2928	32
	9	284	73	0.20	0.467	0.031	13.830	0.932	0.215	0.004	100	99	10	0.96	2470	137	2738	64	2942	33
	10	289	78	0.21	0.565	0.045	17.220	1.377	0.221	0.004	100	99	2	0.97	2889	185	2947	77	2987	32

	11	287	80	0.22	0.486	0.033	14.550	1.006	0.217	0.004	100	99	9	0.96	2553	145	2787	66	2960	32
	12	308	96	0.24	0.534	0.040	16.100	1.200	0.219	0.004	100	99	4	0.97	2759	166	2883	71	2970	32
	13	305	97	0.25	0.484	0.033	14.740	1.001	0.221	0.004	100	100	10	0.96	2543	142	2799	65	2989	32
	14	318	91	0.22	0.571	0.045	17.290	1.363	0.220	0.004	100	100	1	0.97	2913	184	2951	76	2977	31
	15	299	109	0.29	0.450	0.028	13.750	0.872	0.221	0.004	100	99	13	0.95	2396	126	2732	60	2991	32
	16	299	105	0.27	0.545	0.040	16.340	1.208	0.218	0.004	100	100	3	0.97	2804	167	2897	71	2962	31
	17	326	136	0.33	0.509	0.036	15.400	1.100	0.220	0.004	100	99	7	0.96	2652	154	2840	68	2977	31
	18	322	124	0.30	0.589	0.047	17.600	1.405	0.217	0.004	100	99	1	0.97	2986	190	2968	77	2956	31
	19	303	121	0.31	0.499	0.034	14.820	1.004	0.215	0.004	100	100	7	0.96	2609	145	2803	64	2946	31
	20	318	139	0.34	0.467	0.030	14.250	0.909	0.221	0.004	100	100	11	0.96	2471	130	2767	61	2990	31
	21	339	153	0.35	0.477	0.032	14.320	0.955	0.218	0.004	100	100	10	0.96	2516	138	2771	63	2963	30
	22	309	136	0.34	0.543	0.039	16.430	1.190	0.219	0.004	100	100	4	0.97	2798	164	2902	69	2975	30
	23	300	143	0.37	0.535	0.038	16.180	1.153	0.219	0.004	100	100	4	0.96	2764	159	2887	68	2975	31
	24	312	153	0.38	0.450	0.028	13.590	0.838	0.219	0.004	100	100	13	0.95	2395	123	2722	58	2974	30
	25	333	163	0.38	0.506	0.034	15.540	1.052	0.223	0.004	100	100	8	0.96	2637	146	2849	65	3002	29
	26	327	150	0.36	0.499	0.033	15.140	1.003	0.220	0.004	100	100	8	0.96	2610	141	2824	63	2981	29
	27	338	162	0.37	0.499	0.033	15.170	1.001	0.220	0.004	100	100	8	0.96	2610	141	2826	63	2984	29
	28	339	171	0.39	0.528	0.036	15.780	1.089	0.217	0.004	100	100	5	0.97	2734	153	2864	66	2956	29
	29	330	176	0.42	0.449	0.027	13.600	0.822	0.220	0.004	100	100	13	0.96	2391	120	2722	57	2978	29
NCGB12-10-15	1	783	59	0.06	0.294	0.015	8.786	0.485	0.217	0.005	96	86	33	0.92	1660	76	2316	50	2958	35
	2	496	31	0.05	0.438	0.029	12.700	0.878	0.210	0.005	98	92	13	0.95	2340	132	2658	65	2909	36
	3	337	20	0.05	0.588	0.051	17.140	1.499	0.212	0.005	99	95	1	0.96	2979	206	2943	84	2918	40
	4	283	26	0.07	0.658	0.063	18.930	1.823	0.209	0.005	99	96	7	0.96	3259	244	3038	93	2895	43
	5	370	40	0.08	0.515	0.038	15.520	1.171	0.219	0.005	99	97	6	0.96	2677	164	2847	72	2970	36
	6	547	51	0.07	0.391	0.022	11.990	0.676	0.223	0.004	100	99	20	0.95	2126	101	2604	53	2999	29
	7	610	49	0.06	0.671	0.051	20.170	1.537	0.218	0.004	100	99	7	0.98	3311	197	3099	74	2965	27
	8	771	52	0.05	0.411	0.019	12.350	0.589	0.218	0.003	100	99	17	0.95	2219	89	2631	45	2965	24
NCGB12-10-18@2	1	949	264	0.22	0.313	0.016	7.966	0.421	0.185	0.003	98	93	24	0.94	1756	79	2227	48	2693	30
	2	730	176	0.19	0.432	0.027	11.250	0.702	0.189	0.003	99	95	9	0.96	2316	119	2544	58	2731	30
	3	640	142	0.17	0.376	0.020	9.888	0.532	0.191	0.004	99	96	16	0.94	2056	93	2424	50	2750	31
	4	597	145	0.19	0.455	0.028	12.010	0.739	0.191	0.004	99	95	7	0.95	2419	122	2605	58	2753	31
	5	605	123	0.16	0.480	0.030	12.930	0.814	0.196	0.004	99	96	6	0.96	2525	130	2675	59	2790	30
	6	715	132	0.14	0.404	0.021	11.150	0.587	0.200	0.003	99	97	15	0.95	2187	96	2536	49	2828	27
	7	823	132	0.13	0.445	0.024	12.250	0.669	0.200	0.003	99	98	10	0.96	2375	107	2624	51	2822	25
	8	952	178	0.15	0.435	0.023	12.020	0.641	0.200	0.003	100	98	11	0.96	2329	103	2606	50	2829	23
	9	950	174	0.14	0.379	0.017	10.610	0.485	0.203	0.003	100	98	18	0.95	2073	80	2489	42	2850	23
	10	919	199	0.17	0.381	0.017	10.600	0.489	0.202	0.003	100	98	18	0.95	2079	81	2488	43	2842	23
	11	879	174	0.16	0.413	0.021	11.660	0.586	0.205	0.003	100	99	15	0.96	2228	94	2577	47	2865	23
	12	751	180	0.19	0.389	0.019	11.190	0.547	0.209	0.003	100	99	18	0.95	2119	88	2539	46	2895	24
	13	592	124	0.16	0.520	0.033	15.080	0.954	0.210	0.003	100	99	4	0.97	2700	139	2820	60	2907	27
	14	512	96	0.15	0.432	0.024	12.830	0.716	0.215	0.004	100	99	14	0.95	2315	108	2667	53	2945	28
	15	492	83	0.13	0.452	0.027	13.460	0.809	0.216	0.004	100	100	12	0.96	2403	120	2712	57	2951	29
	16	465	92	0.15	0.413	0.024	12.430	0.723	0.218	0.004	100	100	17	0.95	2230	109	2638	55	2967	30
	17	421	96	0.18	0.405	0.024	12.230	0.717	0.219	0.004	100	99	18	0.95	2191	108	2622	55	2975	31
	18	375	101	0.21	0.505	0.037	15.140	1.108	0.218	0.004	100	99	7	0.96	2634	157	2824	70	2963	33
	19	344	95	0.22	0.516	0.041	15.420	1.223	0.217	0.005	100	100	6	0.96	2680	173	2842	76	2958	35
	20	296	111	0.29	0.420	0.028	12.540	0.846	0.217	0.005	100	100	16	0.94	2261	128	2645	64	2955	36
	21	294	97	0.26	0.430	0.030	12.810	0.902	0.216	0.005	100	100	15	0.95	2305	136	2666	66	2951	37
	22	289	117	0.32	0.409	0.028	12.150	0.828	0.215	0.005	100	99	17	0.94	2212	126	2616	64	2945	38
	23	278	131	0.37	0.359	0.022	10.880	0.677	0.220	0.005	100	99	24	0.92	1978	105	2513	58	2979	39
	24	272	120	0.34	0.442	0.033	13.270	0.997	0.218	0.005	100	99	13	0.95	2358	147	2699	71	2965	39
	25	240	120	0.39	0.397	0.027	11.720	0.816	0.214	0.005	100	100	18	0.94	2153	126	2582	65	2938	40
	26	237	141	0.46	0.416	0.030	12.760	0.938	0.223	0.006	100	100	17	0.94	2242	138	2662	69	2999	40
	27	219	124	0.44	0.381	0.026	11.170	0.770	0.213	0.006	100	100	20	0.93	2081	121	2538	64	2926	43

	28	224	143	0.50	0.406	0.030	11.950	0.892	0.214	0.006	100	99	17	0.94	2196	137	2600	70	2932	43
	29	205	124	0.47	0.360	0.024	10.780	0.740	0.217	0.006	100	100	23	0.92	1982	116	2505	64	2961	43
NCGB12-10-13@2	1	853	48	0.04	0.388	0.017	10.040	0.450	0.188	0.003	99	97	14	0.95	2111	80	2438	41	2723	23
	2	609	36	0.05	0.476	0.025	12.940	0.689	0.197	0.003	100	99	6	0.96	2508	110	2675	50	2803	25
	3	631	50	0.06	0.380	0.018	10.760	0.510	0.205	0.003	100	99	19	0.95	2077	83	2503	44	2869	24
	4	641	74	0.09	0.467	0.026	13.650	0.761	0.212	0.003	100	99	10	0.97	2470	114	2726	53	2922	24
	5	596	87	0.11	0.394	0.018	11.730	0.551	0.216	0.003	100	99	19	0.95	2141	85	2583	44	2950	24
	6	556	91	0.13	0.526	0.032	15.610	0.953	0.216	0.003	100	100	5	0.97	2722	135	2853	58	2948	25
	7	492	90	0.14	0.452	0.024	13.480	0.732	0.216	0.004	100	99	12	0.96	2404	108	2714	51	2953	26
	8	436	88	0.16	0.461	0.025	13.830	0.769	0.218	0.004	100	100	11	0.95	2443	112	2738	53	2963	27
	9	434	86	0.15	0.500	0.031	14.720	0.902	0.214	0.004	100	100	7	0.96	2614	131	2797	58	2932	28
	10	422	100	0.19	0.482	0.029	14.170	0.847	0.213	0.004	100	99	8	0.96	2536	124	2761	57	2930	29
	11	418	83	0.16	0.510	0.032	15.270	0.977	0.217	0.004	100	99	6	0.96	2656	138	2832	61	2960	29
	12	377	94	0.20	0.474	0.028	14.130	0.854	0.216	0.004	100	99	10	0.95	2502	124	2758	57	2952	30
	13	359	96	0.21	0.481	0.030	14.380	0.891	0.217	0.004	100	100	9	0.95	2531	129	2775	59	2957	30
	14	349	82	0.18	0.480	0.031	14.390	0.922	0.218	0.004	100	100	9	0.96	2527	133	2776	61	2962	31
	15	330	81	0.19	0.582	0.044	17.560	1.346	0.219	0.004	100	100	0	0.97	2959	181	2966	74	2971	32
	16	301	84	0.22	0.579	0.044	17.170	1.318	0.215	0.004	100	100	0	0.97	2944	181	2944	74	2945	33
	17	267	73	0.21	0.424	0.025	12.780	0.748	0.219	0.005	100	100	16	0.93	2277	111	2664	55	2972	34
	18	294	81	0.22	0.510	0.035	15.390	1.065	0.219	0.004	100	100	7	0.96	2658	150	2840	66	2972	33
	19	303	112	0.29	0.504	0.033	15.080	0.996	0.217	0.004	100	100	7	0.95	2632	142	2820	63	2958	33
	20	318	125	0.31	0.414	0.023	12.570	0.692	0.220	0.004	100	100	17	0.93	2232	103	2648	52	2983	32
	21	335	144	0.33	0.529	0.035	16.110	1.086	0.221	0.004	100	100	5	0.96	2737	150	2884	64	2988	31
	22	337	149	0.34	0.438	0.025	13.210	0.749	0.219	0.004	100	100	14	0.94	2340	111	2694	54	2972	31
	23	342	160	0.37	0.484	0.029	14.600	0.884	0.219	0.004	100	100	9	0.95	2545	126	2790	58	2972	31
	24	346	161	0.36	0.471	0.027	14.210	0.828	0.219	0.004	100	100	11	0.95	2488	119	2764	55	2972	31
	25	387	195	0.39	0.519	0.034	15.860	1.039	0.222	0.004	100	100	6	0.96	2694	144	2868	63	2993	29
	26	367	208	0.44	0.418	0.022	12.580	0.665	0.218	0.004	100	100	16	0.94	2253	100	2649	50	2967	30
	27	376	191	0.40	0.500	0.031	15.370	0.962	0.223	0.004	100	100	8	0.96	2614	134	2839	60	3002	29
	28	375	200	0.42	0.489	0.030	14.930	0.911	0.222	0.004	100	100	9	0.96	2566	128	2811	58	2992	29
	29	344	199	0.45	0.439	0.024	13.230	0.735	0.218	0.004	100	100	14	0.94	2348	109	2696	52	2969	30
NCGB12-10-8@2	1	1849	28	0.01	0.463	0.027	11.220	0.656	0.176	0.002	100	98	4	0.97	2453	118	2542	55	2613	22
	2	1591	24	0.01	0.515	0.032	12.680	0.800	0.179	0.002	100	99	1	0.98	2679	137	2656	59	2639	22
	3	1375	29	0.02	0.550	0.038	13.790	0.952	0.182	0.002	100	99	3	0.98	2824	157	2735	65	2670	23
	4	1217	33	0.02	0.507	0.033	12.900	0.834	0.185	0.003	100	99	1	0.98	2644	139	2672	61	2694	24
	5	1134	59	0.04	0.529	0.036	13.570	0.931	0.186	0.003	100	99	1	0.98	2736	152	2720	65	2708	24
	6	896	75	0.06	0.559	0.039	14.510	1.022	0.188	0.003	100	100	3	0.98	2864	162	2784	67	2726	25
	7	807	89	0.09	0.576	0.043	14.920	1.115	0.188	0.003	100	100	4	0.98	2931	175	2810	71	2725	26
	8	736	100	0.11	0.603	0.047	15.770	1.223	0.190	0.003	100	100	6	0.98	3041	187	2863	74	2740	27
	9	678	104	0.12	0.604	0.048	16.180	1.301	0.194	0.003	100	100	5	0.98	3046	195	2887	77	2778	28
	10	593	106	0.14	0.619	0.052	16.760	1.426	0.196	0.004	100	100	6	0.98	3105	209	2921	82	2797	29
	11	534	103	0.15	0.676	0.063	17.920	1.685	0.192	0.004	100	100	11	0.98	3329	244	2985	90	2762	31
	12	468	92	0.15	0.653	0.059	18.010	1.641	0.200	0.004	100	100	8	0.98	3241	231	2990	88	2826	33
	13	434	109	0.20	0.623	0.057	17.330	1.590	0.202	0.004	100	100	6	0.97	3122	226	2953	88	2840	34
	14	421	105	0.20	0.798	0.096	22.210	2.677	0.202	0.004	100	100	17	0.98	3780	344	3193	117	2842	35
	15	382	109	0.22	0.677	0.070	19.230	2.008	0.206	0.005	100	100	9	0.98	3331	271	3053	101	2875	36
	16	354	107	0.24	0.628	0.062	17.670	1.741	0.204	0.005	100	100	6	0.97	3142	244	2972	95	2859	37
	17	351	131	0.29	0.676	0.073	19.420	2.091	0.208	0.005	100	100	8	0.98	3329	279	3063	104	2893	38
	18	336	130	0.30	0.710	0.079	20.580	2.308	0.210	0.005	100	100	10	0.98	3459	299	3119	109	2907	39
	19	334	131	0.31	0.722	0.085	21.080	2.488	0.212	0.005	100	99	11	0.98	3504	318	3142	114	2919	39
	20	317	144	0.36	0.885	0.127	25.630	3.679	0.210	0.005	100	99	20	0.99	4085	433	3333	140	2907	40
	21	287	144	0.39	0.680	0.076	19.700	2.210	0.210	0.005	100	100	8	0.98	3343	292	3077	108	2907	41
	22	284	147	0.40	0.734	0.089	21.560	2.626	0.213	0.005	100	100	11	0.98	3547	331	3164	118	2929	41
	23	276	161	0.46	0.653	0.071	19.170	2.105	0.213	0.005	100	100	6	0.97	3240	279	3051	106	2928	42

	24	289	170	0.46	0.803	0.108	23.400	3.143	0.211	0.005	100	100	16	0.98	3800	385	3244	131	2916	42
	25	276	155	0.44	0.664	0.075	19.840	2.260	0.217	0.006	100	100	6	0.97	3284	292	3084	110	2956	42
	26	269	170	0.49	0.730	0.092	21.740	2.746	0.216	0.006	100	100	11	0.98	3531	342	3172	123	2952	43
	27	268	163	0.48	0.984	0.165	28.700	4.828	0.212	0.006	100	100	25	0.99	4415	537	3443	165	2918	43
	28	248	176	0.55	0.635	0.069	18.100	1.986	0.207	0.006	100	100	6	0.97	3168	273	2995	106	2880	45
	29	248	173	0.54	0.709	0.087	20.730	2.550	0.212	0.006	100	99	10	0.98	3454	327	3126	119	2922	45
cordierite-biotite schist (NCGB12-13; NAD 83, Zone 15, 627909E, 5868746N)																				
NCGB12-13-1	1	1473	222	0.12	0.066	0.002	1.924	0.095	0.213	0.007	89	67	91	0.78	409.7	12	1089	33	2926	52
	2	1403	224	0.13	0.080	0.003	2.341	0.112	0.212	0.006	90	69	85	0.79	496.6	15	1225	34	2921	48
	3	1294	186	0.12	0.094	0.003	2.859	0.124	0.221	0.005	92	76	81	0.82	578.5	18	1371	33	2987	40
	4	1081	163	0.12	0.119	0.004	3.602	0.154	0.220	0.005	94	79	73	0.85	722.8	24	1550	34	2982	37
	5	820	143	0.14	0.159	0.006	4.889	0.209	0.224	0.005	95	84	62	0.87	949.2	33	1800	36	3006	33
	6	599	104	0.14	0.226	0.009	6.673	0.299	0.214	0.004	97	88	45	0.89	1314	49	2069	40	2937	33
	7	493	109	0.18	0.283	0.012	8.681	0.400	0.223	0.004	98	92	36	0.91	1606	62	2305	42	2999	31
	8	438	80	0.15	0.306	0.013	9.366	0.428	0.222	0.004	99	95	32	0.91	1719	67	2375	42	2997	30
	9	401	86	0.17	0.349	0.016	10.450	0.510	0.217	0.004	99	95	25	0.92	1929	79	2475	45	2961	31
	10	371	89	0.20	0.350	0.016	10.580	0.508	0.219	0.004	99	95	25	0.92	1936	78	2487	45	2974	31
	11	367	83	0.18	0.353	0.016	10.550	0.500	0.217	0.004	99	96	24	0.91	1947	77	2484	44	2959	31
	12	370	77	0.17	0.390	0.019	11.680	0.596	0.217	0.004	99	96	19	0.93	2121	90	2579	48	2962	31
	13	339	81	0.19	0.358	0.016	10.670	0.496	0.216	0.004	99	97	23	0.91	1975	77	2495	43	2950	32
	14	340	75	0.18	0.420	0.022	12.810	0.666	0.221	0.004	99	98	16	0.93	2260	98	2666	49	2990	31
	15	346	78	0.18	0.387	0.019	11.480	0.564	0.215	0.004	99	97	20	0.92	2107	87	2563	46	2946	31
	16	327	81	0.20	0.382	0.018	11.470	0.551	0.218	0.004	99	98	21	0.92	2083	84	2562	45	2966	32
	17	316	69	0.18	0.390	0.019	11.640	0.567	0.217	0.004	99	98	19	0.92	2123	86	2576	46	2955	32
NCGB12-13-1@1	1	2441	635	0.21	0.039	0.001	1.191	0.062	0.224	0.008	86	62	106	0.77	244.4	7	796.5	29	3007	56
	2	2401	672	0.23	0.034	0.001	1.036	0.058	0.220	0.009	84	58	108	0.77	216.8	6	722	29	2979	63
	3	2298	655	0.23	0.041	0.001	1.240	0.070	0.217	0.008	85	59	103	0.77	261.7	8	818.7	32	2958	62
	4	1798	496	0.22	0.057	0.002	1.775	0.090	0.227	0.007	87	64	98	0.79	356	11	1036	33	3029	52
	5	1602	403	0.21	0.073	0.002	2.216	0.109	0.221	0.007	88	66	90	0.79	451.8	14	1186	35	2991	50
	6	1297	302	0.19	0.094	0.003	2.890	0.129	0.223	0.006	91	73	82	0.82	578.9	18	1379	34	3003	42
	7	926	230	0.20	0.135	0.005	4.059	0.177	0.219	0.005	93	78	68	0.84	813.7	27	1646	36	2972	38
	8	679	174	0.21	0.202	0.008	6.090	0.271	0.219	0.005	95	85	51	0.88	1183	43	1989	39	2975	34
	9	517	135	0.21	0.283	0.013	8.411	0.404	0.216	0.004	97	89	34	0.91	1607	64	2276	44	2948	33
	10	425	117	0.22	0.336	0.016	10.170	0.497	0.219	0.004	98	93	27	0.92	1868	76	2450	45	2976	31
	11	368	100	0.22	0.365	0.018	11.010	0.547	0.219	0.004	99	95	23	0.92	2006	83	2524	46	2972	32
	12	331	89	0.22	0.397	0.020	12.050	0.622	0.220	0.004	99	97	19	0.93	2153	93	2609	48	2984	32
	13	314	86	0.22	0.406	0.021	12.420	0.656	0.222	0.004	99	98	18	0.93	2198	97	2637	50	2993	32
	14	297	79	0.22	0.400	0.020	12.090	0.626	0.220	0.005	99	97	19	0.92	2167	93	2611	49	2977	33
	15	285	69	0.20	0.409	0.021	12.390	0.649	0.220	0.005	99	97	17	0.92	2211	96	2635	49	2978	34
	16	290	73	0.20	0.426	0.023	12.970	0.705	0.221	0.005	99	98	16	0.93	2288	103	2677	51	2986	34
NCGB12-13-2	1	6292	5493	0.71	0.044	0.001	1.243	0.035	0.206	0.003	93	77	99	0.81	276.3	6	820	16	2873	27
	2	6765	5740	0.69	0.041	0.001	1.178	0.033	0.207	0.003	93	77	101	0.81	261.4	5	790.5	16	2878	27
	3	6717	5751	0.70	0.042	0.001	1.218	0.034	0.210	0.003	94	79	101	0.82	265.2	5	808.8	16	2908	26
	4	7143	5987	0.68	0.045	0.001	1.287	0.036	0.207	0.003	94	78	99	0.82	283.9	6	840.1	16	2885	26
	5	6962	5733	0.67	0.047	0.001	1.378	0.037	0.213	0.003	94	80	99	0.83	296	6	879.6	16	2926	24
	6	6627	5260	0.65	0.048	0.001	1.396	0.037	0.212	0.003	94	80	99	0.83	300.5	6	887.4	16	2923	24
	7	6607	4868	0.60	0.051	0.001	1.462	0.040	0.209	0.003	94	79	96	0.83	319.5	7	915	17	2896	25
	8	6370	4229	0.54	0.053	0.001	1.505	0.042	0.205	0.003	94	79	94	0.83	334.2	7	932.3	17	2867	25
	9	5731	3357	0.48	0.052	0.001	1.451	0.041	0.202	0.003	94	79	94	0.83	326.7	7	910.2	17	2845	26
	10	5435	2700	0.40	0.052	0.001	1.497	0.041	0.210	0.003	95	83	96	0.84	324.6	7	929.3	17	2908	24
	11	5183	2268	0.36	0.048	0.001	1.425	0.039	0.214	0.003	95	82	99	0.83	304.4	6	899.4	16	2934	25
	12	5044	1960	0.32	0.047	0.001	1.356	0.037	0.211	0.003	95	82	99	0.82	293.5	6	870.4	16	2915	25
	13	4098	1593	0.32	0.056	0.001	1.622	0.048	0.212	0.004	94	81	95	0.83	348.8	8	978.7	19	2917	27
	14	2385	1081	0.37	0.075	0.002	2.145	0.066	0.207	0.004	95	83	86	0.82	466.4	11	1163	21	2885	28

	15	1538	838	0.44	0.091	0.002	2.681	0.081	0.213	0.004	97	89	81	0.84	562.7	14	1323	22	2930	27
	16	1167	636	0.44	0.100	0.003	3.093	0.092	0.224	0.004	98	92	80	0.84	616.1	15	1431	23	3007	26
NCGB12-13-3	1	428	52	0.10	0.503	0.024	13.460	0.655	0.194	0.003	100	99	3	0.94	2625	104	2712	46	2777	28
	2	430	49	0.09	0.480	0.022	13.240	0.617	0.200	0.003	100	100	6	0.94	2529	97	2697	44	2825	27
	3	415	45	0.09	0.590	0.031	16.440	0.862	0.202	0.003	100	99	3	0.95	2990	125	2902	50	2843	27
	4	462	54	0.09	0.529	0.025	15.310	0.719	0.210	0.003	100	100	4	0.94	2736	104	2835	45	2906	26
	5	505	62	0.10	0.556	0.026	16.530	0.788	0.216	0.003	100	100	2	0.95	2849	109	2908	46	2950	24
	6	478	70	0.12	0.513	0.022	15.450	0.663	0.218	0.003	100	99	6	0.94	2669	93	2843	41	2969	24
	7	528	84	0.13	0.544	0.025	16.230	0.743	0.217	0.003	100	99	3	0.95	2798	103	2890	44	2955	23
	8	521	83	0.13	0.532	0.024	16.010	0.716	0.218	0.003	100	100	5	0.95	2751	99	2878	43	2967	23
	9	481	90	0.15	0.506	0.021	15.030	0.634	0.216	0.003	100	100	7	0.94	2639	91	2817	40	2948	24
	10	492	90	0.15	0.522	0.023	15.690	0.693	0.218	0.003	100	99	5	0.94	2707	97	2858	42	2966	24
	11	502	85	0.14	0.484	0.021	14.690	0.628	0.220	0.003	100	99	9	0.94	2544	89	2795	41	2982	24
	12	476	84	0.14	0.548	0.025	16.480	0.767	0.218	0.003	100	99	3	0.95	2816	105	2905	45	2968	24
	13	476	88	0.15	0.464	0.019	13.980	0.581	0.218	0.003	100	99	11	0.93	2459	84	2748	39	2968	24
	14	510	82	0.13	0.429	0.017	12.960	0.516	0.219	0.003	100	99	15	0.93	2301	76	2676	38	2973	24
	15	487	92	0.15	0.446	0.018	13.530	0.553	0.220	0.003	100	99	13	0.93	2379	80	2718	39	2980	24
	16	457	79	0.14	0.498	0.023	15.050	0.689	0.219	0.003	100	99	8	0.94	2607	97	2819	44	2974	25
	17	361	73	0.17	0.448	0.019	13.320	0.574	0.216	0.004	100	99	13	0.92	2385	85	2703	41	2950	27
	18	343	78	0.18	0.444	0.020	13.570	0.619	0.222	0.004	100	100	14	0.93	2369	90	2720	43	2993	28
	19	306	66	0.18	0.462	0.023	13.830	0.684	0.217	0.004	100	100	11	0.93	2450	100	2738	47	2957	30
	20	276	68	0.20	0.446	0.022	13.180	0.666	0.214	0.004	100	99	12	0.92	2377	99	2692	48	2938	32
	21	242	77	0.26	0.368	0.016	11.190	0.510	0.221	0.005	100	99	23	0.89	2019	78	2539	43	2986	34
	22	238	72	0.25	0.397	0.019	11.910	0.586	0.218	0.005	100	100	19	0.91	2153	89	2597	46	2964	34
	23	222	69	0.25	0.420	0.023	12.650	0.687	0.219	0.005	100	99	16	0.92	2258	102	2654	51	2971	35
	24	187	66	0.29	0.386	0.020	11.500	0.617	0.216	0.005	100	99	20	0.90	2106	95	2564	50	2950	38
	25	166	64	0.32	0.382	0.021	11.330	0.644	0.215	0.005	100	99	20	0.90	2086	100	2551	53	2944	41
	26	152	62	0.33	0.366	0.021	10.810	0.628	0.214	0.006	100	99	22	0.89	2009	99	2507	54	2939	43
	27	136	58	0.35	0.325	0.018	9.602	0.541	0.214	0.006	100	100	28	0.88	1813	88	2397	52	2939	45
	28	135	60	0.36	0.359	0.022	10.630	0.656	0.215	0.006	100	99	23	0.90	1975	103	2491	57	2944	45
	29	133	64	0.39	0.308	0.017	9.384	0.531	0.221	0.006	100	99	31	0.87	1731	84	2376	52	2987	45
NCGB12-13-7	1	1505	2319	1.25	0.099	0.003	2.771	0.171	0.203	0.009	78	47	76	0.76	608.7	19	1348	46	2850	69
	2	867	482	0.45	0.139	0.005	3.999	0.237	0.209	0.008	83	56	65	0.78	836.5	30	1634	48	2900	62
	3	634	253	0.33	0.149	0.006	4.449	0.255	0.216	0.008	87	63	63	0.79	895.8	33	1722	47	2954	57
	4	534	185	0.28	0.186	0.008	5.450	0.341	0.213	0.008	87	64	53	0.81	1099	46	1893	54	2927	60
	5	454	161	0.29	0.211	0.010	6.214	0.399	0.214	0.008	88	66	48	0.83	1233	55	2006	56	2935	59
	6	420	147	0.29	0.219	0.011	6.731	0.418	0.223	0.008	90	70	48	0.84	1278	58	2077	55	2999	54
	7	364	143	0.32	0.225	0.011	6.710	0.415	0.217	0.007	90	71	45	0.83	1307	58	2074	55	2954	56
	8	362	134	0.30	0.253	0.014	7.163	0.484	0.206	0.008	90	68	38	0.83	1452	70	2132	60	2872	61
	9	309	119	0.31	0.271	0.014	8.257	0.508	0.221	0.007	93	79	37	0.86	1547	74	2260	56	2986	50
	10	288	128	0.36	0.311	0.018	9.664	0.602	0.225	0.006	95	84	32	0.89	1745	87	2403	57	3020	46
	11	269	123	0.37	0.317	0.018	9.606	0.610	0.220	0.007	95	83	30	0.88	1776	89	2398	58	2978	49
	12	256	116	0.37	0.328	0.019	9.754	0.621	0.216	0.007	95	84	28	0.88	1827	92	2412	59	2951	49
	13	246	113	0.37	0.359	0.022	10.740	0.714	0.217	0.006	96	87	23	0.90	1977	105	2501	62	2959	47
	14	244	121	0.40	0.372	0.023	11.380	0.741	0.222	0.006	97	90	23	0.91	2037	108	2555	61	2996	45
	15	235	124	0.43	0.393	0.025	11.610	0.780	0.214	0.006	97	89	18	0.91	2139	116	2573	63	2936	46
	16	225	114	0.41	0.380	0.023	11.560	0.740	0.221	0.006	97	91	21	0.91	2075	108	2569	60	2986	44
	17	227	115	0.41	0.390	0.024	11.760	0.759	0.219	0.006	98	91	20	0.91	2122	111	2585	60	2972	44
	18	228	124	0.44	0.450	0.030	13.600	0.943	0.219	0.006	98	93	13	0.93	2395	134	2722	66	2975	43
	19	215	115	0.44	0.353	0.020	11.050	0.643	0.227	0.006	98	93	26	0.89	1947	94	2527	54	3032	43
Biotite schist (NCGB12-14; NAD 83, Zone 15, 626394E, 5869259N)																				
NCB12-14-1	1	875	54	0.05	0.473	0.023	13.960	0.700	0.214	0.004	99	96	9	0.93	2498	102	2747	48	2935	30
	2	576	26	0.04	0.620	0.037	18.250	1.114	0.214	0.004	100	98	3	0.94	3108	149	3003	59	2933	33
	3	494	23	0.04	0.674	0.047	19.500	1.375	0.210	0.005	100	98	8	0.95	3323	181	3067	68	2904	37

	4	454	45	0.08	0.673	0.049	19.510	1.442	0.210	0.005	100	98	8	0.95	3318	190	3067	71	2907	38
	5	428	48	0.09	0.545	0.035	15.970	1.043	0.213	0.005	100	99	3	0.93	2804	147	2875	62	2925	39
	6	401	61	0.12	0.591	0.042	17.650	1.253	0.217	0.005	100	99	1	0.94	2992	168	2971	68	2956	39
	7	380	63	0.14	0.523	0.034	15.370	1.021	0.213	0.005	100	99	5	0.93	2710	145	2839	63	2931	40
	8	331	76	0.19	0.648	0.051	19.430	1.549	0.218	0.006	100	99	5	0.94	3220	200	3063	77	2962	43
	9	282	87	0.25	0.614	0.048	18.180	1.447	0.215	0.006	100	98	3	0.93	3086	193	2999	77	2941	47
	10	298	101	0.28	0.578	0.045	17.240	1.364	0.216	0.006	100	100	0	0.94	2942	185	2948	76	2953	45
	11	280	108	0.31	0.544	0.040	16.420	1.225	0.219	0.006	100	100	4	0.93	2799	168	2902	71	2973	46
	12	279	111	0.33	0.575	0.045	17.270	1.359	0.218	0.006	100	99	1	0.94	2929	184	2950	76	2965	46
	13	268	100	0.30	0.535	0.040	16.060	1.213	0.218	0.006	100	99	4	0.92	2764	168	2880	72	2963	47
	14	253	112	0.36	0.518	0.039	15.380	1.162	0.216	0.007	100	99	5	0.92	2689	164	2839	72	2947	49
	15	255	120	0.38	0.558	0.047	17.130	1.452	0.223	0.007	100	99	3	0.93	2860	194	2942	81	2999	49
	16	224	130	0.47	0.529	0.043	15.940	1.300	0.219	0.007	100	99	5	0.92	2737	180	2873	78	2970	52
	17	217	121	0.45	0.548	0.047	16.700	1.445	0.221	0.007	100	100	4	0.93	2815	196	2918	83	2989	53
	18	191	101	0.43	0.558	0.050	16.560	1.502	0.215	0.007	100	100	2	0.93	2860	208	2910	87	2944	56
	19	172	96	0.45	0.471	0.039	13.950	1.182	0.215	0.008	100	99	10	0.91	2488	173	2746	80	2942	58
NCB12-14-38	1	266	60	0.18	0.338	0.025	10.150	0.761	0.218	0.006	100	100	26	0.94	1876	120	2449	69	2965	42
	2	226	49	0.18	0.394	0.031	11.750	0.947	0.216	0.006	100	100	19	0.94	2142	145	2585	75	2953	44
	3	233	64	0.22	0.362	0.027	10.970	0.822	0.220	0.006	100	100	23	0.94	1994	127	2521	70	2977	43
	4	271	87	0.26	0.426	0.035	13.010	1.079	0.222	0.006	100	100	16	0.95	2287	158	2680	78	2992	41
	5	284	106	0.30	0.427	0.033	12.980	1.018	0.220	0.005	100	99	16	0.95	2292	150	2678	74	2984	39
	6	288	119	0.34	0.348	0.022	10.290	0.653	0.214	0.005	100	100	24	0.93	1926	105	2461	59	2938	39
	7	340	149	0.36	0.374	0.024	11.220	0.736	0.218	0.005	100	100	22	0.94	2046	114	2542	61	2965	36
	8	329	128	0.32	0.398	0.025	12.080	0.781	0.220	0.005	100	100	19	0.94	2158	117	2611	61	2983	36
	9	348	171	0.40	0.324	0.017	9.778	0.523	0.219	0.005	100	100	29	0.92	1811	84	2414	49	2971	35
	10	379	199	0.43	0.328	0.017	9.997	0.526	0.221	0.005	100	100	29	0.92	1826	83	2435	49	2991	33
	11	400	207	0.42	0.325	0.016	9.768	0.494	0.218	0.004	100	100	28	0.92	1812	79	2413	47	2968	32
	12	435	245	0.46	0.331	0.016	9.874	0.488	0.216	0.004	100	100	27	0.92	1845	78	2423	46	2952	32
	13	467	253	0.44	0.356	0.018	10.720	0.553	0.219	0.004	100	100	24	0.93	1962	86	2499	48	2971	30
	14	426	255	0.49	0.281	0.012	8.494	0.354	0.220	0.004	100	100	36	0.89	1594	58	2285	38	2978	31
	15	454	278	0.50	0.314	0.014	9.436	0.426	0.218	0.004	100	100	30	0.91	1762	69	2381	41	2964	30
	16	452	287	0.52	0.312	0.014	9.591	0.429	0.223	0.004	100	100	31	0.91	1752	68	2396	41	3001	30
	17	404	245	0.49	0.292	0.012	8.743	0.370	0.217	0.004	100	100	33	0.89	1650	61	2312	39	2961	31
	18	396	232	0.48	0.295	0.013	8.961	0.388	0.220	0.004	100	100	33	0.90	1666	63	2334	40	2983	31
	19	377	208	0.45	0.326	0.015	9.677	0.451	0.216	0.004	100	100	28	0.91	1817	73	2404	43	2948	32
NCB12-14-32	1	690	128	0.15	0.426	0.019	12.890	0.578	0.219	0.003	100	100	15	0.95	2287	86	2671	42	2976	23
	2	454	68	0.12	0.536	0.030	16.040	0.908	0.217	0.004	100	100	4	0.95	2765	126	2879	54	2960	28
	3	305	60	0.16	0.631	0.046	18.710	1.377	0.215	0.005	100	100	4	0.96	3151	183	3027	71	2945	34
	4	220	51	0.19	0.558	0.041	16.780	1.248	0.218	0.005	100	100	2	0.95	2857	171	2922	71	2967	39
	5	195	41	0.17	0.571	0.046	17.320	1.392	0.220	0.006	100	100	1	0.95	2913	187	2953	77	2980	42
	6	211	56	0.22	0.587	0.047	17.800	1.442	0.220	0.005	100	100	0	0.95	2978	192	2979	78	2980	40
	7	248	59	0.19	0.545	0.038	16.390	1.160	0.218	0.005	100	100	3	0.95	2803	160	2900	68	2968	37
	8	324	85	0.21	0.483	0.029	14.680	0.890	0.220	0.004	100	100	9	0.95	2542	126	2795	58	2983	32
	9	375	108	0.23	0.429	0.023	13.180	0.699	0.223	0.004	100	100	16	0.94	2301	102	2693	50	3002	30
	10	333	110	0.27	0.501	0.029	15.070	0.869	0.218	0.004	100	100	7	0.94	2620	123	2820	55	2966	32
	11	282	81	0.23	0.632	0.044	18.920	1.311	0.217	0.005	100	100	4	0.95	3159	172	3038	67	2959	34
	12	318	99	0.25	0.481	0.028	14.330	0.835	0.216	0.004	100	100	9	0.94	2533	121	2772	55	2950	33
	13	333	84	0.21	0.449	0.024	13.450	0.722	0.217	0.004	100	100	13	0.93	2392	106	2712	51	2959	32
	14	331	81	0.20	0.454	0.024	13.710	0.727	0.219	0.004	100	100	12	0.93	2413	106	2730	50	2973	31
	15	345	78	0.19	0.518	0.031	15.920	0.964	0.223	0.004	100	100	7	0.95	2690	132	2872	58	3002	31
NCB12-14-27	1	2487	108	0.04	0.315	0.010	8.225	0.258	0.190	0.002	100	100	24	0.97	1764	48	2256	28	2738	14
	2	1778	103	0.05	0.425	0.015	11.630	0.410	0.199	0.002	100	100	12	0.97	2282	67	2575	33	2814	15
	3	1436	86	0.05	0.439	0.016	12.650	0.452	0.209	0.002	100	100	12	0.96	2345	70	2654	34	2899	16
	4	1288	83	0.05	0.446	0.017	13.140	0.490	0.214	0.002	100	100	12	0.96	2379	74	2690	35	2933	17

	5	1052	62	0.05	0.494	0.019	14.990	0.584	0.220	0.002	100	100	8	0.96	2590	83	2814	37	2980	18
	6	946	68	0.06	0.509	0.021	15.380	0.622	0.219	0.003	100	100	7	0.96	2654	88	2839	39	2973	18
	7	871	96	0.09	0.550	0.025	16.640	0.753	0.219	0.003	100	100	3	0.97	2825	103	2914	43	2976	19
	8	570	63	0.09	0.791	0.042	23.300	1.236	0.214	0.003	100	100	15	0.96	3756	150	3240	52	2934	23
	9	825	110	0.11	0.486	0.019	14.540	0.583	0.217	0.003	100	100	9	0.95	2553	84	2786	38	2959	20
	10	1155	132	0.09	0.449	0.017	13.640	0.508	0.220	0.002	100	100	13	0.96	2392	74	2725	35	2982	17
	11	1324	140	0.09	0.434	0.015	13.190	0.464	0.221	0.002	100	100	15	0.96	2322	68	2694	33	2986	16
	12	1233	156	0.10	0.491	0.018	14.910	0.555	0.220	0.002	100	100	9	0.96	2576	79	2809	35	2981	16
	13	1018	116	0.09	0.512	0.020	15.480	0.599	0.219	0.002	100	100	6	0.96	2666	84	2845	37	2974	18
	14	803	99	0.10	0.503	0.020	15.110	0.605	0.218	0.003	100	100	7	0.96	2627	86	2822	38	2964	19
	15	644	80	0.10	0.561	0.025	16.770	0.760	0.217	0.003	100	100	2	0.96	2870	104	2922	43	2958	22
NCB12-14-14	1	1074	689	0.52	0.391	0.014	11.570	0.427	0.215	0.002	100	100	19	0.95	2128	66	2570	35	2940	19
	2	932	637	0.56	0.379	0.014	11.260	0.407	0.216	0.003	100	100	21	0.94	2071	63	2545	34	2948	20
	3	846	497	0.48	0.421	0.016	12.540	0.492	0.216	0.003	100	100	15	0.95	2266	74	2646	37	2950	20
	4	713	314	0.36	0.475	0.020	14.250	0.595	0.218	0.003	100	100	10	0.95	2504	86	2767	40	2964	21
	5	611	175	0.23	0.468	0.019	14.100	0.583	0.218	0.003	100	100	11	0.94	2475	84	2756	39	2969	22
	6	571	116	0.17	0.526	0.025	15.680	0.738	0.216	0.003	100	100	5	0.95	2725	104	2857	45	2952	23
	7	460	91	0.16	0.519	0.025	15.700	0.753	0.219	0.003	100	100	6	0.95	2696	105	2858	46	2975	25
	8	386	71	0.15	0.538	0.028	16.180	0.835	0.218	0.004	100	100	4	0.95	2775	116	2888	49	2967	27
	9	345	56	0.13	0.585	0.034	17.270	1.000	0.214	0.004	100	100	1	0.95	2969	137	2950	56	2937	29
	10	302	59	0.16	0.521	0.028	15.560	0.849	0.217	0.004	100	100	5	0.94	2704	120	2850	52	2955	31
	11	275	50	0.15	0.507	0.028	15.300	0.839	0.219	0.004	100	100	7	0.93	2642	118	2834	52	2973	32
	12	266	50	0.15	0.512	0.028	15.490	0.868	0.220	0.004	100	100	7	0.93	2664	121	2846	53	2977	33
	13	278	48	0.14	0.582	0.036	17.260	1.085	0.215	0.004	100	100	0	0.95	2958	148	2949	60	2944	33
	14	261	51	0.16	0.480	0.025	14.500	0.767	0.219	0.004	100	100	10	0.92	2527	110	2783	50	2975	33
	15	270	57	0.17	0.540	0.030	15.630	0.879	0.210	0.004	100	100	3	0.94	2782	126	2855	54	2906	32
NCB12-14-11	1	413	99	0.20	0.531	0.026	16.190	0.809	0.221	0.004	100	99	5	0.94	2747	111	2888	48	2989	28
	2	481	115	0.20	0.487	0.023	14.990	0.706	0.223	0.004	100	99	10	0.94	2557	99	2815	45	3005	26
	3	349	87	0.20	0.820	0.054	24.530	1.611	0.217	0.004	100	100	16	0.96	3862	190	3290	64	2958	29
	4	344	88	0.21	0.573	0.030	16.950	0.885	0.215	0.004	100	100	0	0.94	2921	122	2932	50	2940	29
	5	440	119	0.22	0.516	0.025	15.650	0.752	0.220	0.004	100	100	6	0.95	2680	105	2856	46	2983	26
	6	454	120	0.21	0.655	0.035	19.680	1.055	0.218	0.003	100	100	5	0.96	3246	136	3076	52	2967	25
	7	443	131	0.24	0.554	0.025	16.720	0.758	0.219	0.003	100	100	3	0.94	2841	103	2919	43	2973	25
	8	573	166	0.24	0.520	0.023	15.850	0.712	0.221	0.003	100	100	6	0.95	2699	98	2868	43	2989	23
	9	490	139	0.23	0.654	0.032	19.380	0.964	0.215	0.003	100	100	6	0.95	3244	126	3061	48	2943	24
	10	538	151	0.23	0.555	0.025	16.900	0.769	0.221	0.003	100	100	3	0.95	2845	104	2929	44	2988	23
	11	576	167	0.24	0.504	0.021	15.540	0.661	0.224	0.003	100	100	8	0.95	2631	91	2849	41	3007	23
	12	501	129	0.21	0.704	0.038	21.070	1.156	0.217	0.003	100	100	9	0.96	3436	146	3142	53	2959	24
	13	446	104	0.19	0.647	0.033	19.190	0.972	0.215	0.003	100	100	5	0.95	3217	128	3051	49	2944	25
	14	506	136	0.22	0.561	0.026	17.120	0.782	0.221	0.003	100	100	2	0.95	2872	105	2942	44	2989	23
	15	562	143	0.21	0.587	0.027	17.550	0.801	0.217	0.003	100	100	0	0.96	2977	108	2966	44	2958	22
NCB12-14-4	1	472	112	0.19	0.514	0.026	15.560	0.807	0.220	0.004	100	99	6	0.95	2674	113	2850	50	2977	26
	2	354	73	0.17	0.540	0.028	16.180	0.850	0.217	0.004	100	100	4	0.94	2782	118	2888	50	2962	29
	3	258	51	0.16	0.704	0.049	21.140	1.467	0.218	0.005	100	100	9	0.96	3437	184	3145	67	2964	34
	4	202	54	0.22	0.599	0.039	17.650	1.152	0.214	0.005	100	100	2	0.94	3025	156	2971	63	2934	38
	5	199	56	0.23	0.557	0.035	16.720	1.071	0.218	0.005	100	100	2	0.93	2856	147	2919	61	2962	38
	6	218	53	0.20	0.514	0.031	15.810	0.949	0.223	0.005	100	100	7	0.93	2674	130	2865	57	3003	37
	7	239	59	0.20	0.613	0.041	18.850	1.266	0.223	0.005	100	100	2	0.95	3083	163	3034	65	3002	35
	8	245	60	0.20	0.602	0.038	18.010	1.143	0.217	0.005	100	100	2	0.94	3036	153	2990	61	2959	35
	9	264	68	0.21	0.585	0.035	17.530	1.071	0.218	0.004	100	100	0	0.94	2967	144	2964	59	2963	33
	10	278	68	0.20	0.561	0.032	16.740	0.955	0.216	0.004	100	100	2	0.94	2872	131	2920	55	2954	32
	11	308	72	0.19	0.607	0.036	18.640	1.104	0.223	0.004	100	100	1	0.95	3056	143	3023	57	3001	30
	12	312	89	0.23	0.517	0.026	15.670	0.797	0.220	0.004	100	100	6	0.93	2688	111	2857	49	2979	30
	13	330	80	0.20	0.593	0.033	17.840	1.004	0.218	0.004	100	100	1	0.95	3001	134	2981	54	2968	29

	14	331	80	0.20	0.560	0.029	16.770	0.882	0.217	0.004	100	100	2	0.94	2865	121	2921	50	2961	29
	15	333	81	0.20	0.505	0.024	15.390	0.736	0.221	0.004	100	100	7	0.93	2637	103	2840	46	2988	29
NCB12-14-21	1	174	27	0.13	0.472	0.034	13.900	1.013	0.214	0.006	99	98	10	0.93	2493	148	2743	69	2932	45
	2	175	37	0.17	0.415	0.027	12.400	0.823	0.217	0.006	100	99	16	0.92	2239	124	2635	62	2956	44
	3	174	44	0.21	0.793	0.083	23.890	2.516	0.219	0.006	100	100	14	0.97	3764	299	3264	103	2969	43
	4	162	40	0.20	0.384	0.022	11.280	0.660	0.213	0.006	100	100	19	0.89	2094	103	2546	55	2929	44
	5	267	49	0.15	0.475	0.032	14.320	0.959	0.219	0.005	100	99	10	0.94	2506	138	2771	64	2970	36
	6	243	46	0.15	0.473	0.029	14.230	0.884	0.218	0.005	100	100	10	0.93	2498	127	2765	59	2967	37
	7	239	57	0.19	0.498	0.032	14.850	0.956	0.216	0.005	100	99	7	0.94	2607	137	2805	61	2951	37
	8	248	54	0.18	0.494	0.032	14.800	0.954	0.217	0.005	100	99	8	0.94	2588	136	2802	61	2960	37
	9	246	59	0.19	0.482	0.030	14.590	0.916	0.220	0.005	100	100	9	0.93	2537	131	2789	60	2977	37
	10	231	48	0.17	0.455	0.027	13.590	0.817	0.217	0.005	100	100	12	0.92	2419	120	2722	57	2955	38
	11	211	51	0.20	0.477	0.029	14.260	0.886	0.217	0.005	100	99	10	0.93	2512	128	2767	59	2959	38
	12	224	56	0.20	0.485	0.031	14.460	0.922	0.216	0.005	100	99	9	0.93	2551	133	2781	61	2952	37
	13	215	45	0.17	0.452	0.027	13.400	0.795	0.215	0.005	100	100	12	0.92	2402	118	2708	56	2945	38
	14	226	53	0.19	0.581	0.042	17.460	1.281	0.218	0.005	100	100	0	0.95	2951	173	2961	70	2967	37
	15	210	52	0.20	0.425	0.024	12.620	0.718	0.216	0.005	100	100	15	0.91	2282	108	2652	54	2948	38
	16	218	47	0.18	0.508	0.033	15.290	1.016	0.218	0.005	100	100	7	0.94	2647	143	2834	63	2969	38
	17	207	54	0.21	0.491	0.031	14.930	0.950	0.221	0.005	100	100	9	0.93	2575	134	2811	61	2984	38
	18	225	45	0.16	0.520	0.035	15.730	1.066	0.220	0.005	100	100	6	0.94	2698	148	2861	65	2977	38
	19	207	47	0.19	0.478	0.030	14.060	0.876	0.213	0.005	100	100	9	0.93	2518	129	2754	59	2931	39
NCB12-14-23	1	623	100	0.13	0.410	0.019	12.370	0.581	0.219	0.003	100	99	17	0.95	2214	87	2633	44	2972	24
	2	448	66	0.12	0.442	0.022	13.260	0.675	0.218	0.004	100	99	13	0.94	2358	100	2698	48	2964	28
	3	328	44	0.11	0.518	0.032	15.450	0.955	0.217	0.004	100	99	6	0.95	2689	135	2843	59	2955	32
	4	240	33	0.11	0.440	0.026	13.350	0.788	0.220	0.005	100	99	14	0.93	2352	115	2705	56	2980	37
	5	210	28	0.11	0.448	0.028	13.350	0.849	0.216	0.005	100	99	13	0.93	2386	125	2705	60	2953	39
	6	180	28	0.13	0.383	0.022	11.660	0.680	0.221	0.006	100	100	21	0.90	2090	103	2577	55	2987	41
	7	186	30	0.13	0.420	0.027	12.450	0.803	0.215	0.006	100	99	15	0.92	2261	121	2639	61	2943	42
	8	181	22	0.10	0.450	0.030	13.540	0.923	0.218	0.006	100	99	13	0.93	2394	135	2718	65	2969	42
	9	179	27	0.12	0.478	0.034	14.310	1.027	0.217	0.006	100	99	10	0.93	2516	148	2770	68	2961	43
	10	176	22	0.10	0.410	0.026	12.400	0.801	0.219	0.006	100	100	17	0.92	2214	120	2635	61	2977	43
	11	166	25	0.12	0.383	0.023	11.530	0.716	0.219	0.006	100	99	20	0.90	2090	109	2567	58	2970	44
	12	165	19	0.09	0.487	0.037	14.640	1.111	0.218	0.006	100	99	9	0.94	2558	159	2792	72	2966	44
	13	141	24	0.14	0.368	0.023	10.880	0.687	0.215	0.006	100	100	22	0.89	2018	108	2513	59	2942	47
	14	136	22	0.13	0.382	0.025	11.560	0.776	0.220	0.007	100	100	21	0.90	2085	118	2569	63	2977	48
	15	124	15	0.10	0.426	0.031	12.930	0.958	0.220	0.007	100	100	16	0.91	2289	141	2674	70	2980	49
	16	115	18	0.13	0.438	0.033	12.700	0.977	0.210	0.007	100	100	13	0.91	2343	149	2658	72	2907	52
	17	105	17	0.13	0.379	0.027	11.280	0.811	0.216	0.007	100	99	21	0.89	2070	125	2546	67	2951	54
	18	104	20	0.16	0.424	0.033	12.590	0.986	0.215	0.007	100	99	15	0.91	2279	148	2649	74	2945	54
	19	102	17	0.13	0.441	0.035	13.130	1.049	0.216	0.007	100	98	13	0.91	2355	155	2689	75	2951	56
	20	104	18	0.14	0.445	0.035	13.670	1.099	0.223	0.008	100	98	14	0.91	2372	157	2727	76	3001	55
	21	107	23	0.17	0.392	0.028	11.780	0.863	0.218	0.007	100	99	19	0.90	2132	131	2587	69	2966	53
	22	116	16	0.12	0.406	0.030	12.130	0.903	0.217	0.007	100	99	17	0.90	2198	136	2615	70	2956	52
	23	128	25	0.16	0.428	0.032	13.010	0.995	0.220	0.007	100	99	15	0.92	2298	146	2681	72	2984	50
	24	119	17	0.12	0.350	0.023	10.830	0.709	0.224	0.007	100	100	26	0.89	1935	108	2509	61	3013	50
	25	111	18	0.13	0.386	0.027	11.720	0.824	0.220	0.007	100	99	20	0.90	2105	124	2583	66	2982	52
	26	110	18	0.14	0.407	0.029	12.390	0.902	0.221	0.007	100	100	18	0.90	2200	134	2634	68	2987	52
	27	115	19	0.14	0.453	0.036	13.380	1.062	0.215	0.007	100	100	12	0.92	2407	158	2707	75	2940	51
	28	109	24	0.18	0.386	0.027	11.730	0.840	0.220	0.007	100	100	20	0.90	2105	127	2583	67	2983	52
	29	109	16	0.12	0.384	0.027	11.840	0.840	0.224	0.007	100	100	21	0.90	2093	125	2592	66	3008	52
NCB12-14-33	1	4248	4028	0.77	0.169	0.005	3.656	0.111	0.157	0.002	97	84	43	0.90	1008	25	1562	24	2419	23
	2	3496	1879	0.44	0.201	0.006	4.503	0.140	0.162	0.002	99	97	38	0.95	1182	33	1731	26	2480	16
	3	2622	1029	0.32	0.242	0.008	5.601	0.193	0.168	0.002	100	98	31	0.96	1395	43	1916	30	2540	16
	4	1819	558	0.25	0.292	0.011	7.870	0.292	0.196	0.002	100	99	29	0.96	1651	53	2216	33	2790	16

	5	1254	326	0.21	0.385	0.016	10.640	0.460	0.201	0.002	100	99	17	0.97	2099	77	2493	40	2831	18
	6	925	249	0.22	0.392	0.017	11.070	0.495	0.205	0.003	100	100	17	0.96	2133	81	2529	42	2865	20
	7	718	209	0.24	0.388	0.018	11.100	0.506	0.208	0.003	100	99	18	0.95	2113	81	2531	43	2886	22
	8	598	174	0.24	0.456	0.024	12.950	0.694	0.206	0.003	100	100	10	0.96	2420	107	2676	51	2875	24
	9	498	143	0.23	0.476	0.027	13.880	0.794	0.212	0.003	100	100	9	0.96	2508	118	2742	54	2919	26
	10	485	150	0.25	0.421	0.022	12.140	0.637	0.209	0.003	100	99	14	0.95	2265	99	2615	49	2898	27
	11	492	139	0.23	0.384	0.018	11.210	0.530	0.212	0.003	100	100	19	0.94	2096	84	2541	44	2918	26
	12	465	139	0.24	0.383	0.017	11.220	0.516	0.213	0.003	100	100	20	0.94	2088	81	2541	43	2926	26
	13	464	139	0.24	0.433	0.022	12.630	0.654	0.211	0.003	100	100	13	0.95	2321	100	2652	49	2916	27
	14	462	133	0.23	0.398	0.020	11.920	0.591	0.217	0.004	100	100	18	0.94	2160	90	2598	46	2960	27
	15	415	132	0.26	0.423	0.022	12.420	0.655	0.213	0.004	100	100	15	0.95	2274	100	2637	50	2928	28
	16	362	106	0.24	0.452	0.025	13.210	0.743	0.212	0.004	100	100	11	0.95	2406	112	2695	53	2920	30
	17	373	111	0.24	0.403	0.021	11.720	0.611	0.211	0.004	100	100	17	0.94	2182	96	2582	49	2913	29
	18	377	114	0.25	0.449	0.024	13.180	0.714	0.213	0.004	100	100	12	0.95	2392	107	2692	51	2926	29
	19	402	122	0.25	0.422	0.021	12.530	0.620	0.216	0.004	100	100	15	0.94	2268	94	2645	47	2948	28
	20	456	142	0.25	0.404	0.019	12.150	0.573	0.218	0.004	100	100	18	0.94	2189	87	2616	44	2966	26
	21	488	153	0.26	0.435	0.021	12.840	0.620	0.214	0.003	100	100	14	0.95	2326	94	2668	46	2939	26
	22	506	150	0.24	0.432	0.021	12.940	0.622	0.217	0.003	100	100	14	0.95	2316	93	2675	45	2960	25
	23	488	150	0.25	0.418	0.019	12.580	0.577	0.218	0.003	100	100	16	0.94	2251	86	2649	43	2969	26
	24	489	149	0.25	0.414	0.019	12.270	0.556	0.215	0.003	100	99	16	0.94	2231	85	2625	43	2945	26
	25	467	144	0.25	0.417	0.019	12.380	0.555	0.215	0.003	100	100	16	0.94	2247	84	2634	42	2946	25
	26	470	141	0.25	0.430	0.019	12.830	0.585	0.216	0.003	100	100	15	0.94	2306	88	2667	43	2953	25
	27	478	148	0.25	0.425	0.019	12.670	0.573	0.216	0.003	100	100	15	0.94	2282	86	2656	43	2954	25
	28	497	145	0.24	0.442	0.021	13.340	0.628	0.219	0.003	100	100	14	0.95	2361	92	2704	45	2971	25
	29	474	153	0.26	0.387	0.016	11.380	0.471	0.213	0.003	100	100	19	0.93	2108	74	2554	39	2931	25
NCB12-14-34	1	329	57	0.14	0.444	0.026	13.530	0.797	0.221	0.004	100	99	14	0.94	2368	115	2717	56	2988	33
	2	325	56	0.14	0.495	0.031	14.810	0.948	0.217	0.004	100	100	8	0.95	2593	136	2803	61	2958	33
	3	293	50	0.14	0.568	0.041	16.890	1.236	0.216	0.005	100	100	1	0.96	2899	170	2929	70	2949	34
	4	253	43	0.14	0.529	0.038	16.100	1.152	0.221	0.005	100	100	5	0.95	2737	159	2883	68	2986	36
	5	252	50	0.16	0.576	0.046	17.250	1.397	0.217	0.005	100	99	1	0.96	2932	190	2949	78	2960	37
	6	219	55	0.21	0.555	0.044	16.610	1.318	0.217	0.005	100	100	2	0.95	2847	181	2913	76	2958	39
	7	192	50	0.21	0.552	0.045	16.420	1.339	0.216	0.006	100	100	2	0.95	2831	186	2902	78	2951	42
	8	174	50	0.24	0.526	0.042	15.480	1.238	0.214	0.006	100	100	4	0.94	2722	176	2845	76	2933	44
	9	185	46	0.20	0.505	0.040	15.300	1.217	0.220	0.006	100	100	7	0.95	2634	171	2834	76	2980	42
	10	187	50	0.22	0.506	0.040	15.390	1.215	0.220	0.006	100	100	7	0.95	2641	170	2839	75	2983	42
	11	183	50	0.22	0.480	0.036	14.620	1.120	0.221	0.006	100	100	10	0.94	2527	159	2791	73	2987	43
	12	168	51	0.25	0.571	0.051	17.470	1.565	0.222	0.006	100	100	2	0.95	2912	209	2961	86	2994	44
	13	135	49	0.29	0.499	0.042	15.270	1.280	0.222	0.007	100	100	8	0.94	2611	179	2832	80	2993	48
	14	136	53	0.32	0.621	0.065	18.440	1.938	0.216	0.007	100	100	3	0.96	3112	258	3013	101	2947	49
	15	118	42	0.29	0.536	0.049	16.370	1.512	0.222	0.007	100	100	5	0.94	2765	206	2899	88	2993	51
NCB12-14-4	1	407	99	0.20	0.531	0.027	16.100	0.824	0.220	0.004	100	99	5	0.94	2744	113	2883	49	2981	28
	2	302	74	0.20	0.535	0.028	15.810	0.844	0.214	0.004	100	99	4	0.93	2761	119	2865	51	2939	32
	3	225	57	0.21	0.554	0.032	16.830	0.989	0.220	0.005	100	100	3	0.93	2842	134	2925	56	2983	36
	4	207	51	0.20	0.587	0.039	17.370	1.148	0.215	0.005	100	100	1	0.94	2978	156	2956	64	2940	38
	5	198	56	0.23	0.538	0.034	16.310	1.034	0.220	0.005	100	100	4	0.93	2776	142	2895	61	2979	38
	6	194	58	0.24	0.590	0.040	17.740	1.202	0.218	0.005	100	100	1	0.94	2991	161	2976	65	2966	38
	7	180	52	0.24	0.553	0.035	16.660	1.076	0.219	0.005	100	100	3	0.93	2837	147	2915	62	2970	39
	8	182	54	0.24	0.614	0.044	18.410	1.332	0.218	0.005	100	100	2	0.94	3086	176	3012	70	2963	40
	9	178	48	0.22	0.578	0.040	17.380	1.210	0.218	0.005	100	100	1	0.94	2939	163	2956	67	2968	40
	10	177	47	0.22	0.603	0.044	18.130	1.318	0.218	0.006	100	99	2	0.94	3043	175	2997	70	2966	41
	11	173	48	0.22	0.520	0.034	15.730	1.023	0.219	0.006	100	100	6	0.92	2699	142	2861	62	2976	41
	12	180	49	0.22	0.679	0.054	20.120	1.624	0.215	0.005	100	99	8	0.95	3341	209	3097	78	2943	41
	13	166	42	0.21	0.601	0.044	18.320	1.335	0.221	0.006	100	100	1	0.94	3035	175	3007	70	2988	41
	14	166	42	0.21	0.573	0.040	17.400	1.234	0.220	0.006	100	100	1	0.94	2920	165	2957	68	2983	41

	15	157	46	0.24	0.479	0.029	14.570	0.895	0.221	0.006	100	100	10	0.91	2521	127	2788	58	2987	42
NCB12-14-17	1	282	111	0.32	0.445	0.023	12.840	0.678	0.209	0.004	100	99	12	0.92	2373	104	2668	50	2901	33
	2	320	148	0.38	0.506	0.029	15.140	0.883	0.217	0.004	100	100	7	0.95	2640	125	2824	56	2958	31
	3	307	138	0.37	0.489	0.027	14.660	0.809	0.218	0.004	100	100	9	0.94	2564	116	2794	53	2964	32
	4	290	131	0.37	0.485	0.027	14.630	0.812	0.219	0.004	100	100	9	0.93	2549	116	2792	53	2972	33
	5	265	109	0.33	0.529	0.032	16.270	0.976	0.223	0.005	100	100	5	0.94	2739	133	2893	57	3002	34
	6	234	102	0.36	0.529	0.032	16.070	0.964	0.220	0.005	100	100	5	0.93	2738	133	2881	57	2982	36
	7	224	91	0.33	0.546	0.034	16.650	1.045	0.221	0.005	100	100	4	0.94	2806	142	2915	60	2991	36
	8	227	123	0.44	0.584	0.038	17.520	1.161	0.218	0.005	100	100	0	0.94	2963	156	2964	64	2964	36
	9	220	119	0.44	0.487	0.028	14.660	0.853	0.218	0.005	100	100	9	0.92	2560	122	2793	55	2966	36
	10	223	132	0.48	0.566	0.037	17.430	1.140	0.224	0.005	100	100	2	0.94	2890	151	2959	63	3006	37
	11	221	123	0.45	0.611	0.043	18.470	1.301	0.219	0.005	100	100	2	0.95	3074	171	3015	68	2976	37
	12	205	129	0.51	0.494	0.029	14.930	0.899	0.219	0.005	100	100	8	0.92	2587	127	2811	57	2976	38
	13	209	140	0.55	0.509	0.031	15.760	0.980	0.225	0.005	100	100	8	0.93	2653	134	2863	59	3013	38
	14	211	145	0.56	0.443	0.025	13.250	0.750	0.217	0.005	100	100	13	0.91	2366	111	2698	53	2956	38
	15	219	170	0.63	0.547	0.037	16.560	1.114	0.220	0.005	100	100	3	0.94	2811	152	2910	64	2979	37
NCB12-14-19	1	1416	122	0.07	0.456	0.016	13.690	0.479	0.218	0.002	100	100	12	0.96	2423	70	2729	33	2963	17
	2	1492	105	0.06	0.493	0.018	14.860	0.543	0.219	0.002	100	100	8	0.96	2583	77	2806	35	2971	16
	3	1457	92	0.05	0.490	0.017	14.810	0.527	0.219	0.002	100	100	9	0.96	2572	75	2803	34	2974	16
	4	1426	83	0.05	0.523	0.020	15.910	0.597	0.221	0.002	100	100	6	0.96	2711	83	2871	36	2986	16
	5	1446	85	0.05	0.526	0.020	16.030	0.604	0.221	0.002	100	100	5	0.96	2725	83	2878	36	2987	16
	6	1422	83	0.05	0.479	0.017	14.540	0.510	0.220	0.002	100	100	10	0.96	2523	73	2786	33	2982	16
	7	1452	72	0.04	0.542	0.021	16.360	0.648	0.219	0.002	100	100	4	0.97	2790	89	2898	38	2974	16
	8	1384	79	0.05	0.480	0.017	14.560	0.516	0.220	0.002	100	100	10	0.96	2529	74	2787	34	2980	16
	9	1366	69	0.04	0.504	0.019	15.420	0.576	0.222	0.002	100	100	8	0.96	2631	80	2841	36	2994	16
	10	1235	62	0.04	0.505	0.019	15.310	0.571	0.220	0.002	100	100	7	0.96	2636	80	2835	36	2979	17
	11	1093	67	0.05	0.511	0.020	15.580	0.605	0.221	0.002	100	100	7	0.96	2659	84	2851	37	2990	18
	12	922	66	0.06	0.535	0.021	15.960	0.639	0.216	0.003	100	100	4	0.96	2762	89	2875	38	2954	19
	13	798	78	0.08	0.542	0.022	16.340	0.673	0.219	0.003	100	100	4	0.95	2790	93	2897	39	2972	21
	14	734	70	0.08	0.554	0.024	16.630	0.720	0.218	0.003	100	100	3	0.95	2841	99	2914	41	2965	21
	15	667	67	0.08	0.530	0.022	16.040	0.673	0.219	0.003	100	100	5	0.95	2743	93	2879	40	2975	22
	16	652	69	0.09	0.509	0.021	15.230	0.621	0.217	0.003	100	100	6	0.94	2652	88	2830	39	2959	22
	17	689	74	0.09	0.570	0.026	17.250	0.783	0.220	0.003	100	100	1	0.95	2906	106	2949	44	2978	22
	18	655	65	0.08	0.515	0.021	15.650	0.654	0.221	0.003	100	100	7	0.95	2676	91	2856	40	2985	22
	19	674	70	0.08	0.544	0.024	16.370	0.723	0.218	0.003	100	100	3	0.95	2800	100	2899	42	2968	22
	20	636	76	0.10	0.512	0.021	15.530	0.641	0.220	0.003	100	100	7	0.94	2665	90	2848	39	2980	23
	21	617	68	0.09	0.470	0.018	14.330	0.557	0.221	0.003	100	100	11	0.93	2484	80	2772	37	2988	23
	22	599	80	0.11	0.533	0.023	16.110	0.694	0.219	0.003	100	100	5	0.95	2754	96	2883	41	2975	23
	23	580	59	0.08	0.488	0.020	14.970	0.607	0.223	0.003	100	100	9	0.94	2562	85	2813	39	2999	23
	24	569	66	0.09	0.512	0.021	15.520	0.653	0.220	0.003	100	100	7	0.94	2667	91	2848	40	2978	23
	25	562	73	0.11	0.501	0.021	15.100	0.628	0.219	0.003	100	100	8	0.94	2617	89	2822	40	2971	23
	26	563	63	0.09	0.489	0.020	14.930	0.610	0.221	0.003	100	100	9	0.94	2567	86	2811	39	2991	23
	27	562	70	0.10	0.466	0.018	14.360	0.569	0.224	0.003	100	100	12	0.93	2465	81	2774	38	3007	24
	28	545	69	0.10	0.488	0.020	14.980	0.621	0.223	0.003	100	100	9	0.94	2561	87	2814	40	3000	24
	29	547	66	0.10	0.468	0.019	14.230	0.582	0.220	0.003	100	100	11	0.93	2477	84	2765	39	2984	24
	30	508	55	0.09	0.475	0.020	14.520	0.612	0.222	0.003	100	100	11	0.93	2505	87	2785	40	2994	25
	31	451	44	0.08	0.444	0.018	13.520	0.549	0.221	0.004	100	100	14	0.92	2366	80	2717	38	2988	26
	32	412	45	0.09	0.471	0.020	14.300	0.618	0.220	0.004	100	100	11	0.92	2489	89	2770	41	2981	27
	33	384	36	0.08	0.435	0.018	13.110	0.540	0.218	0.004	100	100	14	0.91	2330	80	2687	39	2969	28
	34	359	49	0.11	0.418	0.017	12.660	0.515	0.220	0.004	100	100	16	0.90	2251	77	2655	38	2979	29
	35	363	62	0.14	0.452	0.020	13.880	0.611	0.223	0.004	100	100	13	0.92	2404	88	2741	42	3001	29
	36	326	68	0.17	0.398	0.016	12.140	0.485	0.221	0.004	100	100	19	0.89	2159	73	2615	37	2990	30
	37	325	62	0.16	0.412	0.017	12.770	0.534	0.225	0.004	100	100	18	0.90	2226	78	2663	39	3014	30
	38	313	65	0.17	0.429	0.018	13.020	0.557	0.220	0.004	100	100	15	0.90	2299	82	2681	40	2983	30

	39	292	58	0.16	0.396	0.016	11.900	0.482	0.218	0.004	100	100	19	0.88	2149	73	2596	38	2967	31
	40	275	49	0.15	0.409	0.017	12.600	0.530	0.224	0.004	100	100	18	0.89	2209	78	2650	40	3006	32
	41	274	46	0.14	0.411	0.017	12.550	0.535	0.222	0.004	100	100	18	0.89	2219	79	2646	40	2991	32
	42	266	47	0.14	0.385	0.016	11.930	0.498	0.225	0.005	100	100	21	0.88	2099	74	2599	39	3015	33
	43	257	46	0.15	0.393	0.017	12.120	0.521	0.224	0.005	100	100	20	0.88	2136	77	2613	40	3007	33
	44	236	50	0.17	0.389	0.017	11.740	0.511	0.219	0.005	100	100	20	0.88	2119	78	2584	41	2973	35
	45	218	43	0.16	0.388	0.017	11.820	0.528	0.221	0.005	100	100	20	0.87	2111	79	2591	42	2990	36
	46	218	55	0.20	0.392	0.018	11.820	0.544	0.219	0.005	100	100	19	0.88	2131	83	2590	43	2973	36
	47	208	49	0.19	0.402	0.019	12.170	0.570	0.220	0.005	100	100	18	0.88	2177	86	2617	44	2979	37
	48	190	49	0.21	0.371	0.017	11.340	0.516	0.222	0.005	100	100	23	0.86	2035	78	2552	42	2993	38
	49	193	51	0.22	0.373	0.017	11.570	0.534	0.225	0.005	100	100	23	0.87	2046	80	2571	43	3015	38
NCB12-14-30	1	307	75	0.20	0.397	0.022	11.990	0.685	0.219	0.005	100	99	19	0.92	2155	103	2603	54	2974	36
	2	272	52	0.16	0.423	0.024	12.620	0.732	0.217	0.005	100	100	15	0.92	2274	110	2652	55	2955	37
	3	267	46	0.14	0.448	0.026	13.330	0.787	0.216	0.005	100	100	13	0.93	2385	117	2703	56	2950	37
	4	286	43	0.12	0.457	0.027	13.790	0.830	0.219	0.005	100	100	12	0.93	2427	121	2735	57	2971	36
	5	274	36	0.11	0.428	0.024	13.060	0.753	0.221	0.005	100	100	15	0.92	2298	110	2684	54	2988	36
	6	245	39	0.13	0.500	0.032	15.170	0.989	0.220	0.005	100	100	8	0.93	2613	139	2826	62	2982	38
	7	217	34	0.13	0.441	0.027	13.420	0.840	0.221	0.006	100	100	14	0.92	2355	122	2710	59	2986	41
	8	185	29	0.13	0.464	0.031	13.750	0.916	0.215	0.006	100	100	11	0.92	2458	135	2732	63	2942	44
	9	176	33	0.15	0.572	0.045	16.810	1.338	0.213	0.006	100	100	0	0.94	2917	185	2924	76	2929	45
	10	155	28	0.15	0.456	0.030	13.430	0.902	0.214	0.006	100	99	11	0.91	2422	134	2711	63	2933	47
	11	195	21	0.09	0.483	0.035	14.510	1.045	0.218	0.006	100	100	9	0.93	2541	150	2784	68	2965	42
	12	187	32	0.14	0.485	0.033	14.630	1.008	0.219	0.006	100	100	9	0.92	2548	144	2791	66	2973	43
	13	196	31	0.13	0.477	0.032	14.490	0.972	0.221	0.006	100	100	10	0.93	2512	138	2782	64	2985	42
	14	205	31	0.12	0.439	0.027	13.260	0.837	0.219	0.006	100	100	14	0.92	2348	123	2698	60	2972	41
	15	208	28	0.11	0.493	0.033	14.900	1.013	0.219	0.006	100	100	8	0.93	2583	144	2809	65	2975	41
NCB12-14-12	1	652	376	0.47	0.381	0.017	10.430	0.473	0.199	0.003	99	95	17	0.93	2081	78	2474	42	2815	28
	2	543	340	0.51	0.376	0.017	10.800	0.500	0.209	0.004	99	96	20	0.93	2056	79	2506	43	2895	29
	3	506	337	0.54	0.404	0.019	11.870	0.569	0.213	0.004	99	97	17	0.93	2188	87	2594	45	2929	28
	4	546	379	0.56	0.382	0.016	11.410	0.499	0.217	0.004	99	98	20	0.93	2086	77	2557	41	2955	27
	5	693	474	0.56	0.430	0.020	13.090	0.613	0.221	0.003	100	98	15	0.95	2308	90	2686	44	2984	24
	6	702	558	0.65	0.434	0.019	13.090	0.580	0.219	0.003	99	97	15	0.94	2321	85	2686	42	2974	24
	7	755	589	0.63	0.472	0.022	13.770	0.642	0.212	0.003	99	97	9	0.95	2494	95	2734	44	2917	23
	8	793	608	0.62	0.412	0.016	12.350	0.498	0.217	0.003	99	98	17	0.94	2225	75	2631	38	2960	22
	9	901	684	0.62	0.468	0.021	14.150	0.635	0.219	0.003	99	97	11	0.96	2473	91	2760	43	2976	21
	10	887	713	0.65	0.446	0.018	13.360	0.556	0.217	0.003	99	97	13	0.95	2376	82	2705	39	2961	22
	11	912	762	0.68	0.419	0.016	12.560	0.497	0.217	0.003	99	97	16	0.94	2258	74	2648	37	2961	21
	12	911	871	0.78	0.415	0.016	12.570	0.494	0.220	0.003	99	97	17	0.94	2240	73	2648	37	2977	21
	13	886	747	0.69	0.442	0.018	13.270	0.537	0.218	0.003	99	97	13	0.95	2358	79	2699	38	2966	22
	14	841	623	0.60	0.480	0.020	14.420	0.606	0.218	0.003	99	98	9	0.95	2529	87	2778	40	2964	21
	15	835	579	0.56	0.478	0.019	14.480	0.594	0.220	0.003	99	98	10	0.95	2517	85	2782	39	2980	21
NCB12-14-9	1	157	20	0.10	0.643	0.054	19.140	1.614	0.216	0.006	100	99	5	0.94	3201	211	3049	81	2950	47
	2	148	16	0.09	0.536	0.039	16.210	1.189	0.219	0.006	100	100	4	0.92	2767	164	2889	70	2976	47
	3	156	19	0.10	0.604	0.048	18.300	1.468	0.220	0.006	100	100	1	0.94	3047	193	3006	77	2978	46
	4	167	24	0.12	0.674	0.058	20.470	1.768	0.220	0.006	100	100	6	0.95	3321	223	3114	84	2983	45
	5	161	14	0.07	0.512	0.035	15.250	1.061	0.216	0.006	100	99	6	0.92	2664	150	2831	66	2952	46
	6	163	19	0.10	0.522	0.036	15.520	1.087	0.216	0.006	100	100	5	0.92	2708	153	2848	67	2948	46
	7	174	17	0.08	0.660	0.055	19.630	1.638	0.216	0.006	100	100	6	0.95	3267	212	3073	81	2950	44
	8	170	24	0.11	0.538	0.038	16.290	1.164	0.220	0.006	100	100	4	0.92	2776	160	2894	68	2977	45
	9	172	19	0.09	0.668	0.056	20.470	1.721	0.223	0.006	100	100	6	0.95	3296	216	3114	81	2999	44
	10	165	20	0.10	0.554	0.040	16.530	1.191	0.217	0.006	100	100	2	0.93	2841	164	2908	69	2955	44
	11	163	16	0.08	0.498	0.033	15.300	1.030	0.223	0.006	100	100	8	0.92	2606	143	2834	64	3001	44
	12	175	18	0.08	0.625	0.050	19.050	1.533	0.221	0.006	100	100	3	0.94	3128	198	3044	78	2990	43
	13	159	18	0.09	0.531	0.037	16.130	1.142	0.220	0.006	100	100	5	0.92	2745	157	2885	68	2984	45

	14	167	17	0.08	0.683	0.059	20.420	1.778	0.217	0.006	100	100	8	0.95	3356	227	3111	84	2957	45
	15	166	14	0.07	0.532	0.038	16.260	1.168	0.222	0.006	100	100	5	0.93	2748	159	2892	69	2994	45
NCB12-14-37	1	359	115	0.26	0.668	0.062	17.580	1.654	0.191	0.004	100	99	11	0.97	3297	241	2967	90	2750	36
	2	246	108	0.36	0.495	0.041	13.810	1.163	0.202	0.005	100	100	5	0.96	2593	179	2737	80	2844	41
	3	243	108	0.36	0.404	0.030	12.150	0.923	0.218	0.006	100	100	18	0.94	2187	139	2616	71	2968	41
	4	261	106	0.33	0.465	0.039	14.270	1.211	0.222	0.005	100	99	12	0.96	2463	172	2768	81	2998	40
	5	261	112	0.35	0.498	0.044	14.780	1.320	0.215	0.005	100	100	7	0.96	2606	190	2801	85	2945	39
	6	254	110	0.35	0.447	0.037	13.370	1.111	0.217	0.005	100	100	13	0.96	2382	164	2706	79	2958	39
	7	227	104	0.37	0.447	0.037	13.560	1.143	0.220	0.006	100	100	13	0.95	2383	167	2720	80	2981	42
	8	188	106	0.46	0.486	0.047	14.660	1.419	0.219	0.006	100	100	9	0.96	2555	203	2793	92	2971	46
	9	136	82	0.49	0.559	0.064	16.230	1.875	0.211	0.007	100	100	1	0.96	2861	265	2890	111	2911	54
	10	117	74	0.51	0.458	0.048	13.350	1.413	0.212	0.007	100	100	11	0.94	2429	212	2705	100	2917	57
	11	113	69	0.50	0.502	0.059	15.290	1.815	0.221	0.008	100	100	8	0.95	2623	254	2834	113	2987	58
	12	99	65	0.53	0.477	0.054	14.480	1.645	0.220	0.008	100	100	10	0.95	2513	235	2781	108	2982	60
	13	103	62	0.49	0.510	0.063	15.510	1.916	0.221	0.008	100	100	7	0.95	2655	267	2847	118	2986	60
	14	99	57	0.47	0.422	0.045	12.780	1.363	0.220	0.008	100	100	16	0.94	2270	202	2663	100	2978	61
	15	93	64	0.56	0.409	0.042	11.880	1.223	0.211	0.008	100	100	16	0.93	2209	190	2595	96	2913	63
Biotite schist (NCGB12-15; NAD 83, Zone 15, 627540E, 5869191N)																				
NCGB12-15-1	1	2375	81	0.03	0.323	0.015	7.464	0.340	0.168	0.001	100	98	18	0.98	1803	71	2169	41	2535	15
	2	2067	83	0.03	0.356	0.017	8.615	0.406	0.175	0.002	99	97	16	0.98	1964	79	2298	43	2610	15
	3	1800	81	0.04	0.367	0.017	9.209	0.438	0.182	0.002	100	99	16	0.98	2014	82	2359	44	2672	15
	4	1484	81	0.04	0.367	0.016	9.285	0.419	0.184	0.002	100	99	16	0.98	2014	78	2367	41	2686	16
	5	1280	75	0.05	0.438	0.024	11.420	0.629	0.189	0.002	100	99	9	0.98	2342	108	2558	51	2734	17
	6	1057	77	0.06	0.492	0.029	13.550	0.792	0.200	0.002	100	100	5	0.98	2580	124	2719	55	2824	18
	7	849	80	0.07	0.475	0.026	13.360	0.729	0.204	0.002	100	99	8	0.98	2507	113	2705	52	2857	20
	8	799	79	0.08	0.506	0.031	14.760	0.905	0.212	0.003	100	99	6	0.98	2639	132	2800	58	2919	20
	9	694	77	0.09	0.542	0.033	15.540	0.958	0.208	0.003	100	99	2	0.98	2793	139	2849	59	2888	21
	10	630	93	0.11	0.502	0.030	14.660	0.875	0.212	0.003	100	100	6	0.97	2622	128	2793	57	2919	22
	11	566	80	0.11	0.476	0.027	13.980	0.790	0.213	0.003	100	100	9	0.97	2508	117	2748	54	2929	23
	12	526	88	0.13	0.539	0.034	15.830	1.011	0.213	0.003	100	100	3	0.97	2781	144	2866	61	2927	24
	13	472	85	0.14	0.528	0.033	15.620	0.981	0.214	0.003	100	100	4	0.97	2734	139	2854	60	2939	25
	14	456	81	0.14	0.551	0.036	16.310	1.065	0.215	0.003	100	100	2	0.97	2827	149	2895	63	2943	26
	15	448	103	0.18	0.463	0.025	13.570	0.743	0.213	0.003	100	100	10	0.96	2452	111	2720	52	2927	26
	16	469	108	0.18	0.525	0.033	15.610	0.976	0.216	0.003	100	100	5	0.97	2721	138	2853	60	2948	25
	17	469	121	0.20	0.536	0.034	16.120	1.031	0.218	0.003	100	100	4	0.97	2765	143	2884	61	2968	25
	18	460	129	0.22	0.482	0.027	14.550	0.835	0.219	0.003	100	100	9	0.96	2534	120	2786	55	2975	25
	19	501	143	0.22	0.566	0.038	17.030	1.154	0.218	0.003	100	100	2	0.98	2892	157	2936	65	2967	24
	20	483	149	0.24	0.514	0.032	15.620	0.968	0.220	0.003	100	100	7	0.97	2674	135	2854	59	2983	25
	21	466	150	0.25	0.542	0.034	16.070	1.025	0.215	0.003	100	99	3	0.97	2791	144	2881	61	2944	25
	22	452	149	0.26	0.511	0.031	14.980	0.920	0.213	0.003	100	100	6	0.97	2660	133	2814	58	2926	25
	23	436	149	0.27	0.522	0.033	15.470	0.978	0.215	0.003	100	100	5	0.97	2708	139	2845	60	2944	26
	24	420	145	0.27	0.520	0.033	15.450	0.972	0.215	0.004	100	99	5	0.97	2700	138	2844	60	2947	26
	25	416	151	0.28	0.566	0.039	16.980	1.164	0.218	0.004	100	100	2	0.97	2890	159	2934	66	2964	26
	26	390	150	0.30	0.536	0.035	15.710	1.026	0.213	0.004	100	100	3	0.97	2766	146	2860	62	2926	27
	27	358	152	0.33	0.453	0.026	13.370	0.759	0.214	0.004	100	100	12	0.95	2410	113	2706	54	2936	28
	28	371	161	0.34	0.592	0.043	17.700	1.300	0.217	0.004	100	100	1	0.97	2998	175	2974	71	2957	28
	29	347	151	0.34	0.484	0.030	14.510	0.899	0.218	0.004	100	100	9	0.96	2545	129	2784	59	2962	29
NCGB12-15-2	1	1324	118	0.07	0.507	0.025	15.120	0.737	0.216	0.002	100	100	7	0.98	2643	105	2823	46	2954	16
	2	1284	91	0.06	0.546	0.028	16.130	0.833	0.214	0.002	100	100	3	0.98	2807	117	2885	49	2939	16
	3	1218	81	0.05	0.658	0.038	18.930	1.089	0.209	0.002	100	100	7	0.99	3258	147	3038	56	2896	16
	4	1372	88	0.05	0.557	0.029	16.120	0.830	0.210	0.002	100	100	1	0.98	2856	118	2884	49	2904	15
	5	2313	220	0.07	0.342	0.014	8.769	0.368	0.186	0.001	100	99	20	0.98	1898	69	2314	38	2705	13
	6	3535	411	0.09	0.264	0.010	6.120	0.237	0.168	0.001	100	99	27	0.98	1512	52	1993	34	2537	12
	7	4088	532	0.10	0.259	0.010	5.980	0.242	0.168	0.001	100	99	28	0.99	1484	54	1973	35	2534	11

	8	4628	575	0.10	0.259	0.010	5.329	0.208	0.150	0.001	100	99	23	0.99	1482	51	1873	33	2341	11
	9	5293	701	0.10	0.291	0.011	7.900	0.292	0.197	0.001	100	99	30	0.99	1644	53	2220	33	2804	9
	10	5488	789	0.11	0.253	0.010	6.286	0.238	0.180	0.001	100	99	33	0.99	1452	49	2017	33	2657	10
	11	5448	828	0.12	0.310	0.013	7.481	0.311	0.175	0.001	100	99	22	0.99	1738	63	2171	37	2609	10
	12	4847	806	0.13	0.321	0.013	7.468	0.310	0.169	0.001	100	99	19	0.99	1795	65	2169	37	2545	10
	13	4335	746	0.13	0.302	0.012	6.183	0.254	0.148	0.001	100	98	16	0.99	1703	61	2002	36	2327	12
	14	3926	674	0.13	0.331	0.014	8.652	0.372	0.190	0.001	100	98	22	0.99	1842	69	2302	39	2740	11
	15	3640	681	0.15	0.343	0.015	8.506	0.363	0.180	0.001	100	98	18	0.99	1901	70	2287	39	2651	11
	16	3569	669	0.15	0.344	0.014	7.771	0.312	0.164	0.001	100	98	14	0.99	1908	66	2205	36	2494	12
	17	3319	637	0.15	0.378	0.016	11.640	0.500	0.223	0.001	100	99	22	0.99	2069	76	2576	40	3004	11
	18	3115	605	0.15	0.392	0.016	10.280	0.417	0.190	0.001	100	99	14	0.99	2131	73	2460	38	2745	11
	19	3131	593	0.15	0.482	0.021	12.770	0.549	0.192	0.001	100	99	5	0.99	2538	90	2663	41	2760	11
	20	2992	585	0.15	0.420	0.017	10.620	0.425	0.183	0.001	100	99	10	0.99	2261	76	2491	37	2683	11
	21	2985	585	0.15	0.394	0.015	9.977	0.383	0.184	0.001	100	99	13	0.98	2139	70	2433	35	2688	11
NCGB12-15-3	1	295	175	0.46	0.387	0.029	11.250	0.839	0.211	0.005	100	98	19	0.96	2109	132	2544	70	2912	36
	2	181	90	0.39	0.475	0.043	13.720	1.262	0.210	0.006	100	99	9	0.96	2504	189	2731	87	2903	44
	3	170	71	0.33	0.468	0.043	13.920	1.292	0.216	0.006	100	99	10	0.96	2473	189	2744	88	2950	45
	4	164	66	0.31	0.447	0.038	13.510	1.162	0.219	0.006	100	100	13	0.95	2383	170	2716	81	2974	44
	5	150	56	0.29	0.480	0.041	14.280	1.221	0.216	0.006	100	100	9	0.95	2527	177	2768	81	2949	45
	6	156	53	0.26	0.551	0.050	16.170	1.481	0.213	0.006	100	100	2	0.96	2830	209	2887	88	2927	44
	7	191	65	0.26	0.492	0.040	14.720	1.192	0.217	0.005	100	100	8	0.95	2581	171	2798	77	2958	40
	8	214	75	0.28	0.478	0.035	14.590	1.088	0.222	0.005	100	100	10	0.95	2516	154	2789	71	2992	38
	9	244	81	0.26	0.500	0.037	15.170	1.120	0.220	0.005	100	100	8	0.96	2615	158	2826	70	2980	36
	10	263	96	0.29	0.552	0.043	17.140	1.346	0.225	0.005	100	100	4	0.96	2834	179	2943	75	3018	34
	11	256	90	0.27	0.480	0.032	14.420	0.982	0.218	0.005	100	100	10	0.95	2525	141	2778	65	2967	34
	12	264	101	0.30	0.497	0.034	14.940	1.024	0.218	0.005	100	100	8	0.95	2600	146	2811	65	2967	34
	13	282	106	0.29	0.563	0.043	17.090	1.298	0.220	0.004	100	100	2	0.96	2877	176	2940	73	2983	33
	14	282	97	0.27	0.529	0.038	15.940	1.138	0.219	0.004	100	100	5	0.96	2736	158	2873	68	2971	33
	15	270	103	0.30	0.469	0.029	14.070	0.886	0.217	0.004	100	100	10	0.95	2481	129	2755	60	2962	33
NCGB12-15-5	1	1188	111	0.07	0.500	0.026	14.550	0.767	0.211	0.002	100	99	6	0.98	2615	113	2786	50	2913	17
	2	1165	76	0.05	0.496	0.026	14.760	0.783	0.216	0.002	100	100	7	0.98	2598	113	2800	50	2949	17
	3	1169	73	0.05	0.529	0.030	15.890	0.890	0.218	0.002	100	100	5	0.98	2738	125	2870	54	2965	17
	4	1173	62	0.04	0.546	0.032	16.500	0.957	0.219	0.002	100	100	3	0.98	2808	132	2906	56	2975	17
	5	1146	57	0.04	0.517	0.028	15.530	0.845	0.218	0.002	100	100	6	0.98	2686	119	2849	52	2966	16
	6	1171	50	0.03	0.500	0.026	14.990	0.792	0.217	0.002	100	100	7	0.98	2615	113	2815	50	2961	16
	7	1201	60	0.04	0.522	0.028	15.810	0.856	0.220	0.002	100	100	6	0.98	2709	119	2866	52	2978	16
	8	1157	51	0.03	0.524	0.028	15.840	0.856	0.219	0.002	100	100	5	0.98	2717	120	2867	52	2975	16
	9	1132	52	0.04	0.491	0.024	14.940	0.745	0.221	0.002	100	100	9	0.98	2577	106	2811	48	2984	16
	10	1130	57	0.04	0.483	0.024	14.730	0.721	0.221	0.002	100	100	10	0.98	2538	102	2798	47	2991	16
	11	1114	46	0.03	0.432	0.019	13.040	0.568	0.219	0.002	100	100	15	0.97	2316	85	2682	41	2971	16
	12	1086	44	0.03	0.460	0.021	13.900	0.626	0.219	0.002	100	100	12	0.97	2440	91	2743	43	2974	17
	13	1067	43	0.03	0.445	0.019	13.330	0.575	0.218	0.002	100	100	13	0.97	2371	85	2704	41	2963	17
	14	1196	74	0.05	0.383	0.015	10.970	0.445	0.208	0.002	100	100	19	0.97	2090	72	2521	38	2889	16
	15	1583	125	0.06	0.259	0.008	7.243	0.234	0.203	0.002	100	100	36	0.96	1484	43	2142	29	2850	15
NCGB12-15-1@1	1	880	80	0.07	0.533	0.031	14.250	0.840	0.194	0.002	100	99	1	0.98	2752	131	2767	56	2777	20
	2	682	80	0.09	0.514	0.029	14.480	0.813	0.204	0.003	100	100	4	0.97	2673	122	2782	53	2861	22
	3	830	106	0.10	0.447	0.024	12.870	0.693	0.209	0.003	100	100	11	0.97	2380	107	2670	51	2898	20
	4	1063	138	0.10	0.389	0.019	11.260	0.548	0.210	0.002	100	100	18	0.97	2117	87	2545	45	2907	18
	5	1203	163	0.11	0.419	0.021	11.980	0.609	0.207	0.002	100	100	14	0.98	2257	97	2603	48	2884	17
	6	1232	186	0.12	0.442	0.022	13.100	0.656	0.215	0.002	100	100	13	0.98	2358	99	2687	47	2944	16
	7	1243	200	0.13	0.465	0.023	13.780	0.692	0.215	0.002	100	100	11	0.98	2460	102	2735	48	2944	16
	8	1308	243	0.15	0.460	0.023	13.820	0.692	0.218	0.002	100	100	11	0.98	2441	102	2737	47	2964	16
	9	1317	244	0.14	0.452	0.022	13.530	0.669	0.217	0.002	100	100	12	0.98	2403	99	2717	47	2960	16
	10	1245	268	0.17	0.461	0.023	13.860	0.693	0.218	0.002	100	100	11	0.98	2445	101	2740	47	2966	16

	11	1240	262	0.16	0.471	0.024	13.980	0.725	0.215	0.002	100	100	10	0.98	2487	107	2748	49	2946	17
	12	1091	253	0.18	0.450	0.022	13.400	0.656	0.216	0.002	100	100	12	0.98	2394	98	2708	46	2952	17
	13	1024	232	0.18	0.496	0.027	14.960	0.814	0.219	0.002	100	100	8	0.98	2597	116	2813	52	2972	18
	14	951	235	0.19	0.457	0.023	13.670	0.682	0.217	0.002	100	100	12	0.97	2424	100	2727	47	2960	18
	15	910	217	0.19	0.510	0.028	15.190	0.845	0.216	0.003	100	100	6	0.98	2656	121	2827	53	2952	19
	16	875	247	0.22	0.463	0.023	13.860	0.702	0.217	0.003	100	100	11	0.97	2451	103	2741	48	2961	19
	17	825	243	0.23	0.509	0.028	15.340	0.861	0.218	0.003	100	99	7	0.98	2654	122	2837	54	2969	20
	18	790	234	0.23	0.485	0.026	14.530	0.774	0.218	0.003	100	100	9	0.97	2547	112	2785	51	2963	20
	19	756	242	0.25	0.478	0.025	14.340	0.753	0.218	0.003	100	99	10	0.97	2518	109	2773	50	2964	20
	20	766	238	0.24	0.511	0.029	15.430	0.878	0.219	0.003	100	100	7	0.98	2661	124	2842	54	2973	20
	21	772	230	0.23	0.514	0.029	15.390	0.878	0.217	0.003	100	100	6	0.98	2672	124	2840	54	2961	20
	22	740	236	0.25	0.488	0.027	14.680	0.802	0.218	0.003	100	99	9	0.97	2560	115	2795	52	2969	20
	23	726	236	0.25	0.446	0.022	13.330	0.664	0.217	0.003	100	99	13	0.97	2375	99	2703	47	2958	21
	24	719	240	0.26	0.479	0.026	14.400	0.773	0.218	0.003	100	99	10	0.97	2524	112	2777	51	2966	21
	25	658	235	0.28	0.433	0.021	12.980	0.625	0.218	0.003	100	100	14	0.96	2317	93	2678	45	2963	22
	26	636	216	0.26	0.482	0.026	14.450	0.785	0.218	0.003	100	100	9	0.97	2534	113	2780	52	2964	22
	27	591	211	0.28	0.485	0.027	14.490	0.797	0.217	0.003	100	99	9	0.97	2551	115	2783	52	2955	23
	28	549	200	0.28	0.525	0.031	15.790	0.946	0.218	0.003	100	100	5	0.97	2721	132	2864	57	2966	23
	29	505	187	0.29	0.468	0.025	14.180	0.759	0.220	0.003	100	100	11	0.96	2476	109	2762	51	2978	24
NCGB12-15-2@1	1	1595	167	0.08	0.487	0.040	13.870	1.136	0.207	0.002	100	99	7	0.99	2559	173	2741	78	2878	17
	2	1468	93	0.05	0.478	0.038	13.900	1.114	0.211	0.002	100	99	9	0.99	2519	167	2743	76	2912	17
	3	1513	81	0.04	0.480	0.040	13.930	1.164	0.211	0.002	100	99	8	0.99	2527	174	2745	79	2910	17
	4	1574	72	0.04	0.425	0.032	12.410	0.935	0.212	0.002	100	100	14	0.99	2284	145	2636	71	2919	16
	5	1798	79	0.03	0.468	0.042	13.440	1.194	0.208	0.002	100	100	9	0.99	2474	182	2711	84	2893	15
	6	1737	86	0.04	0.412	0.031	11.870	0.902	0.209	0.002	100	99	15	0.99	2224	143	2594	71	2897	15
	7	1717	92	0.04	0.420	0.032	12.090	0.913	0.209	0.002	100	100	14	0.99	2260	144	2612	71	2896	15
	8	1657	78	0.04	0.455	0.036	13.430	1.078	0.214	0.002	100	100	11	0.99	2416	162	2710	76	2937	15
	9	1581	88	0.04	0.434	0.033	12.610	0.962	0.211	0.002	100	100	13	0.99	2323	149	2651	72	2911	15
	10	1541	86	0.04	0.530	0.049	15.490	1.436	0.212	0.002	100	100	4	1.00	2742	207	2846	88	2921	15
	11	1528	91	0.05	0.461	0.038	13.340	1.104	0.210	0.002	100	100	10	0.99	2442	168	2704	78	2907	16
	12	1533	103	0.05	0.500	0.042	14.760	1.242	0.214	0.002	100	100	7	0.99	2614	181	2800	80	2937	16
	13	1525	114	0.06	0.465	0.036	15.660	1.200	0.244	0.002	100	100	15	0.99	2461	157	2856	73	3148	15
	14	1630	131	0.06	0.454	0.034	11.770	0.883	0.188	0.002	100	100	7	0.99	2413	151	2586	70	2725	16
	15	1818	154	0.07	0.419	0.032	11.350	0.874	0.197	0.002	100	100	12	0.99	2256	146	2552	72	2797	15
	16	2027	170	0.07	0.432	0.033	15.020	1.141	0.252	0.002	100	100	20	0.99	2315	148	2816	72	3198	13
	17	2428	234	0.08	0.447	0.032	10.820	0.784	0.175	0.001	100	100	5	0.99	2383	144	2507	67	2610	14
	18	2840	291	0.08	0.433	0.030	15.280	1.061	0.256	0.002	100	100	20	1.00	2321	135	2833	66	3221	11
	19	3288	346	0.08	0.405	0.028	11.300	0.772	0.203	0.001	100	100	15	1.00	2190	127	2548	64	2846	12
	20	4042	500	0.10	0.287	0.018	8.324	0.531	0.211	0.001	100	100	33	0.99	1626	92	2267	58	2909	11
	21	4134	533	0.10	0.332	0.021	10.190	0.657	0.223	0.001	100	100	28	1.00	1847	103	2452	60	3001	11
	22	4277	533	0.10	0.280	0.017	6.491	0.402	0.168	0.001	100	100	25	0.99	1593	87	2045	55	2537	12
	23	4193	576	0.11	0.234	0.014	6.426	0.372	0.199	0.001	100	100	40	0.99	1357	71	2036	51	2817	12
	24	3876	562	0.11	0.245	0.013	6.257	0.337	0.185	0.001	100	100	35	0.99	1411	68	2012	47	2702	12
	25	3795	580	0.12	0.263	0.014	6.681	0.347	0.184	0.001	100	100	32	0.99	1506	70	2070	46	2690	12
	26	3581	585	0.13	0.232	0.011	5.664	0.281	0.177	0.001	100	100	35	0.99	1346	60	1926	43	2625	13
	27	3375	568	0.13	0.244	0.012	6.528	0.311	0.194	0.001	100	100	37	0.99	1405	60	2050	42	2780	12
	28	3300	552	0.13	0.249	0.011	5.875	0.257	0.171	0.001	100	100	31	0.98	1434	56	1958	38	2568	13
	29	3203	542	0.13	0.240	0.009	5.515	0.215	0.167	0.001	100	100	31	0.98	1388	48	1903	34	2523	13
Garnet Schist (NCGB13-001; NAD 83, Zone 15, 648708E, 5871865N)																				
NCGB13-001-1	1	589	217	0.37	0.392	0.025	9.860	0.740	0.183	0.007	94	77	13	0.85	2130	115	2422	69	2677	66
	2	377	154	0.41	0.618	0.050	16.000	1.370	0.188	0.007	97	88	8	0.91	3103	199	2877	82	2723	57
	3	281	173	0.62	0.590	0.045	15.900	1.250	0.195	0.007	99	94	4	0.90	2991	181	2869	75	2785	57
	4	237	152	0.64	0.572	0.044	15.500	1.230	0.196	0.007	99	95	2	0.89	2917	178	2846	76	2797	59
	5	232	178	0.77	0.527	0.040	15.200	1.200	0.209	0.008	99	97	4	0.90	2727	170	2826	75	2898	58

	6	233	176	0.76	0.543	0.043	14.900	1.210	0.199	0.007	99	96	0	0.89	2797	178	2807	77	2815	60
	7	218	189	0.87	0.578	0.049	15.500	1.370	0.194	0.007	99	95	3	0.91	2940	201	2846	84	2780	62
	8	199	167	0.84	0.494	0.037	13.400	1.050	0.197	0.008	99	97	5	0.88	2589	160	2709	74	2800	63
	9	198	167	0.84	0.517	0.041	14.900	1.210	0.209	0.008	100	98	4	0.89	2687	174	2807	77	2895	61
	10	207	159	0.77	0.549	0.046	15.000	1.320	0.198	0.008	99	96	0	0.90	2822	193	2817	84	2813	64
	11	182	140	0.77	0.563	0.048	15.500	1.380	0.200	0.008	99	96	1	0.89	2878	198	2849	84	2829	67
	12	180	147	0.82	0.513	0.041	14.400	1.190	0.203	0.008	99	98	4	0.88	2671	176	2773	79	2848	65
	13	182	133	0.73	0.491	0.039	13.500	1.110	0.199	0.008	99	96	5	0.87	2576	167	2716	78	2821	68
	14	187	151	0.81	0.535	0.045	15.200	1.320	0.207	0.009	99	96	2	0.88	2760	187	2829	83	2879	67
	15	173	150	0.87	0.479	0.038	12.800	1.060	0.195	0.008	99	96	6	0.86	2521	164	2668	78	2782	70
	16	162	146	0.90	0.501	0.041	13.300	1.150	0.193	0.008	99	95	3	0.87	2619	175	2704	81	2768	72
	17	155	140	0.90	0.472	0.037	13.600	1.120	0.208	0.009	99	95	9	0.86	2491	163	2719	78	2894	71
	18	146	120	0.82	0.448	0.034	12.400	1.010	0.201	0.009	99	95	10	0.84	2385	153	2634	76	2832	73
	19	159	123	0.77	0.530	0.046	14.500	1.320	0.199	0.009	99	96	2	0.88	2742	194	2785	86	2816	71
	20	148	131	0.88	0.446	0.034	13.100	1.050	0.214	0.009	99	98	12	0.85	2377	153	2689	76	2933	70
	21	140	113	0.81	0.494	0.041	13.000	1.130	0.191	0.009	99	97	4	0.85	2589	176	2683	82	2755	75
	22	136	126	0.93	0.486	0.040	13.400	1.170	0.200	0.009	99	96	6	0.85	2552	175	2708	83	2826	75
	23	148	92	0.62	0.555	0.052	15.300	1.470	0.200	0.009	100	98	0	0.89	2844	214	2836	91	2830	71
	24	134	117	0.87	0.426	0.033	11.500	0.940	0.195	0.009	99	98	11	0.84	2286	150	2561	77	2787	76
	25	124	116	0.94	0.426	0.033	11.600	0.954	0.197	0.010	99	96	12	0.82	2286	150	2570	77	2802	79
	26	132	107	0.81	0.439	0.036	12.500	1.080	0.207	0.010	99	96	12	0.84	2344	161	2644	81	2882	77
	27	129	94	0.73	0.501	0.044	14.700	1.330	0.212	0.010	100	99	6	0.86	2620	189	2793	86	2921	75
	28	126	108	0.85	0.477	0.042	13.100	1.200	0.200	0.010	99	97	7	0.85	2514	182	2690	86	2824	79
	29	117	98	0.84	0.427	0.034	12.200	1.020	0.207	0.010	99	96	13	0.81	2290	153	2619	79	2883	81
NCGB13-001-1@1	1	545	105	0.19	0.449	0.031	11.900	0.862	0.192	0.005	99	95	8	0.93	2392	139	2596	68	2759	45
	2	443	148	0.33	0.484	0.032	12.500	0.844	0.187	0.005	99	96	4	0.91	2544	137	2643	63	2719	47
	3	383	173	0.45	0.500	0.033	13.200	0.905	0.191	0.006	100	98	3	0.90	2615	144	2693	65	2752	49
	4	345	198	0.57	0.602	0.049	16.600	1.370	0.200	0.006	100	99	4	0.93	3037	197	2911	79	2825	51
	5	276	155	0.56	0.497	0.036	13.600	1.000	0.198	0.007	100	99	5	0.89	2600	154	2722	70	2813	55
	6	239	142	0.59	0.640	0.058	17.400	1.590	0.197	0.007	100	99	7	0.93	3187	226	2957	88	2804	57
	7	205	153	0.75	0.509	0.039	13.700	1.080	0.195	0.007	100	99	3	0.88	2653	168	2727	75	2782	62
	8	194	130	0.67	0.528	0.042	14.200	1.170	0.195	0.008	100	99	1	0.88	2733	179	2763	78	2785	64
	9	210	141	0.67	0.601	0.056	16.200	1.530	0.195	0.008	100	99	5	0.91	3034	223	2888	90	2788	64
	10	196	136	0.70	0.520	0.043	14.900	1.260	0.207	0.008	100	99	4	0.89	2699	183	2806	81	2884	65
	11	208	158	0.76	0.617	0.060	17.100	1.700	0.201	0.008	100	98	5	0.92	3098	239	2940	95	2833	65
	12	196	155	0.79	0.496	0.041	13.500	1.140	0.198	0.008	100	99	5	0.89	2596	175	2717	80	2808	65
	13	217	163	0.75	0.532	0.045	14.400	1.250	0.196	0.008	100	99	1	0.89	2751	189	2775	83	2792	65
	14	222	165	0.74	0.543	0.048	15.500	1.400	0.207	0.008	100	99	2	0.91	2798	200	2848	86	2884	61
	15	212	157	0.74	0.575	0.051	15.700	1.430	0.199	0.007	100	99	2	0.91	2929	210	2861	87	2814	61
	16	220	181	0.82	0.506	0.041	14.600	1.200	0.209	0.008	100	100	5	0.90	2641	174	2790	78	2899	59
	17	227	184	0.81	0.519	0.042	14.800	1.220	0.207	0.008	100	100	4	0.90	2694	178	2801	78	2879	59
	18	239	175	0.73	0.564	0.049	15.700	1.390	0.202	0.007	100	100	1	0.92	2882	202	2858	85	2842	58
	19	226	171	0.76	0.565	0.050	16.700	1.490	0.214	0.008	100	100	1	0.92	2885	205	2917	86	2939	57
	20	214	160	0.75	0.499	0.040	14.100	1.140	0.205	0.008	100	100	5	0.89	2608	170	2754	77	2863	60
	21	201	167	0.83	0.459	0.035	12.500	0.975	0.198	0.008	100	100	8	0.88	2436	154	2646	73	2810	62
	22	181	141	0.78	0.550	0.048	15.200	1.370	0.201	0.008	100	100	0	0.91	2823	201	2831	86	2836	63
	23	169	144	0.85	0.503	0.042	14.500	1.240	0.209	0.008	100	99	6	0.89	2628	180	2784	81	2899	65
	24	160	119	0.74	0.500	0.042	13.700	1.190	0.199	0.008	100	99	4	0.88	2612	181	2732	82	2822	68
	25	173	127	0.73	0.545	0.050	15.600	1.460	0.207	0.008	100	99	2	0.90	2802	208	2850	89	2884	66
	26	150	98	0.65	0.589	0.056	16.300	1.590	0.201	0.009	100	99	3	0.90	2987	228	2895	93	2831	70
	27	144	108	0.75	0.505	0.044	14.200	1.260	0.204	0.009	100	99	5	0.88	2633	187	2763	84	2859	71
	28	150	103	0.69	0.514	0.046	14.300	1.300	0.202	0.009	100	99	4	0.89	2671	194	2769	86	2841	69
	29	145	119	0.82	0.501	0.043	13.600	1.190	0.197	0.009	100	99	4	0.87	2618	184	2722	83	2800	71
	30	171	109	0.64	0.606	0.062	16.400	1.710	0.196	0.008	100	99	5	0.92	3053	248	2899	100	2793	69

	31	147	108	0.73	0.463	0.038	12.600	1.050	0.197	0.009	100	99	8	0.86	2455	166	2649	79	2802	71
	32	162	130	0.80	0.561	0.053	16.400	1.590	0.212	0.009	100	99	1	0.91	2869	219	2900	93	2920	67
	33	178	116	0.65	0.612	0.063	16.400	1.710	0.194	0.008	100	100	6	0.93	3079	251	2901	100	2779	65
	34	164	129	0.79	0.477	0.039	13.100	1.110	0.199	0.008	100	99	6	0.88	2516	172	2684	80	2814	67
	35	176	134	0.76	0.533	0.047	14.700	1.340	0.200	0.008	100	99	1	0.90	2755	199	2795	87	2824	67
	36	177	128	0.72	0.559	0.050	15.600	1.430	0.202	0.008	100	99	0	0.90	2861	207	2850	88	2842	66
	37	177	127	0.72	0.633	0.060	17.700	1.710	0.203	0.008	100	99	6	0.91	3159	236	2974	93	2851	64
	38	200	160	0.80	0.593	0.052	17.100	1.510	0.209	0.008	100	100	2	0.91	3001	209	2938	85	2895	60
	39	268	242	0.90	0.451	0.033	12.600	0.950	0.204	0.007	100	100	10	0.90	2398	147	2654	71	2855	54
	40	289	252	0.87	0.508	0.039	14.000	1.100	0.199	0.007	100	99	4	0.91	2647	168	2747	75	2821	54
	41	229	212	0.92	0.424	0.027	11.400	0.747	0.196	0.007	100	100	12	0.85	2276	121	2560	61	2793	57
	42	251	203	0.81	0.550	0.042	15.200	1.180	0.201	0.007	100	100	0	0.91	2826	174	2830	74	2834	54
	43	261	193	0.74	0.546	0.041	15.500	1.200	0.206	0.007	100	100	1	0.91	2809	172	2848	74	2875	53
	44	256	200	0.78	0.486	0.033	13.700	0.961	0.204	0.007	100	99	7	0.89	2552	145	2727	67	2858	53
	45	284	204	0.72	0.506	0.035	14.400	1.030	0.206	0.007	100	100	5	0.90	2638	152	2776	68	2878	51
	46	274	197	0.72	0.466	0.030	12.500	0.816	0.194	0.006	100	100	7	0.88	2464	131	2640	62	2777	52
	47	294	248	0.84	0.467	0.030	12.700	0.835	0.198	0.006	100	100	7	0.89	2470	131	2661	62	2810	49
	48	343	246	0.72	0.481	0.032	13.200	0.893	0.200	0.006	100	100	6	0.91	2530	139	2696	64	2822	47
	49	332	244	0.74	0.520	0.036	14.500	1.010	0.202	0.006	100	100	3	0.91	2700	151	2781	66	2840	47
NCGB13-001-3	1	602	44	0.07	0.513	0.032	12.800	0.829	0.181	0.006	99	96	0	0.89	2669	136	2667	61	2666	50
	2	517	24	0.05	0.594	0.039	15.500	1.040	0.189	0.006	99	98	5	0.90	3005	158	2845	64	2733	48
	3	513	46	0.09	0.647	0.046	17.700	1.260	0.198	0.006	100	99	8	0.92	3214	178	2971	69	2810	46
	4	449	29	0.06	0.619	0.041	16.600	1.120	0.194	0.006	100	100	6	0.91	3105	163	2911	65	2780	47
	5	435	44	0.10	0.601	0.039	16.200	1.080	0.195	0.006	100	99	5	0.91	3034	158	2888	64	2788	47
	6	434	50	0.11	0.709	0.054	20.000	1.530	0.204	0.006	100	100	11	0.93	3454	203	3090	74	2861	46
	7	394	43	0.11	0.521	0.031	14.500	0.875	0.201	0.006	100	100	3	0.88	2704	131	2780	57	2835	48
	8	419	50	0.12	0.660	0.047	18.300	1.320	0.201	0.006	100	99	8	0.92	3267	182	3005	70	2834	47
	9	431	62	0.14	0.708	0.055	20.300	1.610	0.208	0.006	100	100	10	0.94	3450	208	3108	76	2893	46
	10	392	62	0.16	0.635	0.044	18.200	1.280	0.207	0.006	100	99	6	0.91	3169	173	2999	68	2886	48
	11	411	67	0.16	0.630	0.045	18.100	1.310	0.209	0.006	100	99	5	0.92	3150	178	2996	70	2895	47
	12	409	54	0.13	0.640	0.046	17.600	1.280	0.200	0.006	100	99	7	0.92	3189	180	2970	70	2824	48
	13	382	80	0.21	0.619	0.043	18.000	1.270	0.210	0.006	100	99	4	0.91	3107	172	2988	68	2908	48
	14	371	71	0.19	0.633	0.045	18.100	1.300	0.208	0.006	100	100	5	0.91	3161	177	2996	69	2886	48
	15	366	61	0.17	0.681	0.051	19.900	1.510	0.212	0.007	100	99	8	0.92	3349	195	3086	73	2919	49
	16	359	110	0.31	0.651	0.047	18.600	1.360	0.207	0.006	100	100	7	0.91	3233	184	3019	71	2880	50
	17	350	83	0.24	0.635	0.046	18.600	1.370	0.213	0.007	100	99	5	0.91	3169	181	3022	71	2926	50
	18	329	85	0.26	0.690	0.054	20.500	1.620	0.216	0.007	100	100	8	0.92	3382	205	3116	76	2949	50
	19	316	91	0.29	0.659	0.049	19.900	1.510	0.219	0.007	100	99	6	0.91	3262	191	3085	73	2971	52
	20	328	84	0.26	0.645	0.048	19.400	1.470	0.219	0.007	100	100	5	0.91	3208	189	3064	73	2970	51
	21	339	106	0.31	0.705	0.057	21.300	1.760	0.219	0.007	100	100	9	0.93	3439	217	3154	80	2977	50
	22	271	89	0.33	0.613	0.043	18.900	1.340	0.223	0.008	100	100	2	0.89	3083	171	3034	68	3002	54
	23	347	86	0.25	0.756	0.067	23.100	2.070	0.222	0.007	100	99	12	0.94	3630	245	3233	87	2995	51
	24	316	88	0.28	0.626	0.047	19.500	1.480	0.226	0.007	100	99	2	0.91	3132	186	3066	73	3023	52
	25	318	91	0.29	0.700	0.057	21.200	1.760	0.220	0.007	100	99	8	0.92	3422	217	3149	80	2979	52
	26	301	94	0.31	0.625	0.046	18.200	1.360	0.211	0.007	100	99	4	0.90	3129	182	3001	72	2917	54
	27	320	83	0.26	0.640	0.049	19.900	1.560	0.226	0.007	100	99	3	0.91	3191	194	3088	76	3022	52
	28	324	85	0.26	0.677	0.054	21.100	1.720	0.226	0.007	100	99	6	0.92	3334	209	3142	79	3021	52
	29	320	83	0.26	0.629	0.048	18.900	1.470	0.218	0.007	100	100	4	0.91	3144	191	3035	75	2964	52
	30	317	97	0.31	0.661	0.053	20.400	1.650	0.224	0.007	100	100	5	0.92	3270	205	3110	78	3008	52
	31	312	85	0.27	0.656	0.051	19.600	1.560	0.217	0.007	100	100	6	0.91	3253	200	3072	77	2955	53
	32	296	74	0.25	0.651	0.051	19.800	1.580	0.221	0.007	100	100	5	0.92	3233	200	3082	77	2984	52
	33	288	85	0.29	0.637	0.050	19.200	1.520	0.219	0.007	100	100	4	0.92	3177	196	3052	77	2970	52
	34	316	80	0.25	0.650	0.052	20.200	1.640	0.226	0.007	100	100	4	0.92	3227	203	3102	79	3022	52
	35	315	96	0.30	0.696	0.059	21.500	1.830	0.224	0.007	100	100	7	0.93	3404	223	3160	83	3008	52

	36	301	80	0.27	0.672	0.055	21.300	1.770	0.230	0.008	100	100	5	0.92	3315	212	3152	81	3049	52
	37	307	87	0.28	0.625	0.049	19.400	1.540	0.225	0.007	100	100	2	0.91	3129	193	3061	77	3017	52
	38	300	89	0.30	0.669	0.054	20.900	1.710	0.227	0.007	100	100	5	0.92	3301	209	3134	79	3028	53
	39	295	81	0.28	0.576	0.042	17.600	1.310	0.222	0.007	100	100	1	0.90	2933	172	2968	72	2992	53
	40	279	87	0.31	0.593	0.044	17.500	1.310	0.214	0.007	100	99	1	0.90	3003	176	2963	72	2936	55
	41	307	92	0.30	0.671	0.056	20.900	1.760	0.226	0.007	100	99	5	0.92	3310	214	3136	81	3027	52
	42	291	83	0.28	0.559	0.040	17.000	1.240	0.221	0.007	100	100	3	0.89	2862	165	2935	70	2986	54
	43	294	94	0.32	0.626	0.049	19.200	1.530	0.222	0.007	100	100	3	0.91	3133	195	3050	77	2996	53
	44	307	93	0.30	0.629	0.051	19.700	1.610	0.227	0.007	100	100	2	0.92	3145	201	3077	79	3033	52
	45	300	90	0.30	0.674	0.057	20.500	1.750	0.220	0.007	100	100	6	0.93	3322	219	3115	83	2984	53
	46	288	80	0.28	0.620	0.048	19.100	1.510	0.223	0.008	100	99	2	0.91	3108	192	3046	77	3006	54
	47	288	101	0.35	0.599	0.045	18.100	1.410	0.219	0.007	100	98	1	0.90	3027	183	2996	75	2975	55
	48	300	97	0.32	0.585	0.045	18.300	1.420	0.227	0.007	100	100	1	0.91	2968	181	3007	74	3033	52
	49	300	92	0.31	0.743	0.067	23.100	2.100	0.226	0.008	100	100	10	0.93	3581	247	3231	89	3021	53
NCGB13-001-4	1	403	122	0.30	0.468	0.030	12.800	0.832	0.198	0.006	100	98	7	0.90	2475	130	2663	61	2808	46
	2	424	126	0.30	0.474	0.030	12.900	0.830	0.198	0.005	100	98	7	0.91	2502	130	2674	61	2807	43
	3	370	107	0.29	0.477	0.028	13.100	0.800	0.200	0.005	100	99	7	0.90	2513	124	2690	57	2825	43
	4	366	109	0.30	0.542	0.036	14.500	0.982	0.194	0.005	100	100	0	0.92	2791	151	2783	64	2776	43
	5	323	108	0.33	0.493	0.030	13.600	0.850	0.200	0.006	100	100	5	0.90	2583	130	2723	59	2829	45
	6	301	83	0.28	0.525	0.034	14.400	0.941	0.199	0.006	100	100	2	0.90	2722	142	2777	62	2817	46
	7	290	96	0.33	0.546	0.036	15.100	1.010	0.201	0.006	100	100	1	0.90	2806	149	2821	64	2831	48
	8	293	90	0.31	0.601	0.042	17.100	1.230	0.207	0.006	100	100	3	0.92	3035	171	2943	69	2880	47
	9	303	102	0.34	0.556	0.036	15.500	1.020	0.202	0.006	100	100	0	0.90	2849	149	2845	63	2842	46
	10	343	106	0.31	0.533	0.033	14.600	0.911	0.199	0.005	100	100	1	0.91	2755	137	2792	59	2819	44
	11	403	160	0.40	0.470	0.027	13.400	0.778	0.206	0.005	100	100	9	0.91	2484	118	2706	55	2876	41
	12	399	174	0.44	0.496	0.028	13.400	0.777	0.197	0.005	100	100	4	0.91	2595	121	2711	55	2798	41
	13	387	164	0.42	0.518	0.029	14.300	0.827	0.201	0.005	100	100	3	0.91	2691	125	2772	55	2832	40
	14	422	182	0.43	0.463	0.025	12.600	0.680	0.197	0.005	100	100	8	0.90	2451	108	2649	51	2805	40
	15	445	159	0.36	0.499	0.028	13.800	0.778	0.201	0.005	100	100	5	0.91	2610	119	2738	53	2834	39
	16	461	190	0.41	0.489	0.026	13.500	0.740	0.201	0.005	100	100	6	0.90	2567	114	2717	52	2830	39
	17	440	167	0.38	0.497	0.027	13.800	0.774	0.202	0.005	100	100	5	0.91	2599	118	2736	53	2838	38
	18	395	149	0.38	0.460	0.023	12.800	0.666	0.202	0.005	100	100	9	0.89	2439	103	2668	49	2846	40
	19	415	159	0.38	0.462	0.024	12.900	0.687	0.202	0.005	100	100	9	0.90	2447	107	2670	50	2844	39
	20	396	141	0.36	0.475	0.025	13.200	0.707	0.201	0.005	100	100	7	0.89	2506	109	2692	51	2836	41
	21	392	135	0.34	0.471	0.026	13.100	0.725	0.202	0.005	100	100	8	0.89	2490	112	2688	52	2841	41
	22	372	135	0.36	0.492	0.028	13.900	0.801	0.206	0.005	100	100	6	0.90	2577	120	2745	54	2871	42
	23	362	126	0.35	0.533	0.032	15.000	0.931	0.205	0.005	100	100	2	0.91	2755	136	2818	59	2863	43
	24	318	116	0.36	0.468	0.026	13.000	0.738	0.202	0.006	100	100	8	0.88	2472	114	2681	53	2843	44
	25	302	102	0.34	0.468	0.027	13.100	0.767	0.203	0.006	100	100	8	0.88	2476	118	2688	55	2853	46
	26	276	103	0.37	0.443	0.025	12.200	0.700	0.200	0.006	100	100	10	0.87	2363	111	2623	54	2830	48
	27	253	91	0.36	0.449	0.025	11.900	0.689	0.193	0.006	100	100	8	0.86	2389	112	2600	54	2769	50
	28	265	101	0.38	0.571	0.037	15.200	1.010	0.193	0.006	100	100	3	0.89	2910	152	2826	63	2767	50
	29	257	71	0.28	0.585	0.038	16.300	1.080	0.202	0.006	100	100	3	0.89	2971	155	2896	63	2844	50
	30	311	112	0.36	0.469	0.026	13.400	0.769	0.207	0.006	100	100	9	0.88	2480	116	2709	54	2884	46
	31	361	129	0.36	0.462	0.025	12.800	0.703	0.201	0.005	100	100	8	0.88	2449	110	2666	52	2835	43
	32	402	174	0.43	0.415	0.020	11.900	0.599	0.208	0.005	100	100	15	0.87	2236	93	2597	47	2892	41
	33	444	169	0.38	0.432	0.022	11.900	0.620	0.200	0.005	100	100	11	0.89	2316	99	2597	49	2824	39
	34	414	186	0.45	0.496	0.027	13.600	0.741	0.199	0.005	100	100	5	0.90	2597	114	2723	51	2818	40
	35	427	183	0.43	0.494	0.026	13.900	0.760	0.205	0.005	100	100	6	0.90	2586	114	2745	52	2865	40
	36	422	161	0.38	0.465	0.024	12.800	0.668	0.200	0.005	100	100	8	0.89	2462	105	2666	49	2824	40
	37	416	182	0.44	0.428	0.021	11.800	0.586	0.200	0.005	100	100	12	0.87	2298	94	2590	46	2828	40
	38	400	166	0.41	0.485	0.026	13.500	0.731	0.202	0.005	100	100	6	0.89	2549	112	2714	51	2839	41
	39	405	160	0.40	0.455	0.024	12.900	0.683	0.206	0.005	100	100	10	0.89	2419	104	2675	50	2875	41
NCGB13-001-5	1	263	78	0.30	0.710	0.060	20.100	1.720	0.206	0.007	100	99	11	0.93	3458	225	3099	83	2873	53

	2	247	95	0.38	0.697	0.057	20.400	1.690	0.212	0.007	100	99	9	0.92	3410	216	3111	80	2924	52
	3	252	120	0.48	0.573	0.040	17.200	1.230	0.217	0.007	100	99	1	0.90	2921	165	2944	69	2960	51
	4	255	110	0.43	0.547	0.037	16.300	1.120	0.216	0.007	100	99	3	0.89	2814	153	2896	65	2953	52
	5	286	147	0.51	0.502	0.032	14.900	0.975	0.215	0.007	100	99	7	0.88	2622	137	2810	62	2947	50
	6	272	136	0.50	0.504	0.031	15.300	0.976	0.221	0.007	100	99	7	0.88	2631	134	2836	61	2985	50
	7	278	142	0.51	0.565	0.038	17.000	1.170	0.219	0.007	100	99	2	0.90	2886	156	2937	66	2973	49
	8	264	147	0.55	0.270	0.012	8.240	0.371	0.221	0.007	100	100	38	0.76	1541	60	2257	41	2989	50
	9	705	379	0.54	0.405	0.025	13.500	0.841	0.241	0.009	100	100	21	0.83	2193	113	2712	59	3126	57
	10	299	150	0.50	0.643	0.046	19.800	1.460	0.224	0.008	100	99	4	0.89	3199	182	3082	71	3007	54
	11	276	156	0.56	0.688	0.052	21.300	1.620	0.224	0.008	100	100	7	0.90	3376	197	3150	74	3010	54
	12	293	177	0.60	0.670	0.050	20.200	1.520	0.219	0.007	100	99	6	0.91	3304	192	3101	73	2972	52
	13	290	160	0.55	0.522	0.031	15.300	0.941	0.213	0.007	100	99	5	0.86	2706	133	2835	59	2928	53
	14	315	199	0.63	0.535	0.033	16.700	1.050	0.226	0.007	100	100	5	0.87	2763	138	2917	60	3025	50
	15	307	186	0.60	0.513	0.030	15.900	0.957	0.225	0.007	100	100	7	0.87	2668	129	2870	58	3016	50
	16	286	192	0.67	0.488	0.027	15.100	0.865	0.224	0.007	100	100	10	0.84	2561	118	2821	55	3013	51
	17	305	181	0.59	0.525	0.031	16.000	0.975	0.221	0.007	100	100	6	0.87	2722	133	2879	58	2990	49
	18	310	173	0.56	0.511	0.030	15.800	0.944	0.224	0.007	100	100	7	0.87	2660	128	2862	57	3007	49
	19	312	194	0.62	0.508	0.030	15.800	0.943	0.226	0.007	100	100	8	0.86	2646	127	2867	57	3026	50
	20	292	176	0.60	0.511	0.030	15.600	0.928	0.221	0.007	100	100	7	0.86	2662	127	2851	57	2986	51
	21	276	156	0.57	0.544	0.034	16.800	1.060	0.224	0.007	100	100	4	0.87	2802	141	2923	61	3007	51
	22	246	158	0.64	0.447	0.025	13.600	0.770	0.221	0.008	100	99	13	0.82	2381	109	2725	53	2991	54
	23	266	143	0.54	0.620	0.042	19.100	1.320	0.224	0.007	100	100	2	0.89	3110	167	3049	67	3009	53
	24	234	158	0.67	0.433	0.024	13.300	0.745	0.223	0.008	100	100	15	0.80	2321	106	2704	53	3004	56
	25	250	145	0.58	0.513	0.031	15.700	0.967	0.223	0.008	100	100	7	0.84	2669	131	2861	59	3000	55
	26	246	140	0.57	0.486	0.028	14.700	0.880	0.220	0.007	100	100	9	0.84	2551	123	2798	57	2981	54
	27	236	140	0.59	0.561	0.036	17.800	1.150	0.230	0.008	100	100	4	0.87	2871	148	2977	62	3049	53
	28	260	131	0.50	0.520	0.032	15.800	0.986	0.221	0.007	100	100	6	0.86	2698	135	2866	60	2986	53
	29	243	139	0.57	0.480	0.028	14.700	0.860	0.222	0.008	100	100	10	0.83	2527	120	2795	56	2996	55
	30	268	158	0.59	0.517	0.031	16.000	0.986	0.225	0.007	100	100	7	0.85	2688	133	2878	59	3014	53
	31	259	156	0.60	0.473	0.027	14.700	0.859	0.225	0.008	100	100	11	0.83	2495	118	2795	56	3019	54
	32	261	154	0.59	0.523	0.032	15.900	0.980	0.221	0.007	100	100	6	0.85	2710	133	2872	59	2988	53
	33	250	177	0.71	0.495	0.029	15.500	0.918	0.228	0.008	100	100	9	0.83	2592	124	2849	56	3035	54
	34	268	158	0.59	0.524	0.032	16.100	1.010	0.223	0.007	100	100	6	0.86	2716	136	2885	60	3005	52
	35	254	160	0.63	0.455	0.025	14.400	0.821	0.229	0.008	100	100	14	0.83	2415	113	2773	54	3045	53
	36	269	171	0.63	0.441	0.024	13.600	0.765	0.223	0.007	100	100	14	0.83	2357	109	2720	53	3001	53
	37	268	178	0.66	0.549	0.034	17.100	1.070	0.225	0.008	100	100	4	0.85	2822	141	2939	60	3019	54
	38	289	173	0.60	0.495	0.029	15.100	0.910	0.221	0.007	100	100	8	0.85	2594	126	2820	57	2986	52
	39	240	152	0.63	0.526	0.031	15.700	0.962	0.217	0.007	100	100	5	0.84	2723	133	2861	58	2960	55
	40	259	160	0.62	0.507	0.030	15.600	0.957	0.223	0.007	100	100	8	0.85	2645	130	2854	59	3005	54
	41	260	167	0.64	0.458	0.026	13.800	0.788	0.218	0.007	100	100	12	0.83	2431	113	2734	54	2967	53
	42	249	168	0.68	0.502	0.030	15.000	0.910	0.217	0.007	100	100	7	0.84	2623	128	2817	58	2959	54
	43	206	146	0.71	0.479	0.027	14.500	0.847	0.220	0.008	100	100	10	0.80	2524	119	2784	55	2979	58
	44	251	156	0.62	0.495	0.030	14.900	0.920	0.219	0.007	100	100	8	0.85	2591	128	2811	59	2972	55
	45	232	144	0.62	0.500	0.030	15.400	0.942	0.223	0.008	100	100	8	0.84	2612	129	2838	58	3003	56
	46	225	154	0.69	0.476	0.028	14.200	0.856	0.217	0.008	100	100	10	0.82	2507	122	2764	57	2958	58
	47	234	135	0.58	0.487	0.030	14.900	0.925	0.222	0.008	100	100	9	0.84	2558	128	2810	59	2997	55
	48	192	138	0.72	0.456	0.026	14.000	0.825	0.222	0.008	100	100	13	0.80	2421	117	2747	56	2995	59
NCGB13-001-7	1	810	180	0.22	0.537	0.035	14.800	1.070	0.201	0.010	97	88	1	0.75	2771	147	2806	69	2831	80
	2	584	152	0.26	0.629	0.039	17.400	1.150	0.201	0.008	97	90	6	0.79	3147	153	2957	63	2831	67
	3	444	151	0.34	0.554	0.031	14.800	0.887	0.194	0.007	98	93	1	0.79	2840	129	2803	57	2777	63
	4	355	136	0.38	0.734	0.050	20.000	1.420	0.198	0.007	99	95	14	0.86	3548	187	3093	69	2809	61
	5	318	116	0.36	0.632	0.042	16.900	1.180	0.194	0.007	99	95	7	0.85	3157	167	2932	67	2780	61
	6	302	111	0.37	0.700	0.052	19.400	1.470	0.201	0.007	99	98	11	0.88	3420	196	3062	73	2834	60
	7	291	96	0.33	0.616	0.044	16.600	1.210	0.195	0.007	99	98	6	0.87	3095	175	2910	70	2785	60

	8	262	93	0.36	0.532	0.036	14.600	1.030	0.199	0.007	99	97	1	0.85	2751	152	2791	67	2820	61
	9	246	89	0.36	0.591	0.043	16.600	1.250	0.203	0.008	99	98	3	0.88	2994	175	2911	72	2854	60
	10	242	97	0.40	0.563	0.040	15.500	1.120	0.200	0.007	100	98	1	0.87	2880	163	2848	69	2826	59
	11	272	117	0.43	0.501	0.033	13.800	0.941	0.200	0.007	100	99	5	0.86	2617	142	2739	64	2830	57
	12	271	108	0.40	0.545	0.038	14.700	1.050	0.195	0.007	100	98	0	0.87	2804	158	2794	68	2787	58
	13	254	115	0.45	0.498	0.033	13.900	0.946	0.202	0.007	99	98	5	0.86	2607	141	2744	64	2846	58
	14	257	105	0.41	0.453	0.028	13.000	0.827	0.208	0.007	100	99	11	0.85	2410	124	2678	60	2887	56
	15	269	109	0.41	0.475	0.031	12.900	0.850	0.196	0.007	100	99	6	0.86	2506	133	2669	62	2795	57
	16	263	125	0.48	0.511	0.034	13.800	0.954	0.196	0.007	100	98	3	0.86	2662	146	2737	65	2793	59
	17	267	107	0.40	0.495	0.033	13.900	0.946	0.204	0.007	100	98	6	0.86	2593	140	2744	64	2856	58
	18	251	109	0.43	0.522	0.036	14.500	1.020	0.202	0.007	100	99	3	0.87	2706	152	2785	67	2842	59
	19	239	96	0.40	0.466	0.030	12.800	0.850	0.199	0.007	100	99	8	0.85	2468	132	2663	63	2815	59
	20	257	92	0.36	0.548	0.039	15.100	1.120	0.200	0.007	100	99	0	0.88	2816	164	2823	70	2829	58
	21	248	111	0.45	0.478	0.031	13.300	0.904	0.202	0.007	100	98	7	0.85	2516	137	2702	64	2843	59
	22	245	98	0.40	0.556	0.040	15.300	1.120	0.199	0.007	100	99	1	0.88	2848	164	2831	70	2819	58
	23	240	115	0.48	0.470	0.030	13.000	0.870	0.201	0.007	100	98	8	0.85	2483	133	2681	63	2835	59
	24	247	105	0.42	0.468	0.030	12.800	0.849	0.198	0.007	100	98	7	0.85	2473	132	2662	63	2808	59
	25	246	104	0.42	0.489	0.032	13.800	0.933	0.205	0.007	100	99	6	0.86	2568	139	2737	64	2864	58
	26	247	99	0.40	0.501	0.033	13.900	0.950	0.201	0.007	100	99	5	0.86	2618	143	2740	65	2831	57
	27	233	115	0.49	0.497	0.032	13.600	0.905	0.199	0.007	100	100	5	0.85	2602	139	2725	63	2818	58
	28	242	109	0.45	0.457	0.028	12.800	0.809	0.203	0.007	100	100	9	0.85	2425	124	2664	60	2851	56
	29	249	113	0.45	0.510	0.034	14.200	0.971	0.202	0.007	100	99	4	0.88	2656	145	2764	65	2844	55
	30	235	117	0.50	0.455	0.028	12.500	0.786	0.200	0.007	100	99	9	0.84	2416	123	2646	59	2827	57
	31	266	121	0.45	0.508	0.034	13.900	0.948	0.198	0.007	100	99	3	0.87	2649	144	2742	65	2811	56
	32	253	133	0.53	0.461	0.028	12.700	0.803	0.200	0.007	100	99	8	0.85	2443	125	2658	60	2826	56
	33	234	113	0.48	0.434	0.026	11.900	0.734	0.200	0.007	100	99	11	0.84	2321	116	2599	58	2823	56
	34	251	124	0.49	0.484	0.031	13.300	0.876	0.199	0.007	100	98	6	0.86	2543	134	2701	62	2822	56
	35	240	128	0.53	0.465	0.029	13.000	0.830	0.203	0.007	100	100	8	0.85	2462	127	2680	60	2849	56
	36	225	115	0.51	0.464	0.029	12.800	0.824	0.200	0.007	100	99	8	0.85	2458	127	2665	61	2825	57
	37	224	94	0.42	0.470	0.030	12.900	0.838	0.199	0.007	100	99	7	0.84	2483	130	2670	61	2814	59
	38	241	110	0.46	0.488	0.032	13.300	0.887	0.198	0.007	100	100	5	0.86	2563	137	2703	63	2809	58
	39	223	110	0.49	0.441	0.027	12.400	0.782	0.204	0.007	100	100	11	0.83	2354	121	2635	59	2858	59
NCGB13-001-10	1	487	115	0.24	0.326	0.019	8.740	0.545	0.195	0.006	99	94	24	0.87	1818	92	2311	57	2781	50
	2	423	103	0.24	0.515	0.039	13.700	1.080	0.193	0.006	99	97	2	0.93	2677	168	2729	75	2769	49
	3	333	99	0.30	0.546	0.041	14.900	1.150	0.198	0.006	99	98	0	0.92	2810	171	2810	73	2809	51
	4	295	88	0.30	0.446	0.029	12.000	0.801	0.196	0.006	99	98	9	0.88	2376	128	2606	62	2790	53
	5	317	86	0.27	0.495	0.036	13.500	1.010	0.198	0.006	100	98	5	0.91	2593	155	2718	70	2813	52
	6	296	90	0.30	0.579	0.048	15.700	1.320	0.196	0.007	99	98	3	0.92	2945	194	2856	80	2794	55
	7	275	99	0.36	0.518	0.039	14.300	1.090	0.200	0.007	100	99	3	0.90	2693	164	2770	73	2827	55
	8	284	76	0.27	0.511	0.038	13.900	1.070	0.198	0.007	100	99	3	0.90	2659	163	2746	73	2811	54
	9	283	89	0.32	0.490	0.036	13.300	0.985	0.197	0.006	100	100	5	0.90	2569	154	2703	70	2804	52
	10	295	82	0.28	0.474	0.034	12.700	0.941	0.195	0.006	100	100	6	0.91	2499	150	2661	70	2786	52
	11	281	96	0.34	0.407	0.026	11.300	0.754	0.201	0.007	100	99	15	0.88	2199	121	2545	62	2834	53
	12	275	90	0.33	0.517	0.040	13.800	1.090	0.193	0.006	100	100	2	0.91	2684	170	2734	75	2770	54
	13	262	68	0.26	0.538	0.044	14.100	1.170	0.191	0.007	100	100	1	0.91	2776	182	2760	78	2748	56
	14	265	90	0.34	0.491	0.037	13.600	1.060	0.201	0.007	100	100	6	0.90	2573	162	2721	74	2832	56
	15	267	85	0.32	0.623	0.057	16.600	1.530	0.193	0.007	100	100	7	0.93	3123	225	2911	88	2768	57
	16	237	72	0.30	0.462	0.033	12.500	0.923	0.195	0.007	100	100	7	0.88	2449	147	2639	70	2788	58
	17	238	75	0.32	0.525	0.043	14.600	1.210	0.201	0.007	100	100	2	0.91	2720	180	2786	79	2835	56
	18	227	76	0.34	0.425	0.030	12.000	0.856	0.205	0.007	100	100	13	0.88	2284	134	2605	67	2866	57
	19	236	72	0.30	0.514	0.041	14.000	1.140	0.198	0.007	100	100	3	0.90	2672	175	2752	77	2811	58
	20	247	96	0.39	0.489	0.038	13.200	1.060	0.197	0.007	100	100	5	0.90	2564	165	2697	75	2798	58
	21	231	70	0.30	0.495	0.039	13.900	1.110	0.204	0.007	100	100	6	0.90	2591	167	2742	76	2855	58
	22	226	76	0.33	0.457	0.034	12.700	0.962	0.202	0.007	100	100	9	0.88	2426	149	2659	71	2841	59

	23	232	77	0.33	0.536	0.045	15.600	1.350	0.212	0.008	100	100	3	0.91	2765	191	2855	82	2919	59
	24	227	68	0.30	0.446	0.033	12.200	0.933	0.198	0.007	100	100	10	0.88	2379	148	2620	72	2812	60
	25	221	65	0.29	0.485	0.039	13.900	1.120	0.207	0.008	100	100	7	0.90	2551	167	2740	77	2882	59
	26	232	85	0.37	0.534	0.045	14.900	1.290	0.202	0.007	100	100	2	0.91	2756	190	2806	82	2843	59
	27	237	78	0.33	0.473	0.037	13.000	1.050	0.200	0.007	100	99	7	0.89	2497	163	2682	76	2824	60
	28	217	70	0.32	0.442	0.032	11.800	0.883	0.194	0.007	100	100	9	0.87	2361	144	2591	70	2776	62
	29	230	79	0.34	0.518	0.042	14.300	1.190	0.200	0.007	100	100	3	0.90	2693	180	2767	79	2823	60
	30	247	83	0.34	0.466	0.035	12.600	0.971	0.196	0.007	100	100	7	0.89	2464	154	2651	72	2797	59
	31	236	81	0.34	0.497	0.038	13.600	1.070	0.198	0.007	100	100	5	0.89	2601	165	2721	75	2811	59
	32	224	74	0.33	0.442	0.031	12.200	0.888	0.200	0.007	100	100	10	0.87	2360	140	2617	68	2823	60
	33	255	88	0.35	0.528	0.043	14.700	1.240	0.203	0.007	100	99	2	0.91	2733	183	2799	80	2847	58
	34	266	107	0.40	0.579	0.051	15.800	1.420	0.198	0.007	100	100	3	0.93	2945	209	2864	86	2807	56
	35	237	84	0.35	0.398	0.026	11.600	0.791	0.212	0.008	100	100	17	0.86	2160	121	2574	64	2919	58
	36	262	99	0.38	0.487	0.038	13.200	1.050	0.197	0.007	100	99	5	0.90	2559	164	2697	75	2802	57
	37	232	90	0.39	0.417	0.029	11.300	0.792	0.196	0.007	100	100	13	0.87	2245	130	2546	66	2796	58
	38	238	86	0.36	0.479	0.036	13.000	1.010	0.197	0.007	100	100	6	0.89	2523	159	2681	73	2802	58
	39	227	77	0.34	0.460	0.034	12.700	0.962	0.200	0.007	100	100	8	0.88	2440	150	2656	71	2825	59
NCGB13-001-11	1	440	265	0.60	0.460	0.036	11.900	0.981	0.188	0.007	98	92	6	0.91	2438	157	2598	77	2725	57
	2	339	197	0.58	0.495	0.035	13.300	0.989	0.194	0.007	99	96	4	0.90	2594	153	2698	70	2778	54
	3	338	149	0.44	0.537	0.041	14.500	1.140	0.196	0.006	99	97	1	0.91	2769	171	2785	74	2796	53
	4	349	155	0.44	0.558	0.044	14.700	1.190	0.191	0.006	99	97	2	0.92	2860	181	2798	77	2753	54
	5	351	149	0.43	0.548	0.042	14.600	1.130	0.193	0.006	100	99	1	0.92	2816	173	2786	74	2765	51
	6	346	138	0.40	0.467	0.031	12.600	0.864	0.196	0.006	100	98	7	0.89	2470	136	2652	64	2794	51
	7	353	135	0.38	0.535	0.040	14.800	1.140	0.201	0.006	100	98	1	0.92	2761	169	2802	73	2832	50
	8	345	136	0.39	0.421	0.027	11.900	0.776	0.204	0.006	100	98	14	0.88	2265	121	2594	61	2861	51
	9	354	141	0.40	0.560	0.044	15.600	1.230	0.202	0.006	100	99	0	0.93	2865	180	2852	76	2842	49
	10	288	124	0.43	0.391	0.023	10.900	0.661	0.202	0.007	100	99	17	0.86	2129	106	2513	57	2840	52
	11	302	114	0.38	0.454	0.030	12.500	0.867	0.200	0.007	99	96	9	0.88	2413	133	2643	65	2824	54
	12	321	132	0.41	0.565	0.044	15.300	1.250	0.197	0.007	99	95	2	0.91	2888	183	2836	78	2799	56
	13	321	129	0.40	0.571	0.045	15.200	1.240	0.193	0.006	99	98	3	0.92	2911	186	2829	78	2771	54
	14	312	127	0.41	0.485	0.035	13.500	0.999	0.203	0.007	99	97	6	0.90	2547	150	2717	70	2847	54
	15	322	119	0.37	0.517	0.039	14.700	1.160	0.206	0.007	99	96	4	0.91	2686	167	2797	75	2878	55
	16	300	125	0.42	0.506	0.037	14.200	1.090	0.204	0.007	99	96	5	0.90	2641	160	2764	73	2855	55
	17	309	126	0.41	0.507	0.038	14.200	1.090	0.204	0.007	99	97	5	0.91	2642	161	2765	73	2856	54
	18	316	119	0.38	0.483	0.035	13.400	1.000	0.202	0.007	99	96	7	0.90	2539	150	2710	70	2840	55
	19	303	132	0.43	0.455	0.031	12.300	0.902	0.196	0.007	98	94	8	0.88	2417	139	2628	69	2795	58
	20	294	112	0.38	0.486	0.036	13.700	1.060	0.205	0.007	98	94	7	0.89	2555	154	2732	73	2865	57
	21	272	118	0.44	0.475	0.033	13.400	0.972	0.204	0.007	99	96	8	0.88	2505	145	2705	69	2858	57
	22	288	116	0.40	0.489	0.035	13.300	1.000	0.197	0.007	99	96	5	0.89	2568	153	2703	71	2805	57
	23	306	115	0.37	0.533	0.042	15.100	1.230	0.205	0.007	99	95	2	0.91	2752	176	2819	78	2866	56
	24	317	124	0.39	0.516	0.040	14.500	1.150	0.203	0.007	99	95	4	0.90	2683	168	2781	76	2853	57
	25	327	149	0.46	0.474	0.034	13.100	0.967	0.201	0.007	99	96	7	0.89	2500	147	2687	70	2831	56
	26	318	118	0.37	0.460	0.032	12.600	0.900	0.198	0.007	99	97	8	0.88	2438	140	2649	67	2813	55
	27	303	112	0.37	0.493	0.035	13.000	0.960	0.192	0.007	99	97	4	0.89	2582	151	2682	69	2758	57
	28	306	116	0.38	0.503	0.036	13.900	1.030	0.201	0.007	100	99	4	0.90	2628	155	2746	70	2834	53
	29	313	129	0.41	0.463	0.031	12.800	0.879	0.201	0.006	100	99	8	0.89	2454	136	2668	65	2834	52
	30	352	144	0.41	0.482	0.033	13.100	0.917	0.197	0.006	100	99	6	0.90	2535	144	2684	66	2798	51
	31	374	140	0.38	0.480	0.033	12.900	0.913	0.194	0.006	100	99	5	0.91	2527	145	2669	67	2779	50
	32	359	154	0.43	0.445	0.028	12.200	0.802	0.199	0.006	100	99	10	0.89	2373	127	2620	62	2817	50
	33	354	156	0.44	0.453	0.029	12.600	0.833	0.202	0.006	100	99	10	0.89	2410	129	2651	62	2840	50
	34	353	135	0.38	0.451	0.029	12.200	0.818	0.197	0.006	100	99	9	0.90	2397	130	2622	63	2800	49
	35	345	131	0.38	0.446	0.029	12.200	0.822	0.198	0.006	100	98	10	0.89	2378	130	2616	63	2806	51
	36	334	126	0.38	0.437	0.028	12.200	0.797	0.203	0.006	100	99	11	0.88	2338	125	2622	61	2849	51
	37	348	148	0.43	0.438	0.028	12.300	0.804	0.203	0.006	100	99	11	0.88	2340	125	2624	62	2851	51

	38	330	133	0.40	0.455	0.030	12.300	0.841	0.196	0.006	100	99	8	0.89	2418	134	2628	64	2794	51
	39	340	150	0.44	0.428	0.028	11.800	0.783	0.200	0.006	100	100	12	0.89	2296	125	2587	62	2824	51
NCGB13-001-9	1	188	48	0.25	0.558	0.055	14.800	1.530	0.192	0.009	98	94	2	0.89	2859	226	2800	98	2759	77
	2	169	42	0.25	0.444	0.034	11.600	0.948	0.189	0.009	99	95	8	0.84	2370	152	2572	76	2736	74
	3	224	61	0.27	0.515	0.045	13.800	1.250	0.195	0.008	100	98	2	0.91	2677	192	2739	85	2785	63
	4	220	63	0.29	0.458	0.037	12.500	1.040	0.198	0.008	99	97	8	0.89	2433	162	2643	78	2808	63
	5	210	69	0.33	0.440	0.033	12.300	0.945	0.203	0.008	100	100	11	0.88	2352	148	2627	72	2847	61
	6	222	63	0.28	0.690	0.075	18.900	2.090	0.199	0.007	100	100	11	0.94	3381	287	3038	107	2819	61
	7	208	68	0.32	0.526	0.046	15.000	1.350	0.207	0.008	100	100	3	0.91	2725	196	2815	86	2880	62
	8	179	62	0.34	0.475	0.037	12.600	1.010	0.192	0.008	100	100	6	0.87	2506	161	2650	75	2762	67
	9	200	53	0.27	0.551	0.050	15.200	1.390	0.200	0.008	100	100	0	0.91	2831	206	2829	87	2827	63
NCGB13-001-9@1	1	210	56	0.26	0.540	0.048	15.300	1.380	0.205	0.008	100	100	2	0.91	2785	200	2834	86	2869	61
	2	210	72	0.34	0.482	0.039	13.100	1.090	0.198	0.008	100	99	6	0.89	2536	169	2689	78	2806	63
	3	220	64	0.29	0.528	0.047	15.000	1.350	0.206	0.008	100	100	3	0.91	2733	197	2814	86	2872	60
	4	192	64	0.33	0.502	0.041	13.600	1.140	0.196	0.008	100	100	4	0.89	2620	177	2721	80	2797	64
	5	203	62	0.30	0.563	0.052	15.800	1.490	0.204	0.008	100	100	0	0.92	2877	215	2864	90	2855	62
	6	202	54	0.26	0.474	0.040	13.300	1.140	0.203	0.008	100	100	8	0.90	2499	174	2699	81	2853	62
	7	199	61	0.31	0.510	0.044	13.900	1.230	0.197	0.008	100	100	3	0.90	2656	190	2741	84	2804	64
	8	207	60	0.29	0.663	0.073	18.700	2.090	0.204	0.008	100	100	8	0.94	3278	283	3025	108	2861	63
	9	189	58	0.31	0.517	0.047	14.200	1.310	0.199	0.008	100	100	3	0.90	2685	198	2763	87	2821	65
	10	178	60	0.34	0.530	0.048	14.600	1.340	0.200	0.008	100	100	2	0.90	2743	200	2790	87	2825	67
	11	161	61	0.38	0.614	0.060	17.300	1.720	0.204	0.009	100	100	5	0.91	3086	240	2950	96	2859	68
	12	174	52	0.30	0.582	0.054	15.800	1.490	0.197	0.008	100	100	3	0.91	2958	220	2864	90	2799	66
	13	208	61	0.30	0.575	0.053	16.500	1.540	0.208	0.008	100	100	1	0.92	2930	216	2905	89	2887	61
	14	224	63	0.28	0.464	0.035	13.200	1.030	0.206	0.008	100	100	9	0.89	2459	156	2695	74	2877	59
	15	249	66	0.26	0.420	0.030	11.900	0.866	0.206	0.007	100	100	14	0.88	2262	135	2598	68	2871	56
	16	270	59	0.22	0.478	0.037	13.300	1.050	0.202	0.007	100	100	7	0.91	2519	161	2701	75	2840	55
	17	264	68	0.26	0.458	0.033	12.500	0.917	0.198	0.007	100	100	8	0.89	2432	145	2644	69	2811	56
	18	271	64	0.24	0.498	0.038	13.600	1.060	0.198	0.007	100	100	4	0.90	2606	164	2720	74	2807	56
	19	267	57	0.21	0.557	0.045	15.200	1.250	0.198	0.007	100	100	1	0.91	2854	185	2829	78	2812	56
	20	275	68	0.25	0.564	0.046	15.800	1.310	0.203	0.007	100	99	1	0.92	2884	189	2862	79	2847	55
	21	286	67	0.23	0.472	0.033	12.600	0.907	0.194	0.006	100	100	6	0.90	2490	145	2650	68	2774	53
	22	293	58	0.20	0.422	0.027	11.700	0.778	0.200	0.006	100	100	13	0.88	2270	124	2577	62	2829	52
	23	306	72	0.23	0.492	0.036	13.500	1.010	0.199	0.006	100	100	5	0.91	2581	155	2714	71	2815	51
	24	301	73	0.24	0.434	0.029	11.900	0.802	0.198	0.006	100	100	11	0.89	2324	129	2594	63	2813	52
	25	289	63	0.22	0.489	0.035	13.500	1.000	0.201	0.006	100	100	6	0.91	2565	154	2717	70	2831	52
	26	281	60	0.21	0.507	0.038	14.500	1.110	0.207	0.007	100	100	5	0.91	2642	163	2781	73	2883	52
	27	266	68	0.25	0.463	0.032	12.800	0.903	0.201	0.007	100	100	8	0.89	2452	140	2667	66	2835	54
	28	270	54	0.20	0.512	0.038	14.000	1.070	0.199	0.007	100	100	3	0.91	2665	163	2751	72	2814	54
	29	275	75	0.27	0.514	0.038	14.000	1.050	0.198	0.007	100	100	3	0.90	2672	161	2750	71	2808	54
	30	298	59	0.20	0.516	0.038	14.400	1.070	0.202	0.006	100	100	3	0.91	2683	161	2773	71	2840	51
	31	296	75	0.25	0.494	0.034	13.800	0.969	0.203	0.006	100	100	6	0.90	2586	147	2735	67	2847	51
	32	327	83	0.25	0.454	0.029	12.300	0.795	0.196	0.006	100	100	8	0.89	2413	128	2626	61	2795	48
	33	369	84	0.23	0.525	0.037	14.400	1.020	0.199	0.006	100	100	2	0.92	2722	155	2777	67	2817	45
	34	396	92	0.23	0.450	0.027	12.200	0.743	0.197	0.005	100	100	9	0.90	2394	119	2621	57	2801	45
	35	434	122	0.28	0.461	0.028	13.000	0.798	0.205	0.005	100	100	9	0.91	2444	122	2682	58	2866	43
	36	444	111	0.25	0.473	0.029	13.000	0.821	0.200	0.005	100	100	7	0.92	2498	128	2683	59	2826	42
	37	450	127	0.28	0.479	0.029	13.200	0.824	0.201	0.005	100	100	7	0.92	2521	128	2697	59	2832	41
	38	460	132	0.29	0.440	0.025	12.700	0.727	0.210	0.005	100	100	12	0.90	2348	110	2660	54	2906	41
	39	477	148	0.31	0.474	0.028	13.000	0.787	0.200	0.005	100	100	7	0.91	2501	123	2683	57	2824	41
NCGB13-001-6	1	489	206	0.42	0.460	0.029	12.800	0.856	0.201	0.006	97	89	9	0.88	2441	126	2662	63	2835	52
	2	451	199	0.44	0.585	0.041	15.600	1.150	0.194	0.006	98	93	4	0.91	2970	168	2855	70	2775	50
	3	424	175	0.41	0.546	0.036	15.100	1.040	0.200	0.006	99	95	0	0.91	2809	151	2820	66	2829	48
	4	393	188	0.48	0.524	0.033	13.900	0.917	0.193	0.006	99	96	1	0.90	2717	141	2746	62	2767	49

	5	431	180	0.42	0.488	0.031	12.700	0.822	0.188	0.005	99	97	4	0.90	2561	132	2656	61	2729	47
	6	408	179	0.44	0.519	0.035	14.600	0.999	0.204	0.006	99	98	3	0.91	2695	147	2790	65	2859	46
	7	364	184	0.50	0.564	0.040	15.400	1.110	0.199	0.006	99	98	1	0.91	2881	163	2842	69	2814	49
	8	339	148	0.44	0.560	0.039	15.300	1.090	0.199	0.006	99	97	1	0.90	2867	160	2836	68	2815	51
	9	347	180	0.52	0.500	0.033	14.100	0.952	0.205	0.006	99	98	5	0.89	2612	140	2758	64	2866	50
	10	338	164	0.48	0.532	0.037	14.400	1.040	0.197	0.006	99	98	1	0.90	2748	156	2777	68	2798	51
	11	347	177	0.51	0.548	0.040	15.600	1.150	0.206	0.006	100	99	1	0.91	2818	165	2850	71	2872	50
	12	324	162	0.50	0.522	0.037	14.600	1.050	0.203	0.006	100	98	3	0.90	2709	155	2792	68	2852	51
	13	311	127	0.41	0.567	0.042	15.800	1.200	0.203	0.007	100	98	1	0.91	2895	172	2867	72	2848	52
	14	287	150	0.52	0.532	0.038	15.100	1.110	0.206	0.007	99	98	3	0.90	2750	159	2824	70	2878	53
	15	286	149	0.52	0.470	0.030	12.700	0.837	0.196	0.007	100	98	7	0.87	2484	131	2657	62	2791	54
	16	311	143	0.46	0.557	0.041	15.300	1.150	0.199	0.006	100	99	1	0.91	2853	169	2832	72	2817	52
	17	289	125	0.43	0.579	0.042	16.100	1.210	0.202	0.007	99	98	2	0.90	2943	173	2882	72	2839	53
	18	312	150	0.48	0.510	0.034	14.000	0.960	0.199	0.006	100	99	3	0.89	2657	146	2748	65	2816	53
	19	331	162	0.49	0.515	0.035	14.500	1.010	0.204	0.006	100	98	4	0.89	2676	149	2780	66	2856	51
	20	304	142	0.47	0.466	0.029	13.100	0.837	0.205	0.007	100	99	9	0.87	2466	127	2690	60	2863	52
	21	313	153	0.49	0.487	0.031	13.900	0.898	0.206	0.007	100	99	7	0.88	2559	133	2740	61	2876	52
	22	330	154	0.47	0.542	0.037	14.800	1.050	0.198	0.006	99	97	0	0.90	2792	155	2804	67	2813	52
	23	314	159	0.51	0.497	0.032	13.900	0.915	0.203	0.007	100	98	5	0.88	2602	137	2745	62	2852	52
	24	325	150	0.46	0.566	0.040	16.100	1.160	0.206	0.007	100	99	0	0.90	2889	164	2880	69	2874	51
	25	288	130	0.45	0.478	0.029	13.300	0.845	0.202	0.007	100	98	7	0.87	2517	128	2701	60	2841	53
	26	318	154	0.49	0.510	0.033	13.900	0.928	0.197	0.006	100	99	3	0.89	2658	142	2741	63	2803	51
	27	277	128	0.46	0.466	0.028	12.900	0.788	0.201	0.007	100	100	8	0.85	2467	122	2675	57	2836	53
	28	312	146	0.47	0.469	0.029	12.800	0.802	0.198	0.006	100	100	7	0.88	2477	126	2664	59	2809	50
	29	307	136	0.44	0.503	0.032	14.600	0.951	0.210	0.007	100	99	6	0.88	2627	137	2789	62	2909	50
	30	304	164	0.54	0.446	0.026	12.400	0.748	0.201	0.007	100	98	10	0.85	2377	116	2632	57	2834	52
	31	284	139	0.49	0.532	0.034	15.300	1.010	0.208	0.007	99	98	3	0.88	2748	144	2833	63	2893	53
	32	291	144	0.50	0.466	0.027	13.200	0.795	0.205	0.007	100	99	9	0.86	2467	120	2692	57	2865	52
	33	313	150	0.48	0.509	0.031	13.500	0.856	0.193	0.006	100	99	2	0.87	2654	134	2717	60	2765	52
	34	324	161	0.50	0.476	0.028	12.900	0.779	0.196	0.006	100	99	6	0.87	2511	122	2673	57	2797	50
	35	346	154	0.44	0.457	0.026	12.800	0.759	0.204	0.006	100	99	9	0.87	2427	116	2668	56	2856	49
	36	333	187	0.56	0.474	0.027	13.400	0.791	0.205	0.006	100	98	8	0.87	2499	119	2709	56	2869	49
	37	344	167	0.48	0.494	0.029	13.700	0.832	0.201	0.006	100	99	5	0.88	2589	126	2730	57	2836	47
	38	332	186	0.56	0.462	0.026	13.100	0.748	0.206	0.006	100	99	9	0.87	2448	113	2689	54	2875	47
	39	333	162	0.49	0.474	0.026	13.400	0.768	0.205	0.006	100	99	8	0.86	2500	115	2710	54	2870	48
NCGB13-001-8	1	895	213	0.24	0.429	0.023	11.800	0.659	0.200	0.004	100	99	12	0.93	2299	106	2591	52	2829	34
	2	989	224	0.23	0.463	0.026	12.400	0.708	0.195	0.004	100	99	7	0.94	2455	114	2639	53	2783	32
	3	972	224	0.23	0.509	0.029	14.000	0.811	0.200	0.004	100	100	4	0.94	2654	124	2750	55	2822	31
	4	976	251	0.26	0.494	0.028	13.600	0.766	0.199	0.004	100	100	5	0.94	2589	119	2721	53	2821	32
	5	829	164	0.20	0.511	0.027	14.100	0.768	0.200	0.004	100	100	4	0.93	2661	117	2756	52	2827	34
	6	704	146	0.21	0.487	0.025	13.600	0.695	0.202	0.004	100	100	6	0.91	2558	106	2721	48	2844	36
	7	714	113	0.16	0.504	0.028	13.700	0.770	0.198	0.004	100	100	4	0.93	2631	119	2732	53	2808	35
	8	729	126	0.17	0.523	0.030	14.700	0.855	0.203	0.005	100	99	3	0.93	2711	127	2793	55	2854	36
	9	644	124	0.19	0.467	0.024	12.900	0.678	0.200	0.005	100	100	8	0.91	2471	106	2671	50	2826	37
	10	594	114	0.19	0.552	0.032	15.300	0.908	0.201	0.005	100	100	0	0.92	2832	134	2834	57	2836	37
	11	567	90	0.16	0.555	0.031	15.300	0.876	0.200	0.005	100	100	0	0.91	2845	130	2835	55	2828	38
	12	613	104	0.17	0.554	0.031	15.300	0.866	0.201	0.005	100	99	0	0.92	2841	127	2837	54	2834	38
	13	655	117	0.18	0.519	0.026	14.400	0.737	0.201	0.005	100	100	3	0.90	2694	111	2773	49	2831	36
	14	769	133	0.17	0.493	0.024	13.900	0.692	0.204	0.004	100	100	6	0.91	2583	105	2741	47	2858	33
	15	804	128	0.16	0.474	0.022	13.300	0.625	0.204	0.004	100	100	8	0.91	2499	96	2701	44	2855	32
	16	856	154	0.18	0.493	0.023	13.700	0.642	0.202	0.004	100	100	6	0.92	2583	98	2731	44	2843	31
	17	984	160	0.16	0.479	0.022	13.500	0.627	0.204	0.004	100	100	7	0.92	2524	96	2714	44	2859	29
	18	869	146	0.17	0.451	0.019	12.400	0.518	0.199	0.004	100	100	9	0.90	2401	83	2633	39	2816	30
	19	940	154	0.16	0.485	0.022	13.500	0.615	0.201	0.004	100	100	6	0.92	2549	95	2713	43	2838	29

	20	904	156	0.17	0.437	0.018	12.300	0.519	0.205	0.004	100	100	12	0.91	2337	81	2631	40	2865	29
	21	951	155	0.16	0.493	0.023	13.600	0.627	0.200	0.004	100	100	5	0.92	2582	97	2720	44	2825	30
	22	992	166	0.17	0.521	0.025	14.400	0.704	0.200	0.004	100	100	3	0.93	2703	107	2773	47	2825	29
	23	951	146	0.15	0.504	0.024	14.000	0.677	0.202	0.004	100	100	4	0.93	2632	103	2752	46	2842	30
	24	882	130	0.15	0.476	0.022	13.100	0.606	0.199	0.004	100	100	7	0.92	2511	95	2687	44	2821	30
	25	807	128	0.16	0.466	0.021	12.900	0.582	0.201	0.004	100	100	8	0.91	2468	91	2672	43	2830	31
	26	769	114	0.15	0.451	0.020	12.300	0.541	0.197	0.004	100	100	9	0.90	2401	87	2625	41	2803	32
	27	783	116	0.15	0.477	0.022	13.400	0.631	0.203	0.004	100	100	7	0.91	2514	97	2705	45	2851	32
	28	770	133	0.17	0.459	0.020	13.000	0.585	0.206	0.004	100	100	10	0.90	2435	90	2680	42	2871	33
	29	806	130	0.16	0.485	0.023	13.700	0.655	0.205	0.004	100	100	7	0.91	2547	99	2730	45	2868	32
	30	759	111	0.15	0.473	0.022	13.100	0.612	0.200	0.004	100	100	7	0.91	2497	95	2685	44	2830	32
	31	699	115	0.17	0.471	0.021	12.900	0.582	0.198	0.004	100	100	7	0.90	2487	92	2670	43	2812	33
	32	743	119	0.16	0.483	0.022	13.200	0.614	0.198	0.004	100	100	6	0.91	2540	96	2692	44	2808	33
	33	796	142	0.18	0.510	0.024	14.000	0.683	0.200	0.004	100	100	4	0.92	2656	104	2753	46	2824	32
	34	753	117	0.16	0.466	0.021	13.400	0.603	0.209	0.004	100	100	10	0.90	2465	90	2711	42	2899	32
	35	733	118	0.16	0.465	0.020	12.900	0.570	0.201	0.004	100	100	8	0.90	2463	89	2671	42	2832	32
	36	794	135	0.17	0.469	0.021	13.100	0.583	0.202	0.004	100	100	8	0.90	2478	90	2686	42	2846	32
	37	844	132	0.16	0.453	0.020	12.300	0.542	0.198	0.004	100	100	9	0.91	2408	87	2631	41	2807	31
	38	810	143	0.18	0.493	0.022	13.600	0.607	0.199	0.004	100	100	5	0.91	2584	94	2719	42	2822	31
	39	867	138	0.16	0.459	0.020	12.500	0.550	0.198	0.004	100	100	8	0.91	2436	87	2646	41	2810	30
NCGB13-001-12	1	453	73	0.16	0.442	0.030	10.300	0.864	0.169	0.008	94	76	4	0.81	2360	135	2463	78	2550	83
	2	417	62	0.15	0.544	0.041	13.900	1.140	0.185	0.008	96	86	2	0.87	2798	170	2741	78	2699	68
	3	386	55	0.14	0.526	0.038	13.900	1.070	0.192	0.008	98	91	1	0.86	2726	160	2745	73	2759	64
	4	361	60	0.17	0.511	0.037	12.900	1.020	0.183	0.008	97	89	0	0.85	2662	158	2671	75	2678	69
	5	334	65	0.19	0.571	0.046	14.700	1.250	0.187	0.008	98	91	4	0.88	2910	187	2797	81	2717	67
	6	283	67	0.24	0.503	0.037	12.800	1.040	0.185	0.008	97	88	2	0.84	2625	158	2665	77	2696	73
	7	285	68	0.24	0.537	0.042	13.900	1.170	0.187	0.008	98	92	1	0.87	2770	178	2741	80	2720	71
	8	272	68	0.25	0.541	0.043	14.900	1.270	0.199	0.009	98	91	1	0.86	2787	180	2806	81	2821	72
	9	258	65	0.25	0.539	0.044	14.400	1.290	0.194	0.009	97	90	0	0.86	2777	186	2777	85	2777	76
	10	232	81	0.35	0.552	0.047	14.600	1.340	0.192	0.009	98	91	1	0.86	2832	194	2790	87	2759	77
	11	232	62	0.27	0.617	0.057	16.200	1.570	0.190	0.009	98	93	7	0.89	3099	227	2886	93	2741	75
	12	237	72	0.31	0.546	0.047	14.400	1.320	0.192	0.009	98	93	1	0.87	2809	197	2779	87	2757	74
	13	239	58	0.24	0.543	0.046	14.500	1.320	0.194	0.009	98	93	0	0.87	2794	193	2782	86	2774	75
	14	213	72	0.34	0.507	0.040	13.200	1.120	0.189	0.009	98	93	2	0.84	2643	170	2695	80	2735	76
	15	213	71	0.34	0.513	0.041	13.900	1.170	0.196	0.009	99	94	3	0.85	2669	173	2742	80	2796	73
	16	226	72	0.32	0.484	0.037	12.500	1.010	0.186	0.008	99	94	4	0.84	2546	160	2639	76	2711	73
	17	221	67	0.30	0.488	0.037	13.000	1.040	0.193	0.009	98	93	4	0.84	2562	159	2678	76	2766	73
	18	259	85	0.33	0.496	0.038	12.800	1.030	0.187	0.008	99	94	3	0.86	2597	163	2663	76	2713	70
	19	255	67	0.26	0.526	0.040	13.800	1.120	0.191	0.008	99	95	1	0.86	2723	171	2738	77	2749	68
	20	266	93	0.35	0.528	0.041	13.700	1.130	0.189	0.008	99	95	0	0.87	2733	174	2732	78	2731	68
	21	260	88	0.34	0.506	0.038	14.100	1.100	0.202	0.008	99	97	4	0.86	2638	163	2756	74	2844	65
	22	284	89	0.31	0.528	0.041	14.400	1.150	0.197	0.008	99	98	1	0.88	2732	172	2773	76	2804	63
	23	275	86	0.31	0.521	0.040	14.000	1.110	0.194	0.008	99	96	2	0.87	2704	168	2748	75	2780	64
	24	257	102	0.40	0.490	0.035	13.100	0.978	0.194	0.008	99	97	5	0.85	2569	151	2688	70	2778	65
	25	277	91	0.33	0.494	0.036	13.700	1.020	0.201	0.008	99	97	5	0.86	2587	153	2728	71	2835	63
	26	264	85	0.32	0.472	0.032	13.200	0.936	0.204	0.008	100	99	8	0.85	2491	142	2697	67	2855	62
	27	285	113	0.40	0.535	0.040	14.400	1.110	0.195	0.007	100	98	0	0.88	2762	168	2774	73	2783	62
	28	274	98	0.36	0.458	0.031	12.500	0.896	0.199	0.008	99	96	9	0.85	2430	138	2646	67	2815	63
	29	283	87	0.31	0.535	0.040	13.800	1.080	0.186	0.007	99	96	1	0.87	2764	168	2734	74	2712	65
NCGB13-001-3@1	1	797	51	0.06	0.531	0.043	11.500	1.040	0.157	0.007	97	87	7	0.87	2744	182	2562	85	2421	77
	2	868	50	0.06	0.574	0.048	13.800	1.200	0.174	0.007	99	93	7	0.90	2925	195	2735	83	2597	63
	3	718	65	0.09	0.430	0.027	10.400	0.691	0.175	0.007	99	95	7	0.84	2306	121	2469	62	2605	62
	4	769	78	0.10	0.442	0.029	11.200	0.784	0.183	0.006	99	95	7	0.88	2358	131	2536	65	2682	56
	5	651	74	0.11	0.467	0.030	11.500	0.770	0.179	0.006	99	96	4	0.87	2470	130	2568	62	2647	55

	6	757	73	0.10	0.540	0.040	13.700	1.040	0.184	0.006	100	98	2	0.92	2784	167	2727	72	2685	50
	7	780	86	0.11	0.499	0.033	13.500	0.926	0.197	0.006	100	98	4	0.90	2610	143	2718	65	2799	49
	8	729	101	0.14	0.469	0.029	12.000	0.784	0.186	0.006	99	97	5	0.89	2478	129	2608	61	2711	50
	9	686	86	0.13	0.424	0.024	11.100	0.659	0.191	0.006	100	99	11	0.87	2276	110	2535	55	2748	48
	10	795	113	0.14	0.596	0.045	15.700	1.200	0.191	0.005	100	99	5	0.93	3012	182	2858	73	2752	46
	11	729	92	0.13	0.496	0.032	13.300	0.874	0.195	0.006	100	98	4	0.90	2596	137	2702	62	2782	47
	12	648	117	0.18	0.459	0.028	12.500	0.775	0.197	0.006	100	99	8	0.89	2437	123	2641	58	2802	46
	13	665	100	0.15	0.511	0.033	13.300	0.896	0.189	0.005	100	98	2	0.91	2660	143	2703	63	2736	46
	14	619	109	0.18	0.449	0.026	12.300	0.742	0.199	0.006	100	98	9	0.89	2392	117	2628	57	2816	46
	15	617	111	0.18	0.475	0.029	12.800	0.803	0.196	0.005	100	99	6	0.90	2503	127	2667	59	2794	45
	16	677	117	0.17	0.560	0.040	15.900	1.140	0.206	0.005	100	100	0	0.93	2864	163	2869	68	2872	43
	17	637	130	0.20	0.441	0.025	12.300	0.710	0.203	0.006	100	100	11	0.88	2354	111	2628	54	2847	45
	18	654	129	0.20	0.433	0.025	11.900	0.700	0.199	0.006	100	99	11	0.89	2317	112	2594	55	2817	45
	19	593	116	0.20	0.510	0.033	14.400	0.943	0.205	0.006	100	99	4	0.91	2656	140	2777	62	2867	45
	20	591	143	0.24	0.468	0.029	13.300	0.830	0.206	0.006	100	99	9	0.90	2473	125	2701	59	2877	45
	21	547	121	0.22	0.419	0.023	12.200	0.695	0.211	0.006	100	100	15	0.88	2255	106	2617	54	2910	45
	22	583	115	0.20	0.456	0.028	12.900	0.800	0.206	0.006	100	100	10	0.90	2421	122	2675	58	2873	44
	23	556	126	0.23	0.507	0.032	14.100	0.921	0.202	0.006	100	99	4	0.91	2644	139	2756	62	2839	46
	24	508	113	0.22	0.425	0.024	12.100	0.706	0.207	0.006	100	99	14	0.88	2283	109	2614	55	2882	46
	25	501	127	0.25	0.435	0.025	13.000	0.769	0.217	0.006	100	99	14	0.88	2330	113	2681	56	2957	46
	26	555	127	0.23	0.487	0.031	14.000	0.920	0.209	0.006	100	100	7	0.91	2557	136	2752	62	2899	45
	27	519	134	0.26	0.520	0.034	15.300	1.020	0.213	0.006	100	100	5	0.91	2698	144	2832	63	2929	46
	28	517	128	0.25	0.478	0.030	14.400	0.906	0.218	0.006	100	100	10	0.89	2516	129	2774	60	2968	47
	29	506	108	0.21	0.436	0.026	12.800	0.769	0.212	0.006	100	100	13	0.88	2332	115	2662	57	2923	47
	30	454	126	0.28	0.437	0.026	13.300	0.796	0.221	0.007	100	100	14	0.88	2337	115	2701	57	2986	47
	31	473	99	0.21	0.469	0.029	14.200	0.904	0.220	0.006	100	100	11	0.89	2478	128	2764	60	2981	47
	32	456	129	0.28	0.427	0.025	12.400	0.736	0.211	0.006	100	99	14	0.87	2293	111	2637	56	2912	48
	33	422	118	0.28	0.411	0.023	12.300	0.703	0.217	0.007	100	100	17	0.85	2218	105	2627	54	2959	49
	34	442	113	0.26	0.424	0.025	12.600	0.747	0.215	0.006	100	100	15	0.87	2280	111	2648	56	2942	48
	35	427	89	0.21	0.418	0.024	13.000	0.765	0.225	0.007	100	100	17	0.87	2253	110	2676	56	3014	48
	36	410	111	0.27	0.459	0.028	13.800	0.863	0.218	0.007	100	100	12	0.88	2433	124	2735	59	2967	49
	37	406	111	0.27	0.434	0.026	13.200	0.802	0.220	0.007	100	100	15	0.87	2323	116	2692	57	2983	50
	38	417	108	0.26	0.537	0.037	16.400	1.150	0.221	0.007	100	100	5	0.90	2771	155	2900	67	2991	50
	39	394	117	0.30	0.418	0.024	12.400	0.732	0.215	0.007	100	100	16	0.86	2252	109	2637	55	2947	51
	40	382	129	0.34	0.440	0.026	13.300	0.816	0.219	0.007	100	100	14	0.86	2352	118	2700	58	2972	51
	41	381	109	0.29	0.441	0.027	13.500	0.850	0.223	0.007	100	100	14	0.87	2354	121	2718	59	3002	51
	42	368	120	0.33	0.441	0.027	13.200	0.830	0.217	0.007	100	100	13	0.87	2357	121	2696	59	2961	52
	43	359	120	0.33	0.430	0.026	12.900	0.801	0.218	0.007	100	100	15	0.86	2306	117	2675	58	2968	52
	44	344	109	0.32	0.414	0.025	12.500	0.765	0.219	0.007	100	100	17	0.85	2234	113	2642	58	2971	53
	45	338	103	0.30	0.404	0.024	12.600	0.754	0.225	0.008	100	100	19	0.84	2189	109	2647	57	3018	53
	46	319	102	0.32	0.409	0.024	12.200	0.734	0.216	0.007	100	100	17	0.84	2210	110	2617	57	2949	54
	47	315	95	0.30	0.500	0.033	15.400	1.040	0.223	0.008	100	100	8	0.87	2612	142	2839	64	3005	55
	48	339	113	0.33	0.426	0.026	12.700	0.787	0.216	0.007	100	100	15	0.85	2289	117	2657	58	2951	54
	49	342	110	0.32	0.438	0.027	13.500	0.854	0.224	0.008	100	100	15	0.86	2340	121	2715	60	3007	54
Cordierite schist (East eyap; NAD 83, Zone 15, 657715E, 5868570N)																				
East-Eyap-15	1	1636	128	0.06	0.435	0.016	13.240	0.504	0.221	0.002	100	100	15	0.97	2327	74	2697	36	2987	16
	2	1187	129	0.09	0.514	0.022	15.390	0.657	0.217	0.002	100	100	6	0.97	2675	93	2840	41	2959	18
	3	898	106	0.10	0.510	0.023	15.180	0.682	0.216	0.003	100	99	6	0.96	2656	97	2827	43	2951	21
	4	766	101	0.11	0.511	0.025	15.400	0.751	0.219	0.003	100	100	7	0.96	2661	106	2840	47	2970	22
	5	687	106	0.13	0.472	0.022	14.040	0.664	0.216	0.003	100	100	10	0.95	2490	97	2752	45	2951	24
	6	637	93	0.12	0.483	0.024	14.540	0.722	0.219	0.003	100	100	9	0.95	2539	104	2785	47	2969	24
	7	561	78	0.11	0.478	0.024	14.410	0.715	0.219	0.003	100	100	10	0.95	2519	103	2777	47	2970	26
	8	539	80	0.12	0.485	0.025	14.420	0.745	0.216	0.004	100	100	9	0.95	2547	108	2778	49	2950	26
	9	493	76	0.13	0.462	0.023	13.920	0.706	0.219	0.004	100	100	11	0.95	2448	102	2744	48	2970	27

	10	479	73	0.12	0.455	0.023	13.490	0.688	0.215	0.004	100	100	12	0.94	2419	102	2715	48	2943	28
	11	455	68	0.12	0.482	0.026	14.480	0.781	0.218	0.004	100	100	9	0.95	2538	112	2782	51	2964	28
	12	429	65	0.12	0.474	0.026	14.510	0.793	0.222	0.004	100	100	11	0.95	2503	113	2783	52	2994	29
	13	409	60	0.12	0.517	0.030	15.520	0.917	0.218	0.004	100	100	6	0.95	2686	129	2848	56	2964	30
	14	388	61	0.13	0.488	0.028	14.660	0.837	0.218	0.004	100	100	9	0.94	2564	120	2793	54	2964	31
	15	371	63	0.14	0.472	0.026	14.210	0.800	0.218	0.004	100	100	10	0.94	2494	115	2764	53	2968	31
	16	351	60	0.14	0.505	0.030	15.070	0.893	0.216	0.004	100	100	7	0.94	2636	127	2820	56	2954	32
	17	341	62	0.15	0.521	0.032	15.670	0.970	0.218	0.004	100	100	6	0.95	2702	136	2857	59	2968	32
	18	327	53	0.13	0.499	0.030	15.310	0.927	0.223	0.005	100	100	8	0.94	2610	129	2835	58	2999	33
	19	332	56	0.14	0.524	0.033	15.580	0.987	0.216	0.004	100	100	5	0.95	2717	139	2851	61	2947	33
	20	321	59	0.15	0.458	0.026	13.710	0.772	0.217	0.005	100	100	12	0.93	2429	113	2730	53	2961	34
	21	341	73	0.17	0.582	0.040	17.540	1.216	0.219	0.004	100	100	0	0.96	2956	163	2965	67	2970	33
	22	317	58	0.15	0.510	0.032	15.220	0.949	0.217	0.004	100	100	6	0.95	2656	135	2829	59	2955	33
	23	295	62	0.17	0.441	0.024	13.380	0.735	0.220	0.005	100	100	14	0.93	2354	107	2707	52	2982	34
	24	305	63	0.17	0.512	0.032	15.220	0.943	0.216	0.005	100	100	6	0.94	2664	134	2829	59	2949	34
	25	281	56	0.16	0.427	0.023	12.820	0.691	0.218	0.005	100	100	15	0.92	2291	103	2667	51	2965	35
	26	289	65	0.18	0.449	0.025	13.350	0.750	0.216	0.005	100	100	12	0.93	2389	111	2705	53	2950	34
	27	286	59	0.17	0.519	0.032	15.660	0.977	0.219	0.005	100	100	6	0.94	2696	136	2856	60	2972	34
East-Eyap-6	1	494	107	0.18	0.611	0.034	16.900	0.940	0.201	0.003	100	99	5	0.96	3073	135	2929	53	2832	27
	2	436	102	0.19	0.723	0.049	20.550	1.386	0.206	0.004	100	100	12	0.97	3508	182	3118	65	2875	28
	3	343	113	0.27	0.650	0.041	18.960	1.195	0.212	0.004	100	100	6	0.96	3226	159	3040	61	2919	30
	4	293	117	0.32	0.725	0.051	21.410	1.521	0.214	0.004	100	100	11	0.96	3514	192	3158	69	2938	32
	5	258	144	0.45	0.682	0.047	20.220	1.398	0.215	0.004	100	100	8	0.96	3352	180	3102	67	2943	34
	6	251	152	0.49	0.672	0.046	19.860	1.360	0.215	0.004	100	100	7	0.95	3312	176	3085	66	2940	34
	7	267	171	0.52	0.695	0.050	21.490	1.559	0.224	0.005	100	100	7	0.96	3403	191	3161	70	3011	33
	8	257	170	0.54	0.685	0.048	20.720	1.458	0.219	0.005	100	100	7	0.96	3363	184	3125	68	2976	33
	9	249	173	0.57	0.760	0.058	22.850	1.757	0.218	0.005	100	100	12	0.96	3645	213	3221	75	2966	34
	10	226	180	0.65	0.597	0.038	18.530	1.173	0.225	0.005	100	100	0	0.94	3016	152	3018	61	3019	35
	11	237	175	0.60	0.701	0.051	21.010	1.546	0.217	0.005	100	100	9	0.96	3423	194	3139	71	2962	35
	12	231	176	0.62	0.617	0.041	18.630	1.239	0.219	0.005	100	100	2	0.95	3099	163	3023	64	2973	35
	13	222	178	0.65	0.583	0.037	17.530	1.124	0.218	0.005	100	100	0	0.94	2960	151	2964	62	2967	36
	14	212	154	0.59	0.604	0.040	18.530	1.236	0.222	0.005	100	100	1	0.94	3047	161	3018	64	2998	36
	15	215	138	0.52	0.635	0.045	19.350	1.374	0.221	0.005	100	100	4	0.95	3170	177	3060	69	2988	36
	16	200	147	0.60	0.577	0.037	17.100	1.112	0.215	0.005	100	100	0	0.94	2937	152	2941	62	2943	37
	17	192	138	0.59	0.552	0.035	16.460	1.040	0.216	0.005	100	100	3	0.93	2831	144	2904	61	2954	37
	18	190	143	0.61	0.621	0.043	18.770	1.316	0.219	0.005	100	100	3	0.95	3114	172	3030	68	2975	37
	19	184	131	0.58	0.574	0.037	17.320	1.138	0.219	0.005	100	100	1	0.94	2925	153	2952	63	2971	38
East-Eyap-17	1	1217	141	0.09	0.384	0.013	9.801	0.340	0.185	0.002	100	100	14	0.95	2094	61	2416	32	2701	18
	2	778	147	0.15	0.459	0.019	12.380	0.507	0.196	0.002	100	100	8	0.95	2436	82	2634	39	2790	21
	3	531	155	0.24	0.486	0.022	13.830	0.624	0.206	0.003	100	100	7	0.95	2555	95	2738	43	2877	24
	4	422	147	0.28	0.567	0.031	16.530	0.908	0.212	0.003	100	100	0	0.96	2895	127	2908	53	2917	26
	5	345	133	0.31	0.502	0.026	14.870	0.779	0.215	0.004	100	100	7	0.94	2624	112	2807	50	2941	29
	6	329	130	0.32	0.498	0.027	14.930	0.812	0.217	0.004	100	100	8	0.94	2607	116	2811	52	2960	30
	7	329	143	0.35	0.497	0.027	14.840	0.822	0.217	0.004	100	100	8	0.94	2601	118	2805	53	2956	30
	8	319	137	0.35	0.548	0.034	16.550	1.023	0.219	0.004	100	100	3	0.95	2817	140	2909	59	2973	31
	9	292	139	0.39	0.520	0.031	15.620	0.934	0.218	0.004	100	100	6	0.95	2701	131	2854	57	2963	32
	10	275	138	0.41	0.462	0.026	14.310	0.809	0.225	0.005	100	100	12	0.94	2450	114	2771	54	3014	33
	11	252	131	0.42	0.507	0.031	15.160	0.931	0.217	0.005	100	100	7	0.94	2645	132	2825	59	2957	34
	12	225	120	0.43	0.499	0.031	14.640	0.920	0.213	0.005	100	100	7	0.94	2609	134	2792	60	2927	36
	13	207	103	0.41	0.472	0.029	14.070	0.879	0.216	0.005	100	100	10	0.93	2493	128	2754	59	2952	37
	14	195	106	0.44	0.481	0.031	14.390	0.947	0.217	0.005	100	100	9	0.93	2531	137	2776	63	2959	39
	15	178	92	0.42	0.498	0.035	15.120	1.067	0.220	0.006	100	100	8	0.94	2607	150	2823	67	2982	40
	16	156	80	0.42	0.566	0.044	17.120	1.333	0.219	0.006	100	100	2	0.94	2893	180	2942	75	2975	43
	17	151	80	0.43	0.476	0.033	14.520	1.015	0.221	0.006	100	100	10	0.93	2511	144	2784	66	2989	43

	18	164	94	0.47	0.497	0.035	14.540	1.042	0.212	0.006	100	100	7	0.93	2601	152	2786	68	2923	43
	19	178	108	0.49	0.482	0.033	14.360	0.997	0.216	0.005	100	100	9	0.93	2535	144	2774	66	2953	40
	20	176	128	0.59	0.506	0.035	15.340	1.069	0.220	0.005	100	100	7	0.94	2638	150	2837	66	2981	40
	21	179	129	0.59	0.459	0.029	13.770	0.879	0.218	0.005	100	100	12	0.93	2435	128	2734	60	2963	40
	22	184	146	0.65	0.458	0.028	13.620	0.848	0.216	0.005	100	100	11	0.92	2428	125	2724	59	2951	39
	23	187	150	0.65	0.474	0.030	14.140	0.902	0.216	0.005	100	100	10	0.93	2503	131	2759	61	2953	38
	24	187	147	0.64	0.458	0.028	14.080	0.861	0.223	0.005	100	100	13	0.92	2429	123	2755	58	3004	38
	25	193	163	0.69	0.434	0.026	13.180	0.782	0.220	0.005	100	100	15	0.92	2324	115	2692	56	2982	38
	26	196	156	0.65	0.542	0.038	16.470	1.154	0.220	0.005	100	100	4	0.95	2791	158	2904	67	2984	37
	27	172	158	0.75	0.421	0.023	12.630	0.709	0.218	0.005	100	100	16	0.91	2265	106	2653	53	2963	39
	28	189	164	0.71	0.456	0.027	13.880	0.838	0.221	0.005	100	100	12	0.92	2420	121	2742	57	2988	38
	29	181	173	0.78	0.451	0.027	13.600	0.810	0.219	0.005	100	100	13	0.92	2402	118	2723	56	2970	39
East-Eyap-18	1	1626	112	0.06	0.422	0.016	11.910	0.457	0.205	0.002	100	100	13	0.97	2270	73	2597	36	2864	16
	2	1176	67	0.05	0.483	0.019	13.860	0.547	0.208	0.002	100	100	8	0.96	2541	83	2740	37	2891	17
	3	1057	48	0.04	0.485	0.019	14.330	0.579	0.214	0.002	100	100	8	0.96	2551	85	2772	38	2937	18
	4	984	43	0.04	0.489	0.020	14.590	0.586	0.216	0.002	100	100	8	0.96	2568	85	2789	38	2952	18
	5	941	40	0.03	0.511	0.021	15.340	0.633	0.218	0.002	100	100	6	0.96	2661	90	2836	39	2963	18
	6	931	27	0.02	0.583	0.027	17.470	0.809	0.217	0.002	100	100	0	0.97	2962	110	2961	45	2960	18
	7	880	30	0.03	0.562	0.024	16.940	0.739	0.219	0.003	100	100	2	0.97	2873	101	2931	42	2972	19
	8	877	25	0.02	0.620	0.028	18.700	0.861	0.219	0.003	100	100	3	0.97	3109	113	3027	44	2972	19
	9	1016	45	0.04	0.496	0.019	15.020	0.575	0.220	0.002	100	100	8	0.96	2594	81	2817	36	2980	17
	10	1139	83	0.06	0.504	0.019	15.460	0.593	0.222	0.002	100	100	8	0.96	2632	83	2844	37	2998	17
	11	1063	82	0.06	0.527	0.020	15.840	0.610	0.218	0.002	100	100	5	0.96	2731	85	2867	37	2965	17
	12	1044	122	0.09	0.563	0.024	16.950	0.714	0.218	0.002	100	100	2	0.97	2880	98	2932	40	2968	17
	13	973	136	0.11	0.479	0.018	14.770	0.563	0.224	0.002	100	100	10	0.96	2521	79	2800	36	3008	18
	14	759	150	0.16	0.575	0.025	17.210	0.754	0.217	0.003	100	100	1	0.96	2927	103	2947	42	2960	20
	15	569	135	0.19	0.557	0.024	16.710	0.727	0.218	0.003	100	100	2	0.95	2855	100	2918	42	2962	22
	16	496	148	0.24	0.528	0.023	15.920	0.697	0.219	0.003	100	100	5	0.94	2732	97	2872	42	2971	24
	17	446	159	0.29	0.503	0.021	14.910	0.637	0.215	0.003	100	100	7	0.93	2626	92	2809	41	2944	25
	18	429	168	0.32	0.533	0.024	16.120	0.740	0.219	0.003	100	100	5	0.94	2755	102	2884	44	2975	26
	19	400	171	0.35	0.474	0.020	14.050	0.591	0.215	0.004	100	100	10	0.92	2500	87	2753	40	2944	26
East-Eyap-16	1	292	19	0.05	0.651	0.049	20.550	1.562	0.229	0.005	100	99	4	0.96	3232	192	3117	74	3045	34
	2	265	16	0.05	0.562	0.037	17.700	1.178	0.229	0.005	100	99	3	0.95	2874	153	2974	64	3042	35
	3	269	27	0.08	0.545	0.034	17.190	1.097	0.229	0.005	100	99	5	0.94	2802	144	2945	61	3045	34
	4	278	30	0.09	0.601	0.040	19.510	1.319	0.236	0.005	100	100	1	0.95	3034	163	3067	65	3090	33
	5	296	34	0.09	0.573	0.036	18.710	1.194	0.237	0.005	100	100	4	0.95	2921	149	3027	62	3098	32
	6	313	48	0.13	0.543	0.032	17.630	1.040	0.235	0.005	100	100	6	0.95	2796	133	2970	57	3089	31
	7	338	54	0.13	0.541	0.030	17.380	0.983	0.233	0.004	100	100	6	0.95	2789	127	2956	54	3072	30
	8	371	74	0.16	0.551	0.031	17.740	0.992	0.234	0.004	100	100	5	0.95	2828	127	2976	54	3077	29
	9	395	80	0.17	0.549	0.030	18.100	0.983	0.239	0.004	100	100	6	0.95	2819	123	2995	52	3115	28
East-Eyap-9	1	2969	76	0.02	0.401	0.011	10.360	0.293	0.187	0.001	100	100	13	0.97	2173	52	2467	26	2720	11
	2	2127	100	0.04	0.502	0.016	13.530	0.439	0.196	0.001	100	100	4	0.97	2623	70	2718	31	2789	13
	3	1471	81	0.05	0.506	0.016	14.240	0.447	0.204	0.002	100	100	5	0.96	2637	68	2766	30	2861	14
	4	1169	96	0.07	0.580	0.021	16.900	0.622	0.211	0.002	100	100	1	0.97	2947	87	2929	35	2916	16
	5	948	75	0.06	0.579	0.022	17.340	0.656	0.217	0.002	100	100	0	0.96	2945	89	2954	36	2960	17
	6	918	51	0.05	0.572	0.022	17.350	0.678	0.220	0.002	100	100	1	0.96	2915	91	2955	38	2981	17
	7	900	55	0.05	0.537	0.020	16.530	0.615	0.223	0.002	100	100	5	0.96	2772	83	2908	36	3003	18
	8	871	45	0.04	0.558	0.021	17.170	0.661	0.223	0.002	100	100	3	0.96	2858	88	2945	37	3004	18
	9	801	49	0.05	0.530	0.019	16.440	0.604	0.225	0.003	100	100	6	0.95	2743	82	2903	35	3015	18
	10	751	48	0.05	0.537	0.020	16.750	0.632	0.226	0.003	100	100	5	0.95	2772	85	2921	36	3025	19
	11	727	42	0.05	0.532	0.020	16.620	0.633	0.227	0.003	100	100	6	0.95	2748	85	2913	37	3029	19
	12	726	48	0.05	0.557	0.022	17.190	0.684	0.224	0.003	100	100	3	0.95	2855	91	2945	38	3008	19
	13	705	42	0.05	0.546	0.021	16.940	0.667	0.225	0.003	100	100	4	0.95	2807	89	2931	38	3018	20
	14	706	40	0.05	0.570	0.023	17.850	0.730	0.227	0.003	100	100	2	0.96	2909	95	2982	39	3031	20

	15	704	43	0.05	0.547	0.021	16.990	0.669	0.226	0.003	100	100	4	0.95	2811	89	2934	38	3020	20
	16	706	41	0.05	0.562	0.023	17.620	0.716	0.227	0.003	100	100	3	0.96	2876	94	2969	39	3033	19
	17	679	40	0.05	0.541	0.021	16.810	0.652	0.225	0.003	100	100	5	0.95	2787	87	2924	37	3020	20
	18	691	38	0.04	0.532	0.020	16.640	0.633	0.227	0.003	100	100	6	0.95	2749	85	2914	36	3031	19
	19	671	40	0.05	0.500	0.018	15.560	0.554	0.226	0.003	100	100	9	0.94	2613	76	2850	34	3022	20
East-Eyap-4	1	1297	229	0.14	0.466	0.016	12.620	0.448	0.197	0.002	100	99	7	0.96	2465	72	2652	33	2797	16
	2	996	231	0.19	0.448	0.015	12.270	0.421	0.199	0.002	100	99	10	0.95	2385	68	2625	32	2816	18
	3	606	213	0.29	0.537	0.022	15.030	0.622	0.203	0.003	100	100	2	0.95	2772	93	2817	39	2850	22
	4	292	138	0.39	0.913	0.066	25.490	1.844	0.203	0.004	100	99	23	0.97	4181	222	3327	71	2847	31
	5	177	118	0.54	0.619	0.043	17.650	1.223	0.207	0.005	100	100	4	0.94	3106	169	2971	67	2881	39
	6	142	98	0.56	0.665	0.057	19.230	1.650	0.210	0.006	100	100	7	0.95	3287	220	3054	83	2904	44
	7	136	93	0.56	0.587	0.049	17.110	1.449	0.211	0.006	100	100	1	0.95	2977	201	2941	81	2916	45
	8	123	78	0.52	0.504	0.039	14.800	1.149	0.213	0.006	100	100	6	0.93	2631	166	2802	74	2928	48
	9	100	68	0.55	0.559	0.047	16.590	1.393	0.215	0.007	100	100	2	0.93	2862	193	2912	80	2946	51
	10	103	65	0.51	0.571	0.049	16.950	1.477	0.215	0.007	100	100	1	0.94	2913	203	2932	84	2945	50
	11	109	76	0.57	0.559	0.046	16.830	1.409	0.219	0.007	100	100	2	0.94	2861	192	2925	80	2970	49
	12	127	96	0.61	0.550	0.044	16.080	1.298	0.212	0.006	100	99	2	0.94	2826	183	2882	77	2921	47
	13	126	109	0.70	0.523	0.038	15.810	1.170	0.219	0.006	100	99	6	0.93	2711	162	2866	71	2976	45
	14	130	103	0.64	0.491	0.034	14.810	1.042	0.219	0.006	100	100	8	0.92	2575	148	2803	67	2972	45
	15	135	109	0.66	0.525	0.039	15.910	1.201	0.220	0.006	100	100	5	0.93	2722	166	2871	72	2978	45
	16	120	101	0.68	0.520	0.038	15.370	1.148	0.215	0.006	100	99	5	0.92	2697	163	2838	71	2940	47
	17	116	91	0.64	0.493	0.036	15.140	1.128	0.223	0.006	100	100	9	0.92	2582	157	2824	71	3002	47
	18	102	84	0.67	0.522	0.042	15.860	1.278	0.220	0.007	100	100	6	0.93	2709	177	2868	77	2983	50
	19	83	61	0.60	0.569	0.049	17.250	1.510	0.220	0.007	100	100	2	0.92	2902	203	2949	84	2980	55
East-Eyap-5	1	1868	183	0.08	0.395	0.013	10.400	0.335	0.191	0.002	100	100	14	0.97	2144	58	2471	30	2752	14
	2	2059	206	0.08	0.392	0.013	10.220	0.331	0.189	0.002	100	100	14	0.97	2130	58	2455	30	2735	13
	3	2186	214	0.08	0.376	0.011	9.606	0.291	0.185	0.001	100	100	15	0.97	2058	53	2398	28	2700	13
	4	2381	226	0.08	0.383	0.011	9.679	0.291	0.183	0.001	100	100	14	0.97	2091	53	2405	28	2683	12
	5	2585	224	0.07	0.388	0.012	9.794	0.296	0.183	0.001	100	100	13	0.97	2111	54	2416	28	2683	12
	6	2739	239	0.07	0.367	0.011	9.040	0.277	0.179	0.001	100	100	15	0.97	2014	53	2342	28	2642	12
	7	2775	249	0.07	0.373	0.011	9.329	0.279	0.182	0.001	100	100	15	0.97	2043	52	2371	27	2667	12
	8	2704	229	0.07	0.420	0.012	10.420	0.312	0.180	0.001	100	100	9	0.97	2258	57	2473	28	2655	11
	9	2713	231	0.07	0.411	0.013	10.480	0.327	0.185	0.001	100	100	11	0.98	2219	58	2478	29	2698	11
	10	2550	232	0.07	0.417	0.013	10.760	0.340	0.187	0.001	100	100	11	0.98	2248	60	2503	29	2717	12
	11	2600	246	0.08	0.387	0.011	10.210	0.297	0.191	0.001	100	100	15	0.97	2111	52	2454	27	2751	11
	12	2709	272	0.08	0.404	0.012	10.580	0.322	0.190	0.001	100	100	13	0.98	2187	56	2487	28	2742	11
	13	2656	268	0.08	0.390	0.011	10.260	0.292	0.191	0.001	100	100	15	0.97	2123	51	2459	26	2749	11
	14	2717	277	0.08	0.411	0.012	10.800	0.314	0.191	0.001	100	100	12	0.97	2219	54	2506	27	2748	11
	15	2693	244	0.07	0.408	0.011	10.640	0.293	0.189	0.001	100	100	12	0.97	2208	51	2493	26	2733	11
	16	2758	260	0.08	0.401	0.011	10.400	0.276	0.188	0.001	100	100	13	0.97	2175	49	2471	25	2724	11
	17	2861	271	0.08	0.412	0.011	10.650	0.282	0.188	0.001	100	100	11	0.97	2222	50	2493	25	2722	11
	18	2949	283	0.08	0.389	0.010	9.984	0.248	0.186	0.001	100	100	14	0.97	2117	45	2433	23	2709	10
	19	3122	274	0.07	0.421	0.011	10.740	0.282	0.185	0.001	100	100	10	0.97	2265	50	2501	24	2699	10
	20	3238	331	0.08	0.376	0.009	9.812	0.236	0.189	0.001	100	100	16	0.97	2058	42	2417	22	2735	10
	21	3248	610	0.15	0.404	0.010	11.020	0.274	0.198	0.001	100	100	14	0.97	2189	46	2525	23	2807	10
	22	3228	1127	0.28	0.374	0.009	9.886	0.227	0.192	0.001	100	100	17	0.97	2046	40	2424	21	2759	10
	23	3194	1460	0.37	0.381	0.008	10.930	0.243	0.208	0.001	100	100	19	0.97	2081	39	2518	21	2892	10
	24	3249	1765	0.44	0.346	0.007	9.373	0.201	0.197	0.001	100	100	21	0.96	1916	35	2375	20	2797	10
	25	3152	1940	0.50	0.331	0.007	8.803	0.179	0.193	0.001	100	100	23	0.96	1841	32	2318	19	2769	10
	26	3131	1754	0.46	0.333	0.007	8.672	0.185	0.189	0.001	100	100	22	0.96	1852	34	2304	19	2733	10
	27	2855	1193	0.34	0.358	0.008	9.304	0.204	0.188	0.001	100	100	18	0.96	1975	37	2368	20	2727	10
	28	2690	1097	0.33	0.356	0.008	9.463	0.201	0.193	0.001	100	100	19	0.96	1963	36	2384	20	2766	10
	29	2798	965	0.28	0.362	0.008	9.303	0.202	0.187	0.001	100	100	17	0.96	1990	37	2368	20	2712	10
	30	2887	892	0.25	0.363	0.008	9.265	0.201	0.185	0.001	100	100	17	0.96	1997	37	2365	20	2698	10

	31	3046	971	0.26	0.375	0.008	9.898	0.203	0.191	0.001	100	100	17	0.96	2053	36	2425	19	2754	10
	32	2884	883	0.25	0.449	0.009	12.160	0.251	0.196	0.001	100	100	9	0.96	2391	41	2617	19	2796	10
	33	2820	843	0.24	0.396	0.008	10.560	0.222	0.193	0.001	100	100	14	0.96	2150	38	2485	20	2771	10
	34	2762	813	0.24	0.365	0.007	9.760	0.201	0.194	0.001	100	100	18	0.96	2004	35	2412	19	2778	10
	35	2725	867	0.26	0.347	0.007	8.694	0.179	0.182	0.001	100	100	18	0.95	1921	34	2306	19	2668	10
	36	2801	901	0.26	0.360	0.008	9.514	0.214	0.192	0.001	100	100	19	0.96	1980	38	2389	21	2758	10
	37	2440	828	0.28	0.389	0.009	9.826	0.235	0.183	0.001	100	100	13	0.96	2116	43	2419	22	2684	11
	38	1900	655	0.28	0.389	0.009	10.230	0.236	0.191	0.001	100	100	15	0.95	2119	41	2456	21	2747	12
	39	1411	434	0.25	0.406	0.009	10.800	0.246	0.193	0.002	100	100	13	0.93	2195	42	2506	21	2768	14
	40	1129	272	0.20	0.385	0.008	10.380	0.231	0.196	0.002	100	100	16	0.91	2100	39	2469	21	2789	15
	41	1004	193	0.16	0.374	0.008	10.020	0.225	0.194	0.002	100	100	17	0.91	2050	39	2436	21	2776	16
	42	909	191	0.17	0.385	0.009	10.540	0.244	0.199	0.002	100	100	17	0.90	2097	41	2483	22	2817	17
	43	832	191	0.19	0.366	0.008	10.430	0.236	0.207	0.002	100	100	21	0.89	2010	39	2473	21	2880	17
	44	805	189	0.19	0.360	0.008	9.611	0.218	0.194	0.002	100	100	19	0.88	1981	38	2398	21	2774	18
	45	750	165	0.18	0.354	0.008	9.625	0.223	0.198	0.002	100	100	21	0.88	1951	39	2400	21	2805	19
	46	713	155	0.18	0.354	0.008	9.739	0.231	0.199	0.002	100	100	21	0.88	1955	40	2410	22	2821	19
	47	667	130	0.16	0.355	0.008	9.685	0.232	0.198	0.002	100	100	20	0.87	1959	40	2405	22	2809	20
	48	631	120	0.15	0.351	0.008	9.582	0.231	0.198	0.002	100	100	21	0.87	1937	40	2395	22	2812	20
	49	597	114	0.16	0.352	0.008	9.468	0.230	0.195	0.002	100	100	20	0.86	1944	40	2384	22	2785	21
East-Eyap-18@1	1	2962	74	0.02	0.270	0.008	6.136	0.173	0.165	0.001	100	99	26	0.96	1538	38	1995	25	2509	13
	2	2393	86	0.03	0.329	0.010	7.302	0.231	0.161	0.001	100	99	16	0.97	1831	50	2149	28	2469	14
	3	1957	119	0.05	0.349	0.011	7.929	0.260	0.165	0.001	100	99	14	0.96	1930	54	2223	30	2505	15
	4	1584	105	0.05	0.400	0.014	9.802	0.335	0.178	0.002	100	99	11	0.96	2170	63	2416	32	2631	16
	5	1273	127	0.08	0.378	0.013	9.328	0.326	0.179	0.002	100	99	14	0.96	2066	61	2371	32	2645	17
	6	934	104	0.09	0.428	0.015	10.890	0.397	0.185	0.002	100	99	9	0.95	2296	70	2514	34	2695	19
	7	759	91	0.10	0.440	0.018	11.500	0.469	0.190	0.002	100	100	9	0.95	2349	80	2565	38	2740	21
	8	632	83	0.11	0.463	0.020	12.380	0.543	0.194	0.003	100	100	7	0.95	2454	89	2634	41	2775	23
	9	521	74	0.12	0.474	0.021	12.840	0.585	0.197	0.003	100	100	7	0.95	2500	94	2668	43	2798	24
	10	446	78	0.14	0.432	0.019	12.070	0.535	0.203	0.003	100	100	12	0.94	2314	85	2610	42	2849	26
	11	417	81	0.16	0.425	0.019	11.970	0.535	0.204	0.003	100	100	13	0.93	2282	85	2602	42	2861	27
	12	390	80	0.17	0.403	0.017	11.120	0.486	0.200	0.003	100	100	15	0.92	2184	80	2533	41	2826	28
	13	361	90	0.20	0.417	0.019	11.830	0.539	0.206	0.004	100	100	14	0.92	2247	86	2591	43	2873	29
	14	358	84	0.19	0.494	0.025	14.100	0.726	0.207	0.004	100	100	6	0.94	2590	109	2757	49	2882	29
	15	312	84	0.22	0.425	0.020	12.380	0.578	0.211	0.004	100	100	14	0.92	2285	89	2634	44	2914	30
	16	293	80	0.22	0.406	0.019	11.870	0.557	0.212	0.004	100	100	17	0.92	2197	86	2595	44	2921	31
	17	271	78	0.24	0.383	0.018	11.260	0.525	0.213	0.004	100	100	20	0.91	2091	82	2545	44	2929	32
	18	268	80	0.24	0.374	0.017	11.040	0.513	0.214	0.004	100	100	21	0.91	2049	81	2526	43	2935	32
	19	265	84	0.26	0.433	0.022	12.650	0.663	0.212	0.004	100	100	13	0.93	2321	101	2654	49	2919	33
	20	256	77	0.25	0.423	0.022	12.510	0.661	0.214	0.004	100	100	15	0.93	2276	100	2644	50	2939	33
	21	246	84	0.28	0.388	0.019	11.560	0.566	0.216	0.004	100	100	19	0.91	2114	87	2569	46	2951	33
	22	240	81	0.27	0.361	0.017	10.910	0.505	0.219	0.005	100	100	24	0.90	1986	78	2515	43	2975	34
	23	244	76	0.26	0.420	0.021	12.560	0.639	0.217	0.004	100	100	16	0.92	2262	96	2647	48	2956	33
	24	250	82	0.27	0.435	0.022	12.870	0.662	0.215	0.004	100	100	14	0.92	2326	99	2670	49	2942	33
	25	249	75	0.25	0.430	0.022	12.790	0.665	0.216	0.004	100	100	14	0.92	2307	100	2664	49	2948	33
	26	233	73	0.25	0.384	0.018	11.580	0.546	0.219	0.005	100	100	21	0.90	2092	83	2571	44	2973	34
	27	234	72	0.25	0.413	0.020	12.480	0.619	0.219	0.005	100	100	17	0.91	2228	93	2641	47	2975	33
	28	234	69	0.24	0.401	0.019	12.280	0.602	0.222	0.005	100	100	19	0.91	2173	90	2626	46	2997	33
	29	218	69	0.26	0.381	0.018	11.430	0.536	0.217	0.005	100	100	21	0.90	2083	83	2559	44	2961	34
	30	217	63	0.24	0.444	0.023	13.640	0.719	0.223	0.005	100	100	14	0.92	2367	103	2725	50	3003	34
	31	211	66	0.25	0.422	0.022	12.620	0.652	0.217	0.005	100	100	16	0.91	2268	98	2651	49	2958	35
	32	213	73	0.28	0.403	0.020	12.240	0.608	0.221	0.005	100	100	18	0.90	2182	91	2623	47	2984	35
	33	217	71	0.27	0.395	0.019	11.950	0.576	0.220	0.005	100	100	19	0.90	2145	87	2601	45	2978	34
	34	234	87	0.30	0.393	0.018	12.060	0.569	0.222	0.005	100	100	20	0.90	2138	85	2609	44	2998	33
	35	249	90	0.30	0.382	0.017	11.770	0.539	0.223	0.004	100	100	21	0.90	2088	81	2586	43	3004	32

	36	242	100	0.34	0.414	0.020	12.710	0.605	0.222	0.004	100	100	17	0.91	2235	89	2658	45	2998	32
	37	239	88	0.30	0.419	0.020	12.720	0.617	0.220	0.004	100	100	16	0.91	2257	92	2659	46	2981	32
	38	248	98	0.32	0.435	0.021	13.310	0.657	0.222	0.004	100	100	15	0.92	2327	96	2702	47	2996	32
	39	266	113	0.35	0.391	0.017	12.170	0.541	0.226	0.004	100	100	21	0.90	2128	80	2618	42	3022	31
	40	274	123	0.36	0.362	0.015	11.330	0.466	0.227	0.004	100	100	25	0.89	1994	70	2551	38	3029	30
	41	294	128	0.35	0.384	0.016	11.890	0.499	0.225	0.004	100	100	21	0.91	2096	74	2596	39	3013	29
	42	311	135	0.35	0.385	0.016	11.940	0.492	0.225	0.004	100	100	21	0.91	2098	73	2600	39	3018	29
	43	315	145	0.37	0.406	0.017	12.500	0.524	0.223	0.004	100	100	18	0.91	2196	77	2643	39	3005	28
	44	320	148	0.37	0.407	0.017	12.780	0.533	0.228	0.004	100	100	19	0.92	2202	77	2663	39	3035	28
East-Eyap-19	1	1018	9	0.01	0.375	0.017	9.554	0.430	0.185	0.002	100	99	15	0.96	2054	78	2393	41	2695	21
	2	536	10	0.01	0.627	0.037	16.240	0.955	0.188	0.003	100	100	8	0.96	3139	145	2891	56	2722	26
	3	447	19	0.04	0.521	0.029	14.230	0.790	0.198	0.003	100	100	2	0.95	2705	122	2765	53	2809	28
	4	464	39	0.07	0.520	0.028	14.610	0.802	0.204	0.003	100	100	3	0.95	2699	120	2790	52	2857	27
	5	490	65	0.11	0.526	0.029	15.460	0.846	0.213	0.003	100	100	4	0.96	2723	121	2844	52	2931	26
	6	480	89	0.15	0.543	0.029	15.870	0.857	0.212	0.003	100	100	3	0.96	2796	122	2869	52	2921	26
	7	460	102	0.18	0.523	0.027	15.410	0.791	0.214	0.003	100	100	5	0.95	2711	113	2841	49	2935	26
	8	493	153	0.25	0.597	0.034	17.460	1.001	0.212	0.003	100	100	2	0.96	3016	137	2961	55	2923	26
	9	540	167	0.25	0.565	0.031	16.830	0.925	0.216	0.003	100	100	1	0.96	2885	127	2925	53	2953	25
	10	516	182	0.29	0.533	0.027	15.540	0.803	0.211	0.003	100	100	3	0.96	2755	115	2849	49	2916	25
	11	462	211	0.37	0.579	0.031	16.730	0.909	0.210	0.003	100	100	1	0.96	2943	128	2919	52	2903	26
	12	435	241	0.45	0.597	0.035	17.640	1.025	0.214	0.004	100	100	2	0.96	3019	139	2970	56	2938	27
	13	440	269	0.50	0.537	0.029	15.880	0.870	0.215	0.004	100	100	4	0.95	2770	123	2870	52	2940	27
	14	454	327	0.59	0.559	0.032	16.460	0.940	0.213	0.004	100	100	1	0.96	2864	131	2904	55	2932	27
	15	467	336	0.59	0.582	0.035	17.470	1.042	0.218	0.003	100	100	0	0.96	2957	141	2961	57	2963	26
	16	461	352	0.62	0.556	0.031	16.330	0.918	0.213	0.003	100	100	2	0.96	2852	129	2896	54	2927	26
	17	449	324	0.59	0.608	0.036	18.060	1.067	0.216	0.004	100	100	2	0.96	3062	143	2993	57	2947	26
	18	464	378	0.66	0.513	0.026	15.370	0.796	0.217	0.004	100	100	6	0.95	2669	113	2839	49	2961	26
	19	470	398	0.69	0.511	0.026	15.340	0.799	0.218	0.003	100	100	6	0.95	2660	113	2837	50	2964	26
East-Eyap-5@1	1	3690	160	0.04	0.382	0.011	9.252	0.264	0.176	0.001	100	99	13	0.97	2085	50	2363	26	2613	11
	2	3368	182	0.04	0.430	0.013	10.560	0.310	0.178	0.001	100	99	7	0.97	2307	57	2486	27	2635	11
	3	3051	198	0.05	0.453	0.013	11.210	0.329	0.180	0.001	100	99	5	0.97	2408	59	2541	27	2649	11
	4	3013	238	0.06	0.477	0.014	12.210	0.356	0.186	0.001	100	99	4	0.97	2515	60	2621	27	2704	11
	5	3055	227	0.06	0.471	0.014	11.890	0.349	0.183	0.001	100	99	4	0.97	2488	60	2596	28	2681	11
	6	3465	289	0.07	0.427	0.012	10.600	0.297	0.180	0.001	100	99	8	0.97	2294	54	2488	26	2651	11
	7	3679	324	0.07	0.429	0.012	10.720	0.293	0.181	0.001	100	100	8	0.98	2300	53	2499	25	2665	10
	8	3701	347	0.08	0.481	0.014	12.080	0.348	0.182	0.001	100	100	3	0.98	2532	60	2610	27	2672	10
	9	3797	338	0.07	0.431	0.011	10.790	0.277	0.182	0.001	100	100	8	0.97	2309	50	2505	24	2669	10
	10	3915	429	0.09	0.423	0.011	10.500	0.263	0.180	0.001	100	99	9	0.97	2273	48	2480	23	2655	10
	11	3817	451	0.10	0.446	0.011	11.120	0.287	0.181	0.001	100	100	6	0.97	2377	51	2533	24	2661	10
	12	3690	413	0.09	0.439	0.011	11.020	0.274	0.182	0.001	100	100	7	0.97	2345	49	2525	23	2673	10
	13	3663	437	0.10	0.412	0.009	10.420	0.239	0.183	0.001	100	99	11	0.97	2225	43	2473	21	2683	10
	14	3713	445	0.10	0.489	0.012	11.960	0.296	0.178	0.001	100	98	1	0.97	2564	52	2601	23	2630	10
	15	3780	468	0.10	0.427	0.010	11.620	0.261	0.197	0.001	100	99	12	0.97	2292	43	2574	21	2805	10
	16	3931	712	0.15	0.414	0.009	10.950	0.227	0.192	0.001	100	99	12	0.96	2232	39	2519	19	2760	9
	17	4051	1188	0.24	0.397	0.008	11.040	0.220	0.201	0.001	100	99	16	0.96	2157	36	2526	19	2837	9
	18	4167	1424	0.28	0.448	0.009	10.760	0.220	0.174	0.001	100	99	5	0.96	2387	41	2502	19	2597	9
	19	4163	1235	0.24	0.481	0.010	13.470	0.275	0.203	0.001	100	99	7	0.96	2530	43	2713	19	2852	9
	20	4123	946	0.19	0.462	0.009	11.970	0.235	0.188	0.001	100	98	6	0.96	2447	40	2602	18	2725	9
	21	4242	1035	0.20	0.385	0.007	10.260	0.196	0.193	0.001	100	99	16	0.96	2099	34	2459	18	2771	9
	22	4397	1357	0.25	0.374	0.007	8.989	0.176	0.175	0.001	100	99	13	0.96	2046	34	2337	18	2602	9
	23	4252	1573	0.30	0.335	0.006	7.899	0.141	0.171	0.001	100	99	18	0.95	1860	29	2220	16	2570	9
	24	4216	1716	0.33	0.349	0.006	8.227	0.151	0.171	0.001	100	100	16	0.96	1929	30	2256	17	2568	9
	25	4008	1708	0.35	0.348	0.006	8.314	0.150	0.173	0.001	100	100	16	0.95	1924	30	2266	16	2590	9
	26	3934	1585	0.33	0.345	0.006	8.221	0.147	0.173	0.001	100	100	17	0.95	1909	29	2256	16	2587	9

	27	3839	1399	0.30	0.342	0.006	8.193	0.148	0.174	0.001	100	100	17	0.95	1896	30	2253	16	2595	9
	28	3763	1017	0.22	0.323	0.005	7.746	0.133	0.174	0.001	100	100	20	0.95	1805	27	2202	15	2595	9
	29	3815	887	0.19	0.300	0.005	7.438	0.125	0.180	0.001	100	100	25	0.95	1691	25	2166	15	2651	9
	30	3253	775	0.19	0.328	0.006	8.118	0.141	0.179	0.001	100	100	20	0.94	1829	27	2244	16	2648	10
	31	2827	751	0.22	0.330	0.006	8.163	0.144	0.180	0.001	100	100	20	0.94	1838	28	2249	16	2648	10
	32	2453	954	0.32	0.329	0.006	8.203	0.146	0.181	0.001	100	100	21	0.93	1834	28	2254	16	2660	11
	33	2165	1158	0.44	0.334	0.006	8.525	0.152	0.185	0.001	100	100	21	0.92	1858	29	2289	16	2699	12
	34	1954	1266	0.53	0.306	0.005	7.248	0.123	0.172	0.001	100	100	22	0.91	1721	25	2142	15	2575	12
	35	1833	1402	0.62	0.331	0.006	7.811	0.139	0.171	0.001	100	100	18	0.91	1843	28	2209	16	2569	13
	36	1580	1356	0.70	0.332	0.006	7.884	0.140	0.172	0.001	100	100	18	0.90	1849	28	2218	16	2578	13
	37	1444	1205	0.68	0.317	0.006	7.483	0.134	0.171	0.001	100	100	20	0.89	1773	27	2171	16	2571	14
	38	1350	1075	0.65	0.323	0.006	8.140	0.149	0.183	0.002	100	100	22	0.89	1802	28	2247	17	2681	14
	39	1211	875	0.59	0.318	0.006	7.660	0.144	0.175	0.002	100	100	21	0.88	1778	29	2192	17	2605	15
	40	1090	541	0.40	0.308	0.006	7.485	0.145	0.176	0.002	100	99	23	0.87	1730	29	2171	17	2619	16
	41	929	364	0.32	0.304	0.006	7.695	0.155	0.184	0.002	100	100	25	0.87	1709	30	2196	18	2687	17
	42	854	281	0.27	0.285	0.006	7.211	0.148	0.183	0.002	100	100	28	0.86	1618	29	2138	18	2683	18
	43	803	243	0.25	0.303	0.006	7.841	0.171	0.188	0.002	100	100	26	0.87	1704	32	2213	20	2724	18
	44	747	193	0.21	0.291	0.006	7.554	0.163	0.188	0.002	100	100	28	0.86	1647	31	2179	19	2726	19
	45	694	172	0.20	0.295	0.006	7.580	0.170	0.187	0.002	100	100	27	0.86	1664	32	2182	20	2713	19
	46	630	142	0.18	0.284	0.006	7.449	0.165	0.190	0.002	100	100	29	0.85	1612	31	2167	20	2744	20
	47	600	133	0.18	0.292	0.007	7.747	0.179	0.192	0.002	100	100	28	0.85	1654	33	2202	21	2761	21
	48	545	118	0.18	0.304	0.007	8.011	0.187	0.191	0.003	100	99	26	0.84	1712	34	2232	21	2751	22
	49	530	114	0.18	0.312	0.007	8.161	0.199	0.190	0.003	100	99	25	0.84	1748	37	2249	22	2742	22
East-Eyap-8	1	2956	19	0.01	0.258	0.006	6.271	0.160	0.177	0.001	100	100	31	0.96	1478	33	2014	22	2621	12
	2	3735	87	0.02	0.274	0.008	6.496	0.180	0.172	0.001	100	100	27	0.97	1559	38	2045	24	2579	11
	3	3429	125	0.03	0.276	0.007	6.296	0.169	0.165	0.001	100	100	25	0.97	1572	37	2018	24	2511	12
	4	2996	191	0.05	0.343	0.010	8.352	0.238	0.177	0.001	100	100	18	0.97	1900	47	2270	26	2623	12
	5	2563	173	0.05	0.376	0.011	9.364	0.285	0.181	0.001	100	100	14	0.97	2057	53	2374	28	2659	12
	6	2162	277	0.10	0.341	0.010	8.524	0.257	0.181	0.001	100	100	19	0.97	1893	49	2288	27	2663	13
	7	1769	304	0.14	0.383	0.012	9.594	0.306	0.182	0.002	100	100	14	0.96	2092	57	2397	29	2666	14
	8	1417	262	0.15	0.371	0.012	9.802	0.324	0.192	0.002	100	100	17	0.96	2034	57	2416	30	2757	16
	9	1209	291	0.20	0.412	0.015	11.260	0.404	0.199	0.002	100	100	14	0.96	2222	67	2545	33	2814	16
	10	947	243	0.21	0.428	0.016	11.910	0.437	0.202	0.002	100	100	12	0.95	2297	71	2597	34	2841	18
	11	794	271	0.28	0.450	0.017	12.770	0.496	0.206	0.002	100	100	11	0.95	2396	77	2663	37	2873	19
	12	673	229	0.28	0.464	0.018	13.700	0.546	0.214	0.003	100	100	10	0.95	2457	81	2729	38	2937	20
	13	653	226	0.28	0.478	0.020	14.200	0.592	0.215	0.003	100	100	9	0.95	2520	86	2763	40	2946	21
	14	656	235	0.29	0.493	0.021	14.820	0.635	0.218	0.003	100	100	8	0.96	2582	91	2804	41	2968	21
	15	643	237	0.30	0.462	0.018	14.000	0.556	0.220	0.003	100	100	12	0.95	2449	80	2750	38	2978	21
	16	670	248	0.30	0.481	0.019	14.570	0.590	0.220	0.003	100	100	10	0.95	2529	84	2788	39	2980	21
	17	694	279	0.33	0.470	0.018	14.460	0.564	0.223	0.003	100	100	11	0.95	2484	80	2780	37	3003	20
	18	723	291	0.33	0.492	0.019	15.150	0.602	0.223	0.003	100	100	9	0.95	2578	84	2825	38	3005	20
	19	740	313	0.34	0.464	0.017	14.370	0.528	0.225	0.003	100	100	12	0.95	2457	75	2774	35	3014	19
	20	774	331	0.35	0.449	0.015	13.940	0.483	0.225	0.003	100	100	14	0.94	2390	69	2745	33	3018	19
	21	867	369	0.35	0.478	0.017	14.910	0.538	0.226	0.003	100	100	11	0.95	2517	75	2809	34	3027	18
	22	929	413	0.36	0.481	0.017	15.000	0.534	0.226	0.002	100	100	11	0.95	2529	74	2815	34	3026	17
	23	953	448	0.38	0.473	0.016	14.650	0.501	0.225	0.002	100	100	11	0.95	2496	70	2793	33	3015	17
	24	991	480	0.39	0.465	0.015	14.640	0.484	0.229	0.002	100	100	13	0.95	2459	67	2792	31	3042	16
	25	1084	538	0.40	0.457	0.015	14.480	0.475	0.230	0.002	100	100	14	0.96	2428	66	2781	31	3049	16
	26	1070	528	0.40	0.453	0.014	14.140	0.449	0.227	0.002	100	100	14	0.95	2407	63	2759	30	3028	16
	27	1077	523	0.40	0.456	0.015	14.260	0.463	0.227	0.002	100	100	13	0.95	2423	65	2767	31	3028	16
	28	1027	523	0.41	0.461	0.015	14.360	0.471	0.226	0.002	100	100	13	0.95	2443	66	2774	31	3024	16
	29	1013	480	0.39	0.478	0.016	15.040	0.522	0.228	0.002	100	100	11	0.96	2519	72	2818	33	3040	17
East-Eyap-11	1	365	95	0.21	0.534	0.027	16.120	0.834	0.219	0.004	100	99	4	0.94	2758	115	2884	50	2973	29
	2	407	131	0.26	0.674	0.041	20.050	1.219	0.216	0.004	100	99	7	0.96	3322	157	3094	59	2949	27

	3	360	125	0.28	0.664	0.035	19.790	1.039	0.216	0.004	100	100	6	0.95	3282	134	3081	51	2953	28
	4	582	118	0.17	0.483	0.020	14.630	0.620	0.220	0.003	100	100	9	0.95	2541	88	2792	40	2978	22
	5	717	188	0.21	0.497	0.020	15.330	0.624	0.224	0.003	100	100	9	0.95	2603	87	2836	39	3006	20
	6	690	286	0.34	0.515	0.021	15.640	0.639	0.221	0.003	100	100	6	0.95	2676	89	2855	39	2984	20
	7	564	321	0.46	0.557	0.025	17.030	0.762	0.222	0.003	100	100	3	0.95	2855	103	2936	43	2993	22
	8	423	286	0.55	0.602	0.030	18.150	0.907	0.219	0.003	100	100	1	0.95	3039	120	2998	48	2970	26
	9	322	279	0.70	0.514	0.024	15.520	0.736	0.219	0.004	100	100	6	0.93	2675	103	2848	45	2972	29
	10	289	212	0.60	0.524	0.027	15.530	0.797	0.215	0.004	100	100	5	0.93	2718	113	2848	49	2942	31
	11	262	207	0.64	0.486	0.024	14.560	0.739	0.217	0.004	100	100	9	0.92	2553	106	2787	48	2961	32
	12	225	170	0.62	0.579	0.034	17.530	1.034	0.220	0.005	100	100	1	0.93	2943	138	2964	57	2979	35
	13	222	162	0.60	0.518	0.029	15.520	0.869	0.217	0.005	100	100	6	0.93	2692	122	2848	53	2960	35
	14	209	174	0.68	0.448	0.022	13.590	0.684	0.220	0.005	100	100	13	0.90	2386	99	2721	48	2981	35
	15	233	190	0.66	0.528	0.030	15.860	0.920	0.218	0.005	100	100	5	0.93	2733	128	2869	55	2965	34
	16	207	167	0.66	0.443	0.022	13.450	0.678	0.220	0.005	100	100	14	0.91	2363	99	2712	48	2983	35
	17	197	158	0.66	0.509	0.028	15.440	0.871	0.220	0.005	100	100	7	0.92	2653	122	2843	54	2980	36
	18	204	168	0.67	0.517	0.030	15.530	0.898	0.218	0.005	100	100	6	0.92	2685	126	2849	55	2966	36
	19	192	159	0.67	0.491	0.027	14.850	0.831	0.219	0.005	100	100	9	0.91	2575	118	2806	53	2976	37
East-Eyap-3	1	1336	272	0.17	0.370	0.012	9.702	0.328	0.190	0.002	100	100	17	0.95	2030	58	2407	31	2743	17
	2	1163	234	0.16	0.477	0.019	12.480	0.488	0.190	0.002	100	100	5	0.96	2514	81	2641	37	2741	18
	3	913	232	0.21	0.479	0.019	12.630	0.497	0.191	0.002	100	100	5	0.96	2521	81	2652	37	2754	19
	4	779	257	0.27	0.510	0.022	13.670	0.588	0.194	0.002	100	100	3	0.96	2658	93	2727	41	2779	21
	5	692	248	0.29	0.536	0.025	14.350	0.660	0.194	0.003	100	100	0	0.96	2768	103	2773	44	2777	22
	6	623	269	0.35	0.555	0.027	14.960	0.727	0.196	0.003	100	100	1	0.96	2845	111	2813	46	2790	23
	7	552	289	0.43	0.548	0.027	15.070	0.745	0.200	0.003	100	100	0	0.95	2817	112	2820	47	2822	24
	8	488	278	0.46	0.574	0.030	15.910	0.847	0.201	0.003	100	100	2	0.96	2922	124	2871	51	2836	26
	9	391	270	0.56	0.564	0.030	16.060	0.872	0.207	0.004	100	100	0	0.95	2882	125	2881	52	2880	28
	10	330	252	0.62	0.672	0.045	18.860	1.261	0.204	0.004	100	100	9	0.96	3314	172	3035	65	2855	30
	11	277	247	0.73	0.525	0.030	15.230	0.869	0.211	0.004	100	100	4	0.94	2718	125	2830	54	2910	33
	12	278	258	0.76	0.554	0.034	16.090	0.995	0.211	0.004	100	100	1	0.94	2842	141	2882	59	2910	34
	13	266	241	0.74	0.561	0.036	16.400	1.048	0.212	0.004	100	100	1	0.95	2872	147	2901	61	2920	34
	14	251	260	0.84	0.504	0.029	14.630	0.864	0.211	0.005	100	100	6	0.93	2629	126	2791	56	2911	35
	15	234	232	0.81	0.532	0.032	15.740	0.968	0.214	0.005	100	100	4	0.94	2752	137	2861	59	2939	36
	16	241	238	0.81	0.504	0.030	14.990	0.899	0.216	0.005	100	100	7	0.93	2629	129	2814	57	2950	35
	17	227	228	0.82	0.489	0.028	14.540	0.842	0.216	0.005	100	100	8	0.93	2565	122	2786	55	2950	36
	18	234	227	0.79	0.509	0.031	15.480	0.934	0.220	0.005	100	100	7	0.93	2654	130	2845	58	2984	35
	19	235	230	0.80	0.563	0.036	16.700	1.087	0.215	0.005	100	100	1	0.94	2881	150	2918	62	2944	36
	20	222	220	0.80	0.454	0.025	13.530	0.748	0.216	0.005	100	100	12	0.92	2411	110	2718	52	2954	36
	21	218	224	0.83	0.491	0.028	14.570	0.849	0.215	0.005	100	100	8	0.92	2575	123	2788	55	2946	37
	22	203	216	0.86	0.444	0.024	13.120	0.713	0.214	0.005	100	100	13	0.91	2369	107	2688	51	2937	37
	23	205	203	0.81	0.493	0.029	14.710	0.874	0.216	0.005	100	100	8	0.93	2584	125	2796	57	2953	37
	24	199	191	0.78	0.448	0.025	13.370	0.745	0.217	0.005	100	100	13	0.91	2384	110	2706	53	2956	38
	25	197	194	0.80	0.488	0.029	14.500	0.871	0.216	0.005	100	100	8	0.92	2562	126	2783	57	2948	38
	26	189	178	0.77	0.460	0.026	13.930	0.809	0.220	0.005	100	100	12	0.91	2438	117	2745	55	2979	39
	27	173	170	0.80	0.437	0.024	12.910	0.726	0.214	0.005	100	100	13	0.90	2337	109	2673	53	2938	40
	28	175	149	0.69	0.470	0.028	13.950	0.838	0.216	0.005	100	100	10	0.92	2481	123	2746	57	2947	40
	29	164	151	0.75	0.438	0.025	13.010	0.746	0.216	0.005	100	100	14	0.90	2340	111	2680	54	2948	41
East-Eyap-2	1	325	85	0.21	0.620	0.040	18.050	1.188	0.211	0.004	100	99	4	0.95	3109	161	2992	63	2915	34
	2	219	97	0.36	0.711	0.055	20.180	1.584	0.206	0.005	100	99	11	0.95	3460	209	3100	76	2874	40
	3	178	102	0.47	0.620	0.048	18.220	1.424	0.213	0.006	100	99	4	0.94	3111	191	3001	75	2928	43
	4	167	105	0.51	0.599	0.047	17.180	1.370	0.208	0.006	100	99	3	0.94	3025	191	2945	77	2890	45
	5	164	97	0.48	0.646	0.055	18.320	1.575	0.206	0.006	100	98	7	0.94	3212	215	3007	83	2872	47
	6	172	114	0.54	0.654	0.058	19.110	1.708	0.212	0.006	100	98	6	0.95	3245	226	3047	86	2919	46
	7	155	108	0.56	0.610	0.051	18.120	1.520	0.216	0.006	100	99	2	0.94	3068	203	2996	81	2948	47
	8	146	107	0.60	0.563	0.044	16.290	1.298	0.210	0.006	100	98	1	0.93	2879	182	2894	76	2904	49

	9	151	119	0.64	0.543	0.041	15.710	1.213	0.210	0.006	100	99	2	0.92	2795	173	2860	74	2905	49
	10	153	127	0.68	0.558	0.044	16.290	1.293	0.212	0.006	100	98	1	0.93	2860	181	2894	76	2918	49
	11	164	113	0.56	0.723	0.070	21.110	2.073	0.212	0.006	100	98	11	0.96	3506	263	3144	95	2920	47
	12	159	115	0.59	0.715	0.067	21.740	2.059	0.221	0.006	99	97	9	0.95	3477	252	3172	92	2984	47
	13	161	120	0.61	0.744	0.073	21.710	2.164	0.212	0.006	99	97	12	0.96	3584	271	3171	97	2919	48
	14	158	121	0.63	0.694	0.064	19.290	1.816	0.202	0.006	98	94	11	0.94	3397	243	3057	91	2840	51
East-Eyap-10	1	644	123	0.16	0.429	0.021	11.480	0.579	0.194	0.003	100	98	11	0.95	2301	96	2563	47	2777	26
	2	569	100	0.14	0.408	0.020	10.870	0.535	0.193	0.003	100	99	13	0.94	2207	91	2512	46	2768	27
	3	499	84	0.14	0.528	0.033	14.290	0.888	0.196	0.003	100	100	1	0.96	2735	138	2769	59	2794	28
	4	474	105	0.18	0.484	0.029	13.480	0.811	0.202	0.003	100	100	6	0.96	2546	126	2714	57	2841	28
	5	403	125	0.25	0.566	0.039	15.660	1.093	0.201	0.004	100	100	1	0.96	2890	162	2856	67	2832	31
	6	328	108	0.27	0.556	0.041	15.370	1.148	0.201	0.004	100	100	0	0.96	2849	171	2839	71	2831	33
	7	245	76	0.25	0.541	0.041	15.430	1.181	0.207	0.005	100	100	2	0.96	2789	172	2842	73	2880	37
	8	219	67	0.25	0.492	0.038	14.180	1.089	0.209	0.005	100	100	7	0.95	2581	162	2762	73	2897	39
	9	197	50	0.21	0.520	0.043	14.720	1.236	0.205	0.005	100	100	4	0.95	2699	184	2797	80	2869	42
	10	177	55	0.25	0.456	0.035	13.410	1.042	0.213	0.006	100	100	11	0.94	2423	156	2709	73	2930	44
	11	165	55	0.27	0.525	0.046	15.020	1.331	0.208	0.006	100	100	4	0.95	2720	195	2817	84	2887	45
	12	172	56	0.27	0.534	0.050	15.600	1.460	0.212	0.006	100	100	3	0.96	2760	209	2853	89	2919	45
	13	165	57	0.28	0.531	0.048	16.020	1.467	0.219	0.006	100	100	5	0.95	2747	203	2878	88	2972	45
	14	177	58	0.27	0.443	0.036	13.060	1.058	0.214	0.006	100	100	13	0.94	2363	159	2684	76	2935	44
	15	176	60	0.28	0.537	0.051	16.100	1.545	0.218	0.006	100	100	4	0.96	2769	215	2883	92	2963	43
	16	152	65	0.35	0.461	0.038	13.710	1.147	0.216	0.006	100	100	11	0.94	2444	169	2730	79	2949	46
	17	142	59	0.34	0.454	0.038	13.830	1.167	0.221	0.007	100	100	13	0.94	2413	168	2738	80	2988	48
	18	141	59	0.34	0.515	0.048	14.940	1.414	0.211	0.006	100	100	5	0.95	2677	206	2811	90	2909	49
	19	127	55	0.35	0.438	0.036	12.760	1.067	0.211	0.007	100	100	13	0.93	2341	163	2662	79	2916	50
East-Eyap-3@1	1	2571	303	0.10	0.286	0.008	7.281	0.207	0.185	0.002	100	99	28	0.96	1621	40	2147	25	2696	14
	2	2609	148	0.05	0.345	0.010	8.716	0.261	0.184	0.001	100	99	19	0.97	1909	49	2309	27	2685	13
	3	2369	115	0.04	0.356	0.010	9.199	0.273	0.187	0.002	100	99	18	0.96	1964	50	2358	27	2719	13
	4	1987	119	0.05	0.392	0.012	10.330	0.327	0.191	0.002	100	99	14	0.96	2134	57	2465	29	2751	14
	5	1627	146	0.07	0.459	0.017	12.280	0.445	0.194	0.002	100	100	8	0.97	2434	73	2626	34	2777	15
	6	1249	138	0.09	0.482	0.019	13.120	0.507	0.198	0.002	100	100	6	0.97	2536	81	2689	37	2805	17
	7	948	155	0.13	0.464	0.018	12.890	0.498	0.201	0.002	100	100	8	0.96	2458	78	2671	36	2837	19
	8	734	140	0.16	0.458	0.019	12.800	0.521	0.203	0.003	100	100	9	0.95	2432	82	2665	38	2847	21
	9	576	160	0.23	0.469	0.020	13.330	0.576	0.206	0.003	100	100	9	0.94	2479	88	2703	41	2875	23
	10	477	165	0.28	0.535	0.027	15.130	0.768	0.205	0.003	100	100	2	0.95	2764	113	2824	48	2866	25
	11	419	190	0.37	0.464	0.022	13.280	0.635	0.208	0.003	100	100	9	0.94	2456	97	2700	45	2888	27
	12	376	201	0.44	0.501	0.026	14.330	0.757	0.207	0.004	100	100	6	0.94	2619	113	2772	50	2885	29
	13	331	227	0.56	0.458	0.023	13.270	0.664	0.210	0.004	100	100	10	0.93	2432	100	2699	47	2906	30
	14	319	209	0.53	0.456	0.023	13.030	0.668	0.207	0.004	100	100	10	0.93	2423	102	2682	48	2883	31
	15	292	224	0.63	0.427	0.021	12.310	0.601	0.209	0.004	100	100	14	0.92	2292	93	2628	46	2898	32
	16	288	227	0.64	0.480	0.026	14.030	0.767	0.212	0.004	100	100	9	0.93	2526	113	2751	52	2921	32
	17	269	221	0.67	0.462	0.024	13.450	0.717	0.211	0.004	100	100	10	0.93	2446	108	2712	50	2916	33
	18	261	226	0.70	0.461	0.025	13.600	0.734	0.214	0.004	100	100	11	0.92	2445	109	2722	51	2935	34
	19	255	218	0.70	0.454	0.024	13.340	0.720	0.213	0.005	100	100	11	0.92	2415	108	2704	51	2928	34
	20	240	208	0.71	0.435	0.023	12.730	0.667	0.212	0.005	100	100	13	0.91	2327	101	2660	49	2924	35
	21	231	215	0.76	0.455	0.024	13.550	0.738	0.216	0.005	100	99	12	0.92	2417	109	2719	52	2952	35
	22	231	207	0.73	0.455	0.025	13.280	0.723	0.212	0.005	100	100	11	0.92	2416	109	2700	51	2920	36
	23	215	219	0.83	0.415	0.021	12.250	0.623	0.214	0.005	100	100	16	0.90	2240	95	2624	48	2936	36
	24	227	209	0.75	0.447	0.024	13.230	0.721	0.215	0.005	100	100	12	0.92	2382	108	2697	51	2941	36
	25	224	214	0.78	0.482	0.028	14.270	0.821	0.215	0.005	100	100	9	0.93	2536	120	2768	55	2941	36
	26	212	206	0.79	0.426	0.022	12.540	0.660	0.213	0.005	100	100	14	0.91	2288	100	2645	50	2931	36
	27	209	216	0.84	0.412	0.021	12.060	0.612	0.212	0.005	100	100	16	0.90	2225	95	2609	48	2922	37
	28	207	215	0.84	0.444	0.023	12.900	0.685	0.211	0.005	100	100	12	0.91	2367	104	2672	50	2912	37
	29	210	216	0.84	0.406	0.020	11.660	0.587	0.208	0.005	100	100	16	0.90	2197	92	2578	47	2893	37

	30	209	208	0.81	0.419	0.021	12.710	0.655	0.220	0.005	100	100	16	0.90	2258	97	2658	49	2979	36
	31	201	218	0.88	0.400	0.020	11.990	0.591	0.217	0.005	100	100	18	0.89	2170	90	2603	46	2961	37
	32	202	228	0.92	0.375	0.017	11.140	0.525	0.215	0.005	100	100	21	0.88	2055	82	2535	44	2945	37
	33	208	221	0.86	0.440	0.023	13.070	0.685	0.216	0.005	100	100	13	0.91	2350	102	2685	49	2948	36
	34	203	208	0.84	0.385	0.018	11.540	0.554	0.218	0.005	100	100	20	0.89	2099	85	2568	45	2963	37
	35	206	239	0.94	0.395	0.019	11.550	0.564	0.212	0.005	100	100	18	0.89	2148	88	2569	46	2920	37
	36	211	229	0.88	0.419	0.021	12.400	0.635	0.215	0.005	100	100	15	0.90	2256	97	2635	48	2941	36
	37	192	202	0.86	0.380	0.018	11.280	0.546	0.215	0.005	100	100	20	0.89	2075	85	2546	45	2947	37
	38	192	198	0.84	0.389	0.019	11.780	0.588	0.220	0.005	100	100	20	0.89	2118	89	2587	47	2979	37
	39	194	201	0.84	0.451	0.025	13.460	0.747	0.216	0.005	100	100	12	0.91	2401	110	2713	52	2954	38
	40	169	177	0.86	0.361	0.017	10.770	0.526	0.216	0.005	100	100	23	0.87	1987	82	2503	45	2954	40
	41	170	155	0.74	0.416	0.022	12.350	0.673	0.215	0.005	100	100	16	0.90	2243	102	2631	51	2946	40
	42	149	153	0.84	0.355	0.017	10.460	0.520	0.214	0.006	100	100	23	0.86	1956	83	2476	46	2936	42
	43	166	160	0.79	0.424	0.024	12.600	0.717	0.215	0.005	100	100	15	0.90	2280	108	2651	54	2947	41
	44	161	144	0.73	0.422	0.024	12.640	0.720	0.217	0.006	100	100	16	0.90	2270	108	2653	54	2959	42
	45	140	139	0.81	0.342	0.017	10.400	0.524	0.221	0.006	100	100	26	0.86	1895	82	2471	47	2986	43
	46	145	133	0.75	0.399	0.022	11.740	0.654	0.213	0.006	100	100	18	0.89	2166	101	2584	52	2930	43
	47	136	130	0.78	0.371	0.020	11.150	0.594	0.218	0.006	100	100	22	0.87	2036	92	2536	50	2964	44
	48	136	120	0.72	0.374	0.020	11.100	0.598	0.216	0.006	100	100	21	0.88	2047	93	2532	50	2947	43
	49	137	129	0.77	0.390	0.021	11.570	0.642	0.215	0.006	100	100	19	0.88	2121	99	2570	52	2946	44
East-Eyap-8@1	1	3857	122	0.03	0.257	0.007	6.507	0.171	0.183	0.001	100	99	32	0.95	1477	34	2047	23	2683	13
	2	3654	152	0.03	0.296	0.008	7.019	0.196	0.172	0.001	100	99	23	0.96	1673	41	2114	25	2576	13
	3	3248	243	0.06	0.312	0.008	7.607	0.208	0.177	0.001	100	100	22	0.96	1749	42	2186	25	2625	14
	4	3039	325	0.09	0.355	0.010	9.053	0.269	0.185	0.002	100	100	18	0.96	1957	50	2343	27	2699	14
	5	2611	374	0.12	0.376	0.011	9.844	0.295	0.190	0.002	100	100	16	0.96	2059	52	2420	28	2740	14
	6	2283	287	0.10	0.412	0.013	11.200	0.349	0.197	0.002	100	100	13	0.96	2224	58	2540	29	2803	14
	7	2193	318	0.12	0.424	0.013	11.700	0.368	0.200	0.002	100	100	12	0.96	2279	60	2581	29	2827	14
	8	2151	357	0.14	0.431	0.013	12.180	0.379	0.205	0.002	100	100	12	0.96	2312	60	2618	29	2864	14
	9	2087	410	0.16	0.438	0.013	12.610	0.387	0.209	0.002	100	100	12	0.96	2344	60	2651	29	2895	14
	10	2016	415	0.17	0.458	0.014	13.180	0.414	0.209	0.002	100	100	10	0.96	2429	63	2693	30	2898	15
	11	1838	424	0.19	0.452	0.014	13.120	0.412	0.210	0.002	100	100	11	0.96	2405	63	2688	30	2909	15
	12	1629	450	0.23	0.470	0.015	13.710	0.447	0.212	0.002	100	100	10	0.96	2482	67	2730	31	2919	16
	13	1383	390	0.23	0.480	0.016	14.100	0.474	0.213	0.002	100	100	9	0.95	2527	70	2756	32	2929	17
	14	1142	354	0.25	0.506	0.018	15.010	0.547	0.215	0.002	100	100	6	0.95	2640	79	2816	35	2945	18
	15	1024	298	0.24	0.508	0.019	14.800	0.566	0.211	0.003	100	100	6	0.95	2646	83	2802	36	2917	20
	16	915	287	0.26	0.478	0.017	14.250	0.524	0.216	0.003	100	100	9	0.94	2517	76	2767	35	2954	21
	17	840	281	0.27	0.442	0.016	13.240	0.468	0.217	0.003	100	100	13	0.93	2360	69	2697	33	2960	21
	18	796	259	0.27	0.479	0.018	14.300	0.545	0.217	0.003	100	100	9	0.94	2521	79	2770	36	2957	22
	19	732	255	0.28	0.484	0.019	14.480	0.564	0.217	0.003	100	100	9	0.93	2542	81	2782	37	2960	23
	20	669	247	0.30	0.439	0.016	13.350	0.490	0.220	0.003	100	100	14	0.92	2348	72	2705	35	2984	24
	21	634	217	0.28	0.436	0.016	13.100	0.484	0.218	0.003	100	100	14	0.92	2333	72	2687	35	2965	24
	22	638	227	0.29	0.473	0.019	14.430	0.574	0.221	0.003	100	100	11	0.93	2498	82	2779	38	2990	24
	23	639	233	0.30	0.446	0.017	13.540	0.517	0.220	0.003	100	100	13	0.92	2375	75	2718	36	2984	24
	24	616	239	0.32	0.437	0.016	13.430	0.498	0.223	0.003	100	100	15	0.92	2337	72	2710	35	3002	24
	25	669	250	0.30	0.492	0.020	15.040	0.617	0.222	0.003	100	100	9	0.94	2578	87	2818	39	2994	24
	26	653	264	0.33	0.444	0.017	13.660	0.513	0.223	0.003	100	100	14	0.92	2367	74	2726	36	3004	24
	27	673	264	0.32	0.432	0.016	13.380	0.488	0.225	0.003	100	100	16	0.92	2315	70	2707	35	3013	24
	28	682	298	0.36	0.449	0.017	13.940	0.523	0.225	0.003	100	100	14	0.93	2392	74	2746	36	3017	23
	29	659	281	0.35	0.438	0.016	13.480	0.491	0.223	0.003	100	100	15	0.92	2340	71	2714	34	3005	23
	30	615	267	0.35	0.422	0.015	12.930	0.454	0.222	0.003	100	100	16	0.91	2267	67	2674	33	2998	23
	31	648	295	0.37	0.439	0.016	13.710	0.496	0.227	0.003	100	100	15	0.92	2346	71	2730	34	3028	23
East-Eyap-13	1	952	99	0.08	0.390	0.023	10.070	0.592	0.188	0.003	100	99	14	0.95	2120	105	2442	54	2721	30
	2	754	113	0.12	0.424	0.028	11.140	0.750	0.191	0.004	100	99	11	0.95	2276	128	2535	63	2749	33
	3	572	89	0.13	0.379	0.025	10.300	0.690	0.197	0.004	100	98	17	0.94	2073	117	2462	62	2801	37

	4	506	97	0.16	0.389	0.028	10.680	0.776	0.199	0.005	100	98	16	0.94	2118	129	2496	67	2820	40
	5	470	84	0.15	0.402	0.031	10.810	0.853	0.195	0.005	100	99	14	0.95	2178	144	2507	73	2786	41
	6	417	90	0.18	0.409	0.033	11.450	0.937	0.203	0.005	100	100	15	0.95	2211	152	2560	77	2850	42
	7	367	88	0.19	0.448	0.039	12.570	1.116	0.204	0.005	100	100	10	0.96	2386	176	2648	84	2854	43
	8	341	102	0.24	0.460	0.041	13.000	1.168	0.205	0.006	100	99	9	0.95	2441	181	2680	85	2865	46
	9	307	90	0.24	0.416	0.034	11.470	0.941	0.200	0.006	100	99	13	0.94	2242	153	2562	77	2827	48
	10	276	92	0.27	0.399	0.031	11.640	0.926	0.212	0.006	100	100	17	0.93	2162	145	2576	74	2919	47
	11	298	97	0.26	0.527	0.053	15.230	1.544	0.210	0.006	100	99	4	0.96	2728	224	2830	97	2904	47
	12	277	90	0.26	0.462	0.041	13.320	1.195	0.209	0.006	100	100	10	0.95	2450	181	2703	85	2897	47
	13	297	111	0.30	0.430	0.036	12.610	1.068	0.213	0.006	100	100	14	0.94	2307	163	2651	80	2925	46
	14	288	105	0.30	0.472	0.042	14.010	1.258	0.215	0.006	100	100	10	0.95	2491	184	2750	85	2946	46
	15	264	117	0.36	0.417	0.033	12.270	0.987	0.213	0.006	100	100	16	0.93	2247	151	2625	76	2931	47
	16	267	110	0.34	0.455	0.038	13.250	1.125	0.211	0.006	100	100	11	0.94	2418	170	2697	80	2914	47
	17	272	109	0.33	0.444	0.037	12.890	1.081	0.210	0.006	100	100	12	0.94	2369	165	2671	79	2909	47
	18	276	110	0.32	0.447	0.037	13.140	1.106	0.213	0.006	100	100	12	0.94	2382	166	2690	79	2930	46
	19	279	120	0.35	0.514	0.047	14.960	1.385	0.211	0.006	100	100	5	0.95	2672	201	2813	88	2916	46
	20	275	140	0.41	0.443	0.037	13.300	1.107	0.218	0.006	100	100	13	0.94	2363	163	2701	79	2966	46
	21	292	133	0.37	0.477	0.042	14.460	1.279	0.220	0.006	100	100	10	0.95	2513	183	2781	84	2981	44
	22	299	157	0.43	0.490	0.043	14.500	1.279	0.215	0.006	100	100	8	0.95	2571	185	2783	84	2940	44
	23	310	184	0.48	0.483	0.042	14.020	1.216	0.211	0.006	100	100	8	0.95	2540	181	2751	82	2910	44
	24	309	190	0.50	0.483	0.041	14.050	1.202	0.211	0.006	100	100	8	0.95	2542	178	2753	81	2911	43
	25	304	201	0.54	0.463	0.038	13.640	1.115	0.214	0.006	100	100	11	0.95	2453	166	2725	77	2933	42
	26	285	197	0.56	0.399	0.028	11.740	0.832	0.213	0.006	100	100	18	0.93	2165	129	2584	66	2932	43
	27	307	215	0.57	0.612	0.060	18.110	1.799	0.215	0.005	100	100	3	0.97	3078	242	2996	96	2941	41
	28	312	214	0.56	0.445	0.034	13.240	1.024	0.216	0.006	100	100	13	0.95	2374	152	2697	73	2949	41
	29	303	213	0.57	0.464	0.036	13.790	1.077	0.216	0.006	100	99	11	0.94	2458	158	2736	74	2948	42
East-Eyap-4@1	1	956	139	0.12	0.543	0.023	15.460	0.666	0.206	0.002	100	100	2	0.96	2797	97	2844	41	2877	19
	2	777	125	0.13	0.499	0.022	14.520	0.631	0.211	0.003	100	100	6	0.96	2610	93	2784	41	2913	21
	3	740	149	0.16	0.493	0.022	14.160	0.646	0.208	0.003	100	100	7	0.96	2584	97	2760	43	2892	22
	4	703	138	0.16	0.571	0.031	16.920	0.918	0.215	0.003	100	100	1	0.97	2912	127	2930	52	2942	22
	5	628	129	0.17	0.487	0.023	14.400	0.684	0.214	0.003	100	100	8	0.96	2559	100	2776	45	2938	23
	6	625	123	0.16	0.526	0.027	15.550	0.806	0.214	0.003	100	100	4	0.96	2725	115	2850	49	2939	23
	7	614	116	0.15	0.504	0.026	15.080	0.774	0.217	0.003	100	100	7	0.96	2633	110	2820	49	2957	23
	8	576	122	0.17	0.508	0.026	14.950	0.767	0.214	0.003	100	100	6	0.96	2647	111	2812	49	2933	24
	9	561	110	0.16	0.552	0.030	16.430	0.912	0.216	0.003	100	100	2	0.97	2832	127	2902	53	2951	23
	10	538	112	0.17	0.532	0.028	15.580	0.833	0.213	0.003	100	100	4	0.96	2749	119	2851	51	2925	24
	11	534	111	0.17	0.528	0.028	15.870	0.855	0.218	0.003	100	100	5	0.96	2731	119	2869	51	2968	24
	12	514	106	0.17	0.570	0.032	16.810	0.956	0.214	0.003	100	100	1	0.96	2909	132	2924	55	2935	25
	13	482	88	0.15	0.622	0.037	18.230	1.090	0.213	0.003	100	100	4	0.97	3117	147	3002	58	2926	25
	14	505	111	0.18	0.528	0.027	15.690	0.822	0.216	0.003	100	100	5	0.96	2732	116	2858	50	2948	25
	15	560	117	0.17	0.573	0.032	17.160	0.970	0.217	0.003	100	100	1	0.97	2920	132	2944	54	2960	23
	16	506	113	0.18	0.579	0.031	17.110	0.924	0.214	0.003	100	100	0	0.96	2946	127	2941	52	2938	24
	17	579	149	0.21	0.523	0.027	15.570	0.797	0.216	0.003	100	100	5	0.96	2711	113	2851	49	2951	23
	18	551	152	0.22	0.542	0.028	16.270	0.854	0.218	0.003	100	100	4	0.96	2793	118	2893	50	2963	23
	19	477	121	0.21	0.603	0.034	17.950	1.031	0.216	0.003	100	100	2	0.96	3041	139	2987	55	2951	25
	20	450	114	0.21	0.555	0.031	16.560	0.930	0.216	0.003	100	100	2	0.96	2848	129	2910	54	2953	26
	21	423	99	0.19	0.510	0.027	14.980	0.804	0.213	0.003	100	100	6	0.95	2657	116	2814	51	2929	27
	22	390	94	0.20	0.568	0.034	16.790	0.996	0.214	0.004	100	100	1	0.96	2901	138	2923	57	2938	27
	23	375	92	0.20	0.533	0.030	16.000	0.920	0.218	0.004	100	100	4	0.95	2755	128	2877	55	2963	28
	24	363	90	0.20	0.564	0.034	16.750	1.024	0.215	0.004	100	100	1	0.96	2883	141	2921	59	2947	28
	25	377	93	0.20	0.516	0.030	15.440	0.894	0.217	0.004	100	100	6	0.96	2684	126	2843	55	2958	28
	26	361	85	0.19	0.689	0.051	20.540	1.534	0.216	0.004	100	100	8	0.97	3380	196	3117	72	2952	29
	27	330	76	0.19	0.554	0.035	16.630	1.059	0.218	0.004	100	100	3	0.96	2841	146	2914	61	2964	29
	28	313	78	0.20	0.611	0.042	18.340	1.282	0.218	0.004	100	100	2	0.96	3072	170	3008	67	2965	30

	29	315	69	0.18	0.562	0.037	16.910	1.117	0.218	0.004	100	100	2	0.96	2873	152	2930	63	2969	30
Sillimanite-staurolite schist (Akow; NAD 83, zone 15, 670288E, 5850306N)																			
AKOW-5	1	1032	257	0.20	0.468	0.020	12.380	0.535	0.192	0.002	100	99	6	0.96	2473	88	2634	41	2760	20
	2	564	148	0.21	0.619	0.032	16.300	0.847	0.191	0.003	100	99	7	0.96	3107	127	2894	50	2749	26
	3	386	84	0.18	0.547	0.029	14.760	0.780	0.196	0.004	100	100	0	0.94	2814	119	2800	50	2790	30
	4	329	71	0.18	0.491	0.026	13.220	0.699	0.196	0.004	100	100	5	0.93	2573	111	2696	50	2789	32
	5	323	62	0.16	0.581	0.036	16.060	1.008	0.200	0.004	100	100	3	0.95	2954	148	2880	60	2829	32
	6	276	54	0.16	0.533	0.029	14.370	0.801	0.196	0.004	100	100	1	0.93	2755	124	2775	53	2789	35
	7	340	62	0.15	0.486	0.025	13.520	0.702	0.202	0.004	100	100	6	0.93	2552	108	2717	49	2841	32
	8	370	61	0.13	0.505	0.026	14.020	0.725	0.201	0.004	100	100	4	0.94	2637	111	2751	49	2837	30
	9	399	62	0.13	0.545	0.029	15.040	0.802	0.200	0.004	100	100	0	0.94	2806	120	2818	51	2826	29
	10	405	70	0.14	0.560	0.030	15.530	0.847	0.201	0.004	100	100	1	0.95	2865	125	2849	52	2837	29
	11	353	58	0.13	0.558	0.029	15.370	0.819	0.200	0.004	100	100	1	0.94	2857	122	2838	51	2825	30
	12	367	54	0.12	0.585	0.033	15.900	0.899	0.197	0.004	100	100	3	0.95	2967	133	2871	54	2804	30
	13	343	56	0.13	0.518	0.027	14.390	0.745	0.201	0.004	100	100	3	0.93	2692	113	2776	49	2837	31
	14	329	53	0.13	0.518	0.027	14.460	0.772	0.202	0.004	100	100	3	0.94	2691	117	2780	51	2846	31
	15	299	50	0.14	0.588	0.035	16.350	0.982	0.202	0.004	100	100	3	0.94	2980	142	2897	58	2840	33
	16	258	44	0.14	0.536	0.030	14.960	0.853	0.202	0.004	100	100	2	0.93	2768	127	2813	54	2845	35
	17	227	36	0.13	0.616	0.038	16.950	1.066	0.200	0.005	100	100	5	0.94	3094	153	2932	60	2822	37
	18	237	42	0.15	0.610	0.037	16.920	1.022	0.201	0.004	100	100	5	0.93	3071	147	2930	58	2835	36
	19	325	55	0.14	0.502	0.025	14.070	0.715	0.204	0.004	100	100	5	0.93	2621	109	2755	48	2854	31
	20	409	72	0.14	0.533	0.026	15.090	0.755	0.205	0.004	100	100	2	0.94	2753	111	2821	48	2870	28
	21	441	80	0.15	0.561	0.028	15.840	0.790	0.205	0.003	100	100	0	0.95	2871	115	2867	48	2864	27
	22	411	88	0.17	0.479	0.020	13.340	0.563	0.202	0.003	100	100	7	0.92	2524	87	2704	40	2841	27
	23	455	91	0.16	0.572	0.028	16.200	0.787	0.205	0.003	100	100	1	0.95	2917	113	2889	46	2869	26
	24	485	116	0.20	0.505	0.022	14.010	0.622	0.201	0.003	100	100	4	0.94	2634	95	2750	42	2837	25
	25	438	100	0.19	0.580	0.028	16.330	0.799	0.204	0.003	100	100	2	0.95	2948	115	2896	47	2860	26
	26	386	93	0.20	0.475	0.020	13.380	0.572	0.204	0.003	100	100	8	0.92	2507	88	2707	40	2859	28
	27	378	82	0.18	0.539	0.026	15.060	0.724	0.203	0.004	100	100	1	0.94	2778	108	2819	46	2848	28
	28	358	85	0.19	0.496	0.022	13.850	0.627	0.202	0.004	100	100	5	0.92	2597	96	2739	43	2846	29
	29	366	80	0.18	0.456	0.020	12.900	0.558	0.205	0.004	100	100	10	0.92	2421	86	2672	41	2868	29
	30	349	83	0.19	0.500	0.023	13.910	0.639	0.202	0.004	100	100	5	0.92	2615	98	2744	44	2839	29
	31	326	75	0.19	0.494	0.022	13.740	0.622	0.202	0.004	100	100	5	0.92	2586	96	2732	43	2841	30
	32	361	91	0.21	0.487	0.022	13.920	0.632	0.208	0.004	100	100	7	0.92	2557	95	2744	43	2886	29
	33	359	84	0.19	0.479	0.021	13.270	0.587	0.201	0.004	100	100	7	0.92	2522	92	2699	42	2834	29
	34	357	88	0.20	0.480	0.021	13.460	0.602	0.203	0.004	100	100	7	0.92	2527	93	2712	42	2853	29
	35	320	79	0.20	0.462	0.020	13.010	0.572	0.204	0.004	100	100	9	0.91	2449	89	2681	42	2860	30
	36	300	72	0.19	0.525	0.026	14.800	0.727	0.204	0.004	100	100	3	0.93	2721	108	2802	47	2861	31
	37	275	75	0.22	0.467	0.021	13.110	0.602	0.204	0.004	100	100	8	0.91	2472	93	2687	43	2854	33
	38	281	69	0.20	0.463	0.021	12.820	0.594	0.201	0.004	100	100	8	0.91	2452	94	2666	44	2833	32
	39	272	75	0.23	0.470	0.022	12.890	0.607	0.199	0.004	100	100	7	0.91	2484	96	2672	44	2818	33
	40	249	66	0.21	0.424	0.019	11.930	0.534	0.204	0.004	100	100	13	0.89	2278	85	2599	42	2859	34
	41	236	57	0.20	0.511	0.027	14.250	0.748	0.202	0.004	100	100	4	0.92	2660	113	2766	50	2845	35
	42	194	50	0.21	0.429	0.020	11.800	0.562	0.199	0.005	100	100	12	0.88	2301	91	2588	45	2821	38
	43	193	50	0.21	0.434	0.021	12.270	0.607	0.205	0.005	100	100	12	0.88	2324	96	2625	47	2867	39
	44	177	48	0.22	0.431	0.021	11.910	0.598	0.200	0.005	100	100	12	0.88	2311	96	2598	47	2830	40
	45	168	43	0.21	0.422	0.021	11.830	0.594	0.203	0.005	100	100	13	0.88	2269	95	2591	47	2853	41
	46	160	44	0.23	0.402	0.020	11.020	0.548	0.199	0.005	100	100	15	0.87	2178	91	2525	46	2817	42
	47	152	39	0.21	0.432	0.023	12.080	0.641	0.203	0.005	100	100	12	0.88	2314	102	2611	50	2850	43
	48	139	42	0.25	0.416	0.021	11.690	0.612	0.204	0.006	100	100	14	0.86	2242	98	2580	49	2857	44
	49	139	29	0.17	0.421	0.022	11.570	0.612	0.199	0.005	100	100	13	0.86	2263	100	2570	49	2822	45
AKOW-1	1	439	138	0.26	0.671	0.062	16.450	1.545	0.178	0.005	99	94	13	0.96	3311	239	2904	90	2632	42
	2	346	91	0.21	0.466	0.038	11.680	0.966	0.182	0.005	99	96	4	0.94	2467	166	2579	77	2668	46
	3	329	96	0.24	0.469	0.040	12.050	1.048	0.186	0.005	99	97	5	0.95	2480	176	2608	82	2709	47

	4	276	102	0.30	0.482	0.042	12.790	1.138	0.193	0.006	100	98	5	0.95	2536	184	2664	84	2763	48
	5	255	99	0.32	0.469	0.040	12.120	1.057	0.187	0.006	99	96	5	0.94	2481	175	2614	82	2719	52
	6	261	104	0.32	0.585	0.062	15.500	1.675	0.192	0.006	99	97	4	0.96	2970	253	2846	103	2760	52
	7	240	96	0.33	0.730	0.096	19.450	2.583	0.193	0.006	99	97	14	0.97	3533	358	3064	128	2770	53
	8	210	109	0.42	0.477	0.045	12.630	1.213	0.192	0.006	100	98	5	0.94	2515	197	2653	90	2759	55
	9	196	90	0.37	0.715	0.098	19.390	2.667	0.197	0.006	100	100	13	0.97	3478	368	3062	133	2799	53
	10	179	87	0.40	0.505	0.054	13.640	1.485	0.196	0.007	100	99	3	0.95	2634	232	2725	103	2794	58
	11	175	70	0.33	0.669	0.093	18.670	2.609	0.202	0.007	100	98	9	0.97	3303	358	3025	135	2845	59
	12	163	76	0.38	0.615	0.080	16.520	2.175	0.195	0.007	100	98	6	0.96	3088	320	2907	126	2784	61
	13	172	66	0.31	0.569	0.071	15.650	1.997	0.200	0.007	99	96	2	0.96	2904	293	2856	122	2822	61
	14	167	74	0.36	0.728	0.113	20.020	3.119	0.200	0.007	100	98	13	0.97	3525	420	3092	151	2822	60
	15	151	60	0.32	0.625	0.085	17.280	2.375	0.200	0.008	100	98	6	0.96	3131	338	2950	132	2829	62
	16	147	56	0.31	0.575	0.075	15.460	2.029	0.195	0.007	100	99	3	0.96	2928	306	2844	125	2785	63
	17	142	61	0.35	0.464	0.051	12.740	1.415	0.199	0.008	100	100	8	0.94	2458	225	2660	105	2817	62
	18	149	59	0.32	0.635	0.091	17.320	2.498	0.198	0.008	100	99	7	0.97	3167	358	2953	138	2809	63
	19	145	54	0.31	0.604	0.082	16.590	2.256	0.199	0.007	100	100	5	0.96	3048	328	2912	130	2819	61
	20	134	66	0.40	0.519	0.060	13.640	1.595	0.191	0.007	100	98	1	0.94	2695	254	2725	111	2747	65
	21	154	64	0.34	0.709	0.110	19.040	2.971	0.195	0.007	99	98	13	0.97	3456	414	3044	151	2782	61
	22	147	66	0.36	0.441	0.045	12.100	1.247	0.199	0.007	100	98	10	0.93	2357	200	2612	97	2816	61
	23	157	66	0.34	0.519	0.061	13.660	1.627	0.191	0.007	99	97	1	0.95	2695	258	2727	113	2750	62
	24	152	60	0.32	0.493	0.055	13.030	1.488	0.192	0.007	99	97	4	0.94	2583	239	2682	108	2757	62
	25	143	58	0.33	0.453	0.047	12.430	1.305	0.199	0.007	100	98	9	0.94	2409	208	2637	99	2818	61
	26	147	54	0.30	0.607	0.080	16.780	2.256	0.201	0.008	99	96	5	0.96	3057	323	2922	129	2831	62
	27	146	59	0.33	0.499	0.056	13.550	1.542	0.197	0.007	100	98	4	0.95	2610	241	2719	108	2801	61
	28	146	56	0.31	0.629	0.085	17.280	2.342	0.199	0.007	100	100	6	0.96	3147	335	2950	130	2819	59
	29	150	63	0.34	0.466	0.050	12.620	1.382	0.196	0.007	100	99	7	0.95	2467	222	2652	103	2796	59
	30	148	58	0.32	0.598	0.079	17.030	2.267	0.207	0.007	100	99	3	0.96	3022	318	2937	128	2879	58
	31	150	60	0.33	0.491	0.054	13.330	1.484	0.197	0.007	100	99	5	0.95	2574	233	2703	105	2801	58
	32	150	74	0.40	0.467	0.048	12.700	1.327	0.197	0.007	99	97	7	0.94	2470	210	2658	98	2804	59
	33	166	72	0.35	0.353	0.029	9.942	0.839	0.204	0.007	99	98	22	0.92	1948	138	2429	78	2862	55
	34	180	78	0.35	0.428	0.040	11.780	1.112	0.200	0.007	99	97	12	0.94	2297	179	2587	88	2823	54
	35	192	115	0.49	0.377	0.031	10.220	0.853	0.197	0.006	99	96	17	0.92	2061	143	2455	77	2800	53
	36	223	113	0.41	0.425	0.036	11.490	1.007	0.196	0.006	99	96	12	0.94	2285	164	2564	82	2793	50
	37	236	127	0.44	0.383	0.028	10.040	0.775	0.190	0.006	99	94	15	0.92	2090	133	2439	71	2744	50
	38	293	155	0.43	0.406	0.031	10.440	0.830	0.187	0.005	98	91	12	0.93	2196	141	2474	74	2712	49
	39	375	195	0.42	0.368	0.024	9.815	0.659	0.194	0.005	99	97	18	0.94	2019	114	2418	62	2773	39
	40	458	277	0.49	0.314	0.017	8.561	0.474	0.198	0.004	100	98	26	0.93	1762	84	2292	50	2806	34
	41	533	270	0.41	0.355	0.020	9.785	0.573	0.200	0.004	100	99	21	0.95	1957	97	2415	54	2827	31
	42	548	280	0.42	0.340	0.018	9.328	0.500	0.199	0.004	100	98	23	0.94	1886	86	2371	49	2819	30
	43	606	289	0.39	0.391	0.022	10.720	0.617	0.199	0.003	100	99	16	0.96	2129	103	2499	54	2814	28
	44	661	307	0.38	0.375	0.020	10.150	0.537	0.196	0.003	100	99	18	0.95	2053	92	2449	49	2796	27
	45	752	311	0.34	0.384	0.019	10.510	0.535	0.199	0.003	100	99	17	0.95	2093	90	2481	47	2815	25
	46	840	338	0.33	0.370	0.017	10.180	0.476	0.200	0.003	100	100	19	0.95	2028	81	2451	43	2824	23
	47	931	405	0.35	0.350	0.015	9.538	0.401	0.198	0.003	100	99	21	0.95	1932	69	2391	39	2809	22
	48	988	409	0.34	0.376	0.016	10.540	0.452	0.203	0.003	100	100	19	0.95	2058	75	2484	40	2853	21
	49	1074	416	0.32	0.384	0.016	10.660	0.455	0.202	0.002	100	100	17	0.96	2094	76	2494	40	2839	20
AKOW-25	1	3688	489	0.11	0.126	0.002	3.152	0.055	0.182	0.002	99	94	62	0.84	762.3	11	1445	13	2672	16
	2	2569	464	0.15	0.223	0.004	5.895	0.123	0.192	0.002	99	97	41	0.91	1296	24	1961	18	2760	15
	3	1788	340	0.16	0.313	0.008	8.286	0.222	0.192	0.002	100	98	25	0.94	1754	41	2263	24	2761	16
	4	1362	245	0.15	0.324	0.010	8.712	0.263	0.195	0.002	100	99	24	0.94	1808	47	2308	27	2786	17
	5	1065	191	0.15	0.351	0.012	9.579	0.319	0.198	0.002	100	99	21	0.94	1941	55	2395	31	2808	19
	6	879	160	0.15	0.388	0.014	10.620	0.398	0.199	0.002	100	99	16	0.94	2114	67	2491	35	2814	20
	7	773	158	0.17	0.410	0.016	11.320	0.457	0.200	0.003	100	99	14	0.95	2214	75	2550	38	2829	21
	8	678	145	0.18	0.419	0.017	11.800	0.481	0.205	0.003	100	99	14	0.94	2254	77	2589	38	2862	22

	9	626	142	0.19	0.434	0.018	12.100	0.509	0.202	0.003	100	100	12	0.94	2324	81	2612	39	2844	23
	10	556	131	0.19	0.445	0.019	12.500	0.539	0.204	0.003	100	100	11	0.94	2374	85	2643	41	2856	24
	11	511	117	0.19	0.450	0.020	12.720	0.566	0.205	0.003	100	99	10	0.94	2396	88	2659	42	2866	25
	12	475	113	0.19	0.452	0.021	12.670	0.581	0.203	0.003	100	100	10	0.94	2403	91	2655	43	2854	26
	13	446	108	0.20	0.517	0.027	14.230	0.746	0.200	0.003	100	100	3	0.95	2687	114	2765	50	2823	27
	14	386	87	0.18	0.461	0.022	12.760	0.615	0.201	0.004	100	100	8	0.93	2445	97	2662	45	2831	29
	15	366	96	0.21	0.453	0.022	12.680	0.623	0.203	0.004	100	100	10	0.93	2409	98	2656	46	2850	29
	16	367	86	0.19	0.456	0.023	12.780	0.646	0.203	0.004	100	100	9	0.94	2424	101	2664	48	2851	29
	17	343	91	0.22	0.444	0.022	12.320	0.607	0.201	0.004	100	100	10	0.93	2370	97	2629	46	2835	30
	18	357	97	0.22	0.461	0.024	12.980	0.671	0.205	0.004	100	100	9	0.94	2442	104	2679	49	2862	29
	19	382	101	0.22	0.453	0.023	12.740	0.657	0.204	0.004	100	100	10	0.94	2407	103	2660	49	2859	29
	20	368	95	0.21	0.433	0.021	11.990	0.597	0.201	0.004	100	100	12	0.93	2318	96	2603	47	2833	29
	21	340	85	0.20	0.461	0.024	13.000	0.690	0.205	0.004	100	100	9	0.94	2444	107	2680	50	2863	30
	22	291	88	0.25	0.431	0.022	12.060	0.622	0.203	0.004	100	100	12	0.93	2309	99	2609	48	2851	32
	23	264	63	0.20	0.438	0.023	12.050	0.648	0.200	0.004	100	100	11	0.92	2339	104	2608	50	2824	34
	24	245	65	0.22	0.431	0.023	12.170	0.668	0.205	0.004	100	100	12	0.92	2312	105	2618	52	2864	35
	25	241	59	0.20	0.466	0.028	13.100	0.786	0.204	0.005	100	99	9	0.93	2464	122	2687	57	2860	36
	26	217	58	0.22	0.411	0.022	11.440	0.626	0.202	0.005	100	99	14	0.91	2220	101	2560	51	2840	37
	27	215	53	0.20	0.447	0.026	12.460	0.725	0.202	0.005	100	99	10	0.92	2382	114	2640	55	2844	38
	28	239	59	0.20	0.454	0.026	12.660	0.746	0.202	0.004	100	99	10	0.93	2414	117	2655	55	2844	36
	29	258	70	0.22	0.431	0.023	12.090	0.667	0.204	0.004	100	99	12	0.93	2310	106	2611	52	2854	34
	30	271	80	0.24	0.384	0.019	10.660	0.536	0.201	0.004	100	100	17	0.92	2095	89	2494	47	2837	33
	31	240	73	0.25	0.390	0.019	10.980	0.554	0.204	0.004	100	100	17	0.91	2125	90	2521	47	2858	35
	32	226	57	0.21	0.439	0.024	12.350	0.695	0.204	0.004	100	100	11	0.92	2347	109	2631	53	2858	36
	33	212	53	0.20	0.501	0.031	13.990	0.873	0.203	0.005	100	99	5	0.93	2618	133	2749	59	2847	37
	34	208	54	0.21	0.394	0.020	10.880	0.573	0.200	0.005	100	100	16	0.90	2142	95	2513	49	2828	38
AKOW-24	1	1116	48	0.04	0.413	0.016	11.330	0.437	0.199	0.003	99	96	14	0.95	2226	71	2550	36	2819	21
	2	1059	62	0.05	0.480	0.020	13.690	0.571	0.207	0.003	99	98	8	0.96	2528	86	2729	39	2880	20
	3	996	79	0.06	0.534	0.024	15.760	0.703	0.214	0.003	100	99	4	0.96	2759	99	2863	43	2937	20
	4	899	85	0.08	0.556	0.025	16.770	0.752	0.219	0.003	100	99	3	0.96	2848	103	2922	43	2973	20
	5	837	88	0.09	0.505	0.021	15.540	0.638	0.223	0.003	100	99	8	0.95	2634	88	2849	39	3004	21
	6	815	85	0.09	0.640	0.033	19.630	1.005	0.223	0.003	100	99	4	0.97	3188	128	3073	50	2999	21
	7	714	86	0.10	0.590	0.028	18.290	0.870	0.225	0.003	100	99	0	0.96	2991	113	3005	46	3015	22
	8	632	77	0.10	0.580	0.027	18.000	0.847	0.225	0.003	100	99	1	0.96	2950	111	2990	45	3017	23
	9	644	79	0.10	0.665	0.036	20.720	1.133	0.226	0.003	100	99	5	0.97	3286	140	3126	53	3024	23
	10	615	74	0.10	0.601	0.030	18.520	0.925	0.224	0.003	100	99	1	0.96	3034	120	3017	48	3006	23
	11	603	75	0.10	0.622	0.032	19.540	1.009	0.228	0.003	100	99	2	0.96	3118	127	3069	50	3037	24
	12	573	74	0.10	0.568	0.027	17.630	0.834	0.225	0.003	100	99	2	0.95	2901	110	2970	45	3017	24
	13	579	69	0.10	0.577	0.028	18.200	0.874	0.229	0.003	100	99	2	0.95	2935	113	3000	46	3044	23
	14	596	74	0.10	0.558	0.025	17.260	0.791	0.224	0.003	100	100	3	0.95	2857	105	2949	44	3013	23
	15	651	82	0.10	0.604	0.029	18.900	0.919	0.227	0.003	100	99	0	0.96	3046	117	3037	47	3030	23
	16	646	71	0.09	0.574	0.026	18.100	0.831	0.229	0.003	100	99	2	0.95	2924	107	2995	44	3043	23
	17	653	80	0.10	0.593	0.028	18.570	0.868	0.227	0.003	100	99	1	0.96	3002	111	3020	45	3032	22
	18	666	81	0.10	0.593	0.027	18.510	0.858	0.227	0.003	100	99	1	0.96	3001	111	3017	45	3027	22
	19	646	76	0.10	0.571	0.025	18.020	0.802	0.229	0.003	100	100	3	0.95	2913	104	2991	43	3043	22
	20	666	79	0.10	0.566	0.025	17.860	0.782	0.229	0.003	100	100	3	0.95	2893	102	2982	42	3043	22
	21	664	81	0.10	0.555	0.023	17.370	0.740	0.227	0.003	100	100	4	0.95	2845	97	2956	41	3032	22
	22	658	72	0.09	0.580	0.025	18.070	0.793	0.226	0.003	100	99	1	0.95	2949	103	2993	42	3023	21
	23	653	75	0.09	0.539	0.022	16.740	0.687	0.225	0.003	100	99	5	0.95	2779	92	2920	39	3019	21
	24	672	81	0.10	0.548	0.022	17.040	0.695	0.226	0.003	100	100	4	0.95	2816	92	2937	39	3021	21
	25	706	79	0.09	0.540	0.022	16.800	0.676	0.226	0.003	100	100	5	0.95	2784	90	2924	39	3021	21
	26	754	81	0.09	0.568	0.024	17.840	0.754	0.228	0.003	100	100	3	0.96	2901	98	2981	41	3036	20
	27	744	83	0.09	0.533	0.021	16.590	0.649	0.226	0.003	100	100	6	0.95	2755	87	2911	38	3021	20
	28	743	76	0.08	0.548	0.022	17.060	0.678	0.226	0.003	100	100	4	0.95	2818	90	2938	38	3022	20

	29	756	80	0.09	0.521	0.020	16.240	0.619	0.226	0.003	100	99	7	0.95	2701	84	2891	37	3026	20
AKOW-20	1	2716	443	0.13	0.312	0.009	7.298	0.225	0.170	0.002	97	86	21	0.90	1749	43	2149	28	2556	23
	2	2877	470	0.13	0.292	0.008	7.336	0.205	0.182	0.002	98	92	26	0.92	1652	39	2153	25	2672	18
	3	2607	437	0.14	0.316	0.009	7.132	0.208	0.164	0.002	99	94	18	0.93	1768	44	2128	26	2497	18
	4	2340	398	0.14	0.343	0.010	8.210	0.240	0.174	0.002	100	98	17	0.95	1899	47	2254	26	2595	16
	5	2298	346	0.12	0.356	0.010	8.936	0.265	0.182	0.002	100	99	17	0.96	1965	50	2331	27	2670	15
	6	2014	339	0.14	0.362	0.010	9.237	0.261	0.185	0.002	100	99	17	0.95	1991	48	2362	26	2699	14
	7	1774	298	0.14	0.398	0.012	10.430	0.308	0.190	0.002	100	100	14	0.95	2158	54	2474	27	2744	15
	8	1507	253	0.14	0.414	0.012	11.190	0.333	0.196	0.002	100	100	13	0.95	2234	56	2539	28	2793	15
	9	1326	232	0.14	0.437	0.014	12.080	0.377	0.200	0.002	100	100	11	0.95	2339	61	2611	29	2828	16
	10	1244	209	0.14	0.443	0.014	12.350	0.398	0.202	0.002	100	100	11	0.95	2364	63	2631	30	2844	17
	11	1107	201	0.15	0.413	0.013	11.590	0.357	0.203	0.002	100	100	14	0.94	2229	58	2572	29	2854	17
	12	997	159	0.13	0.447	0.015	12.410	0.409	0.202	0.002	100	100	10	0.94	2381	65	2636	31	2838	18
	13	884	156	0.14	0.434	0.014	12.110	0.391	0.202	0.002	100	100	12	0.94	2325	63	2613	30	2844	19
	14	800	130	0.13	0.446	0.015	12.640	0.418	0.206	0.002	100	100	11	0.93	2379	65	2653	31	2870	20
	15	729	117	0.13	0.434	0.014	12.090	0.397	0.202	0.003	100	100	12	0.93	2323	63	2611	31	2843	20
	16	704	106	0.12	0.460	0.016	12.850	0.448	0.203	0.003	100	99	9	0.93	2439	70	2669	33	2848	21
	17	666	113	0.14	0.435	0.015	12.180	0.411	0.203	0.003	100	100	12	0.92	2329	65	2619	32	2851	22
	18	600	89	0.12	0.456	0.016	12.760	0.451	0.203	0.003	100	100	9	0.92	2421	71	2662	33	2850	23
	19	559	81	0.12	0.442	0.015	12.370	0.431	0.203	0.003	100	100	11	0.92	2360	68	2633	33	2850	23
	20	553	90	0.13	0.430	0.014	11.960	0.408	0.202	0.003	100	100	12	0.91	2304	65	2601	32	2841	23
	21	555	94	0.14	0.448	0.015	12.450	0.434	0.202	0.003	100	100	10	0.92	2387	69	2639	33	2838	23
	22	570	100	0.14	0.440	0.015	12.360	0.420	0.204	0.003	100	100	11	0.92	2352	66	2632	32	2856	22
	23	640	109	0.14	0.462	0.016	13.080	0.462	0.206	0.003	100	100	9	0.93	2447	71	2686	33	2870	21
	24	612	125	0.17	0.405	0.012	11.430	0.354	0.205	0.003	100	100	15	0.91	2193	57	2559	29	2863	22
	25	619	119	0.16	0.412	0.013	11.640	0.367	0.205	0.003	100	100	15	0.91	2224	59	2576	30	2866	22
	26	615	119	0.16	0.443	0.015	12.370	0.413	0.203	0.003	100	100	11	0.92	2362	65	2633	31	2849	22
	27	593	131	0.18	0.401	0.012	11.300	0.349	0.205	0.003	100	100	16	0.90	2172	56	2548	29	2863	22
	28	605	132	0.18	0.426	0.014	12.030	0.397	0.205	0.003	100	100	13	0.91	2287	63	2607	31	2866	22
	29	544	118	0.18	0.412	0.013	11.540	0.374	0.203	0.003	100	100	14	0.90	2222	60	2568	30	2854	23
AKOW-8	1	1871	361	0.16	0.481	0.017	13.060	0.460	0.197	0.002	100	99	6	0.97	2531	73	2684	33	2801	15
	2	1508	334	0.18	0.500	0.018	13.860	0.499	0.201	0.002	100	99	5	0.97	2615	77	2740	34	2834	16
	3	1212	316	0.21	0.582	0.024	16.250	0.660	0.202	0.002	100	100	2	0.97	2958	96	2892	39	2846	17
	4	1063	286	0.22	0.546	0.021	15.390	0.608	0.204	0.002	100	100	1	0.96	2808	90	2839	38	2862	18
	5	997	295	0.24	0.494	0.018	13.940	0.512	0.205	0.002	100	100	6	0.95	2586	78	2746	35	2865	18
	6	919	242	0.21	0.585	0.025	16.210	0.698	0.201	0.002	100	100	3	0.96	2968	102	2889	41	2835	19
	7	791	213	0.22	0.545	0.022	15.340	0.629	0.204	0.003	100	100	1	0.95	2803	93	2837	39	2861	20
	8	725	203	0.23	0.566	0.025	15.940	0.704	0.204	0.003	100	100	1	0.96	2889	102	2873	42	2861	21
	9	651	180	0.23	0.556	0.024	15.540	0.680	0.203	0.003	100	100	0	0.95	2851	100	2849	42	2847	22
	10	604	149	0.20	0.570	0.026	15.900	0.740	0.202	0.003	100	100	1	0.96	2906	108	2871	44	2846	23
	11	557	144	0.21	0.573	0.027	16.020	0.749	0.203	0.003	100	100	1	0.95	2920	109	2878	45	2848	24
	12	539	132	0.20	0.507	0.022	14.080	0.613	0.202	0.003	100	100	4	0.94	2642	94	2755	41	2839	25
	13	501	116	0.19	0.624	0.032	17.790	0.928	0.207	0.003	100	100	5	0.96	3126	128	2978	50	2880	25
	14	466	116	0.20	0.527	0.024	15.010	0.703	0.207	0.003	100	100	3	0.94	2729	103	2816	45	2879	26
	15	454	120	0.22	0.482	0.021	13.640	0.612	0.205	0.003	100	100	7	0.94	2535	93	2725	42	2869	26
	16	400	98	0.20	0.556	0.028	15.840	0.807	0.207	0.004	100	100	1	0.94	2850	116	2867	49	2879	28
	17	317	76	0.20	0.532	0.027	14.650	0.740	0.200	0.004	100	100	2	0.93	2749	112	2793	48	2825	31
	18	305	72	0.19	0.505	0.026	14.190	0.726	0.204	0.004	100	100	5	0.93	2636	110	2763	49	2857	32
	19	295	71	0.20	0.544	0.030	15.280	0.847	0.204	0.004	100	100	1	0.94	2800	125	2833	53	2856	33
	20	256	62	0.20	0.495	0.025	13.940	0.717	0.204	0.004	100	99	6	0.92	2592	108	2746	49	2861	34
	21	282	77	0.22	0.477	0.024	13.280	0.683	0.202	0.004	100	100	7	0.92	2515	106	2700	49	2842	33
	22	271	68	0.21	0.539	0.030	15.250	0.850	0.205	0.004	100	100	2	0.93	2781	125	2831	53	2867	34
	23	281	77	0.22	0.489	0.025	13.820	0.724	0.205	0.004	100	100	6	0.92	2568	110	2737	50	2865	33
	24	280	75	0.22	0.479	0.024	13.310	0.680	0.202	0.004	100	100	7	0.92	2522	105	2702	48	2839	34

	25	273	70	0.21	0.467	0.023	13.300	0.651	0.207	0.004	100	100	9	0.91	2470	100	2701	46	2879	33
	26	308	75	0.20	0.507	0.026	14.380	0.743	0.206	0.004	100	100	5	0.93	2645	111	2775	49	2871	31
	27	314	78	0.20	0.501	0.024	14.380	0.707	0.208	0.004	100	100	6	0.92	2616	105	2775	47	2893	31
	28	373	85	0.19	0.536	0.028	15.440	0.810	0.209	0.004	100	100	3	0.94	2768	117	2843	50	2896	29
	29	361	81	0.18	0.421	0.017	11.780	0.486	0.203	0.004	100	100	13	0.91	2267	78	2587	39	2848	29
AKOW-13	1	2724	449	0.13	0.275	0.007	7.006	0.189	0.185	0.002	100	99	30	0.95	1567	37	2112	24	2696	14
	2	1693	427	0.21	0.408	0.012	11.050	0.328	0.196	0.002	100	99	14	0.95	2207	55	2527	28	2795	15
	3	1188	312	0.21	0.496	0.017	13.610	0.466	0.199	0.002	100	100	5	0.95	2597	73	2723	32	2819	18
	4	989	256	0.21	0.443	0.015	12.330	0.420	0.202	0.002	100	100	11	0.94	2365	67	2630	32	2840	19
	5	888	240	0.22	0.480	0.018	13.400	0.507	0.203	0.003	100	100	7	0.95	2525	79	2709	36	2848	20
	6	724	188	0.21	0.507	0.020	14.210	0.563	0.203	0.003	100	100	4	0.94	2645	85	2764	38	2852	22
	7	632	159	0.21	0.476	0.018	13.500	0.524	0.206	0.003	100	100	8	0.93	2509	80	2715	37	2872	23
	8	627	192	0.25	0.440	0.016	12.440	0.467	0.205	0.003	100	100	12	0.93	2351	73	2638	35	2867	23
	9	562	180	0.26	0.468	0.018	13.200	0.522	0.205	0.003	100	100	8	0.93	2475	81	2694	37	2862	25
	10	495	157	0.26	0.503	0.022	14.210	0.617	0.205	0.003	100	100	5	0.93	2628	93	2764	41	2865	26
	11	424	142	0.27	0.479	0.021	13.380	0.586	0.203	0.003	100	100	7	0.92	2522	91	2707	41	2848	28
	12	349	107	0.25	0.450	0.019	12.370	0.538	0.200	0.004	100	100	10	0.91	2393	86	2633	41	2823	31
	13	308	93	0.25	0.476	0.023	13.390	0.641	0.204	0.004	100	100	8	0.91	2510	98	2707	45	2858	33
	14	267	73	0.22	0.439	0.021	12.210	0.583	0.202	0.004	100	100	11	0.90	2348	93	2621	45	2839	35
	15	240	70	0.24	0.456	0.023	12.790	0.647	0.203	0.005	100	100	9	0.90	2423	101	2664	48	2853	37
	16	215	67	0.25	0.451	0.023	12.600	0.656	0.203	0.005	100	100	10	0.90	2398	103	2650	49	2848	38
	17	209	55	0.22	0.454	0.024	12.780	0.684	0.204	0.005	100	100	10	0.90	2413	106	2664	50	2859	39
	18	198	59	0.24	0.432	0.022	12.160	0.636	0.204	0.005	100	100	12	0.89	2316	100	2617	49	2859	40
	19	202	56	0.23	0.442	0.023	12.280	0.658	0.201	0.005	100	100	11	0.89	2361	105	2626	50	2838	40
	20	201	48	0.19	0.487	0.028	13.660	0.794	0.203	0.005	100	100	6	0.91	2558	121	2726	55	2853	41
	21	188	58	0.25	0.417	0.021	11.330	0.590	0.197	0.005	100	100	13	0.88	2246	98	2551	49	2803	42
	22	207	58	0.23	0.488	0.027	13.330	0.753	0.198	0.005	100	100	5	0.90	2560	118	2703	53	2812	40
	23	218	60	0.23	0.498	0.027	13.760	0.766	0.200	0.005	100	100	5	0.91	2606	118	2733	53	2829	39
	24	218	73	0.27	0.522	0.028	14.320	0.762	0.199	0.005	100	100	2	0.90	2706	116	2771	51	2819	39
	25	336	91	0.22	0.430	0.019	12.070	0.547	0.204	0.004	100	100	12	0.91	2303	87	2610	43	2858	31
	26	438	125	0.23	0.452	0.020	12.800	0.563	0.206	0.003	100	100	10	0.93	2402	87	2665	41	2871	27
	27	417	115	0.22	0.430	0.017	12.290	0.492	0.207	0.004	100	100	13	0.91	2307	77	2626	38	2883	28
	28	406	105	0.21	0.479	0.021	13.480	0.592	0.204	0.004	100	100	7	0.92	2523	91	2714	42	2859	28
	29	364	109	0.24	0.527	0.025	14.750	0.705	0.203	0.004	100	100	2	0.93	2730	105	2799	45	2850	30
AKOW-9	1	345	55	0.13	0.421	0.024	9.612	0.611	0.166	0.005	96	83	6	0.87	2264	109	2398	59	2514	54
	2	323	56	0.14	0.525	0.035	12.860	0.885	0.178	0.005	98	90	2	0.92	2720	146	2669	65	2631	45
	3	289	41	0.11	0.459	0.027	11.420	0.692	0.180	0.005	98	93	5	0.91	2435	118	2558	57	2657	43
	4	282	40	0.11	0.459	0.027	11.320	0.683	0.179	0.005	98	93	5	0.90	2433	117	2550	56	2645	43
	5	286	44	0.13	0.425	0.023	10.720	0.600	0.183	0.004	99	96	9	0.90	2285	104	2499	52	2679	41
	6	305	43	0.12	0.495	0.030	12.710	0.797	0.186	0.004	99	97	2	0.93	2593	131	2658	59	2708	39
	7	302	49	0.13	0.484	0.029	12.270	0.767	0.184	0.004	99	95	3	0.92	2546	128	2625	59	2687	40
	8	296	44	0.12	0.465	0.027	11.690	0.703	0.182	0.004	99	96	5	0.92	2462	120	2580	56	2674	40
	9	283	45	0.13	0.415	0.022	10.530	0.578	0.184	0.004	99	97	11	0.90	2235	101	2483	51	2692	40
	10	285	51	0.15	0.425	0.023	10.750	0.593	0.184	0.004	100	99	9	0.91	2282	104	2502	51	2685	38
	11	279	40	0.12	0.439	0.025	11.320	0.647	0.187	0.004	100	98	8	0.92	2347	110	2550	53	2715	38
	12	282	55	0.16	0.409	0.022	10.480	0.565	0.186	0.004	100	99	11	0.91	2209	99	2478	50	2706	37
	13	284	45	0.13	0.421	0.022	10.890	0.590	0.188	0.004	100	98	10	0.91	2264	101	2514	50	2722	37
	14	283	48	0.14	0.409	0.021	10.760	0.569	0.191	0.004	100	98	12	0.91	2209	97	2503	49	2751	37
	15	284	45	0.13	0.418	0.022	10.800	0.576	0.188	0.004	100	99	11	0.91	2250	100	2506	50	2720	37
	16	279	45	0.13	0.409	0.021	10.730	0.559	0.190	0.004	100	99	12	0.91	2212	96	2500	48	2743	36
	17	275	41	0.12	0.407	0.021	10.700	0.553	0.191	0.004	100	99	13	0.91	2199	94	2498	48	2751	36
	18	261	42	0.13	0.389	0.019	10.040	0.496	0.187	0.004	100	99	14	0.90	2118	88	2438	46	2717	37
	19	275	40	0.12	0.390	0.019	9.912	0.495	0.184	0.004	100	99	13	0.90	2122	89	2427	46	2693	37
	20	269	43	0.13	0.403	0.020	10.440	0.529	0.188	0.004	100	100	12	0.91	2184	92	2475	47	2723	36

	21	253	38	0.12	0.367	0.017	9.570	0.454	0.189	0.004	100	100	17	0.89	2016	81	2394	44	2733	37
	22	252	44	0.14	0.376	0.018	9.719	0.469	0.188	0.004	100	99	16	0.89	2056	83	2408	44	2722	37
	23	268	43	0.13	0.348	0.016	9.042	0.413	0.188	0.004	100	99	19	0.88	1926	75	2342	42	2728	36
	24	259	47	0.15	0.362	0.017	9.380	0.438	0.188	0.004	100	99	18	0.89	1993	79	2376	43	2722	36
	25	245	38	0.13	0.346	0.015	9.053	0.410	0.190	0.004	100	99	20	0.87	1917	74	2343	41	2738	37
	26	240	38	0.13	0.343	0.015	9.125	0.416	0.193	0.004	100	99	21	0.88	1900	74	2351	42	2769	37
	27	235	36	0.12	0.348	0.016	8.867	0.407	0.185	0.004	100	98	19	0.87	1923	75	2324	42	2698	38
	28	233	38	0.13	0.362	0.016	9.294	0.431	0.186	0.004	100	99	17	0.88	1992	78	2367	43	2708	38
	29	238	36	0.12	0.336	0.015	8.720	0.389	0.188	0.004	100	99	21	0.87	1868	71	2309	41	2726	38
	30	240	37	0.12	0.314	0.013	8.168	0.347	0.188	0.004	100	99	24	0.85	1762	64	2250	38	2728	38
	31	245	32	0.11	0.392	0.019	10.020	0.488	0.186	0.004	100	99	13	0.89	2130	87	2437	45	2704	37
	32	224	32	0.12	0.367	0.017	9.484	0.442	0.188	0.004	100	99	17	0.88	2013	79	2386	43	2722	38
	33	220	29	0.11	0.331	0.014	8.577	0.373	0.188	0.004	100	98	22	0.85	1841	68	2294	40	2727	38
	34	227	31	0.11	0.342	0.015	8.888	0.395	0.189	0.004	100	99	20	0.87	1895	71	2327	41	2730	38
	35	229	32	0.12	0.356	0.016	9.312	0.427	0.190	0.004	100	99	19	0.88	1963	76	2369	42	2740	37
	36	212	28	0.11	0.331	0.014	8.465	0.371	0.185	0.004	100	99	21	0.85	1845	69	2282	40	2701	39
	37	224	35	0.13	0.356	0.016	9.317	0.427	0.190	0.004	100	99	19	0.87	1961	76	2370	42	2742	38
	38	226	31	0.11	0.327	0.014	8.362	0.361	0.186	0.004	100	100	22	0.86	1822	67	2271	39	2704	38
	39	220	33	0.12	0.328	0.014	8.541	0.369	0.189	0.004	100	100	22	0.86	1830	68	2290	39	2730	38
	40	217	29	0.11	0.327	0.014	8.438	0.359	0.187	0.004	100	100	22	0.85	1823	66	2279	39	2718	38
	41	210	27	0.11	0.320	0.013	8.253	0.346	0.187	0.004	100	100	23	0.85	1789	64	2259	38	2717	38
	42	225	29	0.11	0.330	0.014	8.447	0.361	0.186	0.004	100	100	21	0.86	1839	67	2280	39	2704	37
	43	222	32	0.12	0.350	0.015	9.193	0.405	0.191	0.004	100	99	20	0.87	1932	72	2357	40	2749	37
	44	212	26	0.10	0.314	0.013	8.119	0.330	0.188	0.004	100	100	24	0.84	1760	61	2244	37	2721	38
AKOW-7	1	180	44	0.20	0.540	0.044	12.720	1.112	0.171	0.007	97	85	4	0.90	2781	184	2659	82	2567	65
	2	151	42	0.22	0.483	0.039	11.580	0.999	0.174	0.007	98	89	1	0.90	2540	170	2571	81	2595	65
	3	151	36	0.19	0.524	0.046	13.440	1.241	0.186	0.007	98	92	0	0.92	2716	196	2711	87	2708	60
	4	158	42	0.22	0.466	0.038	11.690	0.982	0.182	0.006	98	93	5	0.91	2466	165	2580	79	2670	58
	5	148	48	0.26	0.490	0.040	12.970	1.087	0.192	0.006	99	96	4	0.92	2571	173	2677	79	2758	55
	6	158	53	0.27	0.450	0.034	11.960	0.928	0.193	0.006	99	98	8	0.92	2395	152	2601	73	2766	52
	7	171	62	0.30	0.514	0.042	13.620	1.127	0.192	0.006	99	97	2	0.93	2675	178	2724	78	2760	51
	8	161	51	0.26	0.427	0.030	11.600	0.832	0.197	0.006	100	99	12	0.91	2292	136	2573	67	2803	50
	9	152	46	0.25	0.495	0.039	13.320	1.060	0.195	0.006	100	99	4	0.92	2592	167	2702	75	2786	51
	10	146	49	0.27	0.432	0.032	11.620	0.864	0.195	0.006	100	98	11	0.91	2314	142	2574	70	2785	52
	11	149	46	0.25	0.588	0.056	15.790	1.513	0.195	0.006	100	99	4	0.94	2981	226	2864	92	2783	52
	12	139	45	0.27	0.425	0.031	11.710	0.875	0.200	0.007	100	99	12	0.90	2284	142	2581	70	2823	54
	13	136	50	0.30	0.410	0.030	11.020	0.817	0.195	0.006	100	99	13	0.90	2213	136	2525	69	2786	54
	14	140	49	0.28	0.456	0.036	12.200	0.974	0.194	0.006	100	99	8	0.92	2422	159	2620	75	2777	52
	15	129	48	0.30	0.421	0.031	11.730	0.885	0.202	0.007	100	100	13	0.90	2264	142	2583	71	2844	53
	16	141	44	0.26	0.495	0.042	13.860	1.188	0.203	0.006	100	100	6	0.93	2592	181	2740	81	2852	52
	17	129	46	0.29	0.434	0.033	12.000	0.934	0.201	0.007	100	99	11	0.91	2323	149	2605	73	2832	54
	18	133	49	0.30	0.496	0.043	13.580	1.201	0.199	0.007	100	99	5	0.93	2596	187	2721	84	2814	54
	19	116	35	0.25	0.384	0.028	10.460	0.788	0.198	0.007	100	98	17	0.89	2094	132	2476	70	2807	58
	20	112	40	0.29	0.471	0.041	12.250	1.088	0.189	0.007	100	99	5	0.92	2488	180	2624	83	2731	59
	21	101	34	0.27	0.405	0.032	10.930	0.892	0.196	0.007	100	99	14	0.89	2194	149	2517	76	2789	61
	22	101	31	0.25	0.431	0.037	11.560	1.010	0.195	0.007	100	98	11	0.91	2310	166	2570	82	2781	62
	23	90	32	0.29	0.341	0.025	9.484	0.701	0.202	0.008	100	99	23	0.86	1890	118	2386	68	2842	64
	24	95	31	0.26	0.408	0.034	11.100	0.931	0.197	0.007	100	100	14	0.90	2207	154	2532	78	2804	62
	25	94	36	0.31	0.360	0.027	9.924	0.772	0.200	0.008	100	98	20	0.87	1980	129	2428	72	2828	63
	26	95	39	0.34	0.362	0.028	9.948	0.783	0.199	0.008	100	98	20	0.88	1992	131	2430	73	2821	64
	27	94	30	0.26	0.441	0.039	11.950	1.080	0.197	0.008	100	99	10	0.91	2353	175	2600	85	2799	63
	28	82	35	0.35	0.436	0.038	11.530	1.024	0.192	0.008	100	99	10	0.89	2332	170	2567	83	2758	67
	29	88	32	0.30	0.375	0.030	10.240	0.842	0.198	0.008	100	99	18	0.88	2052	142	2457	76	2812	65
	30	89	30	0.27	0.401	0.034	10.970	0.935	0.198	0.008	100	99	15	0.89	2174	154	2520	79	2812	65

	31	85	34	0.33	0.397	0.033	10.940	0.920	0.200	0.008	100	99	16	0.89	2153	151	2518	78	2827	65
	32	85	28	0.27	0.354	0.027	9.890	0.774	0.202	0.008	100	99	21	0.87	1956	130	2425	72	2846	64
	33	84	37	0.36	0.387	0.031	10.770	0.889	0.202	0.008	100	100	17	0.89	2107	146	2504	77	2844	64
	34	87	32	0.30	0.387	0.032	11.100	0.928	0.208	0.008	100	100	18	0.89	2108	148	2531	78	2891	64
	35	84	36	0.35	0.355	0.027	9.764	0.758	0.200	0.008	100	99	21	0.87	1957	129	2413	72	2824	65
	36	86	34	0.32	0.363	0.028	9.879	0.766	0.198	0.008	100	100	19	0.87	1994	131	2424	72	2806	64
	37	87	35	0.33	0.330	0.024	9.086	0.674	0.200	0.008	100	99	24	0.86	1839	116	2347	68	2823	64
	38	89	40	0.36	0.357	0.027	9.814	0.747	0.199	0.008	100	100	21	0.87	1968	127	2418	70	2821	63
	39	88	33	0.30	0.390	0.031	10.910	0.880	0.203	0.008	100	99	17	0.89	2121	143	2516	75	2851	62
	40	81	37	0.37	0.308	0.021	8.535	0.597	0.201	0.008	100	100	28	0.84	1730	104	2290	64	2835	64
	41	90	39	0.35	0.354	0.026	9.891	0.748	0.203	0.008	100	100	22	0.87	1953	125	2425	70	2848	62
	42	77	30	0.32	0.306	0.021	8.536	0.593	0.203	0.008	100	100	28	0.83	1719	103	2290	63	2847	65
	43	84	34	0.33	0.316	0.022	8.889	0.627	0.204	0.008	100	100	27	0.85	1769	107	2327	64	2860	62
	44	88	36	0.34	0.389	0.031	10.930	0.878	0.204	0.008	100	99	17	0.88	2118	142	2517	75	2858	63
AKOW-3	1	526	55	0.09	0.875	0.047	24.040	1.315	0.199	0.004	99	94	21	0.94	4052	162	3270	53	2821	30
	2	1103	104	0.08	0.442	0.015	12.450	0.427	0.205	0.003	100	98	11	0.93	2357	67	2639	32	2862	20
	3	1447	128	0.07	0.434	0.014	12.180	0.394	0.204	0.002	100	99	12	0.95	2324	63	2618	30	2854	17
	4	1226	77	0.05	0.797	0.036	22.640	1.020	0.206	0.002	100	99	16	0.97	3777	128	3212	44	2876	18
	5	1692	204	0.10	0.460	0.014	12.580	0.384	0.198	0.002	100	99	8	0.95	2440	61	2649	29	2813	16
	6	2759	516	0.15	0.323	0.009	7.845	0.216	0.176	0.002	100	99	20	0.95	1805	43	2213	25	2616	15
	7	3245	606	0.15	0.325	0.009	7.339	0.206	0.164	0.001	100	99	17	0.95	1813	44	2154	25	2496	14
	8	3295	630	0.16	0.359	0.011	8.368	0.255	0.169	0.001	100	99	14	0.96	1978	51	2272	28	2548	14
	9	2880	540	0.15	0.357	0.010	8.208	0.231	0.167	0.001	100	99	14	0.95	1967	47	2254	26	2526	14
	10	2992	590	0.16	0.362	0.010	8.160	0.236	0.163	0.001	100	99	12	0.96	1993	49	2249	26	2490	14
	11	3203	674	0.17	0.342	0.009	7.734	0.212	0.164	0.001	100	99	15	0.95	1895	45	2201	25	2499	14
	12	3364	724	0.18	0.353	0.010	7.942	0.226	0.163	0.001	100	99	13	0.96	1949	48	2225	26	2489	14
	13	3314	684	0.17	0.329	0.009	7.270	0.199	0.160	0.001	100	99	16	0.96	1832	43	2145	24	2460	14
	14	3243	732	0.18	0.349	0.010	7.761	0.219	0.161	0.001	100	100	13	0.96	1931	47	2204	25	2468	14
	15	2985	651	0.18	0.387	0.011	9.027	0.267	0.169	0.001	100	99	11	0.96	2107	53	2341	27	2551	14
	16	2638	546	0.17	0.392	0.011	9.581	0.274	0.177	0.002	100	99	12	0.96	2133	51	2395	26	2627	14
	17	2398	478	0.16	0.420	0.013	10.530	0.317	0.182	0.002	100	99	9	0.96	2261	57	2482	28	2668	15
	18	2017	402	0.16	0.498	0.016	13.000	0.427	0.189	0.002	100	100	3	0.96	2606	70	2680	31	2736	15
	19	1751	323	0.15	0.469	0.014	12.300	0.368	0.190	0.002	100	100	6	0.95	2479	61	2628	28	2744	16
	20	2137	387	0.15	0.399	0.012	10.430	0.306	0.190	0.002	100	100	13	0.95	2165	54	2474	27	2738	15
	21	2101	380	0.15	0.399	0.012	10.430	0.307	0.190	0.002	100	100	13	0.95	2165	54	2473	27	2738	15
	22	1901	328	0.14	0.436	0.013	11.580	0.359	0.192	0.002	100	100	10	0.95	2335	60	2571	29	2763	16
	23	1708	300	0.14	0.453	0.014	12.030	0.373	0.193	0.002	100	100	8	0.95	2409	62	2607	29	2764	16
	24	1556	274	0.14	0.502	0.017	13.370	0.445	0.193	0.002	100	100	3	0.95	2624	71	2706	31	2768	17
	25	1404	247	0.14	0.490	0.015	13.160	0.415	0.195	0.002	100	100	5	0.94	2570	66	2691	30	2783	17
	26	1338	248	0.15	0.511	0.017	13.800	0.454	0.196	0.002	100	100	3	0.95	2662	71	2736	31	2791	18
	27	1324	240	0.15	0.472	0.015	12.900	0.410	0.198	0.002	100	100	7	0.94	2493	65	2672	30	2811	18
	28	1344	254	0.15	0.509	0.018	13.990	0.485	0.199	0.002	100	100	4	0.95	2651	75	2749	33	2822	18
	29	1222	247	0.17	0.437	0.013	12.080	0.372	0.201	0.002	100	100	11	0.93	2338	60	2611	29	2830	18
	30	1192	262	0.18	0.465	0.015	12.980	0.435	0.202	0.002	100	100	8	0.95	2463	68	2678	32	2845	18
	31	1043	199	0.16	0.483	0.016	13.360	0.459	0.201	0.002	100	100	6	0.94	2542	72	2706	32	2830	19
	32	898	160	0.15	0.490	0.017	13.380	0.474	0.198	0.002	100	100	5	0.94	2570	75	2707	34	2811	21
	33	836	137	0.13	0.467	0.016	13.070	0.462	0.203	0.003	100	100	8	0.94	2470	72	2684	33	2850	21
	34	781	138	0.14	0.456	0.016	12.630	0.441	0.201	0.003	100	100	9	0.93	2424	70	2652	33	2832	21
	35	724	135	0.15	0.470	0.017	12.910	0.468	0.199	0.003	100	100	7	0.93	2482	74	2673	34	2821	23
	36	649	98	0.12	0.468	0.017	12.910	0.471	0.200	0.003	100	100	8	0.92	2476	74	2673	34	2826	24
	37	619	114	0.15	0.477	0.018	13.160	0.493	0.200	0.003	100	100	7	0.92	2512	77	2691	35	2828	24
	38	639	117	0.15	0.464	0.016	12.900	0.461	0.202	0.003	100	100	8	0.92	2455	72	2672	34	2840	24
	39	734	130	0.14	0.452	0.015	12.600	0.433	0.202	0.003	100	100	10	0.92	2405	68	2650	32	2843	22
	40	807	179	0.18	0.457	0.015	12.770	0.429	0.203	0.003	100	100	9	0.93	2426	67	2663	32	2848	21

	41	853	183	0.17	0.481	0.016	13.420	0.450	0.203	0.003	100	100	7	0.93	2530	70	2710	32	2847	20
	42	922	230	0.20	0.432	0.013	12.060	0.376	0.202	0.002	100	100	12	0.93	2316	60	2609	29	2845	19
	43	931	240	0.21	0.468	0.015	13.230	0.440	0.205	0.002	100	100	9	0.94	2475	68	2696	31	2867	19
	44	831	209	0.20	0.487	0.016	13.560	0.460	0.202	0.003	100	100	6	0.93	2559	71	2720	32	2841	20
	45	797	176	0.18	0.493	0.017	13.720	0.484	0.202	0.003	100	100	6	0.93	2582	75	2731	33	2843	21
	46	720	146	0.17	0.446	0.014	12.470	0.409	0.203	0.003	100	100	10	0.92	2378	65	2640	31	2848	22
	47	733	156	0.17	0.483	0.017	13.510	0.485	0.203	0.003	100	100	7	0.93	2542	75	2716	34	2848	22
	48	685	146	0.17	0.483	0.017	13.490	0.492	0.203	0.003	100	100	7	0.93	2541	76	2715	34	2847	22
	49	678	133	0.16	0.449	0.015	12.530	0.433	0.203	0.003	100	100	10	0.92	2389	68	2645	33	2847	23
AKOW-6	1	2691	331	0.10	0.192	0.004	5.125	0.112	0.194	0.002	100	99	48	0.93	1132	22	1840	19	2773	14
	2	1848	320	0.14	0.279	0.008	7.555	0.207	0.197	0.002	100	99	32	0.94	1586	38	2180	25	2797	15
	3	1227	234	0.16	0.365	0.012	10.060	0.323	0.200	0.002	100	99	20	0.94	2005	55	2441	30	2826	18
	4	836	153	0.15	0.410	0.014	11.190	0.392	0.198	0.003	100	99	14	0.93	2214	65	2539	33	2810	21
	5	686	125	0.15	0.465	0.018	12.670	0.500	0.198	0.003	100	99	8	0.94	2461	80	2656	37	2808	23
	6	715	129	0.15	0.459	0.018	12.280	0.486	0.194	0.003	100	99	8	0.94	2435	79	2626	37	2777	22
	7	725	155	0.17	0.514	0.020	13.670	0.536	0.193	0.003	100	99	2	0.94	2673	85	2727	37	2768	22
	8	925	214	0.19	0.435	0.015	12.200	0.425	0.204	0.002	100	99	12	0.95	2328	67	2620	33	2854	19
	9	988	234	0.19	0.479	0.017	13.400	0.479	0.203	0.002	100	100	7	0.95	2521	74	2708	34	2851	18
	10	914	188	0.17	0.538	0.021	15.040	0.586	0.203	0.002	100	100	2	0.96	2774	87	2818	37	2849	19
	11	815	165	0.17	0.491	0.018	13.640	0.506	0.202	0.002	100	100	6	0.95	2575	78	2725	35	2838	20
	12	746	165	0.18	0.502	0.019	14.010	0.541	0.202	0.003	100	99	5	0.94	2623	83	2750	37	2845	21
	13	683	133	0.16	0.502	0.020	13.960	0.561	0.202	0.003	100	100	5	0.95	2624	86	2747	38	2840	22
	14	628	125	0.16	0.485	0.019	13.480	0.541	0.202	0.003	100	100	6	0.94	2550	84	2714	38	2838	23
	15	568	108	0.16	0.461	0.018	12.910	0.511	0.203	0.003	100	100	9	0.93	2446	80	2673	37	2850	24
	16	517	99	0.16	0.500	0.021	14.060	0.605	0.204	0.003	100	100	5	0.94	2611	92	2753	41	2859	25
	17	469	93	0.16	0.490	0.021	13.790	0.608	0.204	0.003	100	100	6	0.94	2571	93	2736	42	2860	26
	18	427	79	0.15	0.475	0.021	13.250	0.589	0.202	0.003	100	100	7	0.93	2506	91	2698	42	2845	27
	19	359	70	0.16	0.508	0.024	14.010	0.681	0.200	0.004	100	100	4	0.93	2650	105	2750	46	2825	30
	20	273	52	0.15	0.556	0.028	15.390	0.778	0.201	0.004	100	100	0	0.92	2848	115	2840	48	2834	33
	21	379	77	0.17	0.426	0.019	11.980	0.542	0.204	0.004	100	100	13	0.92	2287	86	2603	42	2858	29
	22	362	73	0.16	0.409	0.017	11.560	0.490	0.205	0.004	100	100	15	0.91	2212	79	2569	40	2864	29
	23	336	65	0.16	0.567	0.030	15.730	0.851	0.201	0.004	100	100	1	0.94	2896	125	2860	52	2835	31
	24	293	55	0.15	0.512	0.025	14.120	0.703	0.200	0.004	100	100	3	0.92	2667	108	2758	47	2825	33
	25	349	88	0.21	0.460	0.022	13.190	0.635	0.208	0.004	100	100	10	0.92	2438	97	2694	45	2891	30
	26	340	73	0.18	0.468	0.022	13.260	0.635	0.206	0.004	100	100	9	0.92	2474	97	2698	45	2871	30
	27	295	67	0.19	0.526	0.027	14.800	0.760	0.204	0.004	100	100	3	0.92	2725	113	2803	49	2859	32
	28	297	71	0.20	0.414	0.018	11.620	0.514	0.203	0.004	100	100	14	0.90	2234	83	2574	41	2854	32
	29	324	85	0.21	0.414	0.018	11.860	0.533	0.208	0.004	100	100	15	0.91	2231	84	2593	42	2889	31
	30	285	72	0.21	0.507	0.026	14.320	0.733	0.205	0.004	100	100	5	0.92	2646	110	2771	49	2864	33
	31	262	61	0.19	0.440	0.021	12.330	0.596	0.203	0.004	100	100	11	0.91	2352	94	2630	45	2851	34
	32	233	59	0.21	0.419	0.020	11.870	0.566	0.205	0.004	100	100	14	0.90	2257	90	2594	45	2869	35
	33	216	56	0.21	0.445	0.022	12.470	0.637	0.203	0.005	100	100	11	0.90	2373	100	2640	48	2851	37
	34	192	45	0.19	0.513	0.029	14.080	0.797	0.199	0.005	100	100	3	0.91	2670	122	2755	54	2818	39
AKOW-3@1	1	855	43	0.04	0.418	0.019	10.740	0.520	0.186	0.003	98	90	10	0.93	2253	88	2501	45	2710	29
	2	696	36	0.04	0.579	0.031	14.720	0.816	0.184	0.003	99	95	5	0.95	2944	129	2797	53	2693	28
	3	881	51	0.05	0.417	0.018	11.150	0.479	0.194	0.003	99	96	12	0.94	2248	80	2536	40	2774	24
	4	1090	65	0.05	0.401	0.016	10.670	0.434	0.193	0.002	100	98	14	0.95	2175	74	2495	38	2766	21
	5	1033	49	0.04	0.470	0.020	11.760	0.508	0.181	0.002	99	95	4	0.95	2484	87	2585	41	2666	23
	6	952	39	0.03	0.578	0.025	14.380	0.627	0.180	0.003	98	91	6	0.94	2942	100	2775	41	2656	24
	7	1286	109	0.07	0.440	0.017	11.750	0.456	0.194	0.002	100	98	10	0.96	2350	76	2585	36	2774	19
	8	1589	197	0.10	0.303	0.010	7.275	0.246	0.174	0.002	100	99	23	0.95	1706	50	2146	30	2598	19
	9	1733	219	0.10	0.273	0.009	6.304	0.212	0.167	0.002	100	99	26	0.95	1557	46	2019	30	2531	18
	10	1764	220	0.10	0.266	0.009	6.054	0.205	0.165	0.002	100	99	26	0.95	1522	45	1984	30	2506	18
	11	1764	234	0.11	0.278	0.009	6.208	0.204	0.162	0.002	100	99	24	0.95	1581	45	2006	29	2477	18

	12	1799	248	0.11	0.329	0.012	7.436	0.267	0.164	0.002	100	99	17	0.96	1835	56	2165	32	2495	18
	13	1754	224	0.10	0.294	0.010	6.947	0.232	0.171	0.002	100	98	24	0.95	1661	48	2105	30	2572	18
	14	1835	270	0.12	0.268	0.008	6.371	0.198	0.173	0.002	100	99	28	0.95	1529	42	2028	27	2583	17
	15	2523	348	0.11	2.262	0.661	54.250	15.850	0.174	0.002	100	99	61	1.00	7623	1310	4074	291	2596	15
	16	-618	-61	0.08	0.071	0.000	1.757	0.006	0.181	0.000	100	99	80	0.80	439.3	1	1030	2	2659	3
	17	1619	215	0.11	0.321	0.010	8.178	0.268	0.185	0.002	100	99	23	0.95	1794	51	2251	30	2696	17
	18	1461	179	0.10	0.333	0.011	8.570	0.276	0.187	0.002	100	99	21	0.95	1850	51	2293	29	2716	17
	19	1270	157	0.10	0.373	0.012	9.651	0.324	0.188	0.002	100	99	16	0.95	2044	58	2402	31	2721	18
	20	1415	158	0.09	0.328	0.010	8.506	0.267	0.188	0.002	100	99	22	0.95	1826	49	2287	29	2728	17
	21	1506	175	0.09	0.334	0.010	8.828	0.276	0.192	0.002	100	99	22	0.95	1856	50	2320	29	2758	16
	22	1377	151	0.09	0.347	0.011	9.080	0.280	0.190	0.002	100	99	20	0.95	1918	51	2346	28	2742	16
	23	1311	148	0.09	0.370	0.012	9.886	0.319	0.194	0.002	100	100	18	0.95	2028	56	2424	30	2775	17
	24	1268	132	0.08	0.358	0.011	9.395	0.293	0.191	0.002	100	99	19	0.95	1971	52	2377	29	2747	17
	25	1203	124	0.08	0.365	0.011	9.662	0.305	0.192	0.002	100	99	18	0.95	2007	54	2403	29	2758	17
	26	1153	124	0.09	0.371	0.012	9.687	0.305	0.189	0.002	100	100	17	0.94	2035	54	2405	29	2736	17
	27	1148	118	0.08	0.377	0.012	11.660	0.367	0.224	0.002	99	95	22	0.94	2062	55	2577	30	3012	18
	28	1137	127	0.09	0.421	0.013	10.870	0.363	0.187	0.002	97	87	10	0.93	2264	61	2512	31	2719	21
	29	1097	116	0.09	0.419	0.013	11.160	0.361	0.193	0.002	99	94	12	0.94	2258	60	2536	30	2767	19
	30	1098	118	0.09	0.450	0.014	12.530	0.397	0.202	0.002	98	94	10	0.94	2397	62	2645	30	2841	18
	31	1043	106	0.08	0.398	0.013	10.520	0.338	0.192	0.002	99	97	14	0.94	2160	58	2482	30	2757	19
	32	954	95	0.08	0.368	0.011	9.619	0.303	0.190	0.002	100	99	17	0.93	2020	54	2399	29	2738	19
	33	947	91	0.08	0.398	0.013	10.420	0.354	0.190	0.002	100	99	13	0.94	2161	62	2473	31	2741	19
	34	946	80	0.07	0.382	0.012	10.090	0.330	0.192	0.002	100	100	16	0.94	2084	58	2443	30	2757	19
	35	915	76	0.07	0.372	0.012	9.834	0.318	0.192	0.002	100	99	17	0.94	2037	56	2419	30	2758	19
	36	857	73	0.07	0.386	0.013	10.140	0.336	0.191	0.002	100	99	15	0.94	2104	59	2448	31	2748	19
	37	833	66	0.06	0.387	0.013	10.160	0.337	0.191	0.002	100	100	15	0.94	2107	59	2450	31	2748	19
	38	799	59	0.06	0.377	0.012	9.856	0.320	0.190	0.002	100	100	16	0.93	2061	57	2421	30	2740	20
	39	842	60	0.06	0.391	0.013	10.300	0.349	0.191	0.002	100	99	15	0.94	2127	61	2462	31	2751	19
AKOW-10	1	1509	392	0.21	0.246	0.007	6.652	0.186	0.196	0.002	100	98	37	0.92	1416	35	2066	25	2796	18
	2	1235	331	0.22	0.256	0.007	6.952	0.193	0.197	0.002	100	99	36	0.91	1468	36	2105	25	2803	19
	3	1128	306	0.22	0.319	0.010	8.922	0.285	0.203	0.002	100	99	26	0.93	1786	49	2330	29	2848	19
	4	949	278	0.24	0.397	0.014	11.080	0.389	0.203	0.002	100	99	16	0.94	2154	64	2530	33	2847	20
	5	854	229	0.22	0.430	0.016	12.010	0.439	0.203	0.003	100	99	12	0.94	2304	70	2605	34	2848	21
	6	834	217	0.21	0.456	0.018	12.670	0.497	0.202	0.003	100	99	9	0.95	2423	79	2656	37	2838	21
	7	800	202	0.21	0.464	0.018	12.990	0.513	0.203	0.003	100	100	9	0.95	2457	80	2679	37	2851	21
	8	729	196	0.22	0.500	0.021	13.990	0.586	0.203	0.003	100	100	5	0.95	2614	90	2749	40	2849	22
	9	662	176	0.22	0.503	0.022	14.420	0.631	0.208	0.003	100	100	6	0.95	2627	94	2777	42	2889	23
	10	543	144	0.22	0.525	0.024	14.650	0.676	0.202	0.003	100	100	3	0.94	2720	102	2793	44	2846	25
	11	440	100	0.19	0.558	0.028	15.280	0.774	0.199	0.003	100	100	1	0.94	2859	116	2833	48	2814	28
	12	393	100	0.21	0.533	0.028	14.760	0.773	0.201	0.004	100	99	2	0.94	2755	116	2800	50	2833	30
	13	372	91	0.20	0.524	0.027	14.690	0.776	0.203	0.004	100	99	3	0.94	2715	116	2795	50	2854	30
	14	391	92	0.19	0.538	0.029	14.760	0.798	0.199	0.004	100	100	1	0.94	2776	121	2800	51	2817	30
	15	404	96	0.19	0.502	0.025	14.430	0.730	0.208	0.004	100	100	6	0.94	2624	108	2778	48	2893	29
	16	418	112	0.22	0.519	0.027	14.720	0.761	0.206	0.004	100	100	4	0.94	2694	113	2797	49	2873	29
	17	418	112	0.22	0.515	0.026	14.470	0.745	0.204	0.004	100	99	4	0.94	2679	112	2781	49	2856	29
	18	407	105	0.21	0.489	0.024	13.970	0.690	0.207	0.004	100	100	7	0.94	2568	104	2747	47	2883	29
AKOW-11	1	2604	618	0.19	0.265	0.007	6.304	0.166	0.172	0.002	100	98	28	0.94	1517	35	2019	23	2580	15
	2	2005	484	0.20	0.321	0.009	7.920	0.222	0.179	0.002	100	99	21	0.95	1797	43	2222	25	2641	15
	3	1396	331	0.19	0.375	0.011	9.957	0.298	0.193	0.002	100	99	17	0.94	2051	52	2431	28	2766	17
	4	1247	316	0.21	0.445	0.016	11.960	0.433	0.195	0.002	100	99	9	0.95	2371	71	2601	34	2786	18
	5	716	2	0.00	0.243	0.005	6.640	0.149	0.199	0.003	100	100	38	0.81	1400	28	2065	20	2814	22
	6	878	191	0.18	0.396	0.013	10.980	0.372	0.201	0.003	100	100	16	0.93	2151	61	2522	32	2835	20
	7	779	177	0.18	0.373	0.012	10.250	0.336	0.200	0.003	100	99	18	0.92	2042	57	2457	30	2822	21
	8	701	148	0.17	0.395	0.014	10.750	0.376	0.197	0.003	100	99	15	0.92	2148	63	2502	33	2803	23

	9	661	142	0.18	0.402	0.014	11.220	0.408	0.202	0.003	100	100	15	0.92	2178	67	2542	34	2846	23
	10	574	125	0.18	0.386	0.014	10.710	0.384	0.201	0.003	100	100	17	0.91	2106	64	2498	33	2834	24
	11	539	126	0.19	0.406	0.015	11.700	0.438	0.209	0.003	100	100	16	0.92	2194	69	2581	35	2900	25
	12	568	123	0.18	0.399	0.015	11.080	0.413	0.201	0.003	100	100	16	0.92	2166	68	2530	35	2837	25
	13	566	129	0.19	0.386	0.014	10.800	0.395	0.203	0.003	100	100	17	0.91	2105	65	2506	34	2849	25
	14	757	177	0.19	0.412	0.016	11.450	0.442	0.202	0.003	100	100	14	0.91	2222	72	2561	36	2841	26
AKOW-9	1	166	49	0.24	0.587	0.040	15.390	1.113	0.190	0.005	95	82	5	0.92	2978	162	2839	69	2742	46
	2	169	53	0.25	0.548	0.037	14.460	1.023	0.191	0.005	96	85	1	0.93	2817	153	2780	67	2754	44
	3	144	40	0.23	0.508	0.031	13.400	0.870	0.192	0.005	97	88	2	0.91	2647	134	2708	61	2755	44
	4	144	37	0.21	0.696	0.056	18.370	1.520	0.191	0.005	98	90	12	0.95	3405	213	3009	80	2754	42
	5	137	42	0.25	0.519	0.033	13.460	0.897	0.188	0.005	97	88	1	0.92	2696	140	2712	63	2725	44
	6	140	46	0.27	0.506	0.031	13.040	0.838	0.187	0.005	98	90	2	0.92	2638	133	2683	61	2716	43
	7	143	44	0.25	0.618	0.045	16.570	1.236	0.195	0.005	98	93	6	0.95	3101	179	2910	72	2781	40
	8	123	35	0.23	0.578	0.039	15.070	1.034	0.189	0.005	99	94	4	0.93	2939	158	2819	65	2735	41
	9	128	40	0.26	0.542	0.035	14.390	0.951	0.192	0.005	99	96	1	0.93	2793	147	2776	63	2763	39
	10	137	39	0.23	0.543	0.035	14.620	0.951	0.195	0.004	99	97	0	0.94	2797	145	2791	62	2787	38
	11	145	48	0.27	0.598	0.041	15.980	1.118	0.194	0.004	99	96	5	0.95	3020	166	2876	67	2776	37
	12	150	44	0.24	0.532	0.033	14.210	0.894	0.194	0.004	99	97	1	0.94	2750	138	2764	60	2774	36
	13	147	50	0.28	0.536	0.032	14.270	0.873	0.193	0.004	99	97	0	0.94	2767	135	2768	58	2769	36
	14	148	48	0.27	0.516	0.030	13.820	0.813	0.194	0.004	100	98	2	0.93	2684	127	2738	56	2778	35
	15	163	50	0.25	0.539	0.033	14.460	0.887	0.195	0.004	99	98	0	0.94	2778	136	2781	58	2782	34
	16	161	62	0.31	0.465	0.025	12.660	0.678	0.197	0.004	100	99	7	0.93	2463	108	2654	50	2804	33
	17	168	53	0.26	0.521	0.031	13.860	0.822	0.193	0.004	100	99	1	0.94	2701	130	2740	56	2769	32
	18	156	46	0.24	0.468	0.025	12.240	0.663	0.190	0.004	100	99	6	0.93	2477	110	2623	51	2738	33
	19	156	50	0.26	0.433	0.022	11.920	0.620	0.200	0.004	100	99	11	0.92	2321	100	2598	49	2822	33
	20	155	46	0.24	0.497	0.028	13.120	0.762	0.192	0.004	100	99	3	0.94	2599	123	2688	55	2756	34
	21	141	44	0.25	0.471	0.026	12.600	0.702	0.194	0.004	100	99	6	0.93	2487	114	2650	52	2777	34
	22	132	38	0.23	0.507	0.030	13.470	0.795	0.193	0.004	100	99	3	0.93	2644	127	2713	56	2765	35
	23	131	34	0.21	0.481	0.026	12.660	0.703	0.191	0.004	100	99	5	0.92	2531	115	2654	52	2750	35
	24	157	53	0.28	0.427	0.021	11.580	0.582	0.197	0.004	100	100	12	0.92	2290	96	2571	47	2800	32
AKOW-15	1	2749	258	0.08	0.313	0.009	9.062	0.257	0.210	0.002	100	99	29	0.96	1757	43	2344	26	2904	13
	2	1811	239	0.11	0.519	0.018	14.580	0.521	0.204	0.002	100	99	3	0.97	2693	78	2788	34	2858	15
	3	1206	172	0.12	0.560	0.022	15.570	0.617	0.202	0.002	100	100	1	0.96	2868	91	2851	38	2839	18
	4	953	162	0.14	0.479	0.018	13.460	0.499	0.204	0.002	100	100	7	0.95	2522	77	2713	35	2858	20
	5	901	158	0.14	0.511	0.021	14.380	0.590	0.204	0.003	100	99	4	0.95	2662	89	2775	39	2858	21
	6	835	163	0.16	0.478	0.019	13.360	0.538	0.203	0.003	100	99	7	0.95	2518	83	2705	38	2848	21
	7	746	139	0.15	0.470	0.019	13.400	0.539	0.207	0.003	100	99	9	0.94	2482	82	2709	38	2882	22
	8	690	127	0.15	0.503	0.022	14.020	0.610	0.202	0.003	100	99	5	0.95	2625	93	2751	41	2845	23
	9	625	115	0.15	0.541	0.025	15.360	0.718	0.206	0.003	100	100	2	0.95	2789	105	2838	45	2872	24
	10	546	105	0.16	0.494	0.022	13.840	0.611	0.203	0.003	100	100	6	0.94	2588	93	2739	42	2853	26
	11	519	106	0.17	0.523	0.025	14.740	0.699	0.205	0.003	100	100	3	0.94	2710	104	2798	45	2862	27
	12	494	95	0.16	0.518	0.025	14.670	0.700	0.206	0.003	100	100	4	0.94	2689	104	2794	45	2871	27
	13	478	96	0.16	0.509	0.024	14.340	0.685	0.204	0.003	100	100	4	0.94	2652	103	2772	45	2861	27
	14	444	92	0.17	0.466	0.021	13.160	0.588	0.205	0.003	100	100	9	0.93	2464	91	2691	42	2867	28
	15	442	92	0.17	0.488	0.023	13.900	0.656	0.207	0.004	100	100	7	0.93	2563	99	2743	45	2879	28
AKOW-17	1	1675	324	0.16	0.338	0.011	8.628	0.288	0.185	0.002	100	99	20	0.96	1875	54	2300	30	2702	16
	2	925	169	0.15	0.464	0.019	12.490	0.502	0.195	0.002	100	100	7	0.96	2458	82	2642	38	2787	20
	3	727	149	0.17	0.473	0.021	13.010	0.569	0.200	0.003	100	100	7	0.95	2497	90	2681	41	2822	22
	4	558	109	0.16	0.489	0.023	13.710	0.637	0.204	0.003	100	100	6	0.95	2564	98	2730	44	2855	24
	5	477	84	0.14	0.516	0.027	14.600	0.757	0.205	0.003	100	100	4	0.95	2680	113	2790	49	2870	26
	6	442	72	0.13	0.500	0.026	13.960	0.741	0.203	0.003	100	100	5	0.95	2613	113	2747	50	2848	27
	7	373	62	0.14	0.502	0.028	13.860	0.770	0.200	0.004	100	100	4	0.95	2624	119	2740	53	2828	30
	8	277	44	0.13	0.506	0.029	14.130	0.818	0.203	0.004	100	100	4	0.94	2640	124	2758	55	2846	33
	9	238	39	0.13	0.543	0.034	14.880	0.951	0.199	0.004	100	100	0	0.94	2798	144	2808	61	2815	36

	10	225	47	0.17	0.562	0.037	15.730	1.035	0.203	0.005	100	100	0	0.94	2875	151	2861	63	2851	37
	11	273	44	0.13	0.453	0.025	12.640	0.717	0.202	0.004	100	100	10	0.93	2410	113	2653	53	2845	34
	12	288	56	0.16	0.517	0.031	14.820	0.893	0.208	0.004	100	100	4	0.94	2684	131	2804	57	2891	33
	13	295	56	0.16	0.515	0.029	14.400	0.823	0.203	0.004	100	100	4	0.94	2677	124	2777	54	2850	32
	14	337	69	0.17	0.519	0.029	14.660	0.832	0.205	0.004	100	100	4	0.95	2695	124	2793	54	2865	30
	15	359	64	0.15	0.470	0.023	13.210	0.660	0.204	0.004	100	100	8	0.94	2485	102	2695	47	2856	29
NCTK10-44-9	1	2115	325	0.12	0.323	0.014	7.865	0.354	0.177	0.002	99	97	20	0.97	1804	70	2216	41	2621	17
	2	1758	240	0.11	0.383	0.018	9.677	0.459	0.183	0.002	100	99	14	0.98	2089	84	2405	44	2684	17
	3	1698	185	0.08	0.381	0.017	10.070	0.461	0.192	0.002	100	99	16	0.97	2079	81	2441	42	2759	17
	4	1639	152	0.07	0.361	0.015	9.634	0.414	0.194	0.002	100	98	19	0.97	1985	73	2400	40	2775	17
	5	1702	158	0.07	0.378	0.017	10.270	0.458	0.197	0.002	100	98	17	0.97	2066	78	2459	41	2802	17
	6	2054	201	0.08	0.310	0.012	8.331	0.329	0.195	0.002	100	99	26	0.97	1740	60	2268	36	2785	16
	7	2294	244	0.08	0.306	0.012	8.057	0.329	0.191	0.002	100	98	26	0.97	1722	61	2237	37	2750	15
	8	2345	287	0.10	0.333	0.014	8.622	0.365	0.188	0.002	100	98	22	0.98	1851	68	2299	39	2724	15
	9	2467	312	0.10	0.385	0.016	9.554	0.400	0.180	0.002	100	99	13	0.98	2099	75	2393	38	2653	15
	10	2517	329	0.10	0.359	0.015	10.020	0.413	0.203	0.002	100	99	21	0.98	1976	70	2437	38	2848	14
	11	2646	372	0.11	0.333	0.013	8.915	0.348	0.194	0.002	100	99	23	0.98	1854	63	2329	36	2777	14
	12	2860	435	0.12	0.308	0.012	8.256	0.323	0.194	0.002	100	98	26	0.98	1732	59	2259	36	2779	14
	13	3021	472	0.12	0.273	0.010	7.178	0.263	0.191	0.002	100	98	31	0.97	1554	50	2134	33	2751	14
	14	3465	587	0.13	0.254	0.009	6.533	0.241	0.187	0.001	100	99	34	0.98	1457	48	2050	32	2715	13
	15	3690	664	0.14	0.263	0.010	6.715	0.255	0.185	0.001	100	98	32	0.98	1506	51	2075	34	2699	13
	16	3841	782	0.16	0.263	0.010	6.611	0.246	0.183	0.001	100	98	31	0.98	1502	49	2061	33	2677	13
	17	3903	906	0.18	0.270	0.009	6.552	0.230	0.176	0.001	100	98	29	0.98	1540	48	2053	31	2616	13
	18	4443	1237	0.22	0.289	0.010	7.720	0.259	0.194	0.001	100	98	29	0.98	1636	48	2199	30	2775	12
	19	5345	1838	0.27	0.243	0.008	6.055	0.189	0.181	0.001	100	98	34	0.98	1403	39	1984	27	2658	11
	20	6082	2263	0.29	0.290	0.009	6.481	0.210	0.162	0.001	100	99	22	0.98	1640	47	2043	29	2479	11
	21	6592	2596	0.31	0.356	0.011	8.439	0.270	0.172	0.001	100	99	15	0.98	1963	54	2279	29	2577	10
	22	6526	2579	0.31	0.446	0.014	11.220	0.362	0.183	0.001	100	99	7	0.99	2377	64	2542	30	2676	9
	23	6184	2395	0.30	0.406	0.013	10.400	0.343	0.186	0.001	100	99	12	0.99	2194	61	2471	31	2708	9
	24	5633	2215	0.31	0.271	0.009	6.591	0.209	0.177	0.001	100	99	28	0.98	1545	43	2058	28	2620	10
	25	5345	2102	0.31	0.176	0.006	3.974	0.128	0.164	0.001	100	99	44	0.98	1045	31	1629	26	2495	12
	26	5207	2085	0.31	0.156	0.005	3.537	0.111	0.165	0.001	100	99	49	0.97	933	27	1536	25	2505	12
	27	5079	1996	0.31	0.174	0.005	4.181	0.132	0.174	0.001	100	100	47	0.98	1035	30	1670	26	2598	12
	28	4693	1854	0.31	0.199	0.006	4.783	0.153	0.174	0.001	100	100	41	0.98	1170	34	1782	27	2600	12
	29	4688	1826	0.30	0.191	0.006	4.787	0.150	0.182	0.001	100	100	45	0.98	1126	32	1783	26	2670	12
NCTK10-44-7	1	1336	636	0.37	0.266	0.011	7.116	0.292	0.194	0.003	99	96	33	0.95	1520	54	2126	37	2777	21
	2	1126	404	0.28	0.332	0.015	8.886	0.408	0.194	0.002	99	97	23	0.96	1847	73	2326	42	2778	21
	3	921	263	0.22	0.390	0.018	12.440	0.593	0.232	0.003	100	99	22	0.97	2122	86	2638	45	3063	20
	4	832	216	0.20	0.383	0.018	10.660	0.490	0.202	0.003	100	100	18	0.96	2090	82	2494	43	2842	21
	5	752	180	0.19	0.457	0.024	12.960	0.691	0.206	0.003	100	100	10	0.97	2426	107	2677	50	2872	21
	6	710	157	0.17	0.483	0.027	13.560	0.753	0.204	0.003	100	99	7	0.97	2541	116	2719	53	2855	22
	7	665	149	0.18	0.460	0.024	12.910	0.683	0.204	0.003	100	100	9	0.97	2437	107	2673	50	2857	22
	8	651	146	0.18	0.448	0.023	12.470	0.649	0.202	0.003	100	100	10	0.97	2387	103	2641	49	2841	22
	9	654	142	0.17	0.461	0.025	12.990	0.695	0.205	0.003	100	100	9	0.97	2442	108	2679	50	2863	23
	10	625	135	0.17	0.466	0.025	13.300	0.731	0.207	0.003	100	100	9	0.97	2467	112	2701	52	2881	23
	11	589	123	0.16	0.481	0.027	13.540	0.771	0.204	0.003	100	100	7	0.97	2532	119	2718	54	2860	23
	12	565	121	0.17	0.481	0.028	13.740	0.793	0.207	0.003	100	100	8	0.97	2534	120	2732	55	2882	24
	13	520	113	0.17	0.486	0.028	13.860	0.810	0.207	0.003	100	100	7	0.97	2551	122	2740	55	2883	25
	14	503	104	0.16	0.503	0.031	14.100	0.880	0.203	0.003	100	100	5	0.97	2627	134	2757	59	2853	25
	15	458	108	0.18	0.466	0.027	13.130	0.777	0.204	0.003	100	100	9	0.96	2467	121	2689	56	2861	26
	16	415	89	0.17	0.494	0.031	14.070	0.891	0.207	0.003	100	100	6	0.97	2588	134	2754	60	2879	27
	17	415	96	0.18	0.492	0.031	13.850	0.889	0.204	0.003	100	100	6	0.97	2578	136	2740	61	2861	28
	18	415	98	0.19	0.467	0.029	13.340	0.828	0.207	0.004	100	100	9	0.96	2469	127	2704	59	2885	28
	19	407	93	0.18	0.449	0.027	12.940	0.778	0.209	0.004	100	100	11	0.96	2391	119	2675	57	2898	28

	20	410	87	0.17	0.479	0.030	13.490	0.862	0.204	0.004	100	100	7	0.96	2524	133	2715	60	2860	28
	21	383	97	0.20	0.470	0.029	13.340	0.835	0.206	0.004	100	100	9	0.96	2483	128	2704	59	2874	29
	22	386	93	0.19	0.487	0.032	13.780	0.907	0.205	0.004	100	100	7	0.96	2557	138	2735	62	2869	29
	23	361	97	0.21	0.469	0.030	13.260	0.844	0.205	0.004	100	100	9	0.96	2478	130	2699	60	2868	30
	24	335	100	0.23	0.422	0.024	12.070	0.692	0.208	0.004	100	100	14	0.95	2269	109	2610	54	2886	30
	25	350	100	0.22	0.475	0.030	13.510	0.862	0.206	0.004	100	100	8	0.96	2505	132	2716	60	2877	30
	26	348	101	0.23	0.414	0.023	11.690	0.659	0.205	0.004	100	100	15	0.95	2231	105	2580	53	2867	30
	27	360	104	0.23	0.462	0.028	13.140	0.809	0.206	0.004	100	100	9	0.96	2449	125	2690	58	2877	29
	28	367	103	0.22	0.444	0.026	12.560	0.744	0.205	0.004	100	100	11	0.96	2368	117	2647	56	2868	29
	29	378	120	0.25	0.431	0.025	12.230	0.702	0.206	0.004	100	100	13	0.95	2311	111	2622	54	2873	29
NCTK10-44-10	1	562	41	0.06	0.350	0.018	8.946	0.466	0.186	0.003	100	99	19	0.95	1932	86	2333	48	2704	26
	2	624	103	0.13	0.361	0.018	9.641	0.488	0.194	0.003	100	100	19	0.96	1987	86	2401	47	2774	25
	3	617	101	0.13	0.408	0.022	10.880	0.585	0.194	0.003	100	99	13	0.96	2204	100	2513	50	2773	25
	4	569	95	0.13	0.463	0.027	12.320	0.730	0.193	0.003	100	100	7	0.97	2452	120	2629	56	2769	25
	5	486	85	0.14	0.487	0.030	13.010	0.802	0.194	0.003	100	100	5	0.97	2556	129	2681	58	2776	27
	6	434	89	0.16	0.428	0.024	11.560	0.664	0.196	0.003	100	100	11	0.96	2295	110	2569	54	2793	28
	7	377	90	0.19	0.556	0.040	15.260	1.113	0.199	0.004	100	100	1	0.97	2851	167	2832	70	2818	30
	8	321	87	0.21	0.468	0.030	12.610	0.807	0.195	0.004	100	100	7	0.95	2475	131	2651	60	2788	33
	9	295	77	0.20	0.473	0.031	13.140	0.864	0.202	0.004	100	100	7	0.95	2495	135	2689	62	2839	33
	10	318	97	0.24	0.505	0.036	14.040	1.010	0.202	0.004	100	100	4	0.96	2636	155	2752	68	2839	33
	11	311	93	0.23	0.429	0.026	11.810	0.732	0.200	0.004	100	100	12	0.95	2302	119	2590	58	2824	33
	12	308	85	0.22	0.533	0.039	15.180	1.121	0.207	0.004	100	100	3	0.96	2752	165	2827	70	2881	32
	13	325	100	0.24	0.502	0.035	14.210	1.003	0.205	0.004	100	100	5	0.96	2624	151	2764	67	2867	32
	14	311	99	0.25	0.444	0.027	12.500	0.777	0.204	0.004	100	100	11	0.95	2367	122	2643	58	2861	32
	15	330	105	0.25	0.555	0.041	15.340	1.145	0.200	0.004	100	100	0	0.97	2848	171	2837	71	2829	32
	16	314	100	0.25	0.472	0.030	13.180	0.842	0.203	0.004	100	100	8	0.95	2491	131	2693	60	2848	32
	17	330	103	0.24	0.478	0.031	13.490	0.876	0.205	0.004	100	100	8	0.96	2518	135	2715	61	2864	31
	18	342	119	0.27	0.505	0.034	14.000	0.950	0.201	0.004	100	100	4	0.96	2635	146	2750	64	2835	31
	19	343	115	0.26	0.500	0.034	14.130	0.966	0.205	0.004	100	100	5	0.96	2613	146	2758	65	2866	31
	20	331	116	0.27	0.512	0.036	14.610	1.024	0.207	0.004	100	100	5	0.96	2666	152	2790	67	2881	31
	21	342	106	0.24	0.538	0.040	15.470	1.162	0.209	0.004	100	100	2	0.97	2775	169	2845	72	2895	31
	22	321	114	0.28	0.481	0.032	13.440	0.906	0.203	0.004	100	100	7	0.96	2533	140	2711	64	2846	32
	23	307	102	0.26	0.513	0.037	14.550	1.046	0.206	0.004	100	100	4	0.96	2670	156	2786	68	2872	33
	24	289	97	0.26	0.513	0.037	14.400	1.049	0.204	0.004	100	100	4	0.96	2670	158	2776	69	2855	33
	25	282	98	0.27	0.569	0.047	16.200	1.335	0.207	0.004	100	100	0	0.97	2902	192	2889	79	2880	34
	26	280	91	0.25	0.580	0.049	16.060	1.371	0.201	0.004	100	100	2	0.97	2947	201	2880	82	2834	35
	27	264	77	0.23	0.553	0.046	15.220	1.257	0.200	0.004	100	100	0	0.97	2839	189	2829	79	2822	36
	28	241	77	0.25	0.510	0.040	13.860	1.096	0.197	0.004	100	100	3	0.96	2656	171	2740	75	2803	37
	29	231	78	0.26	0.519	0.042	14.340	1.177	0.200	0.005	100	100	3	0.96	2696	180	2772	78	2828	37
NCTK10-44-13	1	2106	629	0.23	0.328	0.013	9.138	0.365	0.202	0.002	100	99	25	0.98	1829	63	2352	37	2843	15
	2	1405	388	0.22	0.422	0.018	11.570	0.483	0.199	0.002	100	100	12	0.97	2270	80	2571	39	2817	16
	3	1013	263	0.20	0.467	0.021	13.050	0.589	0.203	0.002	100	100	8	0.97	2472	92	2683	43	2846	18
	4	881	195	0.17	0.450	0.021	12.650	0.600	0.204	0.002	100	100	10	0.97	2396	94	2654	45	2857	20
	5	813	192	0.18	0.441	0.021	12.430	0.595	0.205	0.003	100	100	11	0.97	2355	94	2638	45	2862	20
	6	781	171	0.17	0.450	0.021	12.800	0.612	0.206	0.003	100	100	11	0.96	2393	95	2665	45	2878	21
	7	720	175	0.19	0.452	0.021	12.800	0.605	0.205	0.003	100	100	10	0.96	2404	94	2665	45	2870	22
	8	662	152	0.18	0.460	0.022	13.070	0.636	0.206	0.003	100	100	10	0.96	2438	98	2685	46	2876	22
	9	613	141	0.18	0.487	0.025	13.940	0.724	0.208	0.003	100	100	7	0.96	2558	109	2745	49	2887	23
	10	577	126	0.17	0.446	0.021	12.530	0.603	0.204	0.003	100	100	11	0.96	2377	95	2645	45	2856	24
	11	520	116	0.18	0.403	0.018	11.370	0.505	0.205	0.003	100	100	16	0.94	2183	82	2554	41	2863	25
	12	521	117	0.18	0.452	0.023	12.800	0.653	0.205	0.003	100	100	10	0.96	2404	102	2665	48	2869	25
	13	457	93	0.16	0.423	0.021	12.060	0.591	0.207	0.003	100	100	14	0.95	2272	93	2609	46	2882	26
	14	356	78	0.17	0.410	0.019	11.610	0.557	0.206	0.004	100	100	15	0.93	2213	89	2573	45	2871	29
	15	315	77	0.19	0.461	0.025	13.060	0.720	0.206	0.004	100	100	9	0.94	2444	111	2684	52	2870	31

	16	297	63	0.17	0.454	0.025	12.630	0.702	0.202	0.004	100	100	10	0.94	2411	111	2652	52	2842	32
	17	301	81	0.21	0.415	0.022	11.860	0.620	0.207	0.004	100	100	15	0.93	2237	98	2593	49	2884	32
	18	340	92	0.21	0.386	0.019	10.980	0.544	0.206	0.004	100	100	18	0.93	2104	88	2521	46	2876	30
	19	353	91	0.20	0.405	0.020	11.440	0.583	0.205	0.004	100	100	16	0.94	2191	94	2560	48	2866	30
	20	301	81	0.21	0.364	0.016	10.290	0.469	0.205	0.004	100	100	21	0.91	2001	78	2461	42	2866	31
	21	300	77	0.20	0.431	0.023	12.070	0.659	0.203	0.004	100	100	12	0.94	2312	105	2609	51	2849	32
	22	255	70	0.22	0.373	0.018	10.480	0.517	0.204	0.004	100	100	19	0.91	2044	86	2478	46	2857	34
	23	234	60	0.20	0.369	0.019	10.470	0.532	0.206	0.005	100	100	20	0.91	2025	87	2477	47	2873	36
	24	215	52	0.19	0.370	0.019	10.500	0.548	0.206	0.005	100	100	20	0.90	2028	90	2480	48	2874	37
	25	206	56	0.21	0.401	0.023	11.470	0.652	0.208	0.005	100	100	16	0.92	2172	104	2562	53	2887	38
	26	195	54	0.21	0.359	0.019	10.240	0.545	0.207	0.005	100	100	22	0.90	1976	90	2457	49	2882	39
	27	191	58	0.23	0.355	0.019	10.130	0.541	0.207	0.005	100	100	22	0.90	1956	89	2447	49	2884	39
	28	176	55	0.24	0.336	0.017	9.436	0.487	0.204	0.005	100	100	24	0.88	1867	83	2381	47	2857	41
	29	173	54	0.24	0.367	0.020	10.500	0.581	0.208	0.005	100	100	21	0.89	2013	95	2480	51	2889	41
NCTK10-44-1	1	2514	588	0.18	0.260	0.009	6.914	0.243	0.193	0.002	98	91	34	0.96	1489	46	2100	31	2768	16
	2	2308	546	0.18	0.317	0.012	8.569	0.334	0.196	0.002	99	94	26	0.97	1773	60	2293	36	2796	15
	3	1856	385	0.16	0.365	0.015	9.899	0.401	0.197	0.002	99	97	19	0.97	2004	69	2425	37	2801	15
	4	1464	309	0.16	0.407	0.018	11.200	0.491	0.200	0.002	99	98	14	0.97	2201	81	2540	41	2823	16
	5	1181	239	0.16	0.419	0.018	11.600	0.507	0.201	0.002	99	98	13	0.97	2256	83	2572	41	2832	18
	6	1006	187	0.15	0.469	0.022	12.960	0.625	0.201	0.002	100	98	8	0.97	2478	99	2677	46	2831	19
	7	858	160	0.15	0.490	0.025	13.600	0.693	0.201	0.002	100	99	6	0.97	2572	108	2722	48	2836	20
	8	773	136	0.14	0.454	0.022	12.730	0.613	0.204	0.003	100	99	10	0.96	2411	96	2660	45	2854	21
	9	709	137	0.15	0.433	0.020	12.210	0.567	0.204	0.003	100	99	12	0.96	2320	90	2620	44	2862	22
	10	642	118	0.14	0.474	0.024	13.370	0.680	0.205	0.003	100	99	8	0.96	2499	105	2706	48	2865	22
	11	611	109	0.14	0.481	0.025	13.480	0.712	0.203	0.003	100	99	7	0.96	2530	110	2714	50	2853	23
	12	576	109	0.15	0.458	0.023	12.840	0.658	0.203	0.003	100	99	9	0.96	2431	103	2668	48	2853	24
	13	527	108	0.16	0.451	0.023	12.620	0.636	0.203	0.003	100	99	10	0.95	2400	100	2652	47	2850	25
	14	483	96	0.16	0.482	0.026	13.490	0.740	0.203	0.003	100	99	7	0.96	2535	114	2715	52	2851	26
	15	438	88	0.16	0.504	0.028	13.860	0.777	0.200	0.003	100	99	4	0.96	2629	120	2740	53	2823	28
NCTK10-44-3	1	2108	119	0.04	0.295	0.012	7.537	0.310	0.185	0.002	100	99	27	0.97	1666	60	2177	37	2702	16
	2	2473	150	0.05	0.294	0.011	7.098	0.276	0.175	0.002	100	99	25	0.98	1660	57	2124	35	2609	14
	3	2788	160	0.04	0.250	0.009	6.597	0.239	0.191	0.002	100	100	35	0.97	1440	47	2059	32	2752	14
	4	2875	169	0.05	0.247	0.009	5.970	0.221	0.175	0.001	100	100	32	0.98	1425	47	1972	32	2607	13
	5	3033	177	0.05	0.245	0.009	5.820	0.211	0.172	0.001	100	100	32	0.98	1413	46	1949	31	2580	13
	6	3342	209	0.05	0.229	0.008	5.443	0.199	0.172	0.001	100	100	35	0.98	1330	44	1892	31	2579	13
	7	3500	230	0.05	0.222	0.007	5.318	0.180	0.174	0.001	100	100	37	0.98	1291	39	1872	29	2596	12
	8	3593	244	0.05	0.222	0.008	5.351	0.190	0.175	0.001	100	100	37	0.98	1291	41	1877	30	2607	12
	9	3875	251	0.05	0.193	0.007	4.496	0.154	0.169	0.001	100	100	41	0.98	1138	36	1730	28	2546	12
	10	3960	287	0.06	0.189	0.006	4.313	0.147	0.165	0.001	100	100	41	0.98	1118	35	1696	28	2510	12
	11	4020	302	0.06	0.168	0.005	3.757	0.121	0.162	0.001	100	100	45	0.97	1000	30	1584	26	2481	12
	12	3966	272	0.05	0.172	0.006	3.907	0.129	0.165	0.001	100	100	45	0.98	1021	31	1615	27	2509	12
	13	3921	276	0.05	0.167	0.005	3.953	0.124	0.172	0.001	100	100	48	0.97	994	29	1625	25	2577	12
	14	3646	260	0.06	0.186	0.006	4.458	0.142	0.174	0.001	100	100	44	0.98	1098	32	1723	26	2598	12
	15	3316	240	0.06	0.206	0.007	4.920	0.161	0.173	0.001	100	100	40	0.98	1209	36	1806	28	2587	12
	16	3140	216	0.05	0.202	0.006	5.028	0.155	0.181	0.001	100	100	42	0.97	1186	33	1824	26	2659	13
	17	2872	205	0.06	0.220	0.007	5.425	0.170	0.179	0.001	100	100	38	0.97	1282	36	1889	27	2642	13
	18	2713	184	0.05	0.226	0.007	5.809	0.181	0.187	0.001	100	100	39	0.97	1312	37	1948	27	2713	13
	19	2605	177	0.05	0.237	0.007	6.122	0.191	0.187	0.001	100	100	37	0.97	1373	38	1993	27	2716	13
	20	2466	172	0.05	0.258	0.008	6.916	0.222	0.194	0.002	100	100	35	0.97	1480	42	2101	29	2779	13
	21	2386	167	0.05	0.258	0.008	6.836	0.217	0.193	0.002	100	100	34	0.97	1477	42	2090	28	2764	13
	22	2294	145	0.05	0.261	0.008	6.947	0.215	0.193	0.002	100	100	34	0.97	1496	41	2105	27	2767	13
	23	2235	151	0.05	0.281	0.009	7.490	0.237	0.193	0.002	100	100	30	0.97	1598	45	2172	28	2768	13
	24	2257	159	0.05	0.292	0.009	8.072	0.257	0.201	0.002	100	100	30	0.97	1652	46	2239	29	2830	13
	25	2321	155	0.05	0.311	0.010	8.310	0.279	0.194	0.002	100	100	26	0.97	1743	51	2265	30	2777	13

	26	2232	143	0.05	0.320	0.010	8.414	0.275	0.191	0.002	100	100	24	0.97	1791	51	2277	30	2747	13
	27	2141	148	0.05	0.377	0.013	10.020	0.347	0.193	0.002	100	100	17	0.97	2062	61	2437	32	2767	13
	28	1965	139	0.06	0.337	0.011	9.010	0.297	0.194	0.002	100	100	22	0.97	1870	53	2339	30	2778	13
	29	1859	138	0.06	0.357	0.012	9.483	0.323	0.193	0.002	100	100	19	0.97	1965	57	2386	31	2767	14
	30	1727	121	0.05	0.345	0.011	9.160	0.301	0.192	0.002	100	100	21	0.97	1913	54	2354	30	2762	14
	31	1686	104	0.05	0.366	0.013	9.927	0.350	0.197	0.002	100	100	19	0.97	2012	61	2428	33	2797	14
	32	1636	102	0.05	0.362	0.013	9.718	0.339	0.195	0.002	100	100	19	0.97	1989	59	2408	32	2785	15
	33	1463	90	0.05	0.372	0.013	10.020	0.355	0.195	0.002	100	100	18	0.97	2040	62	2437	33	2786	15
	34	1383	95	0.05	0.413	0.016	11.020	0.426	0.194	0.002	100	100	13	0.97	2227	73	2525	36	2774	15
	35	1403	83	0.05	0.396	0.015	10.710	0.400	0.196	0.002	100	100	15	0.97	2152	68	2498	35	2793	15
	36	1398	97	0.05	0.394	0.014	10.670	0.383	0.196	0.002	100	100	15	0.97	2142	65	2494	33	2795	16
	37	1322	107	0.06	0.371	0.013	9.979	0.363	0.195	0.002	100	100	18	0.97	2035	63	2433	34	2784	16
	38	1298	98	0.06	0.359	0.013	9.877	0.366	0.200	0.002	100	100	20	0.97	1977	63	2423	34	2823	16
	39	1312	101	0.06	0.347	0.013	9.737	0.358	0.204	0.002	100	100	23	0.96	1919	61	2410	34	2856	16
	40	1355	112	0.06	0.355	0.013	9.725	0.370	0.199	0.002	100	100	21	0.97	1958	64	2409	35	2815	16
	41	1454	184	0.10	0.325	0.012	8.887	0.330	0.199	0.002	100	100	25	0.97	1813	58	2326	34	2814	16
	42	1655	310	0.15	0.299	0.011	7.977	0.297	0.193	0.002	100	100	28	0.97	1687	55	2228	34	2772	15
	43	1895	474	0.20	0.230	0.008	6.011	0.199	0.190	0.002	100	100	39	0.96	1335	40	1977	29	2738	15
	44	2205	643	0.23	0.213	0.007	5.411	0.183	0.184	0.002	100	100	41	0.97	1246	38	1887	29	2690	14
	45	2549	801	0.25	0.187	0.006	4.808	0.149	0.187	0.002	100	100	47	0.97	1104	31	1786	26	2713	14
	46	3060	1001	0.26	0.174	0.005	4.227	0.132	0.177	0.001	100	100	48	0.97	1032	30	1679	26	2620	13
	47	3471	1165	0.26	0.169	0.005	4.007	0.122	0.173	0.001	100	100	48	0.97	1004	28	1636	25	2582	13
	48	3759	1348	0.28	0.181	0.005	4.804	0.136	0.192	0.001	100	100	50	0.97	1075	28	1786	24	2760	11
	49	4042	1435	0.28	0.163	0.005	3.711	0.107	0.165	0.001	100	100	47	0.97	975	26	1574	23	2505	12
NCTK10-44-4	1	179	55	0.24	0.442	0.034	11.740	0.938	0.193	0.005	99	95	9	0.94	2361	154	2584	75	2764	47
	2	155	53	0.27	0.515	0.054	13.710	1.467	0.193	0.006	99	97	2	0.96	2676	231	2730	101	2770	50
	3	137	48	0.27	0.459	0.045	12.840	1.281	0.203	0.006	100	98	9	0.95	2434	200	2668	94	2850	51
	4	134	51	0.29	0.380	0.032	10.330	0.880	0.197	0.006	99	97	17	0.93	2074	148	2465	79	2804	52
	5	145	51	0.28	0.508	0.054	13.950	1.490	0.199	0.006	100	98	4	0.96	2650	230	2746	101	2818	49
	6	147	52	0.27	0.521	0.053	14.340	1.472	0.200	0.006	100	99	2	0.96	2704	225	2772	98	2823	47
	7	147	63	0.34	0.518	0.049	14.550	1.395	0.204	0.006	100	98	3	0.95	2691	209	2786	91	2856	47
	8	207	66	0.25	0.495	0.046	13.810	1.283	0.202	0.005	100	99	5	0.96	2593	197	2737	88	2845	41
	9	220	65	0.23	0.465	0.038	13.000	1.069	0.203	0.005	100	99	9	0.96	2461	167	2680	78	2849	39
	10	238	72	0.24	0.495	0.041	13.800	1.149	0.202	0.005	100	100	5	0.96	2592	176	2736	79	2845	37
	11	237	78	0.26	0.492	0.040	14.000	1.136	0.207	0.005	100	100	6	0.96	2578	171	2750	77	2879	36
	12	232	86	0.29	0.477	0.038	13.490	1.071	0.205	0.005	100	100	8	0.96	2514	164	2715	75	2868	37
	13	215	83	0.30	0.475	0.037	13.230	1.043	0.202	0.005	100	99	7	0.95	2504	162	2696	74	2843	39
	14	196	68	0.27	0.559	0.051	15.730	1.433	0.204	0.005	100	100	0	0.96	2861	209	2861	87	2860	40
	15	210	80	0.30	0.466	0.037	12.900	1.022	0.201	0.005	100	99	8	0.95	2465	161	2673	75	2834	39
	16	231	97	0.33	0.497	0.041	14.310	1.182	0.209	0.005	100	100	6	0.96	2599	176	2770	78	2897	37
	17	238	100	0.33	0.534	0.046	14.990	1.296	0.204	0.005	100	99	2	0.97	2757	193	2815	82	2857	37
	18	242	111	0.36	0.537	0.047	15.170	1.348	0.205	0.005	100	99	2	0.97	2770	199	2826	85	2867	37
	19	203	88	0.34	0.533	0.045	14.780	1.264	0.201	0.005	100	100	2	0.96	2754	191	2801	81	2835	39
	20	190	87	0.36	0.539	0.048	14.740	1.309	0.199	0.005	100	100	1	0.96	2777	199	2798	84	2814	39
	21	185	80	0.34	0.449	0.035	12.480	0.974	0.202	0.005	100	100	10	0.95	2389	155	2641	73	2841	40
	22	183	80	0.34	0.531	0.048	14.580	1.334	0.199	0.005	100	99	1	0.96	2748	203	2788	87	2818	41
	23	170	72	0.33	0.548	0.052	15.510	1.488	0.205	0.005	100	100	1	0.96	2816	218	2847	92	2869	42
	24	172	66	0.30	0.605	0.065	17.160	1.856	0.206	0.005	100	99	3	0.97	3048	261	2944	104	2873	42
	25	162	63	0.31	0.497	0.045	13.430	1.225	0.196	0.005	100	99	4	0.96	2600	194	2710	86	2794	44
	26	167	70	0.33	0.584	0.062	16.190	1.721	0.201	0.005	100	100	3	0.97	2966	251	2888	102	2834	43
	27	154	60	0.30	0.600	0.064	16.350	1.765	0.198	0.005	100	100	4	0.97	3028	259	2898	103	2808	45
	28	149	58	0.30	0.524	0.049	14.430	1.362	0.200	0.006	100	100	2	0.96	2717	208	2779	90	2824	45
	29	164	71	0.34	0.604	0.064	16.640	1.772	0.200	0.005	100	100	4	0.97	3047	257	2914	102	2824	43
NCTK10-44-5	1	1760	571	0.25	0.229	0.010	6.087	0.275	0.193	0.003	99	96	40	0.95	1329	53	1988	39	2767	24

	2	663	269	0.32	0.420	0.024	10.960	0.625	0.189	0.004	100	98	11	0.94	2259	107	2520	53	2737	31
	3	341	137	0.31	0.399	0.025	10.420	0.679	0.190	0.005	99	97	13	0.92	2163	117	2473	60	2738	43
	4	226	112	0.39	0.324	0.021	8.709	0.587	0.195	0.006	100	99	24	0.90	1810	104	2308	61	2784	50
	5	178	83	0.36	0.315	0.023	8.344	0.611	0.192	0.006	100	100	25	0.89	1767	111	2269	66	2759	55
	6	168	85	0.39	0.297	0.022	8.178	0.627	0.200	0.007	100	98	29	0.89	1676	110	2251	69	2824	57
	7	147	69	0.37	0.322	0.026	9.285	0.774	0.209	0.008	100	99	27	0.90	1798	128	2367	76	2901	61
	8	123	59	0.37	0.298	0.024	8.178	0.674	0.199	0.008	100	99	29	0.87	1682	119	2251	75	2818	67
	9	105	56	0.42	0.268	0.022	7.443	0.619	0.201	0.009	99	98	34	0.85	1531	110	2166	74	2837	73
	10	101	39	0.30	0.367	0.038	10.100	1.053	0.199	0.009	100	99	19	0.91	2017	178	2444	96	2820	74
	11	87	36	0.32	0.281	0.025	8.026	0.742	0.207	0.010	100	98	33	0.86	1596	127	2234	83	2884	78
	12	81	31	0.30	0.292	0.028	8.093	0.778	0.201	0.010	100	100	30	0.87	1653	138	2241	87	2833	80
	13	68	32	0.36	0.262	0.024	7.476	0.703	0.207	0.011	100	99	37	0.84	1499	123	2170	84	2883	86
	14	71	30	0.33	0.293	0.030	8.118	0.836	0.201	0.011	100	99	30	0.87	1656	147	2244	93	2834	85
	15	67	30	0.35	0.274	0.027	7.364	0.738	0.195	0.011	100	99	32	0.84	1560	135	2157	90	2786	91
	16	70	32	0.35	0.328	0.038	9.244	1.099	0.205	0.011	99	96	26	0.89	1827	183	2363	109	2863	91
	17	63	26	0.33	0.318	0.036	8.624	0.999	0.197	0.011	100	98	25	0.87	1781	176	2299	105	2797	94
	18	56	26	0.37	0.282	0.030	7.597	0.830	0.195	0.012	99	97	31	0.84	1602	149	2185	98	2787	99
	19	53	23	0.35	0.348	0.041	9.534	1.165	0.199	0.012	99	98	22	0.87	1923	198	2391	112	2817	99
NCTK10-44-6	1	2067	204	0.08	0.327	0.013	8.229	0.335	0.182	0.002	99	96	21	0.97	1826	64	2257	37	2674	17
	2	2095	209	0.08	0.379	0.016	9.794	0.415	0.188	0.002	100	98	15	0.97	2070	75	2416	39	2721	16
	3	2709	299	0.09	0.295	0.011	7.528	0.283	0.185	0.002	100	98	27	0.97	1664	55	2176	34	2702	14
	4	3393	469	0.11	0.278	0.010	6.771	0.255	0.177	0.001	100	99	27	0.98	1580	53	2082	33	2623	13
	5	3652	630	0.13	0.242	0.009	6.027	0.219	0.181	0.001	100	99	35	0.98	1395	45	1980	32	2662	13
	6	3539	726	0.16	0.287	0.011	7.368	0.291	0.186	0.001	100	99	28	0.98	1625	56	2157	35	2711	13
	7	3089	650	0.16	0.341	0.013	10.010	0.375	0.213	0.002	100	99	25	0.98	1892	61	2436	35	2928	12
	8	2671	594	0.17	0.332	0.013	8.895	0.344	0.195	0.002	100	99	23	0.98	1846	62	2327	35	2782	13
	9	2433	615	0.20	0.318	0.012	8.162	0.313	0.186	0.002	100	99	23	0.98	1780	59	2249	35	2708	14
	10	2244	584	0.20	0.339	0.013	9.175	0.367	0.197	0.002	100	99	22	0.98	1880	65	2356	37	2797	14
	11	2041	534	0.20	0.326	0.013	8.481	0.346	0.189	0.002	100	99	23	0.98	1821	64	2284	37	2729	15
	12	1854	496	0.21	0.307	0.012	7.666	0.298	0.181	0.002	100	99	24	0.97	1725	58	2193	35	2664	16
	13	1704	455	0.21	0.314	0.012	8.798	0.338	0.204	0.002	100	100	27	0.97	1758	59	2317	35	2854	15
	14	1610	435	0.21	0.301	0.012	8.013	0.313	0.193	0.002	100	99	27	0.97	1698	58	2233	35	2767	16
	15	1563	402	0.20	0.296	0.011	7.943	0.302	0.195	0.002	100	99	28	0.97	1671	56	2225	34	2783	16
	16	1482	415	0.22	0.290	0.011	7.600	0.279	0.190	0.002	100	99	28	0.96	1640	53	2185	33	2744	17
	17	1441	377	0.20	0.300	0.011	8.027	0.294	0.194	0.002	100	99	28	0.96	1690	54	2234	33	2779	17
	18	1466	403	0.21	0.307	0.012	8.306	0.322	0.196	0.002	100	99	27	0.97	1727	58	2265	35	2794	17
	19	1396	382	0.21	0.282	0.010	7.562	0.272	0.195	0.002	100	99	31	0.96	1602	51	2180	32	2780	17
	20	1286	341	0.21	0.278	0.010	7.319	0.262	0.191	0.002	100	99	30	0.95	1583	50	2151	32	2748	18
	21	1236	334	0.21	0.280	0.010	7.288	0.265	0.189	0.002	100	99	30	0.96	1592	51	2147	32	2731	18
	22	1170	295	0.20	0.282	0.010	7.388	0.266	0.190	0.002	100	99	30	0.95	1603	51	2160	32	2740	18
	23	1145	285	0.19	0.292	0.010	7.662	0.276	0.190	0.002	100	100	28	0.95	1651	52	2192	32	2745	18
	24	1120	300	0.21	0.278	0.010	7.118	0.246	0.186	0.002	100	100	29	0.95	1582	48	2126	31	2703	19
	25	1046	274	0.20	0.280	0.009	7.359	0.251	0.191	0.002	100	100	30	0.94	1590	48	2156	31	2749	19
	26	1012	268	0.21	0.275	0.009	7.156	0.248	0.189	0.002	100	100	31	0.94	1566	48	2131	31	2731	19
	27	957	239	0.20	0.261	0.009	6.893	0.229	0.192	0.002	100	99	34	0.93	1493	44	2098	29	2758	20
	28	918	248	0.21	0.278	0.009	7.338	0.251	0.191	0.002	100	99	31	0.94	1583	47	2153	31	2752	20
	29	936	219	0.18	0.284	0.010	7.384	0.261	0.189	0.002	100	100	29	0.94	1609	50	2159	32	2733	20
NCTK10-44-3@1	1	1552	124	0.06	0.288	0.013	7.101	0.313	0.179	0.002	100	98	26	0.96	1632	63	2124	39	2641	21
	2	1414	72	0.04	0.270	0.011	6.667	0.263	0.179	0.002	100	99	29	0.95	1541	54	2068	35	2644	20
	3	1406	65	0.04	0.281	0.011	6.770	0.269	0.175	0.002	100	99	27	0.96	1594	56	2082	35	2607	20
	4	1406	70	0.04	0.327	0.013	7.462	0.306	0.166	0.002	100	99	17	0.96	1823	65	2168	37	2514	19
	5	1343	59	0.03	0.320	0.013	7.608	0.303	0.173	0.002	100	100	20	0.96	1788	62	2186	36	2583	19
	6	1378	53	0.03	0.296	0.012	7.258	0.298	0.178	0.002	100	99	25	0.96	1670	60	2144	37	2634	18
	7	1447	58	0.03	0.272	0.010	6.616	0.253	0.177	0.002	100	100	28	0.96	1551	52	2061	34	2620	18

	8	1471	82	0.04	0.315	0.012	6.278	0.241	0.145	0.002	100	100	13	0.96	1765	59	2015	34	2282	18
	9	1554	115	0.06	0.552	0.020	11.930	0.445	0.157	0.001	100	100	9	0.97	2835	85	2599	35	2420	16
	10	1621	121	0.06	0.320	0.012	7.708	0.289	0.175	0.002	100	100	21	0.97	1788	58	2198	34	2605	17
	11	1595	112	0.05	0.282	0.010	6.672	0.240	0.172	0.002	100	100	26	0.96	1599	51	2069	32	2576	17
	12	1644	119	0.06	0.273	0.010	6.570	0.239	0.175	0.002	100	100	28	0.96	1554	50	2055	32	2604	17
	13	1761	120	0.05	0.297	0.011	7.061	0.259	0.172	0.002	100	99	23	0.97	1678	54	2119	33	2580	16
	14	1736	142	0.06	0.343	0.012	8.678	0.306	0.184	0.002	100	99	19	0.96	1901	58	2305	32	2685	16
	15	1828	137	0.06	0.421	0.016	10.940	0.413	0.188	0.002	100	99	11	0.97	2266	72	2518	35	2728	15
	16	1920	210	0.09	0.425	0.015	10.510	0.379	0.179	0.002	100	99	8	0.97	2284	69	2481	34	2646	15
	17	2012	239	0.09	0.415	0.015	10.160	0.366	0.177	0.002	100	99	9	0.97	2240	68	2449	33	2628	15
	18	2004	254	0.10	0.401	0.014	9.811	0.349	0.177	0.002	100	99	11	0.97	2174	65	2417	33	2629	15
	19	1989	283	0.11	0.356	0.012	8.823	0.309	0.180	0.002	100	99	17	0.97	1965	59	2320	32	2649	15
	20	2130	365	0.13	0.330	0.012	7.954	0.290	0.175	0.002	100	99	19	0.97	1838	58	2226	33	2604	15
	21	2261	432	0.15	0.342	0.012	8.460	0.308	0.179	0.002	100	98	18	0.97	1897	59	2282	33	2646	15
	22	2317	567	0.19	0.332	0.011	8.065	0.281	0.176	0.002	100	98	19	0.97	1847	56	2238	32	2618	15
	23	2560	871	0.27	0.363	0.013	9.185	0.323	0.183	0.002	99	98	16	0.97	1998	60	2357	32	2683	14
	24	2895	1364	0.37	0.319	0.010	7.883	0.245	0.179	0.001	99	97	22	0.97	1784	48	2218	28	2646	14
	25	3247	1708	0.41	0.287	0.009	6.762	0.206	0.171	0.001	99	96	25	0.96	1624	43	2081	27	2569	14
	26	3507	1941	0.43	0.264	0.007	6.249	0.179	0.172	0.001	99	97	29	0.96	1509	38	2011	25	2576	13
	27	3669	1786	0.38	0.264	0.007	6.447	0.182	0.177	0.001	99	97	30	0.96	1512	38	2039	25	2624	13
	28	3672	1696	0.36	0.258	0.007	5.984	0.169	0.168	0.001	99	97	29	0.96	1478	37	1974	25	2542	13
	29	3465	1530	0.34	0.261	0.007	6.119	0.170	0.170	0.001	99	97	28	0.96	1497	37	1993	24	2555	13
	30	3102	1282	0.32	0.265	0.007	6.489	0.180	0.177	0.001	99	97	30	0.96	1517	37	2044	25	2628	13
	31	2746	1082	0.31	0.259	0.007	6.188	0.166	0.174	0.001	100	98	30	0.96	1482	35	2003	24	2593	13
	32	2522	951	0.29	0.281	0.008	6.068	0.167	0.157	0.001	99	97	22	0.95	1597	38	1986	24	2419	14
	33	2442	849	0.27	0.269	0.007	6.225	0.172	0.168	0.001	100	98	27	0.95	1535	37	2008	24	2536	14
	34	2266	811	0.28	0.240	0.006	5.797	0.155	0.175	0.002	100	98	33	0.95	1388	33	1946	23	2606	15
	35	2141	746	0.27	0.250	0.007	5.968	0.161	0.173	0.002	100	98	31	0.95	1441	34	1971	24	2585	15
	36	1944	680	0.27	0.252	0.007	6.047	0.161	0.174	0.002	100	98	31	0.94	1449	34	1983	23	2597	15
	37	1881	624	0.26	0.262	0.007	6.403	0.175	0.177	0.002	99	98	30	0.94	1501	36	2033	24	2626	16
	38	1747	592	0.26	0.244	0.006	5.806	0.154	0.173	0.002	100	98	32	0.93	1408	33	1947	23	2582	16
	39	1688	561	0.26	0.253	0.007	6.265	0.172	0.180	0.002	100	98	32	0.94	1451	35	2014	24	2652	16
Metafeldspathic arenite (NCB13-9B; NAD 83, Zone 15, 688250E, 5825109N)																				
NCGB13-9B-2	1	1945	1814	0.93	0.178	0.007	4.460	0.247	0.182	0.007	93	74	48	0.77	1054	39	1724	46	2673	59
	2	1615	1258	0.78	0.224	0.009	5.720	0.266	0.185	0.005	96	85	39	0.82	1305	46	1934	40	2697	44
	3	1360	976	0.72	0.285	0.012	7.420	0.339	0.189	0.004	98	92	29	0.87	1615	60	2163	41	2734	38
	4	1154	786	0.68	0.342	0.015	8.980	0.419	0.190	0.004	99	94	21	0.88	1896	72	2336	43	2745	36
	5	1067	659	0.62	0.353	0.015	9.400	0.426	0.193	0.004	99	97	20	0.88	1951	73	2378	42	2768	35
	6	973	588	0.60	0.385	0.018	10.400	0.487	0.195	0.004	99	97	16	0.89	2101	81	2468	44	2785	35
	7	907	523	0.58	0.372	0.016	9.870	0.444	0.193	0.004	100	98	17	0.88	2036	76	2423	41	2766	36
	8	940	484	0.51	0.364	0.016	9.670	0.435	0.193	0.004	100	98	18	0.88	2000	75	2404	41	2766	36
	9	853	471	0.55	0.381	0.017	10.000	0.459	0.191	0.004	100	99	16	0.88	2081	79	2438	42	2751	36
	10	825	436	0.53	0.391	0.017	10.500	0.483	0.196	0.004	100	99	16	0.88	2125	81	2484	42	2792	36
	11	802	409	0.51	0.388	0.017	10.600	0.485	0.198	0.004	100	100	16	0.88	2115	80	2489	42	2811	36
	12	845	468	0.55	0.384	0.017	10.400	0.468	0.197	0.004	100	100	17	0.87	2095	78	2472	42	2798	37
	13	867	446	0.51	0.406	0.018	11.200	0.522	0.201	0.005	100	99	15	0.88	2196	84	2544	43	2833	37
	14	786	425	0.54	0.379	0.016	10.500	0.453	0.200	0.005	100	100	18	0.86	2073	75	2477	40	2828	37
	15	801	394	0.49	0.399	0.018	10.800	0.489	0.196	0.004	100	100	14	0.87	2165	82	2503	42	2790	37
	16	790	427	0.54	0.409	0.018	11.200	0.498	0.199	0.005	100	100	14	0.87	2210	81	2541	41	2817	37
	17	707	383	0.54	0.375	0.016	10.600	0.456	0.206	0.005	100	100	19	0.85	2054	73	2492	40	2872	37
	18	726	377	0.52	0.380	0.016	10.500	0.462	0.201	0.005	100	100	18	0.86	2078	76	2482	41	2832	37
	19	767	395	0.51	0.418	0.019	11.900	0.538	0.206	0.005	100	100	14	0.87	2252	84	2594	42	2873	37
	20	711	368	0.52	0.375	0.016	10.200	0.434	0.197	0.005	100	100	18	0.85	2051	73	2452	39	2803	38
	21	705	374	0.53	0.396	0.017	11.000	0.489	0.201	0.005	100	100	16	0.86	2148	79	2519	42	2833	38

	22	690	350	0.51	0.374	0.016	10.200	0.438	0.198	0.005	100	100	18	0.85	2047	73	2454	40	2811	38
	23	683	342	0.50	0.374	0.016	10.400	0.451	0.201	0.005	100	100	19	0.85	2049	74	2467	40	2833	38
	24	713	399	0.56	0.376	0.016	10.500	0.461	0.203	0.005	100	100	19	0.85	2055	75	2479	41	2848	38
	25	700	366	0.52	0.361	0.015	10.200	0.440	0.205	0.005	100	100	21	0.85	1986	72	2453	40	2866	38
	26	687	334	0.49	0.366	0.015	10.300	0.443	0.204	0.005	100	100	20	0.85	2011	72	2461	40	2857	38
	27	676	329	0.49	0.382	0.016	10.600	0.462	0.202	0.005	100	100	18	0.85	2085	75	2490	40	2839	39
	28	695	372	0.53	0.372	0.016	10.300	0.448	0.201	0.005	100	100	19	0.85	2037	74	2463	40	2836	38
	29	693	345	0.50	0.366	0.015	9.900	0.423	0.196	0.005	100	100	19	0.84	2008	72	2426	39	2797	39
NCGB13-9B-3	1	2043	1327	0.65	0.133	0.005	4.310	0.183	0.235	0.005	98	94	71	0.87	804	29	1695	35	3089	34
	2	1154	600	0.52	0.254	0.011	8.500	0.388	0.243	0.005	99	98	44	0.90	1458	58	2285	42	3138	32
	3	877	295	0.34	0.355	0.016	12.000	0.549	0.245	0.005	100	99	28	0.89	1960	76	2604	43	3152	33
	4	876	198	0.23	0.485	0.025	16.700	0.856	0.250	0.005	100	99	13	0.92	2549	107	2918	49	3183	32
	5	835	115	0.14	0.501	0.024	17.900	0.858	0.259	0.005	100	100	13	0.91	2620	102	2984	46	3239	31
	6	857	94	0.11	0.541	0.026	19.600	0.948	0.263	0.005	100	100	10	0.92	2787	108	3071	47	3262	30
	7	808	66	0.08	0.552	0.025	19.900	0.909	0.261	0.005	100	100	8	0.91	2834	104	3085	44	3253	31
	8	816	53	0.06	0.578	0.027	21.100	0.988	0.264	0.005	100	100	7	0.92	2940	110	3141	46	3272	30
	9	818	38	0.05	0.608	0.029	22.200	1.070	0.265	0.005	100	100	4	0.92	3063	116	3193	47	3275	30
	10	777	29	0.04	0.596	0.027	22.100	1.020	0.269	0.005	100	100	6	0.91	3012	110	3188	45	3301	31
	11	750	32	0.04	0.656	0.032	24.700	1.210	0.273	0.005	100	100	1	0.92	3253	124	3296	48	3323	31
	12	760	24	0.03	0.647	0.031	24.800	1.200	0.278	0.006	100	100	3	0.92	3217	122	3300	47	3351	31
	13	705	17	0.02	0.633	0.030	24.200	1.140	0.278	0.006	100	100	4	0.91	3161	117	3278	46	3350	31
	14	714	24	0.03	0.658	0.032	25.800	1.260	0.285	0.006	100	100	2	0.92	3261	124	3340	48	3388	31
	15	770	27	0.04	0.610	0.028	24.900	1.170	0.295	0.006	100	100	7	0.91	3071	114	3302	46	3446	30
	16	758	19	0.03	0.648	0.031	25.700	1.230	0.288	0.006	100	100	3	0.91	3221	120	3335	47	3404	31
	17	728	17	0.02	0.656	0.031	26.800	1.280	0.296	0.006	100	100	4	0.91	3252	121	3376	47	3450	30
	18	747	18	0.02	0.650	0.030	26.400	1.240	0.295	0.006	100	100	4	0.91	3229	119	3362	46	3442	30
	19	744	14	0.02	0.618	0.028	25.200	1.130	0.295	0.006	100	100	7	0.90	3103	109	3314	44	3445	31
	20	755	20	0.03	0.665	0.032	27.700	1.330	0.303	0.006	100	100	4	0.92	3285	123	3409	47	3483	30
	21	789	18	0.02	0.628	0.028	25.700	1.160	0.297	0.006	100	100	6	0.90	3141	111	3336	44	3456	30
	22	827	14	0.02	0.687	0.033	28.200	1.370	0.298	0.006	100	100	2	0.92	3371	127	3427	48	3461	30
	23	786	17	0.02	0.633	0.028	26.400	1.200	0.303	0.006	100	100	6	0.91	3163	112	3362	44	3484	30
	24	791	13	0.02	0.664	0.031	27.500	1.300	0.301	0.006	100	100	4	0.92	3283	120	3403	46	3474	30
	25	792	14	0.02	0.671	0.031	28.300	1.340	0.306	0.006	100	100	4	0.92	3308	121	3431	46	3503	29
	26	786	11	0.01	0.659	0.030	27.500	1.260	0.303	0.006	100	100	4	0.91	3264	117	3402	45	3484	29
	27	791	10	0.01	0.667	0.031	27.900	1.300	0.303	0.006	100	100	4	0.92	3295	119	3415	46	3486	29
	28	813	11	0.01	0.651	0.029	27.300	1.240	0.304	0.006	100	100	5	0.92	3234	115	3393	44	3488	29
	29	795	16	0.02	0.841	0.046	35.300	1.920	0.304	0.006	100	100	8	0.94	3933	159	3646	54	3492	29
NCGB13-9B-4	1	1450	1420	0.98	0.142	0.005	3.380	0.174	0.173	0.006	97	85	55	0.70	853	30	1501	40	2591	61
	2	1284	1058	0.82	0.202	0.008	5.170	0.229	0.186	0.005	98	92	44	0.78	1187	42	1848	38	2704	46
	3	1164	931	0.80	0.256	0.010	6.460	0.284	0.183	0.005	98	92	33	0.80	1469	51	2040	39	2681	45
	4	969	753	0.78	0.322	0.013	8.420	0.376	0.190	0.005	99	95	23	0.83	1800	65	2277	41	2738	42
	5	828	667	0.81	0.371	0.016	9.240	0.440	0.181	0.005	99	94	15	0.83	2034	77	2362	44	2658	45
	6	800	703	0.88	0.418	0.020	10.600	0.538	0.183	0.005	98	93	10	0.85	2253	90	2487	47	2684	45
	7	718	669	0.93	0.395	0.018	9.850	0.489	0.181	0.005	98	93	12	0.83	2148	84	2420	46	2658	46
	8	687	697	1.01	0.401	0.019	10.000	0.498	0.181	0.005	99	95	11	0.84	2174	86	2438	46	2666	45
	9	659	650	0.99	0.411	0.020	10.400	0.536	0.184	0.005	99	95	11	0.85	2220	91	2475	48	2691	46
	10	618	646	1.05	0.423	0.021	10.900	0.568	0.187	0.005	99	95	10	0.85	2276	94	2516	48	2716	46
	11	620	613	0.99	0.405	0.020	10.600	0.552	0.190	0.005	99	96	13	0.85	2194	92	2490	48	2742	46
	12	554	626	1.13	0.382	0.018	9.710	0.493	0.184	0.005	99	96	14	0.83	2086	85	2407	47	2692	48
	13	521	500	0.96	0.420	0.022	10.700	0.581	0.185	0.005	99	97	10	0.86	2258	98	2499	50	2701	47
	14	531	551	1.04	0.409	0.021	10.300	0.552	0.182	0.005	99	96	11	0.85	2210	95	2460	50	2674	48
	15	480	517	1.08	0.386	0.019	9.660	0.509	0.181	0.006	99	96	13	0.82	2105	89	2403	48	2666	50
	16	451	465	1.03	0.396	0.020	10.300	0.546	0.188	0.006	99	98	13	0.84	2149	93	2460	49	2728	49
	17	408	463	1.14	0.434	0.023	11.100	0.623	0.185	0.006	99	97	9	0.84	2325	105	2532	52	2702	51

	18	396	454	1.15	0.459	0.026	11.900	0.703	0.188	0.006	99	97	6	0.85	2436	114	2598	55	2726	52
	19	376	411	1.09	0.472	0.027	11.800	0.716	0.181	0.006	99	96	4	0.85	2492	120	2587	57	2661	54
	20	394	438	1.11	0.442	0.025	11.700	0.686	0.192	0.006	99	97	9	0.85	2359	111	2578	55	2755	52
	21	399	438	1.10	0.404	0.022	10.500	0.590	0.188	0.006	99	98	13	0.84	2186	100	2478	52	2726	52
	22	402	490	1.22	0.445	0.026	11.200	0.664	0.182	0.006	100	99	7	0.86	2371	114	2537	55	2672	51
	23	375	432	1.15	0.424	0.024	11.100	0.637	0.190	0.006	100	99	11	0.85	2277	107	2532	53	2742	51
	24	374	416	1.11	0.453	0.026	11.500	0.692	0.184	0.006	100	98	6	0.86	2407	117	2563	56	2689	52
	25	363	422	1.16	0.448	0.026	11.500	0.680	0.186	0.006	100	100	7	0.86	2385	114	2565	55	2711	52
	26	337	384	1.14	0.428	0.024	11.300	0.651	0.191	0.006	100	100	10	0.84	2297	108	2546	54	2751	52
	27	336	362	1.08	0.478	0.029	12.300	0.764	0.187	0.006	100	100	4	0.87	2519	126	2628	58	2714	52
	28	322	345	1.07	0.445	0.025	11.600	0.682	0.189	0.006	100	100	8	0.84	2374	113	2573	55	2734	53
	29	322	339	1.05	0.497	0.031	12.900	0.826	0.189	0.006	100	100	3	0.87	2599	133	2675	60	2733	53
NCGB13-9B-8	1	2363	814	0.34	0.224	0.011	5.330	0.277	0.173	0.004	99	94	36	0.90	1302	57	1874	44	2584	38
	2	2141	652	0.30	0.266	0.013	6.460	0.332	0.176	0.004	99	96	29	0.92	1519	66	2040	45	2619	33
	3	1955	665	0.34	0.271	0.012	6.710	0.311	0.180	0.003	99	96	29	0.91	1544	61	2074	41	2651	31
	4	1912	652	0.34	0.350	0.019	8.990	0.488	0.186	0.003	100	98	19	0.95	1936	89	2337	50	2707	29
	5	1507	584	0.39	0.349	0.017	9.170	0.455	0.191	0.004	100	99	20	0.93	1930	81	2355	45	2747	30
	6	1381	545	0.39	0.376	0.019	9.840	0.521	0.190	0.004	100	99	16	0.93	2055	91	2420	49	2742	32
	7	1228	544	0.44	0.392	0.021	10.400	0.561	0.192	0.004	100	99	15	0.93	2130	96	2467	50	2757	33
	8	1049	445	0.42	0.437	0.026	12.000	0.731	0.199	0.004	100	99	11	0.94	2339	118	2603	57	2815	34
	9	859	385	0.45	0.420	0.024	11.100	0.654	0.192	0.004	100	99	11	0.93	2261	109	2536	55	2764	37
	10	813	365	0.45	0.407	0.024	10.800	0.645	0.193	0.005	100	98	13	0.92	2203	108	2510	55	2769	39
	11	754	315	0.42	0.426	0.026	11.100	0.696	0.189	0.005	99	98	10	0.92	2288	117	2533	58	2736	41
	12	710	295	0.42	0.404	0.024	11.100	0.671	0.199	0.005	100	99	14	0.91	2189	109	2530	56	2816	41
	13	643	279	0.43	0.394	0.023	10.600	0.638	0.195	0.005	100	99	15	0.90	2143	107	2488	56	2783	43
	14	591	263	0.45	0.407	0.025	10.900	0.697	0.194	0.005	100	99	13	0.91	2202	116	2515	59	2778	44
	15	587	249	0.43	0.415	0.027	11.200	0.738	0.196	0.005	100	99	13	0.91	2237	121	2542	61	2795	45
	16	565	213	0.38	0.421	0.028	11.700	0.801	0.202	0.006	100	100	13	0.92	2264	128	2583	64	2844	45
	17	501	204	0.41	0.375	0.023	10.100	0.628	0.195	0.006	100	100	17	0.89	2051	107	2440	58	2783	47
	18	508	187	0.37	0.433	0.030	11.800	0.840	0.197	0.006	100	100	11	0.92	2319	136	2585	67	2801	47
	19	474	189	0.40	0.424	0.029	11.400	0.789	0.194	0.006	100	100	11	0.90	2280	130	2554	65	2779	49
	20	446	174	0.39	0.418	0.028	11.400	0.788	0.197	0.006	100	100	13	0.90	2253	128	2555	65	2804	50
	21	447	173	0.39	0.439	0.031	11.900	0.863	0.196	0.006	100	99	10	0.91	2348	139	2595	68	2794	51
	22	435	148	0.34	0.480	0.037	13.200	1.040	0.200	0.006	100	100	6	0.92	2525	161	2694	74	2823	50
	23	413	171	0.41	0.405	0.027	10.800	0.734	0.193	0.006	100	100	13	0.89	2190	123	2504	63	2769	52
	24	414	144	0.35	0.442	0.032	12.200	0.891	0.200	0.006	100	100	10	0.91	2357	141	2618	69	2827	51
	25	426	180	0.42	0.430	0.030	12.000	0.862	0.203	0.006	100	100	12	0.90	2307	135	2607	67	2849	52
	26	416	157	0.38	0.389	0.025	10.700	0.708	0.200	0.006	100	100	17	0.88	2117	116	2498	61	2823	52
	27	431	168	0.39	0.437	0.032	12.000	0.887	0.200	0.006	100	100	11	0.91	2335	141	2606	69	2824	51
	28	413	165	0.40	0.425	0.029	11.700	0.828	0.200	0.007	100	99	12	0.89	2282	132	2581	66	2825	53
	29	416	159	0.38	0.387	0.025	10.700	0.714	0.200	0.006	100	100	17	0.88	2107	117	2496	62	2829	52
NCGB13-9B-11	1	2920	2502	0.86	0.130	0.005	3.410	0.181	0.191	0.006	95	83	63	0.80	786	30	1506	42	2748	53
	2	2090	1582	0.76	0.190	0.008	4.900	0.230	0.187	0.005	97	88	47	0.83	1119	41	1803	40	2720	43
	3	1617	1003	0.62	0.255	0.010	6.590	0.288	0.187	0.004	98	92	34	0.86	1464	53	2058	39	2720	36
	4	1470	919	0.63	0.302	0.012	8.060	0.343	0.194	0.004	99	95	27	0.88	1699	60	2238	38	2775	33
	5	1375	702	0.51	0.345	0.014	9.170	0.391	0.193	0.004	99	97	21	0.89	1911	68	2355	39	2766	32
	6	1344	723	0.54	0.362	0.015	9.660	0.404	0.193	0.004	99	98	19	0.89	1993	69	2403	38	2772	31
	7	1239	677	0.55	0.368	0.015	10.100	0.413	0.199	0.004	99	98	19	0.89	2018	69	2440	38	2814	30
	8	1247	612	0.49	0.385	0.016	10.400	0.442	0.197	0.004	100	98	16	0.90	2099	74	2474	39	2799	30
	9	1216	632	0.52	0.386	0.015	10.600	0.433	0.199	0.004	100	99	17	0.90	2103	72	2488	38	2819	30
	10	1191	610	0.51	0.382	0.015	10.200	0.409	0.194	0.004	100	99	16	0.89	2085	70	2452	37	2773	30
	11	1246	642	0.52	0.380	0.015	10.100	0.402	0.194	0.004	100	99	16	0.90	2076	69	2449	37	2775	29
	12	1325	639	0.48	0.375	0.015	10.300	0.411	0.199	0.004	100	100	18	0.90	2053	69	2461	37	2818	29
	13	1295	648	0.50	0.370	0.014	10.200	0.408	0.201	0.004	100	100	19	0.90	2030	68	2458	37	2833	28

	14	1188	620	0.52	0.367	0.014	9.950	0.390	0.197	0.004	100	100	19	0.90	2013	66	2430	36	2800	29
	15	1196	678	0.57	0.360	0.013	9.490	0.363	0.191	0.003	100	99	19	0.89	1981	64	2387	35	2754	29
	16	1241	585	0.47	0.368	0.014	9.780	0.382	0.193	0.003	100	100	18	0.89	2019	66	2414	36	2767	29
	17	1163	634	0.54	0.361	0.013	9.720	0.361	0.195	0.004	100	100	19	0.88	1987	62	2409	34	2788	30
	18	1266	628	0.50	0.353	0.013	9.370	0.359	0.192	0.003	100	100	20	0.89	1950	63	2375	35	2762	29
	19	1250	605	0.48	0.360	0.014	9.550	0.374	0.192	0.003	100	99	19	0.89	1983	65	2392	36	2761	29
	20	1250	614	0.49	0.344	0.013	9.040	0.343	0.190	0.003	100	99	20	0.89	1908	61	2342	35	2744	29
	21	1231	631	0.51	0.324	0.011	8.510	0.308	0.191	0.003	100	100	23	0.88	1807	56	2287	33	2748	29
	22	1280	645	0.50	0.344	0.013	8.900	0.342	0.187	0.003	100	100	20	0.89	1908	62	2328	35	2720	29
	23	1269	662	0.52	0.348	0.013	8.970	0.342	0.187	0.003	100	100	19	0.89	1924	62	2335	35	2717	29
	24	1227	612	0.50	0.326	0.012	8.570	0.311	0.191	0.003	100	100	23	0.88	1819	56	2293	33	2748	29
	25	1225	615	0.50	0.346	0.013	9.200	0.350	0.193	0.003	100	100	21	0.89	1917	62	2358	35	2765	29
	26	1265	605	0.48	0.330	0.012	8.710	0.320	0.192	0.003	100	100	23	0.88	1836	57	2308	34	2757	29
	27	1268	652	0.51	0.333	0.012	8.670	0.322	0.189	0.003	100	100	22	0.88	1854	58	2304	34	2731	29
	28	1174	610	0.52	0.336	0.012	8.600	0.319	0.186	0.003	100	100	21	0.88	1866	58	2297	34	2706	30
	29	1181	582	0.49	0.337	0.012	8.570	0.319	0.185	0.003	100	100	20	0.88	1871	59	2293	34	2694	30
NCGB13-9B-10	1	1180	178	0.15	0.308	0.015	6.840	0.383	0.161	0.005	96	81	19	0.84	1730	72	2091	50	2468	51
	2	935	129	0.14	0.391	0.021	8.590	0.510	0.159	0.005	96	83	8	0.87	2129	95	2296	54	2448	50
	3	815	119	0.15	0.392	0.020	8.570	0.495	0.158	0.005	96	83	7	0.84	2133	91	2293	53	2439	53
	4	711	99	0.14	0.415	0.022	9.360	0.560	0.164	0.005	96	84	6	0.84	2237	99	2373	55	2492	54
	5	576	93	0.16	0.440	0.024	9.760	0.602	0.161	0.005	96	84	3	0.84	2349	106	2413	57	2467	57
	6	565	78	0.14	0.408	0.022	9.620	0.582	0.171	0.006	97	86	8	0.84	2206	100	2399	56	2567	55
	7	504	92	0.18	0.424	0.023	10.100	0.620	0.172	0.006	97	85	7	0.83	2281	104	2441	57	2578	57
	8	486	98	0.20	0.404	0.022	9.320	0.605	0.167	0.006	95	81	8	0.82	2188	102	2370	60	2530	63
	9	476	83	0.17	0.392	0.021	9.360	0.586	0.173	0.006	96	83	11	0.82	2132	97	2374	57	2589	60
	10	473	109	0.23	0.428	0.025	10.000	0.666	0.170	0.006	96	84	6	0.83	2298	111	2439	61	2559	62
	11	446	98	0.22	0.378	0.020	9.150	0.576	0.176	0.007	96	83	13	0.80	2065	94	2353	58	2613	63
	12	425	80	0.19	0.413	0.023	9.620	0.642	0.169	0.007	96	82	7	0.81	2227	106	2399	61	2549	66
	13	390	98	0.25	0.392	0.022	9.750	0.630	0.181	0.007	96	83	12	0.79	2131	99	2411	59	2657	65
	14	397	91	0.23	0.407	0.023	9.980	0.677	0.178	0.007	96	83	10	0.80	2203	107	2433	63	2631	68
	15	383	105	0.27	0.418	0.025	10.300	0.716	0.180	0.007	96	83	9	0.81	2249	113	2465	64	2648	67
	16	332	67	0.20	0.447	0.028	10.900	0.793	0.177	0.008	95	82	5	0.81	2382	123	2514	68	2623	72
	17	302	77	0.26	0.425	0.026	9.750	0.736	0.166	0.008	95	78	5	0.77	2284	117	2411	70	2520	81
	18	298	74	0.25	0.422	0.026	10.000	0.781	0.172	0.009	94	76	7	0.77	2271	119	2435	72	2575	83
	19	302	76	0.25	0.407	0.025	9.870	0.742	0.176	0.008	95	79	10	0.78	2200	114	2423	69	2615	79
	20	262	97	0.37	0.377	0.022	9.430	0.683	0.181	0.009	95	80	14	0.75	2063	104	2381	67	2665	80
	21	265	90	0.34	0.424	0.027	9.960	0.803	0.170	0.009	94	77	6	0.77	2278	123	2431	74	2562	87
	22	251	92	0.37	0.409	0.026	10.100	0.780	0.179	0.009	95	79	10	0.77	2210	118	2443	71	2643	83
	23	236	83	0.35	0.473	0.032	13.000	0.979	0.199	0.009	97	88	7	0.82	2496	140	2680	71	2822	71
	24	210	71	0.34	0.413	0.026	10.700	0.781	0.188	0.009	96	86	11	0.77	2227	119	2496	68	2723	77
	25	216	69	0.32	0.439	0.029	11.200	0.880	0.185	0.009	95	82	8	0.78	2347	131	2539	73	2697	81
	26	225	85	0.38	0.435	0.029	10.700	0.855	0.179	0.009	95	81	7	0.77	2327	129	2501	74	2646	85
	27	231	90	0.39	0.412	0.027	9.870	0.808	0.174	0.009	95	79	9	0.75	2223	123	2423	75	2595	90
	28	209	94	0.45	0.418	0.028	9.890	0.822	0.172	0.010	95	79	7	0.74	2252	126	2425	77	2573	93
	29	212	78	0.37	0.429	0.029	10.600	0.865	0.179	0.009	95	81	8	0.77	2303	131	2490	76	2646	87
NCGB13-9B-14	1	987	277	0.28	0.276	0.016	6.850	0.578	0.180	0.010	89	64	29	0.74	1570	79	2092	75	2654	94
	2	785	191	0.24	0.327	0.018	8.700	0.590	0.193	0.008	94	78	23	0.79	1822	87	2307	62	2769	68
	3	710	134	0.19	0.368	0.020	9.930	0.612	0.196	0.007	97	88	18	0.82	2021	95	2429	57	2791	58
	4	584	107	0.18	0.441	0.026	11.800	0.770	0.194	0.007	98	91	10	0.85	2356	118	2591	61	2780	57
	5	451	77	0.17	0.427	0.025	11.500	0.714	0.195	0.007	99	94	11	0.82	2293	112	2565	58	2787	59
	6	459	72	0.16	0.470	0.031	12.700	0.873	0.195	0.007	99	94	7	0.85	2484	134	2655	65	2788	60
	7	389	71	0.18	0.378	0.022	10.600	0.653	0.203	0.008	99	96	18	0.81	2069	103	2488	57	2850	61
	8	374	51	0.14	0.482	0.033	13.300	0.963	0.201	0.007	99	97	6	0.87	2535	145	2704	68	2833	60
	9	343	49	0.14	0.510	0.036	14.200	1.050	0.203	0.008	99	97	4	0.87	2655	155	2766	70	2848	61

	10	298	48	0.16	0.500	0.034	14.000	0.990	0.204	0.008	99	98	5	0.84	2615	146	2752	67	2855	65
	11	359	49	0.14	0.608	0.047	18.000	1.410	0.214	0.008	100	98	3	0.89	3063	187	2987	76	2937	59
	12	386	70	0.18	0.499	0.033	13.800	0.934	0.201	0.007	100	99	5	0.86	2608	141	2736	64	2831	57
	13	424	93	0.22	0.451	0.027	12.700	0.784	0.204	0.007	100	98	10	0.85	2398	120	2656	58	2859	54
	14	436	102	0.23	0.408	0.023	12.000	0.695	0.214	0.007	100	98	17	0.83	2204	104	2608	54	2939	53
	15	490	108	0.22	0.418	0.023	11.800	0.678	0.205	0.006	100	99	14	0.85	2251	105	2591	54	2868	50
	16	505	111	0.22	0.408	0.022	11.600	0.658	0.206	0.007	99	98	15	0.84	2205	102	2570	53	2873	52
	17	525	137	0.26	0.435	0.025	12.600	0.754	0.211	0.007	99	98	13	0.85	2327	112	2652	56	2911	52
	18	475	118	0.25	0.451	0.027	13.000	0.796	0.209	0.007	100	99	11	0.85	2400	119	2679	58	2897	53
	19	406	101	0.25	0.463	0.028	13.200	0.804	0.206	0.007	100	100	9	0.84	2455	121	2692	58	2876	55
	20	417	135	0.32	0.481	0.030	13.300	0.849	0.201	0.007	100	99	7	0.86	2530	130	2701	60	2832	54
	21	453	140	0.31	0.440	0.026	12.100	0.739	0.199	0.007	100	99	10	0.85	2352	117	2610	57	2817	53
	22	481	186	0.39	0.415	0.024	11.400	0.674	0.200	0.007	100	98	13	0.84	2237	107	2560	55	2827	54
	23	526	243	0.46	0.405	0.023	11.100	0.651	0.200	0.006	99	98	15	0.85	2191	104	2536	54	2824	52
	24	547	252	0.46	0.366	0.019	10.200	0.558	0.202	0.006	99	98	20	0.84	2011	90	2451	51	2839	50
	25	598	275	0.46	0.361	0.019	9.850	0.527	0.198	0.006	100	99	20	0.85	1984	88	2421	49	2811	47
	26	689	339	0.49	0.375	0.019	10.100	0.535	0.195	0.005	100	100	17	0.86	2053	91	2442	49	2783	45
	27	683	326	0.48	0.369	0.018	10.400	0.529	0.203	0.006	100	99	20	0.85	2026	86	2468	47	2854	45
	28	682	313	0.46	0.375	0.018	10.400	0.521	0.202	0.005	100	99	19	0.85	2051	85	2472	46	2839	44
	29	699	353	0.51	0.381	0.018	10.800	0.537	0.206	0.006	100	100	19	0.85	2083	86	2509	46	2874	43
NCGB13-9B-15	1	1714	324	0.19	0.335	0.014	7.730	0.353	0.167	0.004	97	88	17	0.86	1864	66	2200	41	2529	40
	2	1789	429	0.24	0.309	0.013	6.840	0.303	0.161	0.003	98	91	19	0.88	1734	62	2091	39	2463	36
	3	2004	465	0.23	0.288	0.012	6.140	0.271	0.154	0.003	99	94	20	0.90	1633	60	1996	39	2395	33
	4	2113	536	0.25	0.279	0.011	6.060	0.254	0.157	0.003	99	96	22	0.91	1589	56	1984	37	2425	30
	5	2193	512	0.23	0.297	0.013	6.500	0.285	0.159	0.003	100	98	20	0.93	1676	63	2046	39	2442	27
	6	2167	478	0.22	0.304	0.013	6.630	0.297	0.158	0.003	100	98	19	0.94	1712	66	2063	40	2435	27
	7	2148	546	0.25	0.306	0.013	6.420	0.280	0.152	0.002	100	99	17	0.93	1720	64	2035	38	2371	27
	8	2075	473	0.23	0.289	0.012	6.100	0.255	0.153	0.002	100	99	19	0.93	1637	59	1990	36	2380	27
	9	2113	503	0.24	0.298	0.013	6.350	0.277	0.154	0.002	100	99	18	0.93	1683	63	2025	38	2394	27
	10	2002	490	0.24	0.287	0.012	6.010	0.251	0.152	0.002	100	99	19	0.92	1627	58	1977	36	2366	27
	11	2047	512	0.25	0.297	0.013	6.170	0.271	0.151	0.002	100	99	18	0.93	1678	63	2001	38	2353	27
	12	1996	498	0.25	0.287	0.012	6.040	0.256	0.153	0.002	100	100	20	0.93	1625	59	1982	37	2378	27
	13	1792	444	0.25	0.289	0.012	6.150	0.258	0.154	0.003	100	100	20	0.92	1638	59	1997	37	2394	28
	14	1702	448	0.26	0.284	0.011	5.910	0.242	0.151	0.003	100	100	20	0.92	1611	57	1963	35	2358	28
	15	1792	416	0.23	0.296	0.012	6.370	0.272	0.156	0.003	100	100	19	0.92	1670	61	2028	38	2416	28
	16	1686	464	0.28	0.300	0.013	6.460	0.280	0.156	0.003	100	100	19	0.93	1691	63	2040	38	2415	28
	17	1584	441	0.28	0.287	0.011	6.150	0.249	0.156	0.003	100	100	21	0.91	1625	57	1997	35	2408	28
	18	1601	402	0.25	0.298	0.012	6.430	0.273	0.157	0.003	100	100	19	0.92	1680	61	2037	37	2420	28
	19	1582	423	0.27	0.311	0.014	6.770	0.303	0.158	0.003	100	100	18	0.93	1746	67	2082	40	2434	29
	20	1533	428	0.28	0.296	0.012	6.400	0.265	0.157	0.003	100	100	20	0.91	1670	59	2032	36	2423	29
	21	1491	398	0.27	0.300	0.012	6.610	0.276	0.160	0.003	100	100	20	0.91	1690	60	2061	37	2455	29
	22	1469	415	0.28	0.319	0.014	7.200	0.313	0.164	0.003	100	100	18	0.92	1785	66	2136	39	2493	29
	23	1398	396	0.28	0.305	0.012	6.720	0.274	0.160	0.003	100	100	19	0.91	1717	60	2076	36	2453	30
	24	1419	356	0.25	0.334	0.015	7.420	0.332	0.161	0.003	100	100	15	0.93	1860	71	2164	40	2466	29
	25	1253	380	0.30	0.325	0.013	7.440	0.309	0.166	0.003	100	100	18	0.91	1813	64	2166	37	2520	29
	26	1295	382	0.29	0.349	0.015	8.000	0.349	0.166	0.003	100	100	14	0.92	1931	71	2231	39	2519	29
	27	1245	399	0.32	0.347	0.014	8.180	0.347	0.171	0.003	100	100	16	0.91	1921	69	2251	38	2566	29
	28	1294	372	0.29	0.370	0.017	8.740	0.397	0.171	0.003	100	100	13	0.93	2030	78	2311	41	2570	29
	29	1223	410	0.34	0.355	0.015	8.580	0.359	0.175	0.003	100	100	16	0.91	1958	69	2294	38	2609	29
	30	1173	372	0.32	0.365	0.015	8.750	0.368	0.174	0.003	100	100	14	0.91	2003	71	2312	38	2597	30
	31	1150	378	0.33	0.375	0.016	9.140	0.389	0.177	0.003	100	100	14	0.91	2054	73	2352	39	2622	29
	32	1169	368	0.31	0.412	0.018	10.000	0.455	0.176	0.003	100	100	9	0.92	2223	84	2435	42	2616	29
	33	1053	353	0.34	0.378	0.015	9.190	0.372	0.176	0.003	100	100	13	0.90	2066	70	2357	37	2620	30
	34	1097	391	0.36	0.408	0.017	10.000	0.430	0.178	0.003	100	100	10	0.91	2206	79	2434	40	2631	30

	35	1157	376	0.33	0.415	0.018	10.400	0.456	0.181	0.003	100	100	10	0.92	2238	82	2468	41	2663	29
	36	1089	382	0.35	0.421	0.018	10.500	0.455	0.181	0.003	100	100	9	0.91	2266	81	2482	40	2664	30
	37	1062	359	0.34	0.444	0.020	11.300	0.506	0.184	0.003	100	100	7	0.92	2367	87	2547	42	2693	30
	38	996	345	0.35	0.413	0.017	10.200	0.425	0.179	0.003	100	100	10	0.90	2229	77	2455	39	2647	30
	39	1017	386	0.38	0.436	0.018	10.900	0.464	0.181	0.003	100	100	8	0.91	2331	82	2514	40	2665	30
NCGB13-9B-17	1	4514	16253	3.60	0.096	0.004	2.120	0.231	0.160	0.014	78	41	65	0.70	591	23	1156	75	2460	145
	2	4357	18442	4.23	0.107	0.004	2.560	0.216	0.173	0.011	81	47	65	0.70	657	23	1288	62	2586	107
	3	4769	21273	4.46	0.107	0.004	2.420	0.214	0.164	0.011	80	45	62	0.69	657	23	1250	63	2496	115
	4	4491	22309	4.97	0.107	0.004	2.530	0.211	0.172	0.011	80	45	65	0.70	656	22	1282	61	2573	107
	5	4815	22739	4.72	0.109	0.004	2.470	0.217	0.165	0.011	78	42	62	0.70	665	22	1265	63	2510	115
	6	4973	23819	4.79	0.117	0.004	2.840	0.225	0.177	0.011	79	44	63	0.71	711	23	1367	59	2623	100
	7	5021	24374	4.85	0.114	0.004	2.790	0.210	0.177	0.010	79	44	64	0.70	697	22	1352	56	2625	95
	8	4647	22075	4.75	0.116	0.004	2.440	0.214	0.153	0.011	78	39	56	0.68	708	22	1255	63	2375	119
	9	4250	20664	4.86	0.116	0.004	2.420	0.191	0.151	0.010	80	43	55	0.67	707	21	1248	57	2361	107
	10	4191	18358	4.38	0.123	0.004	2.470	0.193	0.146	0.009	81	43	52	0.66	745	23	1264	56	2305	106
	11	3969	16337	4.12	0.126	0.004	2.510	0.181	0.144	0.008	83	46	50	0.66	767	22	1275	52	2278	98
	12	3945	14622	3.71	0.139	0.004	3.000	0.178	0.156	0.007	86	54	50	0.68	840	24	1407	45	2416	75
	13	3706	12451	3.36	0.150	0.004	3.260	0.174	0.158	0.006	88	58	48	0.69	900	25	1471	41	2431	66
	14	3341	9917	2.97	0.168	0.005	3.640	0.192	0.157	0.006	89	59	44	0.71	1000	29	1558	42	2427	64
	15	2847	7771	2.73	0.179	0.006	3.710	0.189	0.151	0.006	90	61	39	0.70	1060	30	1573	41	2353	62
	16	2578	6360	2.47	0.191	0.006	4.080	0.195	0.155	0.005	91	66	38	0.73	1126	33	1650	39	2401	56
	17	2474	6068	2.45	0.208	0.007	4.410	0.204	0.154	0.005	92	69	34	0.75	1217	36	1714	38	2389	53
	18	2377	5076	2.14	0.213	0.007	4.440	0.207	0.151	0.005	93	70	32	0.76	1246	38	1720	39	2357	52
	19	2287	4554	1.99	0.223	0.008	4.880	0.211	0.159	0.004	95	77	33	0.80	1295	40	1799	36	2445	44
	20	2296	4111	1.79	0.230	0.008	5.150	0.212	0.163	0.004	96	82	32	0.82	1334	41	1845	35	2482	40
	21	2334	3653	1.57	0.245	0.009	5.220	0.224	0.155	0.004	96	82	27	0.83	1410	46	1856	37	2399	41
	22	2086	2974	1.43	0.245	0.008	5.360	0.214	0.159	0.004	97	86	29	0.84	1410	44	1879	34	2445	37
	23	2000	2622	1.31	0.243	0.008	5.430	0.213	0.162	0.003	97	87	30	0.84	1401	43	1890	34	2480	36
	24	1939	2205	1.14	0.260	0.009	5.610	0.228	0.157	0.003	97	88	25	0.85	1488	48	1918	35	2421	36
	25	1912	2174	1.14	0.267	0.010	5.910	0.237	0.160	0.003	98	89	25	0.86	1528	49	1962	35	2458	35
	26	1826	1855	1.02	0.277	0.010	6.050	0.240	0.159	0.003	98	91	23	0.87	1575	51	1983	35	2441	34
	27	1826	1765	0.97	0.292	0.011	6.450	0.260	0.160	0.003	99	94	21	0.89	1649	55	2039	35	2460	31
	28	1967	1629	0.83	0.277	0.010	5.910	0.231	0.155	0.003	99	95	22	0.89	1574	51	1962	34	2400	31
	29	2002	1655	0.83	0.278	0.010	6.050	0.230	0.158	0.003	99	96	23	0.90	1580	51	1983	33	2435	29
	30	2038	1615	0.79	0.282	0.010	5.960	0.229	0.153	0.003	99	96	21	0.90	1603	52	1970	33	2381	29
	31	2132	1522	0.71	0.287	0.011	6.070	0.236	0.154	0.003	99	97	20	0.91	1624	53	1986	34	2388	28
	32	2102	1464	0.70	0.265	0.009	5.620	0.200	0.154	0.003	99	97	24	0.89	1514	46	1919	31	2391	28
	33	2237	1372	0.61	0.291	0.011	6.130	0.241	0.153	0.003	99	97	19	0.91	1647	55	1994	34	2376	28
	34	2072	1323	0.64	0.275	0.010	5.680	0.210	0.150	0.003	99	96	21	0.90	1565	49	1928	32	2345	28
	35	2235	1370	0.61	0.290	0.011	6.160	0.235	0.154	0.002	100	98	20	0.92	1640	53	1998	33	2392	26
	36	2302	1347	0.59	0.278	0.010	5.820	0.211	0.152	0.002	100	98	21	0.91	1582	49	1949	31	2365	26
	37	2233	1289	0.58	0.276	0.010	5.670	0.205	0.149	0.002	100	99	20	0.91	1569	49	1927	31	2337	26
	38	2243	1287	0.57	0.279	0.010	5.820	0.214	0.151	0.002	100	99	21	0.92	1587	50	1950	32	2360	25
	39	2426	1398	0.58	0.263	0.009	5.410	0.194	0.149	0.002	100	98	22	0.91	1507	46	1886	31	2333	26
NCGB13-9B-19	1	2463	1272	0.52	0.315	0.013	8.000	0.386	0.184	0.005	96	84	23	0.81	1765	64	2231	44	2690	47
	2	2418	988	0.41	0.343	0.014	8.810	0.413	0.186	0.005	97	87	20	0.85	1901	69	2319	43	2710	40
	3	2305	792	0.34	0.357	0.015	9.510	0.415	0.193	0.004	98	92	19	0.88	1966	69	2388	40	2771	35
	4	2299	712	0.31	0.361	0.014	9.270	0.393	0.187	0.004	98	92	18	0.88	1985	68	2366	39	2712	33
	5	2275	621	0.27	0.370	0.015	9.470	0.400	0.186	0.004	98	93	16	0.89	2031	69	2385	39	2703	32
	6	2464	596	0.24	0.363	0.014	9.610	0.397	0.192	0.004	99	95	18	0.90	1997	68	2398	38	2759	30
	7	2329	483	0.21	0.357	0.014	9.210	0.364	0.187	0.003	99	96	18	0.89	1969	64	2359	36	2716	30
	8	2391	488	0.20	0.387	0.016	10.100	0.431	0.189	0.003	99	96	15	0.92	2109	74	2442	39	2733	28
	9	2391	498	0.21	0.345	0.013	8.970	0.345	0.189	0.003	99	97	20	0.90	1909	61	2335	35	2732	28
	10	2257	426	0.19	0.330	0.012	8.450	0.314	0.186	0.003	99	97	21	0.89	1840	57	2281	34	2703	28

	11	2223	439	0.20	0.307	0.010	7.820	0.276	0.185	0.003	99	98	25	0.89	1726	52	2210	32	2695	28
	12	2219	438	0.20	0.313	0.011	8.000	0.286	0.186	0.003	100	98	24	0.89	1753	53	2230	32	2703	27
	13	2226	422	0.19	0.300	0.010	7.560	0.265	0.182	0.003	100	98	25	0.88	1693	50	2180	31	2675	27
	14	2295	418	0.18	0.299	0.010	7.360	0.257	0.179	0.003	100	98	25	0.88	1685	50	2156	31	2641	27
	15	2406	434	0.18	0.307	0.011	7.580	0.271	0.179	0.003	100	98	23	0.89	1727	52	2183	32	2644	27
	16	2398	459	0.19	0.286	0.009	7.190	0.241	0.182	0.003	100	98	27	0.88	1622	46	2135	30	2672	27
	17	2235	421	0.19	0.285	0.009	7.080	0.237	0.180	0.003	100	98	27	0.88	1617	46	2121	30	2654	27
	18	2206	437	0.20	0.294	0.010	7.070	0.240	0.175	0.003	99	98	24	0.88	1660	48	2120	30	2602	28
	19	2175	461	0.21	0.293	0.009	7.250	0.241	0.179	0.003	100	98	26	0.88	1656	47	2142	30	2647	27
	20	2190	434	0.20	0.298	0.010	7.280	0.248	0.177	0.003	100	98	24	0.88	1682	49	2146	30	2626	27
	21	2123	469	0.22	0.286	0.009	6.910	0.225	0.175	0.003	99	97	26	0.86	1621	44	2101	29	2610	28
	22	2197	439	0.20	0.296	0.010	7.410	0.251	0.181	0.003	100	98	26	0.89	1672	48	2162	30	2666	26
	23	2097	449	0.21	0.278	0.009	6.950	0.222	0.182	0.003	100	98	29	0.87	1579	43	2105	28	2667	27
	24	2047	457	0.22	0.283	0.009	6.840	0.221	0.176	0.003	100	98	26	0.87	1604	44	2091	29	2611	27
	25	2230	479	0.21	0.283	0.009	7.160	0.232	0.183	0.003	100	98	28	0.88	1607	44	2132	29	2685	26
	26	2128	485	0.23	0.288	0.009	7.110	0.231	0.179	0.003	100	99	26	0.88	1633	45	2125	29	2642	26
	27	2055	500	0.24	0.286	0.009	7.190	0.230	0.182	0.003	100	99	27	0.87	1620	44	2135	29	2674	26
	28	2086	485	0.23	0.282	0.009	7.120	0.225	0.183	0.003	100	99	28	0.87	1603	43	2127	28	2680	26
	29	1949	486	0.25	0.287	0.009	7.220	0.231	0.183	0.003	100	99	27	0.87	1626	44	2139	29	2677	26
	30	1866	487	0.26	0.287	0.009	7.050	0.223	0.178	0.003	100	99	26	0.86	1626	44	2117	28	2636	27
	31	2034	495	0.24	0.280	0.008	7.020	0.219	0.182	0.003	100	99	28	0.86	1591	42	2114	28	2671	27
	32	2004	490	0.24	0.297	0.009	7.430	0.240	0.182	0.003	100	99	25	0.87	1675	46	2164	29	2668	27
	33	1955	468	0.24	0.295	0.009	7.390	0.236	0.182	0.003	100	99	26	0.86	1665	45	2160	29	2670	27
	34	1777	465	0.26	0.301	0.009	7.770	0.249	0.187	0.003	100	99	26	0.87	1695	46	2204	29	2719	27
	35	1709	408	0.24	0.296	0.009	7.640	0.240	0.187	0.003	100	99	27	0.86	1672	45	2189	28	2716	27
	36	1776	465	0.26	0.295	0.009	7.570	0.237	0.186	0.003	100	99	27	0.86	1664	44	2181	28	2710	27
	37	1753	442	0.25	0.303	0.009	7.820	0.246	0.188	0.003	100	99	26	0.86	1704	45	2211	28	2721	27
	38	1754	412	0.23	0.302	0.009	7.800	0.246	0.187	0.003	100	99	26	0.86	1701	46	2208	28	2719	27
	39	1818	452	0.25	0.310	0.010	8.060	0.255	0.188	0.003	100	99	25	0.86	1742	47	2238	29	2728	27
NCGB13-9B-20	1	1081	400	0.37	0.316	0.016	7.770	0.429	0.178	0.005	99	96	22	0.88	1768	81	2204	50	2639	43
	2	1122	409	0.36	0.371	0.020	9.310	0.511	0.182	0.004	99	98	15	0.91	2032	92	2369	50	2674	38
	3	1066	484	0.45	0.377	0.019	9.400	0.488	0.181	0.004	100	99	14	0.91	2063	89	2378	48	2660	36
	4	1196	627	0.52	0.383	0.020	9.580	0.514	0.182	0.004	100	99	14	0.93	2089	94	2396	49	2668	34
	5	1383	984	0.71	0.350	0.018	8.280	0.423	0.171	0.003	100	99	16	0.92	1935	83	2262	46	2571	33
	6	1496	1167	0.78	0.329	0.016	7.680	0.386	0.170	0.003	100	100	18	0.93	1832	78	2195	45	2553	32
	7	1610	1362	0.85	0.342	0.018	7.900	0.430	0.168	0.003	100	99	16	0.94	1895	87	2219	49	2534	31
	8	1402	1464	1.04	0.247	0.009	5.740	0.224	0.169	0.003	100	99	31	0.88	1423	48	1937	34	2543	32
	9	1604	1567	0.98	0.296	0.014	6.590	0.314	0.162	0.003	100	99	21	0.92	1670	68	2059	42	2474	31
	10	1717	1710	1.00	0.300	0.014	6.710	0.320	0.162	0.003	100	98	20	0.92	1690	69	2074	42	2481	31
	11	1790	1801	1.01	0.334	0.017	7.470	0.393	0.162	0.003	100	98	16	0.93	1856	82	2169	47	2480	32
	12	1692	1702	1.01	0.323	0.015	8.060	0.392	0.181	0.003	100	99	21	0.93	1805	75	2238	44	2662	30
	13	1634	1647	1.01	0.324	0.015	7.410	0.355	0.166	0.003	100	99	18	0.92	1811	73	2162	43	2514	32
	14	1568	1546	0.99	0.357	0.018	8.450	0.424	0.172	0.003	100	100	15	0.93	1969	83	2280	46	2573	30
	15	1526	1507	0.99	0.340	0.016	7.950	0.381	0.169	0.003	100	99	16	0.92	1888	77	2225	43	2553	31
	16	1460	1429	0.98	0.362	0.018	8.790	0.439	0.176	0.003	100	99	15	0.93	1992	84	2316	46	2615	31
	17	1375	1460	1.06	0.351	0.016	8.590	0.408	0.178	0.003	100	100	17	0.92	1938	78	2296	43	2631	31
	18	1373	1328	0.97	0.361	0.018	8.820	0.436	0.177	0.003	100	100	15	0.93	1987	83	2320	45	2627	31
	19	1303	1371	1.05	0.337	0.015	8.110	0.371	0.175	0.003	100	100	18	0.91	1870	73	2243	41	2603	31
	20	1366	1454	1.06	0.359	0.017	8.690	0.426	0.176	0.003	100	100	15	0.93	1976	82	2306	45	2612	31
	21	1410	1544	1.09	0.329	0.015	7.920	0.360	0.175	0.003	100	100	19	0.91	1834	71	2222	41	2601	31
	22	1353	1410	1.04	0.361	0.018	8.830	0.437	0.177	0.003	100	100	15	0.93	1989	83	2320	45	2626	31
	23	1299	1361	1.05	0.347	0.017	8.420	0.407	0.176	0.003	100	100	17	0.93	1921	79	2277	44	2614	31
	24	1381	1552	1.12	0.343	0.016	8.250	0.400	0.174	0.003	100	100	17	0.93	1901	78	2259	44	2600	31
	25	1375	1512	1.10	0.337	0.016	8.010	0.379	0.172	0.003	100	100	18	0.92	1871	75	2232	43	2581	31

	26	1282	1461	1.14	0.334	0.015	7.930	0.365	0.172	0.003	100	100	18	0.91	1855	72	2223	41	2581	31
	27	1302	1413	1.09	0.358	0.017	8.560	0.420	0.174	0.003	100	100	15	0.92	1971	81	2292	45	2592	32
	28	1258	1392	1.11	0.363	0.018	8.920	0.446	0.178	0.004	100	100	15	0.92	1998	84	2330	46	2635	32
	29	1171	1335	1.14	0.349	0.016	8.410	0.395	0.175	0.004	100	100	16	0.91	1931	76	2276	43	2603	33
	30	1112	1133	1.02	0.361	0.017	8.730	0.423	0.176	0.004	100	100	15	0.91	1986	81	2310	44	2611	34
	31	1084	1175	1.08	0.391	0.020	9.680	0.498	0.179	0.004	100	100	12	0.92	2129	91	2404	47	2647	34
	32	1017	1070	1.05	0.378	0.018	9.240	0.449	0.178	0.004	100	100	13	0.90	2065	84	2362	45	2630	35
	33	980	1034	1.06	0.374	0.018	9.120	0.444	0.177	0.004	100	100	14	0.90	2048	83	2350	45	2624	35
	34	958	957	1.00	0.392	0.019	9.740	0.491	0.180	0.004	100	100	12	0.91	2133	89	2411	46	2655	35
	35	953	1025	1.08	0.373	0.018	9.110	0.440	0.177	0.004	100	100	14	0.90	2043	82	2349	44	2626	36
	36	949	989	1.04	0.382	0.018	9.540	0.466	0.181	0.004	100	100	14	0.90	2084	85	2391	45	2664	35
	37	899	954	1.06	0.378	0.018	9.280	0.448	0.178	0.004	100	100	13	0.90	2068	83	2366	44	2633	36
	38	924	939	1.02	0.388	0.019	9.570	0.467	0.179	0.004	100	100	12	0.90	2114	86	2394	45	2642	36
	39	964	1000	1.04	0.386	0.018	9.710	0.465	0.183	0.004	100	100	13	0.90	2103	84	2407	44	2676	35
	40	980	1021	1.04	0.397	0.019	9.750	0.482	0.178	0.004	100	100	11	0.91	2157	89	2411	46	2634	35
	41	972	1054	1.08	0.372	0.017	9.440	0.435	0.184	0.004	100	100	15	0.89	2040	79	2382	42	2688	35
	42	1043	1148	1.10	0.389	0.018	9.970	0.483	0.186	0.004	100	100	14	0.90	2118	85	2432	45	2706	35
	43	1022	1119	1.09	0.377	0.017	9.550	0.446	0.184	0.004	100	100	15	0.90	2060	81	2392	43	2688	35
	44	945	1014	1.07	0.393	0.018	9.820	0.466	0.181	0.004	100	100	12	0.90	2138	84	2418	44	2663	35
	45	928	1007	1.08	0.397	0.019	9.850	0.478	0.180	0.004	100	100	12	0.90	2157	87	2421	45	2651	35
	46	987	1084	1.10	0.404	0.019	10.300	0.503	0.186	0.004	100	100	12	0.90	2185	88	2466	45	2706	35
	47	992	1078	1.09	0.401	0.019	10.300	0.499	0.187	0.004	100	100	13	0.90	2173	87	2464	45	2715	35
	48	986	1048	1.06	0.405	0.020	10.300	0.507	0.183	0.004	100	100	11	0.91	2194	90	2458	46	2684	35
	49	893	933	1.04	0.384	0.018	9.630	0.456	0.182	0.004	100	100	14	0.90	2094	83	2400	44	2671	36
NCGB13-9B-19@1	1	1796	362	0.20	0.409	0.017	10.900	0.466	0.193	0.003	100	99	13	0.92	2209	79	2513	40	2768	28
	2	1655	330	0.20	0.437	0.019	11.500	0.513	0.191	0.003	100	99	9	0.93	2339	86	2566	42	2751	28
	3	1588	352	0.22	0.412	0.017	11.100	0.467	0.196	0.003	100	99	13	0.92	2224	77	2534	39	2793	28
	4	1715	355	0.21	0.430	0.019	11.400	0.509	0.193	0.003	100	98	10	0.92	2308	84	2560	42	2766	28
	5	1570	350	0.22	0.414	0.017	11.200	0.478	0.196	0.003	100	98	13	0.92	2235	79	2539	40	2792	28
	6	1543	352	0.23	0.447	0.020	12.000	0.542	0.195	0.003	100	99	9	0.93	2383	88	2608	42	2788	28
	7	1517	294	0.19	0.416	0.017	11.100	0.475	0.194	0.003	100	99	12	0.92	2242	79	2533	40	2775	28
	8	1440	315	0.22	0.427	0.018	11.300	0.491	0.192	0.003	100	99	11	0.92	2290	82	2549	40	2763	28
	9	1457	278	0.19	0.428	0.018	11.800	0.513	0.199	0.004	100	98	12	0.92	2298	83	2585	41	2818	28
	10	1474	319	0.22	0.424	0.018	11.600	0.498	0.199	0.004	100	98	12	0.91	2277	80	2574	40	2817	29
	11	1362	304	0.22	0.414	0.017	11.200	0.475	0.196	0.004	99	98	13	0.91	2233	78	2537	40	2790	29
	12	1338	282	0.21	0.418	0.017	11.100	0.476	0.193	0.004	99	97	12	0.91	2249	79	2534	40	2770	30
	13	1326	272	0.20	0.432	0.019	11.600	0.512	0.195	0.004	99	97	11	0.91	2316	83	2576	41	2786	30
	14	1282	269	0.21	0.425	0.018	11.100	0.483	0.189	0.004	99	96	10	0.90	2282	81	2528	41	2732	31
	15	1295	255	0.20	0.422	0.018	11.300	0.487	0.195	0.004	99	96	12	0.89	2268	79	2550	40	2782	32
	16	1356	270	0.20	0.415	0.018	11.000	0.480	0.192	0.004	99	97	12	0.90	2239	80	2524	41	2762	32
	17	1292	303	0.23	0.430	0.019	11.400	0.513	0.192	0.004	99	96	10	0.90	2307	84	2557	42	2762	33
	18	1268	260	0.20	0.418	0.018	10.900	0.491	0.190	0.004	99	96	11	0.90	2250	82	2516	42	2739	33
NCGB13-9B-23	1	1714	1246	0.73	0.259	0.011	6.210	0.315	0.174	0.005	94	78	30	0.80	1485	54	2006	44	2595	51
	2	1101	647	0.59	0.332	0.014	8.490	0.398	0.185	0.005	97	88	21	0.83	1850	67	2284	43	2700	43
	3	842	385	0.46	0.379	0.017	9.820	0.467	0.188	0.005	98	93	15	0.85	2072	79	2418	44	2724	41
	4	702	315	0.45	0.444	0.023	11.400	0.614	0.187	0.005	99	94	8	0.88	2368	101	2560	50	2716	43
	5	653	266	0.41	0.434	0.023	11.500	0.629	0.192	0.005	99	96	10	0.88	2322	102	2563	51	2759	43
	6	561	241	0.43	0.428	0.023	11.100	0.617	0.188	0.005	99	96	10	0.87	2298	102	2533	52	2727	46
	7	507	233	0.46	0.416	0.022	10.900	0.611	0.190	0.005	99	97	12	0.87	2242	102	2516	52	2744	46
	8	446	219	0.49	0.411	0.023	11.100	0.636	0.196	0.006	99	97	13	0.86	2218	103	2533	53	2796	48
	9	418	177	0.42	0.441	0.025	11.200	0.682	0.185	0.006	99	96	8	0.86	2353	114	2544	57	2699	51
	10	415	192	0.46	0.503	0.032	13.300	0.892	0.192	0.006	99	95	3	0.88	2628	138	2701	63	2756	52
	11	375	187	0.50	0.430	0.025	11.700	0.707	0.197	0.006	99	96	11	0.85	2306	112	2578	57	2799	53
	12	369	177	0.48	0.484	0.031	13.200	0.867	0.197	0.006	100	98	6	0.89	2546	134	2691	62	2803	51

	13	375	176	0.47	0.487	0.032	13.900	0.933	0.207	0.006	100	99	7	0.89	2558	138	2744	64	2885	50
	14	346	172	0.50	0.434	0.026	12.500	0.759	0.209	0.007	100	99	13	0.86	2321	115	2642	57	2898	51
	15	364	169	0.46	0.483	0.031	13.800	0.909	0.206	0.007	99	98	7	0.88	2542	134	2733	63	2878	51
	16	395	196	0.50	0.522	0.035	14.600	0.995	0.203	0.006	100	98	3	0.90	2706	147	2787	65	2847	50
	17	373	195	0.52	0.479	0.029	14.200	0.888	0.215	0.007	100	100	9	0.88	2523	128	2763	59	2943	49
	18	358	199	0.56	0.501	0.031	14.400	0.908	0.208	0.006	100	100	6	0.88	2620	133	2775	60	2890	49
	19	380	216	0.57	0.527	0.034	15.300	0.999	0.211	0.006	100	100	4	0.90	2729	142	2835	62	2911	48
	20	409	226	0.55	0.535	0.035	15.400	1.010	0.208	0.006	100	100	3	0.90	2764	145	2839	63	2893	47
	21	421	240	0.57	0.544	0.035	16.100	1.070	0.214	0.006	100	99	3	0.90	2800	148	2882	63	2939	46
	22	464	282	0.61	0.535	0.034	15.800	1.010	0.214	0.006	100	99	4	0.90	2763	141	2863	61	2935	46
	23	422	247	0.58	0.498	0.029	14.400	0.860	0.209	0.006	100	99	6	0.88	2606	125	2774	57	2898	47
	24	402	227	0.57	0.505	0.030	15.400	0.926	0.221	0.006	100	99	7	0.88	2636	128	2839	57	2987	46
	25	456	266	0.58	0.572	0.039	18.100	1.240	0.229	0.006	100	99	3	0.92	2915	159	2993	66	3046	44
	26	400	237	0.59	0.514	0.030	14.800	0.878	0.208	0.006	100	99	5	0.88	2676	127	2800	57	2892	47
	27	414	259	0.62	0.515	0.030	15.500	0.924	0.218	0.006	100	100	6	0.89	2678	128	2846	57	2968	45
	28	443	235	0.53	0.569	0.036	16.800	1.080	0.215	0.006	100	100	1	0.90	2904	147	2925	61	2940	45
	29	416	245	0.59	0.517	0.030	15.000	0.877	0.210	0.006	100	100	5	0.88	2686	126	2815	56	2909	46
	30	441	254	0.58	0.537	0.032	16.200	0.985	0.219	0.006	100	99	4	0.89	2770	134	2889	58	2973	45
	31	433	255	0.59	0.555	0.034	16.600	1.030	0.217	0.006	100	99	2	0.90	2847	140	2914	60	2961	45
	32	414	217	0.52	0.536	0.031	15.700	0.936	0.212	0.006	100	98	3	0.88	2768	131	2858	57	2922	46
	33	425	249	0.59	0.512	0.029	15.300	0.886	0.217	0.006	100	99	6	0.88	2667	123	2837	55	2960	45
	34	419	216	0.51	0.550	0.032	16.200	0.971	0.213	0.006	100	99	2	0.89	2824	134	2888	57	2932	45
	35	434	301	0.69	0.495	0.027	14.900	0.826	0.218	0.006	100	99	8	0.87	2594	116	2809	53	2967	45
	36	439	257	0.58	0.533	0.031	15.700	0.916	0.214	0.006	100	99	4	0.89	2756	128	2859	56	2933	45
	37	422	253	0.60	0.540	0.031	15.900	0.923	0.214	0.006	100	99	3	0.88	2784	129	2872	55	2934	45
	38	422	263	0.62	0.529	0.029	15.700	0.888	0.215	0.006	100	100	4	0.88	2737	124	2857	54	2943	44
	39	442	277	0.63	0.568	0.033	17.100	1.010	0.218	0.006	100	100	1	0.89	2900	136	2938	57	2965	44
NCGB13-9B-24	1	4872	12850	2.64	0.070	0.004	1.230	0.206	0.128	0.018	87	51	61	0.65	434	23	813	94	2067	245
	2	4604	12094	2.63	0.061	0.003	1.310	0.131	0.155	0.012	91	66	76	0.66	383	16	850	58	2404	134
	3	4206	11178	2.66	0.078	0.003	2.090	0.114	0.195	0.007	96	84	82	0.72	482	17	1145	38	2787	62
	4	3642	10440	2.87	0.111	0.004	2.800	0.134	0.183	0.006	96	86	66	0.73	680	23	1356	36	2677	54
	5	2384	6760	2.84	0.173	0.006	4.610	0.200	0.193	0.005	98	90	52	0.79	1028	35	1750	36	2770	44
	6	1649	4371	2.65	0.238	0.009	6.780	0.289	0.207	0.005	98	93	41	0.82	1375	48	2082	38	2880	40
	7	1271	3022	2.38	0.311	0.013	8.230	0.373	0.192	0.005	98	93	26	0.84	1745	64	2257	41	2760	41
	8	1066	2242	2.10	0.330	0.014	9.040	0.412	0.199	0.005	98	93	24	0.83	1837	67	2342	42	2817	42
	9	786	1694	2.16	0.393	0.018	10.600	0.507	0.195	0.005	99	94	15	0.83	2138	82	2487	44	2786	44
	10	580	1102	1.90	0.458	0.023	12.700	0.669	0.201	0.006	99	96	9	0.85	2429	102	2655	50	2832	47
	11	443	840	1.89	0.519	0.029	14.200	0.834	0.198	0.006	99	95	2	0.85	2696	124	2763	56	2813	51
	12	366	651	1.78	0.516	0.030	14.400	0.870	0.203	0.007	99	97	4	0.84	2682	127	2778	57	2849	55
	13	372	528	1.42	0.545	0.036	15.500	1.040	0.207	0.007	100	98	2	0.87	2806	149	2849	64	2880	56
	14	304	451	1.48	0.493	0.032	13.600	0.909	0.200	0.007	100	99	5	0.85	2582	138	2721	63	2825	60
	15	291	360	1.24	0.505	0.035	14.200	1.020	0.204	0.008	100	100	5	0.86	2633	152	2764	68	2861	60
	16	296	357	1.21	0.428	0.028	11.900	0.804	0.202	0.008	100	99	12	0.84	2294	126	2597	63	2842	62
	17	317	340	1.07	0.449	0.031	12.500	0.877	0.202	0.007	100	100	10	0.86	2390	137	2641	66	2840	60
	18	311	302	0.97	0.421	0.028	12.000	0.819	0.207	0.008	100	100	14	0.85	2264	127	2603	64	2878	60
	19	288	276	0.96	0.391	0.025	11.100	0.729	0.205	0.008	100	100	17	0.83	2129	115	2529	61	2869	62
	20	298	261	0.88	0.414	0.028	11.400	0.782	0.199	0.007	100	100	13	0.85	2235	126	2554	64	2817	60
	21	297	296	1.00	0.387	0.025	10.600	0.704	0.199	0.008	100	100	17	0.83	2111	116	2491	62	2818	62
	22	281	245	0.87	0.425	0.029	11.400	0.808	0.195	0.008	100	100	11	0.85	2285	132	2559	66	2784	63
	23	271	229	0.85	0.423	0.029	11.500	0.824	0.198	0.008	100	100	12	0.85	2273	133	2567	67	2808	64
	24	258	248	0.96	0.408	0.028	11.300	0.799	0.201	0.008	100	100	14	0.83	2207	128	2548	66	2831	66
	25	249	223	0.89	0.397	0.027	11.400	0.806	0.209	0.009	100	100	17	0.83	2154	126	2558	66	2895	66
	26	235	213	0.91	0.470	0.036	12.800	0.996	0.198	0.008	100	100	7	0.86	2484	156	2666	73	2807	68
	27	230	209	0.91	0.431	0.031	11.800	0.879	0.198	0.008	100	100	11	0.84	2311	141	2585	70	2807	68

	28	219	217	0.99	0.404	0.028	11.000	0.795	0.198	0.009	100	100	14	0.81	2188	129	2525	67	2808	71
	29	229	199	0.87	0.443	0.032	12.200	0.916	0.200	0.009	100	99	10	0.84	2362	144	2618	71	2823	69
	30	239	185	0.77	0.438	0.032	11.800	0.873	0.195	0.008	100	100	10	0.84	2342	141	2585	70	2781	68
	31	264	186	0.71	0.428	0.030	11.600	0.845	0.196	0.008	100	99	11	0.84	2297	136	2571	68	2795	66
	32	248	229	0.92	0.403	0.027	11.300	0.778	0.204	0.008	100	100	16	0.83	2181	123	2551	64	2859	65
	33	271	207	0.76	0.488	0.036	13.300	0.998	0.198	0.008	100	100	5	0.86	2562	155	2702	71	2808	64
	34	271	225	0.83	0.397	0.025	11.300	0.737	0.206	0.008	100	100	17	0.82	2155	116	2546	61	2874	63
	35	278	204	0.73	0.418	0.027	11.700	0.767	0.203	0.008	100	100	14	0.82	2253	121	2581	61	2849	62
	36	314	238	0.76	0.424	0.027	11.600	0.756	0.198	0.007	100	100	12	0.84	2280	122	2572	61	2812	60
	37	309	257	0.83	0.425	0.026	12.000	0.760	0.204	0.007	100	100	13	0.83	2283	119	2601	60	2859	59
	38	329	226	0.69	0.412	0.024	11.300	0.687	0.198	0.007	100	100	13	0.83	2224	112	2545	57	2811	58
	39	334	253	0.76	0.404	0.024	11.200	0.668	0.200	0.007	100	100	15	0.83	2189	108	2538	56	2830	57
NCGB13-9B-7	1	1679	2482	1.48	0.229	0.009	6.090	0.312	0.193	0.006	93	75	40	0.82	1327	49	1989	45	2771	49
	2	1032	1377	1.33	0.366	0.016	9.970	0.480	0.198	0.005	96	84	19	0.86	2008	74	2432	44	2809	41
	3	764	885	1.16	0.538	0.028	15.000	0.808	0.202	0.005	97	89	1	0.90	2776	115	2813	51	2839	39
	4	604	579	0.96	0.570	0.029	15.400	0.838	0.196	0.005	97	90	2	0.88	2908	120	2841	52	2794	42
	5	530	450	0.85	0.601	0.034	16.400	0.954	0.198	0.005	98	94	4	0.90	3032	135	2902	56	2813	41
	6	501	350	0.70	0.526	0.029	14.900	0.832	0.205	0.005	99	96	3	0.90	2724	120	2807	53	2868	40
	7	474	341	0.72	0.515	0.028	14.100	0.778	0.199	0.005	99	97	3	0.89	2677	117	2757	52	2815	41
	8	496	315	0.63	0.600	0.037	16.800	1.060	0.203	0.005	99	98	4	0.92	3029	150	2922	61	2849	40
	9	455	300	0.66	0.486	0.025	13.200	0.713	0.198	0.005	100	98	5	0.89	2555	110	2698	51	2806	41
	10	452	288	0.64	0.534	0.030	14.900	0.864	0.202	0.005	100	98	2	0.90	2760	128	2807	55	2841	41
	11	428	282	0.66	0.477	0.025	13.300	0.711	0.203	0.005	100	98	7	0.88	2515	108	2705	50	2850	41
	12	429	290	0.68	0.503	0.027	14.000	0.766	0.202	0.005	100	99	5	0.89	2627	115	2750	52	2842	41
	13	454	301	0.66	0.545	0.031	15.300	0.894	0.204	0.005	100	99	1	0.91	2804	130	2836	56	2858	40
	14	418	293	0.70	0.470	0.024	12.900	0.671	0.199	0.005	100	99	7	0.88	2484	104	2673	49	2819	41
	15	426	248	0.58	0.471	0.024	13.000	0.684	0.201	0.005	100	99	8	0.88	2487	106	2681	50	2832	41
	16	449	283	0.63	0.490	0.026	13.800	0.745	0.205	0.005	100	99	6	0.89	2568	112	2737	51	2864	40
	17	457	259	0.57	0.491	0.026	13.400	0.733	0.197	0.005	100	99	5	0.89	2577	114	2706	52	2805	41
	18	424	224	0.53	0.514	0.028	14.400	0.805	0.203	0.005	100	99	4	0.89	2673	120	2774	53	2848	42
	19	391	224	0.57	0.422	0.020	11.900	0.592	0.204	0.005	100	98	13	0.85	2270	92	2595	47	2858	43
	20	378	212	0.56	0.468	0.025	12.800	0.689	0.198	0.005	100	99	7	0.87	2473	108	2664	51	2813	44
	21	357	184	0.52	0.491	0.027	13.500	0.772	0.200	0.006	100	99	5	0.88	2576	118	2717	54	2823	45
	22	329	173	0.52	0.453	0.024	12.400	0.685	0.199	0.006	100	99	9	0.86	2408	107	2638	52	2820	47
	23	336	196	0.58	0.483	0.028	13.400	0.790	0.202	0.006	100	99	7	0.88	2539	121	2710	56	2840	46
	24	314	168	0.53	0.512	0.031	13.800	0.863	0.196	0.006	100	99	3	0.89	2667	133	2739	59	2792	48
	25	290	171	0.59	0.466	0.027	12.900	0.763	0.201	0.006	100	99	8	0.87	2466	118	2672	56	2832	49
	26	272	158	0.58	0.458	0.027	12.700	0.755	0.200	0.006	100	99	9	0.86	2432	117	2655	56	2829	51
	27	276	132	0.48	0.527	0.034	14.100	0.936	0.194	0.006	100	99	1	0.89	2728	144	2757	63	2777	51
	28	250	145	0.58	0.459	0.027	12.700	0.775	0.201	0.006	100	99	9	0.86	2435	120	2660	57	2836	52
	29	256	144	0.56	0.480	0.030	13.100	0.832	0.197	0.007	100	98	6	0.86	2526	129	2684	60	2805	53
NCGB13-9B-13	1	1866	450	0.24	0.342	0.016	8.320	0.404	0.177	0.003	99	96	18	0.95	1894	78	2267	44	2622	26
	2	2059	353	0.17	0.364	0.018	8.580	0.433	0.171	0.002	100	98	14	0.96	1999	85	2294	46	2568	23
	3	2128	292	0.14	0.366	0.019	8.660	0.445	0.172	0.002	100	99	14	0.97	2011	88	2303	47	2574	23
	4	2251	279	0.12	0.348	0.017	8.390	0.411	0.175	0.002	100	99	17	0.97	1925	81	2274	44	2604	21
	5	2340	284	0.12	0.342	0.016	7.810	0.368	0.166	0.002	100	99	15	0.96	1897	76	2209	42	2513	21
	6	2413	249	0.10	0.364	0.017	8.230	0.397	0.164	0.002	100	99	12	0.97	2000	82	2256	44	2498	21
	7	2456	254	0.10	0.319	0.014	7.070	0.320	0.161	0.002	100	99	17	0.96	1784	69	2120	40	2464	21
	8	2685	248	0.09	0.341	0.017	7.380	0.361	0.157	0.002	100	99	13	0.97	1890	79	2159	44	2426	21
	9	2829	262	0.09	0.338	0.017	7.520	0.371	0.161	0.002	100	99	15	0.97	1878	79	2175	44	2469	20
	10	2653	229	0.09	0.315	0.014	6.610	0.296	0.152	0.002	100	99	16	0.96	1764	68	2061	39	2373	21
	11	2653	206	0.08	0.306	0.013	6.270	0.277	0.149	0.002	100	99	16	0.96	1721	66	2014	39	2329	20
	12	2971	243	0.08	0.315	0.014	6.570	0.295	0.152	0.002	100	100	15	0.97	1763	68	2056	40	2363	20
	13	2962	255	0.09	0.317	0.014	6.560	0.291	0.150	0.002	100	99	15	0.97	1774	68	2054	39	2347	20

	14	2974	249	0.08	0.328	0.015	7.090	0.321	0.157	0.002	100	100	15	0.97	1827	71	2123	40	2422	19
	15	2940	242	0.08	0.330	0.014	7.220	0.314	0.159	0.002	100	99	15	0.96	1840	69	2139	39	2441	20
	16	2777	228	0.08	0.338	0.014	7.050	0.303	0.151	0.002	99	97	12	0.96	1877	69	2118	38	2361	21
	17	3009	249	0.08	0.396	0.018	8.110	0.382	0.149	0.002	99	97	4	0.97	2150	85	2244	43	2331	20
	18	2902	247	0.09	0.345	0.014	7.610	0.320	0.160	0.002	100	97	14	0.96	1909	68	2186	38	2457	20
	19	3026	241	0.08	0.415	0.019	9.870	0.449	0.173	0.002	100	98	8	0.97	2237	85	2423	42	2583	18
	20	3027	265	0.09	0.455	0.021	10.900	0.498	0.174	0.002	99	98	4	0.97	2418	91	2518	42	2600	18
	21	2864	221	0.08	0.476	0.020	11.600	0.486	0.176	0.002	100	98	2	0.97	2510	86	2571	39	2619	18
	22	2877	239	0.08	0.461	0.019	10.800	0.456	0.171	0.002	100	98	3	0.97	2445	85	2510	39	2563	18
	23	2826	221	0.08	0.453	0.019	9.880	0.420	0.158	0.002	100	98	1	0.97	2407	84	2424	39	2438	19
	24	2917	240	0.08	0.414	0.018	9.030	0.386	0.158	0.002	100	98	5	0.97	2233	80	2341	39	2436	19
	25	2854	228	0.08	0.395	0.017	8.480	0.367	0.156	0.002	100	99	6	0.97	2146	78	2284	39	2410	19
	26	2869	227	0.08	0.399	0.018	9.560	0.424	0.174	0.002	100	98	10	0.97	2166	81	2393	41	2593	18
	27	2935	236	0.08	0.366	0.016	7.920	0.342	0.157	0.002	100	98	10	0.96	2010	73	2222	39	2423	20
	28	2893	221	0.08	0.361	0.015	7.870	0.335	0.158	0.002	100	99	11	0.96	1989	72	2217	38	2434	19
	29	3019	247	0.08	0.348	0.014	7.300	0.307	0.152	0.002	100	99	11	0.96	1923	69	2149	37	2373	19
	30	2975	256	0.09	0.340	0.014	7.240	0.298	0.154	0.002	100	99	13	0.96	1886	67	2141	37	2396	19
	31	2924	238	0.08	0.359	0.015	7.400	0.319	0.150	0.002	100	99	9	0.97	1975	72	2161	39	2344	19
	32	2800	234	0.08	0.386	0.015	8.520	0.339	0.160	0.002	100	99	8	0.96	2102	71	2288	36	2458	18
	33	2921	239	0.08	0.354	0.014	7.920	0.321	0.162	0.002	100	100	13	0.96	1954	68	2222	37	2478	18
	34	3076	271	0.09	0.348	0.014	7.630	0.309	0.159	0.002	100	99	13	0.96	1926	67	2188	36	2443	18
	35	3161	269	0.09	0.361	0.014	7.380	0.297	0.148	0.002	100	99	8	0.96	1985	68	2158	36	2328	19
	36	3159	269	0.09	0.347	0.015	7.090	0.300	0.148	0.002	100	99	10	0.97	1919	69	2123	38	2327	19
	37	3080	266	0.09	0.332	0.013	7.050	0.282	0.154	0.002	100	99	14	0.96	1847	63	2118	36	2392	19
	38	3247	320	0.10	0.305	0.012	6.480	0.256	0.154	0.002	100	99	17	0.96	1716	59	2044	35	2393	19
	39	3354	300	0.09	0.296	0.012	6.240	0.248	0.153	0.002	100	99	18	0.96	1671	57	2011	35	2380	18
NCGB13-9B-12	1	3081	590	0.19	0.264	0.010	5.680	0.227	0.156	0.003	99	95	24	0.90	1510	51	1929	34	2414	30
	2	2859	422	0.15	0.299	0.012	6.400	0.271	0.156	0.003	99	97	19	0.93	1684	60	2033	37	2408	27
	3	2699	273	0.10	0.317	0.014	6.660	0.307	0.153	0.002	100	98	15	0.94	1773	70	2067	41	2375	27
	4	2510	233	0.09	0.298	0.013	6.140	0.277	0.150	0.002	100	98	17	0.94	1679	65	1996	39	2343	27
	5	2326	209	0.09	0.334	0.016	7.120	0.347	0.155	0.003	100	98	14	0.95	1856	77	2127	43	2400	27
	6	1702	167	0.10	0.355	0.017	7.720	0.377	0.158	0.003	100	98	12	0.94	1957	80	2199	44	2434	29
	7	1326	170	0.13	0.396	0.019	8.870	0.447	0.162	0.003	99	97	8	0.93	2152	89	2325	46	2480	32
	8	1193	182	0.15	0.418	0.021	9.290	0.487	0.161	0.003	99	97	5	0.92	2249	96	2367	48	2471	34
	9	1106	166	0.15	0.440	0.024	10.000	0.551	0.165	0.003	99	97	4	0.93	2350	106	2435	51	2506	35
	10	1055	189	0.18	0.450	0.025	10.500	0.601	0.169	0.004	99	96	3	0.93	2397	111	2481	53	2551	36
	11	989	206	0.21	0.430	0.023	10.200	0.567	0.172	0.004	99	96	6	0.92	2304	104	2452	51	2578	37
	12	896	201	0.22	0.429	0.023	10.500	0.577	0.177	0.004	99	96	7	0.92	2300	103	2479	51	2630	37
	13	914	205	0.22	0.450	0.025	10.900	0.629	0.176	0.004	99	95	5	0.92	2396	111	2517	54	2617	38
	14	974	205	0.21	0.500	0.031	12.100	0.779	0.176	0.004	99	95	0	0.94	2613	134	2612	60	2612	38
	15	897	214	0.24	0.453	0.025	11.100	0.630	0.178	0.004	99	96	5	0.92	2410	111	2531	53	2630	37
	16	918	242	0.26	0.453	0.025	11.500	0.657	0.184	0.004	99	96	6	0.92	2408	111	2563	53	2689	37
	17	873	241	0.28	0.453	0.025	11.200	0.633	0.180	0.004	99	95	5	0.92	2409	109	2543	53	2651	38
	18	894	235	0.26	0.461	0.026	11.600	0.668	0.182	0.004	99	95	5	0.92	2445	113	2570	54	2671	37
	19	867	237	0.27	0.474	0.027	11.800	0.694	0.181	0.004	98	93	4	0.92	2501	117	2591	55	2662	38
	20	880	243	0.28	0.457	0.025	11.300	0.634	0.179	0.004	98	93	5	0.91	2427	108	2549	52	2648	38
	21	917	280	0.31	0.473	0.026	12.100	0.680	0.185	0.004	99	94	4	0.92	2498	112	2610	53	2698	37
	22	922	290	0.31	0.461	0.024	11.600	0.636	0.182	0.004	99	94	5	0.91	2444	107	2571	51	2673	37
	23	886	266	0.30	0.446	0.023	11.300	0.608	0.184	0.004	98	92	7	0.90	2379	101	2549	50	2686	38
	24	859	295	0.34	0.482	0.026	12.100	0.683	0.182	0.004	98	92	3	0.91	2534	113	2611	53	2671	39
	25	895	324	0.36	0.416	0.020	10.700	0.540	0.187	0.004	98	92	11	0.89	2243	90	2499	47	2714	37
	26	938	316	0.34	1.316	0.165	34.200	4.330	0.189	0.004	98	92	40	0.98	5413	460	3616	125	2730	37
	27	949	323	0.34	0.498	0.027	12.900	0.739	0.188	0.004	98	90	2	0.91	2607	116	2672	54	2722	39
	28	878	337	0.38	0.500	0.027	13.100	0.740	0.190	0.005	98	90	3	0.91	2612	115	2686	53	2743	39

	29	846	334	0.39	0.485	0.025	12.200	0.655	0.182	0.004	98	90	3	0.90	2549	107	2620	50	2675	39
	30	863	334	0.39	0.476	0.024	12.300	0.641	0.187	0.004	98	92	5	0.90	2508	103	2626	49	2718	38
	31	917	328	0.36	0.520	0.028	13.300	0.762	0.186	0.004	98	90	0	0.91	2699	120	2703	54	2705	38
	32	964	373	0.39	0.467	0.023	11.700	0.616	0.182	0.004	97	88	4	0.89	2471	100	2583	49	2673	40
	33	999	413	0.41	0.505	0.026	12.900	0.712	0.186	0.004	98	90	1	0.91	2636	113	2674	52	2704	38
	34	949	384	0.40	0.466	0.023	12.300	0.626	0.191	0.004	98	92	6	0.90	2466	99	2624	48	2749	37
	35	938	385	0.41	0.478	0.024	12.500	0.654	0.190	0.004	98	91	5	0.90	2520	103	2644	49	2740	37
	36	970	426	0.44	0.475	0.023	12.700	0.656	0.194	0.004	98	91	6	0.90	2503	102	2656	49	2774	36
	37	933	395	0.42	0.484	0.024	12.300	0.662	0.185	0.004	97	88	3	0.90	2546	106	2630	50	2694	39
	38	958	407	0.43	0.464	0.022	11.700	0.609	0.183	0.005	96	86	5	0.88	2459	98	2581	49	2678	40
	39	1038	469	0.45	0.469	0.022	12.300	0.622	0.190	0.004	97	89	6	0.89	2479	98	2625	48	2739	38
	40	1060	438	0.41	0.512	0.027	13.000	0.728	0.184	0.004	97	88	1	0.91	2666	115	2681	53	2693	39
	41	991	417	0.42	0.480	0.023	12.300	0.645	0.187	0.004	97	88	4	0.89	2528	102	2631	49	2712	39
	42	991	467	0.47	0.485	0.024	12.100	0.642	0.181	0.004	97	87	2	0.89	2551	104	2611	50	2659	40
	43	974	426	0.44	0.454	0.021	11.700	0.585	0.187	0.004	97	88	7	0.88	2411	93	2582	47	2719	39
	44	969	438	0.45	0.450	0.021	11.600	0.581	0.188	0.004	97	87	7	0.88	2395	92	2576	47	2722	39
	45	1014	476	0.47	0.457	0.022	11.500	0.590	0.183	0.004	97	87	6	0.89	2427	96	2565	48	2676	39
	46	1031	462	0.45	0.452	0.021	11.600	0.588	0.186	0.004	97	86	7	0.88	2404	94	2575	47	2711	39
	47	1021	486	0.48	0.443	0.020	11.600	0.570	0.190	0.005	97	87	9	0.88	2363	90	2573	46	2743	39
	48	1053	489	0.46	0.462	0.022	11.700	0.608	0.184	0.004	96	85	5	0.89	2448	97	2584	48	2693	40
	49	1020	422	0.41	0.443	0.020	10.700	0.541	0.176	0.004	97	86	6	0.88	2364	91	2501	47	2615	41
NCGB13-9B-15@1	1	2179	482	0.22	0.283	0.012	6.360	0.272	0.163	0.003	100	98	23	0.90	1608	58	2027	38	2486	31
	2	2160	450	0.21	0.302	0.013	6.620	0.297	0.159	0.003	100	99	19	0.92	1701	65	2061	40	2444	30
	3	2041	459	0.22	0.300	0.012	6.510	0.276	0.157	0.003	100	99	19	0.91	1690	61	2047	37	2429	29
	4	2047	395	0.19	0.313	0.013	6.800	0.299	0.158	0.003	100	99	17	0.92	1755	66	2086	39	2431	29
	5	1943	406	0.21	0.311	0.013	6.460	0.273	0.151	0.003	100	100	16	0.92	1744	63	2040	37	2355	29
	6	2104	435	0.21	0.310	0.013	6.570	0.286	0.154	0.003	100	99	17	0.92	1739	65	2055	38	2388	29
	7	2028	436	0.22	0.287	0.011	6.080	0.246	0.154	0.003	100	100	20	0.91	1625	56	1987	35	2389	30
	8	1965	439	0.22	0.300	0.012	6.450	0.268	0.156	0.003	100	100	19	0.91	1690	60	2039	37	2412	29
	9	2005	435	0.22	0.320	0.014	6.920	0.301	0.157	0.003	100	100	16	0.92	1792	66	2101	39	2420	29
	10	2035	443	0.22	0.311	0.013	6.950	0.292	0.162	0.003	100	100	19	0.91	1744	63	2105	37	2479	29
	11	1994	439	0.22	0.306	0.012	6.790	0.277	0.161	0.003	100	100	19	0.91	1722	60	2084	36	2463	29
	12	1894	449	0.24	0.345	0.015	7.780	0.338	0.163	0.003	100	100	14	0.92	1912	70	2206	39	2491	29
	13	1724	369	0.21	0.320	0.013	7.250	0.295	0.165	0.003	100	100	18	0.91	1788	62	2143	36	2502	29
	14	1751	418	0.24	0.340	0.014	7.730	0.329	0.165	0.003	100	100	15	0.92	1885	68	2200	38	2507	29
	15	1742	424	0.24	0.342	0.014	7.770	0.328	0.165	0.003	100	100	15	0.92	1897	68	2204	38	2503	29
	16	1670	410	0.25	0.346	0.014	7.910	0.335	0.166	0.003	100	100	15	0.92	1916	69	2221	38	2516	29
	17	1595	439	0.28	0.319	0.012	7.130	0.284	0.162	0.003	100	100	17	0.90	1786	60	2128	35	2478	30
	18	1690	378	0.22	0.347	0.015	8.280	0.353	0.173	0.003	100	100	16	0.92	1922	69	2262	39	2585	29
	19	1611	422	0.26	0.344	0.014	7.960	0.329	0.168	0.003	100	100	16	0.91	1905	66	2227	37	2538	30
	20	1523	407	0.27	0.345	0.014	8.210	0.331	0.172	0.003	100	100	16	0.90	1911	65	2254	37	2581	30
	21	1544	406	0.26	0.370	0.015	8.760	0.373	0.172	0.003	100	100	13	0.91	2029	73	2313	39	2574	30
	22	1518	386	0.25	0.368	0.015	8.790	0.370	0.173	0.003	100	100	14	0.91	2020	72	2316	38	2589	30
	23	1447	416	0.29	0.358	0.014	8.650	0.352	0.175	0.003	100	100	15	0.90	1974	68	2301	37	2606	30
	24	1462	384	0.26	0.375	0.015	8.850	0.369	0.171	0.003	100	100	12	0.90	2054	72	2322	38	2567	31
	25	1405	391	0.28	0.392	0.017	9.360	0.402	0.173	0.003	100	100	11	0.91	2133	76	2374	39	2588	31
	26	1311	359	0.27	0.374	0.015	8.950	0.370	0.174	0.003	100	100	13	0.89	2048	71	2333	38	2592	31
	27	1270	395	0.31	0.375	0.015	9.060	0.366	0.175	0.003	100	100	13	0.89	2055	69	2344	37	2607	32
	28	1279	373	0.29	0.393	0.016	9.660	0.406	0.178	0.003	100	100	12	0.90	2137	75	2403	39	2636	32
	29	1241	406	0.33	0.386	0.016	9.590	0.394	0.180	0.003	100	100	13	0.89	2105	72	2396	38	2654	32
	30	1181	346	0.29	0.389	0.015	9.580	0.388	0.179	0.004	100	100	12	0.88	2116	71	2396	37	2643	32
	31	1214	359	0.30	0.409	0.017	10.000	0.418	0.177	0.003	100	100	10	0.89	2209	76	2434	39	2628	32
	32	1125	345	0.31	0.420	0.017	10.600	0.447	0.183	0.004	100	100	10	0.89	2259	79	2489	39	2682	32
	33	1155	362	0.31	0.427	0.018	10.900	0.469	0.185	0.004	100	100	9	0.90	2293	81	2515	40	2700	32

	34	1047	341	0.33	0.419	0.017	10.600	0.439	0.183	0.004	100	100	10	0.88	2257	77	2488	38	2683	33
	35	1012	342	0.34	0.418	0.017	10.700	0.437	0.185	0.004	100	100	10	0.88	2250	76	2493	38	2698	33
	36	1007	326	0.32	0.431	0.018	10.900	0.457	0.184	0.004	100	100	9	0.88	2310	79	2517	39	2687	33
	37	984	361	0.37	0.430	0.018	10.900	0.455	0.185	0.004	100	100	9	0.88	2303	79	2517	39	2694	34
	38	997	326	0.33	0.434	0.018	11.000	0.469	0.184	0.004	100	100	8	0.88	2323	81	2524	40	2689	34
	39	1017	341	0.34	0.457	0.020	11.800	0.520	0.187	0.004	100	100	6	0.89	2427	88	2585	41	2712	34
	40	1027	340	0.33	0.438	0.018	11.300	0.487	0.187	0.004	100	100	8	0.88	2342	83	2549	40	2718	34
	41	1014	347	0.34	0.420	0.017	10.600	0.449	0.183	0.004	100	100	10	0.88	2261	79	2490	39	2682	34
	42	826	320	0.39	0.402	0.016	10.100	0.406	0.183	0.004	100	100	12	0.84	2179	72	2448	37	2680	36
	43	879	320	0.36	0.425	0.018	11.000	0.470	0.188	0.004	100	100	10	0.87	2285	80	2524	40	2722	35
	44	937	336	0.36	0.435	0.019	11.000	0.488	0.184	0.004	100	100	8	0.88	2328	84	2527	41	2691	35
	45	915	324	0.35	0.424	0.018	11.000	0.472	0.189	0.004	100	100	10	0.87	2277	80	2524	40	2729	36
	46	898	344	0.38	0.429	0.018	11.000	0.478	0.186	0.004	100	100	9	0.87	2299	82	2522	40	2706	36
	47	864	310	0.36	0.432	0.018	11.000	0.480	0.184	0.004	100	100	9	0.87	2315	83	2521	41	2691	36
	48	834	303	0.36	0.430	0.018	11.200	0.487	0.189	0.004	100	100	10	0.87	2304	82	2539	41	2732	36
	49	814	309	0.38	0.452	0.020	11.200	0.509	0.180	0.004	100	100	6	0.88	2404	89	2543	42	2655	36
NCGB13-9B-17@1	1	3702	19831	5.36	0.097	0.004	2.250	0.159	0.168	0.009	93	73	67	0.71	598	24	1197	50	2538	85
	2	3663	24185	6.60	0.081	0.003	1.780	0.129	0.161	0.009	93	72	70	0.69	499	19	1039	47	2462	90
	3	3449	25029	7.26	0.070	0.003	1.470	0.113	0.153	0.009	92	68	71	0.66	437	15	920	46	2374	101
	4	3514	22579	6.43	0.078	0.003	1.490	0.122	0.138	0.009	92	64	62	0.64	485	17	925	50	2203	113
	5	3584	21704	6.06	0.092	0.003	1.730	0.128	0.137	0.008	93	67	57	0.65	568	20	1022	48	2186	99
	6	3338	20694	6.20	0.109	0.004	2.070	0.133	0.138	0.007	94	73	52	0.68	668	24	1138	44	2196	82
	7	3250	20692	6.37	0.117	0.005	2.220	0.133	0.137	0.006	95	76	50	0.71	714	26	1187	42	2192	74
	8	2946	18040	6.12	0.119	0.004	2.340	0.130	0.143	0.006	96	79	52	0.73	722	26	1225	39	2268	66
	9	3039	14987	4.93	0.138	0.006	2.580	0.145	0.136	0.005	97	82	43	0.78	834	33	1295	41	2171	61
	10	3308	12726	3.85	0.138	0.006	2.650	0.139	0.140	0.004	97	84	45	0.80	831	32	1313	39	2221	55
	11	3079	8648	2.81	0.167	0.007	3.100	0.161	0.135	0.004	98	89	36	0.85	994	41	1433	40	2164	48
	12	2686	5401	2.01	0.182	0.008	3.480	0.174	0.139	0.003	99	93	34	0.88	1075	45	1522	39	2214	41
	13	2617	3587	1.37	0.203	0.010	4.000	0.204	0.143	0.003	99	96	31	0.91	1194	52	1634	42	2258	36
	14	2470	2374	0.96	0.223	0.012	4.480	0.243	0.146	0.003	99	97	29	0.93	1295	61	1726	45	2298	35
	15	2244	1628	0.73	0.223	0.011	4.500	0.238	0.147	0.003	99	97	29	0.92	1297	59	1731	44	2306	35
	16	2091	1367	0.65	0.241	0.013	4.770	0.260	0.144	0.003	99	97	25	0.93	1391	65	1780	46	2271	36
	17	2102	1260	0.60	0.228	0.011	4.480	0.230	0.143	0.003	100	98	27	0.92	1321	59	1728	43	2263	35
	18	2100	1122	0.53	0.251	0.014	4.900	0.279	0.142	0.003	100	99	22	0.94	1442	71	1802	48	2249	35
	19	2046	1134	0.55	0.249	0.014	4.870	0.276	0.142	0.003	100	97	23	0.93	1434	70	1798	48	2250	36
	20	2038	1109	0.54	0.249	0.013	4.990	0.272	0.145	0.003	100	98	24	0.93	1434	67	1818	46	2291	35
	21	1944	1063	0.55	0.233	0.011	4.790	0.243	0.149	0.003	100	99	28	0.92	1351	59	1784	43	2336	35
	22	1980	997	0.50	0.248	0.013	5.360	0.287	0.157	0.003	100	99	27	0.93	1427	66	1878	46	2422	34
	23	1903	1094	0.57	0.264	0.014	5.520	0.293	0.152	0.003	100	99	23	0.92	1511	69	1904	46	2363	35
	24	1837	901	0.49	0.293	0.016	6.390	0.364	0.158	0.003	100	98	20	0.93	1658	81	2031	50	2434	35
	25	1621	808	0.50	0.289	0.015	6.310	0.331	0.159	0.003	100	98	21	0.92	1634	73	2020	46	2441	35
	26	1797	917	0.51	0.306	0.016	6.830	0.372	0.162	0.003	100	99	19	0.94	1723	80	2090	48	2474	33
	27	1813	872	0.48	0.303	0.015	6.600	0.341	0.158	0.003	100	99	19	0.93	1704	75	2059	46	2436	33
	28	1903	989	0.52	0.321	0.017	7.100	0.380	0.161	0.003	100	99	17	0.94	1793	82	2124	48	2462	32
	29	2007	928	0.46	0.323	0.017	7.350	0.398	0.165	0.003	100	99	18	0.94	1806	83	2155	48	2506	31
	30	2130	1025	0.48	0.318	0.016	6.970	0.367	0.159	0.003	100	99	17	0.94	1777	80	2108	47	2448	31
	31	2291	1194	0.52	0.287	0.013	6.370	0.304	0.161	0.003	100	99	22	0.93	1624	67	2028	42	2469	30
	32	2327	1225	0.53	0.284	0.013	6.470	0.311	0.165	0.003	100	98	24	0.93	1610	66	2042	42	2512	30
	33	2380	1226	0.52	0.299	0.015	6.460	0.330	0.156	0.003	99	97	19	0.94	1688	73	2040	45	2417	31
	34	2495	1340	0.54	0.302	0.015	6.860	0.352	0.165	0.003	100	99	21	0.94	1702	75	2093	45	2503	29
	35	2469	1310	0.53	0.299	0.015	6.570	0.334	0.160	0.003	100	99	20	0.95	1684	74	2056	45	2452	28
	36	2393	1382	0.58	0.281	0.013	6.250	0.305	0.161	0.003	100	99	23	0.94	1597	67	2011	43	2468	29
	37	2600	1468	0.56	0.288	0.014	6.280	0.315	0.158	0.003	100	98	21	0.94	1633	70	2015	44	2434	29
	38	2750	1618	0.59	0.291	0.015	6.490	0.332	0.162	0.003	100	98	22	0.95	1646	73	2044	45	2474	28

	39	2668	1664	0.62	0.265	0.012	5.920	0.282	0.162	0.003	100	98	26	0.94	1517	62	1965	41	2476	28
Sand-sized metafeldspathic arenite (NCB13-7; NAD 83, Zone 15, 689548E, 5825474N)																				
NCGB13-7-2	1	4168	11057	2.65	0.091	0.003	2.200	0.103	0.175	0.006	93	73	71	0.72	561	16	1180	33	2608	54
	2	4608	11479	2.49	0.083	0.002	2.020	0.092	0.176	0.006	93	74	74	0.73	516	14	1124	31	2618	52
	3	4715	11314	2.40	0.084	0.002	2.040	0.088	0.176	0.005	94	77	74	0.74	519	14	1129	29	2619	48
	4	4642	10648	2.29	0.085	0.003	1.970	0.087	0.167	0.005	94	76	71	0.74	529	15	1105	30	2529	51
	5	4570	9440	2.07	0.094	0.003	2.250	0.092	0.174	0.005	95	81	70	0.77	577	16	1196	29	2598	44
	6	4450	8679	1.95	0.105	0.003	2.470	0.097	0.171	0.004	96	83	65	0.78	643	18	1264	28	2568	41
	7	4209	7554	1.79	0.121	0.004	2.890	0.112	0.173	0.004	97	85	61	0.81	738	22	1379	29	2583	38
	8	3963	6292	1.59	0.141	0.005	3.340	0.130	0.171	0.004	97	87	54	0.83	852	26	1490	30	2571	36
	9	3505	4766	1.36	0.158	0.005	3.740	0.143	0.171	0.004	97	89	50	0.84	946	29	1579	31	2571	34
	10	3072	3734	1.22	0.176	0.006	4.110	0.157	0.169	0.003	98	90	45	0.85	1047	33	1657	31	2550	33
	11	2960	2900	0.98	0.201	0.007	4.760	0.190	0.172	0.003	98	92	40	0.88	1180	39	1778	33	2576	32
	12	2773	2433	0.88	0.214	0.008	5.000	0.193	0.170	0.003	99	94	37	0.88	1250	41	1820	33	2553	31
	13	2613	1924	0.74	0.217	0.008	5.150	0.194	0.173	0.003	99	95	37	0.88	1264	40	1845	32	2583	30
	14	2521	1711	0.68	0.231	0.008	5.480	0.210	0.172	0.003	99	96	34	0.89	1342	44	1897	33	2574	30
	15	2660	1494	0.56	0.251	0.010	5.880	0.242	0.170	0.003	99	96	30	0.90	1444	51	1959	36	2558	30
	16	2424	1251	0.52	0.244	0.009	5.810	0.229	0.173	0.003	99	96	32	0.89	1407	47	1948	34	2585	30
	17	2211	923	0.42	0.265	0.010	6.250	0.257	0.171	0.003	99	97	28	0.90	1517	53	2012	36	2566	30
	18	2210	887	0.40	0.276	0.011	6.610	0.278	0.174	0.003	100	98	27	0.91	1569	57	2060	37	2596	29
	19	2196	816	0.37	0.263	0.010	6.510	0.264	0.180	0.003	100	98	31	0.91	1506	52	2048	36	2649	29
	20	2102	648	0.31	0.280	0.011	6.890	0.290	0.178	0.003	100	98	27	0.91	1591	57	2097	37	2638	29
	21	2036	623	0.31	0.281	0.011	6.890	0.290	0.178	0.003	99	97	27	0.91	1597	57	2098	37	2633	30
	22	1845	612	0.33	0.273	0.010	6.690	0.265	0.178	0.003	99	97	28	0.89	1555	52	2071	35	2634	30
	23	1909	544	0.29	0.293	0.012	7.140	0.307	0.177	0.003	99	97	25	0.91	1656	60	2129	38	2624	30
	24	1889	551	0.29	0.288	0.012	7.170	0.300	0.180	0.003	100	98	27	0.90	1633	58	2133	37	2657	30
	25	1805	521	0.29	0.305	0.013	7.490	0.329	0.178	0.003	100	98	24	0.91	1715	64	2172	39	2638	30
	26	1743	501	0.29	0.294	0.012	7.350	0.305	0.182	0.003	100	98	26	0.90	1660	59	2155	37	2667	30
	27	1861	501	0.27	0.306	0.013	7.870	0.341	0.186	0.003	100	98	25	0.91	1723	63	2216	39	2709	30
	28	1592	475	0.30	0.305	0.012	7.540	0.318	0.179	0.003	100	98	24	0.90	1717	61	2177	38	2644	31
	29	1446	429	0.30	0.300	0.012	7.570	0.317	0.183	0.004	99	98	25	0.89	1691	60	2181	38	2680	32
	30	1490	423	0.28	0.303	0.012	7.610	0.323	0.182	0.004	100	98	25	0.90	1704	61	2186	38	2675	31
	31	1467	429	0.29	0.313	0.013	8.060	0.346	0.187	0.004	100	99	24	0.90	1757	64	2238	39	2712	31
	32	1523	389	0.26	0.325	0.014	8.490	0.380	0.190	0.004	100	99	23	0.91	1814	69	2285	41	2739	31
	33	1339	403	0.30	0.319	0.013	8.230	0.355	0.187	0.004	100	98	23	0.90	1786	65	2256	39	2715	32
	34	1315	386	0.29	0.304	0.012	7.830	0.330	0.187	0.004	99	98	26	0.88	1709	61	2212	38	2717	33
	35	1392	400	0.29	0.328	0.014	8.250	0.373	0.183	0.004	99	97	21	0.90	1827	69	2259	41	2677	33
	36	1319	374	0.28	0.332	0.014	8.540	0.377	0.186	0.004	100	98	21	0.90	1848	69	2290	40	2711	33
	37	1368	425	0.31	0.323	0.014	8.610	0.377	0.193	0.004	100	98	24	0.90	1806	67	2297	40	2768	32
	38	1316	407	0.31	0.333	0.014	8.630	0.382	0.188	0.004	100	98	22	0.89	1852	69	2300	40	2726	33
	39	1230	370	0.30	0.325	0.013	8.150	0.347	0.182	0.004	99	97	21	0.88	1816	65	2248	39	2668	34
	40	1252	380	0.30	0.326	0.014	8.670	0.377	0.193	0.004	100	98	24	0.89	1817	66	2304	40	2769	32
NCGB13-7-2@1	1	4168	11057	2.65	0.091	0.003	2.200	0.103	0.175	0.006	93	73	71	0.72	561	16	1180	33	2608	54
	2	4608	11479	2.49	0.083	0.002	2.020	0.092	0.176	0.006	93	74	74	0.73	516	14	1124	31	2618	52
	3	4715	11314	2.40	0.084	0.002	2.040	0.088	0.176	0.005	94	77	74	0.74	519	14	1129	29	2619	48
	4	4642	10648	2.29	0.085	0.003	1.970	0.087	0.167	0.005	94	76	71	0.74	529	15	1105	30	2529	51
	5	4570	9440	2.07	0.094	0.003	2.250	0.092	0.174	0.005	95	81	70	0.77	577	16	1196	29	2598	44
	6	4450	8679	1.95	0.105	0.003	2.470	0.097	0.171	0.004	96	83	65	0.78	643	18	1264	28	2568	41
	7	4209	7554	1.79	0.121	0.004	2.890	0.112	0.173	0.004	97	85	61	0.81	738	22	1379	29	2583	38
	8	3963	6292	1.59	0.141	0.005	3.340	0.130	0.171	0.004	97	87	54	0.83	852	26	1490	30	2571	36
	9	3505	4766	1.36	0.158	0.005	3.740	0.143	0.171	0.004	97	89	50	0.84	946	29	1579	31	2571	34
	10	3072	3734	1.22	0.176	0.006	4.110	0.157	0.169	0.003	98	90	45	0.85	1047	33	1657	31	2550	33
	11	2960	2900	0.98	0.201	0.007	4.760	0.190	0.172	0.003	98	92	40	0.88	1180	39	1778	33	2576	32
	12	2773	2433	0.88	0.214	0.008	5.000	0.193	0.170	0.003	99	94	37	0.88	1250	41	1820	33	2553	31

	13	2613	1924	0.74	0.217	0.008	5.150	0.194	0.173	0.003	99	95	37	0.88	1264	40	1845	32	2583	30
	14	2521	1711	0.68	0.231	0.008	5.480	0.210	0.172	0.003	99	96	34	0.89	1342	44	1897	33	2574	30
	15	2660	1494	0.56	0.251	0.010	5.880	0.242	0.170	0.003	99	96	30	0.90	1444	51	1959	36	2558	30
	16	2424	1251	0.52	0.244	0.009	5.810	0.229	0.173	0.003	99	96	32	0.89	1407	47	1948	34	2585	30
	17	2211	923	0.42	0.265	0.010	6.250	0.257	0.171	0.003	99	97	28	0.90	1517	53	2012	36	2566	30
	18	2210	887	0.40	0.276	0.011	6.610	0.278	0.174	0.003	100	98	27	0.91	1569	57	2060	37	2596	29
	19	2196	816	0.37	0.263	0.010	6.510	0.264	0.180	0.003	100	98	31	0.91	1506	52	2048	36	2649	29
	20	2102	648	0.31	0.280	0.011	6.890	0.290	0.178	0.003	100	98	27	0.91	1591	57	2097	37	2638	29
	21	2036	623	0.31	0.281	0.011	6.890	0.290	0.178	0.003	99	97	27	0.91	1597	57	2098	37	2633	30
	22	1845	612	0.33	0.273	0.010	6.690	0.265	0.178	0.003	99	97	28	0.89	1555	52	2071	35	2634	30
	23	1909	544	0.29	0.293	0.012	7.140	0.307	0.177	0.003	99	97	25	0.91	1656	60	2129	38	2624	30
	24	1889	551	0.29	0.288	0.012	7.170	0.300	0.180	0.003	100	98	27	0.90	1633	58	2133	37	2657	30
	25	1805	521	0.29	0.305	0.013	7.490	0.329	0.178	0.003	100	98	24	0.91	1715	64	2172	39	2638	30
	26	1743	501	0.29	0.294	0.012	7.350	0.305	0.182	0.003	100	98	26	0.90	1660	59	2155	37	2667	30
	27	1861	501	0.27	0.306	0.013	7.870	0.341	0.186	0.003	100	98	25	0.91	1723	63	2216	39	2709	30
	28	1592	475	0.30	0.305	0.012	7.540	0.318	0.179	0.003	100	98	24	0.90	1717	61	2177	38	2644	31
	29	1446	429	0.30	0.300	0.012	7.570	0.317	0.183	0.004	99	98	25	0.89	1691	60	2181	38	2680	32
	30	1490	423	0.28	0.303	0.012	7.610	0.323	0.182	0.004	100	98	25	0.90	1704	61	2186	38	2675	31
	31	1467	429	0.29	0.313	0.013	8.060	0.346	0.187	0.004	100	99	24	0.90	1757	64	2238	39	2712	31
	32	1523	389	0.26	0.325	0.014	8.490	0.380	0.190	0.004	100	99	23	0.91	1814	69	2285	41	2739	31
	33	1339	403	0.30	0.319	0.013	8.230	0.355	0.187	0.004	100	98	23	0.90	1786	65	2256	39	2715	32
	34	1315	386	0.29	0.304	0.012	7.830	0.330	0.187	0.004	99	98	26	0.88	1709	61	2212	38	2717	33
	35	1392	400	0.29	0.328	0.014	8.250	0.373	0.183	0.004	99	97	21	0.90	1827	69	2259	41	2677	33
	36	1319	374	0.28	0.332	0.014	8.540	0.377	0.186	0.004	100	98	21	0.90	1848	69	2290	40	2711	33
	37	1368	425	0.31	0.323	0.014	8.610	0.377	0.193	0.004	100	98	24	0.90	1806	67	2297	40	2768	32
	38	1316	407	0.31	0.333	0.014	8.630	0.382	0.188	0.004	100	98	22	0.89	1852	69	2300	40	2726	33
	39	1230	370	0.30	0.325	0.013	8.150	0.347	0.182	0.004	99	97	21	0.88	1816	65	2248	39	2668	34
	40	1252	380	0.30	0.326	0.014	8.670	0.377	0.193	0.004	100	98	24	0.89	1817	66	2304	40	2769	32
	41	1230	421	0.34	0.333	0.014	8.630	0.378	0.188	0.004	100	98	21	0.89	1854	68	2299	40	2723	33
	42	1119	378	0.34	0.310	0.012	8.150	0.336	0.190	0.004	99	98	25	0.87	1742	60	2247	37	2745	34
	43	1206	372	0.31	0.335	0.014	8.760	0.387	0.190	0.004	99	98	22	0.89	1861	69	2314	40	2742	34
	44	1197	391	0.33	0.326	0.013	8.550	0.367	0.190	0.004	99	97	23	0.88	1819	65	2291	39	2744	34
	45	1255	373	0.30	0.341	0.015	9.050	0.410	0.192	0.004	99	98	21	0.90	1893	72	2343	41	2763	34
	46	1084	367	0.34	0.328	0.013	8.760	0.372	0.194	0.004	100	98	23	0.88	1829	65	2313	39	2773	34
	47	1121	324	0.29	0.327	0.014	8.650	0.373	0.192	0.004	99	98	23	0.88	1825	66	2302	39	2758	34
	48	1139	368	0.32	0.333	0.014	8.800	0.382	0.192	0.004	100	99	22	0.88	1853	68	2317	40	2756	34
	49	1067	319	0.30	0.342	0.015	9.160	0.409	0.195	0.004	100	98	22	0.89	1894	71	2354	41	2781	34
NCGB13-7-4	1	1155	336	0.29	0.598	0.028	14.500	0.711	0.175	0.005	98	93	8	0.86	3022	113	2780	47	2609	43
	2	1153	234	0.20	0.557	0.024	13.700	0.609	0.179	0.004	99	96	4	0.85	2855	98	2731	42	2641	40
	3	1236	247	0.20	0.579	0.026	14.600	0.661	0.182	0.004	99	97	6	0.87	2946	104	2787	43	2674	38
	4	1173	232	0.20	0.604	0.027	15.200	0.710	0.183	0.004	99	97	7	0.88	3046	110	2829	44	2678	38
	5	1211	219	0.18	0.560	0.024	14.100	0.626	0.183	0.004	100	98	4	0.87	2866	100	2760	42	2683	37
	6	1267	215	0.17	0.572	0.025	14.800	0.664	0.187	0.004	100	98	4	0.88	2915	103	2800	43	2718	36
	7	1233	186	0.15	0.531	0.022	13.800	0.590	0.188	0.004	100	99	0	0.87	2747	93	2734	41	2723	36
	8	1232	152	0.12	0.558	0.024	14.600	0.645	0.190	0.004	100	99	2	0.88	2857	100	2789	42	2740	35
	9	1147	167	0.15	0.568	0.025	14.800	0.661	0.189	0.004	100	99	3	0.88	2901	102	2803	42	2733	35
	10	1169	153	0.13	0.574	0.026	15.400	0.700	0.194	0.004	100	99	3	0.89	2924	105	2838	43	2778	35
	11	1131	163	0.14	0.574	0.025	15.500	0.694	0.196	0.004	100	99	3	0.88	2925	103	2849	43	2795	35
	12	1140	152	0.13	0.571	0.025	15.600	0.702	0.198	0.004	100	99	2	0.89	2911	103	2853	43	2812	35
	13	1032	143	0.14	0.544	0.023	14.900	0.645	0.198	0.004	100	99	0	0.87	2801	97	2806	41	2810	35
	14	994	156	0.16	0.547	0.023	14.600	0.639	0.194	0.004	100	99	1	0.87	2811	97	2790	42	2774	36
	15	1030	142	0.14	0.544	0.024	14.900	0.662	0.199	0.004	100	99	0	0.89	2799	99	2808	42	2814	34
	16	1017	119	0.12	0.552	0.024	15.300	0.690	0.202	0.004	100	99	0	0.89	2833	101	2836	43	2839	34
	17	982	145	0.15	0.494	0.020	13.400	0.554	0.197	0.004	100	99	5	0.86	2586	86	2707	39	2799	35

	18	994	150	0.15	0.517	0.022	14.100	0.609	0.197	0.004	100	99	2	0.88	2688	93	2754	41	2803	34
	19	1022	182	0.18	0.529	0.023	14.600	0.639	0.200	0.004	100	99	2	0.89	2738	96	2788	42	2824	34
	20	1095	161	0.15	0.497	0.021	13.700	0.579	0.199	0.004	100	99	5	0.88	2602	89	2727	40	2821	33
	21	1039	159	0.15	0.483	0.020	13.300	0.550	0.199	0.004	100	99	6	0.87	2542	85	2699	39	2818	34
	22	1041	152	0.15	0.512	0.022	13.600	0.592	0.193	0.004	100	98	2	0.89	2664	92	2724	41	2769	34
	23	1039	140	0.13	0.503	0.021	13.600	0.592	0.196	0.004	100	98	4	0.89	2628	92	2723	41	2794	33
	24	1059	121	0.11	0.502	0.021	13.100	0.553	0.189	0.004	100	99	2	0.88	2620	89	2684	40	2733	33
	25	1099	146	0.13	0.481	0.020	12.800	0.538	0.193	0.004	100	99	5	0.89	2530	86	2662	40	2764	33
	26	1074	132	0.12	0.473	0.019	12.500	0.517	0.192	0.004	100	99	6	0.88	2497	84	2645	39	2760	33
	27	1109	142	0.13	0.498	0.022	13.800	0.611	0.202	0.004	100	100	5	0.90	2604	93	2739	42	2840	32
	28	1063	151	0.14	0.445	0.017	11.800	0.473	0.192	0.004	100	99	9	0.87	2372	78	2589	37	2763	33
	29	1080	161	0.15	0.452	0.018	12.100	0.501	0.194	0.004	100	99	8	0.88	2404	81	2609	39	2773	32
	30	1085	162	0.15	0.454	0.019	12.000	0.503	0.192	0.004	100	99	8	0.89	2412	82	2607	39	2762	32
	31	1087	174	0.16	0.437	0.017	11.400	0.465	0.189	0.004	100	99	9	0.88	2336	78	2556	38	2736	32
	32	1112	173	0.16	0.440	0.018	11.700	0.485	0.193	0.004	100	100	9	0.89	2350	80	2583	39	2771	32
	33	1143	165	0.14	0.435	0.018	11.300	0.463	0.188	0.004	100	100	9	0.89	2327	79	2546	38	2724	32
	34	1109	160	0.14	0.427	0.017	11.200	0.454	0.189	0.004	100	100	10	0.89	2293	77	2536	38	2736	31
	35	1136	183	0.16	0.413	0.016	10.600	0.422	0.186	0.004	100	100	11	0.88	2229	73	2486	37	2704	32
	36	1103	195	0.18	0.384	0.014	9.720	0.376	0.184	0.004	100	99	14	0.86	2096	67	2409	36	2685	33
	37	1062	162	0.15	0.397	0.015	10.200	0.404	0.186	0.004	100	99	13	0.88	2155	71	2452	37	2708	32
	38	1042	170	0.16	0.384	0.014	9.830	0.377	0.186	0.004	100	100	14	0.87	2097	67	2419	35	2703	32
	39	1068	170	0.16	0.430	0.018	10.500	0.439	0.177	0.003	100	99	7	0.89	2307	79	2479	39	2623	32
NCGB13-7-6	1	1147	4067	3.54	0.374	0.016	10.000	0.538	0.195	0.007	93	75	17	0.77	2049	76	2439	49	2783	56
	2	937	3203	3.42	0.484	0.023	13.200	0.719	0.197	0.006	94	78	6	0.82	2543	99	2691	52	2803	52
	3	783	2368	3.02	0.532	0.026	14.900	0.817	0.203	0.006	95	82	2	0.84	2751	110	2809	52	2851	49
	4	630	1526	2.42	0.609	0.032	17.600	1.000	0.210	0.006	96	85	3	0.86	3068	129	2970	55	2904	48
	5	599	1091	1.82	0.564	0.029	15.900	0.891	0.204	0.006	95	83	0	0.84	2883	118	2869	54	2860	49
	6	558	930	1.67	0.582	0.030	16.000	0.924	0.200	0.006	95	81	3	0.83	2956	122	2880	55	2827	52
	7	583	844	1.45	0.584	0.031	16.100	0.936	0.200	0.006	95	82	3	0.84	2966	124	2881	56	2823	52
	8	545	869	1.59	0.554	0.027	15.600	0.842	0.205	0.006	95	84	0	0.82	2841	112	2855	51	2864	50
	9	565	780	1.38	0.587	0.030	17.000	0.937	0.209	0.006	95	84	2	0.84	2978	121	2932	53	2901	49
	10	562	748	1.33	0.570	0.027	16.400	0.859	0.209	0.006	96	85	0	0.83	2907	112	2902	50	2898	48
	11	608	737	1.21	0.572	0.027	16.100	0.821	0.204	0.006	96	87	1	0.83	2916	110	2880	49	2855	47
	12	605	621	1.03	0.582	0.028	16.300	0.843	0.203	0.006	96	86	2	0.84	2955	113	2895	49	2854	46
	13	580	511	0.88	0.582	0.028	16.500	0.847	0.206	0.006	97	88	2	0.85	2957	113	2906	49	2871	45
	14	603	479	0.79	0.547	0.025	15.700	0.766	0.209	0.006	97	90	2	0.84	2811	104	2860	47	2895	43
	15	623	429	0.69	0.548	0.025	15.500	0.761	0.205	0.005	97	90	1	0.85	2817	105	2847	47	2868	42
	16	627	399	0.64	0.528	0.024	14.800	0.706	0.203	0.005	98	92	3	0.86	2731	101	2802	45	2854	41
	17	680	373	0.55	0.510	0.023	14.100	0.683	0.201	0.005	98	91	4	0.86	2658	99	2758	46	2831	41
	18	661	334	0.51	0.542	0.026	15.000	0.756	0.200	0.005	98	92	1	0.87	2793	109	2812	48	2826	41
	19	652	325	0.50	0.529	0.025	14.900	0.740	0.204	0.005	98	93	3	0.87	2737	106	2809	47	2862	40
	20	643	285	0.44	0.489	0.022	13.700	0.647	0.204	0.005	98	93	6	0.85	2565	94	2733	45	2859	40
	21	650	295	0.45	0.497	0.023	14.200	0.674	0.207	0.005	98	94	6	0.86	2601	97	2760	45	2879	40
	22	615	268	0.44	0.495	0.023	14.000	0.672	0.205	0.005	99	95	6	0.87	2591	98	2748	46	2866	39
	23	574	231	0.40	0.494	0.022	13.500	0.637	0.198	0.005	99	96	5	0.86	2587	97	2714	45	2811	40
	24	599	229	0.38	0.469	0.021	13.200	0.619	0.205	0.005	99	96	8	0.86	2480	92	2697	44	2865	40
	25	608	264	0.43	0.484	0.023	13.800	0.669	0.207	0.005	99	96	7	0.87	2543	98	2735	46	2880	39
	26	585	277	0.47	0.474	0.021	13.500	0.628	0.206	0.005	99	96	8	0.85	2499	93	2712	44	2875	40
	27	600	280	0.47	0.488	0.023	13.700	0.665	0.204	0.005	99	96	6	0.86	2562	99	2729	46	2855	41
	28	557	304	0.54	0.456	0.020	12.500	0.583	0.198	0.005	99	96	9	0.85	2422	90	2640	44	2812	41
	29	518	253	0.49	0.467	0.021	13.000	0.626	0.203	0.005	99	95	8	0.85	2470	94	2683	45	2848	42
NCGB13-7-7	1	579	176	0.30	0.494	0.029	13.300	0.798	0.195	0.005	99	96	4	0.91	2589	124	2699	57	2783	42
	2	552	141	0.26	0.503	0.029	13.800	0.813	0.199	0.005	100	98	4	0.92	2628	124	2735	56	2816	39
	3	608	157	0.26	0.474	0.026	13.300	0.743	0.204	0.005	100	99	8	0.92	2499	113	2704	53	2861	36

	4	637	176	0.28	0.464	0.025	12.600	0.678	0.197	0.004	100	100	8	0.92	2459	108	2653	50	2805	35
	5	609	171	0.28	0.494	0.026	13.900	0.746	0.204	0.004	100	100	6	0.92	2589	113	2744	51	2860	35
	6	591	182	0.31	0.468	0.023	13.400	0.670	0.207	0.005	100	100	9	0.91	2477	101	2705	47	2881	35
	7	621	201	0.32	0.471	0.023	12.900	0.641	0.200	0.004	100	100	7	0.90	2486	100	2676	47	2822	35
	8	644	203	0.31	0.467	0.022	13.100	0.637	0.203	0.004	100	100	8	0.90	2469	98	2684	46	2851	34
	9	650	238	0.37	0.467	0.022	12.900	0.626	0.201	0.004	100	100	8	0.91	2469	98	2673	46	2831	33
	10	724	225	0.31	0.469	0.023	13.200	0.646	0.204	0.004	100	100	8	0.92	2481	99	2692	46	2855	32
	11	750	282	0.38	0.430	0.019	11.800	0.536	0.198	0.004	100	100	11	0.91	2306	87	2585	43	2811	32
	12	856	322	0.38	0.444	0.021	12.400	0.597	0.203	0.004	100	100	11	0.92	2368	94	2637	45	2849	31
	13	869	347	0.40	0.412	0.018	11.500	0.517	0.202	0.004	100	100	14	0.91	2225	83	2564	42	2845	31
	14	822	326	0.40	0.453	0.022	12.300	0.596	0.196	0.004	100	100	9	0.92	2408	96	2624	46	2795	32
	15	789	327	0.41	0.436	0.020	11.900	0.564	0.198	0.004	100	100	11	0.91	2333	91	2598	44	2812	32
	16	767	321	0.42	0.454	0.022	12.700	0.629	0.203	0.004	100	100	10	0.92	2411	98	2659	47	2854	32
	17	746	289	0.39	0.444	0.022	12.400	0.613	0.203	0.004	100	100	11	0.92	2367	96	2638	46	2853	32
	18	736	307	0.42	0.424	0.020	11.800	0.551	0.202	0.004	100	100	13	0.91	2277	88	2587	44	2840	33
	19	800	308	0.39	0.476	0.025	13.300	0.699	0.203	0.004	100	100	7	0.93	2510	108	2703	50	2851	32
NCGB13-7-13	1	1435	2931	2.04	0.174	0.009	4.580	0.265	0.191	0.005	99	95	51	0.88	1035	51	1745	48	2749	45
	2	1436	2933	2.04	0.172	0.008	4.570	0.237	0.193	0.005	99	97	52	0.88	1020	46	1745	43	2772	40
	3	1617	3042	1.88	0.192	0.010	5.110	0.275	0.193	0.005	99	97	47	0.90	1134	53	1838	46	2765	39
	4	1680	2987	1.78	0.179	0.008	4.670	0.237	0.190	0.005	99	97	50	0.88	1059	46	1762	42	2741	39
	5	1775	2566	1.45	0.150	0.007	3.940	0.190	0.191	0.004	100	98	57	0.89	900	38	1621	39	2747	37
	6	1856	2345	1.26	0.126	0.005	3.160	0.136	0.182	0.004	100	99	62	0.87	764	29	1448	33	2672	36
	7	2046	2276	1.11	0.118	0.005	2.940	0.124	0.180	0.004	100	100	64	0.87	721	27	1392	32	2655	35
	8	2065	2151	1.04	0.116	0.005	2.750	0.116	0.172	0.004	100	99	62	0.86	710	27	1343	32	2573	36
	9	1829	1855	1.01	0.121	0.005	3.160	0.130	0.190	0.004	100	99	65	0.85	736	27	1448	32	2740	36
	10	1691	1915	1.13	0.139	0.006	3.600	0.161	0.187	0.004	100	99	59	0.86	841	33	1550	36	2720	38
	11	1615	1674	1.04	0.163	0.007	4.260	0.203	0.189	0.005	100	99	53	0.87	975	41	1685	39	2736	39
	12	1335	1446	1.08	0.160	0.007	4.390	0.206	0.199	0.005	100	99	56	0.86	957	39	1710	39	2817	40
	13	1288	1360	1.06	0.158	0.007	4.030	0.187	0.185	0.005	100	99	54	0.84	946	38	1641	38	2699	42
	14	1260	1287	1.02	0.160	0.007	4.370	0.200	0.198	0.005	100	99	56	0.84	958	38	1707	38	2809	41
	15	1274	1250	0.98	0.165	0.007	4.490	0.210	0.197	0.005	100	99	55	0.85	984	40	1728	39	2804	41
	16	1270	1113	0.88	0.159	0.007	4.330	0.210	0.198	0.005	100	99	57	0.85	950	40	1698	40	2807	42
	17	1047	1133	1.08	0.137	0.005	3.730	0.158	0.197	0.005	100	99	62	0.79	828	30	1577	34	2804	44
	18	1105	952	0.86	0.154	0.007	4.310	0.196	0.203	0.005	100	100	59	0.83	923	37	1695	37	2851	42
	19	1134	946	0.83	0.162	0.007	4.450	0.203	0.199	0.005	100	100	56	0.84	967	39	1722	38	2821	41
	20	1154	868	0.75	0.157	0.007	4.470	0.205	0.206	0.005	100	100	59	0.84	941	38	1725	38	2875	41
	21	1031	750	0.73	0.154	0.006	4.160	0.186	0.196	0.005	100	100	57	0.82	924	36	1667	37	2793	42
	22	992	673	0.68	0.158	0.007	4.200	0.188	0.192	0.005	100	100	55	0.83	947	37	1674	37	2762	42
	23	1021	626	0.61	0.169	0.007	4.820	0.220	0.207	0.005	100	99	56	0.84	1005	40	1789	38	2884	41
	24	1043	577	0.55	0.169	0.007	4.810	0.214	0.207	0.005	100	99	56	0.83	1005	39	1786	37	2880	41
	25	959	470	0.49	0.172	0.007	4.600	0.206	0.194	0.005	100	99	53	0.83	1022	40	1750	37	2778	42
	26	978	402	0.41	0.173	0.007	4.810	0.217	0.202	0.005	100	99	54	0.84	1027	41	1787	38	2842	41
	27	949	312	0.33	0.157	0.006	4.270	0.186	0.198	0.005	100	100	57	0.81	937	36	1688	36	2810	42
	28	954	274	0.29	0.174	0.007	4.620	0.204	0.193	0.005	100	100	52	0.83	1033	40	1752	37	2765	42
	29	931	201	0.22	0.175	0.007	4.760	0.212	0.198	0.005	100	100	53	0.83	1037	40	1777	37	2807	42
NCGB13-7-12	1	2999	7497	2.50	0.182	0.006	4.060	0.187	0.161	0.005	95	77	41	0.77	1080	34	1645	38	2469	50
	2	3142	6793	2.16	0.204	0.007	4.310	0.197	0.153	0.004	96	80	35	0.80	1196	40	1695	38	2382	47
	3	2795	5317	1.90	0.194	0.007	4.070	0.175	0.152	0.004	96	82	36	0.79	1145	36	1648	35	2366	45
	4	2924	4920	1.68	0.210	0.007	4.390	0.189	0.152	0.004	96	82	33	0.81	1230	39	1711	36	2364	43
	5	2858	4659	1.63	0.223	0.008	4.650	0.192	0.151	0.004	97	85	30	0.82	1296	41	1759	35	2362	41
	6	2556	3764	1.47	0.239	0.009	4.960	0.203	0.151	0.003	97	87	27	0.84	1382	44	1813	35	2352	38
	7	2628	3600	1.37	0.248	0.009	5.410	0.227	0.158	0.003	98	88	28	0.86	1429	48	1887	36	2437	36
	8	2380	3110	1.31	0.247	0.009	5.250	0.216	0.154	0.003	98	89	27	0.85	1422	47	1860	35	2392	37
	9	2019	2453	1.21	0.246	0.009	5.490	0.219	0.161	0.003	99	93	29	0.87	1420	47	1898	34	2471	33

	10	1984	2363	1.19	0.256	0.010	5.710	0.237	0.162	0.003	98	92	27	0.87	1468	50	1932	36	2475	34
	11	1956	2288	1.17	0.240	0.009	5.150	0.213	0.156	0.003	98	91	29	0.85	1384	46	1844	35	2413	37
	12	1871	2252	1.20	0.238	0.009	5.310	0.213	0.162	0.004	98	91	31	0.85	1375	44	1870	34	2477	36
	13	1933	2212	1.14	0.243	0.009	5.090	0.212	0.152	0.003	98	90	27	0.84	1401	46	1834	35	2368	38
	14	1868	2077	1.11	0.232	0.008	4.950	0.196	0.155	0.004	98	90	29	0.83	1346	42	1811	33	2398	38
	15	1965	2074	1.06	0.226	0.008	4.750	0.188	0.152	0.003	98	92	30	0.84	1315	42	1776	33	2372	37
	16	2031	2092	1.03	0.224	0.008	4.870	0.192	0.158	0.003	98	92	32	0.84	1304	42	1797	33	2429	36
	17	2018	2061	1.02	0.228	0.008	4.880	0.197	0.155	0.003	98	92	30	0.84	1324	43	1799	34	2405	37
	18	1851	1884	1.02	0.236	0.009	5.160	0.208	0.159	0.003	98	92	30	0.85	1363	44	1846	34	2443	36
	19	1817	1768	0.97	0.237	0.008	5.150	0.206	0.158	0.003	98	91	30	0.84	1369	44	1844	34	2431	37
	20	1611	1663	1.03	0.224	0.007	5.130	0.194	0.166	0.004	98	91	34	0.82	1302	39	1841	32	2519	37
	21	1596	1674	1.05	0.246	0.009	5.700	0.228	0.168	0.004	99	93	31	0.85	1417	46	1932	34	2540	35
	22	1510	1585	1.05	0.244	0.009	5.840	0.225	0.174	0.004	99	93	33	0.84	1405	44	1953	33	2597	35
	23	1644	1714	1.04	0.256	0.009	6.050	0.238	0.171	0.004	99	94	30	0.86	1471	48	1983	34	2570	34
	24	1585	1730	1.09	0.255	0.009	6.110	0.235	0.174	0.004	99	94	30	0.84	1465	46	1992	34	2594	35
	25	1539	1633	1.06	0.268	0.010	6.220	0.248	0.169	0.004	99	93	27	0.85	1528	50	2007	35	2544	35
	26	1391	1559	1.12	0.255	0.009	6.160	0.230	0.175	0.004	99	94	31	0.83	1464	45	1998	33	2607	35
	27	1398	1544	1.10	0.263	0.009	6.490	0.246	0.179	0.004	99	95	30	0.84	1507	47	2045	33	2641	34
	28	1488	1559	1.05	0.291	0.011	7.120	0.284	0.177	0.004	99	95	25	0.86	1649	54	2127	35	2628	34
	29	1436	1474	1.03	0.267	0.010	6.620	0.253	0.180	0.004	99	96	30	0.85	1524	48	2062	34	2653	33
	30	1300	1486	1.14	0.264	0.009	6.510	0.249	0.179	0.004	99	94	30	0.84	1511	47	2048	34	2643	35
	31	1389	1406	1.01	0.253	0.009	6.190	0.233	0.177	0.004	99	94	32	0.84	1453	45	2003	33	2629	35
	32	1405	1438	1.02	0.265	0.009	6.580	0.253	0.180	0.004	99	95	30	0.85	1513	48	2057	34	2656	33
	33	1375	1391	1.01	0.256	0.009	6.320	0.234	0.179	0.004	99	96	32	0.84	1471	45	2021	33	2641	33
	34	1384	1384	1.00	0.248	0.008	6.090	0.224	0.178	0.004	99	95	33	0.84	1426	44	1989	32	2638	34
	35	1373	1319	0.96	0.250	0.009	6.090	0.229	0.177	0.004	99	95	32	0.84	1437	45	1989	33	2625	34
	36	1390	1405	1.01	0.240	0.008	5.900	0.218	0.178	0.004	99	95	34	0.83	1385	42	1961	32	2639	34
	37	1462	1371	0.94	0.247	0.009	5.670	0.216	0.167	0.004	99	94	30	0.83	1422	44	1927	33	2524	36
	38	1372	1283	0.94	0.234	0.008	5.610	0.207	0.174	0.004	99	94	34	0.83	1354	41	1918	32	2597	35
	39	1336	1243	0.93	0.232	0.008	5.590	0.208	0.175	0.004	99	95	35	0.83	1345	41	1914	32	2604	35
	40	1237	1155	0.93	0.234	0.008	5.400	0.200	0.168	0.004	99	94	33	0.82	1353	41	1884	32	2534	36
	41	1287	1243	0.97	0.229	0.008	5.570	0.206	0.176	0.004	99	95	36	0.82	1331	40	1911	32	2616	36
	42	1247	1143	0.92	0.239	0.008	5.880	0.213	0.178	0.004	99	98	34	0.83	1382	42	1958	31	2637	34
	43	1185	1161	0.98	0.236	0.008	5.830	0.214	0.179	0.004	99	97	35	0.82	1365	42	1951	32	2646	35
	44	1142	1084	0.95	0.253	0.009	5.900	0.232	0.169	0.004	99	94	30	0.83	1455	47	1961	34	2548	38
	45	1029	1043	1.01	0.248	0.009	6.130	0.230	0.179	0.004	99	95	33	0.81	1430	44	1994	33	2643	37
	46	1042	1112	1.07	0.258	0.009	6.320	0.244	0.178	0.004	99	95	31	0.82	1479	47	2021	34	2631	38
	47	982	1055	1.07	0.250	0.009	6.200	0.236	0.180	0.004	99	96	33	0.81	1439	45	2005	33	2651	38
	48	911	1051	1.15	0.255	0.009	6.410	0.246	0.183	0.004	99	96	33	0.80	1461	46	2034	34	2679	39
	49	912	1101	1.21	0.264	0.010	6.760	0.271	0.186	0.004	99	95	32	0.81	1512	50	2081	35	2703	39
NCGB13-7-17	1	1694	5505	3.25	0.333	0.017	8.700	0.462	0.190	0.004	98	90	22	0.91	1853	80	2307	48	2738	37
	2	1679	4388	2.61	0.373	0.018	9.790	0.507	0.191	0.004	98	92	17	0.92	2042	86	2416	48	2748	34
	3	1626	3722	2.29	0.392	0.018	10.300	0.504	0.191	0.004	98	94	14	0.92	2133	85	2465	45	2751	32
	4	1821	3349	1.84	0.425	0.021	11.400	0.574	0.194	0.004	99	95	11	0.93	2284	94	2553	47	2774	30
	5	1896	3145	1.66	0.370	0.016	9.540	0.426	0.187	0.003	99	96	17	0.92	2027	75	2392	41	2719	30
	6	1869	2802	1.50	0.365	0.016	9.070	0.401	0.180	0.003	99	95	16	0.91	2006	73	2345	40	2655	30
	7	2106	2822	1.34	0.352	0.015	8.490	0.377	0.175	0.003	99	96	16	0.92	1946	72	2285	40	2604	30
	8	2182	2546	1.17	0.350	0.015	8.560	0.388	0.177	0.003	99	96	17	0.93	1935	73	2292	41	2627	28
	9	2251	2500	1.11	0.315	0.013	7.450	0.318	0.171	0.003	99	96	20	0.92	1765	63	2167	38	2572	29
	10	2375	2489	1.05	0.289	0.011	6.640	0.272	0.167	0.003	99	96	23	0.91	1635	57	2065	36	2526	29
	11	2470	2447	0.99	0.273	0.010	6.300	0.252	0.167	0.003	99	96	26	0.91	1556	53	2018	35	2530	28
	12	2486	2220	0.89	0.281	0.011	6.340	0.262	0.164	0.003	99	95	24	0.91	1595	56	2025	36	2496	29
	13	2446	2028	0.83	0.268	0.010	6.000	0.240	0.162	0.003	99	95	25	0.90	1530	52	1975	35	2480	29
	14	2445	1925	0.79	0.269	0.010	6.160	0.243	0.166	0.003	99	97	26	0.91	1536	52	1999	35	2517	28

	15	2427	1818	0.75	0.276	0.011	6.160	0.245	0.162	0.003	99	97	24	0.91	1569	53	1999	35	2479	28
	16	2307	1566	0.68	0.269	0.010	5.830	0.231	0.158	0.003	99	96	24	0.91	1533	51	1951	34	2429	29
	17	2403	1572	0.65	0.265	0.010	5.860	0.229	0.160	0.003	99	97	25	0.91	1517	51	1956	34	2459	28
	18	2450	1465	0.60	0.274	0.011	6.230	0.257	0.165	0.003	100	98	25	0.92	1563	55	2009	36	2505	27
	19	2262	1312	0.58	0.257	0.009	5.810	0.221	0.164	0.003	99	97	28	0.90	1477	48	1948	33	2495	28
	20	2351	1369	0.58	0.269	0.010	5.940	0.230	0.160	0.003	99	97	25	0.90	1534	50	1967	34	2458	28
	21	2393	1402	0.59	0.279	0.011	6.100	0.246	0.159	0.003	99	95	23	0.91	1584	54	1991	35	2445	29
	22	2368	1307	0.55	0.278	0.010	6.120	0.242	0.160	0.003	99	96	23	0.90	1579	52	1994	34	2456	29
	23	2203	1146	0.52	0.258	0.009	6.060	0.224	0.171	0.003	99	97	29	0.90	1478	47	1985	32	2564	27
	24	2144	989	0.46	0.298	0.012	6.790	0.288	0.165	0.003	99	97	22	0.93	1680	61	2085	38	2512	27
	25	2017	978	0.48	0.268	0.010	6.180	0.233	0.167	0.003	100	98	27	0.91	1532	49	2002	33	2529	27
	26	1992	1003	0.50	0.266	0.009	6.100	0.224	0.166	0.003	100	98	27	0.91	1519	48	1990	32	2522	27
	27	2028	984	0.48	0.274	0.010	6.290	0.238	0.166	0.003	100	98	25	0.91	1562	50	2018	33	2522	27
	28	2060	999	0.49	0.268	0.010	5.930	0.223	0.161	0.003	99	97	25	0.90	1528	49	1966	33	2464	28
	29	1995	906	0.45	0.269	0.010	6.120	0.228	0.165	0.003	100	98	26	0.90	1537	49	1993	32	2507	27
	30	1942	805	0.41	0.274	0.010	6.180	0.231	0.164	0.003	99	97	25	0.90	1562	50	2002	33	2492	28
	31	1829	743	0.41	0.265	0.009	6.070	0.220	0.166	0.003	99	97	27	0.89	1515	47	1987	32	2521	28
	32	1892	780	0.41	0.269	0.009	6.020	0.220	0.162	0.003	99	97	25	0.89	1538	48	1979	32	2477	28
	33	1853	744	0.40	0.270	0.009	6.140	0.223	0.165	0.003	100	98	26	0.89	1541	48	1995	32	2505	28
	34	1895	721	0.38	0.277	0.010	6.250	0.233	0.163	0.003	100	98	24	0.90	1577	50	2011	33	2491	27
	35	1793	687	0.38	0.271	0.009	6.030	0.220	0.161	0.003	99	96	25	0.89	1544	48	1980	32	2471	29
	36	1790	689	0.39	0.271	0.010	6.280	0.230	0.168	0.003	99	98	26	0.90	1544	48	2015	32	2540	27
	37	1721	714	0.41	0.279	0.010	6.330	0.233	0.165	0.003	99	97	24	0.90	1587	49	2023	32	2504	28
	38	1699	735	0.43	0.284	0.010	6.540	0.238	0.167	0.003	100	98	24	0.90	1610	50	2051	32	2529	27
	39	1780	805	0.45	0.275	0.010	6.390	0.230	0.168	0.003	100	98	26	0.90	1567	48	2030	32	2541	27
NCGB13-7-20	1	289	229	0.79	0.373	0.028	9.870	0.914	0.192	0.011	94	79	17	0.80	2044	133	2423	85	2759	90
	2	254	147	0.58	0.563	0.050	15.400	1.490	0.198	0.009	97	87	1	0.88	2879	208	2838	93	2809	76
	3	214	92	0.43	0.572	0.047	15.400	1.400	0.195	0.009	97	87	3	0.85	2917	195	2842	87	2788	79
	4	226	100	0.44	0.537	0.042	14.700	1.250	0.199	0.009	98	90	1	0.86	2771	177	2798	81	2818	71
	5	217	89	0.41	0.438	0.030	11.700	0.863	0.193	0.008	98	92	10	0.82	2342	133	2578	69	2770	71
	6	228	98	0.43	0.450	0.030	13.300	0.948	0.214	0.009	99	95	12	0.83	2393	135	2698	68	2936	65
	7	242	90	0.37	0.537	0.041	14.400	1.150	0.194	0.008	99	95	0	0.87	2770	171	2775	76	2779	65
	8	212	83	0.39	0.430	0.028	11.800	0.810	0.199	0.008	99	97	12	0.82	2305	127	2587	64	2815	66
	9	217	80	0.37	0.432	0.029	12.000	0.837	0.201	0.008	99	98	12	0.82	2316	130	2602	66	2832	66
	10	215	75	0.35	0.504	0.038	14.100	1.080	0.202	0.008	100	99	5	0.86	2631	161	2755	73	2846	65
	11	192	60	0.31	0.529	0.041	15.300	1.230	0.210	0.009	100	99	4	0.86	2737	174	2837	76	2908	68
	12	182	61	0.34	0.486	0.037	13.700	1.060	0.204	0.009	100	99	7	0.84	2555	159	2729	74	2859	71
	13	167	64	0.38	0.506	0.040	14.500	1.180	0.207	0.009	100	99	5	0.84	2641	171	2780	77	2883	73
	14	145	48	0.33	0.495	0.039	13.500	1.110	0.197	0.009	100	99	5	0.84	2591	170	2713	78	2806	76
	15	143	60	0.42	0.489	0.039	13.900	1.150	0.206	0.010	100	99	7	0.83	2567	170	2744	78	2877	76
	16	137	46	0.34	0.509	0.042	14.300	1.210	0.204	0.010	100	100	4	0.84	2651	180	2768	81	2855	78
	17	124	42	0.33	0.463	0.037	13.200	1.080	0.206	0.010	100	100	9	0.81	2451	162	2691	77	2877	81
	18	126	47	0.37	0.497	0.041	14.000	1.200	0.204	0.010	100	99	6	0.82	2599	178	2747	81	2857	82
	19	125	40	0.32	0.529	0.046	14.700	1.310	0.201	0.010	100	99	2	0.83	2737	193	2795	85	2837	82
NCGB13-7-5	1	1090	923	0.85	0.427	0.026	12.200	0.764	0.207	0.004	99	97	13	0.95	2291	119	2616	59	2878	31
	2	895	765	0.85	0.475	0.027	13.500	0.770	0.207	0.004	100	99	8	0.94	2504	116	2719	54	2882	32
	3	896	738	0.82	0.500	0.029	14.200	0.833	0.206	0.004	99	98	6	0.94	2615	124	2765	56	2876	32
	4	793	607	0.77	0.520	0.030	14.800	0.865	0.207	0.004	100	99	4	0.94	2699	127	2803	56	2878	32
	5	734	432	0.59	0.537	0.031	15.100	0.882	0.204	0.004	100	99	2	0.94	2772	130	2820	56	2855	33
	6	681	361	0.53	0.554	0.032	15.900	0.940	0.208	0.004	100	100	1	0.94	2842	134	2871	56	2891	33
	7	594	243	0.41	0.579	0.034	16.300	0.979	0.205	0.004	100	100	2	0.94	2945	140	2896	57	2863	35
	8	568	200	0.35	0.568	0.033	16.200	0.957	0.207	0.005	100	100	0	0.93	2899	136	2890	56	2883	35
	9	514	164	0.32	0.537	0.030	15.300	0.862	0.206	0.005	100	100	2	0.92	2772	125	2832	54	2875	36
	10	481	148	0.31	0.594	0.036	17.100	1.040	0.208	0.005	100	100	2	0.93	3007	145	2940	59	2894	37

	11	495	126	0.26	0.524	0.029	14.900	0.849	0.206	0.005	100	100	3	0.92	2717	125	2808	54	2873	37
	12	507	129	0.25	0.540	0.032	15.400	0.912	0.206	0.005	100	100	2	0.92	2784	132	2839	57	2878	38
	13	467	100	0.21	0.525	0.030	15.100	0.872	0.209	0.005	100	100	4	0.91	2721	126	2822	55	2895	39
	14	437	96	0.22	0.557	0.034	15.900	0.974	0.207	0.005	100	100	0	0.92	2855	139	2869	59	2880	40
	15	397	103	0.26	0.511	0.029	14.400	0.829	0.205	0.005	100	99	4	0.90	2660	123	2779	54	2867	42
	16	403	104	0.26	0.542	0.032	15.400	0.933	0.207	0.005	100	100	2	0.91	2790	135	2842	58	2878	42
	17	383	82	0.21	0.527	0.031	14.800	0.889	0.204	0.005	100	100	3	0.90	2729	131	2802	57	2855	43
	18	373	84	0.22	0.549	0.034	15.800	0.991	0.209	0.006	100	100	2	0.91	2821	141	2864	60	2894	43
	19	348	77	0.22	0.487	0.028	13.600	0.789	0.203	0.006	100	100	6	0.88	2559	120	2723	55	2848	45
NCGB13-7-9	1	2388	1140	0.48	0.242	0.014	5.850	0.382	0.176	0.006	96	82	33	0.86	1394	70	1954	57	2613	56
	2	2476	1072	0.43	0.279	0.016	6.700	0.435	0.174	0.005	97	86	27	0.89	1586	82	2072	57	2598	49
	3	2414	890	0.37	0.284	0.017	6.580	0.433	0.168	0.005	97	87	24	0.90	1610	85	2057	58	2539	49
	4	2310	879	0.38	0.278	0.016	6.180	0.405	0.162	0.005	97	86	24	0.89	1579	82	2002	57	2472	51
	5	2455	844	0.34	0.290	0.018	6.530	0.434	0.163	0.005	98	89	22	0.91	1644	89	2050	58	2488	47
	6	2671	802	0.30	0.318	0.022	7.070	0.512	0.161	0.004	98	91	17	0.93	1780	107	2120	64	2468	44
	7	2685	873	0.33	0.258	0.014	5.760	0.343	0.162	0.004	99	93	27	0.91	1479	73	1941	51	2478	42
	8	2797	893	0.32	0.284	0.018	6.140	0.411	0.157	0.004	98	91	21	0.92	1612	89	1996	58	2422	44
	9	2746	857	0.31	0.263	0.015	5.930	0.362	0.164	0.004	99	94	27	0.92	1503	77	1966	53	2496	41
	10	2644	844	0.32	0.281	0.017	5.830	0.377	0.151	0.004	99	93	20	0.92	1594	86	1951	56	2356	42
	11	2543	777	0.31	0.257	0.015	5.630	0.340	0.159	0.004	99	93	26	0.91	1476	74	1920	52	2441	42
	12	2581	791	0.31	0.270	0.016	5.990	0.369	0.161	0.004	99	94	25	0.93	1543	80	1974	54	2462	39
	13	2563	730	0.28	0.252	0.014	5.500	0.323	0.158	0.004	99	94	27	0.92	1448	72	1900	50	2437	40
	14	2629	804	0.31	0.260	0.015	5.670	0.338	0.158	0.004	99	95	26	0.92	1489	75	1926	52	2436	39
	15	2820	759	0.27	0.259	0.015	5.580	0.337	0.156	0.004	99	96	25	0.93	1484	76	1913	52	2416	37
	16	2706	785	0.29	0.252	0.014	5.340	0.316	0.154	0.004	99	94	26	0.91	1449	72	1876	51	2388	41
	17	2725	744	0.27	0.267	0.015	5.970	0.358	0.162	0.004	99	95	25	0.93	1526	78	1971	52	2477	38
	18	2594	710	0.27	0.253	0.013	5.420	0.303	0.156	0.003	99	96	26	0.92	1452	69	1888	48	2408	38
	19	2715	851	0.31	0.258	0.015	5.690	0.340	0.160	0.004	99	96	26	0.93	1481	75	1930	52	2454	38
	20	2574	812	0.32	0.237	0.013	5.010	0.284	0.153	0.004	99	95	28	0.91	1372	66	1821	48	2382	40
	21	2605	811	0.31	0.234	0.012	5.010	0.274	0.155	0.004	99	96	29	0.91	1356	63	1820	46	2403	38
	22	2840	857	0.30	0.233	0.012	4.970	0.276	0.155	0.004	99	94	29	0.91	1349	63	1815	47	2401	39
	23	2769	844	0.30	0.262	0.015	5.740	0.351	0.159	0.003	99	96	25	0.94	1502	79	1938	53	2442	36
	24	2521	711	0.28	0.258	0.014	5.640	0.323	0.159	0.003	99	97	26	0.93	1479	72	1923	49	2443	36
	25	2607	817	0.31	0.249	0.013	5.500	0.303	0.161	0.003	99	97	28	0.93	1431	68	1901	47	2462	35
	26	2607	716	0.27	0.252	0.013	5.410	0.297	0.156	0.003	100	98	26	0.93	1448	68	1886	47	2411	35
	27	2759	760	0.28	0.250	0.014	5.520	0.313	0.160	0.003	99	97	28	0.93	1439	70	1903	49	2456	36
	28	2806	782	0.28	0.248	0.013	5.430	0.297	0.159	0.003	99	97	28	0.92	1427	67	1890	47	2445	36
	29	2639	728	0.28	0.254	0.013	5.560	0.304	0.159	0.003	100	98	27	0.93	1457	69	1910	47	2445	35
NCGB13-7-3	1	1258	2873	2.28	0.226	0.011	6.090	0.315	0.196	0.005	98	94	41	0.89	1313	57	1989	45	2791	39
	2	1161	1778	1.53	0.311	0.017	8.600	0.479	0.201	0.004	99	97	27	0.93	1746	82	2297	51	2831	34
	3	983	1427	1.45	0.346	0.018	9.600	0.505	0.202	0.004	99	97	22	0.92	1913	84	2397	48	2839	34
	4	866	1035	1.20	0.381	0.020	10.500	0.564	0.201	0.004	99	98	18	0.92	2080	92	2483	50	2832	35
	5	820	895	1.09	0.398	0.021	11.200	0.614	0.205	0.004	100	99	16	0.92	2159	98	2541	51	2863	34
	6	722	644	0.89	0.421	0.023	11.800	0.652	0.204	0.004	100	99	14	0.92	2263	103	2592	52	2860	35
	7	707	528	0.75	0.452	0.026	12.600	0.735	0.202	0.005	100	99	10	0.93	2404	115	2650	55	2844	36
	8	635	416	0.65	0.432	0.023	12.300	0.664	0.207	0.005	100	100	13	0.91	2316	103	2631	51	2883	37
	9	588	300	0.51	0.462	0.025	13.200	0.740	0.207	0.005	100	100	10	0.91	2448	112	2694	53	2885	37
	10	558	262	0.47	0.477	0.027	13.300	0.758	0.203	0.005	100	100	7	0.91	2516	116	2704	54	2847	38
	11	554	227	0.41	0.452	0.024	12.700	0.680	0.204	0.005	100	99	10	0.90	2404	105	2659	50	2858	39
	12	567	209	0.37	0.460	0.025	12.600	0.688	0.198	0.005	100	99	8	0.91	2441	109	2649	51	2812	39
	13	546	194	0.36	0.435	0.022	12.100	0.620	0.202	0.005	100	100	11	0.89	2329	98	2611	48	2838	39
	14	576	166	0.29	0.429	0.021	12.200	0.617	0.206	0.005	100	100	13	0.89	2301	96	2617	48	2871	38
	15	582	172	0.29	0.446	0.022	12.500	0.643	0.204	0.005	100	100	11	0.90	2376	100	2644	48	2856	38
	16	560	153	0.27	0.404	0.019	11.400	0.543	0.206	0.005	100	100	16	0.88	2186	86	2560	44	2871	37

	17	638	186	0.29	0.467	0.025	13.200	0.711	0.205	0.005	100	99	9	0.91	2472	108	2696	51	2869	36
	18	603	188	0.31	0.439	0.021	12.300	0.597	0.203	0.005	100	100	11	0.89	2348	94	2626	46	2849	37
	19	614	178	0.29	0.454	0.022	12.800	0.636	0.204	0.005	100	100	10	0.90	2411	98	2663	47	2861	36
NCGB13-7-8	1	1231	2993	2.43	0.364	0.018	10.200	0.650	0.203	0.008	88	63	20	0.82	1999	85	2452	59	2852	60
	2	1131	2095	1.85	0.427	0.025	11.500	0.777	0.196	0.007	91	72	11	0.87	2290	112	2565	63	2791	55
	3	1155	1878	1.63	0.378	0.020	10.300	0.619	0.199	0.006	94	80	18	0.88	2065	94	2466	55	2817	47
	4	1143	1824	1.60	0.365	0.019	9.850	0.573	0.196	0.006	95	83	19	0.88	2005	90	2421	54	2792	46
	5	1047	1577	1.51	0.372	0.020	9.680	0.571	0.189	0.005	96	84	16	0.88	2039	93	2404	54	2730	46
	6	920	1224	1.33	0.383	0.020	10.200	0.599	0.194	0.005	96	86	16	0.89	2088	95	2457	54	2778	44
	7	902	1124	1.25	0.403	0.022	11.000	0.657	0.198	0.005	97	89	15	0.90	2182	103	2524	56	2812	43
	8	889	1104	1.24	0.405	0.023	11.100	0.659	0.198	0.005	98	92	14	0.91	2190	105	2529	55	2813	41
	9	843	983	1.17	0.382	0.020	10.400	0.589	0.197	0.005	98	92	17	0.90	2085	95	2468	53	2801	42
	10	798	916	1.15	0.394	0.022	10.800	0.629	0.199	0.005	98	92	16	0.90	2142	100	2506	54	2816	42
	11	764	835	1.09	0.382	0.020	10.700	0.607	0.203	0.005	98	91	18	0.89	2086	95	2496	53	2848	43
	12	733	801	1.09	0.435	0.024	12.100	0.714	0.201	0.005	98	92	11	0.90	2327	110	2609	56	2836	42
	13	804	907	1.13	0.377	0.020	10.600	0.579	0.203	0.005	98	93	19	0.89	2063	92	2485	51	2851	41
	14	814	882	1.08	0.390	0.021	10.900	0.632	0.203	0.005	98	92	17	0.90	2125	99	2518	54	2852	41
	15	728	744	1.02	0.348	0.016	9.860	0.493	0.206	0.005	98	93	23	0.86	1923	78	2422	46	2873	42
	16	786	800	1.02	0.377	0.019	10.500	0.569	0.203	0.005	98	94	19	0.89	2063	90	2484	50	2849	41
	17	801	777	0.97	0.388	0.020	10.700	0.595	0.200	0.005	98	93	17	0.89	2112	94	2499	52	2830	42
	18	768	640	0.83	0.372	0.019	9.990	0.556	0.195	0.005	98	92	18	0.88	2039	91	2434	51	2783	44
	19	743	638	0.86	0.384	0.020	10.800	0.601	0.204	0.005	98	94	18	0.89	2093	94	2506	52	2859	42
	20	783	670	0.86	0.375	0.019	10.500	0.568	0.202	0.005	99	95	19	0.89	2054	91	2478	50	2846	41
	21	682	620	0.91	0.361	0.018	10.100	0.518	0.202	0.005	99	95	21	0.87	1985	83	2440	48	2845	42
	22	715	572	0.80	0.363	0.018	10.300	0.541	0.205	0.005	99	96	21	0.88	1998	86	2459	49	2866	41
	23	669	602	0.90	0.355	0.018	10.200	0.530	0.208	0.005	99	96	22	0.88	1956	84	2449	48	2887	41
	24	663	571	0.86	0.364	0.019	10.300	0.548	0.205	0.005	99	96	21	0.88	1999	87	2460	49	2866	42
	25	624	546	0.87	0.360	0.018	10.200	0.547	0.205	0.006	99	95	21	0.87	1984	87	2452	50	2867	44
	26	672	541	0.80	0.384	0.021	11.000	0.626	0.207	0.006	99	95	18	0.89	2097	97	2520	53	2882	43
	27	588	502	0.85	0.367	0.019	9.870	0.527	0.195	0.005	99	95	18	0.86	2016	87	2423	49	2785	45
	28	573	502	0.88	0.362	0.018	9.360	0.514	0.188	0.005	98	93	18	0.85	1991	87	2374	50	2722	48
	29	630	456	0.72	0.384	0.021	11.000	0.633	0.207	0.006	99	94	18	0.88	2096	98	2520	54	2882	44
NCGB13-7-15	1	2116	3914	1.85	0.177	0.006	3.920	0.195	0.161	0.005	94	75	42	0.78	1051	36	1618	40	2463	53
	2	2327	3824	1.64	0.182	0.007	4.080	0.197	0.163	0.005	95	79	42	0.82	1077	38	1650	39	2484	47
	3	2487	3768	1.52	0.185	0.007	4.140	0.198	0.162	0.004	95	79	41	0.82	1094	39	1663	39	2481	46
	4	2856	3344	1.17	0.210	0.009	4.580	0.241	0.159	0.004	95	79	35	0.86	1226	49	1746	44	2440	46
	5	2760	2862	1.04	0.194	0.008	4.220	0.201	0.157	0.004	96	82	38	0.85	1144	42	1677	39	2428	42
	6	2694	2396	0.89	0.188	0.007	4.170	0.189	0.161	0.004	97	84	40	0.86	1110	40	1667	37	2465	39
	7	2872	2142	0.75	0.209	0.009	4.370	0.217	0.152	0.004	97	84	33	0.88	1224	48	1707	41	2365	40
	8	2797	1818	0.65	0.201	0.008	4.440	0.206	0.160	0.004	97	86	37	0.88	1181	45	1720	38	2456	37
	9	3051	1704	0.56	0.206	0.009	4.530	0.210	0.160	0.003	98	90	36	0.90	1206	47	1737	39	2454	33
	10	3099	1493	0.48	0.206	0.009	4.450	0.204	0.157	0.003	98	90	35	0.91	1208	46	1721	38	2419	33
	11	2800	1216	0.43	0.229	0.011	4.850	0.244	0.153	0.003	98	89	30	0.91	1330	56	1793	42	2384	35
	12	2716	1106	0.41	0.201	0.008	4.440	0.192	0.160	0.003	98	93	37	0.91	1182	43	1720	36	2457	31
	13	2871	1017	0.35	0.215	0.009	4.740	0.210	0.160	0.003	99	95	34	0.93	1257	48	1775	37	2453	28
	14	3017	1002	0.33	0.235	0.011	5.170	0.247	0.159	0.003	99	96	30	0.94	1362	56	1848	41	2449	28
	15	2865	918	0.32	0.208	0.008	4.710	0.201	0.164	0.003	99	96	37	0.93	1220	45	1770	36	2499	27
	16	2936	888	0.30	0.245	0.012	5.410	0.264	0.160	0.003	99	96	29	0.94	1414	60	1886	42	2455	27
	17	2672	794	0.30	0.258	0.012	5.630	0.272	0.159	0.003	99	96	26	0.94	1478	62	1921	42	2440	27
	18	2563	687	0.27	0.222	0.009	4.940	0.202	0.162	0.003	99	97	33	0.92	1290	46	1809	35	2474	27
	19	2785	690	0.25	0.238	0.011	5.040	0.232	0.154	0.003	99	96	28	0.94	1375	55	1827	39	2389	27
	20	2715	608	0.22	0.237	0.010	5.670	0.246	0.174	0.003	99	97	34	0.94	1370	52	1926	37	2592	25
	21	2694	599	0.22	0.236	0.010	5.220	0.235	0.160	0.003	99	97	30	0.94	1366	53	1856	38	2460	27
	22	2669	505	0.19	0.224	0.010	5.030	0.229	0.163	0.003	99	97	33	0.94	1304	52	1825	39	2486	27

	23	2525	517	0.20	0.226	0.010	5.110	0.232	0.164	0.003	99	97	33	0.94	1314	52	1837	39	2495	27
	24	2465	455	0.18	0.218	0.009	4.820	0.212	0.160	0.003	100	98	34	0.93	1272	49	1789	37	2460	27
	25	2726	495	0.18	0.229	0.010	5.250	0.244	0.166	0.003	100	98	33	0.94	1332	54	1860	40	2517	26
	26	2478	429	0.17	0.235	0.011	5.300	0.248	0.164	0.003	99	97	32	0.94	1359	55	1870	40	2496	27
	27	2415	363	0.15	0.210	0.009	4.750	0.204	0.164	0.003	99	97	36	0.93	1229	46	1777	36	2498	27
	28	2318	331	0.14	0.382	0.026	8.520	0.595	0.162	0.003	100	97	9	0.97	2086	123	2288	63	2474	27
	29	2238	323	0.14	0.239	0.011	5.470	0.249	0.166	0.003	100	98	31	0.94	1381	55	1896	39	2518	26
	30	2194	303	0.14	0.232	0.010	5.420	0.230	0.170	0.003	100	99	34	0.93	1343	50	1888	36	2554	25
	31	2226	305	0.14	0.240	0.010	5.590	0.246	0.169	0.003	100	99	32	0.94	1387	54	1915	38	2546	25
	32	2164	253	0.12	0.249	0.011	5.730	0.257	0.167	0.003	100	99	30	0.94	1435	56	1936	39	2525	26
	33	2057	260	0.13	0.237	0.010	5.500	0.230	0.169	0.003	100	98	32	0.93	1370	50	1901	36	2544	26
	34	2051	217	0.11	0.250	0.011	5.920	0.264	0.172	0.003	100	99	31	0.94	1436	56	1964	39	2577	26
	35	2054	231	0.11	0.248	0.011	5.810	0.252	0.170	0.003	100	99	31	0.93	1428	54	1948	38	2556	26
	36	2102	200	0.10	0.256	0.011	6.110	0.271	0.173	0.003	100	99	30	0.94	1469	57	1992	39	2588	26
	37	1957	201	0.10	0.262	0.011	6.250	0.275	0.173	0.003	100	99	29	0.94	1500	57	2011	38	2586	26
	38	1900	172	0.09	0.268	0.011	6.360	0.270	0.172	0.003	100	100	28	0.93	1532	57	2026	37	2576	26
	39	1817	175	0.10	0.283	0.012	6.660	0.286	0.170	0.003	100	100	25	0.94	1609	60	2067	38	2561	26
Clast-supported polymictic metaconglomerate NCB13-7B; NAD 83, Zone 15, 689548E, 5825474N)																				
NCGB13-7b-1	1	5317	6392	1.20	0.069	0.003	1.730	0.143	0.183	0.010	81	49	82	0.77	427	20	1019	53	2678	92
	2	3595	3871	1.08	0.090	0.004	2.520	0.182	0.204	0.009	83	54	79	0.79	555	24	1279	53	2855	75
	3	2771	2713	0.98	0.098	0.004	2.560	0.194	0.189	0.010	82	52	72	0.76	603	25	1288	55	2735	85
	4	2370	2285	0.96	0.110	0.005	2.910	0.226	0.192	0.010	82	51	69	0.76	674	28	1385	59	2756	87
	5	2297	2035	0.89	0.126	0.006	3.550	0.257	0.203	0.010	84	56	67	0.78	768	33	1538	57	2854	76
	6	2145	1848	0.86	0.120	0.005	3.220	0.250	0.194	0.010	82	52	67	0.75	732	31	1461	60	2777	87
	7	1964	1725	0.88	0.137	0.006	3.910	0.294	0.207	0.010	83	55	65	0.78	827	37	1615	61	2882	78
	8	1858	1651	0.89	0.145	0.007	3.800	0.317	0.191	0.011	81	50	59	0.76	870	40	1593	67	2749	92
	9	1786	1472	0.82	0.133	0.006	3.450	0.290	0.189	0.011	80	48	62	0.74	802	34	1515	66	2731	97
	10	1680	1565	0.93	0.132	0.006	3.390	0.280	0.187	0.011	81	49	61	0.73	797	32	1503	65	2716	97
	11	1774	1588	0.90	0.134	0.006	3.280	0.286	0.178	0.011	80	46	58	0.72	809	33	1476	68	2634	106
	12	1688	1462	0.87	0.152	0.007	4.030	0.320	0.192	0.011	82	51	57	0.75	911	38	1639	65	2763	90
	13	1737	1449	0.83	0.160	0.008	3.930	0.335	0.178	0.011	82	49	51	0.73	958	42	1620	69	2633	100
	14	1663	1351	0.81	0.147	0.007	3.550	0.320	0.175	0.011	80	45	54	0.72	884	38	1538	71	2606	109
	15	1493	1300	0.87	0.151	0.007	3.930	0.315	0.189	0.011	82	50	57	0.74	904	37	1619	65	2734	93
	16	1521	1228	0.81	0.157	0.007	4.500	0.325	0.208	0.010	83	56	59	0.77	940	39	1731	60	2889	77
	17	1270	1061	0.84	0.156	0.007	4.560	0.318	0.212	0.010	84	57	60	0.76	936	37	1742	58	2918	75
	18	1321	1080	0.82	0.152	0.006	4.200	0.307	0.200	0.010	83	54	59	0.75	913	36	1674	60	2828	82
	19	1425	1177	0.83	0.162	0.007	4.510	0.329	0.202	0.010	83	55	56	0.75	970	39	1733	61	2839	80
	20	1447	1108	0.77	0.153	0.007	3.750	0.315	0.178	0.011	81	48	53	0.72	915	37	1581	67	2635	102
	21	1395	1058	0.76	0.197	0.010	5.020	0.423	0.185	0.011	82	50	44	0.75	1160	53	1823	71	2695	95
	22	1265	1049	0.83	0.167	0.007	4.430	0.333	0.192	0.010	83	53	53	0.73	998	39	1718	62	2760	86
	23	1373	990	0.72	0.179	0.008	4.930	0.365	0.200	0.010	83	54	52	0.76	1062	44	1808	63	2824	81
	24	1183	969	0.82	0.165	0.007	4.200	0.324	0.185	0.010	82	51	52	0.72	986	37	1675	63	2694	92
	25	1252	922	0.74	0.189	0.008	5.190	0.370	0.199	0.010	84	56	50	0.76	1115	45	1851	61	2820	78
	26	1267	947	0.75	0.178	0.008	4.640	0.347	0.189	0.010	83	53	50	0.73	1055	41	1757	63	2735	87
	27	1219	808	0.66	0.177	0.007	4.770	0.344	0.196	0.010	84	55	52	0.74	1048	41	1780	61	2794	82
	28	1167	800	0.69	0.193	0.009	5.020	0.383	0.189	0.010	83	53	46	0.74	1137	46	1823	65	2731	87
	29	1129	790	0.70	0.188	0.008	5.030	0.352	0.194	0.009	85	56	49	0.74	1108	43	1824	59	2780	79
	30	1166	738	0.63	0.206	0.009	5.240	0.390	0.184	0.009	84	54	42	0.74	1209	49	1858	64	2689	85
	31	1154	773	0.67	0.202	0.009	5.160	0.376	0.186	0.009	85	55	44	0.73	1183	47	1846	62	2704	83
	32	1157	739	0.64	0.211	0.010	5.280	0.412	0.182	0.010	83	53	41	0.74	1231	52	1865	67	2670	89
	33	1028	669	0.65	0.198	0.008	5.430	0.357	0.199	0.009	86	59	48	0.74	1164	44	1890	56	2819	73
	34	1113	674	0.61	0.222	0.010	6.290	0.416	0.205	0.009	86	61	44	0.78	1295	53	2018	58	2868	68
	35	1083	668	0.62	0.206	0.009	5.530	0.373	0.194	0.009	86	58	45	0.75	1210	47	1906	58	2780	75
	36	1071	659	0.62	0.196	0.008	4.980	0.352	0.185	0.009	85	55	45	0.72	1152	43	1816	60	2696	82

	37	1053	628	0.60	0.211	0.009	5.570	0.368	0.191	0.009	86	59	43	0.74	1236	47	1912	57	2752	74
	38	1044	673	0.64	0.224	0.010	6.230	0.397	0.201	0.008	87	61	42	0.76	1305	50	2008	56	2837	68
	39	1042	656	0.63	0.211	0.009	6.000	0.364	0.206	0.008	87	63	46	0.76	1236	46	1976	53	2873	65
NCGB13-7b-3	1	1227	4295	3.50	0.172	0.011	4.420	0.376	0.186	0.009	91	70	51	0.82	1024	61	1716	70	2709	80
	2	592	1634	2.76	0.308	0.021	8.400	0.646	0.198	0.007	97	87	27	0.89	1729	106	2275	70	2810	57
	3	364	738	2.03	0.331	0.021	9.030	0.634	0.198	0.007	98	92	24	0.86	1843	103	2341	64	2809	58
	4	277	407	1.47	0.478	0.038	13.900	1.160	0.210	0.008	99	96	8	0.90	2518	167	2740	79	2907	58
	5	231	256	1.11	0.471	0.037	12.900	1.050	0.198	0.008	99	97	7	0.89	2489	162	2669	77	2808	63
	6	195	177	0.90	0.512	0.043	14.400	1.230	0.204	0.008	100	99	4	0.89	2665	181	2776	81	2858	63
	7	174	118	0.68	0.505	0.041	13.600	1.150	0.196	0.008	100	99	3	0.88	2634	177	2724	80	2791	67
	8	156	107	0.69	0.471	0.037	13.400	1.080	0.207	0.009	100	99	9	0.86	2489	161	2710	76	2880	69
	9	163	80	0.49	0.525	0.044	14.500	1.260	0.200	0.009	100	99	2	0.88	2721	187	2784	82	2830	69
	10	172	72	0.42	0.546	0.049	15.300	1.410	0.203	0.008	100	98	1	0.90	2807	204	2831	88	2848	68
	11	152	73	0.48	0.504	0.041	13.600	1.150	0.196	0.008	100	100	4	0.87	2629	177	2723	80	2794	69
	12	152	73	0.48	0.510	0.043	15.000	1.280	0.213	0.009	100	100	6	0.87	2658	182	2816	81	2930	70
	13	158	64	0.41	0.477	0.039	14.000	1.180	0.213	0.009	100	100	9	0.87	2512	171	2747	80	2925	70
	14	155	58	0.37	0.500	0.042	13.600	1.180	0.197	0.009	100	99	4	0.87	2615	181	2722	82	2803	72
	15	147	59	0.40	0.497	0.042	13.500	1.180	0.196	0.009	100	99	4	0.86	2600	182	2712	83	2796	74
	16	145	51	0.35	0.554	0.051	15.700	1.480	0.205	0.009	100	100	1	0.89	2843	212	2858	90	2868	72
	17	134	54	0.40	0.488	0.042	13.500	1.190	0.200	0.009	100	99	6	0.86	2564	181	2715	83	2830	76
	18	139	49	0.35	0.575	0.056	16.000	1.600	0.202	0.010	100	98	2	0.89	2927	229	2875	96	2838	77
	19	126	57	0.45	0.493	0.043	14.200	1.270	0.209	0.010	100	99	7	0.85	2582	185	2763	85	2898	80
	20	136	48	0.35	0.503	0.046	14.600	1.360	0.211	0.010	100	100	6	0.87	2629	196	2790	88	2909	75
	21	122	45	0.37	0.481	0.043	13.800	1.260	0.209	0.010	100	99	8	0.85	2531	185	2738	86	2894	79
	22	116	44	0.38	0.516	0.048	13.900	1.330	0.195	0.010	100	100	2	0.86	2681	204	2741	91	2786	83
	23	113	41	0.36	0.455	0.040	12.400	1.120	0.197	0.010	100	99	9	0.84	2418	175	2633	85	2803	83
	24	113	39	0.34	0.528	0.052	15.300	1.530	0.210	0.010	100	100	4	0.87	2732	217	2835	95	2909	81
	25	92	41	0.44	0.453	0.041	13.000	1.200	0.209	0.011	100	100	11	0.82	2410	180	2683	87	2895	88
	26	92	36	0.39	0.444	0.040	12.900	1.200	0.211	0.012	100	100	12	0.82	2367	179	2672	88	2911	89
	27	92	31	0.34	0.511	0.051	14.700	1.490	0.208	0.011	100	100	5	0.85	2661	215	2794	97	2891	90
	28	101	35	0.35	0.526	0.055	15.000	1.620	0.206	0.011	99	98	3	0.87	2725	233	2814	103	2878	88
	29	79	29	0.37	0.504	0.050	13.100	1.380	0.189	0.011	99	96	2	0.83	2631	215	2690	99	2734	99
NCGB13-7b-6	1	2569	6451	2.51	0.237	0.012	5.690	0.341	0.174	0.005	92	70	34	0.87	1369	62	1929	52	2599	49
	2	2392	5047	2.11	0.256	0.013	5.970	0.343	0.170	0.005	93	74	29	0.89	1467	65	1972	50	2553	45
	3	2150	3598	1.67	0.278	0.014	6.480	0.363	0.169	0.004	95	79	25	0.90	1583	70	2043	49	2546	41
	4	2092	2608	1.25	0.315	0.017	7.460	0.439	0.172	0.004	96	85	20	0.93	1765	85	2168	53	2575	36
	5	1878	1980	1.05	0.304	0.016	7.360	0.409	0.176	0.004	97	86	23	0.92	1711	78	2156	50	2611	35
	6	1831	1615	0.88	0.311	0.017	7.180	0.409	0.168	0.004	97	87	20	0.92	1744	81	2135	51	2535	36
	7	1712	1368	0.80	0.274	0.013	6.660	0.341	0.176	0.004	98	91	28	0.92	1563	67	2067	45	2615	33
	8	1655	1272	0.77	0.281	0.014	6.670	0.346	0.172	0.004	98	91	26	0.92	1594	69	2069	46	2581	34
	9	1750	1257	0.72	0.282	0.014	6.950	0.368	0.179	0.004	98	92	27	0.93	1600	71	2105	47	2642	32
	10	1689	1277	0.76	0.251	0.011	6.020	0.289	0.174	0.004	98	92	31	0.91	1444	58	1979	42	2597	34
	11	1693	1221	0.72	0.257	0.012	6.230	0.316	0.176	0.004	98	91	31	0.91	1475	62	2008	44	2612	35
	12	1561	1212	0.78	0.256	0.012	6.170	0.309	0.174	0.004	98	90	30	0.90	1471	61	2000	44	2601	37
	13	1568	1156	0.74	0.238	0.011	5.710	0.279	0.174	0.004	98	91	34	0.89	1376	55	1933	42	2597	37
	14	1451	1116	0.77	0.244	0.011	5.820	0.286	0.173	0.004	98	91	32	0.89	1407	57	1950	43	2588	38
	15	1560	1194	0.77	0.236	0.011	5.580	0.282	0.172	0.004	98	91	34	0.89	1364	57	1914	43	2576	39
	16	1397	1189	0.85	0.213	0.009	5.000	0.236	0.170	0.004	97	88	37	0.85	1245	46	1819	40	2560	42
	17	1470	1280	0.87	0.250	0.012	5.890	0.330	0.171	0.005	96	85	31	0.87	1440	64	1959	49	2563	46
	18	1414	1306	0.92	0.224	0.010	5.290	0.271	0.171	0.005	96	85	36	0.85	1304	52	1867	44	2568	46
	19	1487	1410	0.95	0.225	0.010	5.070	0.267	0.164	0.005	96	84	33	0.84	1306	53	1831	45	2495	47
NCGB13-7b-9	1	2193	5061	2.31	0.111	0.004	2.890	0.263	0.188	0.013	77	43	68	0.73	681	26	1380	69	2729	111
	2	2289	4467	1.95	0.099	0.004	2.260	0.201	0.165	0.011	78	41	65	0.70	610	21	1199	63	2506	116
	3	2375	3703	1.56	0.127	0.005	2.860	0.219	0.163	0.009	82	47	56	0.71	773	28	1370	58	2484	96

4	2269	3246	1.43	0.141	0.005	3.170	0.195	0.163	0.007	86	55	52	0.71	851	28	1450	48	2487	75
5	2448	2865	1.17	0.166	0.006	3.940	0.198	0.172	0.006	90	65	49	0.77	988	32	1622	41	2582	54
6	2091	2018	0.96	0.196	0.007	4.730	0.213	0.175	0.005	92	72	42	0.79	1153	36	1773	38	2608	46
7	1995	1442	0.72	0.249	0.009	6.100	0.272	0.178	0.004	95	79	33	0.85	1431	49	1990	39	2634	39
8	1833	1035	0.56	0.258	0.009	6.300	0.260	0.177	0.004	96	84	31	0.85	1479	48	2018	36	2626	36
9	1679	696	0.41	0.300	0.012	7.370	0.336	0.178	0.004	96	85	24	0.89	1693	61	2157	41	2633	35
10	1550	504	0.33	0.303	0.012	7.440	0.320	0.178	0.004	97	88	24	0.89	1705	59	2166	38	2637	33
11	1571	423	0.27	0.290	0.011	7.200	0.296	0.180	0.004	97	89	26	0.88	1639	54	2137	37	2656	33
12	1429	361	0.25	0.300	0.011	7.490	0.306	0.181	0.004	98	90	25	0.88	1689	56	2172	37	2665	32
13	1314	276	0.21	0.308	0.012	7.820	0.322	0.184	0.004	98	91	24	0.89	1730	58	2210	37	2691	32
14	1283	261	0.20	0.308	0.012	7.690	0.311	0.181	0.004	98	92	24	0.88	1729	57	2195	36	2665	32
15	1311	250	0.19	0.317	0.012	8.160	0.338	0.187	0.004	98	93	24	0.89	1773	60	2249	37	2715	31
16	1161	197	0.17	0.322	0.013	8.270	0.343	0.186	0.004	98	92	23	0.88	1801	61	2261	38	2708	33
17	1035	186	0.18	0.320	0.012	8.270	0.343	0.187	0.004	98	92	23	0.87	1791	60	2261	38	2717	34
18	965	184	0.19	0.355	0.014	9.450	0.406	0.193	0.004	98	94	20	0.88	1957	69	2383	40	2770	34
19	895	163	0.18	0.338	0.013	9.030	0.380	0.194	0.004	99	94	22	0.87	1878	65	2341	38	2773	35
20	796	134	0.17	0.391	0.017	10.400	0.480	0.193	0.004	98	93	15	0.87	2127	79	2474	43	2772	37
21	709	130	0.18	0.360	0.015	9.910	0.435	0.200	0.005	99	94	20	0.86	1983	70	2427	40	2823	37
22	626	122	0.19	0.390	0.017	10.400	0.481	0.194	0.005	98	94	15	0.86	2124	78	2473	43	2773	40
23	618	102	0.17	0.379	0.017	10.200	0.473	0.195	0.005	98	93	17	0.85	2072	77	2450	43	2781	41
24	590	106	0.18	0.383	0.017	10.200	0.475	0.193	0.005	98	94	16	0.85	2088	78	2449	43	2764	41
25	568	89	0.16	0.415	0.019	11.300	0.547	0.198	0.005	99	96	13	0.87	2236	87	2549	45	2807	40
26	536	87	0.16	0.386	0.017	10.500	0.482	0.198	0.005	99	95	17	0.84	2103	78	2482	42	2808	42
27	533	99	0.19	0.390	0.017	10.600	0.497	0.197	0.005	99	94	16	0.84	2122	80	2487	44	2800	43
28	530	72	0.14	0.426	0.020	11.700	0.584	0.199	0.005	99	95	12	0.86	2287	91	2581	47	2820	42
29	481	76	0.16	0.379	0.016	10.500	0.468	0.200	0.005	99	97	18	0.83	2070	76	2476	41	2829	42
30	481	70	0.14	0.405	0.018	11.200	0.525	0.201	0.005	99	97	15	0.84	2190	83	2542	44	2836	42
31	499	64	0.13	0.430	0.020	11.800	0.579	0.199	0.005	99	97	11	0.86	2306	91	2586	46	2814	42
32	451	66	0.15	0.387	0.017	10.500	0.477	0.196	0.005	99	96	16	0.82	2111	78	2477	42	2792	44
33	435	60	0.14	0.411	0.018	11.200	0.527	0.198	0.005	99	97	14	0.84	2218	84	2541	44	2810	43
34	457	62	0.13	0.432	0.020	12.200	0.585	0.204	0.005	100	98	12	0.85	2316	91	2616	45	2857	42
35	433	55	0.13	0.375	0.016	10.600	0.469	0.206	0.006	100	98	19	0.81	2051	74	2493	41	2875	43
36	444	49	0.11	0.416	0.019	11.600	0.542	0.202	0.005	99	98	14	0.84	2243	85	2570	44	2839	43
37	426	62	0.15	0.411	0.018	11.500	0.538	0.203	0.005	99	98	15	0.83	2219	84	2566	44	2852	43
38	435	57	0.13	0.420	0.019	11.400	0.532	0.197	0.005	99	98	12	0.83	2261	86	2555	44	2798	44
39	433	53	0.12	0.405	0.018	11.200	0.511	0.200	0.005	100	98	15	0.83	2193	82	2539	43	2829	43
40	447	61	0.14	0.444	0.021	12.400	0.595	0.202	0.005	100	98	10	0.84	2370	92	2631	45	2839	43
41	426	49	0.12	0.401	0.018	11.100	0.499	0.200	0.005	100	98	15	0.82	2175	80	2528	42	2824	44
42	420	49	0.12	0.405	0.018	11.100	0.508	0.199	0.005	100	99	14	0.83	2194	82	2533	43	2818	43
43	413	56	0.13	0.433	0.020	12.200	0.583	0.205	0.006	100	99	12	0.84	2317	90	2622	45	2867	43
44	398	46	0.12	0.377	0.016	10.600	0.467	0.203	0.006	100	99	19	0.81	2064	75	2488	41	2854	44
45	438	48	0.11	0.433	0.020	12.000	0.573	0.201	0.005	100	99	12	0.84	2321	90	2605	45	2834	44
46	401	56	0.14	0.394	0.017	11.000	0.495	0.202	0.006	100	99	16	0.81	2141	79	2521	42	2842	44
47	428	52	0.12	0.398	0.017	11.200	0.507	0.204	0.006	100	99	16	0.82	2158	80	2540	42	2861	44
48	415	47	0.11	0.398	0.017	11.200	0.502	0.203	0.006	100	99	16	0.81	2162	80	2536	42	2851	44
49	388	48	0.12	0.399	0.017	11.100	0.500	0.203	0.006	100	98	16	0.81	2164	79	2535	42	2847	44
50	381	44	0.12	0.373	0.015	10.400	0.447	0.203	0.006	100	99	19	0.79	2042	72	2475	40	2853	44
51	549	56	0.10	0.560	0.033	15.800	0.947	0.204	0.005	100	99	0	0.92	2867	136	2864	57	2862	39
52	558	55	0.10	0.622	0.041	17.900	1.200	0.208	0.005	100	99	4	0.94	3118	163	2983	64	2894	38
53	538	61	0.11	0.583	0.036	16.000	0.990	0.199	0.005	100	99	3	0.93	2960	145	2875	59	2815	39
54	544	52	0.10	0.546	0.032	15.900	0.940	0.211	0.005	100	99	2	0.92	2810	133	2870	57	2912	37
55	560	53	0.09	0.578	0.036	16.000	0.999	0.201	0.005	100	99	2	0.93	2941	145	2877	60	2833	38
56	560	64	0.11	0.591	0.036	16.700	1.050	0.205	0.005	100	99	3	0.93	2994	148	2920	60	2869	38
57	555	56	0.10	0.569	0.034	16.000	0.979	0.203	0.005	100	100	1	0.93	2903	141	2874	59	2854	37

	58	542	63	0.12	0.572	0.034	16.100	0.975	0.204	0.005	100	100	1	0.93	2917	140	2881	58	2856	38
	59	533	58	0.11	0.540	0.031	15.200	0.877	0.203	0.005	100	100	1	0.92	2785	129	2825	55	2853	38
NCGB13-7b-10	1	2661	7038	2.64	0.113	0.006	2.500	0.300	0.160	0.015	78	41	59	0.70	693	34	1273	87	2456	154
	2	2536	5143	2.03	0.140	0.007	3.470	0.285	0.179	0.010	85	55	57	0.74	846	37	1520	65	2647	94
	3	2291	3626	1.58	0.188	0.010	4.440	0.346	0.171	0.009	87	58	43	0.76	1113	52	1720	65	2568	85
	4	1867	2468	1.32	0.205	0.010	5.210	0.334	0.184	0.007	91	68	43	0.80	1202	52	1855	55	2693	64
	5	1599	1830	1.14	0.205	0.009	5.180	0.311	0.184	0.007	92	71	43	0.79	1200	49	1850	51	2687	61
	6	1624	1620	1.00	0.215	0.010	5.120	0.320	0.173	0.007	92	70	38	0.78	1255	52	1839	53	2583	65
	7	1460	1320	0.90	0.204	0.009	5.040	0.297	0.179	0.007	92	72	42	0.78	1197	47	1826	50	2645	62
	8	1415	1179	0.83	0.209	0.009	5.120	0.287	0.178	0.006	94	76	40	0.79	1222	48	1840	48	2634	57
	9	1453	1064	0.73	0.218	0.010	5.590	0.306	0.186	0.006	94	79	40	0.82	1273	51	1915	47	2705	52
	10	1398	1046	0.75	0.215	0.009	5.610	0.286	0.189	0.006	95	83	42	0.82	1255	48	1917	44	2735	48
	11	1285	854	0.66	0.245	0.011	6.140	0.335	0.182	0.006	95	82	34	0.83	1413	58	1996	48	2668	51
	12	1184	826	0.70	0.217	0.009	5.560	0.275	0.186	0.006	96	83	40	0.80	1267	46	1910	42	2705	49
	13	1167	738	0.63	0.223	0.009	5.740	0.287	0.187	0.006	96	83	40	0.80	1295	48	1937	43	2716	49
	14	1128	731	0.65	0.249	0.011	6.310	0.330	0.184	0.006	96	83	34	0.82	1432	56	2020	46	2690	49
	15	1086	655	0.60	0.261	0.011	6.760	0.350	0.188	0.006	96	83	33	0.83	1493	58	2081	46	2727	48
	16	1007	603	0.60	0.237	0.009	6.250	0.288	0.191	0.005	97	88	38	0.81	1369	49	2011	40	2755	44
	17	928	562	0.61	0.259	0.011	7.130	0.326	0.200	0.005	97	90	36	0.83	1482	54	2128	41	2826	41
	18	864	512	0.59	0.272	0.011	7.400	0.337	0.197	0.005	97	89	33	0.82	1553	56	2161	41	2802	43
	19	827	441	0.53	0.282	0.012	7.420	0.345	0.191	0.005	97	88	30	0.82	1602	58	2163	42	2749	44
	20	721	415	0.58	0.298	0.012	7.850	0.351	0.191	0.005	98	91	27	0.81	1681	59	2214	40	2752	43
	21	720	356	0.49	0.309	0.013	8.390	0.370	0.197	0.005	98	93	27	0.83	1738	62	2274	40	2798	41
	22	664	356	0.54	0.358	0.016	9.920	0.470	0.201	0.005	98	93	21	0.85	1971	75	2427	44	2835	41
	23	679	321	0.47	0.353	0.016	9.480	0.447	0.195	0.005	98	93	20	0.85	1948	74	2385	43	2783	41
	24	647	293	0.45	0.355	0.015	9.630	0.442	0.197	0.005	98	94	20	0.84	1958	72	2400	42	2800	42
	25	575	253	0.44	0.358	0.015	9.960	0.448	0.202	0.005	99	96	21	0.84	1974	73	2431	42	2839	41
	26	554	257	0.46	0.355	0.015	9.950	0.448	0.203	0.005	99	95	21	0.83	1960	72	2430	42	2852	41
	27	564	224	0.40	0.358	0.015	9.940	0.453	0.201	0.005	99	95	21	0.84	1974	73	2429	42	2837	41
	28	535	246	0.46	0.356	0.015	9.990	0.441	0.204	0.005	99	96	22	0.83	1961	71	2434	41	2857	41
	29	513	219	0.43	0.368	0.016	10.200	0.461	0.201	0.005	99	96	19	0.83	2021	74	2453	42	2834	42
	30	499	204	0.41	0.354	0.015	9.800	0.427	0.201	0.005	99	97	21	0.81	1956	70	2416	40	2831	42
	31	518	178	0.34	0.370	0.016	10.500	0.477	0.205	0.005	99	97	20	0.84	2027	75	2477	42	2869	41
	32	469	183	0.39	0.361	0.015	9.900	0.438	0.199	0.005	99	96	20	0.81	1986	72	2425	41	2817	43
	33	473	169	0.36	0.383	0.017	10.700	0.488	0.203	0.005	99	97	18	0.83	2091	78	2498	42	2848	43
	34	452	161	0.36	0.387	0.017	10.600	0.495	0.199	0.005	99	96	17	0.83	2110	80	2490	43	2816	43
	35	456	153	0.34	0.367	0.016	10.400	0.470	0.205	0.006	99	97	20	0.81	2017	74	2471	42	2870	44
	36	479	166	0.35	0.362	0.016	10.000	0.453	0.201	0.005	99	96	20	0.81	1989	73	2435	42	2832	44
	37	420	144	0.34	0.381	0.017	10.700	0.495	0.205	0.006	99	97	18	0.81	2079	78	2502	43	2865	45
	38	420	133	0.32	0.367	0.016	10.300	0.466	0.204	0.006	99	97	20	0.80	2013	74	2463	42	2858	45
	39	400	135	0.34	0.398	0.018	10.600	0.507	0.192	0.006	99	95	14	0.81	2161	83	2486	44	2763	48
NCGB13-7b-1@1	1	2080	2903	1.40	0.152	0.007	3.750	0.351	0.179	0.012	82	50	54	0.72	914	42	1583	75	2641	111
	2	1662	1899	1.14	0.169	0.008	4.220	0.326	0.181	0.010	88	61	50	0.74	1006	44	1677	63	2662	88
	3	1271	1129	0.89	0.233	0.012	6.100	0.409	0.190	0.008	92	74	38	0.81	1351	63	1990	58	2740	65
	4	1199	745	0.62	0.212	0.010	5.340	0.314	0.182	0.007	94	78	41	0.78	1242	51	1875	50	2674	61
	5	1097	546	0.50	0.320	0.018	8.180	0.546	0.185	0.006	95	81	23	0.86	1790	90	2251	60	2702	56
	6	1102	452	0.41	0.261	0.012	6.840	0.375	0.190	0.006	96	86	33	0.84	1496	63	2092	48	2743	49
	7	995	376	0.38	0.262	0.012	7.040	0.359	0.195	0.006	97	88	34	0.83	1499	60	2117	45	2786	47
	8	1017	321	0.32	0.346	0.019	8.610	0.513	0.181	0.005	97	89	18	0.88	1915	90	2298	54	2658	46
	9	1058	264	0.25	0.323	0.017	8.160	0.468	0.183	0.005	97	89	22	0.88	1803	82	2248	52	2682	46
	10	1081	258	0.24	0.313	0.016	7.710	0.422	0.179	0.005	98	90	22	0.88	1754	77	2198	49	2642	44
	11	1042	242	0.23	0.332	0.017	8.250	0.458	0.180	0.005	98	92	20	0.89	1846	83	2259	50	2656	43
	12	1179	196	0.17	0.260	0.011	6.510	0.309	0.182	0.004	99	95	31	0.87	1490	59	2047	42	2668	40
	13	1120	241	0.21	0.280	0.013	7.100	0.344	0.184	0.004	99	94	29	0.87	1593	64	2124	43	2687	40

	14	1086	193	0.18	0.304	0.015	7.180	0.379	0.171	0.004	98	93	22	0.88	1710	74	2134	47	2571	42
	15	1083	174	0.16	0.282	0.013	7.010	0.340	0.180	0.004	99	95	28	0.88	1601	64	2113	43	2657	39
	16	1207	206	0.17	0.305	0.015	7.680	0.386	0.183	0.004	99	96	25	0.90	1714	72	2194	45	2680	37
	17	1065	193	0.18	0.261	0.011	6.470	0.285	0.180	0.004	99	96	31	0.85	1497	55	2042	39	2649	39
	18	1047	168	0.16	0.349	0.018	8.660	0.472	0.180	0.004	99	95	18	0.90	1928	86	2302	50	2654	40
	19	1151	190	0.17	0.295	0.014	7.420	0.371	0.182	0.004	99	96	26	0.89	1665	69	2163	45	2675	38
	20	1145	167	0.15	0.275	0.012	6.680	0.321	0.176	0.004	99	94	28	0.87	1568	62	2070	42	2615	40
	21	1033	184	0.18	0.324	0.016	7.870	0.419	0.176	0.005	98	92	20	0.88	1808	78	2217	48	2619	42
	22	1046	171	0.16	0.287	0.013	7.120	0.337	0.180	0.004	99	94	27	0.87	1628	63	2126	42	2650	40
	23	1143	157	0.14	0.293	0.014	7.220	0.355	0.179	0.004	99	96	25	0.88	1658	68	2139	44	2640	39
	24	1058	161	0.15	0.290	0.013	6.930	0.326	0.174	0.004	99	96	25	0.87	1639	64	2102	42	2593	40
	25	1038	164	0.16	0.263	0.011	6.480	0.288	0.179	0.004	99	97	30	0.86	1506	56	2043	39	2639	38
	26	1096	167	0.15	0.277	0.012	6.610	0.307	0.173	0.004	99	96	27	0.86	1578	61	2061	41	2586	39
	27	1096	166	0.15	0.277	0.012	6.820	0.314	0.178	0.004	99	97	28	0.87	1578	61	2089	41	2638	38
	28	1076	151	0.14	0.283	0.013	6.980	0.329	0.179	0.004	99	97	27	0.88	1607	64	2109	42	2642	38
	29	926	139	0.15	0.287	0.013	7.090	0.330	0.179	0.004	99	96	26	0.86	1628	63	2123	41	2643	39
	30	1005	137	0.14	0.278	0.012	6.830	0.318	0.178	0.004	99	97	28	0.87	1582	62	2090	41	2635	38
	31	986	133	0.13	0.347	0.018	8.860	0.479	0.185	0.004	99	97	19	0.91	1920	86	2324	49	2701	38
	32	903	152	0.17	0.227	0.008	5.310	0.215	0.170	0.004	99	96	35	0.80	1318	44	1871	35	2556	41
	33	995	145	0.15	0.304	0.014	7.530	0.361	0.179	0.004	99	97	24	0.88	1712	69	2177	43	2648	38
	34	1030	156	0.15	0.288	0.013	7.250	0.342	0.183	0.004	99	97	27	0.88	1632	64	2143	42	2676	38
	35	984	150	0.15	0.339	0.017	8.350	0.435	0.179	0.004	99	97	19	0.90	1880	81	2270	47	2642	38
	36	918	144	0.16	0.256	0.010	6.580	0.282	0.186	0.004	99	97	33	0.85	1469	53	2057	38	2711	38
	37	957	148	0.16	0.306	0.014	7.580	0.360	0.180	0.004	100	98	24	0.88	1719	69	2183	43	2653	37
	38	968	148	0.15	0.276	0.012	6.990	0.317	0.184	0.004	99	98	29	0.87	1572	60	2111	40	2686	38
	39	993	145	0.15	0.324	0.016	8.230	0.413	0.184	0.004	99	97	22	0.89	1811	76	2257	45	2690	39
	40	956	151	0.16	0.277	0.012	7.130	0.317	0.187	0.004	99	98	30	0.86	1575	59	2128	40	2714	38
	41	938	146	0.16	0.294	0.013	7.570	0.348	0.187	0.004	100	98	27	0.87	1659	64	2182	41	2717	38
	42	848	153	0.18	0.301	0.013	7.560	0.353	0.182	0.004	99	97	25	0.86	1695	66	2181	42	2675	40
	43	859	142	0.17	0.299	0.013	7.270	0.332	0.177	0.004	99	97	24	0.86	1684	64	2145	41	2621	40
	44	843	155	0.18	0.293	0.013	7.440	0.334	0.184	0.004	100	99	27	0.86	1658	63	2166	40	2689	39
	45	938	152	0.16	0.294	0.013	7.290	0.336	0.180	0.004	100	99	26	0.87	1660	65	2148	41	2654	38
	46	911	176	0.19	0.296	0.013	7.440	0.341	0.182	0.004	100	99	26	0.87	1673	65	2165	41	2672	38
	47	877	174	0.20	0.293	0.013	7.430	0.336	0.184	0.004	100	98	27	0.86	1654	63	2165	41	2692	39
	48	893	152	0.17	0.287	0.012	7.250	0.323	0.184	0.004	100	99	28	0.86	1624	61	2143	40	2686	39
	49	886	190	0.21	0.316	0.015	7.980	0.386	0.183	0.004	100	99	23	0.88	1769	72	2228	44	2682	39
NCGB13-7b-14	1	1356	4174	3.08	0.121	0.008	2.640	0.316	0.158	0.014	86	54	56	0.71	736	43	1313	88	2439	147
	2	1209	2693	2.23	0.125	0.007	2.890	0.271	0.169	0.011	89	63	58	0.72	756	38	1381	71	2544	112
	3	1027	1794	1.75	0.169	0.010	3.970	0.360	0.171	0.010	90	66	47	0.74	1004	54	1628	74	2566	103
	4	820	1250	1.52	0.232	0.015	5.280	0.483	0.165	0.010	92	69	33	0.77	1342	78	1866	78	2512	98
	5	633	986	1.56	0.179	0.009	4.410	0.315	0.179	0.009	94	78	47	0.74	1060	49	1714	59	2643	80
	6	590	807	1.37	0.439	0.043	11.800	1.230	0.195	0.008	97	87	10	0.92	2347	191	2589	97	2784	65
	7	514	710	1.38	0.211	0.012	5.610	0.384	0.193	0.008	97	87	44	0.79	1232	63	1918	59	2771	69
	8	451	635	1.41	0.234	0.014	6.120	0.445	0.189	0.009	96	85	38	0.78	1357	72	1993	63	2737	75
	9	431	549	1.27	0.207	0.011	5.610	0.378	0.196	0.009	97	88	45	0.76	1214	61	1918	58	2796	71
	10	430	519	1.21	0.263	0.016	6.860	0.482	0.189	0.008	98	90	33	0.81	1506	82	2093	62	2734	69
	11	406	506	1.25	0.270	0.016	6.980	0.483	0.188	0.008	98	91	31	0.80	1539	82	2109	61	2722	69
	12	419	452	1.08	0.282	0.017	7.610	0.515	0.196	0.008	98	93	31	0.82	1603	87	2187	61	2791	63
	13	412	424	1.03	0.223	0.012	5.740	0.356	0.187	0.008	98	92	39	0.76	1299	62	1938	54	2713	67
	14	379	426	1.12	0.252	0.014	6.950	0.441	0.200	0.008	98	92	37	0.79	1450	72	2105	56	2824	65
	15	344	420	1.22	0.287	0.017	7.620	0.504	0.193	0.008	98	93	29	0.80	1626	85	2187	59	2764	65
	16	342	383	1.12	0.286	0.017	7.770	0.519	0.197	0.008	98	92	30	0.80	1623	85	2204	60	2800	66
	17	366	374	1.02	0.293	0.018	7.820	0.531	0.194	0.008	98	92	29	0.81	1657	89	2211	61	2773	66
	18	384	403	1.05	0.340	0.023	8.810	0.631	0.188	0.007	99	94	20	0.85	1887	108	2318	65	2723	63

	19	392	384	0.98	0.263	0.015	7.000	0.435	0.193	0.007	99	94	33	0.80	1506	75	2111	55	2767	62
	20	365	363	0.99	0.272	0.015	6.840	0.451	0.183	0.008	98	90	30	0.76	1550	77	2091	58	2677	71
	21	407	338	0.83	0.323	0.021	8.300	0.609	0.187	0.008	97	90	23	0.82	1802	102	2264	66	2713	69
	22	381	348	0.92	0.288	0.017	8.040	0.514	0.203	0.008	99	95	31	0.81	1629	84	2236	58	2850	61
	23	365	338	0.93	0.246	0.013	6.650	0.402	0.196	0.008	98	94	37	0.76	1419	68	2066	53	2791	65
	24	353	305	0.86	0.303	0.018	8.030	0.528	0.192	0.008	99	95	27	0.81	1708	91	2235	59	2760	64
	25	334	285	0.85	0.270	0.015	7.540	0.464	0.203	0.008	99	96	34	0.79	1541	77	2178	55	2847	63
	26	349	293	0.84	0.272	0.016	7.180	0.466	0.191	0.008	98	93	31	0.78	1553	79	2133	58	2751	68
	27	367	299	0.81	0.325	0.021	8.570	0.629	0.191	0.008	98	92	23	0.83	1814	104	2293	67	2752	69
	28	304	263	0.86	0.278	0.017	7.400	0.503	0.193	0.008	98	92	31	0.77	1581	84	2161	61	2768	72
	29	288	246	0.85	0.274	0.016	7.220	0.480	0.191	0.008	98	93	31	0.77	1561	82	2139	59	2751	71
	30	292	251	0.86	0.283	0.017	7.820	0.524	0.200	0.008	99	95	32	0.79	1607	87	2211	60	2829	68
	31	270	244	0.90	0.314	0.020	8.220	0.583	0.190	0.008	99	94	25	0.79	1760	99	2256	64	2742	73
	32	271	220	0.81	0.282	0.017	7.870	0.506	0.202	0.008	100	98	32	0.79	1603	86	2216	58	2844	66
	33	264	236	0.90	0.299	0.019	8.350	0.566	0.202	0.009	99	97	29	0.80	1687	94	2269	62	2845	68
	34	240	226	0.94	0.273	0.016	7.410	0.500	0.197	0.009	98	94	33	0.75	1554	83	2162	60	2802	75
	35	257	225	0.87	0.304	0.019	8.130	0.578	0.194	0.009	98	93	27	0.78	1712	96	2246	64	2775	74
	36	263	212	0.80	0.288	0.018	7.670	0.524	0.193	0.009	98	94	29	0.77	1630	88	2193	61	2771	73
	37	269	222	0.83	0.285	0.017	7.550	0.498	0.192	0.008	99	96	30	0.78	1615	86	2179	59	2762	70
	38	270	201	0.75	0.336	0.022	9.360	0.663	0.202	0.009	99	96	24	0.81	1867	107	2373	65	2842	69
	39	262	203	0.78	0.319	0.021	8.450	0.605	0.192	0.009	98	93	24	0.79	1785	101	2281	65	2762	73
	40	246	218	0.88	0.324	0.021	9.120	0.621	0.204	0.009	99	97	26	0.80	1811	101	2350	62	2858	69
	41	292	225	0.77	0.336	0.022	9.020	0.638	0.195	0.008	99	96	22	0.81	1868	107	2340	65	2782	69
	42	255	184	0.72	0.292	0.018	8.280	0.536	0.206	0.009	99	97	31	0.77	1651	88	2262	59	2873	69
	43	265	203	0.77	0.315	0.020	8.580	0.573	0.198	0.008	99	97	26	0.79	1765	96	2294	61	2806	69
	44	283	206	0.73	0.359	0.024	10.400	0.745	0.211	0.009	99	97	22	0.83	1977	115	2475	66	2915	66
	45	247	200	0.81	0.339	0.022	9.140	0.645	0.196	0.009	99	95	22	0.79	1881	106	2352	65	2790	72
	46	278	179	0.64	0.306	0.019	8.420	0.553	0.199	0.008	99	97	28	0.78	1722	93	2277	60	2821	69
	47	284	192	0.68	0.378	0.026	10.300	0.761	0.198	0.008	99	96	17	0.82	2068	123	2462	68	2806	70
	48	240	190	0.79	0.279	0.017	7.690	0.503	0.200	0.009	99	95	32	0.75	1588	84	2196	59	2825	72
	49	227	163	0.72	0.348	0.023	9.120	0.664	0.190	0.009	99	94	20	0.79	1923	111	2350	67	2744	74
NCGB13-7b-15	1	1591	997	0.63	0.297	0.014	7.250	0.372	0.177	0.004	97	89	24	0.91	1676	71	2143	46	2627	34
	2	1457	629	0.43	0.298	0.013	7.380	0.341	0.180	0.004	98	91	25	0.91	1682	64	2159	41	2649	33
	3	1128	341	0.30	0.366	0.016	9.160	0.422	0.181	0.004	98	93	16	0.90	2012	75	2354	42	2665	33
	4	772	243	0.31	0.488	0.022	13.100	0.622	0.195	0.004	99	96	5	0.90	2560	97	2686	45	2782	34
	5	658	205	0.31	0.560	0.028	15.200	0.778	0.197	0.004	99	97	1	0.91	2864	116	2827	49	2800	36
	6	623	151	0.24	0.488	0.023	13.700	0.648	0.203	0.004	99	97	6	0.89	2563	98	2726	45	2849	35
	7	726	145	0.20	0.479	0.022	13.400	0.644	0.203	0.004	99	97	7	0.90	2522	98	2707	45	2848	34
	8	765	147	0.19	0.450	0.020	12.800	0.571	0.206	0.004	99	98	11	0.89	2396	87	2664	42	2873	33
	9	721	134	0.19	0.462	0.020	12.300	0.556	0.194	0.004	100	98	7	0.89	2448	89	2631	42	2775	34
	10	703	107	0.15	0.472	0.021	13.400	0.612	0.206	0.004	100	98	8	0.89	2493	92	2708	43	2873	34
	11	677	101	0.15	0.464	0.020	13.300	0.593	0.207	0.004	100	98	9	0.89	2457	89	2698	42	2884	34
	12	653	109	0.17	0.474	0.020	13.300	0.584	0.204	0.004	99	98	8	0.88	2499	88	2701	42	2856	34
	13	755	100	0.13	0.418	0.017	11.700	0.486	0.202	0.004	100	99	13	0.89	2252	77	2577	39	2844	32
	14	796	118	0.15	0.404	0.016	11.200	0.456	0.201	0.004	100	99	15	0.89	2189	74	2539	38	2831	32
	15	814	108	0.13	0.433	0.018	12.200	0.527	0.205	0.004	100	98	12	0.90	2321	82	2622	40	2863	31
	16	835	117	0.14	0.435	0.018	11.400	0.488	0.190	0.004	99	97	9	0.89	2328	81	2554	40	2739	32
	17	958	98	0.10	0.388	0.015	10.100	0.410	0.188	0.004	99	97	14	0.89	2116	71	2441	38	2725	31
	18	1073	95	0.09	0.347	0.013	9.010	0.351	0.189	0.003	99	97	20	0.89	1918	62	2339	36	2731	30
	19	1034	117	0.11	0.357	0.013	9.110	0.351	0.185	0.004	99	97	18	0.88	1966	63	2349	35	2701	31
	20	1017	105	0.10	0.397	0.016	10.000	0.421	0.184	0.003	99	98	12	0.90	2153	74	2438	39	2686	31
	21	1040	95	0.09	0.344	0.013	8.530	0.322	0.180	0.003	100	98	18	0.88	1906	60	2289	34	2651	30
	22	1102	99	0.09	0.324	0.012	8.160	0.302	0.183	0.003	100	98	22	0.88	1810	56	2249	33	2676	30
	23	1157	113	0.10	0.328	0.012	8.110	0.304	0.179	0.003	99	97	20	0.88	1831	57	2243	34	2644	30

	24	1220	102	0.08	0.318	0.011	7.960	0.294	0.181	0.003	100	98	22	0.88	1781	55	2227	33	2666	29
	25	1058	92	0.09	0.346	0.012	8.970	0.332	0.188	0.003	100	98	20	0.88	1916	59	2335	34	2724	30
	26	938	99	0.11	0.351	0.012	9.210	0.329	0.190	0.004	100	98	19	0.86	1940	58	2359	33	2744	31
	27	972	110	0.11	0.408	0.016	10.700	0.434	0.190	0.003	100	100	13	0.90	2205	74	2499	38	2746	29
	28	962	125	0.13	0.399	0.015	10.400	0.411	0.188	0.004	100	99	13	0.89	2164	71	2467	37	2727	30
	29	995	137	0.14	0.323	0.011	8.200	0.290	0.184	0.003	100	98	22	0.86	1803	53	2253	32	2692	31
NCGB13-7b-17	1	823	1639	1.99	0.283	0.016	6.990	0.535	0.179	0.008	92	71	27	0.80	1606	82	2110	68	2644	77
	2	537	1109	2.06	0.289	0.016	7.680	0.522	0.193	0.008	93	77	29	0.79	1636	77	2194	61	2766	68
	3	459	787	1.71	0.343	0.019	8.970	0.602	0.190	0.007	95	82	20	0.82	1902	93	2335	61	2739	64
	4	442	625	1.41	0.328	0.017	8.630	0.554	0.191	0.007	95	81	23	0.80	1828	84	2300	58	2751	63
	5	452	554	1.22	0.399	0.024	10.900	0.720	0.198	0.007	96	85	15	0.85	2166	109	2515	61	2809	56
	6	432	414	0.96	0.462	0.029	13.100	0.887	0.205	0.006	97	90	9	0.89	2449	130	2686	64	2869	50
	7	468	449	0.96	0.422	0.025	11.600	0.734	0.199	0.006	97	90	13	0.88	2270	112	2573	59	2821	50
	8	492	410	0.83	0.463	0.028	12.700	0.805	0.199	0.006	98	92	8	0.89	2452	122	2655	60	2814	48
	9	508	375	0.74	0.530	0.035	15.300	1.060	0.210	0.006	98	93	3	0.92	2740	148	2835	66	2903	45
	10	503	318	0.63	0.486	0.030	13.500	0.860	0.201	0.006	98	94	6	0.90	2554	129	2712	60	2832	45
	11	517	320	0.62	0.521	0.033	14.400	0.937	0.201	0.005	98	94	3	0.91	2704	138	2777	62	2831	44
	12	577	326	0.57	0.526	0.033	15.100	0.960	0.208	0.005	99	96	3	0.93	2726	138	2820	61	2888	39
	13	542	402	0.74	0.571	0.035	15.800	0.993	0.201	0.005	99	96	2	0.92	2912	143	2866	60	2833	40
	14	606	422	0.70	0.580	0.035	16.600	1.040	0.208	0.005	99	96	1	0.93	2949	144	2914	60	2890	38
	15	772	460	0.60	0.487	0.027	14.200	0.809	0.212	0.005	99	97	8	0.93	2557	117	2763	54	2917	35
	16	910	507	0.56	0.531	0.030	14.500	0.847	0.199	0.004	99	97	1	0.94	2745	128	2786	55	2815	33
	17	1119	547	0.49	0.462	0.025	12.600	0.710	0.198	0.004	99	97	8	0.94	2447	112	2653	53	2813	31
	18	1098	545	0.50	0.404	0.020	10.900	0.540	0.195	0.004	99	96	14	0.93	2188	89	2513	46	2786	31
	19	1162	487	0.42	0.448	0.024	12.000	0.657	0.194	0.004	99	96	9	0.94	2388	107	2604	51	2778	30
NCGB13-7b-19	1	136	142	1.05	0.265	0.021	6.260	0.658	0.171	0.013	95	80	28	0.72	1514	105	2013	92	2572	122
	2	113	91	0.81	0.408	0.039	9.780	1.090	0.174	0.012	97	86	9	0.80	2204	178	2414	103	2596	112
	3	97	71	0.74	0.404	0.039	10.700	1.130	0.193	0.012	98	92	13	0.81	2185	178	2499	98	2764	102
	4	84	42	0.50	0.401	0.039	10.200	1.110	0.184	0.013	98	92	12	0.78	2174	179	2453	100	2693	114
	5	93	40	0.43	0.557	0.067	15.400	1.930	0.200	0.013	99	96	1	0.87	2856	277	2840	120	2830	102
	6	75	34	0.45	0.368	0.035	10.400	1.050	0.204	0.014	99	96	20	0.77	2019	164	2467	94	2861	109
	7	77	43	0.55	0.458	0.047	12.000	1.300	0.190	0.013	99	96	7	0.80	2432	206	2604	102	2741	109
	8	78	32	0.41	0.497	0.054	14.100	1.580	0.205	0.013	100	98	6	0.84	2601	232	2753	107	2867	103
	9	80	37	0.46	0.404	0.040	11.100	1.160	0.200	0.013	99	98	15	0.81	2186	183	2532	97	2823	103
	10	67	29	0.43	0.521	0.058	13.700	1.590	0.191	0.013	99	97	1	0.83	2704	244	2728	110	2747	110
	11	67	30	0.45	0.394	0.037	10.100	0.994	0.186	0.012	100	100	13	0.77	2141	173	2443	91	2706	107
	12	79	34	0.43	0.506	0.053	14.400	1.550	0.206	0.013	100	99	5	0.84	2640	227	2776	102	2876	99
	13	82	32	0.38	0.469	0.048	13.500	1.440	0.208	0.013	100	99	9	0.83	2478	212	2713	101	2893	100
	14	87	46	0.53	0.494	0.052	13.900	1.510	0.204	0.012	100	100	6	0.85	2588	226	2743	103	2859	96
	15	75	35	0.46	0.381	0.036	11.000	1.060	0.209	0.013	100	100	19	0.79	2082	166	2524	90	2900	100
	16	70	31	0.44	0.553	0.063	16.600	1.940	0.218	0.014	100	100	3	0.85	2838	262	2914	112	2966	102
	17	55	24	0.44	0.345	0.033	9.030	0.893	0.190	0.013	100	99	20	0.73	1912	156	2341	90	2740	116
	18	70	25	0.36	0.496	0.056	14.000	1.640	0.205	0.014	100	99	6	0.83	2597	240	2753	110	2869	109
	19	64	29	0.46	0.555	0.068	16.800	2.110	0.219	0.015	100	100	3	0.85	2844	283	2921	121	2974	110
	20	53	21	0.40	0.397	0.042	10.700	1.180	0.196	0.015	100	99	15	0.77	2156	194	2501	102	2795	121
	21	47	21	0.45	0.551	0.069	16.400	2.140	0.216	0.017	100	99	3	0.82	2829	289	2901	125	2952	125
	22	50	19	0.38	0.413	0.046	11.200	1.310	0.197	0.015	100	98	13	0.77	2228	211	2540	109	2799	128
	23	44	25	0.56	0.420	0.049	11.400	1.430	0.196	0.017	99	96	12	0.75	2262	224	2555	117	2796	140
	24	43	17	0.39	0.366	0.041	10.200	1.190	0.201	0.016	100	98	20	0.75	2012	193	2450	109	2836	132
	25	44	20	0.45	0.563	0.077	15.700	2.200	0.202	0.016	100	99	1	0.83	2881	316	2860	134	2845	131
	26	46	18	0.39	0.432	0.051	11.400	1.430	0.192	0.016	99	97	10	0.78	2312	230	2557	117	2758	133
	27	42	24	0.56	0.432	0.052	11.700	1.470	0.197	0.016	100	98	11	0.77	2316	233	2582	117	2798	137
	28	42	20	0.47	0.403	0.046	11.400	1.350	0.205	0.017	100	100	16	0.76	2184	212	2555	111	2865	131
	29	43	21	0.48	0.431	0.049	12.300	1.450	0.208	0.016	100	100	13	0.78	2309	221	2631	111	2888	124

NCGB13-7b-21	1	1552	7255	4.67	0.175	0.008	4.750	0.312	0.197	0.008	91	71	52	0.79	1040	46	1776	55	2799	66
	2	823	3509	4.26	0.271	0.014	7.430	0.454	0.199	0.007	94	79	33	0.81	1547	68	2164	55	2814	58
	3	528	1740	3.29	0.382	0.022	10.800	0.679	0.205	0.007	97	88	18	0.86	2083	102	2503	59	2864	52
	4	404	970	2.40	0.469	0.029	13.200	0.882	0.203	0.007	98	91	8	0.87	2481	129	2691	63	2852	54
	5	333	557	1.67	0.506	0.031	13.400	0.854	0.192	0.007	99	95	3	0.85	2641	131	2710	60	2763	55
	6	369	535	1.45	0.447	0.025	13.100	0.754	0.212	0.007	99	97	12	0.84	2380	110	2686	54	2924	52
	7	441	379	0.86	0.395	0.020	11.200	0.607	0.207	0.006	99	97	17	0.84	2144	94	2543	50	2879	48
	8	455	271	0.60	0.451	0.025	12.600	0.724	0.203	0.006	100	98	10	0.88	2398	112	2649	54	2847	45
	9	385	199	0.52	0.452	0.023	12.400	0.664	0.198	0.006	100	98	9	0.85	2405	104	2632	50	2811	47
	10	376	187	0.50	0.447	0.022	12.600	0.649	0.204	0.006	100	99	11	0.84	2381	99	2649	49	2861	46
	11	439	177	0.40	0.607	0.037	16.100	1.000	0.193	0.005	100	99	6	0.91	3059	148	2886	59	2767	44
	12	462	158	0.34	0.419	0.020	11.900	0.582	0.206	0.005	100	99	14	0.86	2256	90	2595	46	2871	42
	13	455	162	0.36	0.457	0.023	12.800	0.655	0.204	0.005	100	99	10	0.87	2426	100	2668	48	2856	42
	14	507	151	0.30	0.470	0.024	14.000	0.730	0.215	0.006	100	99	10	0.88	2483	105	2747	50	2947	41
	15	449	184	0.41	0.419	0.019	11.600	0.546	0.202	0.006	100	99	13	0.83	2256	87	2576	44	2839	45
	16	481	147	0.31	0.440	0.022	13.300	0.668	0.219	0.006	100	100	14	0.86	2348	97	2699	48	2973	43
	17	427	150	0.35	0.516	0.027	14.600	0.776	0.205	0.006	100	99	4	0.86	2681	114	2790	51	2869	46
	18	417	124	0.30	0.379	0.017	11.100	0.512	0.213	0.006	100	99	20	0.83	2072	79	2532	43	2925	43
	19	406	107	0.26	0.729	0.049	20.000	1.350	0.199	0.005	100	99	13	0.92	3529	181	3092	65	2818	44
	20	386	125	0.32	0.366	0.016	10.100	0.442	0.200	0.006	100	99	19	0.80	2010	73	2442	41	2824	45
	21	394	155	0.39	0.471	0.023	13.000	0.651	0.200	0.006	100	99	7	0.84	2487	101	2680	47	2829	46
	22	510	126	0.25	0.442	0.022	12.300	0.624	0.202	0.006	100	100	11	0.85	2359	98	2626	48	2839	44
	23	346	123	0.36	0.434	0.020	11.900	0.577	0.200	0.006	100	100	11	0.79	2323	92	2600	45	2824	50
	24	411	114	0.28	0.534	0.029	15.900	0.881	0.216	0.006	100	100	4	0.88	2758	122	2872	53	2952	44
	25	405	96	0.24	0.402	0.019	11.300	0.539	0.204	0.006	100	99	16	0.84	2176	85	2548	44	2859	44
	26	402	149	0.37	0.465	0.023	13.000	0.648	0.202	0.006	100	99	8	0.84	2461	99	2677	47	2845	45
	27	434	133	0.31	0.389	0.018	10.000	0.469	0.187	0.005	100	99	14	0.82	2117	82	2435	43	2712	46
	28	441	122	0.28	0.624	0.040	17.000	1.090	0.197	0.006	100	100	6	0.91	3124	157	2933	62	2804	46
	29	387	127	0.33	0.416	0.021	12.300	0.628	0.214	0.007	100	99	16	0.82	2241	94	2626	48	2938	49
NCGB13-7b-22	1	3371	14169	4.20	0.179	0.006	5.030	0.318	0.204	0.009	79	48	53	0.74	1061	34	1824	54	2857	72
	2	3318	13626	4.11	0.116	0.003	2.940	0.192	0.183	0.009	80	46	65	0.70	709	20	1393	50	2684	82
	3	3283	8639	2.63	0.119	0.004	3.240	0.207	0.197	0.009	81	51	68	0.73	726	23	1467	50	2804	74
	4	3033	8718	2.87	0.127	0.005	3.230	0.216	0.184	0.009	84	54	62	0.73	770	26	1464	52	2694	79
	5	2313	5966	2.58	0.128	0.005	2.970	0.214	0.168	0.009	85	54	57	0.70	777	27	1401	55	2543	89
	6	1419	4558	3.21	0.169	0.007	4.130	0.286	0.177	0.009	87	59	49	0.72	1005	38	1660	57	2628	81
	7	1272	3786	2.98	0.147	0.006	3.800	0.238	0.187	0.008	89	64	57	0.72	885	31	1592	50	2717	73
	8	1095	3083	2.82	0.217	0.010	5.400	0.356	0.181	0.008	91	68	39	0.76	1264	53	1885	57	2660	71
	9	967	3253	3.36	0.195	0.008	4.740	0.316	0.176	0.008	90	66	43	0.72	1151	45	1775	56	2615	77
	10	898	2434	2.71	0.222	0.011	5.700	0.402	0.186	0.009	89	65	39	0.76	1295	57	1931	61	2705	76
	11	743	2126	2.86	0.243	0.012	6.100	0.426	0.182	0.009	90	66	35	0.74	1401	60	1990	61	2672	78
	12	792	2036	2.57	0.204	0.009	5.370	0.327	0.192	0.008	92	72	45	0.73	1194	46	1881	52	2756	68
	13	668	1714	2.56	0.266	0.013	6.830	0.425	0.187	0.008	93	75	32	0.76	1518	63	2090	55	2713	67
	14	558	1220	2.19	0.292	0.014	8.460	0.506	0.210	0.008	94	80	32	0.79	1651	71	2282	54	2908	59
	15	445	996	2.24	0.312	0.015	8.320	0.512	0.194	0.008	94	79	26	0.76	1750	75	2267	56	2773	65
	16	445	969	2.18	0.521	0.035	13.700	1.030	0.191	0.008	95	82	1	0.85	2703	148	2732	71	2753	64
	17	442	853	1.93	0.336	0.017	9.460	0.544	0.204	0.007	96	86	24	0.79	1866	81	2384	53	2862	58
	18	360	582	1.61	0.336	0.017	8.800	0.527	0.190	0.007	96	84	22	0.77	1867	82	2317	55	2742	64
	19	325	516	1.59	0.340	0.017	9.550	0.543	0.204	0.007	97	89	24	0.78	1886	82	2392	52	2857	59
	20	319	423	1.33	0.345	0.018	9.360	0.543	0.197	0.007	97	89	22	0.78	1909	84	2374	53	2801	60
	21	316	374	1.18	0.343	0.018	9.620	0.560	0.203	0.008	97	89	23	0.78	1902	85	2399	54	2852	60
	22	319	353	1.11	0.379	0.021	10.200	0.623	0.195	0.007	98	90	17	0.80	2072	97	2454	56	2787	61
	23	290	297	1.03	0.333	0.017	8.960	0.509	0.195	0.007	98	92	23	0.76	1853	82	2334	52	2786	61
	24	286	248	0.87	0.387	0.022	11.100	0.689	0.209	0.008	98	92	18	0.80	2107	102	2535	58	2898	61
	25	288	274	0.95	0.367	0.020	10.300	0.608	0.203	0.008	98	94	20	0.79	2014	95	2460	55	2853	60

	26	271	244	0.90	0.343	0.018	9.450	0.545	0.200	0.007	99	95	22	0.78	1902	88	2383	53	2824	60
	27	252	199	0.79	0.334	0.018	9.640	0.556	0.210	0.008	98	94	26	0.77	1857	86	2401	53	2902	61
	28	239	199	0.83	0.353	0.020	9.810	0.591	0.202	0.008	98	93	21	0.78	1948	93	2417	56	2839	63
	29	234	229	0.98	0.328	0.018	9.040	0.546	0.200	0.008	98	93	25	0.76	1830	87	2342	55	2823	66
NCGB13-7b-18	1	1526	3588	2.35	0.150	0.006	3.490	0.253	0.169	0.009	88	60	52	0.73	899	36	1525	57	2550	84
	2	1496	2598	1.74	0.181	0.008	4.400	0.272	0.176	0.007	91	67	46	0.77	1071	42	1711	51	2620	66
	3	1489	2023	1.36	0.284	0.016	6.530	0.457	0.167	0.006	92	70	24	0.84	1609	80	2050	62	2529	63
	4	1389	1403	1.01	0.217	0.009	5.220	0.299	0.174	0.006	93	73	38	0.80	1266	50	1856	49	2601	57
	5	1407	1140	0.81	0.224	0.010	5.480	0.303	0.177	0.006	94	78	37	0.82	1305	53	1897	48	2625	52
	6	1367	914	0.67	0.203	0.008	5.170	0.259	0.184	0.005	95	82	43	0.82	1193	45	1847	43	2693	47
	7	1438	818	0.57	0.217	0.010	5.270	0.288	0.176	0.005	95	81	38	0.84	1266	52	1863	47	2615	49
	8	1319	650	0.49	0.188	0.008	4.620	0.233	0.179	0.005	95	82	45	0.80	1109	41	1753	42	2640	50
	9	1294	542	0.42	0.189	0.008	4.640	0.236	0.178	0.005	96	84	45	0.82	1113	43	1756	42	2638	48
	10	1127	474	0.42	0.191	0.008	4.860	0.240	0.185	0.005	97	87	46	0.82	1126	43	1796	42	2696	46
	11	1209	493	0.41	0.221	0.011	5.640	0.308	0.185	0.005	97	89	40	0.87	1286	56	1923	47	2702	45
	12	1146	434	0.38	0.181	0.007	4.620	0.229	0.185	0.005	97	87	48	0.82	1072	41	1752	41	2699	47
	13	1061	384	0.36	0.194	0.008	4.830	0.234	0.181	0.005	98	90	44	0.82	1141	43	1791	41	2662	46
	14	935	328	0.35	0.187	0.007	4.810	0.221	0.187	0.005	98	91	47	0.81	1106	40	1787	39	2712	45
	15	876	304	0.35	0.209	0.009	5.440	0.267	0.189	0.005	97	89	43	0.82	1224	47	1891	42	2730	46
	16	771	328	0.43	0.228	0.010	5.760	0.286	0.183	0.006	97	87	38	0.79	1324	50	1940	43	2682	50
	17	755	299	0.40	0.236	0.010	6.100	0.297	0.188	0.005	98	90	37	0.81	1363	52	1991	42	2725	47
	18	748	267	0.36	0.265	0.012	6.800	0.349	0.186	0.005	98	92	32	0.85	1515	63	2085	45	2708	46
	19	607	272	0.45	0.229	0.009	5.950	0.262	0.189	0.005	99	94	39	0.78	1327	47	1968	38	2732	46
	20	658	255	0.39	0.276	0.012	7.360	0.354	0.193	0.005	99	95	31	0.84	1572	62	2156	43	2770	44
	21	555	228	0.41	0.289	0.013	7.590	0.374	0.190	0.006	98	93	29	0.81	1638	64	2184	44	2745	48
	22	528	221	0.42	0.285	0.013	7.770	0.383	0.198	0.006	98	94	31	0.82	1615	64	2205	44	2809	47
	23	512	198	0.39	0.318	0.015	8.570	0.434	0.195	0.006	99	95	25	0.84	1780	73	2294	46	2789	46
	24	430	169	0.39	0.273	0.012	7.590	0.362	0.202	0.006	99	95	34	0.79	1556	60	2184	43	2841	48
	25	469	158	0.34	0.322	0.016	8.740	0.456	0.197	0.006	99	95	25	0.84	1798	76	2311	48	2801	47
	26	432	175	0.40	0.514	0.032	14.100	0.922	0.199	0.006	99	95	3	0.89	2674	137	2758	62	2820	49
	27	484	176	0.36	0.362	0.018	10.300	0.550	0.206	0.006	99	96	21	0.85	1990	87	2462	49	2878	46
	28	463	174	0.38	0.313	0.014	8.550	0.421	0.198	0.006	99	96	27	0.82	1754	71	2292	45	2813	47
	29	431	156	0.36	0.354	0.018	10.400	0.552	0.212	0.006	99	95	23	0.84	1955	85	2469	49	2924	48
	30	436	153	0.35	0.356	0.018	10.000	0.536	0.204	0.006	99	95	22	0.85	1962	85	2435	49	2857	47
	31	431	157	0.37	0.298	0.013	8.050	0.385	0.196	0.006	99	96	28	0.81	1682	66	2237	43	2793	47
	32	490	166	0.34	0.287	0.013	8.000	0.394	0.202	0.006	99	96	31	0.81	1626	66	2231	44	2844	48
	33	495	187	0.38	0.321	0.016	8.980	0.472	0.203	0.006	99	98	26	0.85	1793	78	2336	48	2852	46
	34	528	210	0.40	0.279	0.013	8.570	0.424	0.223	0.006	99	98	36	0.84	1587	66	2294	45	3000	44
	35	577	225	0.39	0.235	0.010	6.800	0.316	0.210	0.006	100	98	42	0.83	1361	54	2086	41	2905	43
	36	562	212	0.38	0.204	0.008	5.580	0.249	0.198	0.006	99	97	46	0.79	1197	45	1913	38	2812	45
	37	647	247	0.38	0.212	0.009	6.020	0.290	0.206	0.006	99	96	46	0.82	1239	50	1979	42	2875	46
	38	654	271	0.41	0.180	0.007	5.060	0.228	0.204	0.006	99	97	53	0.80	1066	40	1830	38	2860	45
	39	627	239	0.38	0.182	0.008	4.890	0.232	0.195	0.006	99	97	50	0.81	1076	43	1800	40	2786	47
	40	721	254	0.35	0.145	0.006	3.800	0.172	0.190	0.006	99	96	58	0.77	874	32	1593	36	2743	48
	41	787	276	0.35	0.157	0.007	4.060	0.196	0.187	0.006	99	94	55	0.79	941	37	1647	39	2720	50
	42	759	302	0.40	0.152	0.006	3.750	0.174	0.179	0.005	99	97	54	0.79	914	35	1582	37	2641	48
	43	804	272	0.34	0.156	0.007	4.020	0.190	0.187	0.005	99	97	55	0.81	934	37	1638	39	2714	46
	44	847	347	0.41	0.138	0.006	3.480	0.156	0.184	0.005	99	98	59	0.79	831	31	1523	35	2686	46
	45	861	361	0.42	0.144	0.006	3.550	0.172	0.179	0.005	99	96	56	0.80	866	35	1539	38	2647	49
	46	788	323	0.41	0.112	0.004	2.760	0.124	0.179	0.006	99	95	65	0.73	683	24	1346	33	2645	51
	47	786	395	0.50	0.113	0.004	2.740	0.130	0.175	0.006	99	94	64	0.74	691	25	1339	35	2609	54
	48	723	316	0.44	0.104	0.004	2.550	0.111	0.178	0.006	99	96	67	0.71	639	22	1288	32	2632	52
	49	926	385	0.42	0.111	0.004	2.770	0.129	0.180	0.006	99	95	66	0.76	681	25	1347	35	2656	51
NCGB13-7b-5	1	899	2540	2.83	0.376	0.022	10.000	0.683	0.194	0.007	93	74	17	0.86	2055	101	2438	63	2775	58

	2	706	2260	3.20	0.430	0.023	12.200	0.724	0.205	0.006	94	80	13	0.85	2304	101	2617	56	2868	51
	3	706	1795	2.54	0.363	0.016	9.670	0.511	0.193	0.006	95	81	19	0.82	1996	78	2404	49	2770	50
	4	679	1456	2.14	0.386	0.018	9.800	0.534	0.184	0.006	95	82	14	0.83	2102	84	2416	50	2693	51
	5	626	1070	1.71	0.516	0.029	14.600	0.868	0.205	0.006	97	89	4	0.89	2681	123	2788	57	2866	45
	6	597	737	1.23	0.405	0.020	10.900	0.571	0.195	0.005	97	90	14	0.85	2193	90	2514	49	2784	46
	7	570	548	0.96	0.396	0.019	11.000	0.565	0.202	0.006	98	93	16	0.85	2148	87	2526	48	2845	44
	8	508	409	0.81	0.397	0.019	11.300	0.569	0.207	0.006	99	95	17	0.84	2156	87	2552	47	2883	45
	9	564	360	0.64	0.510	0.031	14.600	0.902	0.208	0.005	99	96	5	0.91	2658	130	2791	59	2888	42
	10	501	232	0.46	0.410	0.021	11.500	0.602	0.203	0.005	99	98	15	0.86	2216	94	2565	49	2854	44
	11	451	186	0.41	0.442	0.024	12.100	0.675	0.199	0.005	99	97	10	0.88	2357	106	2615	52	2821	45
	12	397	174	0.44	0.462	0.025	12.800	0.724	0.201	0.006	99	96	8	0.86	2450	110	2665	53	2832	48
	13	432	168	0.39	0.464	0.025	12.600	0.716	0.198	0.006	99	98	8	0.86	2455	112	2653	53	2807	48
	14	434	137	0.32	0.411	0.021	11.400	0.608	0.202	0.006	99	97	14	0.83	2218	96	2560	50	2843	49
	15	446	133	0.30	0.493	0.030	14.100	0.876	0.207	0.006	99	98	6	0.89	2584	129	2754	59	2881	47
	16	360	115	0.32	0.352	0.017	10.200	0.513	0.210	0.007	100	98	23	0.81	1943	81	2451	47	2904	50
	17	372	111	0.30	0.564	0.037	15.900	1.070	0.205	0.006	99	97	0	0.89	2885	151	2873	64	2864	50
	18	363	111	0.31	0.469	0.027	13.800	0.826	0.214	0.007	100	99	10	0.87	2479	120	2738	57	2935	49
	19	373	104	0.28	0.425	0.024	11.400	0.651	0.194	0.006	100	99	11	0.86	2281	107	2553	54	2776	49
	20	306	94	0.31	0.392	0.020	11.300	0.607	0.208	0.007	100	99	18	0.82	2133	95	2545	50	2893	52
	21	329	110	0.33	0.361	0.018	10.000	0.516	0.201	0.006	100	99	20	0.80	1987	85	2436	48	2835	52
	22	358	99	0.28	0.378	0.020	10.700	0.572	0.206	0.006	100	100	19	0.82	2065	91	2501	49	2878	51
	23	308	87	0.28	0.413	0.022	11.700	0.642	0.205	0.007	100	100	15	0.82	2227	101	2578	51	2867	52
	24	322	94	0.29	0.416	0.023	11.200	0.624	0.195	0.006	100	100	12	0.83	2244	102	2539	52	2785	53
	25	307	102	0.33	0.401	0.022	10.500	0.591	0.190	0.006	100	99	13	0.81	2173	100	2482	52	2745	55
	26	289	83	0.29	0.368	0.019	9.990	0.547	0.197	0.007	100	99	19	0.80	2020	91	2433	51	2800	56
	27	346	93	0.27	0.345	0.019	10.300	0.575	0.216	0.007	100	99	25	0.82	1911	89	2458	52	2948	53
	28	280	81	0.29	0.509	0.032	14.400	0.929	0.204	0.007	100	99	4	0.85	2654	137	2774	61	2862	56
	29	289	88	0.30	0.328	0.017	8.830	0.463	0.195	0.007	100	99	24	0.76	1830	80	2320	48	2785	59
Metafeldspathic arenite (NCB13-5B; NAD 83, Zone 16, 300330E, 5820880N)																				
NCGB13-5B-1	1	1712	421	0.25	0.285	0.015	6.900	0.543	0.176	0.009	83	51	26	0.78	1618	77	2099	70	2611	83
	2	1489	288	0.19	0.362	0.020	9.330	0.619	0.187	0.006	90	68	17	0.87	1993	96	2371	61	2714	54
	3	1247	220	0.18	0.416	0.022	11.300	0.670	0.197	0.005	94	78	13	0.90	2244	101	2547	55	2798	43
	4	1058	167	0.16	0.430	0.022	11.300	0.630	0.190	0.005	95	82	10	0.89	2305	98	2547	52	2746	41
	5	926	163	0.18	0.396	0.018	10.600	0.514	0.194	0.005	97	88	14	0.87	2152	82	2487	45	2773	39
	6	965	143	0.15	0.432	0.021	11.000	0.576	0.185	0.005	97	88	9	0.89	2315	94	2527	49	2702	40
	7	875	156	0.18	0.430	0.021	11.300	0.587	0.190	0.005	97	87	10	0.88	2307	93	2548	49	2746	40
	8	719	128	0.18	0.434	0.020	9.630	0.516	0.161	0.005	95	79	3	0.82	2322	89	2400	49	2467	52
	9	721	123	0.17	0.532	0.026	11.400	0.627	0.156	0.005	96	80	7	0.85	2749	108	2560	51	2413	50
	10	669	116	0.17	0.508	0.025	13.300	0.679	0.190	0.005	98	94	2	0.89	2647	106	2703	48	2745	39
	11	665	125	0.19	0.416	0.019	11.100	0.520	0.193	0.005	99	95	12	0.86	2243	84	2530	44	2768	40
	12	716	151	0.21	0.438	0.020	11.600	0.566	0.191	0.005	99	95	9	0.87	2343	92	2570	46	2754	40
	13	690	124	0.18	0.437	0.020	11.800	0.575	0.195	0.005	99	95	10	0.87	2336	91	2585	46	2787	40
	14	659	114	0.17	0.429	0.020	11.700	0.557	0.198	0.005	99	95	11	0.86	2303	88	2581	45	2807	40
	15	672	126	0.19	0.417	0.019	11.200	0.529	0.194	0.005	99	95	12	0.86	2246	85	2537	44	2779	40
	16	672	123	0.18	0.432	0.020	11.400	0.543	0.191	0.005	99	96	10	0.86	2314	89	2554	45	2751	40
	17	689	131	0.19	0.408	0.018	10.900	0.502	0.194	0.005	99	97	13	0.86	2206	82	2517	43	2779	39
	18	666	128	0.19	0.404	0.018	10.500	0.479	0.189	0.005	99	97	13	0.86	2189	81	2483	42	2733	39
	19	647	132	0.20	0.428	0.019	11.200	0.521	0.190	0.005	99	96	10	0.86	2295	86	2539	43	2740	40
	20	639	129	0.20	0.400	0.017	10.700	0.471	0.193	0.005	99	97	14	0.85	2171	78	2495	41	2771	39
	21	662	108	0.16	0.413	0.018	10.400	0.463	0.182	0.004	99	97	10	0.85	2230	80	2470	41	2675	40
	22	678	137	0.20	0.444	0.020	11.600	0.545	0.190	0.005	99	96	8	0.86	2369	89	2577	44	2744	39
	23	681	123	0.18	0.409	0.017	10.500	0.462	0.185	0.005	99	96	11	0.84	2210	78	2476	41	2702	40
	24	672	132	0.20	0.411	0.017	10.800	0.476	0.191	0.005	98	92	12	0.83	2217	77	2507	41	2750	42
	25	715	138	0.19	0.445	0.019	11.200	0.528	0.182	0.005	97	89	7	0.84	2374	86	2536	44	2668	43

	26	642	128	0.20	0.418	0.017	11.400	0.501	0.198	0.005	98	92	13	0.83	2251	78	2556	41	2807	41
	27	636	140	0.22	0.417	0.018	12.200	0.554	0.213	0.005	99	95	15	0.85	2246	82	2622	43	2926	39
	28	671	140	0.21	0.412	0.018	10.700	0.487	0.189	0.005	99	94	12	0.84	2222	80	2498	42	2731	41
	29	629	131	0.21	0.415	0.018	11.200	0.503	0.196	0.005	98	94	13	0.83	2236	80	2541	42	2794	41
	30	613	122	0.20	0.401	0.017	10.300	0.460	0.185	0.005	98	93	12	0.82	2174	77	2458	41	2703	43
	31	623	109	0.17	0.413	0.018	11.200	0.505	0.197	0.005	99	96	13	0.85	2228	81	2543	42	2804	40
	32	607	118	0.19	0.398	0.017	10.600	0.466	0.194	0.005	99	98	14	0.84	2158	77	2491	41	2775	40
	33	606	112	0.18	0.389	0.016	10.300	0.444	0.192	0.005	99	98	15	0.83	2116	75	2462	40	2761	40
	34	618	118	0.19	0.409	0.018	10.500	0.473	0.187	0.005	99	97	12	0.84	2208	80	2483	42	2716	41
	35	619	134	0.22	0.384	0.016	10.100	0.440	0.191	0.005	99	97	15	0.83	2093	74	2444	40	2751	41
	36	651	130	0.20	0.390	0.016	10.500	0.460	0.195	0.005	100	98	16	0.84	2123	76	2480	41	2787	40
	37	571	103	0.18	0.387	0.016	10.200	0.438	0.190	0.005	100	98	15	0.83	2109	75	2449	40	2744	41
	38	586	113	0.19	0.390	0.016	10.300	0.450	0.191	0.005	100	98	15	0.84	2122	76	2459	41	2751	41
	39	579	111	0.19	0.401	0.017	10.400	0.458	0.188	0.005	99	97	13	0.83	2172	78	2469	41	2723	41
	40	600	129	0.22	0.455	0.019	14.400	0.658	0.229	0.006	97	89	14	0.83	2416	86	2773	44	3045	42
	41	588	101	0.17	0.468	0.019	13.800	0.636	0.214	0.006	94	81	10	0.80	2475	84	2735	44	2934	45
	42	567	103	0.18	0.440	0.019	10.600	0.508	0.175	0.005	98	89	6	0.82	2351	86	2490	44	2606	46
	43	550	106	0.19	0.409	0.017	10.900	0.494	0.193	0.005	98	94	13	0.82	2208	79	2513	42	2769	43
	44	577	109	0.19	0.404	0.017	12.000	0.534	0.215	0.006	98	92	17	0.82	2187	77	2601	42	2941	42
	45	581	99	0.17	0.420	0.018	12.300	0.556	0.212	0.006	98	93	15	0.83	2262	81	2625	43	2918	42
	46	560	118	0.21	0.425	0.018	10.400	0.479	0.178	0.005	99	94	8	0.82	2282	82	2471	43	2630	44
	47	559	110	0.20	0.370	0.015	9.390	0.413	0.184	0.005	98	93	16	0.80	2028	71	2377	40	2691	45
	48	590	115	0.19	0.411	0.018	11.300	0.516	0.199	0.005	99	96	14	0.84	2221	82	2547	43	2818	42
	49	569	95	0.17	0.378	0.016	10.100	0.441	0.193	0.005	99	97	17	0.82	2067	73	2440	40	2768	42
NCGB13-5B-4	1	19558	19755	1.01	0.165	0.006	4.020	0.189	0.177	0.005	75	38	50	0.82	983	31	1638	38	2624	45
	2	10572	15115	1.43	0.191	0.007	4.570	0.253	0.174	0.006	75	38	43	0.80	1126	39	1744	46	2593	57
	3	6180	8403	1.36	0.204	0.008	4.950	0.306	0.176	0.007	75	38	41	0.77	1199	43	1810	52	2611	67
	4	3723	4110	1.10	0.220	0.009	5.030	0.341	0.166	0.008	76	38	35	0.74	1283	47	1824	57	2513	78
	5	2769	2973	1.07	0.221	0.008	5.630	0.350	0.184	0.008	77	43	39	0.76	1288	44	1920	54	2693	69
	6	2349	2257	0.96	0.244	0.010	6.330	0.409	0.188	0.008	77	43	36	0.76	1409	50	2023	57	2725	71
	7	1838	1705	0.93	0.252	0.010	6.180	0.424	0.178	0.009	77	42	32	0.74	1447	51	2002	60	2635	79
	8	1495	1420	0.95	0.262	0.010	6.810	0.442	0.188	0.008	78	45	33	0.74	1501	52	2088	57	2729	73
	9	1382	1248	0.90	0.277	0.011	6.790	0.477	0.178	0.009	78	43	28	0.73	1577	57	2085	62	2632	82
	10	1274	1057	0.83	0.278	0.011	7.350	0.480	0.192	0.009	80	47	31	0.74	1580	56	2154	58	2757	73
	11	1170	1053	0.90	0.301	0.013	7.600	0.540	0.183	0.009	79	46	25	0.74	1695	64	2184	64	2681	81
	12	1005	887	0.88	0.267	0.011	6.770	0.469	0.184	0.009	80	46	31	0.72	1526	54	2082	61	2688	82
	13	924	760	0.82	0.278	0.011	7.230	0.492	0.188	0.009	81	49	30	0.72	1583	57	2140	61	2727	79
	14	840	687	0.82	0.277	0.011	6.840	0.479	0.179	0.009	81	49	28	0.71	1576	57	2091	62	2645	83
	15	858	683	0.80	0.274	0.011	7.130	0.478	0.189	0.009	82	51	31	0.72	1560	56	2127	60	2732	78
	16	823	625	0.76	0.288	0.012	7.320	0.515	0.184	0.009	82	51	28	0.72	1631	61	2152	63	2693	82
	17	706	513	0.73	0.276	0.012	6.760	0.511	0.178	0.010	81	48	28	0.70	1569	59	2081	67	2634	91
	18	651	497	0.76	0.288	0.013	7.230	0.544	0.182	0.010	81	49	27	0.71	1629	63	2140	67	2675	89
	19	664	471	0.71	0.306	0.014	7.710	0.561	0.183	0.009	83	52	24	0.72	1720	68	2197	65	2678	84
	20	662	467	0.70	0.287	0.013	7.530	0.535	0.191	0.010	83	53	29	0.72	1625	63	2177	64	2747	82
	21	611	453	0.74	0.295	0.013	8.280	0.532	0.203	0.009	85	59	30	0.73	1667	63	2262	58	2854	72
	22	599	401	0.67	0.309	0.014	8.620	0.577	0.203	0.009	85	57	28	0.74	1733	68	2298	61	2847	74
	23	533	379	0.71	0.295	0.013	7.560	0.562	0.186	0.010	83	52	27	0.71	1664	65	2180	67	2708	87
	24	506	366	0.72	0.286	0.013	7.390	0.564	0.187	0.010	82	51	28	0.70	1623	64	2160	68	2718	91
	25	536	370	0.69	0.312	0.015	7.670	0.619	0.178	0.010	82	49	22	0.70	1751	71	2193	72	2636	97
	26	497	385	0.77	0.274	0.012	7.200	0.513	0.191	0.010	84	54	31	0.69	1561	59	2136	64	2747	85
	27	496	325	0.66	0.314	0.015	8.270	0.613	0.191	0.010	84	54	25	0.72	1762	71	2261	67	2749	86
	28	497	309	0.62	0.307	0.014	8.180	0.604	0.193	0.010	83	54	26	0.72	1727	69	2251	67	2768	85
	29	497	339	0.68	0.300	0.014	7.870	0.589	0.190	0.010	83	53	27	0.71	1691	68	2216	67	2744	88
NCGB13-5B-5	1	1127	1000	0.89	0.239	0.011	7.450	0.705	0.226	0.015	61	30	44	0.77	1381	59	2167	85	3025	105

	2	972	692	0.71	0.299	0.015	7.860	0.690	0.191	0.012	72	37	27	0.75	1685	73	2215	79	2749	99
	3	806	425	0.53	0.362	0.019	9.340	0.686	0.187	0.008	84	53	17	0.80	1993	91	2372	67	2716	73
	4	707	283	0.40	0.412	0.022	11.500	0.721	0.203	0.006	92	73	14	0.88	2224	102	2568	58	2851	49
	5	683	249	0.36	0.410	0.021	12.000	0.662	0.212	0.005	95	84	16	0.89	2215	95	2602	52	2918	40
	6	680	218	0.32	0.441	0.023	12.300	0.705	0.202	0.005	96	84	11	0.90	2354	105	2626	54	2843	41
	7	648	182	0.28	0.443	0.023	12.100	0.659	0.198	0.005	97	88	10	0.90	2362	101	2610	51	2809	39
	8	684	187	0.27	0.451	0.023	12.700	0.692	0.204	0.005	97	89	10	0.91	2400	103	2659	51	2862	37
	9	653	174	0.27	0.450	0.022	13.200	0.696	0.213	0.005	97	90	12	0.91	2395	100	2697	50	2932	36
	10	668	194	0.29	0.460	0.024	13.000	0.707	0.205	0.005	97	89	9	0.91	2441	105	2678	51	2863	37
	11	664	180	0.27	0.451	0.023	12.800	0.670	0.206	0.005	98	91	10	0.91	2400	100	2664	49	2872	36
	12	666	172	0.26	0.464	0.024	13.400	0.725	0.209	0.005	98	92	10	0.92	2456	106	2706	51	2899	35
	13	588	166	0.28	0.467	0.024	13.300	0.713	0.206	0.005	98	91	9	0.91	2471	105	2701	51	2878	37
	14	532	143	0.27	0.494	0.027	13.900	0.797	0.205	0.005	97	90	6	0.91	2588	115	2746	54	2864	39
	15	491	137	0.28	0.478	0.025	13.400	0.750	0.204	0.005	97	89	7	0.89	2517	109	2709	53	2855	42
	16	472	104	0.22	0.495	0.027	13.900	0.814	0.205	0.005	97	90	6	0.90	2590	117	2746	55	2863	42
	17	424	110	0.26	0.493	0.027	14.000	0.813	0.207	0.006	97	90	6	0.89	2582	116	2753	55	2880	44
	18	413	110	0.27	0.465	0.024	13.400	0.750	0.209	0.006	97	89	10	0.87	2460	107	2707	53	2898	44
	19	414	122	0.30	0.455	0.023	12.700	0.704	0.202	0.006	97	89	10	0.87	2416	104	2657	52	2845	45
NCGB13-5B-8	1	4223	4738	1.12	0.040	0.002	1.070	0.143	0.193	0.019	64	29	98	0.77	254	13	739	70	2768	162
	2	3597	3423	0.95	0.052	0.003	1.310	0.152	0.184	0.016	69	33	90	0.75	324	15	850	67	2692	142
	3	3152	2423	0.77	0.070	0.003	1.860	0.174	0.193	0.013	75	41	84	0.76	435	20	1068	62	2771	107
	4	2589	1762	0.68	0.084	0.004	2.310	0.215	0.198	0.012	77	44	80	0.77	522	26	1214	66	2811	102
	5	2057	1387	0.67	0.096	0.005	2.710	0.231	0.205	0.011	79	48	77	0.78	591	28	1332	63	2867	91
	6	1704	1191	0.70	0.117	0.006	3.270	0.281	0.203	0.011	80	49	70	0.78	714	35	1475	67	2850	91
	7	1460	1072	0.73	0.126	0.006	3.860	0.301	0.222	0.011	81	53	71	0.80	765	35	1605	63	2995	79
	8	1282	939	0.73	0.151	0.008	4.460	0.362	0.214	0.011	82	54	62	0.80	907	45	1724	67	2938	81
	9	1116	899	0.81	0.147	0.007	4.460	0.351	0.221	0.011	81	54	65	0.79	882	41	1724	65	2987	81
	10	1116	876	0.79	0.143	0.008	3.970	0.385	0.201	0.013	77	45	62	0.76	862	43	1628	79	2837	108
	11	1104	1046	0.95	0.137	0.007	3.990	0.366	0.212	0.013	77	46	66	0.77	827	39	1632	74	2918	101
	12	1071	929	0.87	0.129	0.006	3.640	0.337	0.205	0.013	78	46	66	0.75	781	35	1557	74	2864	106
	13	965	872	0.90	0.144	0.007	4.330	0.365	0.219	0.012	80	51	65	0.77	865	39	1699	70	2972	90
	14	831	785	0.95	0.183	0.010	5.670	0.460	0.225	0.011	82	55	56	0.80	1084	53	1927	70	3014	81
	15	706	678	0.96	0.196	0.010	6.040	0.462	0.224	0.011	84	58	53	0.79	1152	54	1981	67	3007	77
	16	644	579	0.90	0.237	0.013	6.500	0.523	0.199	0.010	85	58	39	0.77	1372	66	2046	71	2816	84
	17	533	509	0.95	0.237	0.012	6.600	0.463	0.202	0.009	89	65	40	0.76	1373	60	2060	62	2840	74
	18	485	442	0.91	0.284	0.015	8.360	0.551	0.214	0.008	92	74	34	0.81	1610	75	2271	60	2935	62
	19	426	368	0.86	0.311	0.017	9.150	0.609	0.214	0.008	93	76	30	0.82	1744	84	2353	61	2934	61
NCGB13-5B-10	1	3426	3651	1.07	0.069	0.003	1.930	0.191	0.202	0.014	73	40	87	0.77	431	20	1091	66	2843	112
	2	3151	3419	1.09	0.110	0.005	2.780	0.241	0.184	0.011	77	43	67	0.76	671	31	1349	65	2686	97
	3	2217	2191	0.99	0.225	0.012	6.100	0.400	0.196	0.007	87	61	41	0.86	1310	62	1990	57	2795	56
	4	1570	1452	0.93	0.320	0.016	8.570	0.492	0.194	0.005	92	73	25	0.88	1791	78	2293	52	2777	44
	5	1174	1004	0.85	0.354	0.018	9.060	0.517	0.186	0.005	94	77	18	0.88	1952	84	2344	52	2706	45
	6	909	716	0.79	0.355	0.018	9.180	0.537	0.187	0.006	94	77	18	0.87	1959	85	2356	54	2719	48
	7	792	608	0.77	0.307	0.014	8.150	0.436	0.193	0.006	95	81	26	0.84	1725	69	2248	48	2766	47
	8	748	515	0.69	0.311	0.015	8.060	0.439	0.188	0.006	95	81	25	0.83	1747	71	2237	49	2723	50
	9	679	448	0.66	0.289	0.013	7.510	0.396	0.188	0.006	95	82	28	0.82	1636	64	2174	47	2729	50
	10	643	404	0.63	0.296	0.014	7.700	0.417	0.188	0.006	95	82	27	0.82	1673	67	2197	49	2729	51
	11	641	325	0.51	0.297	0.013	7.850	0.404	0.192	0.005	97	87	28	0.83	1677	67	2214	46	2755	47
	12	597	325	0.54	0.279	0.012	7.220	0.350	0.187	0.005	97	87	30	0.81	1588	59	2139	43	2720	47
	13	582	286	0.49	0.284	0.012	7.280	0.355	0.186	0.006	97	87	29	0.80	1611	60	2147	43	2708	49
	14	557	264	0.47	0.283	0.012	7.220	0.344	0.185	0.005	97	87	28	0.79	1606	58	2138	43	2698	48
	15	590	249	0.42	0.298	0.013	7.580	0.377	0.185	0.005	97	87	26	0.82	1680	64	2182	45	2695	48
	16	588	227	0.39	0.279	0.011	7.220	0.348	0.188	0.006	96	86	30	0.80	1584	58	2139	43	2725	48
	17	593	247	0.42	0.278	0.011	7.090	0.330	0.185	0.005	97	88	29	0.79	1583	57	2123	41	2696	47

	18	623	270	0.43	0.289	0.012	7.350	0.338	0.184	0.005	98	90	27	0.81	1637	59	2155	41	2693	45
	19	626	249	0.40	0.274	0.011	7.120	0.315	0.188	0.005	98	91	31	0.81	1563	55	2126	39	2726	43
	20	610	234	0.38	0.277	0.011	6.960	0.310	0.182	0.005	98	90	29	0.80	1576	55	2106	40	2672	45
	21	592	237	0.40	0.276	0.011	6.690	0.301	0.176	0.005	97	88	27	0.79	1573	54	2072	40	2613	46
	22	594	229	0.38	0.294	0.011	7.270	0.311	0.179	0.005	97	88	25	0.78	1661	54	2146	38	2648	45
	23	619	242	0.39	0.283	0.011	7.340	0.315	0.188	0.005	98	91	29	0.80	1606	55	2154	38	2727	42
	24	615	233	0.38	0.272	0.010	7.390	0.311	0.197	0.005	98	92	33	0.81	1553	53	2160	38	2799	41
	25	628	243	0.39	0.281	0.011	7.190	0.313	0.186	0.005	97	89	29	0.79	1595	54	2136	39	2706	44
	26	634	227	0.36	0.289	0.011	6.680	0.295	0.168	0.005	97	86	23	0.77	1636	54	2070	39	2534	48
	27	608	230	0.38	0.313	0.012	7.780	0.336	0.180	0.005	97	87	23	0.79	1757	58	2206	39	2653	45
	28	616	250	0.41	0.286	0.011	6.520	0.302	0.165	0.005	95	81	23	0.75	1621	53	2048	41	2511	52
	29	612	241	0.39	0.272	0.010	7.590	0.300	0.202	0.005	97	90	34	0.78	1551	48	2184	35	2846	41
NCGB13-5B-11	1	1891	783	0.41	0.197	0.009	4.910	0.293	0.180	0.006	91	68	43	0.85	1160	51	1803	50	2657	52
	2	1795	604	0.34	0.228	0.010	5.520	0.293	0.175	0.004	94	76	36	0.88	1325	55	1903	46	2609	42
	3	1754	516	0.29	0.258	0.012	6.590	0.321	0.185	0.004	96	84	33	0.91	1479	59	2058	43	2701	33
	4	1672	503	0.30	0.259	0.011	6.340	0.282	0.177	0.003	97	87	31	0.90	1486	54	2025	39	2630	32
	5	1576	451	0.29	0.267	0.011	6.570	0.285	0.178	0.003	97	87	30	0.90	1525	54	2055	38	2639	32
	6	1482	431	0.29	0.264	0.010	6.690	0.271	0.184	0.003	98	91	31	0.91	1510	51	2071	36	2687	29
	7	1524	438	0.29	0.280	0.011	7.150	0.295	0.185	0.003	98	92	29	0.91	1591	55	2131	37	2702	28
	8	1457	431	0.30	0.286	0.011	7.420	0.296	0.188	0.003	98	94	29	0.91	1623	54	2163	36	2724	27
	9	1321	398	0.30	0.292	0.011	7.760	0.294	0.193	0.003	99	94	29	0.91	1653	53	2204	34	2764	27
	10	1331	408	0.31	0.304	0.011	8.220	0.314	0.196	0.003	99	94	27	0.91	1712	55	2256	35	2794	26
	11	1266	358	0.28	0.312	0.011	8.480	0.319	0.197	0.003	99	95	26	0.91	1752	55	2284	34	2801	26
	12	1214	369	0.30	0.319	0.012	8.600	0.328	0.196	0.003	99	95	25	0.91	1783	57	2296	35	2791	26
	13	1197	369	0.31	0.318	0.011	8.470	0.319	0.193	0.003	99	94	25	0.90	1779	56	2283	34	2771	27
	14	1168	379	0.32	0.299	0.010	8.160	0.289	0.198	0.003	99	94	29	0.89	1686	50	2249	32	2810	27
	15	1159	355	0.31	0.316	0.011	8.500	0.314	0.195	0.003	99	95	25	0.90	1771	55	2286	34	2784	27
	16	1119	353	0.32	0.305	0.010	8.360	0.298	0.199	0.003	99	95	28	0.89	1714	51	2271	32	2820	27
	17	1128	366	0.32	0.306	0.011	8.180	0.295	0.194	0.003	99	95	27	0.88	1718	52	2251	33	2778	28
	18	1069	338	0.32	0.300	0.010	8.160	0.287	0.197	0.003	99	95	28	0.88	1690	50	2249	32	2805	28
	19	981	312	0.32	0.334	0.012	9.130	0.341	0.198	0.003	99	96	24	0.89	1856	58	2351	34	2813	28
	20	979	318	0.32	0.331	0.012	8.760	0.326	0.192	0.003	99	95	23	0.88	1843	57	2314	34	2759	29
	21	1023	341	0.33	0.296	0.010	7.730	0.272	0.189	0.003	99	94	27	0.86	1672	49	2200	32	2736	29
	22	1048	372	0.36	0.277	0.009	7.090	0.239	0.186	0.003	98	93	30	0.85	1574	44	2123	30	2707	30
	23	1077	393	0.36	0.288	0.009	7.480	0.256	0.188	0.003	98	93	28	0.86	1634	46	2171	31	2726	29
	24	1121	421	0.38	0.291	0.010	7.490	0.264	0.187	0.003	98	93	27	0.87	1648	48	2172	32	2712	28
	25	1101	409	0.37	0.293	0.010	7.620	0.268	0.188	0.003	98	91	28	0.86	1658	48	2187	32	2728	29
	26	1082	347	0.32	0.315	0.011	8.110	0.293	0.187	0.003	98	92	24	0.87	1767	52	2243	33	2712	30
	27	988	346	0.35	0.308	0.010	8.400	0.294	0.198	0.004	98	94	27	0.86	1731	50	2276	32	2809	29
	28	906	289	0.32	0.322	0.011	8.650	0.309	0.195	0.004	99	95	24	0.87	1800	53	2302	33	2784	30
	29	977	263	0.27	0.326	0.012	8.790	0.325	0.196	0.004	99	95	24	0.88	1816	56	2316	34	2792	29
	30	907	242	0.27	0.320	0.011	8.580	0.314	0.194	0.004	98	94	25	0.87	1789	54	2294	33	2780	30
	31	861	212	0.25	0.318	0.011	8.520	0.309	0.194	0.004	99	94	25	0.86	1779	53	2288	33	2779	31
	32	817	215	0.26	0.319	0.011	8.790	0.319	0.200	0.004	99	96	26	0.86	1787	54	2316	33	2822	31
	33	807	198	0.25	0.331	0.012	9.080	0.339	0.199	0.004	99	96	24	0.87	1842	57	2346	34	2819	31
	34	720	203	0.28	0.344	0.012	9.320	0.344	0.197	0.004	99	97	22	0.85	1905	58	2370	34	2799	32
	35	733	173	0.24	0.343	0.012	9.490	0.360	0.200	0.004	99	96	23	0.86	1903	60	2387	35	2830	32
	36	698	189	0.27	0.325	0.011	8.820	0.320	0.197	0.004	99	95	25	0.83	1813	54	2320	33	2802	33
	37	718	197	0.27	0.325	0.011	8.590	0.315	0.192	0.004	99	94	24	0.84	1812	54	2296	33	2759	33
	38	689	163	0.24	0.341	0.012	9.120	0.341	0.194	0.004	99	95	22	0.85	1893	58	2350	34	2775	33
	39	666	183	0.27	0.331	0.011	8.820	0.320	0.193	0.004	99	95	23	0.83	1843	55	2320	33	2770	33
NCGB13-5B-12	1	4169	2299	0.55	0.049	0.002	1.330	0.141	0.197	0.015	68	33	95	0.77	307	14	858	62	2805	126
	2	2391	1241	0.52	0.072	0.004	1.750	0.201	0.176	0.015	72	36	78	0.74	449	22	1028	74	2617	141
	3	1438	711	0.49	0.106	0.006	2.610	0.270	0.178	0.013	78	44	67	0.74	651	32	1304	76	2637	123

	4	1049	499	0.48	0.127	0.007	3.210	0.304	0.183	0.012	82	50	62	0.74	773	38	1460	73	2680	109
	5	877	440	0.50	0.147	0.008	3.600	0.343	0.178	0.012	83	51	55	0.74	884	44	1550	76	2631	111
	6	834	440	0.53	0.146	0.007	3.490	0.334	0.173	0.012	83	50	54	0.72	880	41	1525	75	2589	115
	7	800	427	0.53	0.153	0.008	4.130	0.348	0.196	0.011	84	55	58	0.75	917	42	1660	69	2791	93
	8	800	455	0.57	0.156	0.008	4.180	0.346	0.195	0.011	84	55	57	0.75	933	42	1670	68	2782	92
	9	836	499	0.60	0.163	0.008	4.600	0.369	0.204	0.011	84	56	57	0.77	975	45	1749	67	2861	85
	10	792	498	0.63	0.165	0.008	4.600	0.352	0.202	0.010	85	58	56	0.76	985	44	1749	64	2843	82
	11	806	492	0.61	0.174	0.008	4.640	0.355	0.194	0.010	86	58	52	0.76	1033	46	1757	64	2774	82
	12	854	545	0.64	0.173	0.008	4.700	0.350	0.197	0.010	86	59	53	0.76	1028	45	1767	62	2803	80
	13	854	521	0.61	0.181	0.009	5.280	0.369	0.211	0.009	86	62	54	0.79	1074	47	1865	60	2915	71
	14	772	523	0.68	0.170	0.007	4.570	0.343	0.195	0.010	84	55	53	0.74	1010	41	1744	62	2788	84
	15	808	535	0.66	0.173	0.008	4.340	0.362	0.182	0.011	82	50	50	0.73	1026	43	1701	69	2675	98
	16	810	589	0.73	0.182	0.008	4.940	0.378	0.197	0.010	83	54	51	0.75	1075	46	1809	65	2804	84
	17	836	608	0.73	0.181	0.008	5.040	0.375	0.202	0.010	84	55	52	0.76	1073	46	1826	63	2840	80
	18	796	576	0.72	0.185	0.008	5.310	0.384	0.209	0.010	83	56	53	0.77	1092	46	1870	62	2894	77
	19	812	642	0.79	0.176	0.008	4.820	0.386	0.199	0.011	81	50	53	0.75	1044	44	1788	67	2817	90
	20	798	686	0.86	0.167	0.007	4.620	0.354	0.200	0.011	81	52	55	0.74	996	40	1752	64	2829	87
	21	834	665	0.80	0.189	0.009	5.390	0.398	0.207	0.010	83	55	51	0.77	1118	48	1884	63	2879	79
	22	844	663	0.79	0.191	0.009	5.660	0.395	0.215	0.010	84	58	52	0.78	1125	47	1925	60	2945	72
	23	787	680	0.86	0.187	0.008	5.270	0.376	0.204	0.010	84	56	51	0.76	1106	45	1863	61	2860	78
	24	777	608	0.78	0.190	0.009	5.390	0.377	0.206	0.009	85	58	51	0.77	1121	46	1883	60	2873	75
	25	756	564	0.75	0.201	0.009	5.700	0.394	0.206	0.009	86	59	48	0.77	1180	49	1932	60	2873	73
	26	763	542	0.71	0.210	0.010	5.850	0.390	0.202	0.009	87	62	46	0.78	1228	51	1953	58	2843	69
	27	734	514	0.70	0.205	0.009	5.510	0.373	0.195	0.009	87	61	45	0.76	1200	49	1902	58	2787	73
	28	716	480	0.67	0.196	0.008	5.380	0.347	0.199	0.008	88	64	48	0.76	1154	46	1882	55	2819	69
	29	703	469	0.67	0.214	0.010	5.850	0.381	0.198	0.008	88	64	44	0.77	1251	51	1954	57	2811	69
	30	676	459	0.68	0.202	0.009	5.400	0.350	0.194	0.008	88	64	46	0.75	1183	47	1885	56	2780	70
	31	677	414	0.61	0.214	0.010	5.820	0.371	0.198	0.008	89	66	44	0.77	1249	51	1950	55	2806	67
	32	663	441	0.67	0.220	0.010	6.050	0.385	0.199	0.008	89	67	43	0.78	1283	53	1983	55	2821	66
	33	621	401	0.65	0.216	0.010	6.060	0.374	0.204	0.008	89	68	45	0.78	1260	50	1984	54	2855	64
	34	645	411	0.64	0.212	0.009	5.600	0.356	0.192	0.008	89	66	43	0.76	1237	49	1917	55	2760	69
	35	651	445	0.68	0.221	0.010	6.110	0.386	0.200	0.008	89	67	43	0.78	1287	53	1991	55	2830	65
	36	638	424	0.66	0.214	0.009	6.010	0.359	0.204	0.008	90	69	45	0.77	1252	49	1978	52	2855	62
	37	639	439	0.69	0.220	0.010	6.090	0.360	0.201	0.008	91	71	43	0.78	1283	51	1989	52	2830	61
	38	644	409	0.64	0.226	0.010	6.340	0.378	0.204	0.007	91	72	43	0.79	1312	53	2025	52	2857	59
	39	575	369	0.64	0.214	0.009	5.930	0.350	0.201	0.008	91	70	44	0.77	1252	48	1965	51	2831	62
NCGB13-5B-14	1	1691	2077	1.23	0.144	0.008	3.730	0.268	0.188	0.008	90	66	58	0.82	868	43	1579	57	2724	68
	2	1228	1319	1.07	0.190	0.010	4.700	0.308	0.179	0.006	94	76	45	0.84	1122	54	1767	55	2646	59
	3	897	842	0.94	0.262	0.016	7.120	0.476	0.197	0.006	96	84	35	0.89	1501	80	2127	59	2802	49
	4	692	566	0.82	0.319	0.020	8.460	0.570	0.192	0.006	97	87	24	0.89	1785	95	2282	61	2763	50
	5	579	446	0.77	0.372	0.024	10.300	0.691	0.201	0.006	98	92	19	0.91	2039	111	2464	62	2835	45
	6	516	410	0.79	0.386	0.024	10.500	0.678	0.198	0.005	99	95	17	0.91	2104	110	2483	60	2810	44
	7	531	348	0.66	0.385	0.023	10.300	0.648	0.194	0.005	99	96	16	0.91	2099	108	2461	58	2775	43
	8	563	353	0.63	0.391	0.024	10.700	0.686	0.198	0.005	99	96	16	0.92	2127	112	2495	60	2809	42
	9	556	403	0.72	0.359	0.020	9.940	0.591	0.201	0.005	99	96	21	0.90	1977	97	2429	55	2833	42
	10	556	378	0.68	0.383	0.023	10.400	0.642	0.198	0.005	99	97	17	0.92	2090	106	2474	57	2807	41
	11	591	397	0.67	0.391	0.024	10.400	0.660	0.193	0.005	99	96	15	0.92	2126	111	2472	59	2771	42
	12	627	399	0.64	0.409	0.027	11.100	0.755	0.196	0.005	99	98	14	0.93	2210	124	2530	63	2797	40
	13	624	351	0.56	0.401	0.027	10.500	0.712	0.190	0.005	100	99	13	0.93	2174	122	2483	63	2746	40
	14	630	369	0.59	0.461	0.034	12.200	0.922	0.192	0.005	100	99	7	0.95	2442	151	2618	71	2757	40
	15	575	313	0.54	0.416	0.028	11.100	0.778	0.194	0.005	100	99	12	0.94	2240	130	2535	65	2779	40
	16	565	282	0.50	0.429	0.031	11.100	0.809	0.187	0.005	100	99	9	0.94	2303	139	2529	68	2716	41
	17	589	282	0.48	0.448	0.034	11.800	0.910	0.190	0.005	100	99	8	0.95	2387	151	2586	72	2746	41
	18	577	273	0.47	0.457	0.034	11.700	0.887	0.186	0.005	100	100	6	0.95	2425	150	2583	71	2710	41

	19	594	283	0.48	0.427	0.030	10.800	0.780	0.183	0.005	100	99	9	0.94	2293	137	2505	67	2681	41
	20	600	251	0.42	0.468	0.036	11.900	0.933	0.185	0.005	100	99	5	0.95	2472	157	2600	73	2702	41
	21	567	268	0.47	0.441	0.031	11.400	0.827	0.187	0.005	100	99	8	0.94	2356	141	2554	68	2715	42
	22	499	230	0.46	0.425	0.029	10.900	0.753	0.186	0.005	100	99	10	0.93	2283	129	2515	64	2708	43
	23	501	216	0.43	0.439	0.031	11.800	0.839	0.195	0.005	100	99	10	0.93	2348	137	2589	67	2783	43
	24	506	193	0.38	0.449	0.031	12.200	0.870	0.197	0.005	100	99	9	0.93	2392	140	2621	67	2802	42
	25	456	196	0.43	0.425	0.028	11.300	0.750	0.192	0.005	100	99	11	0.92	2284	125	2544	62	2759	44
	26	449	188	0.42	0.435	0.029	11.800	0.808	0.197	0.005	100	100	11	0.92	2328	131	2592	64	2805	43
	27	450	167	0.37	0.437	0.029	11.400	0.765	0.189	0.005	100	99	9	0.92	2337	128	2556	63	2736	45
	28	414	172	0.41	0.414	0.026	11.100	0.704	0.194	0.005	100	100	12	0.91	2234	117	2530	59	2777	45
	29	411	161	0.39	0.436	0.029	11.900	0.799	0.197	0.005	100	100	10	0.92	2335	129	2593	63	2801	44
	30	423	150	0.35	0.435	0.029	11.800	0.795	0.197	0.005	100	99	11	0.91	2328	128	2588	63	2799	45
	31	429	163	0.38	0.434	0.028	11.500	0.762	0.192	0.006	100	98	10	0.91	2321	126	2562	62	2758	47
	32	410	158	0.39	0.394	0.023	10.500	0.644	0.193	0.006	100	99	15	0.89	2141	108	2479	57	2768	46
	33	396	160	0.40	0.419	0.026	11.200	0.722	0.194	0.006	100	98	12	0.90	2256	119	2540	60	2776	47
	34	399	140	0.35	0.415	0.026	11.400	0.733	0.198	0.006	100	99	13	0.90	2238	119	2553	60	2813	45
	35	390	160	0.41	0.452	0.030	11.500	0.788	0.185	0.005	100	99	7	0.91	2403	134	2569	64	2702	46
	36	382	149	0.39	0.383	0.022	10.400	0.610	0.196	0.006	100	99	16	0.88	2091	102	2467	55	2794	46
	37	408	158	0.39	0.420	0.026	11.500	0.732	0.198	0.006	100	99	12	0.90	2261	119	2561	60	2809	45
	38	426	166	0.39	0.411	0.025	11.100	0.703	0.196	0.005	100	99	13	0.90	2220	116	2531	59	2792	45
	39	409	146	0.36	0.424	0.027	11.400	0.734	0.195	0.005	100	99	12	0.91	2278	120	2557	60	2786	45
NCGB13-5B-16	1	1253	2988	2.39	0.071	0.005	1.450	0.471	0.149	0.040	46	13	70	0.82	441	32	911	195	2332	456
	2	838	1859	2.22	0.121	0.008	2.340	0.590	0.140	0.029	56	18	50	0.73	738	47	1225	179	2228	359
	3	617	1280	2.07	0.189	0.012	4.910	0.690	0.188	0.019	69	33	47	0.74	1117	66	1804	119	2726	169
	4	473	929	1.96	0.235	0.015	6.350	0.738	0.196	0.016	75	42	39	0.75	1359	77	2026	102	2796	132
	5	402	672	1.67	0.283	0.018	7.680	0.818	0.197	0.014	79	47	31	0.76	1606	91	2194	96	2801	117
	6	365	620	1.70	0.300	0.019	8.430	0.840	0.203	0.013	81	51	29	0.76	1693	94	2278	90	2854	107
	7	350	507	1.45	0.313	0.020	8.160	0.856	0.189	0.014	81	49	25	0.74	1756	98	2249	95	2734	118
	8	345	412	1.19	0.367	0.025	10.700	0.951	0.211	0.011	87	63	21	0.81	2017	117	2497	83	2913	84
	9	312	394	1.26	0.333	0.020	9.560	0.786	0.208	0.010	89	66	25	0.79	1853	99	2393	76	2892	82
	10	306	332	1.09	0.373	0.024	10.300	0.868	0.201	0.010	90	69	19	0.81	2041	115	2466	78	2837	80
	11	292	288	0.99	0.386	0.025	10.800	0.872	0.202	0.009	92	73	17	0.82	2104	118	2502	75	2843	75
	12	285	268	0.94	0.401	0.027	11.100	0.893	0.200	0.009	92	75	15	0.82	2172	122	2529	75	2829	75
	13	277	246	0.89	0.378	0.023	10.400	0.798	0.200	0.009	93	75	18	0.80	2066	109	2473	71	2827	74
	14	283	247	0.87	0.418	0.028	10.800	0.965	0.187	0.010	89	65	11	0.79	2251	128	2505	83	2718	90
	15	275	301	1.09	0.413	0.027	11.200	1.040	0.196	0.012	85	56	13	0.77	2228	122	2537	87	2794	98
	16	305	421	1.38	0.367	0.023	10.800	1.080	0.213	0.014	76	46	22	0.76	2014	108	2505	93	2930	108
	17	379	585	1.54	0.359	0.025	9.770	1.300	0.197	0.018	66	32	20	0.75	1979	118	2413	122	2803	152
	18	382	785	2.05	0.277	0.017	7.920	1.070	0.207	0.020	61	28	34	0.75	1578	86	2222	122	2883	159
	19	431	906	2.10	0.245	0.016	6.680	1.090	0.198	0.024	54	22	38	0.76	1415	81	2071	144	2806	200
	20	451	1123	2.49	0.221	0.014	5.860	1.070	0.192	0.027	50	19	41	0.78	1289	75	1955	158	2758	228
	21	460	1206	2.62	0.213	0.014	6.210	1.060	0.211	0.027	48	19	47	0.79	1244	72	2005	149	2916	204
	22	479	1253	2.61	0.223	0.014	7.470	1.110	0.243	0.025	49	22	50	0.81	1297	75	2170	133	3141	164
	23	494	1333	2.70	0.214	0.014	5.940	1.130	0.201	0.029	46	17	44	0.79	1252	76	1967	165	2835	233
	24	479	1358	2.84	0.196	0.013	5.690	1.100	0.211	0.030	43	16	50	0.81	1154	71	1930	167	2911	233
	25	466	1306	2.80	0.200	0.013	4.910	1.110	0.178	0.031	43	14	42	0.79	1177	72	1805	190	2633	294
	26	460	1381	3.00	0.195	0.013	5.890	1.050	0.219	0.029	44	17	52	0.82	1148	68	1959	155	2974	212
	27	489	1371	2.80	0.183	0.012	4.400	1.050	0.175	0.033	42	13	45	0.81	1081	67	1713	198	2604	315
	28	535	1376	2.57	0.188	0.013	4.980	1.050	0.192	0.031	43	15	48	0.81	1113	68	1816	178	2757	265
	29	498	1477	2.96	0.183	0.012	5.360	1.020	0.212	0.030	43	16	54	0.82	1083	65	1878	163	2923	230
NCGB13-5B-20	1	5606	2620	0.47	0.046	0.002	1.020	0.141	0.162	0.018	64	26	85	0.74	287	13	714	71	2480	182
	2	4812	1932	0.40	0.064	0.003	1.560	0.161	0.177	0.013	70	34	82	0.74	400	18	955	64	2623	127
	3	4144	1551	0.37	0.079	0.003	2.000	0.172	0.183	0.011	75	39	78	0.75	491	21	1116	58	2685	101
	4	3838	1325	0.35	0.092	0.004	2.130	0.181	0.168	0.010	77	40	69	0.73	566	23	1158	59	2541	102

	5	3649	1160	0.32	0.106	0.005	2.340	0.193	0.160	0.009	79	42	61	0.72	651	27	1224	59	2453	100
	6	3374	1008	0.30	0.118	0.005	2.770	0.192	0.170	0.008	82	48	61	0.75	719	28	1348	52	2561	79
	7	3189	917	0.29	0.130	0.005	3.150	0.201	0.176	0.007	84	53	59	0.77	786	30	1446	49	2619	69
	8	2777	793	0.29	0.142	0.006	3.310	0.216	0.169	0.007	84	52	54	0.77	856	34	1484	51	2549	71
	9	2479	663	0.27	0.144	0.006	3.620	0.210	0.182	0.007	87	59	56	0.79	869	33	1554	46	2669	59
	10	2392	688	0.29	0.140	0.006	3.420	0.204	0.177	0.007	87	58	56	0.78	846	31	1510	47	2626	64
	11	2247	619	0.28	0.143	0.006	3.550	0.216	0.181	0.007	86	57	57	0.78	859	32	1538	48	2658	65
	12	2180	651	0.30	0.142	0.006	3.390	0.217	0.174	0.007	85	55	55	0.76	854	32	1503	50	2594	71
	13	2161	662	0.31	0.142	0.006	3.340	0.221	0.170	0.008	85	54	54	0.75	857	33	1490	52	2559	74
	14	2142	606	0.28	0.141	0.006	3.280	0.220	0.170	0.008	85	54	54	0.75	848	32	1477	52	2553	76
	15	2086	615	0.29	0.138	0.005	3.450	0.210	0.182	0.007	86	58	58	0.77	831	30	1516	48	2669	66
	16	2087	608	0.29	0.149	0.006	3.640	0.228	0.177	0.007	87	58	54	0.77	894	35	1558	50	2629	67
	17	1982	573	0.29	0.147	0.006	3.620	0.221	0.179	0.007	87	60	55	0.77	882	33	1554	48	2645	65
	18	2009	577	0.29	0.150	0.006	3.770	0.226	0.182	0.007	88	61	55	0.78	903	34	1585	48	2668	63
	19	2070	577	0.28	0.151	0.006	3.740	0.224	0.179	0.007	88	61	54	0.77	909	34	1579	48	2643	64
	20	2009	567	0.28	0.158	0.006	3.790	0.224	0.174	0.007	89	63	51	0.77	945	35	1592	47	2599	63
	21	1808	479	0.26	0.149	0.006	3.530	0.212	0.172	0.007	88	60	53	0.75	894	32	1533	48	2576	68
	22	1739	476	0.27	0.157	0.006	3.880	0.227	0.180	0.007	89	63	53	0.78	937	35	1609	47	2650	62
	23	1722	442	0.26	0.147	0.006	3.310	0.208	0.163	0.007	87	58	50	0.73	885	31	1483	49	2488	74
	24	1886	487	0.26	0.173	0.007	4.050	0.254	0.170	0.007	88	60	46	0.77	1026	40	1645	51	2561	68
	25	1796	458	0.25	0.165	0.006	4.120	0.231	0.182	0.006	90	65	51	0.78	983	36	1659	46	2668	58
	26	1736	495	0.29	0.176	0.007	4.300	0.249	0.178	0.007	89	65	48	0.78	1043	39	1693	48	2630	60
	27	1771	424	0.24	0.182	0.007	4.890	0.277	0.195	0.007	88	63	50	0.80	1079	40	1801	48	2782	56
	28	1668	440	0.26	0.176	0.007	4.640	0.259	0.192	0.007	89	65	51	0.79	1042	38	1757	47	2759	56
	29	1575	412	0.26	0.172	0.007	4.230	0.229	0.179	0.006	91	67	49	0.77	1022	36	1681	44	2642	57
	30	1527	388	0.25	0.180	0.007	4.430	0.239	0.179	0.006	91	69	47	0.79	1066	39	1718	45	2642	55
	31	1554	397	0.26	0.182	0.007	4.510	0.244	0.180	0.006	91	69	47	0.80	1079	40	1734	45	2650	55
	32	1547	390	0.25	0.179	0.007	4.170	0.228	0.169	0.006	91	68	45	0.77	1060	38	1669	45	2551	59
	33	1542	411	0.27	0.189	0.008	4.590	0.248	0.176	0.006	92	70	44	0.80	1118	41	1748	45	2615	55
	34	1523	348	0.23	0.193	0.008	4.530	0.248	0.170	0.006	92	70	42	0.79	1138	42	1736	46	2558	56
	35	1619	426	0.26	0.193	0.008	4.580	0.244	0.172	0.006	92	71	42	0.80	1137	42	1746	44	2581	54
	36	1528	398	0.26	0.197	0.008	4.710	0.242	0.173	0.005	93	73	42	0.80	1160	42	1768	43	2588	52
	37	1609	395	0.25	0.209	0.009	5.280	0.275	0.184	0.005	93	74	42	0.83	1222	46	1866	45	2686	48
	38	1508	356	0.24	0.208	0.008	4.960	0.260	0.173	0.006	92	70	39	0.79	1218	43	1813	44	2588	54
	39	1530	382	0.25	0.225	0.009	5.270	0.295	0.170	0.006	90	66	35	0.79	1307	49	1864	48	2557	57
NCGB13-5B-22	1	5075	47976	9.45	0.025	0.002	0.815	0.191	0.241	0.041	31	12	118	0.92	156	11	606	107	3126	269
	2	4476	53876	12.04	0.030	0.002	1.000	0.233	0.241	0.040	30	11	114	0.92	192	14	705	118	3124	267
	3	3225	44603	13.83	0.046	0.003	1.500	0.308	0.235	0.035	33	12	104	0.90	293	19	932	125	3086	237
	4	1991	25418	12.76	0.083	0.005	2.600	0.433	0.228	0.027	42	16	87	0.85	512	29	1300	122	3036	193
	5	1147	12546	10.94	0.117	0.007	2.830	0.532	0.175	0.026	48	16	62	0.79	714	38	1363	141	2607	246
	6	770	6889	8.94	0.165	0.009	4.050	0.602	0.178	0.020	59	23	50	0.75	984	48	1644	121	2635	190
	7	585	3978	6.80	0.223	0.012	6.720	0.657	0.219	0.015	70	39	46	0.76	1296	61	2076	86	2973	108
	8	481	2620	5.45	0.265	0.014	7.440	0.683	0.203	0.013	77	45	35	0.75	1517	71	2165	82	2853	103
	9	404	1689	4.18	0.287	0.015	8.030	0.672	0.203	0.011	82	53	31	0.75	1628	76	2234	76	2848	92
	10	354	1182	3.34	0.345	0.020	9.230	0.780	0.194	0.011	85	58	21	0.76	1913	95	2361	77	2774	91
	11	344	954	2.77	0.351	0.020	9.820	0.740	0.203	0.010	89	66	22	0.78	1941	95	2418	70	2847	76
	12	304	763	2.51	0.328	0.018	9.250	0.701	0.205	0.010	87	63	26	0.75	1828	85	2364	69	2864	82
	13	340	705	2.07	0.365	0.021	10.100	0.846	0.200	0.011	85	58	19	0.77	2008	101	2440	78	2823	89
	14	312	686	2.20	0.367	0.021	10.400	0.889	0.206	0.012	82	54	20	0.75	2016	98	2474	79	2875	92
	15	324	733	2.26	0.371	0.022	11.200	1.010	0.220	0.013	78	48	22	0.76	2032	102	2541	84	2977	95
	16	355	880	2.48	0.336	0.019	9.910	1.020	0.214	0.015	71	39	26	0.74	1868	93	2426	95	2934	116
	17	378	1015	2.68	0.325	0.019	9.360	1.050	0.209	0.017	68	35	27	0.74	1812	92	2374	103	2900	129
	18	362	1057	2.92	0.302	0.017	10.000	1.050	0.241	0.017	65	35	36	0.76	1699	85	2437	97	3128	114
	19	356	973	2.74	0.350	0.021	11.200	1.250	0.232	0.018	64	33	27	0.76	1934	101	2538	104	3063	122

NCGB13-5B-25	1	3617	3977	1.10	0.125	0.006	4.670	0.542	0.271	0.021	32	13	79	0.87	760	34	1763	97	3311	122
	2	2979	2813	0.94	0.129	0.006	4.040	0.484	0.226	0.020	36	13	71	0.84	785	32	1642	98	3026	140
	3	2149	1713	0.80	0.122	0.005	4.000	0.416	0.237	0.018	42	17	75	0.83	745	28	1635	84	3101	118
	4	1502	1051	0.70	0.152	0.006	3.120	0.445	0.149	0.017	53	17	45	0.73	914	36	1438	110	2331	198
	5	1066	602	0.57	0.217	0.010	4.980	0.520	0.166	0.013	66	28	36	0.71	1266	52	1816	88	2522	133
	6	750	418	0.56	0.260	0.012	5.670	0.503	0.158	0.010	78	41	26	0.69	1490	60	1927	77	2437	112
	7	678	309	0.45	0.298	0.014	7.420	0.537	0.181	0.009	85	56	25	0.76	1682	72	2164	65	2659	78
	8	629	274	0.43	0.331	0.016	9.210	0.577	0.202	0.007	90	68	24	0.82	1845	79	2359	57	2839	59
	9	565	231	0.41	0.388	0.020	10.700	0.664	0.199	0.007	92	74	17	0.84	2115	94	2496	58	2822	55
	10	518	212	0.41	0.410	0.021	11.200	0.671	0.198	0.006	94	79	14	0.85	2214	97	2537	56	2807	52
	11	511	172	0.34	0.431	0.022	12.300	0.696	0.207	0.006	96	87	13	0.87	2310	100	2629	53	2885	46
	12	489	163	0.33	0.441	0.023	12.300	0.697	0.202	0.006	97	87	11	0.87	2357	102	2628	53	2845	46
	13	481	160	0.33	0.402	0.019	11.200	0.590	0.202	0.006	97	88	15	0.85	2176	88	2539	49	2844	46
	14	502	159	0.32	0.421	0.021	11.700	0.631	0.202	0.006	97	88	13	0.86	2265	94	2585	50	2845	45
	15	495	195	0.39	0.395	0.018	11.100	0.550	0.204	0.005	98	91	17	0.85	2147	83	2534	46	2861	43
	16	523	170	0.33	0.413	0.020	11.500	0.582	0.202	0.005	98	92	14	0.87	2228	89	2567	47	2846	42
	17	534	183	0.34	0.437	0.021	12.000	0.625	0.199	0.005	98	91	11	0.87	2338	95	2603	49	2817	42
	18	513	158	0.31	0.435	0.021	12.200	0.627	0.203	0.005	98	92	12	0.87	2326	94	2618	48	2853	41
	19	510	180	0.35	0.414	0.019	11.900	0.578	0.208	0.005	98	94	15	0.87	2233	87	2594	46	2889	40
NCGB13-5B-26	1	4269	4027	0.94	0.069	0.003	1.640	0.092	0.171	0.006	90	65	78	0.78	432	16	985	36	2570	59
	2	3423	2481	0.72	0.100	0.004	2.410	0.117	0.175	0.005	94	76	68	0.84	612	22	1244	35	2607	44
	3	3251	1962	0.60	0.091	0.003	2.230	0.098	0.178	0.004	94	78	72	0.83	560	18	1190	31	2636	41
	4	3460	1966	0.57	0.086	0.003	2.160	0.094	0.182	0.005	94	77	75	0.83	532	17	1167	30	2669	41
	5	3672	2197	0.60	0.083	0.003	2.060	0.087	0.181	0.004	94	78	76	0.82	512	16	1136	29	2661	40
	6	3412	2128	0.62	0.094	0.003	2.310	0.101	0.178	0.004	94	78	71	0.83	579	19	1214	31	2633	41
	7	2953	1853	0.63	0.114	0.004	2.940	0.125	0.188	0.004	95	82	67	0.86	693	23	1392	32	2723	36
	8	2672	1579	0.59	0.141	0.005	3.640	0.160	0.188	0.004	96	85	59	0.88	847	30	1559	35	2726	35
	9	2283	1335	0.58	0.151	0.006	3.910	0.167	0.188	0.004	96	85	56	0.87	908	31	1616	35	2722	34
	10	1973	1064	0.54	0.169	0.007	4.390	0.191	0.188	0.004	97	87	52	0.88	1007	36	1710	36	2726	34
	11	1851	997	0.54	0.178	0.007	4.700	0.203	0.192	0.004	97	88	51	0.88	1055	38	1768	36	2758	33
	12	1692	876	0.52	0.187	0.007	4.900	0.213	0.190	0.004	97	89	48	0.88	1106	40	1802	37	2740	34
	13	1539	770	0.50	0.195	0.008	5.250	0.227	0.196	0.004	98	91	47	0.89	1147	42	1861	37	2790	32
	14	1607	764	0.48	0.182	0.007	4.960	0.207	0.197	0.004	98	91	51	0.88	1079	38	1813	35	2805	32
	15	1666	800	0.48	0.182	0.007	4.860	0.207	0.193	0.004	98	90	50	0.88	1078	38	1795	36	2772	34
	16	1538	780	0.51	0.167	0.006	4.520	0.179	0.196	0.004	98	91	54	0.86	997	33	1736	33	2795	33
	17	1645	792	0.48	0.166	0.006	4.370	0.186	0.191	0.004	97	88	53	0.86	990	34	1707	35	2752	36
	18	1827	902	0.49	0.151	0.005	3.890	0.165	0.187	0.004	96	86	56	0.84	904	30	1611	34	2718	38
	19	1974	1003	0.51	0.131	0.004	3.490	0.132	0.194	0.004	97	88	63	0.83	791	24	1524	30	2773	35
	20	1968	972	0.49	0.138	0.005	3.640	0.144	0.191	0.004	97	88	61	0.85	833	27	1558	32	2755	34
	21	1977	949	0.48	0.128	0.004	3.350	0.125	0.190	0.004	97	89	63	0.83	775	23	1493	29	2745	35
	22	2144	1049	0.49	0.129	0.004	3.340	0.128	0.188	0.004	97	89	62	0.84	782	24	1491	30	2723	34
	23	2195	1085	0.49	0.124	0.004	3.230	0.124	0.189	0.004	97	89	64	0.84	754	23	1464	30	2732	34
	24	2314	1182	0.51	0.113	0.003	2.980	0.110	0.191	0.004	97	88	68	0.82	691	20	1403	28	2750	34
	25	2317	1197	0.52	0.121	0.004	3.140	0.122	0.189	0.004	97	88	65	0.84	734	23	1443	30	2734	35
	26	2133	1104	0.52	0.115	0.004	3.010	0.116	0.190	0.004	96	86	67	0.81	703	21	1410	29	2739	37
	27	2153	1114	0.52	0.114	0.003	2.990	0.108	0.191	0.004	97	89	68	0.82	693	20	1404	28	2748	35
	28	2217	1150	0.52	0.120	0.004	3.190	0.122	0.193	0.004	97	88	66	0.83	729	22	1455	30	2770	35
	29	2225	1171	0.53	0.113	0.004	3.000	0.116	0.192	0.004	96	86	68	0.82	691	21	1408	29	2763	36
	30	2178	1129	0.52	0.111	0.003	2.870	0.110	0.188	0.004	96	85	68	0.80	677	20	1374	29	2727	38
	31	2238	1177	0.53	0.115	0.004	3.080	0.117	0.194	0.004	97	87	68	0.83	703	21	1429	29	2777	35
	32	2158	1132	0.52	0.118	0.004	3.220	0.117	0.199	0.004	98	91	68	0.84	717	21	1462	28	2815	32
	33	1997	1032	0.52	0.119	0.004	3.300	0.117	0.202	0.004	98	92	69	0.84	723	21	1481	28	2839	32
	34	1974	1052	0.53	0.121	0.004	3.220	0.119	0.194	0.004	97	90	66	0.83	735	22	1463	29	2773	34
	35	2008	1036	0.52	0.114	0.003	3.040	0.108	0.193	0.004	97	90	68	0.81	697	20	1417	27	2766	34

	36	2009	1042	0.52	0.115	0.003	3.080	0.108	0.194	0.004	98	91	68	0.82	701	20	1427	27	2780	33
	37	2056	1030	0.50	0.123	0.004	3.340	0.123	0.197	0.004	98	90	66	0.84	747	22	1490	29	2803	33
	38	1941	1020	0.53	0.118	0.004	3.150	0.113	0.194	0.004	97	90	67	0.82	719	21	1444	28	2772	34
	39	1939	1013	0.52	0.116	0.003	3.100	0.110	0.194	0.004	97	90	68	0.82	706	20	1433	27	2778	34
NCGB13-5B-27	1	2964	1532	0.52	0.109	0.005	2.100	0.152	0.140	0.007	89	58	53	0.73	667	28	1148	50	2221	86
	2	2040	899	0.44	0.189	0.008	3.970	0.225	0.153	0.005	94	74	38	0.82	1113	45	1628	46	2377	55
	3	1535	495	0.32	0.270	0.013	6.650	0.349	0.179	0.004	97	86	29	0.89	1541	65	2066	46	2641	39
	4	1265	325	0.26	0.315	0.015	7.920	0.397	0.183	0.004	98	92	23	0.90	1764	72	2222	45	2676	35
	5	1108	244	0.22	0.341	0.016	8.860	0.438	0.189	0.004	99	94	21	0.91	1889	77	2324	45	2731	34
	6	1031	201	0.19	0.346	0.016	8.970	0.437	0.188	0.004	99	95	20	0.90	1916	77	2335	45	2724	35
	7	1062	194	0.18	0.352	0.016	9.430	0.457	0.194	0.004	99	95	20	0.90	1944	78	2381	45	2779	34
	8	980	177	0.18	0.345	0.015	9.070	0.424	0.191	0.004	99	95	20	0.90	1911	74	2345	43	2748	34
	9	979	184	0.19	0.375	0.018	10.000	0.509	0.194	0.004	99	96	17	0.92	2054	86	2439	47	2777	34
	10	987	204	0.21	0.363	0.017	9.600	0.467	0.192	0.004	99	95	18	0.90	1995	80	2397	45	2759	34
	11	956	183	0.19	0.340	0.014	9.220	0.412	0.197	0.004	99	95	22	0.88	1886	69	2360	41	2800	35
	12	966	190	0.20	0.393	0.018	10.100	0.482	0.186	0.004	98	93	13	0.89	2136	83	2439	44	2703	36
	13	1019	216	0.21	0.380	0.018	10.200	0.509	0.194	0.004	99	94	16	0.91	2077	85	2449	46	2774	34
	14	1021	228	0.22	0.349	0.016	9.490	0.443	0.197	0.004	99	96	21	0.90	1929	75	2386	43	2803	33
	15	1112	242	0.22	0.324	0.014	8.860	0.403	0.198	0.004	99	97	25	0.90	1808	69	2324	41	2813	32
	16	1145	302	0.26	0.306	0.013	8.180	0.367	0.194	0.004	99	96	27	0.90	1721	65	2252	41	2776	33
	17	1161	310	0.27	0.320	0.014	8.260	0.379	0.187	0.004	99	94	23	0.89	1787	68	2259	42	2719	34
	18	1198	337	0.28	0.356	0.016	9.400	0.442	0.192	0.004	98	91	19	0.90	1962	75	2378	43	2757	34
	19	1208	327	0.27	0.326	0.013	9.400	0.413	0.209	0.004	98	91	27	0.89	1819	65	2378	40	2900	32
	20	1259	359	0.29	0.280	0.012	7.380	0.324	0.191	0.004	98	94	30	0.89	1592	58	2159	39	2752	33
	21	1333	380	0.28	0.276	0.012	7.360	0.323	0.193	0.004	99	95	31	0.89	1572	58	2156	39	2770	32
	22	1283	385	0.30	0.262	0.010	7.000	0.296	0.194	0.004	99	95	34	0.89	1498	53	2112	38	2777	32
	23	1288	450	0.35	0.280	0.012	7.590	0.339	0.197	0.004	99	95	31	0.90	1590	60	2183	40	2800	32
	24	1280	450	0.35	0.303	0.013	7.770	0.368	0.186	0.004	98	92	26	0.90	1705	66	2205	43	2709	34
	25	1214	442	0.36	0.286	0.012	7.630	0.339	0.193	0.004	98	91	30	0.88	1623	59	2188	40	2770	34
	26	1206	436	0.36	0.293	0.012	8.230	0.372	0.203	0.004	98	91	31	0.89	1658	61	2257	41	2854	34
	27	1207	386	0.32	0.278	0.011	7.700	0.333	0.201	0.004	98	94	32	0.89	1583	57	2196	39	2831	32
	28	1248	451	0.36	0.285	0.012	7.600	0.341	0.193	0.004	98	93	30	0.89	1618	60	2185	40	2770	33
	29	1317	428	0.32	0.289	0.012	7.660	0.346	0.192	0.004	99	95	29	0.90	1638	62	2192	41	2760	32
NCGB13-5B-29	1	3310	2438	0.74	0.176	0.012	3.700	1.030	0.153	0.035	25	6	40	0.82	1044	64	1572	223	2377	389
	2	2682	1797	0.67	0.176	0.010	4.920	0.872	0.203	0.027	29	9	53	0.84	1045	54	1806	150	2848	219
	3	2960	1662	0.56	0.211	0.012	6.070	0.957	0.209	0.024	33	11	47	0.81	1233	64	1985	138	2896	189
	4	2602	1327	0.51	0.227	0.013	6.440	0.959	0.206	0.023	36	12	43	0.79	1320	67	2038	131	2871	179
	5	2212	1040	0.47	0.230	0.013	6.720	0.931	0.212	0.021	39	14	43	0.79	1336	66	2076	122	2919	163
	6	1955	930	0.48	0.216	0.011	5.430	0.833	0.182	0.022	41	13	40	0.77	1263	59	1890	132	2671	196
	7	1720	700	0.41	0.236	0.012	6.400	0.836	0.197	0.019	45	16	39	0.77	1364	62	2032	115	2801	159
	8	1573	668	0.42	0.248	0.012	7.070	0.835	0.206	0.018	48	19	39	0.77	1430	64	2120	105	2878	140
	9	1287	554	0.43	0.243	0.012	5.880	0.802	0.175	0.019	50	17	33	0.74	1402	61	1958	118	2610	176
	10	1170	474	0.40	0.265	0.013	7.010	0.823	0.192	0.017	53	21	33	0.75	1516	65	2113	104	2759	144
	11	1021	445	0.44	0.267	0.012	7.240	0.760	0.196	0.015	58	24	34	0.74	1526	61	2141	94	2797	127
	12	881	423	0.48	0.290	0.014	7.870	0.844	0.197	0.015	59	25	30	0.74	1643	70	2216	97	2797	129
	13	800	404	0.50	0.294	0.014	8.090	0.825	0.200	0.015	61	28	30	0.74	1662	68	2241	92	2823	122
	14	729	397	0.55	0.295	0.014	8.010	0.779	0.197	0.014	65	31	29	0.72	1668	67	2232	88	2799	117
	15	699	398	0.57	0.290	0.014	7.550	0.784	0.189	0.015	66	30	28	0.72	1643	69	2179	93	2731	127
	16	624	365	0.59	0.306	0.015	7.980	0.778	0.189	0.014	69	34	26	0.71	1721	72	2229	88	2734	118
	17	548	357	0.65	0.296	0.014	8.390	0.733	0.206	0.013	72	39	31	0.72	1671	68	2274	79	2871	102
	18	518	304	0.59	0.302	0.014	8.700	0.722	0.209	0.012	74	42	30	0.73	1703	69	2307	76	2895	95
	19	503	302	0.60	0.316	0.015	8.710	0.707	0.200	0.012	77	45	26	0.72	1772	72	2308	74	2824	94
NCGB13-5B-30	1	1159	5689	4.91	0.233	0.014	7.650	1.210	0.238	0.027	36	14	48	0.83	1348	73	2190	143	3109	181
	2	1243	3749	3.02	0.181	0.010	5.450	0.870	0.219	0.026	42	16	56	0.82	1070	57	1893	137	2972	189

	3	1132	2293	2.03	0.158	0.009	3.270	0.773	0.150	0.029	44	12	44	0.78	946	53	1475	184	2348	330
	4	886	1527	1.72	0.175	0.010	4.660	0.749	0.194	0.024	51	20	52	0.78	1037	54	1760	134	2773	200
	5	707	1124	1.59	0.235	0.014	5.770	0.928	0.179	0.022	57	22	35	0.74	1358	74	1942	139	2639	204
	6	546	733	1.34	0.277	0.017	7.100	0.960	0.186	0.019	64	29	30	0.73	1576	84	2124	120	2706	166
	7	435	481	1.11	0.351	0.021	10.100	1.040	0.209	0.015	73	41	23	0.76	1938	102	2444	95	2898	113
	8	343	354	1.03	0.375	0.022	10.300	0.988	0.200	0.013	79	48	18	0.74	2053	105	2464	89	2823	106
	9	349	267	0.76	0.389	0.025	9.750	0.999	0.182	0.013	81	49	13	0.74	2120	115	2411	94	2668	116
	10	321	196	0.61	0.391	0.024	10.800	0.908	0.200	0.011	88	64	16	0.78	2126	112	2505	78	2827	87
	11	298	185	0.62	0.397	0.024	10.900	0.852	0.200	0.010	91	72	16	0.78	2155	112	2519	72	2826	79
	12	286	158	0.55	0.453	0.030	12.400	0.994	0.198	0.009	93	75	9	0.81	2410	133	2631	76	2806	78
	13	249	146	0.59	0.431	0.028	11.700	0.900	0.197	0.009	94	78	11	0.80	2312	124	2584	72	2805	76
	14	245	127	0.52	0.465	0.031	12.600	0.969	0.196	0.009	95	80	7	0.81	2462	135	2650	72	2797	74
	15	247	143	0.58	0.473	0.032	13.500	1.020	0.207	0.009	95	83	8	0.82	2496	138	2714	71	2881	70
	16	252	130	0.51	0.461	0.030	13.700	0.965	0.216	0.008	97	90	11	0.84	2443	132	2730	67	2950	63
	17	277	123	0.45	0.473	0.032	13.300	0.969	0.203	0.008	97	88	8	0.85	2498	138	2699	69	2853	64
	18	255	121	0.47	0.398	0.024	11.400	0.768	0.208	0.008	96	87	17	0.81	2160	109	2559	63	2892	65
	19	250	107	0.43	0.438	0.027	12.600	0.875	0.209	0.008	96	87	12	0.82	2339	122	2650	65	2896	65
NCGB13-5B-28	1	2792	4151	1.49	0.039	0.002	0.939	0.190	0.173	0.028	62	25	92	0.80	249	14	672	99	2589	265
	2	2064	2618	1.27	0.064	0.003	1.590	0.229	0.179	0.020	70	33	82	0.76	403	20	967	90	2645	182
	3	1620	1731	1.07	0.097	0.005	2.540	0.289	0.191	0.016	74	40	73	0.75	595	29	1284	83	2749	136
	4	1155	1220	1.06	0.126	0.006	3.360	0.347	0.193	0.015	76	43	65	0.74	765	35	1495	81	2772	123
	5	859	854	0.99	0.168	0.008	4.740	0.444	0.205	0.013	78	47	56	0.75	999	47	1774	79	2867	106
	6	686	631	0.92	0.217	0.012	6.080	0.534	0.203	0.012	82	53	44	0.75	1267	61	1988	77	2851	96
	7	548	501	0.91	0.269	0.015	7.680	0.621	0.207	0.011	86	60	35	0.77	1535	75	2195	73	2884	85
	8	443	395	0.89	0.288	0.016	7.690	0.627	0.194	0.011	87	61	30	0.75	1629	78	2196	73	2777	90
	9	388	333	0.86	0.379	0.023	10.400	0.805	0.200	0.009	90	69	18	0.79	2072	106	2475	71	2825	77
	10	361	314	0.87	0.337	0.018	9.610	0.707	0.207	0.010	89	68	25	0.76	1874	89	2398	68	2879	77
	11	488	459	0.94	0.325	0.019	8.890	0.793	0.199	0.012	84	56	25	0.76	1811	94	2327	81	2816	95
	12	508	742	1.46	0.262	0.014	6.980	0.686	0.193	0.013	80	48	34	0.72	1502	73	2109	87	2767	115
	13	551	757	1.37	0.254	0.014	7.090	0.720	0.203	0.014	77	45	37	0.74	1458	73	2123	90	2848	116
	14	504	765	1.52	0.232	0.012	6.600	0.681	0.206	0.015	76	43	42	0.73	1346	65	2059	91	2875	120
	15	534	740	1.39	0.266	0.016	7.360	0.802	0.201	0.015	75	42	35	0.74	1521	79	2156	97	2831	126
	16	492	715	1.45	0.250	0.014	7.240	0.740	0.210	0.015	76	44	39	0.74	1440	72	2141	91	2903	116
	17	480	717	1.49	0.265	0.015	7.810	0.774	0.214	0.015	77	46	37	0.74	1514	76	2210	89	2936	111
	18	474	691	1.46	0.274	0.015	8.520	0.782	0.226	0.014	78	49	38	0.75	1560	77	2288	83	3021	99
	19	421	584	1.39	0.285	0.016	8.230	0.784	0.210	0.014	79	48	33	0.74	1615	80	2257	86	2903	107
	20	392	488	1.24	0.300	0.017	8.430	0.776	0.204	0.013	81	51	29	0.73	1693	83	2278	84	2855	104
	21	402	500	1.25	0.307	0.018	8.050	0.778	0.190	0.013	82	50	26	0.72	1728	86	2237	87	2743	112
	22	353	389	1.10	0.304	0.016	8.620	0.703	0.206	0.012	85	59	29	0.73	1709	81	2299	74	2874	91
	23	357	387	1.08	0.321	0.018	8.490	0.697	0.191	0.011	87	61	24	0.73	1797	86	2284	75	2755	93
	24	352	284	0.81	0.325	0.018	9.230	0.688	0.206	0.010	89	68	26	0.76	1812	86	2361	68	2877	79
	25	336	336	1.00	0.333	0.018	9.400	0.678	0.204	0.010	91	71	25	0.76	1855	88	2378	66	2862	77
	26	350	296	0.85	0.345	0.019	9.420	0.715	0.198	0.010	90	68	22	0.76	1908	93	2380	70	2812	81
	27	346	343	0.99	0.340	0.019	9.670	0.693	0.206	0.010	91	71	24	0.76	1886	89	2404	66	2877	76
	28	329	339	1.03	0.302	0.016	8.560	0.617	0.205	0.010	90	69	30	0.73	1702	78	2292	66	2870	80
	29	353	360	1.02	0.317	0.018	8.600	0.689	0.197	0.011	88	64	25	0.74	1777	86	2296	73	2797	88

SI 4.6: LA-ICP-MS REE depth-profile data, NCGB, NW Ontario

sample	time (s)	depth (μm)	position	Al 27 (ppm)	P 31* (ppm)	Ti 49 (ppm)	Fe 57 (ppm)	Sr 88 (ppm)	Y 89 (ppm)	Sn 118 (ppm)	La 139 (ppm)	Ce 140 (ppm)	Pr 141 (ppm)	Nd 146 (ppm)	Sm 147 (ppm)	Eu 151 (ppm)	Gd 157 (ppm)	Tb 159 (ppm)	Dy 163 (ppm)	Ho 165 (ppm)	Er 167 (ppm)	Tm 169 (ppm)	Yb 173 (ppm)	Lu 175 (ppm)	Hf 177 (ppm)	Th 232 (ppm)	U 238 (ppm)	Th/U	La_N/Yb_N
NCGB12-10-2	15.6	5.2	Rim	5259	798	658	1664	22	1399	1	24	157	23	121	45	9	72	16	154	47	192	43	423	75	13814	298	1780	0.16	0.041
			Core	9435	3322	919	2619	25	1675	6	73	258	34	161	53	10	96	22	219	60	217	46	400	65	10533	388	977	0.39	0.132
NCGB12-10-7	4.0	1.3	Rim	3208	1125	477	839	36	16917	46	31	228	34	184	64	12	97	19	158	43	142	27	292	52	13444	58	781	0.08	0.077
			Core	125	493	32	101	1	1228	1	6	68	6	35	18	4	49	12	124	40	163	34	311	56	8009	299	248	1.20	0.013
NCGB12-10-8			No rim	132	260	13	62	0	678	1	0	22	0	2	4	1	16	5	57	21	101	24	238	47	8971	111	158	0.78	0.000
NCGB12-10-10			No rim	45	1500	272	71	0	918	2	0	26	0	2	3	1	18	6	73	28	138	33	350	71	9122	266	496	0.59	0.000
NCGB12-10-11			No rim	62	275	53	30	0	884	1	0	23	0	5	6	2	25	7	76	27	129	29	304	61	7915	169	176	0.95	0.000
NCGB12-10-12			No rim	315	451	28	102	1	901	1	6	74	9	53	29	3	47	11	101	27	110	24	229	41	9979	160	230	0.78	0.017
NCGB12-10-13	10.4	3.5	Rim	16	126	9	36	1	309	1	0	16	0	2	2	1	5	2	21	9	44	12	130	27	10908	84	272	0.31	0.002
			Core	90	358	13	147	0	512	2	0	28	0	3	2	1	10	3	40	15	77	18	183	37	9874	125	185	0.69	0.002
NCGB12-10-18	4.4	1.5	Rim	352	157	25	88	3	1008	0	2	27	2	9	3	1	10	3	54	26	199	56	686	143	10915	138	407	0.35	0.002
			Core	68	270	20	18	1	672	1	0	31	0	2	4	1	17	5	59	21	96	21	199	39	9130	150	150	1.04	0.000
NCGB12-10-18a	6.0	2.0	Rim	131	148	13	65	2	862	0	1	30	2	9	5	1	13	4	59	23	125	35	391	82	10467	144	309	0.49	0.002
			Core	321	542	21	21	3	611	1	6	42	1	7	4	1	15	5	52	19	86	19	178	35	8780	149	160	0.94	0.022
NCGB12-10-20	9.6	3.2	Rim	20	160	12	38	0	1062	1	0	41	0	5	7	2	26	8	93	34	170	41	415	83	10686	333	964	0.39	0.000
			Core	49	255	15	18	0	772	1	0	20	0	5	6	2	23	6	68	24	114	27	249	52	7935	119	128	0.98	0.000
NCGB12-10-23			No rim	64	236	55	42	0	658	1	0	17	0	3	5	2	17	5	55	21	101	23	226	46	8090	105	113	0.92	0.000
NCGB12-10-24			No rim	102	519	17	178	3	613	1	2	38	1	4	3	1	14	4	48	20	87	22	219	49	7970	297	313	0.95	0.006
NCGB12-10-26	7.2	2.4	Rim	8	148	6	17	0	311	0	0	8	0	1	1	0	4	2	18	9	49	14	159	39	10783	83	296	0.28	0.001
			Core	147	186	17	70	0	331	1	0	7	1	3	2	0	6	2	25	9	52	13	134	31	8639	32	83	0.41	0.002
NCGB12-10-27	12.0	4.0	Rim	6	222	15	23	1	752	1	0	41	0	2	3	1	16	4	57	22	103	25	248	48	11698	252	329	0.80	0.000
			Core	61	211	18	17	0	504	1	0	35	0	2	3	1	14	4	45	15	72	16	147	28	9381	150	153	0.98	0.000
NCGB12-13-1	7.2	2.4	Rim	4659	7997	631	876	8	4712	2	75	375	67	358	225	56	297	58	406	73	226	40	337	53	12405	150	472	0.32	0.160
			Core	299	613	63	57	1	1042	1	12	79	14	80	54	13	87	20	157	40	141	27	251	44	9548	102	210	0.50	0.036
NCGB12-13-3	7.2	2.4	Rim	119	377	20	42	1	514	0	6	49	6	35	17	7	31	6	59	17	76	19	195	40	10767	76	468	0.17	0.022
			Core	227	532	21	40	1	785	0	7	57	7	43	26	8	44	10	89	27	111	25	251	50	9719	92	247	0.38	0.019
NCGB12-13-7	23.1	7.7	Rim	1613	2291	436	290	3	2562	1	287	1020	171	883	469	127	545	95	555	99	268	43	311	50	10706	173	426	0.46	0.662
			Core	155	574	58	36	0	519	1	16	93	13	72	41	11	60	12	86	19	68	14	122	22	9674	112	194	0.58	0.094
NCB12-14-19	17.6	5.9	Rim	147	135	40	27	4	1050	1	16	67	10	57	33	39	63	13	127	33	121	23	226	41	12574	78	458	0.18	0.049
			Core	85	587	32	32	2	840	3	4	21	2	13	8	2	19	6	69	23	110	23	219	42	9516	64	211	0.29	0.012
NCB12-14-27			No rim	84	735	11	67	38	1956	1	6	108	4	22	15	17	48	14	161	58	281	67	652	126	8649	745	1031	0.64	0.007
NCB12-14-27a			No rim	64	687	13	61	13	1527	1	4	75	3	18	14	6	41	11	129	46	223	53	529	103	8345	525	790	0.61	0.005
NCB12-14-32			No rim	22	1625	15	16	2	727	1	2	17	1	6	4	1	16	5	61	22	113	26	252	52	9125	68	160	0.45	0.006
NCB12-14-33	14.0	4.7	Rim	1186	1091	171	272	8	1786	2	19	74	11	56	39	13	87	21	191	53	212	44	405	71	8700	128	414	0.30	0.033
			Core	387	688	60	106	2	1016	1	5	26	3	18	11	4	28	8	92	32	148	32	329	64	8243	80	286	0.28	0.011
NCB12-14-33a	12.4	4.1	Rim	239	722	35	50	13	1780	1	15	66	9	53	34	14	70	16	175	56	245	51	502	95	11025	127	615	0.21	0.021
			Core	428	685	25	65	2	1485	1	11	45	6	37	24	7	58	14	152	46	198	40	367	73	9176	98	310	0.33	0.022
NCGB12-15-1			No rim	930	471	81	134	2	1650	1	16	78	12	70	45	15	90	25	231	62	236	46	394	69	9668	119	255	0.55	0.029
NCGB12-15-2			No rim	98	495	14	94	58	1349	1	2	19	1	8	7	3	27	9	105	40	195	47	491	104	8850	198	1084	0.26	0.002
NCGB12-15-3			No rim	12	624	12	10	0	641	0	0	12	0	3	3	1	11	4	49	20	102	25	251	54	9332	71	216	0.34	0.001
NCGB12-15-3a			No rim	18	346	16	19	1	563	1	0	10	0	3	2	1	9	3	44	17	88	21	225	47	9902	61	192	0.33	0.001
NCGB13-01-1			No rim	550	1376	17	331	4	738	1	16	63	6	30	16	3	41	8	81	24	103	23	227	46	9102	156	202	0.79	0.052
NCGB13-01-2			No rim	1764	188	34	18	0	589	2	0	12	0	1	2	0	12	4	54	20	88	20	175	31	10554	51	119	0.42	0.000
NCGB13-01-4	10.0	3.3	Rim	91	273	8	119	1	1095	1	1	39	1	6	5	2	22	7	91	36	177	44	458	83	9424	384	766	0.45	0.001
			Core	1435	1057	20	1379	4	2449	3	18	162	12	79	49	22	114	25	245	79	349	77	727	139	8169	1303	1300	0.93	0.018
NCGB13-01-5			No rim	1611	312	18	783	1	983	1	0	11	0	2	4	2	26	8	97	32	140	31	271	48	7802	101	188	0.55	0.001
NCGB13-01-6	15.2	5.1	Rim	155	97	15	168	1	803	0	15	69	9	60	47	7	89	15	124	30	106	23	211	40	10703	107	284	0.37	0.049
			Core	496	183	40	276	3	1609	1	58	241	37	263	192	40	298	45	297	60	194	36	321	62	9291	334	551	0.58	0.129
NCGB13-01-7			No rim	235	172	13	322	1	596	1	7	43	5	40	30	7	52	9	76	21	84	18	181	36	9090	96	217	0.42	0.026
NCGB13-01-8	19.2	6.4	Rim	68	169	10	72	0	590	1	11	43	6	32	12	16	26	5	54	19	88	20	197	36	10235	101	480	0.22	0.039
			Core	885	311	20	468	49	1003	2	134	354	48	212	65	354	100	17	134	34	135	27	252	48	8028	420	834	0.47	0.382
NCGB13-01-10	14.0	4.7	Rim	44	279	8	40	1	705	1	3	20	2	19	15	4	29	7	75	22	105	24	253	48	9930	106	322	0.34	0.009
			Core	26	255	10	31	1	734	1	2	16	2	13	12	2	28	7	73	22	105	23	237	45	8643	102	253	0.41	0.006
NCGB13-01-11	20.4	6.8	Rim	43	173	10	96	1	814	1	237	400	45	185	28	2	29	6	73	26	131	33	333	67	9642	157	489	0.32	0.510

sample	time (s)	depth (μm)	position	Al 27 (ppm)	P 31* (ppm)	Ti 49 (ppm)	Fe 57 (ppm)	Sr 88 (ppm)	Y 89 (ppm)	Sn 118 (ppm)	La 139 (ppm)	Ce 140 (ppm)	Pr 141 (ppm)	Nd 146 (ppm)	Sm 147 (ppm)	Eu 151 (ppm)	Gd 157 (ppm)	Tb 159 (ppm)	Dy 163 (ppm)	Ho 165 (ppm)	Er 167 (ppm)	Tm 169 (ppm)	Yb 173 (ppm)	Lu 175 (ppm)	Hf 177 (ppm)	Th 232 (ppm)	U 238 (ppm)	Th/U	La_N/Yb_N
			Core	61	161	13	56	1	879	1	9	68	8	48	23	3	43	9	82	28	133	30	296	64	8663	196	409	0.48	0.022
East-eyap-3			No rim	21	318	18	23	1	641	1	1	33	1	5	5	1	20	5	58	20	96	21	211	41	9415	127	159	0.83	0.003
East-eyap-4	4.0	1.3	Rim	158	271	23	88	7	1349	1	13	57	5	32	22	4	56	14	126	41	185	41	482	95	9073	156	338	0.55	0.020
			Core	972	279	150	373	0	569	1	1	19	1	5	4	2	16	4	50	18	86	19	189	37	7514	77	95	0.79	0.002
East-eyap-5	12.8	4.3	Rim	669	681	18	247	22	1581	1	17	61	8	46	19	18	44	10	122	45	224	59	665	127	13679	232	1366	0.17	0.018
			Core	110	416	12	63	3	764	1	0	13	0	3	3	1	13	4	53	21	110	26	266	51	9408	88	263	0.34	0.001
East-eyap-6			No rim	10	472	13	54	1	338	5	0	24	0	1	1	0	6	2	25	10	47	13	119	24	10921	64	145	0.57	0.000
East-eyap-12			No rim	104	335	21	28	1	588	2	0	27	0	1	2	1	9	3	43	18	89	23	242	49	10714	122	285	0.53	0.001
East-eyap-15	20.4	6.8	Rim	21	471	9	61	5	699	1	0	6	0	1	1	1	11	4	53	22	116	29	322	63	10131	67	371	0.21	0.001
			Core	772	1120	12	541	39	2635	0	37	115	16	92	40	32	103	25	259	85	383	82	814	142	10545	301	1579	0.19	0.032
East-eyap-17			No rim	7	416	18	22	1	912	1	0	28	0	3	6	1	23	7	82	30	131	28	263	49	9215	110	137	0.81	0.000
East-eyap-18	3.2	1.1	Rim	1361	372	48	369	18	2609	1	32	138	22	135	76	36	157	30	275	82	314	78	755	144	8055	102	624	0.16	0.030
			Core	403	488	32	149	1	1953	1	5	26	3	19	13	7	44	13	165	63	302	64	639	116	6934	159	382	0.41	0.005
East-eyap-18a	7.2	2.4	Rim	2022	281	225	570	26	2841	1	44	170	27	169	91	47	186	40	333	86	329	68	731	139	8883	88	612	0.17	0.043
			Core	53	507	24	23	1	2704	1	1	12	1	9	13	4	67	20	249	91	403	82	736	134	6988	213	346	0.62	0.001
East-eyap-19			No rim	21	250	15	21	0	849	1	0	26	0	4	6	2	23	7	75	27	128	28	278	53	8698	134	161	0.89	0.001
Akow-1	19.6	6.5	Rim	1042	222	11	54	1	625	0	2	27	2	13	5	3	15	4	52	19	95	25	257	51	10960	112	304	0.37	0.004
			Core	330	276	8	29	2	783	1	3	32	3	17	7	3	19	5	62	24	120	28	300	61	8813	169	462	0.36	0.006
Akow-3	20.8	6.9	Rim	222	469	11	90	19	1191	1	3	25	3	15	8	1	26	8	100	37	179	41	395	72	12160	151	784	0.20	0.006
			Core	221	403	13	34	1	829	1	2	19	2	13	7	1	21	7	79	28	126	28	260	50	10036	72	277	0.26	0.004
Akow-3a	8.8	2.9	Rim	540	649	17	238	79	1720	3	4	22	2	9	5	2	24	9	124	51	264	61	627	104	13829	294	1681	0.18	0.005
			Core	1243	557	87	191	3	963	1	2	19	2	9	5	1	19	6	83	30	151	32	314	59	10493	119	480	0.24	0.004
Akow 3b	12.8	4.3	Rim	568	599	22	280	83	1537	2	1	11	0	1	3	1	21	8	124	48	258	59	565	101	12900	310	1650	0.20	0.001
			Core	81	378	11	29	3	927	1	1	17	1	8	5	1	19	6	81	29	143	31	296	58	10488	110	417	0.27	0.003
Akow-6	4.8	1.6	Rim	7604	1620	214	1976	22	1214	6	0	11	0	2	2	0	13	5	74	33	153	37	404	68	19594	776	11043	0.15	0.001
			Core	24	320	12	18	1	584	1	0	8	0	1	2	0	10	3	48	18	97	21	221	43	9615	65	239	0.29	0.000
Akow-9	9.6	3.2	Rim	2111	221	10	43	0	391	0	0	17	1	5	3	3	9	3	31	12	59	15	157	32	10367	45	99	0.45	0.002
			Core	851	346	45	122	2	910	1	6	53	6	39	15	7	27	7	76	28	135	30	325	66	9534	161	594	0.31	0.013
Akow-20	7.6	2.5	Rim	1356	1870	78	419	17	2294	1	11	74	11	63	29	10	65	22	247	80	345	76	725	112	11793	246	1062	0.24	0.011
			Core	1265	701	36	179	2	1361	1	4	37	5	25	12	7	35	12	143	48	221	48	429	75	9392	117	431	0.27	0.007
Akow-23	10.0	3.3	Rim	1264	165	62	54	2	527	3	0	4	0	1	1	0	6	2	22	7	49	12	131	27	11655	21	114	0.19	0.000
			Core	11	49557	14	64	37	514	1	29	76	11	63	23	4	38	6	53	17	74	16	163	32	11068	37	115	0.32	0.129
Akow-24	13.2	4.4	Rim	2087	741	126	563	34	5965	15	19	161	26	152	71	12	136	38	383	110	432	86	742	117	13811	236	922	0.23	0.018
			Core	515	519	36	164	14	2908	1	6	75	8	48	26	5	72	23	271	97	436	85	746	127	10197	539	1117	0.48	0.006
Akow-25			No rim	579	391	15	46	1	780	1	2	21	2	14	7	2	20	6	77	27	125	27	261	47	9497	74	274	0.28	0.005
NCTK10-44-4			No rim	433	384	12	42	0	655	1	1	13	1	7	5	1	17	5	63	21	100	22	191	38	8688	69	186	0.37	0.003
NCTK10-44-7	7.6	2.5	Rim	1220	559	15	117	1	1049	1	2	23	3	14	7	2	21	6	76	30	137	35	324	60	10388	107	425	0.26	0.004
			Core	726	525	15	115	1	963	1	3	34	5	26	11	4	26	8	89	30	139	30	277	55	8592	91	318	0.29	0.008
NCTK10-44-10	6.0	2.0	Rim	16	315	7	16	0	548	1	0	9	0	2	2	0	11	4	48	18	86	22	186	35	10752	56	239	0.24	0.001
			Core	155	505	23	61	0	548	1	36	90	10	39	8	1	15	5	56	19	83	19	174	33	8547	56	257	0.22	0.147
NCTK10-44-10a	6.0	2.0	Rim	92	346	16	52	0	613	0	0	10	1	3	3	1	11	4	61	20	98	23	214	36	10304	60	244	0.25	0.001
			Core	343	435	24	62	0	714	1	1	15	2	10	7	2	21	7	74	24	108	22	206	38	8861	62	236	0.26	0.003
NCTK10-44-11			No rim	47	840	11	19	1	830	1	2	18	2	10	5	1	17	6	72	27	129	29	264	54	9249	112	394	0.28	0.004
NCTK10-44-13			No rim	158	3908	25	68	5	955	1	40	115	13	57	15	2	27	7	89	30	140	32	299	58	9288	125	358	0.37	0.096
NCTK10-44-13a	10.4	3.5	Rim	74	845	15	31	0	764	1	1	15	1	7	6	1	17	5	67	24	112	28	278	52	10294	79	353	0.23	0.003
			Core	224	1414	548	189	1	1161	1	4	40	5	24	13	3	33	10	110	37	166	36	335	65	9002	145	354	0.42	0.009
NCGB13-9B-2	12.0	4.0	Rim	41	214	8	96	12	587	1	0	12	0	1	1	1	8	3	42	17	93	26	281	49	9448	199	796	0.25	0.001
			Core	33	286	18	43	2	544	1	1	17	1	7	5	1	14	4	45	17	82	21	213	43	8929	121	361	0.34	0.005
NCGB13-9B-3			No rim	12	200	10	95	0	653	1	0	6	0	1	1	0	8	3	49	22	115	30	331	73	11751	16	282	0.08	0.000
NCGB13-9B-4			Rim	36	2054	8	201	5	1138	1	14	82	5	22	9	3	27	8	95	37	170	46	470	81	10674	351	503	0.70	0.021
			Core	9	1095	10	106	2	1750	1	3	87	2	12	9	2	40	12	152	56	280	66	653	113	10691	614	693	0.89	0.004
NCGB13-9B-7	10.8	3.6	Rim	263	244	15	289	2	602	0	42	97	7	24	10	2	23	6	58	18	87	22	204	39	9649	163	376	0.42	0.148
			Core	153	362	13	118	1	769	1	8	53	3	15	9	5	27	7	72	24	109	27	264	51	8563	215	445	0.49	0.022
NCGB13-9B-8			No rim	5369	1853	705	5806	40	4457	1	149	451	60	304	185	42	387	81	654	159	535	102	835	139	8327	825	1246	0.66	0.128
NCGB13-9B-11	8.0	2.7	Rim	81	97	11	282	25	1013	1	6	35	3	19	11	18	26	7	81	30	137	40	423	80	11300	356	1082	0.33	0.010

sample	time (s)	depth (μm)	position	Al 27 (ppm)	P 31* (ppm)	Ti 49 (ppm)	Fe 57 (ppm)	Sr 88 (ppm)	Y 89 (ppm)	Sn 118 (ppm)	La 139 (ppm)	Ce 140 (ppm)	Pr 141 (ppm)	Nd 146 (ppm)	Sm 147 (ppm)	Eu 151 (ppm)	Gd 157 (ppm)	Tb 159 (ppm)	Dy 163 (ppm)	Ho 165 (ppm)	Er 167 (ppm)	Tm 169 (ppm)	Yb 173 (ppm)	Lu 175 (ppm)	Hf 177 (ppm)	Th 232 (ppm)	U 238 (ppm)	Th/U	La_N/Yb_N
			Core	23	171	13	44	1	807	1	1	25	1	6	5	2	20	6	70	26	123	29	295	57	10257	248	357	0.75	0.002
NCGB13-9B-12			No rim	746	7880	27	393	14	1226	1	27	118	17	99	49	19	82	15	136	39	163	36	337	62	9056	178	527	0.36	0.058
NCGB13-9B-13	11.2	3.7	Rim	314	386	31	899	89	1617	1	19	65	8	44	18	25	38	11	121	45	248	73	925	206	26382	227	2513	0.10	0.015
			Core	140	218	37	229	13	1414	1	15	84	13	67	18	39	39	10	124	45	216	51	486	93	12189	257	909	0.30	0.023
NCGB13-9B-14			No rim	480	367	121	1251	2	1214	1	11	67	10	64	46	11	98	20	162	41	145	29	242	44	8464	144	319	0.45	0.033
NCGB13-9B-15	6.0	2.0	Rim	169	186	34	735	93	853	1	3	42	2	9	7	3	15	4	49	21	120	41	545	134	13000	466	2109	0.23	0.004
			Core	72	326	21	131	5	783	1	2	43	2	15	11	4	30	7	75	24	112	27	289	59	9914	231	525	0.47	0.006
NCGB13-9B-16			No rim	4162	736	514	4001	11	1770	1	30	155	23	140	91	22	174	32	243	58	206	41	344	62	7773	316	549	0.58	0.062
NCGB13-9B-17	11.2	3.7	Rim	755	3208	198	1013	39	1749	0	9	53	7	42	30	11	65	16	164	55	247	62	588	103	10699	515	1599	0.32	0.011
			Core	231	3337	32	351	16	1559	1	16	86	11	63	32	14	63	16	156	51	229	53	499	90	9689	405	1046	0.39	0.023
NCGB13-9B-19	9.6	3.2	Rim	2153	839	58	2497	75	2770	1	71	238	35	172	98	58	185	42	347	92	344	76	720	127	12089	267	1379	0.20	0.071
			Core	1318	449	32	1103	4	1517	1	11	55	7	39	27	7	69	17	168	50	215	46	426	84	9786	161	471	0.35	0.019
NCGB13-9B-20			No rim	964	378	34	2346	1	1095	1	6	53	6	34	28	5	69	15	130	35	131	28	249	48	9881	179	228	0.76	0.016
NCGB13-9B-23			No rim	506	735	80	672	2	1796	1	12	99	10	60	45	10	98	22	208	61	254	55	524	95	8826	306	325	0.95	0.017
NCGB13-9B-24			No rim	33	415	15	74	1	503	1	2	28	1	4	3	1	12	3	42	16	76	19	191	37	8701	134	264	0.51	0.009
NCGB13-7-2	12.0	4.0	Rim	187	453	42	76	1	1297	1	13	57	8	42	27	12	56	13	125	41	169	40	377	61	11377	122	390	0.32	0.024
			Core	263	474	23	68	3	1941	1	27	121	15	79	45	40	91	21	196	62	257	53	468	82	11039	208	504	0.41	0.042
NCGB13-7-3	8.4	2.8	Rim	4	317	8	32	0	740	1	0	7	0	0	1	0	11	4	59	24	119	30	291	54	13328	79	471	0.17	0.000
			Core	342	471	25	184	1	1159	1	13	60	8	54	30	20	58	13	127	38	151	32	290	53	10191	106	312	0.35	0.032
NCGB13-7-3a	13.6	4.5	Rim	3	369	2	28	0	812	0	0	8	0	1	2	0	12	5	68	26	132	31	315	57	13074	84	466	0.18	0.001
			Core	7	395	10	17	0	860	1	1	12	0	3	3	1	18	6	72	27	131	29	279	53	10358	92	313	0.30	0.002
NCGB13-7-4			No rim	1354	254	452	597	6	1024	1	21	106	16	89	40	17	61	13	112	35	144	31	290	52	11080	89	427	0.21	0.051
NCGB13-7-5			No rim	658	293	40	276	1	716	1	24	63	6	27	12	5	26	6	61	22	102	26	247	50	10359	113	331	0.35	0.070
NCGB13-7-6			No rim	281	727	138	265	2	1778	1	6	59	5	29	20	4	52	15	166	58	249	55	499	89	9944	277	663	0.43	0.008
NCGB13-7-7			No rim	37	329	10	158	0	700	1	0	7	0	1	2	1	13	4	54	22	110	25	260	51	8529	62	142	0.39	0.000
NCGB13-7-8	10.4	3.5	Rim	4299	1828	66	1390	9	1903	1	63	326	45	235	103	91	165	31	244	59	245	51	466	80	10597	266	690	0.39	0.096
			Core	11368	903	54	1336	22	2025	1	62	309	43	230	98	54	153	31	248	68	258	55	497	86	8643	304	716	0.43	0.089
NCGB13-7-9	11.6	3.9	Rim	2083	431	158	956	1	1385	1	5	39	4	24	14	4	34	9	109	43	216	55	556	103	11519	153	661	0.23	0.006
			Core	565	411	31	357	1	927	1	1	16	1	7	5	2	19	6	76	29	140	34	329	66	8862	88	269	0.34	0.003
NCGB13-7-9b				461	422	37	208	1	1131	1	2	20	1	6	4	2	20	6	85	35	182	44	447	85	10611	132	454	0.30	0.003
NCGB13-7-13	10.8	3.6	Rim	646	250	31	130	5	1916	0	47	173	29	170	102	41	183	34	257	62	221	44	398	72	10300	110	527	0.22	0.085
			Core	1191	311	27	317	1	1733	2	31	85	14	82	56	17	119	26	206	55	199	39	340	65	7920	71	169	0.43	0.066
NCGB13-7-15	11.6	3.9	Rim	267	298	32	174	7	1142	1	29	114	17	91	40	10	65	15	123	36	142	32	293	50	13170	93	659	0.15	0.072
			Core	527	395	41	245	3	1737	1	49	218	33	182	84	19	142	27	216	55	196	37	296	52	10584	116	329	0.36	0.119
NCGB13-7-17	13.2	4.4	Rim	9958	142	39	3323	24	1126	1	44	208	26	125	58	27	90	18	131	33	123	30	370	90	14912	118	1108	0.12	0.085
			Core	6719	241	39	2476	6	1125	1	28	134	16	83	46	17	83	17	137	36	140	29	287	58	10875	140	495	0.29	0.069
NCGB13-7-20			No rim	855	267	49	4158	1	718	1	8	31	3	14	10	4	22	6	63	22	107	23	233	46	8545	81	231	0.37	0.024
NCGB13-7B-1	12.8	4.3	Rim	729	601	131	138	8	3030	3	156	380	95	518	283	73	378	73	514	104	325	61	517	79	9143	160	325	0.47	0.217
			Core	332	397	26	169	2	899	1	15	48	11	62	36	10	56	12	98	30	115	24	224	41	7701	65	132	0.51	0.047
NCGB13-7B-3			No rim	845	584	72	191	5	1435	3	22	119	25	155	105	50	171	33	221	49	163	31	278	50	9035	139	253	0.52	0.056
NCGB13-7B-5			No rim	337	213	59	129	9	855	2	36	183	33	188	78	36	101	18	124	27	97	19	180	32	16294	128	225	0.57	0.145
NCGB13-7B-6			No rim	341	507	52	162	6	1384	2	41	159	29	158	74	32	109	20	152	40	162	33	296	54	8155	111	239	0.40	0.099
NCGB13-7B-9	15.2	5.1	Rim	1021	760	123	233	31	1286	8	103	326	41	166	56	160	68	13	114	39	175	42	426	70	13706	121	630	0.19	0.174
			Core	904	8897	75	296	24	1578	2	20	95	17	88	45	31	73	18	160	50	215	46	429	77	11208	146	537	0.27	0.034
NCGB13-7B-10	10.8	3.6	Rim	483	545	213	83	17	1656	2	72	281	46	244	93	101	132	21	185	48	194	43	415	68	12823	141	544	0.26	0.125
			Core	327	580	116	100	10	1832	1	39	160	24	129	61	45	106	22	198	59	236	52	470	79	10949	198	493	0.40	0.059
NCGB13-7B-11	5.6	1.9	Rim	5	515	9	30	0	932	1	1	13	1	5	3	3	15	5	74	31	148	35	354	59	11896	108	552	0.19	0.002
			Core	89	640	30	37	3	1143	2	15	74	13	67	30	26	49	11	115	38	164	37	343	59	10308	113	388	0.29	0.032
NCGB13-7B-14			No rim	55	415	17	28	3	770	1	8	35	5	29	15	5	27	6	69	25	108	26	237	44	9827	81	228	0.36	0.023
NCGB13-7B-15	9.2	3.1	Rim	1124	1382	181	546	22	4005	2	98	440	82	460	297	101	441	83	590	134	460	98	905	140	13365	219	926	0.26	0.078
			Core	1605	1419	300	1036	40	4179	3	62	304	52	303	186	70	311	63	517	137	528	107	946	156	9431	684	1237	0.56	0.047
NCGB13-7B-17	11.2	3.7	Rim	583	589	274	467	24	2287	10	50	195	33	170	84	84	146	33	282	76	284	58	500	82	14528	329	698	0.52	0.071
			Core	182	321	27	96	1	1286	1	15	91	13	74	47	11	85	19	160	44	169	33	278	46	10073	247	174	1.67	0.038
NCGB13-7B-18			No rim	1674	383	302	383	65	1319	1	184	646	93	423	115	98	125	19	135	39	168	41	408	79	9846	242	549	0.44	0.324
NCGB13-7B-19	10.8	3.6	Rim	127	291	52	82	1	687	1	8	28	5	24	13	5	26	6	64	21	101	23	222	41	11473	97	273	0.37	0.025

sample	time (s)	depth (µm)	position	Al 27 (ppm)	P 31* (ppm)	Ti 49 (ppm)	Fe 57 (ppm)	Sr 88 (ppm)	Y 89 (ppm)	Sn 118 (ppm)	La 139 (ppm)	Ce 140 (ppm)	Pr 141 (ppm)	Nd 146 (ppm)	Sm 147 (ppm)	Eu 151 (ppm)	Gd 157 (ppm)	Tb 159 (ppm)	Dy 163 (ppm)	Ho 165 (ppm)	Er 167 (ppm)	Tm 169 (ppm)	Yb 173 (ppm)	Lu 175 (ppm)	Hf 177 (ppm)	Th 232 (ppm)	U 238 (ppm)	Th/U	La_N/Yb_N
			Core	103	530	23	45	1	977	1	22	65	10	52	23	8	40	9	90	31	143	31	297	55	10274	118	319	0.37	0.052
NCGB13-7B-21	9.6	3.2	Rim	92	560	21	142	8	1408	1	13	69	8	36	19	30	38	11	105	43	203	49	501	88	10998	143	488	0.29	0.018
			Core	101	424	30	59	4	1016	1	14	57	10	45	20	10	37	9	93	32	144	34	339	66	8177	79	163	0.49	0.029
NCGB13-7B-22			No rim	167	455	141	104	15	1307	2	36	173	32	195	75	24	95	17	144	41	168	36	334	59	10600	177	419	0.43	0.076
NCGB13-5B-1	12.8	4.3	Rim	811	599	34	138	5	1358	1	7	45	6	33	17	5	45	15	145	45	181	42	400	67	9765	126	579	0.22	0.012
			Core	729	583	54	162	5	1125	1	4	25	2	15	9	4	33	9	112	38	157	36	344	60	7742	126	362	0.35	0.007
NCGB13-5B-4			No rim	1165	501	129	75	2	2229	1	162	500	92	498	242	35	291	50	339	71	234	45	397	65	9915	91	193	0.45	0.292
NCGB13-5B-5	9.2	3.1	Rim	173	323	78	106	2	689	0	6	41	6	33	10	2	17	5	60	21	107	25	273	49	10337	106	467	0.23	0.016
			Core	370	339	42	190	5	890	1	10	85	13	71	26	6	38	9	89	28	122	28	286	53	9231	199	450	0.44	0.026
NCGB13-5B-8			No rim	2692	681	168	285	33	3383	3	297	1397	281	1456	338	68	329	51	396	100	350	68	596	103	8713	314	363	0.86	0.358
NCGB13-5B-10	10.0	3.3	Rim	958	381	58	293	23	1751	2	60	314	60	300	90	24	110	24	207	49	181	38	320	52	9561	221	645	0.34	0.135
			Core	61	233	12	21	1	1050	1	3	23	4	22	12	3	36	10	107	34	146	30	276	50	6794	92	185	0.51	0.008
NCGB13-5B-11	9.2	3.1	Rim	426	284	29	90	8	1410	1	20	119	23	124	61	15	93	21	184	42	164	37	343	65	11612	85	603	0.14	0.042
			Core	293	298	14	56	3	1098	0	6	47	7	40	22	6	45	12	115	34	145	32	311	59	9559	102	458	0.22	0.015
NCGB13-5B-12	17.6	5.9	Rim	1432	703	179	193	21	2396	1	105	608	124	671	197	41	218	39	314	77	252	49	432	63	10776	251	490	0.51	0.174
			Core	2375	1493	411	910	65	3625	2	165	876	170	847	203	48	215	40	340	94	360	85	928	174	22767	335	1818	0.20	0.128
NCGB13-5B-14			No rim	76	324	16	22	3	954	1	4	34	4	25	13	3	32	9	94	30	137	30	277	51	8651	121	257	0.47	0.011
NCGB13-5B-16	14.8	4.9	Rim	1426	984	169	212	9	2880	2	89	402	76	393	159	30	194	43	389	95	306	59	480	69	11068	146	445	0.33	0.132
			Core	1215	1029	120	196	10	2656	3	59	290	53	275	110	22	146	35	324	87	295	56	452	70	9471	175	491	0.36	0.094
NCGB13-5B-20	13.6	4.5	Rim	661	250	50	109	6	783	1	19	88	17	88	32	6	41	9	81	24	101	24	230	39	9267	67	595	0.11	0.058
			Core	1672	877	123	409	26	2140	1	84	277	51	255	82	23	121	27	254	65	246	51	466	75	8780	366	913	0.39	0.130
NCGB13-5B-22	12.4	4.1	Rim	6843	2295	773	1155	86	10085	3	632	3800	742	3950	1084	216	1083	185	1353	303	914	158	1307	179	11780	935	466	2.03	0.347
			Core	2513	1149	292	697	27	3042	3	184	1038	201	1036	273	57	278	49	395	95	316	59	501	75	9651	762	301	2.38	0.263
NCGB13-5B-25	11.6	3.9	Rim	685	507	78	128	11	1213	1	48	313	64	366	103	24	104	17	141	35	134	30	271	45	10433	116	279	0.40	0.126
			Core	1671	740	158	314	22	2144	2	127	865	189	1020	225	44	200	29	227	61	223	45	394	68	8708	247	243	0.97	0.231
NCGB13-5B-26			No rim	112	507	38	41	6	923	2	7	33	5	30	14	4	29	8	85	28	121	28	260	49	6921	55	184	0.31	0.020
NCGB13-5B-27			No rim	62	448	12	20	1	688	1	3	18	3	15	7	2	19	5	59	21	97	23	226	43	7493	40	148	0.28	0.009
NCGB13-5B-28			No rim	811	707	52	159	5	1793	1	45	264	48	252	74	15	101	22	203	56	197	42	378	62	8727	136	371	0.34	0.085
NCGB13-5B-29	13.2	4.4	Rim	108	797	22	67	2	1005	1	7	51	8	41	16	3	27	8	86	31	138	31	296	49	11291	115	223	0.50	0.016
			Core	166	1089	35	44	6	1387	2	9	63	11	67	31	7	64	15	150	46	182	37	319	55	9735	138	190	0.75	0.021
NCGB13-5B-30	14.8	4.9	Rim	3731	1632	271	539	17	4620	1	387	2162	417	2105	463	95	436	71	545	136	448	85	709	112	12602	214	526	0.41	0.392
			Core	494	771	37	95	3	1230	1	44	257	48	233	51	10	56	11	122	39	165	36	332	58	9246	114	357	0.32	0.096

*P31 has very low concentrations in NIST612. Because of this, data is semi quantifiable and interpretations must be limited.

Supplementary Information – Chapter 5

Fluid-mediated alteration of zircon under lower greenschist condition

C.J. Kelly[1], D.A. Schneider[1], D.E Harlov[2] & S.E. Jackson[3]

[1]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, ON K1N 6N5 Canada
[2]Deutsches GeoForschungsZentrum, Telegrafenberg, D-14473 Potsdam, Germany
[3]Natural Resources Canada, Geological Survey of Canada, Ottawa, ON, K1A 0E4 Canada

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SI 5.2: LA-ICP-MS element grain maps of unpolished zircon 365

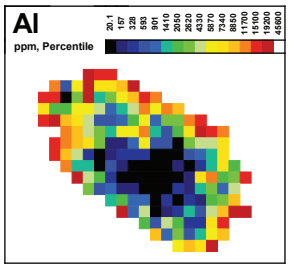
SI 5.1: Electron microprobe results for unaltered and altered FCT zircon

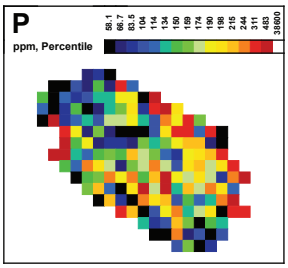
sample		ZrO_2 (wt%)	SiO_2 (wt%)	HfO_2 (wt%)	Y_2O_3 (wt%)	ThO_2 (wt%)	UO_2 (wt%)	P_2O_5 (wt%)	MgO (wt%)	CaO (wt%)	Ce_2O3 (wt%)	La_2O_3 (wt%)	Lu_2O_3 (wt%)	Na_2O (wt%)	K_2O (wt%)	Total
Zircon Std		66.44	32.65	0.683	0.121	0.003	0.006	0.019	0.000	0.002	0.007	-	0.014	-	0.002	99.95
Zircon Std		66.58	32.87	0.673	0.126	-	-	0.021	-	0.002	0.003	0.003	0.025	-	-	100.30
Zircon Std		66.35	32.87	0.699	0.134	0.001	0.007	0.028	-	-	0.052	0.015	-	-	-	100.16
Cambodian zircon		66.48	33.26	1.110	0.015	-	-	0.027	0.002	0.003	0.015	-	-	-	-	100.91
Primary FCT-1	Core	66.48	33.55	1.044	0.143	0.009	0.011	0.045	0.009	-	0.050	0.001	0.018	-	0.000	101.36
Primary FCT-1		64.92	33.45	1.377	0.099	0.035	0.059	0.035	0.003	0.003	0.016	0.016	0.010	0.002	-	100.02
Primary FCT-2	Core	65.73	32.50	1.135	0.192	0.014	0.013	0.042	0.004	-	0.012	0.003	0.004	0.001	-	99.65
Primary FCT-2		64.70	32.32	1.438	0.194	0.025	0.051	0.053	0.005	0.005	0.021	0.046	-	0.004	-	98.85
Primary FCT-2		65.07	33.02	1.456	0.267	0.026	0.068	0.091	0.011	0.002	0.009	0.007	0.023	-	-	100.06
Primary FCT-3	Core	65.71	32.54	1.428	0.124	0.030	0.058	0.054	0.010	0.008	0.006	0.005	0.015	0.007	-	99.99
Primary FCT-3		65.05	32.94	1.336	0.099	0.019	0.048	0.036	0.001	-	0.026	0.000	0.001	-	-	99.55
Primary FCT-4	Core	65.92	32.79	1.386	0.131	0.014	0.025	0.073	0.002	0.004	0.026	0.018	-	0.000	-	100.39
Primary FCT-4		64.84	32.88	1.500	0.085	0.016	0.042	0.058	0.004	0.003	0.013	0.003	0.013	0.002	-	99.46
Primary FCT-5	Core	65.19	32.15	0.829	0.488	0.169	0.163	0.192	0.007	0.003	0.062	0.011	0.024	-	-	99.29
Primary FCT-5		67.37	31.19	1.400	0.057	0.014	0.039	0.045	0.007	-	0.031	0.009	0.003	0.004	0.005	100.18
Primary FCT-5		66.80	31.87	1.268	0.072	0.011	0.044	0.031	0.008	0.009	0.012	0.017	-	0.003	0.002	100.15
Primary FCT-6	Core	66.20	32.71	1.468	0.028	0.004	0.018	0.026	0.008	-	-	0.031	0.003	0.003	0.001	100.50
Primary FCT-6		65.26	33.43	1.314	0.120	0.028	0.046	0.038	-	0.000	0.022	0.038	0.001	-	-	100.30
Primary FCT-7	Core	66.03	32.58	0.980	0.268	0.027	0.018	0.052	0.002	-	0.006	0.013	-	0.002	-	99.97
Primary FCT-7		65.95	32.72	0.985	0.081	0.007	0.014	0.092	0.007	0.001	0.008	0.012	0.017	-	-	99.90
Primary FCT-7		65.52	33.34	1.414	0.074	0.032	0.044	0.050	0.004	-	0.026	-	0.020	-	-	100.52
Primary FCT-8	Core	66.22	32.62	1.320	0.134	0.034	0.061	0.054	0.003	-	0.043	-	0.010	0.004	-	100.50
Primary FCT-9	Core	66.36	32.80	0.977	0.151	0.026	0.027	0.090	0.007	0.007	0.028	0.003	0.011	-	-	100.49
Primary FCT-9		65.35	33.49	1.123	0.128	0.048	0.062	0.088	0.009	-	0.038	0.019	0.032	-	-	100.39
Primary FCT-10	Core	66.78	32.71	0.938	0.059	-	0.012	0.055	0.003	0.000	0.007	-	-	0.008	0.002	100.57
Primary FCT-10		66.42	32.68	0.944	0.170	0.004	-	0.075	0.002	-	0.046	0.003	-	0.003	0.003	100.35
Primary FCT-10		66.48	32.79	1.196	0.078	0.001	0.014	0.040	0.003	-	0.023	0.006	0.020	0.002	0.002	100.66
Primary FCT-10		66.00	32.61	1.166	0.100	0.010	0.011	0.045	0.004	0.001	0.019	-	0.005	0.000	-	99.97
Primary FCT-10		65.72	32.53	1.195	0.077	0.005	0.006	0.043	0.007	0.002	0.013	-	-	0.007	0.000	99.60
Primary FCT-11	Core	66.94	32.29	0.926	0.090	0.001	0.010	0.097	0.004	-	0.018	-	0.000	-	0.001	100.38
Primary FCT-11		65.50	33.35	1.282	0.083	0.009	0.049	0.038	0.008	-	-	-	0.024	0.002	-	100.35
Primary FCT-12	Core	66.69	32.43	1.427	0.037	0.005	0.026	0.047	0.006	-	-	0.030	0.018	-	0.000	100.71
Primary FCT-12		65.65	32.80	1.421	0.026	0.016	0.027	0.041	0.000	0.003	0.019	-	-	0.004	-	100.01
Primary FCT-13	Core	66.61	32.02	1.176	0.208	0.013	0.020	0.046	0.012	-	0.032	-	0.016	0.004	-	100.16
Primary FCT-13		66.11	32.54	1.331	0.094	0.024	0.051	0.025	0.001	-	-	0.027	0.009	-	-	100.21
Primary FCT-14	Core	67.02	32.00	1.179	0.142	0.014	0.030	0.071	0.007	0.001	0.017	0.005	0.038	0.003	0.000	100.53
Primary FCT-14		66.81	31.61	1.415	0.052	0.020	0.050	0.045	-	0.001	0.031	0.011	0.026	0.004	-	100.08
Primary FCT-15	Core	66.27	31.67	1.358	0.204	0.024	0.050	0.144	0.004	-	0.014	-	0.007	-	-	99.74
Primary FCT-15		66.70	31.67	1.394	0.039	0.018	0.040	0.046	0.007	0.000	0.030	0.000	-	0.002	0.001	99.95
Primary FCT-16	Core	66.22	31.83	1.117	0.187	0.018	0.021	0.041	0.007	-	-	-	0.029	0.001	-	99.48
Primary FCT-16		65.78	32.16	1.360	0.108	0.008	0.035	0.137	0.009	-	0.025	0.001	0.021	0.002	-	99.65
Primary FCT-17	Core	66.77	31.84	1.362	0.088	0.008	0.036	0.035	0.009	-	0.040	-	0.015	0.000	0.003	100.21
Primary FCT-17		66.03	32.69	1.325	0.053	0.004	0.032	0.022	0.002	-	0.001	0.024	0.006	0.007	0.002	100.20
Primary FCT-18	Core	66.29	31.56	1.469	0.099	0.013	0.054	0.060	0.005	0.008	-	0.004	-	0.004	-	99.57
Primary FCT-18		65.45	32.51	1.413	0.073	0.027	0.033	0.036	0.004	-	0.023	0.023	0.002	0.004	0.002	99.59
Primary FCT-19	Core	66.76	31.68	0.973	0.066	-	0.009	0.069	0.003	0.002	0.009	-	0.019	-	-	99.59
Primary FCT-20	Core	66.52	32.15	1.059	0.201	0.028	0.032	0.056	0.006	-	0.034	-	0.007	0.008	-	100.11
ZF-66-1	Core	65.93	31.83	1.368	0.075	0.033	0.055	0.041	0.008	0.005	0.044	-	-	0.003	-	99.39
ZF-66-1		66.55	32.61	1.289	0.071	0.017	0.043	0.035	0.005	-	0.033	-	0.008	0.006	-	100.66
ZF-66-2	Core	66.02	31.95	1.366	0.119	0.035	0.050	0.025	0.007	-	0.005	-	0.007	-	-	99.58
ZF-66-2		65.02	32.27	1.239	0.167	0.024	0.041	0.043	0.005	0.007	0.020	-	-	0.003	0.003	98.84
ZF-66-2		66.78	31.19	1.331	0.051	0.015	0.032	0.024	0.013	0.003	0.033	0.013	-	0.010	0.001	99.49
ZF-66-3	Core	65.28	31.73	1.009	0.698	0.118	0.117	0.125	-	0.002	0.039	-	0.035	0.002	-	99.15
ZF-66-3		64.79	32.67	1.180	0.172	0.048	0.068	0.447	0.004	0.470	0.029	0.003	-	0.002	-	99.89
ZF-66-3		65.77	32.96	1.196	0.207	0.094	0.092	0.084	0.003	-	0.036	-	0.022	0.002	-	100.47
ZF-66-3		65.24	32.36	1.099	0.316	0.048	0.060	0.085	0.005	0.016	0.028	-	0.011	0.018	0.001	99.28
ZF-66-4	Core	66.19	32.10	0.965	0.325	0.044	0.070	0.185	0.009	0.001	0.037	-	0.031	0.005	-	99.95
ZF-66-4		65.12	32.14	1.036	0.518	0.074	0.067	0.097	0.011	0.005	0.055	0.001	0.011	-	-	99.13
ZF-66-5	Core	66.40	31.69	0.890	0.189	0.021	0.032	0.117	0.011	-	0.014	0.008	0.024	0.001	0.002	99.40
ZF-66-5		65.12	34.74	1.286	0.008	0.014	0.047	0.053	0.010	0.010	0.014	0.013	-	0.001	-	101.32
ZF-66-5		66.03	32.78	1.256	0.051	0.002	0.026	0.064	0.005	-	-	0.017	0.008	0.000	0.001	100.24
ZF-66-5		64.96	33.02	1.297	0.155	0.032	0.061	0.020	0.007	0.000	0.001	0.023	0.016	0.002	-	99.59
ZF-66-6	Core	66.01	32.33	1.004	0.315	0.024	0.036	0.102	0.006	0.004	0.016	0.011	0.002	-	0.003	99.86
ZF-66-7	Core	66.34	32.35	0.954	0.138	0.013	0.010	0.072	0.012	-	0.012	0.016	0.014	0.004	0.002	99.93
ZF-66-7		65.85	32.69	1.389	0.015	0.008	0.012	0.030	0.015	-	0.033	-	-	-	0.002	100.04
ZF-66-7a	Core	65.73	32.30	1.182	0.363	0.034	0.046	0.082	0.009	-	0.003	0.019	-	0.000	-	99.77
ZF-66-7a		65.71	32.05	1.389	0.061	0.011	0.046	0.043	0.010	0.004	0.025	-	0.001	0.004	-	99.36
ZF-66-7a		68.90	29.74	1.477	0.053	0.004	0.024	0.064	0.013	0.015	0.043	-	0.026	0.000	0.022	100.38
ZF-66-8	Core	66.44	31.89	1.201	0.199	0.010	0.017	0.047	0.005	-	0.007	-	0.012	0.000	-	99.82
ZF-66-8		65.79	32.70	1.159	0.085	0.003	0.019	0.058	0.010	0.005	0.022	-	0.020	0.001	0.000	99.87
ZF-67-1	Core	65.95	32.28	1.382	0.224	0.035	0.041	0.066	0.005	-	0.011	0.007	0.043	-	-	100.05
ZF-67-1		65.23	32.20	1.305	0.048	0.010	0.036	0.042	0.011	-	0.024	0.025	-	0.005	0.002	98.93
ZF-67-2	Core	66.02	31.83	1.148	0.220	0.023	0.019	0.078	0.004	-	0.032	0.031	0.013	0.001	0.001	99.42
ZF-67-2		65.38	32.53	1.361	0.100	0.008	0.039	0.115	0.006	-	0.002	0.012	0.002	0.001	0.001	99.56
ZF-67-3	Core	64.94	31.17	0.860	0.743	0.182	0.183	0.176	0.006	0.014	0.038	0.006	0.057	-	-	98.38
ZF-67-3		61.12	32.36	0.885	0.335	0.056	0.076	0.163	0.021	0.041	0.038	0.021	0.008	-	0.069	95.19
ZF-67-4	Core	65.72	32.00	1.051	0.202	0.020	0.014	0.057	0.003	0.007	-	0.003	0.020	0.007	0.005	99.11
ZF-67-4		65.13	32.49	1.458	0.156	0.040	0.066	0.045	0.005	0.012	-	-	0.017	-	-	99.42
ZF-67-4		66.90	30.46	1.509	0.036	0.005	0.027	0.042	0.008	-	0.025	0.011	0.004	0.004	0.045	99.07
ZF-67-5	Core	65.93	31.76	1.014	0.195	0.022	0.023	0.089	0.004	0.015	0.030	0.004	0.000	-	-	99.08
ZF-67-5		65.93	31.13	1.537	0.113	0.028	0.057	0.055	-	-	-	0.013	-	-	0.000	98.86

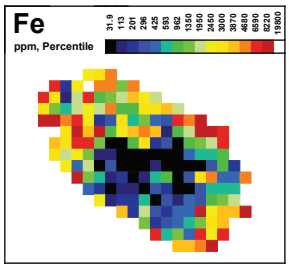
sample		ZrO_2 (wt%)	SiO_2 (wt%)	HfO_2 (wt%)	Y_2O_3 (wt%)	ThO_2 (wt%)	UO_2 (wt%)	P_2O_5 (wt%)	MgO (wt%)	CaO (wt%)	Ce_2O3 (wt%)	La_2O_3 (wt%)	Lu_2O_3 (wt%)	Na_2O (wt%)	K_2O (wt%)	Total
ZF-67-5		66.07	31.50	1.106	0.086	0.009	0.006	0.050	0.004	0.004	0.043	-	-	0.005	0.003	98.89
ZF-67-6	Core	65.31	31.94	1.360	0.099	0.029	0.045	0.034	0.001	0.015	0.028	0.003	0.017	-	-	98.88
ZF-67-6		65.00	31.76	1.312	0.059	0.013	0.040	0.067	0.012	0.009	0.028	-	-	0.000	-	98.30
ZF-67-6		64.77	31.78	1.333	0.064	0.015	0.039	0.046	0.010	0.004	0.034	0.011	-	-	-	98.11
ZF-67-7	Core	65.18	31.71	1.320	0.143	0.031	0.058	0.025	0.010	0.015	0.001	0.027	-	0.001	-	98.52
ZF-67-7		64.76	32.79	1.321	0.053	0.008	0.035	0.042	0.011	-	0.015	0.035	0.017	-	0.001	99.09
ZF-67-7		65.50	31.45	1.451	0.016	0.000	0.023	0.045	0.011	0.014	0.014	0.001	-	0.004	0.009	98.54
ZF-68-1	Core	65.77	31.96	1.051	0.121	0.011	0.014	0.099	0.007	0.009	0.006	0.016	-	0.005	-	99.07
ZF-68-1		64.96	32.64	1.331	0.119	0.022	0.044	0.022	0.005	0.005	0.039	0.020	-	0.000	-	99.21
ZF-68-1		65.31	32.42	1.044	0.310	0.025	0.045	0.081	0.002	-	0.017	0.026	0.001	0.001	0.001	99.28
ZF-68-1		66.95	31.17	1.411	0.084	0.020	0.036	0.037	0.008	-	0.030	-	0.004	-	-	99.75
ZF-68-2	Core	64.95	31.82	1.069	0.295	0.085	0.085	0.148	0.008	0.025	0.050	-	0.027	0.015	-	98.58
ZF-68-2		66.22	32.72	0.932	0.281	0.029	0.033	0.076	0.009	0.002	0.026	0.012	-	-	0.001	100.35
ZF-68-2		65.61	32.28	1.323	0.072	0.020	0.050	0.037	0.012	0.001	0.012	-	-	0.004	-	99.42
ZF-68-2		66.42	31.72	1.426	0.057	0.014	0.034	0.055	0.004	0.003	0.023	-	0.019	0.001	-	99.77
ZF-68-3	Core	65.37	32.13	1.521	0.079	0.023	0.063	0.036	0.007	0.015	0.018	0.002	-	-	0.001	99.27
ZF-68-3		65.08	32.44	1.294	0.031	0.006	0.030	0.027	0.009	-	0.036	-	0.018	0.005	0.000	98.97
ZF-68-4	Core	65.76	32.62	0.961	0.344	0.031	0.040	0.086	0.006	0.004	0.018	0.003	-	0.002	-	99.88
ZF-68-4		65.60	31.81	1.194	0.136	0.016	0.032	0.049	0.005	-	0.012	0.009	0.017	0.002	0.000	98.88
ZF-68-5	Core	65.16	31.96	1.228	0.333	0.032	0.045	0.081	0.010	0.002	0.022	0.031	0.018	0.004	0.003	98.93
ZF-68-5		64.60	33.02	1.460	0.040	0.006	0.021	0.046	0.005	-	0.043	0.021	0.021	0.003	0.003	99.28
ZF-68-5		65.14	32.33	1.352	0.063	0.008	0.036	0.064	0.009	0.001	0.026	0.026	0.002	0.002	-	99.06
ZF-69-1	Core	65.08	31.96	1.482	0.156	0.035	0.050	0.049	0.004	0.000	-	0.010	0.014	-	-	98.84
ZF-69-1		64.07	33.30	1.304	0.122	0.036	0.048	0.037	0.005	0.002	0.002	-	0.013	0.003	-	98.94
ZF-69-1		67.55	30.32	1.405	0.105	0.013	0.029	0.104	0.008	0.014	0.010	-	-	0.048	0.002	99.61
ZF-69-2	Core	65.14	31.91	1.485	0.074	0.015	0.045	0.077	0.002	0.007	-	0.004	0.013	0.008	-	98.78
ZF-69-2		65.47	32.07	1.434	0.063	0.007	0.045	0.075	-	-	0.032	-	0.008	-	-	99.20
ZF-69-2		65.03	31.48	1.387	0.038	0.012	0.049	0.051	0.003	-	0.028	-	0.010	-	0.001	98.08
ZF-69-2		65.34	31.92	1.347	0.070	0.012	0.048	0.041	0.005	-	0.022	-	-	0.004	-	98.81
ZF-69-2		65.14	32.32	1.351	0.037	0.002	0.028	0.050	0.007	0.006	0.033	0.016	0.002	0.005	-	99.00
ZF-69-2		54.10	30.22	0.848	5.261	0.031	0.046	2.699	0.044	0.031	0.010	-	0.007	0.044	0.004	93.35
ZF-69-2		65.01	32.01	1.386	0.030	-	0.020	0.045	0.010	0.001	0.018	-	0.001	0.005	-	98.54
ZF-69-2		65.46	31.70	1.395	0.081	0.021	0.052	0.038	0.012	0.000	0.053	-	-	0.004	-	98.82
ZF-69-3	Core	65.08	32.14	1.201	0.360	0.103	0.130	0.087	0.001	0.014	0.036	0.005	0.019	0.007	-	99.19
ZF-69-3		63.68	30.07	1.430	0.071	0.014	0.021	0.048	0.005	0.007	-	-	0.027	0.184	0.002	95.56
ZF-69-3		65.34	32.66	1.460	0.066	0.032	0.057	0.053	0.008	-	0.021	-	0.022	0.009	-	99.72
Zircon Std		66.51	32.31	0.666	0.092	0.003	0.015	0.026	0.004	0.002	0.023	0.008	0.015	0.003	0.004	99.69
Zircon Std		66.34	31.83	0.682	0.120	0.006	0.019	0.029	0.007	-	0.017	0.004	0.003	-	-	99.05
Zircon Std		66.26	31.98	0.671	0.141	0.011	0.010	0.028	0.004	0.000	0.002	0.016	0.002	-	0.002	99.12
ZF-69-4	Core	65.85	32.47	1.449	0.126	0.016	0.063	0.065	0.001	0.009	0.033	0.034	0.013	-	-	100.14
ZF-69-4		65.48	32.96	1.462	0.131	0.022	0.067	0.111	0.004	-	0.025	-	-	0.003	-	100.27
ZF-69-4		65.79	32.96	1.500	0.132	0.023	0.049	0.122	0.007	0.006	0.033	-	0.015	0.003	-	100.65
ZF-69-5	Core	65.92	31.88	1.144	0.214	0.014	0.023	0.056	0.004	-	0.032	0.027	-	-	-	99.32
ZF-69-5		65.44	31.90	1.166	0.114	0.006	0.029	0.122	0.010	0.001	0.043	-	0.015	-	0.001	98.85
ZF-69-5		68.19	29.70	1.250	0.215	0.022	0.017	0.078	0.005	0.019	0.019	0.002	0.012	0.006	-	99.54
ZF-69-6	Core	65.57	31.87	1.541	0.084	0.034	0.079	0.031	0.010	0.001	0.023	0.017	0.022	0.009	-	99.28
ZF-69-6		68.36	30.66	1.425	0.050	0.002	0.035	0.036	0.020	-	0.011	-	0.008	0.149	0.003	100.76
ZF-69-6		66.61	31.42	1.310	0.049	0.028	0.059	0.045	0.002	-	0.032	0.031	0.016	0.002	-	99.61
ZF-69-7	Core	66.47	32.06	1.165	0.034	0.003	0.008	0.034	0.003	-	0.014	0.006	-	0.005	0.004	99.81
ZF-69-7		65.59	32.31	1.448	0.070	0.008	0.023	0.030	0.003	-	0.047	0.020	0.003	0.000	-	99.56
ZF-69-7		65.64	32.50	1.373	0.046	0.012	0.042	0.053	0.005	-	0.008	0.032	-	0.003	-	99.71
ZF-69-8	Core	65.24	31.40	1.277	0.185	0.058	0.079	0.047	0.005	-	0.014	-	-	-	-	98.30
ZF-69-8		65.18	31.76	1.265	0.085	0.017	0.045	0.074	0.002	0.002	0.021	0.015	-	0.003	-	98.47
ZF-69-8		61.54	31.35	1.260	0.344	0.007	0.029	0.236	0.017	0.002	0.005	-	-	0.009	-	94.81
ZF-69-8		65.23	31.85	1.341	0.241	0.029	0.052	0.107	0.008	0.002	0.038	-	0.002	0.003	-	98.90
ZF-69-8		65.03	31.74	1.339	0.112	0.022	0.043	0.021	0.008	0.009	0.015	-	-	0.006	-	98.34
ZF-69-8		65.69	32.08	1.358	0.047	0.008	0.033	0.045	0.017	0.008	0.017	0.025	0.015	0.002	-	99.34
ZF-69-8		65.73	31.78	1.349	0.098	0.016	0.044	0.042	0.002	-	0.003	0.015	0.008	-	-	99.09
ZF-69-8		65.48	31.96	1.333	0.080	0.023	0.038	0.033	0.001	0.004	0.014	0.016	0.017	0.007	0.003	99.02
ZF-69-8		65.30	31.38	1.309	0.163	0.033	0.056	0.037	0.010	0.004	0.036	0.012	0.001	0.000	-	98.34
ZF-69-8		65.97	32.00	1.306	0.180	0.061	0.071	0.048	0.000	-	0.002	-	0.038	-	-	99.68
ZF-69-8		66.37	31.00	1.422	0.031	0.008	0.028	0.026	0.008	-	0.043	-	0.007	-	0.003	98.95
ZF-69-9	Core	65.77	32.03	1.362	0.098	0.037	0.054	0.041	0.007	0.002	0.016	-	0.013	0.006	-	99.44
ZF-69-9		65.26	32.80	1.296	0.074	0.021	0.044	0.034	0.004	0.005	0.018	0.004	0.027	-	-	99.59
ZF-69-9		66.54	31.69	1.338	0.044	0.015	0.034	0.043	0.009	0.001	0.035	-	0.015	0.015	-	99.78
ZF-69-10	Core	65.81	32.22	1.404	0.142	0.018	0.054	0.062	0.003	-	0.026	-	0.025	0.002	-	99.77
ZF-69-10		65.10	32.98	1.455	0.100	0.019	0.051	0.046	0.012	-	0.025	-	0.009	0.006	-	99.81
ZF-69-10		67.37	31.51	1.363	0.069	0.026	0.040	0.041	0.009	-	0.031	0.016	0.011	0.002	0.001	100.49
ZF-69-11	Core	65.42	32.09	1.520	0.168	0.032	0.064	0.050	0.004	0.004	0.017	0.034	0.019	0.002	-	99.42
ZF-69-11		65.27	32.75	1.294	0.137	0.037	0.061	0.041	0.009	-	0.025	0.014	0.008	0.008	-	99.65
ZF-69-11		65.61	32.75	1.401	0.033	0.010	0.028	0.042	-	0.005	-	-	0.015	0.006	0.001	99.91
ZF-69-12	Core	65.40	32.03	1.478	0.250	0.031	0.069	0.088	0.006	-	0.041	0.017	0.013	0.003	-	99.43
ZF-69-12		65.97	32.28	1.338	0.057	0.013	0.047	0.060	-	-	0.012	-	0.001	-	-	99.77
ZF-69-12		64.88	32.30	1.363	0.116	0.012	0.046	0.054	0.002	-	0.017	-	0.021	0.002	-	98.81
ZF-69-13	Core	65.66	32.27	1.379	0.136	0.039	0.057	0.049	0.005	-	-	0.011	-	-	-	99.60
ZF-69-13		65.82	32.62	1.341	0.030	0.009	0.041	0.064	0.008	0.001	0.024	0.025	0.011	0.006	-	99.99
ZF-69-13		66.79	31.27	1.371	0.063	0.012	0.036	0.053	0.012	0.005	0.036	-	0.020	0.073	0.001	99.74
ZF-69-14	Core	66.01	32.59	1.013	0.139	0.021	0.030	0.060	0.010	0.002	0.037	-	0.013	0.005	-	99.93
ZF-69-14		64.85	33.21	1.444	0.192	0.039	0.075	0.053	0.007	-	0.024	-	0.014	-	-	99.91
ZF-69-14		67.39	31.47	1.392	0.138	0.026	0.035	0.027	0.010	-	0.018	0.031	0.024	0.003	-	100.57
ZF-68-4T		66.63	32.21	1.394	0.038	0.020	0.041	0.043	0.011	-	-	0.009	-	0.003	-	100.40
ZF-68-4T		66.17	32.01	1.361	0.084	0.013	0.046	0.053	0.004	-	0.030	-	-	0.002	0.002	99.78

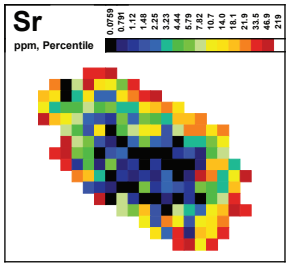
sample	ZrO_2 (wt%)	SiO_2 (wt%)	HfO_2 (wt%)	Y_2O_3 (wt%)	ThO_2 (wt%)	UO_2 (wt%)	P_2O_5 (wt%)	MgO (wt%)	CaO (wt%)	Ce_2O3 (wt%)	La_2O_3 (wt%)	Lu_2O_3 (wt%)	Na_2O (wt%)	K_2O (wt%)	Total
ZF-68-4T	66.21	32.42	1.092	0.098	0.009	0.014	0.077	0.009	-	0.014	0.033	-	0.001	0.002	99.98
ZF-68-4T	66.14	32.11	1.024	0.154	0.008	0.022	0.108	0.006	-	0.007	0.038	0.008	-	0.004	99.63
ZF-68-4T	65.83	32.02	0.958	0.236	0.008	0.024	0.102	0.006	0.000	0.017	-	0.014	0.000	-	99.21
ZF-68-4T	65.87	32.61	1.065	0.315	0.027	0.030	0.070	0.002	-	0.035	0.010	0.026	0.002	-	100.06
ZF-68-4T	65.50	32.19	1.047	0.351	0.042	0.046	0.068	0.003	0.001	0.021	0.021	0.005	0.003	0.004	99.30
ZF-68-4T	65.63	32.43	1.106	0.324	0.031	0.031	0.065	0.005	0.005	0.022	-	0.017	0.004	-	99.67
ZF-68-4T	65.68	32.49	1.347	0.045	0.007	0.033	0.041	0.008	0.014	0.041	-	-	0.005	0.001	99.71
ZF-68-4T	65.24	32.61	1.320	0.086	0.023	0.052	0.038	0.007	0.006	0.030	0.010	0.002	0.002	-	99.43
ZF-67-2T	67.42	30.11	1.356	0.106	0.010	0.016	0.067	0.013	0.018	0.030	0.023	0.003	0.008	0.034	99.21
ZF-67-2T	66.34	32.12	1.175	0.236	0.024	0.030	0.068	0.004	0.000	0.011	-	0.006	0.001	0.002	100.02
ZF-67-2T	66.05	31.72	1.175	0.230	0.017	0.023	0.048	0.007	-	-	0.006	0.019	-	0.000	99.29
ZF-67-2T	64.95	31.86	1.104	0.217	0.018	0.036	0.058	0.013	0.032	0.016	-	0.011	0.002	0.004	98.32
ZF-67-2T	65.74	32.58	1.129	0.231	0.019	0.038	0.056	0.012	0.008	0.014	-	0.007	-	0.004	99.84
ZF-67-2T	66.12	32.30	1.159	0.164	0.025	0.015	0.076	0.007	-	0.040	0.029	0.020	-	0.001	99.96
ZF-67-2T	65.93	32.37	1.169	0.054	0.009	0.019	0.115	0.009	0.000	0.019	-	0.021	-	0.002	99.72
ZF-67-2T	64.47	34.00	1.460	0.082	0.017	0.052	0.074	0.008	-	0.033	0.006	-	0.006	-	100.21
ZF-66-4T	65.04	31.76	1.028	0.741	0.124	0.102	0.128	0.002	-	0.058	-	0.027	-	-	99.02
ZF-66-4T	63.98	31.72	0.897	0.525	0.080	0.102	0.265	0.260	0.011	0.057	-	0.003	-	0.127	98.03
ZF-66-4T	65.77	31.69	0.967	0.278	0.040	0.055	0.192	0.009	-	0.020	0.026	0.027	-	-	99.07
ZF-66-4T	64.70	31.71	0.982	0.666	0.112	0.101	0.146	0.004	-	0.083	-	0.027	0.003	-	98.54
ZF-66-4T	65.03	32.05	1.106	0.343	0.041	0.041	0.083	0.001	0.005	0.039	0.017	0.004	-	-	98.76
Primary FCT-3T	67.18	31.68	1.376	0.099	0.019	0.043	0.033	0.004	-	0.000	-	0.013	0.004	-	100.46
Primary FCT-3T	66.20	32.08	1.299	0.094	0.016	0.044	0.044	0.004	0.004	0.032	-	0.006	0.004	-	99.83
Primary FCT-3T	66.15	31.91	1.356	0.084	0.015	0.048	0.039	0.008	-	0.052	-	0.011	-	-	99.67
Primary FCT-3T	65.97	32.01	1.522	0.050	0.007	0.031	0.024	0.003	0.010	0.029	-	0.010	-	-	99.67
Primary FCT-3T	65.77	32.09	1.414	0.101	0.017	0.062	0.046	0.002	0.002	0.010	0.020	0.004	0.002	-	99.54
Primary FCT-3T	65.62	32.33	1.460	0.063	0.027	0.052	0.056	0.003	-	0.023	0.017	0.007	0.006	-	99.66
Primary FCT-3T	65.59	32.57	1.401	0.056	0.001	0.044	0.032	0.006	0.006	0.031	-	-	0.009	-	99.75
Primary FCT-3T	65.48	32.43	1.318	0.094	0.023	0.053	0.038	0.008	-	0.040	-	0.011	-	-	99.49
Primary FCT-3T	65.40	32.26	1.316	0.075	0.012	0.047	0.047	0.007	-	0.032	-	0.002	-	-	99.19
Primary FCT-3T	64.51	32.82	1.249	0.032	0.021	0.041	0.028	0.003	0.001	0.019	-	-	0.003	-	98.73
Zircon Std	66.54	32.26	0.670	0.103	0.004	0.005	0.029	0.008	0.000	0.006	0.001	-	-	-	99.63
Zircon Std	66.41	32.42	0.684	0.087	0.000	0.007	0.036	0.002	-	0.004	-	-	0.002	0.002	99.65
Zircon Std	66.47	32.27	0.661	0.125	0.000	-	0.031	0.003	0.000	0.018	-	0.020	-	-	99.60
Cambodian zircon	65.93	32.37	1.089	0.017	0.004	-	0.018	0.002	0.004	0.015	0.022	0.002	-	0.001	99.47
Cambodian zircon	65.96	32.04	1.105	-	-	0.004	0.036	0.008	-	0.041	-	0.009	-	0.000	99.21
Cambodian zircon	66.05	32.31	1.102	0.023	0.013	0.000	0.023	0.002	-	0.026	-	0.002	0.002	0.001	99.55

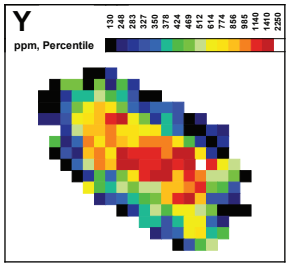
SI 5.2
Unaltered

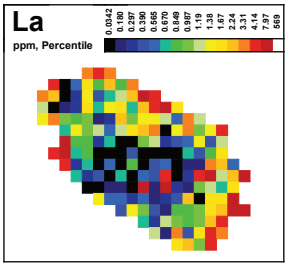


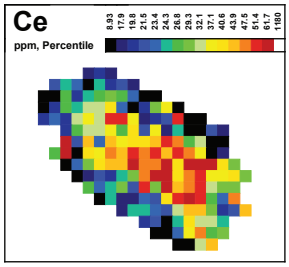


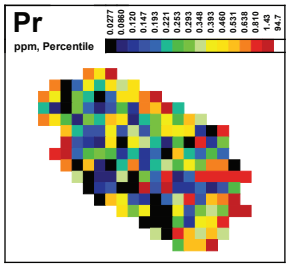


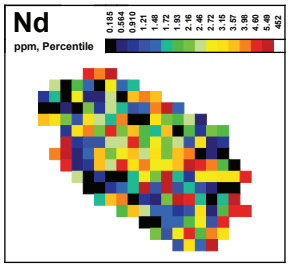


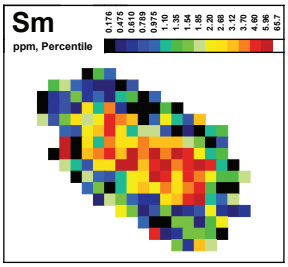


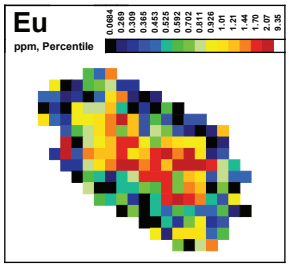


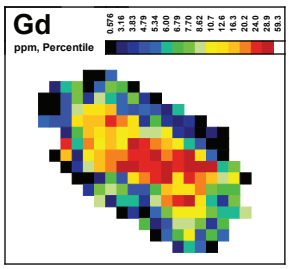


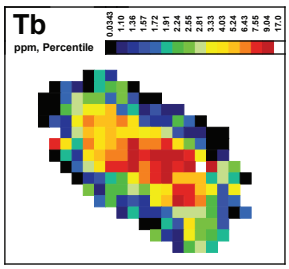


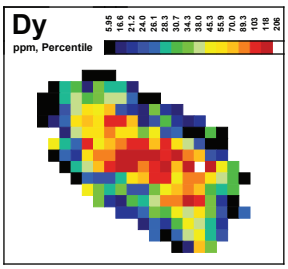


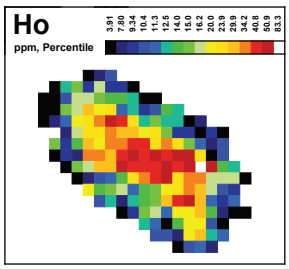


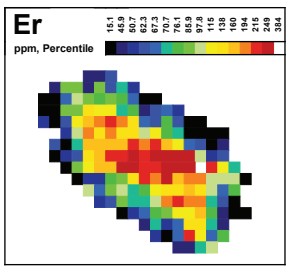


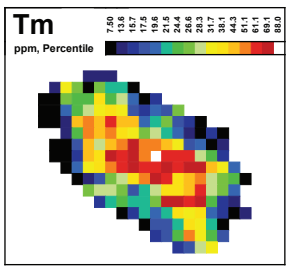


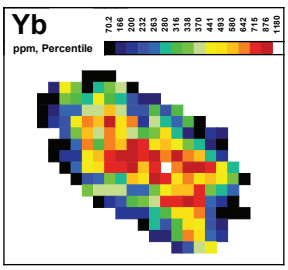


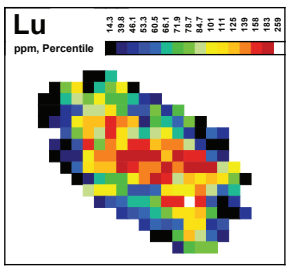


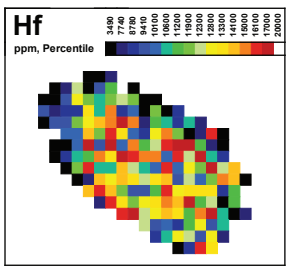


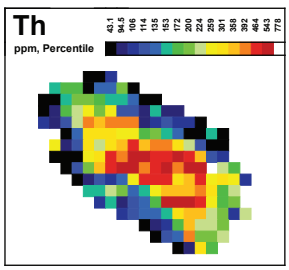


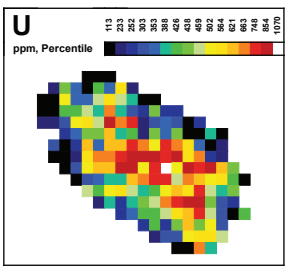


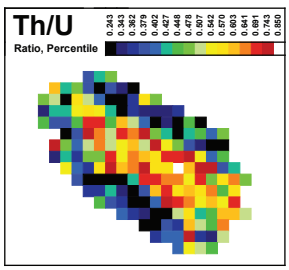


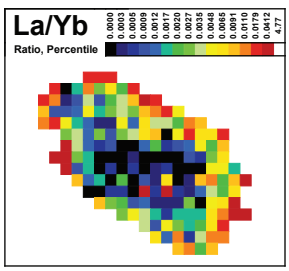


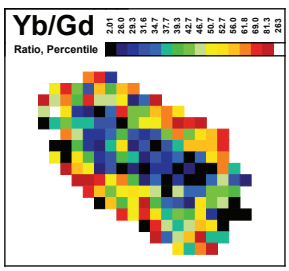


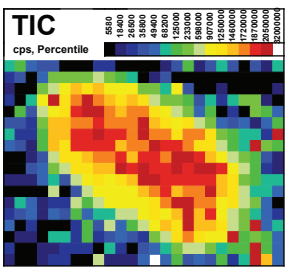












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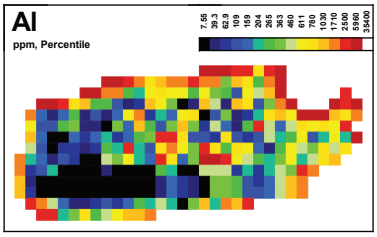

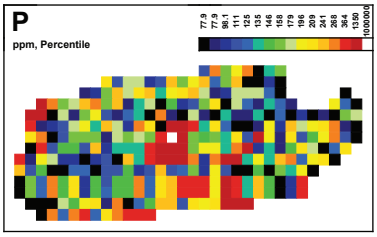

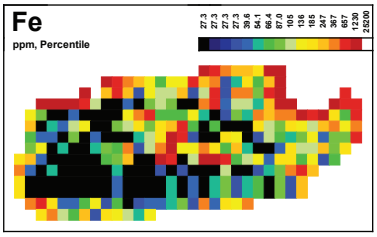

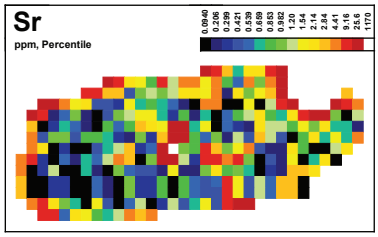

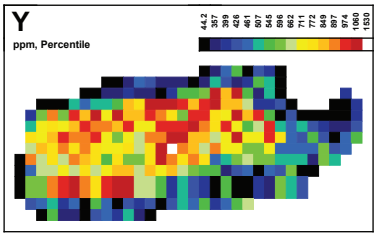

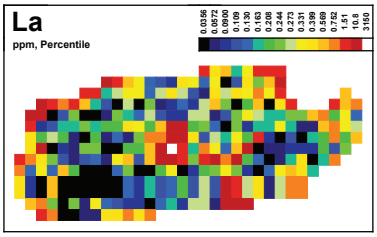

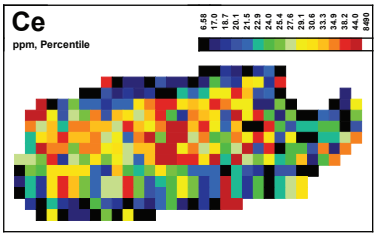

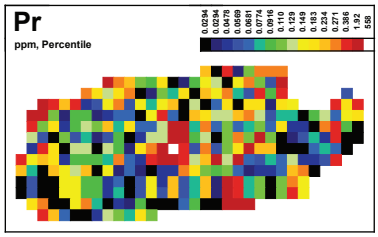

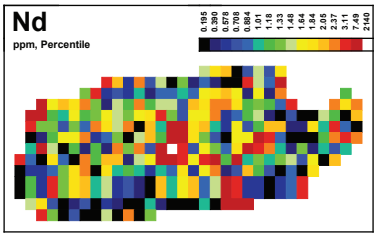

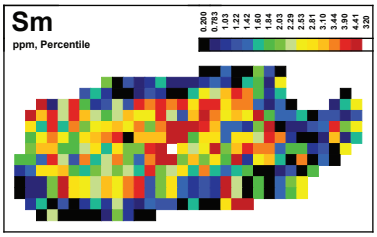

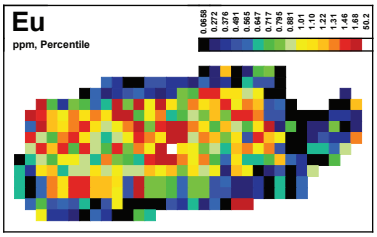

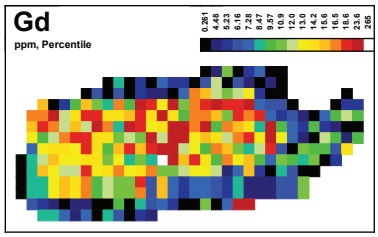

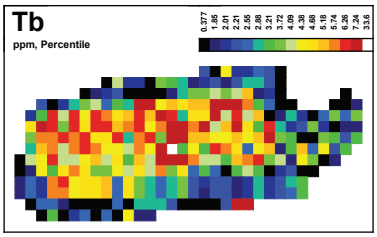

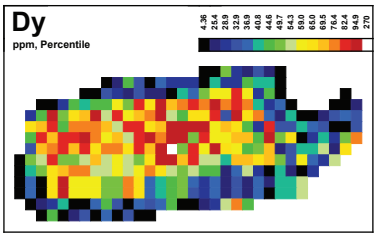

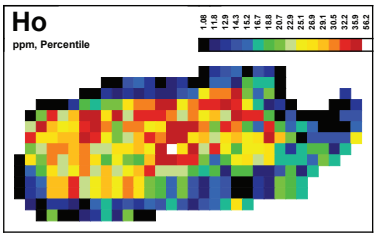

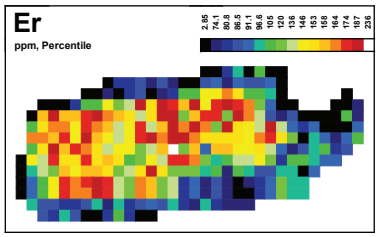

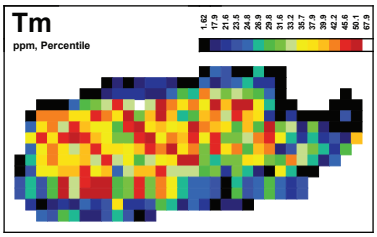

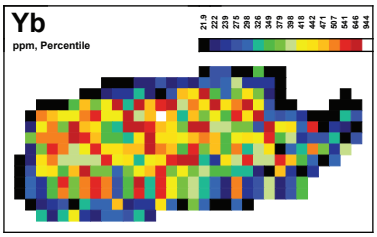

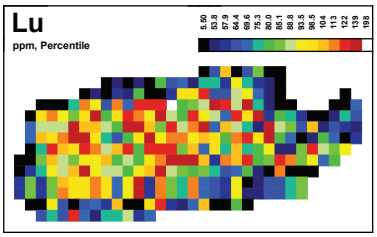

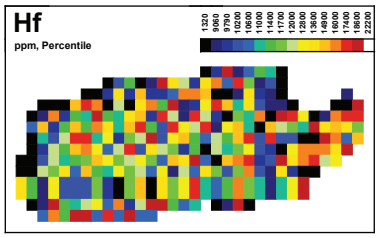

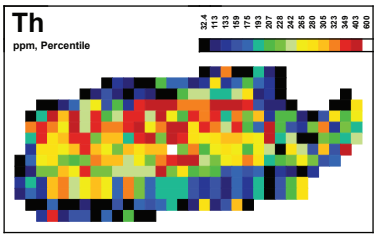

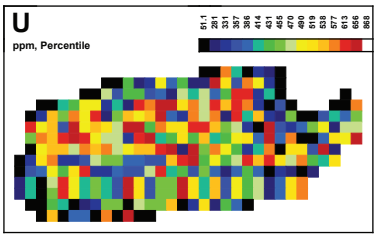

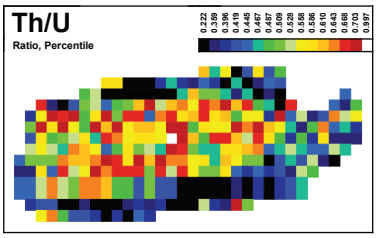

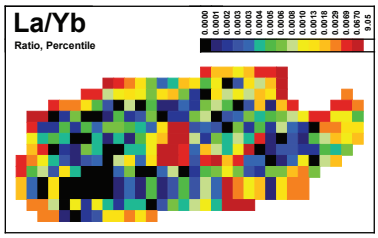

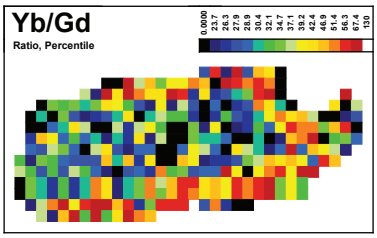

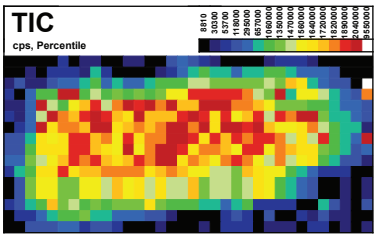

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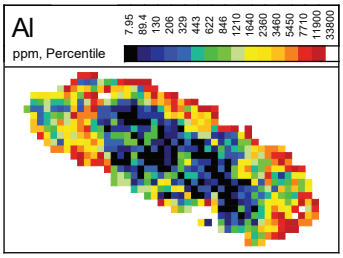

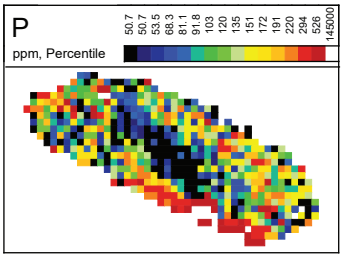

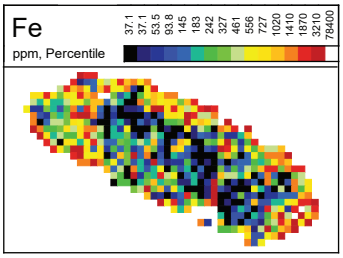

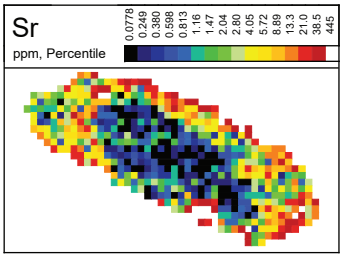

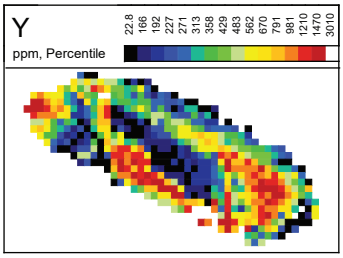

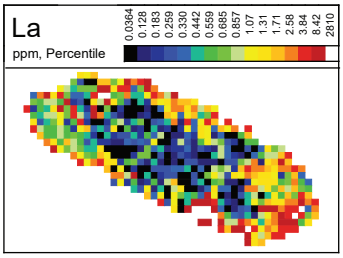

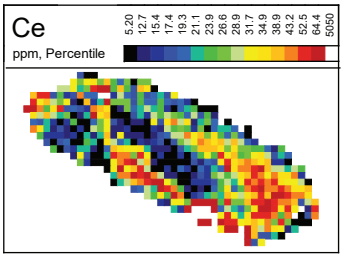

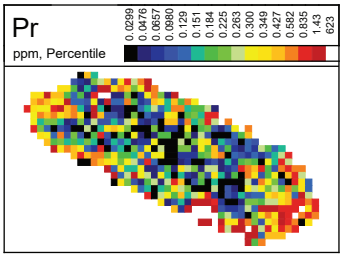

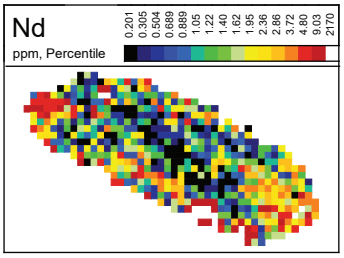

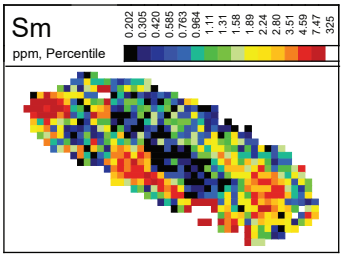

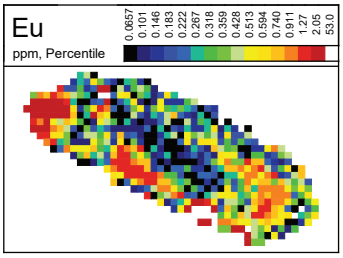

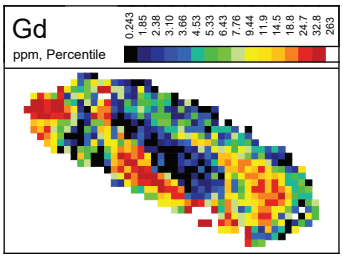

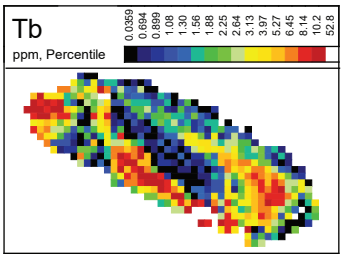

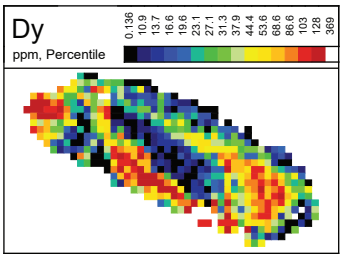

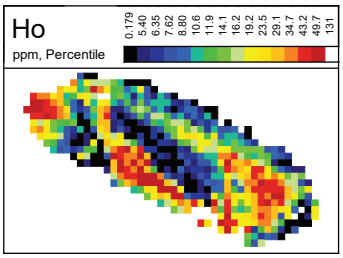

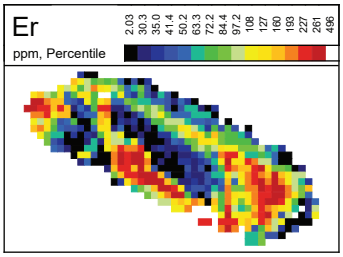

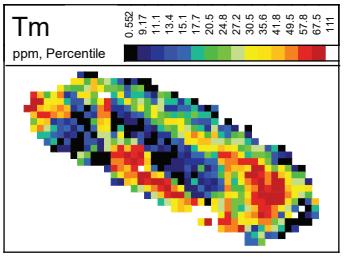

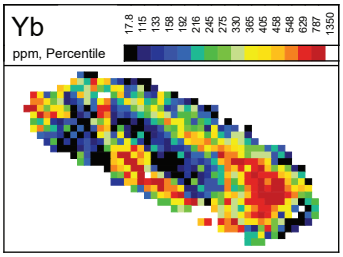

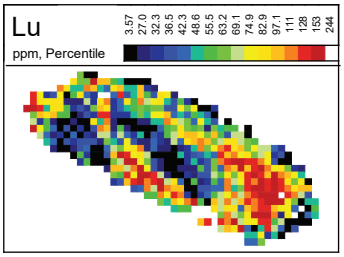

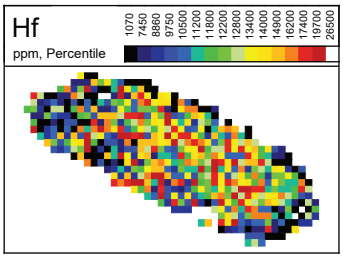

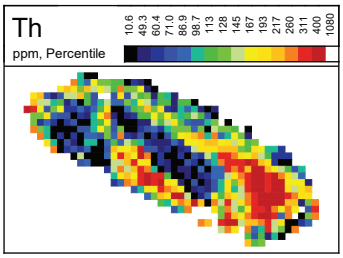

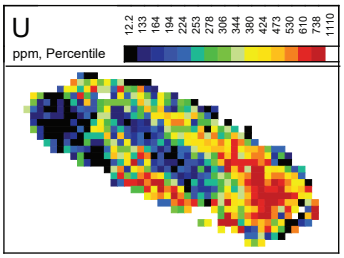

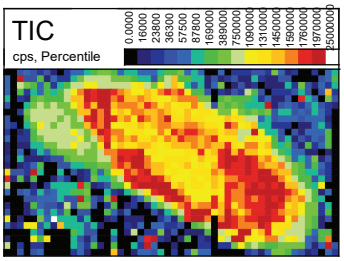

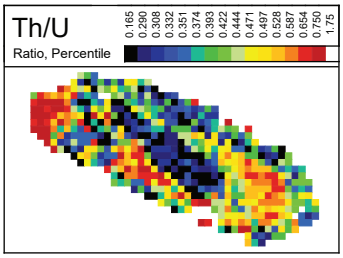

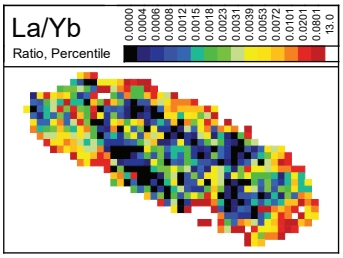

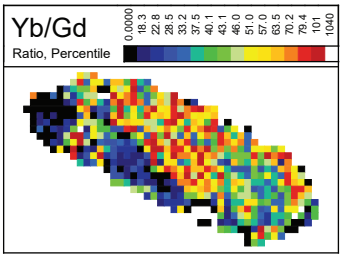

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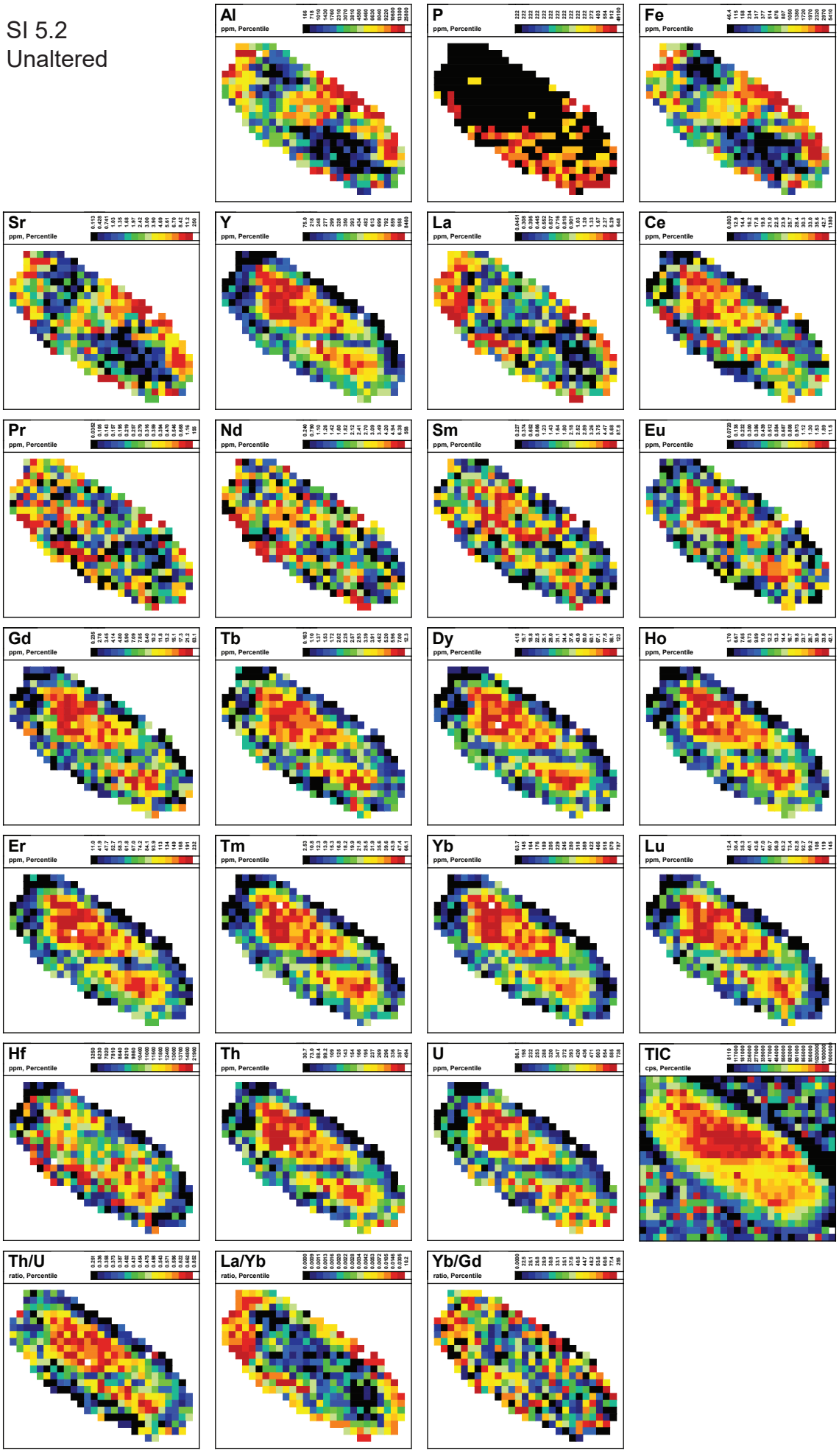

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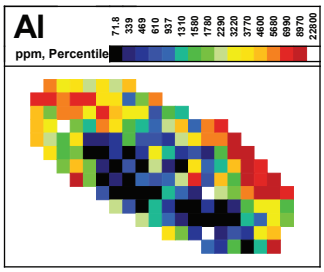
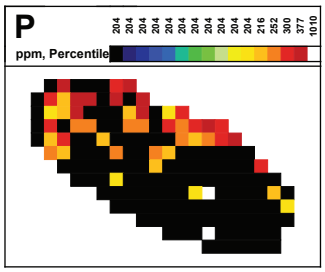
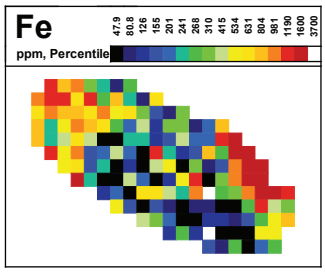
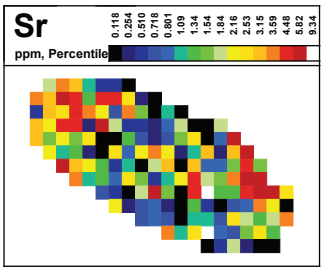
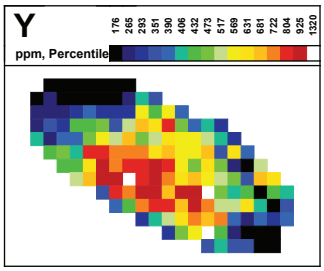
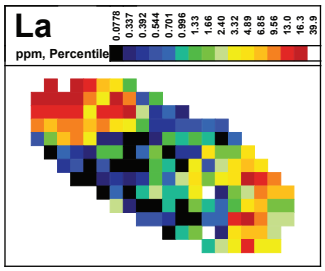


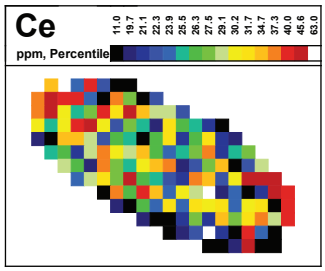


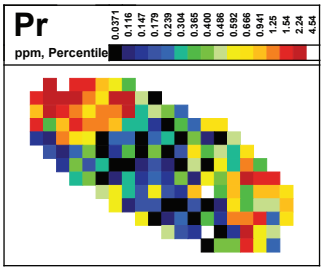


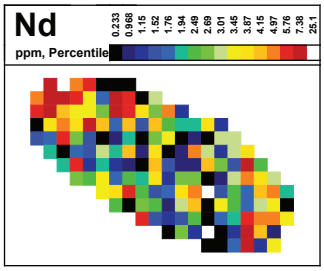


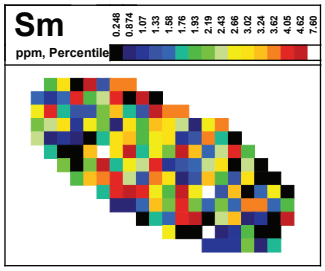


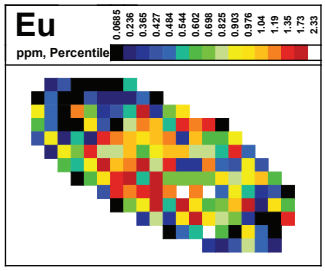


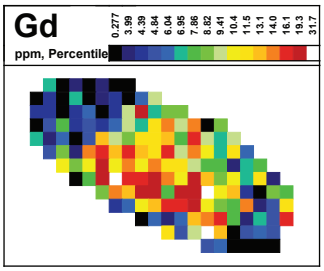


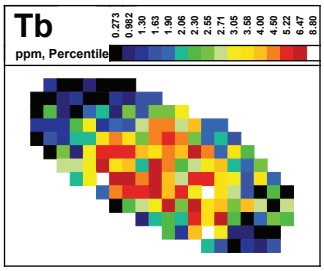


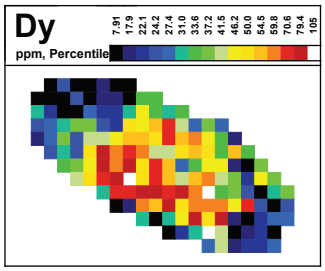


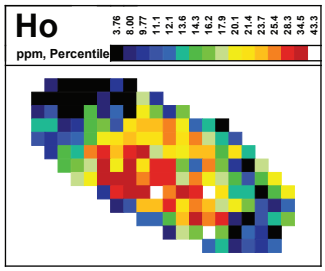


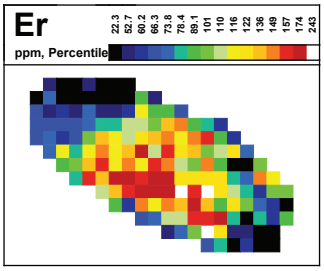


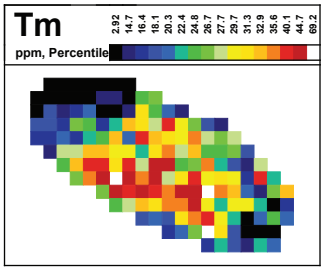


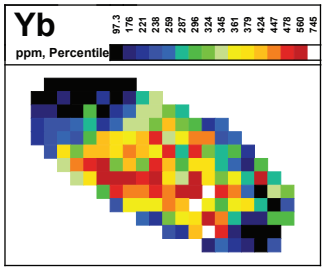


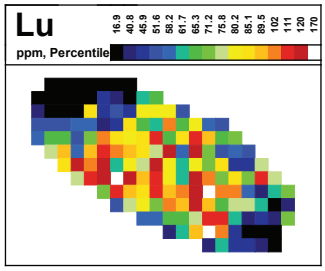


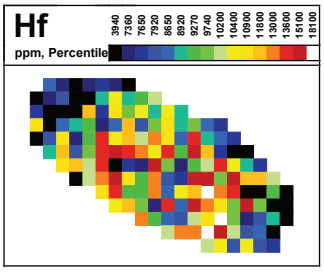


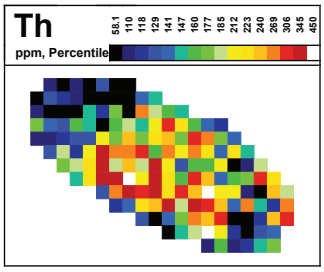


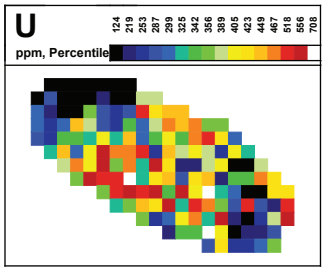


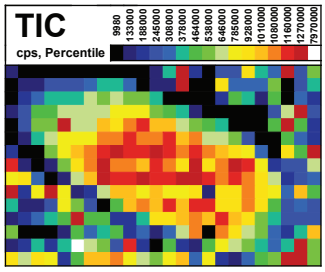


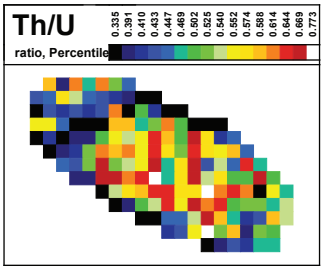


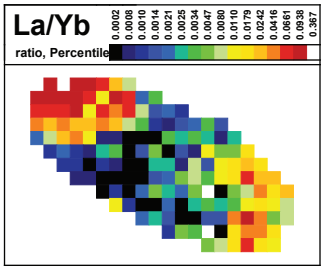


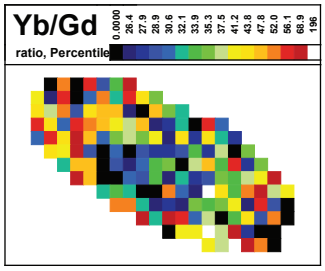




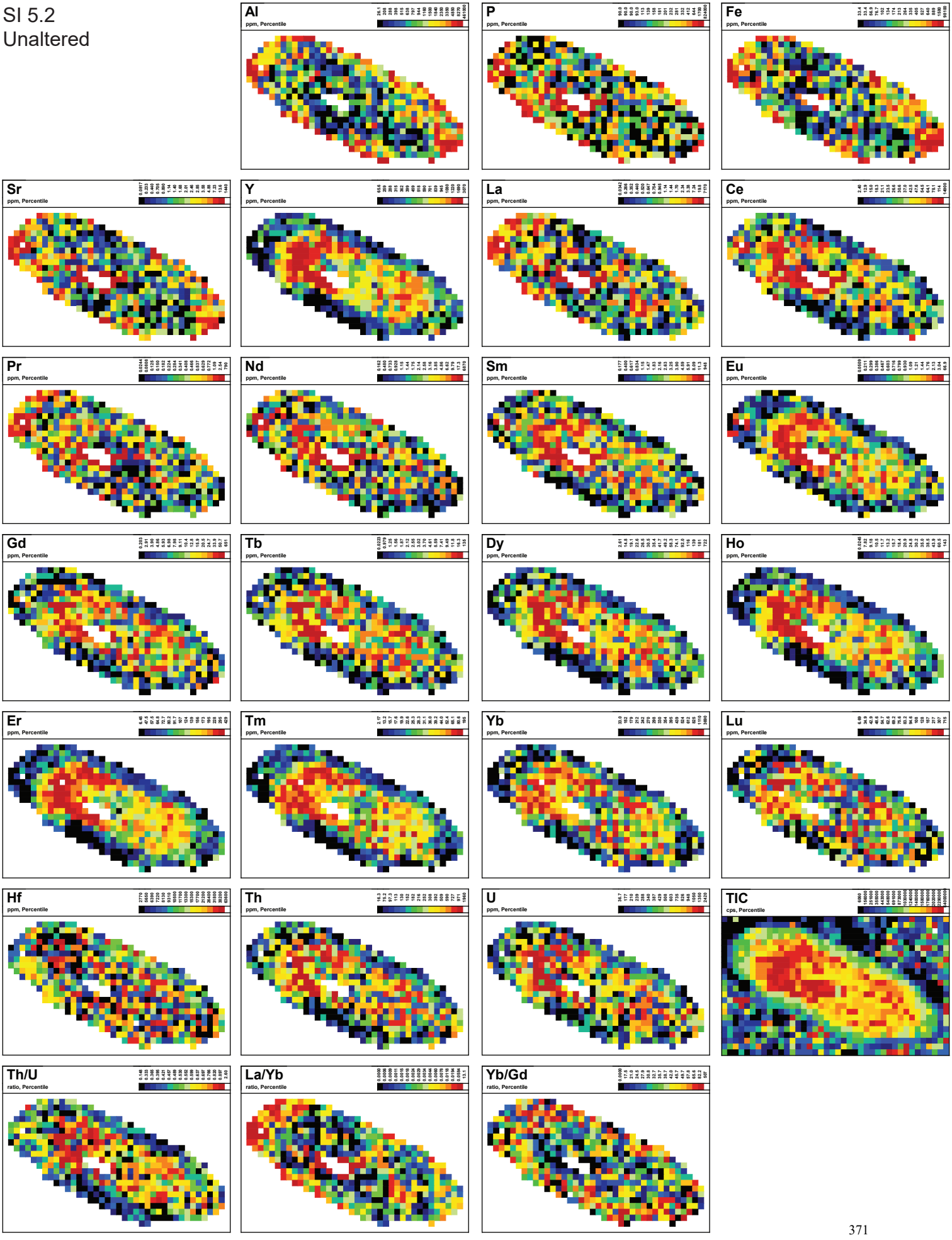




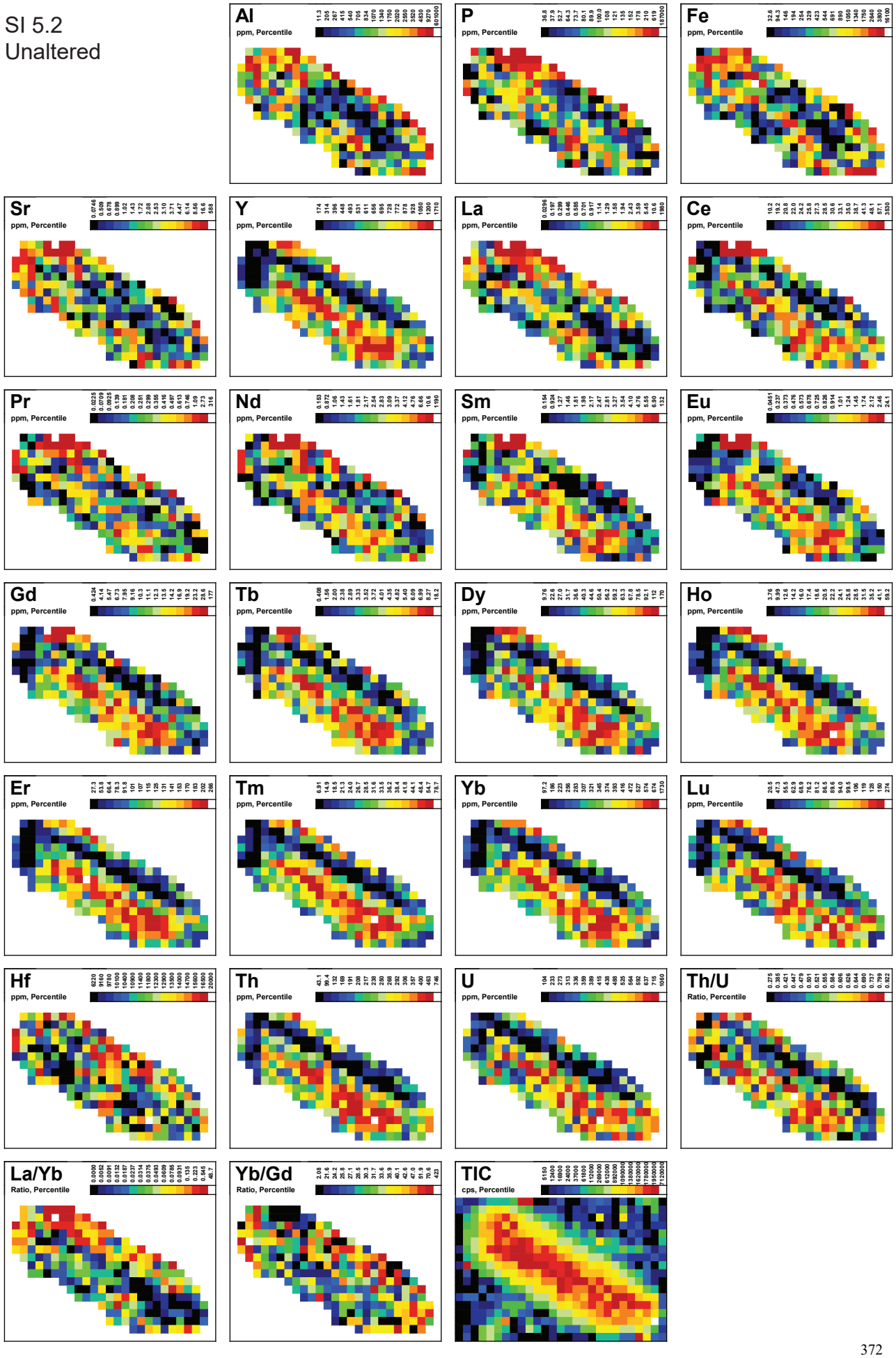




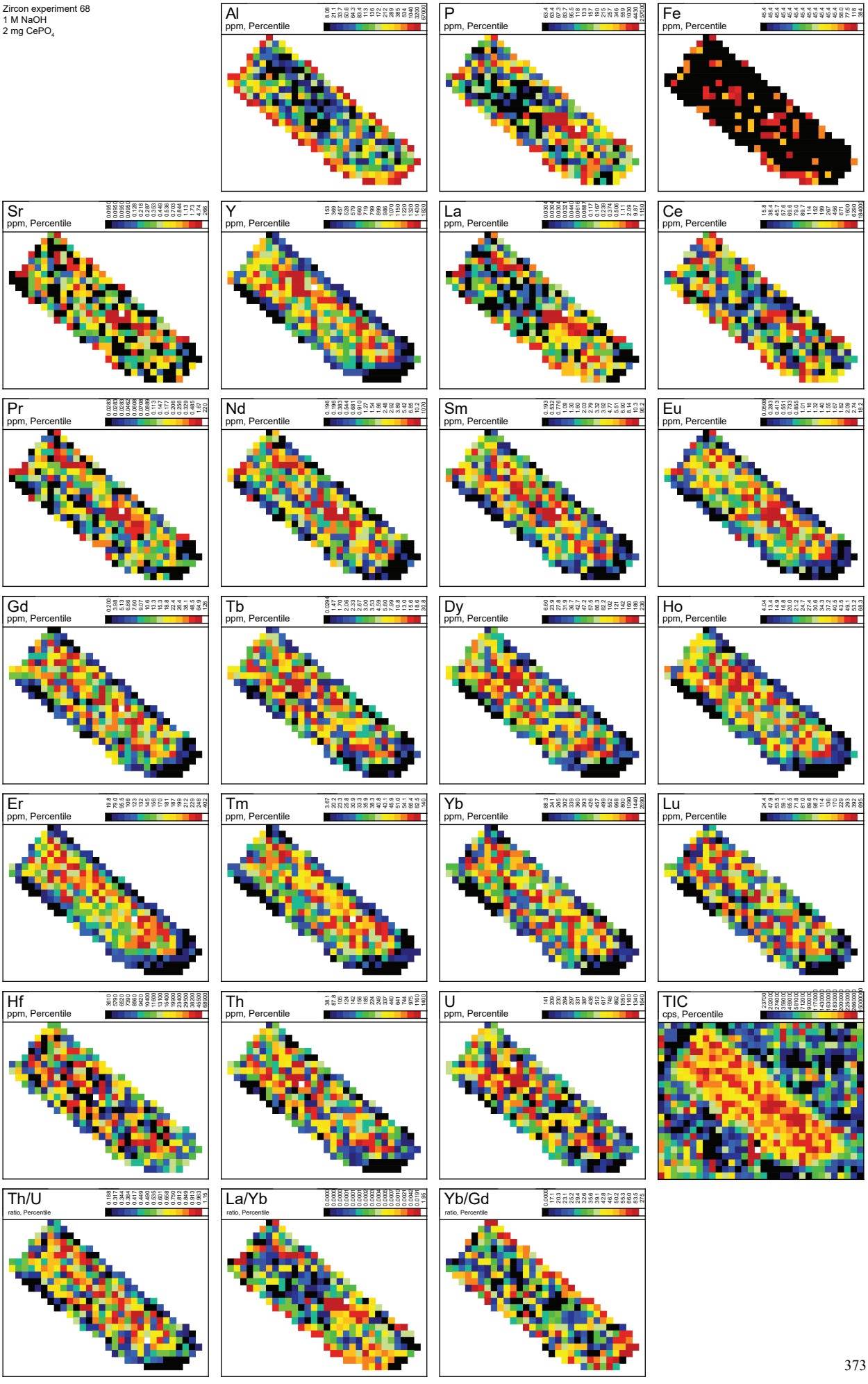
SI 5.2
Unaltered



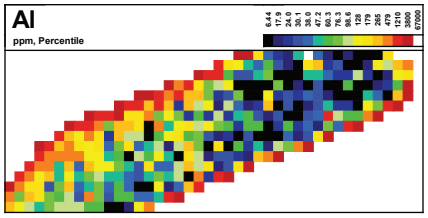
SI 5.2
Unaltered



Zircon experiment 68
1 M NaOH
2 mg $CePO_4$



SI 5.2
ZF-68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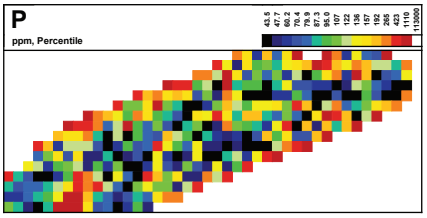
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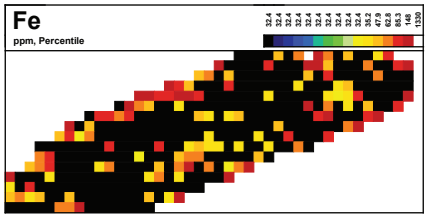
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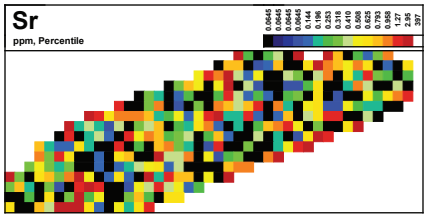
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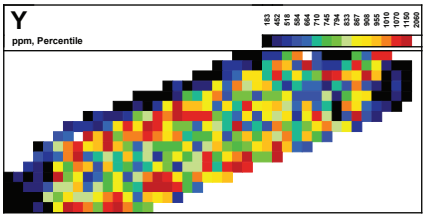
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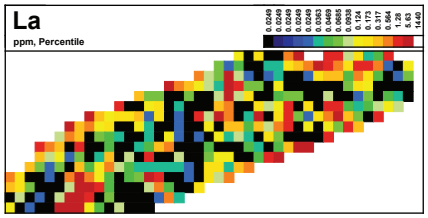
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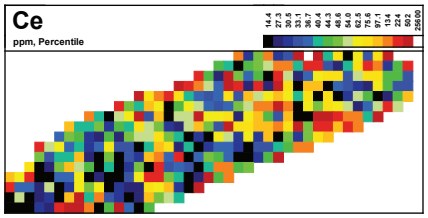
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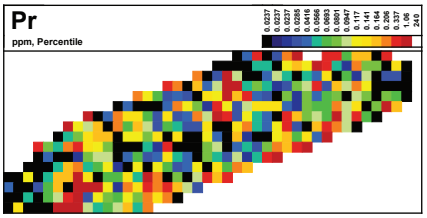
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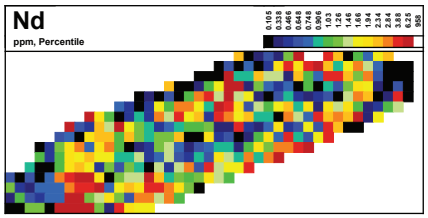
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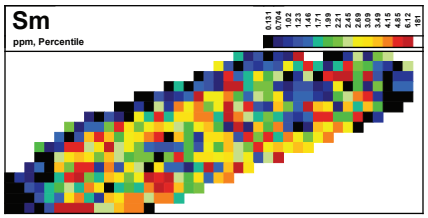
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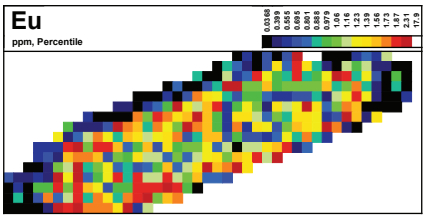
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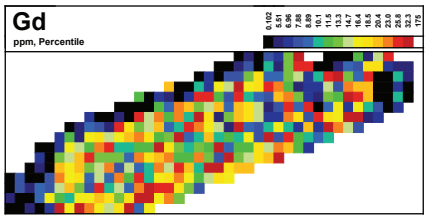
ppm, Percentile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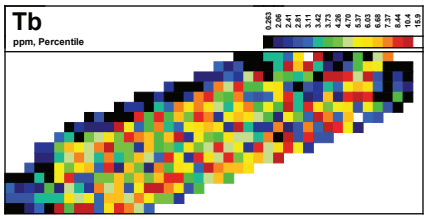
ppm, Percentile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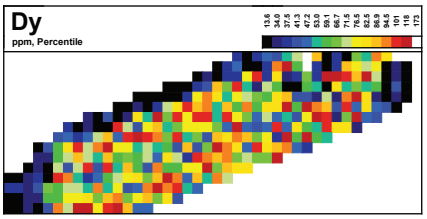
ppm, Percentile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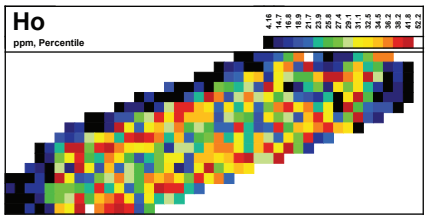
ppm, Percentile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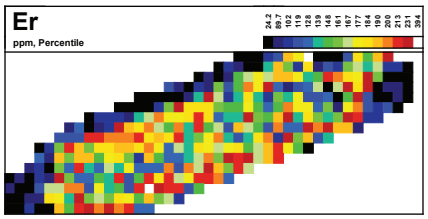
ppm, Percentile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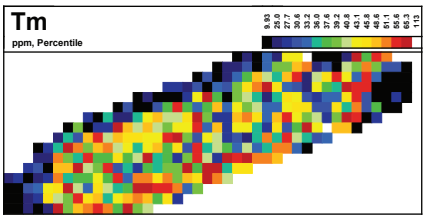
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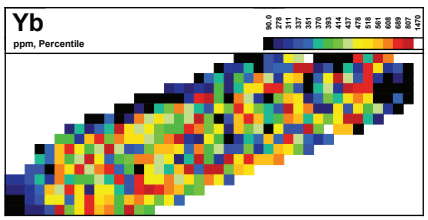
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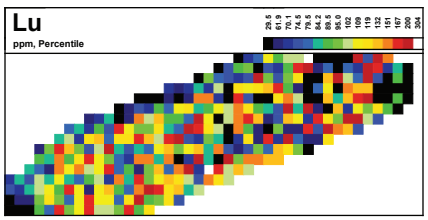
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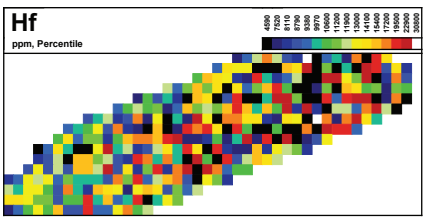
ppm, Percentile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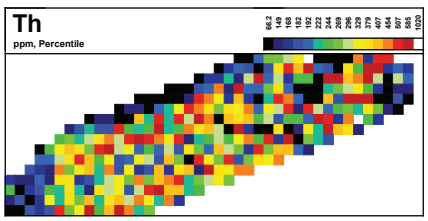
ppm, Percentile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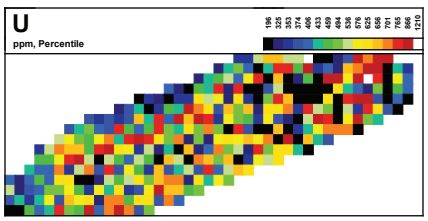
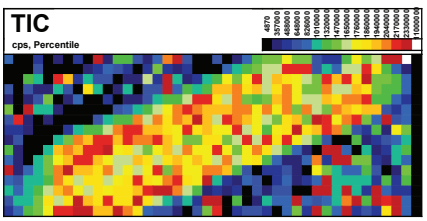
ppm, Percentile


U
ppm, Percentile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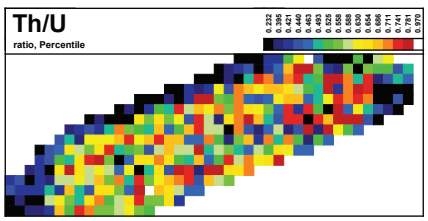
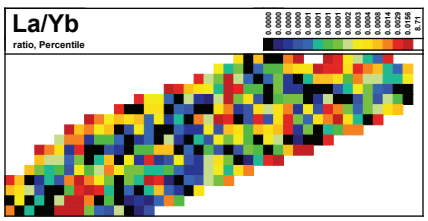
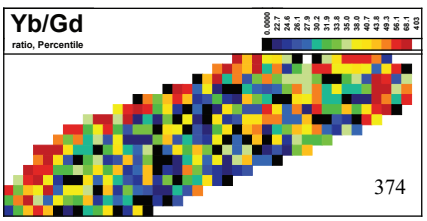
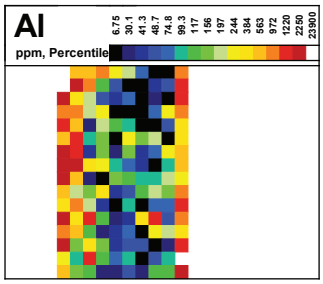
cps, Percentile


Th/U
ratio, Percentile


La/Yb
ratio, Percentile


Yb/Gd
ratio, Percentile

SI 5.2
ZF-68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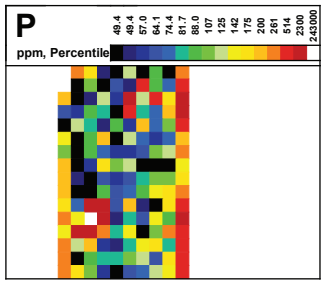
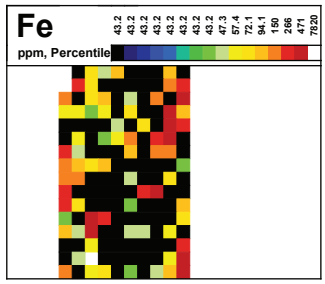
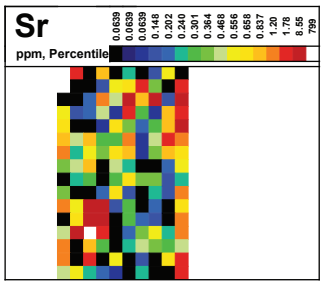
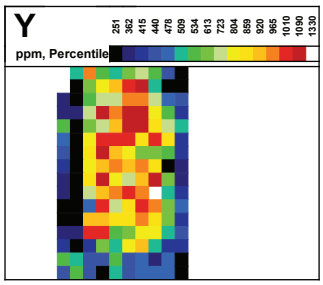
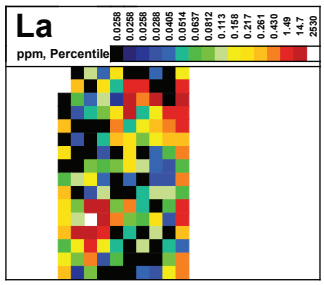
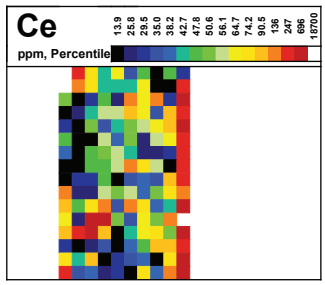

P
ppm, Percentile
49.4 49.4 57.0 64.1 74.4 81.7 88.0 107 125 142 175 200 261 514 2000 240000

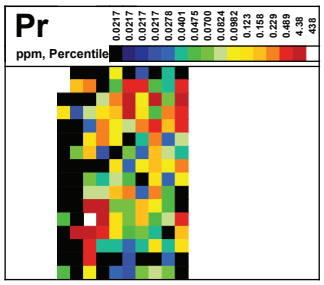

Fe
ppm, Percentile
43.2 43.2 43.2 43.2 43.2 43.2 43.2 43.2 47.3 57.4 72.1 94.1 150 196 266 471 7820

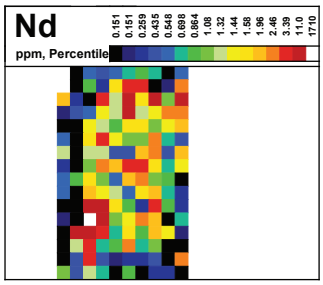

Sr
ppm, Percentile
0.0639 0.0639 0.0639 0.148 0.232 0.240 0.301 0.384 0.468 0.556 0.658 0.837 1.20 1.78 8.55 799

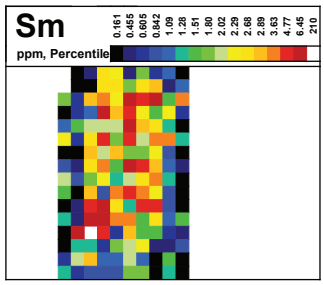

Y
ppm, Percentile
251 322 415 440 478 509 534 613 723 804 869 920 965 1010 1090 1330

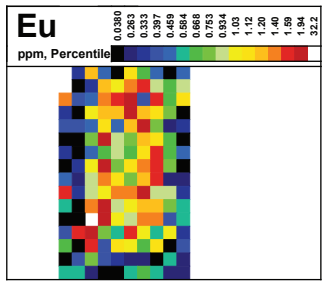

La
ppm, Percentile
0.0258 0.0258 0.0258 0.0258 0.0405 0.0514 0.0637 0.0812 0.113 0.158 0.217 0.261 0.430 1.49 4.47 2530

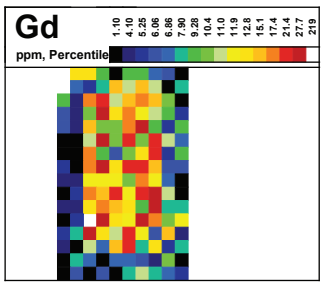

Ce
ppm, Percentile
13.9 25.8 29.5 35.0 38.2 42.7 47.8 50.6 56.1 64.7 74.2 90.5 135 205 247 696 18700

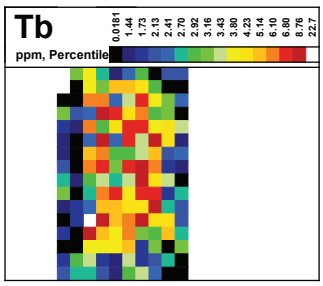

Pr
ppm, Percentile
0.0217 0.0217 0.0217 0.0217 0.0277 0.0401 0.0475 0.0700 0.0824 0.0982 0.123 0.158 0.229 0.489 4.38 438

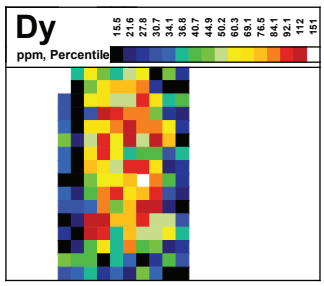

Nd
ppm, Percentile
0.151 0.151 0.259 0.435 0.548 0.698 0.864 1.08 1.32 1.44 1.58 1.96 2.46 3.39 11.0 1710

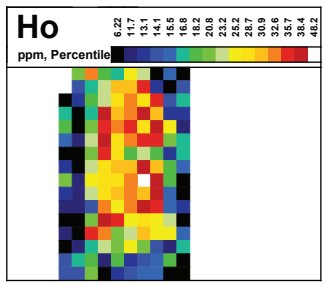

Sm
ppm, Percentile
0.161 0.455 0.605 0.842 1.09 1.28 1.51 1.80 2.02 2.29 2.68 2.89 3.63 4.77 6.46 210

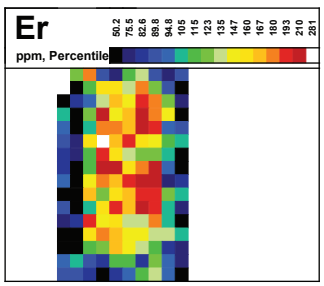

Eu
ppm, Percentile
0.0380 0.263 0.333 0.397 0.459 0.584 0.668 0.753 0.934 1.03 1.12 1.20 1.40 1.59 1.94 32.2

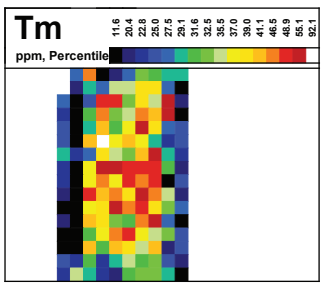

Gd
ppm, Percentile
1.10 4.10 5.25 6.06 6.86 7.90 9.28 10.4 11.0 11.9 12.8 15.1 17.4 21.4 27.7 219

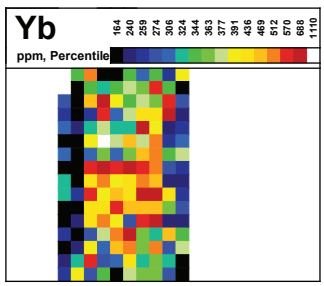

Tb
ppm, Percentile
0.0161 1.44 1.73 2.13 2.41 2.70 2.92 3.16 3.43 3.80 4.23 5.14 6.10 6.80 8.76 22.7

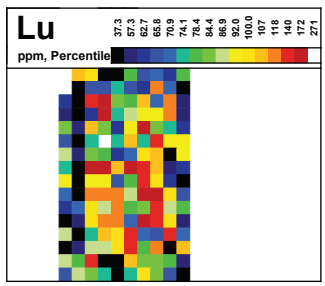

Dy
ppm, Percentile
15.5 21.6 27.8 30.7 34.1 36.8 40.7 44.9 60.2 60.3 69.1 76.5 84.1 92.1 112 151

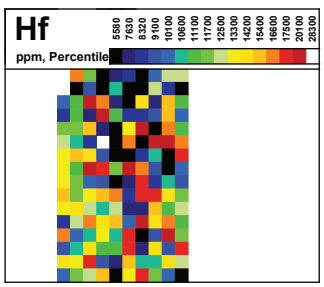

Ho
ppm, Percentile
6.22 11.7 13.1 14.1 15.5 16.8 18.2 20.8 23.2 25.2 28.7 30.9 33.6 35.7 38.4 48.2

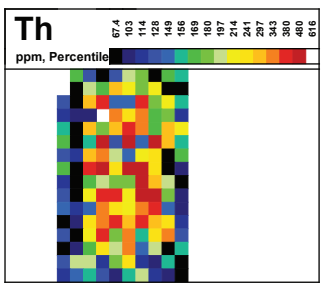

Er
ppm, Percentile
50.2 75.5 82.6 90.8 98.8 105 115 123 135 147 160 167 180 193 210 281

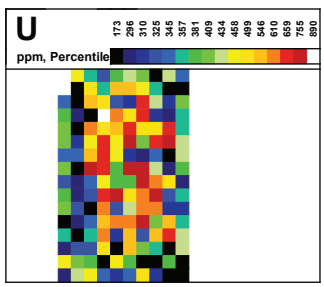

Tm
ppm, Percentile
11.6 20.4 22.8 25.0 27.5 29.1 31.6 32.5 35.5 37.0 39.0 41.1 46.5 48.9 55.1 92.1

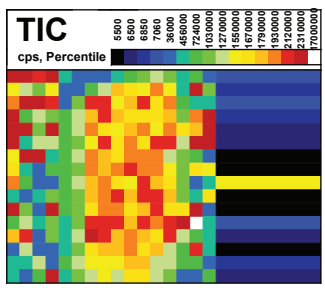

Yb
ppm, Percentile
164 240 259 274 306 324 344 363 377 391 436 469 512 670 888 1110

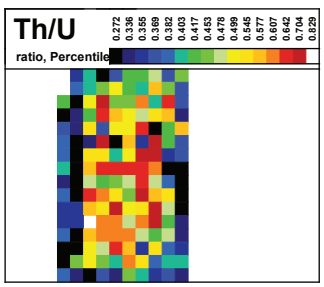

Lu
ppm, Percentile
37.3 57.3 62.7 65.8 70.9 74.1 78.4 84.4 86.9 92.0 100.0 107 118 140 172 271

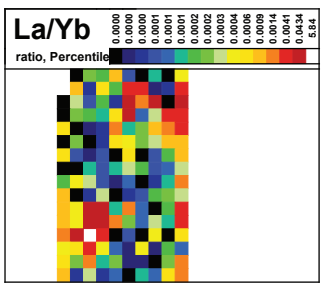

Hf
ppm, Percentile
5880 7630 8320 9100 10100 10600 11100 11700 12500 13300 14200 15400 16600 17500 20100 28300

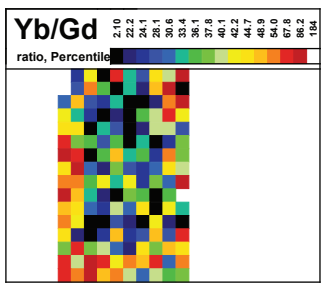

Th
ppm, Percentile
67.4 93.3 111 128 149 156 169 180 197 214 241 297 343 380 480 616


U
ppm, Percentile
173 296 310 325 345 357 381 409 434 458 499 546 610 659 755 890


TIC
cps, Percentile
5500 6500 6850 7060 36000 456000 724000 1030000 1270000 1550000 1670000 1790000 1950000 2120000 2310000 17000000


Th/U
ratio, Percentile
0.272 0.336 0.355 0.369 0.382 0.403 0.417 0.453 0.478 0.499 0.545 0.577 0.607 0.642 0.704 0.829


La/Yb
ratio, Percentile
0.0000 0.0000 0.0000 0.0001 0.0001 0.0001 0.0002 0.0002 0.0003 0.0004 0.0006 0.0009 0.0014 0.0041 0.0434 5.84


Yb/Gd
ratio, Percentile
2.10 22.2 24.1 28.1 30.6 33.4 36.1 37.8 40.1 42.2 44.7 48.9 54.0 67.8 86.2 194

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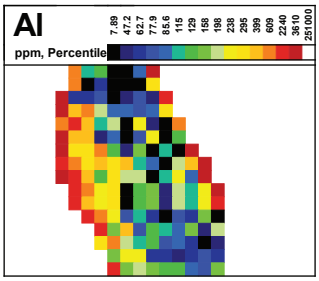
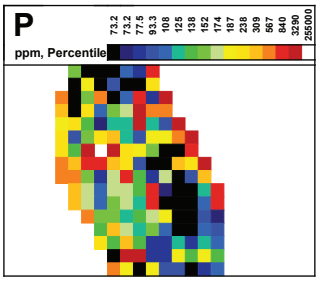
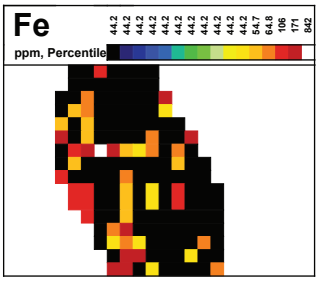
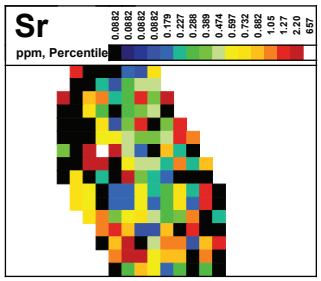
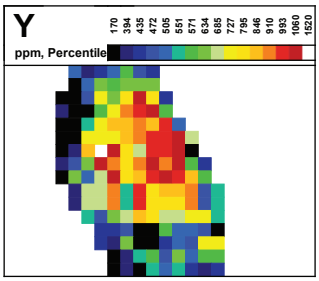
ZF-68

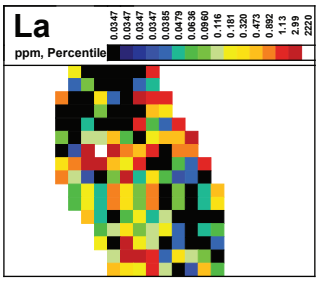

Al
ppm, Percentile
7.89 47.2 62.7 72.8 85.6 115 129 158 198 238 295 399 609 2240 3610 251000

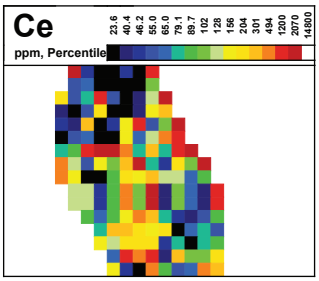

P
ppm, Percentile
73.2 73.2 77.5 93.3 108 125 138 152 174 187 228 309 567 840 3290 256000

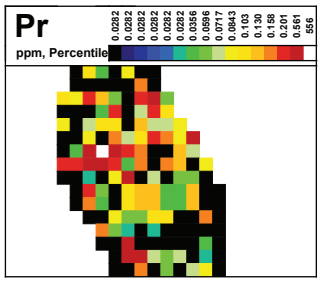

Fe
ppm, Percentile
44.2 44.2 44.2 44.2 44.2 44.2 44.2 44.2 44.2 44.2 44.2 54.7 64.8 106 171 842

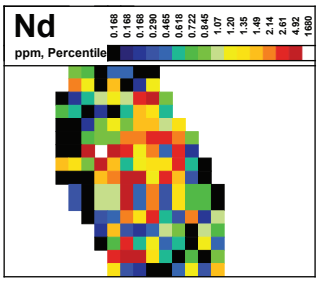

Sr
ppm, Percentile
0.0882 0.0882 0.0882 0.0882 0.0882 0.179 0.227 0.288 0.369 0.474 0.607 0.732 0.882 1.05 1.27 2.20 657

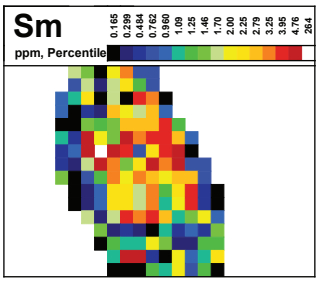

Y
ppm, Percentile
170 394 435 472 506 551 571 634 685 727 795 846 910 993 1060 1520

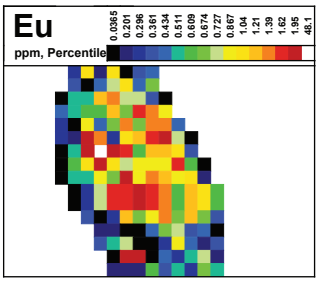

La
ppm, Percentile
0.0347 0.0347 0.0347 0.0347 0.0385 0.0479 0.0636 0.0960 0.116 0.181 0.320 0.473 0.802 1.13 2.99 2220

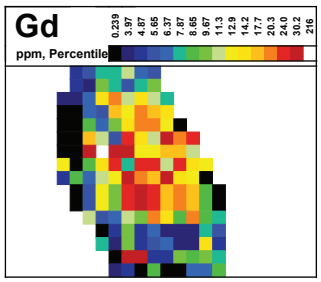

Ce
ppm, Percentile
23.6 40.4 46.2 55.0 65.0 79.1 89.7 102 126 156 204 301 494 1200 2070 14800

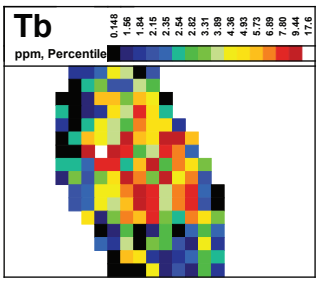

Pr
ppm, Percentile
0.0282 0.0282 0.0282 0.0282 0.0282 0.0282 0.0356 0.0696 0.0757 0.0843 0.103 0.130 0.158 0.201 0.561 556

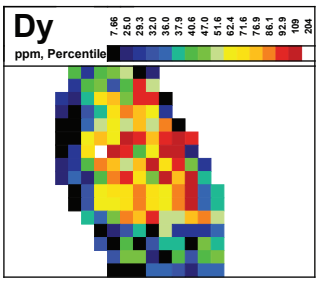

Nd
ppm, Percentile
0.168 0.168 0.168 0.309 0.485 0.618 0.722 0.845 1.07 1.20 1.35 1.49 2.14 2.61 4.92 1660

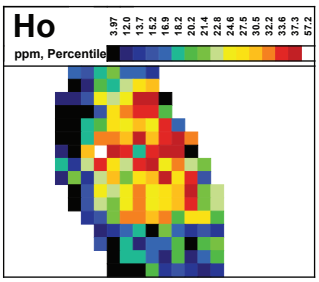

Sm
ppm, Percentile
0.165 0.299 0.484 0.762 0.960 1.09 1.25 1.46 1.70 2.00 2.25 2.78 3.25 3.95 4.76 264

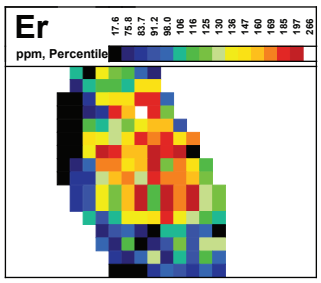

Eu
ppm, Percentile
0.0365 0.201 0.296 0.361 0.434 0.511 0.609 0.674 0.727 0.867 1.04 1.21 1.39 1.62 1.95 46.1

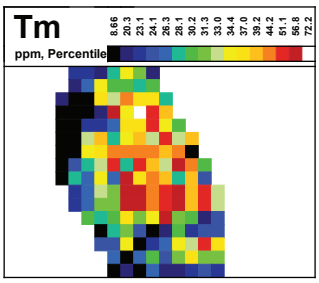

Gd
ppm, Percentile
0.239 3.97 4.87 5.65 6.37 7.87 8.65 9.67 11.3 12.9 14.2 17.7 20.3 24.0 30.2 216

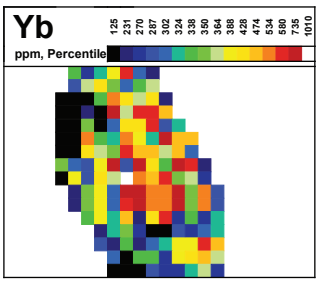

Tb
ppm, Percentile
0.148 1.96 1.64 2.15 2.35 2.54 2.82 3.31 3.89 4.36 4.93 5.73 6.89 7.80 9.44 17.6

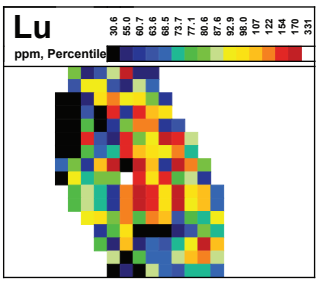

Dy
ppm, Percentile
7.66 25.0 29.3 32.0 36.0 37.9 40.6 47.0 51.6 62.4 71.6 77.9 86.1 92.9 109 204

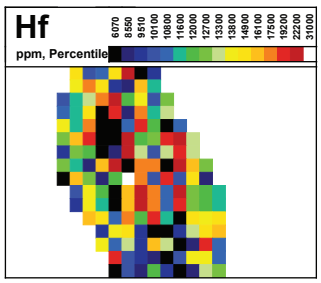

Ho
ppm, Percentile
3.97 12.0 13.7 15.2 16.9 16.2 20.2 21.4 22.8 24.6 27.5 30.5 32.2 33.6 37.3 67.2


Er
ppm, Percentile
17.6 75.8 83.7 91.2 98.0 106 116 125 130 136 147 160 169 185 197 266


Tm
ppm, Percentile
8.66 20.3 23.1 26.1 28.1 30.2 31.3 33.0 34.4 37.0 39.2 44.2 51.1 56.8 72.2


Yb
ppm, Percentile
125 231 270 287 302 324 338 350 364 388 428 474 534 580 735 1010


Lu
ppm, Percentile
30.6 55.0 60.7 63.6 68.5 73.7 77.1 87.6 87.6 92.9 98.0 107 122 154 170 331


Hf
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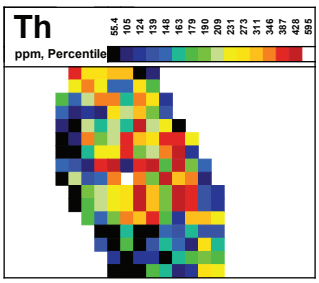
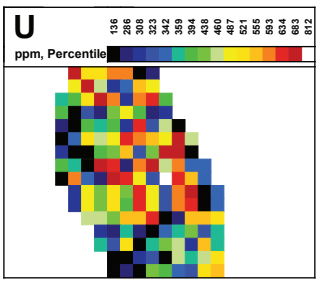
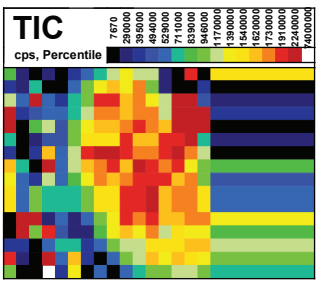
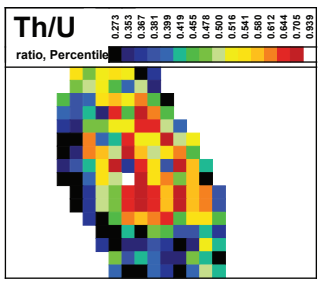
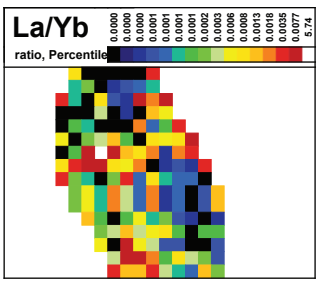
6070 8550 9510 10100 10800 11600 12000 12700 13200 13800 14900 16100 17500 19200 22200 31000

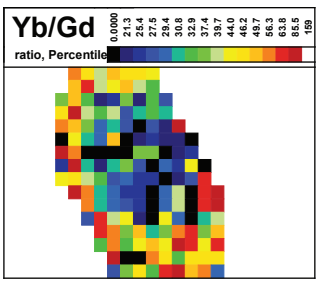

Th
ppm, Percentile
55.4 105 124 138 148 163 179 190 209 231 273 311 346 387 428 595


U
ppm, Percentile
136 286 308 323 342 359 394 438 460 487 521 555 593 634 683 812


TIC
cps, Percentile
7670 290000 395000 494000 529000 711000 880000 946000 1170000 1390000 1540000 1620000 1730000 1910000 2240000 7400000


Th/U
ratio, Percentile
0.273 0.353 0.367 0.381 0.399 0.419 0.455 0.478 0.497 0.516 0.541 0.580 0.612 0.644 0.705 0.939


La/Yb
ratio, Percentile
0.0000 0.0000 0.0000 0.0000 0.0001 0.0001 0.0001 0.0002 0.0003 0.0006 0.0008 0.0013 0.0018 0.0035 0.0077 5.74


Yb/Gd
ratio, Percentile
0.0000 21.3 25.4 27.5 29.4 30.8 32.9 37.4 39.7 44.0 46.2 48.7 51.3 53.8 85.5 169

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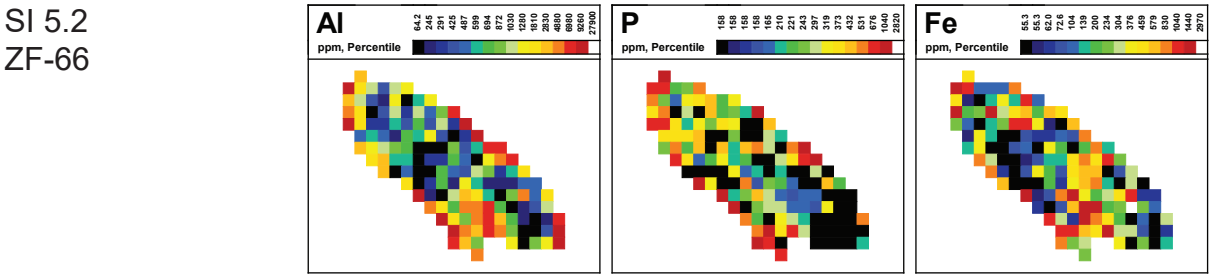
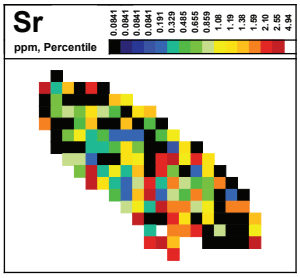

Al
ppm, Percentile
64.2 245 291 425 487 589 694 872 1030 1280 1810 2530 4080 6980 9260 27900

P
ppm, Percentile
158 158 158 158 166 166 210 221 243 297 319 373 432 531 676 1040 2320

Fe
ppm, Percentile
55.3 65.3 72.6 104 139 200 234 304 376 469 579 830 1440 2970


Sr
ppm, Percentile
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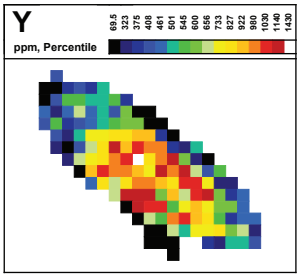
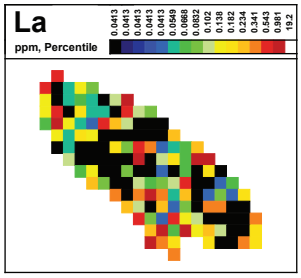
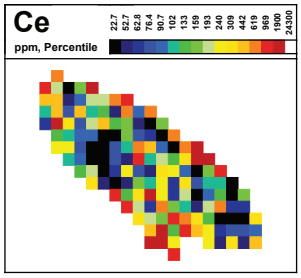
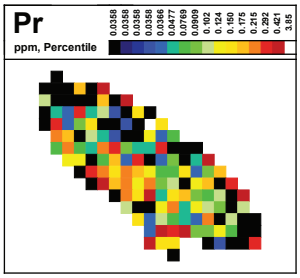
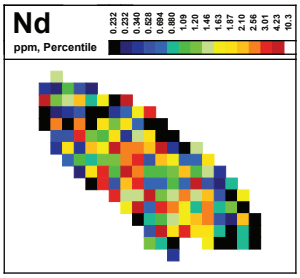
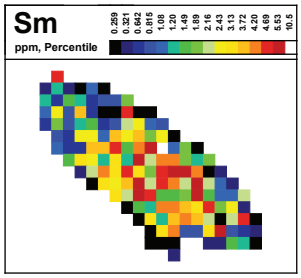

Y
ppm, Percentile
69.5 323 375 408 461 545 600 656 733 827 922 980 1030 1140 1430

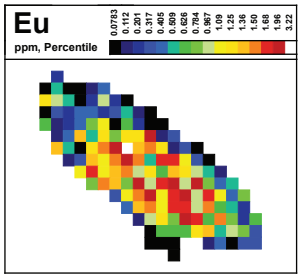

La
ppm, Percentile
0.0413 0.0413 0.0413 0.0413 0.0413 0.0549 0.0688 0.0852 0.102 0.132 0.182 0.234 0.341 0.543 0.861 19.2

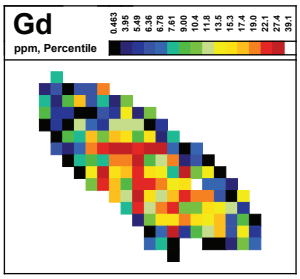

Ce
ppm, Percentile
22.7 62.7 64.3 76.4 90.7 102 133 159 193 240 309 442 619 980 1590 24300

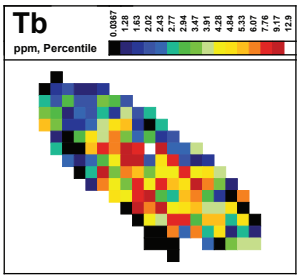

Pr
ppm, Percentile
0.0358 0.0358 0.0358 0.0358 0.0366 0.0477 0.0769 0.0969 0.102 0.124 0.150 0.175 0.215 0.292 0.421 3.85

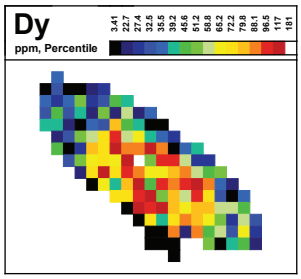

Nd
ppm, Percentile
0.232 0.232 0.340 0.828 0.894 0.980 1.09 1.20 1.46 1.63 1.87 2.10 2.56 3.01 4.23 10.3

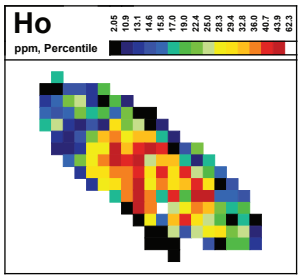

Sm
ppm, Percentile
0.269 0.321 0.642 0.745 1.05 1.20 1.49 1.89 2.16 2.43 3.13 3.72 4.20 4.69 5.53 16.5

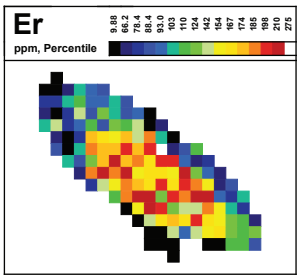

Eu
ppm, Percentile
0.0783 0.201 0.311 0.317 0.405 0.809 0.826 0.894 0.987 1.09 1.25 1.36 1.50 1.66 1.96 3.22

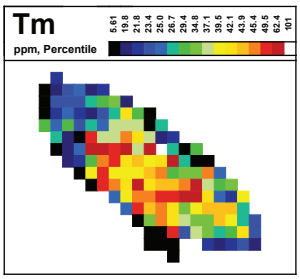

Gd
ppm, Percentile
0.463 3.65 5.49 6.36 6.78 7.61 9.00 10.4 11.8 13.5 15.3 17.4 19.0 22.1 27.4 39.1

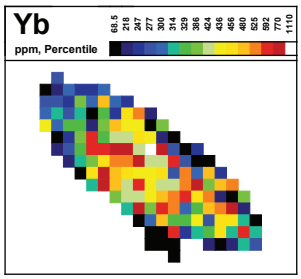

Tb
ppm, Percentile
0.0367 1.28 1.83 2.02 2.43 2.77 2.94 3.47 3.91 4.28 4.84 5.33 6.07 7.76 9.17 12.9

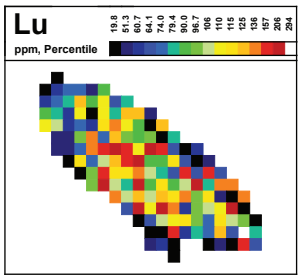

Dy
ppm, Percentile
3.41 22.7 27.4 31.5 35.5 39.2 45.6 51.2 58.8 65.2 72.2 79.8 88.1 96.5 117 161

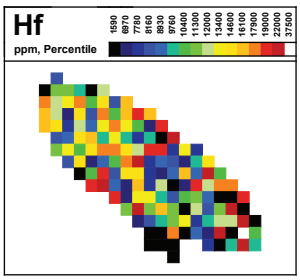

Ho
ppm, Percentile
2.05 3.19 13.1 14.6 15.8 17.0 19.0 21.4 25.0 28.3 29.4 32.8 36.0 40.7 45.8 62.3

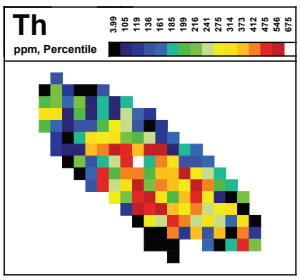

Er
ppm, Percentile
9.88 65.2 78.4 88.4 93.0 103 110 124 142 154 167 174 185 199 210 275


Tm
ppm, Percentile
5.61 19.8 21.8 23.4 25.0 26.7 29.4 34.8 37.1 39.5 42.1 43.9 45.4 49.5 62.4 101


Yb
ppm, Percentile
68.5 218 247 277 301 314 329 386 424 466 486 490 525 592 770 1110


Lu
ppm, Percentile
19.8 51.3 61.7 64.1 74.0 79.4 90.0 94.7 96.5 110 115 125 135 197 267 294


Hf
ppm, Percentile
1590 6970 7780 8160 8930 9760 10400 11500 12000 13400 14600 16100 17900 19600 22000 37500


Th
ppm, Percentile
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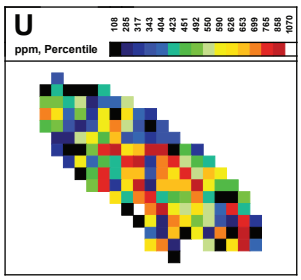
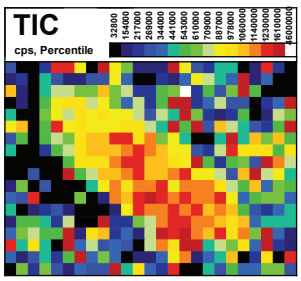
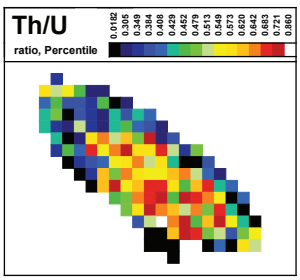
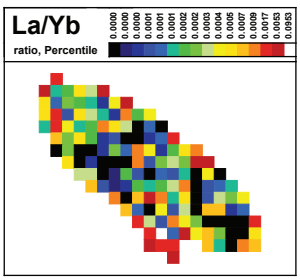
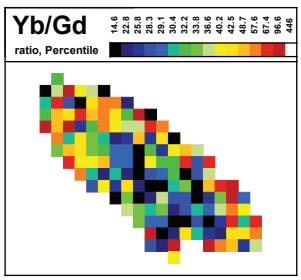

U
ppm, Percentile
108 285 317 343 404 423 451 492 560 626 636 653 699 765 858 1070


TIC
cps, Percentile
32800 154000 217000 268000 344000 441000 543000 710000 797000 887000 978000 1060000 1140000 1340000 1610000 4600000


Th/U
ratio, Percentile
0.0102 0.0245 0.349 0.384 0.408 0.429 0.452 0.479 0.513 0.549 0.573 0.620 0.642 0.683 0.721 0.860


La/Yb
ratio, Percentile
0.0000 0.0000 0.0000 0.0001 0.0001 0.0001 0.0002 0.0002 0.0003 0.0004 0.0005 0.0007 0.0009 0.0017 0.0053 0.0953


Yb/Gd
ratio, Percentile
14.6 22.8 25.8 28.3 29.1 30.4 32.2 33.8 36.6 39.2 42.5 48.7 57.6 67.4 96.6 446

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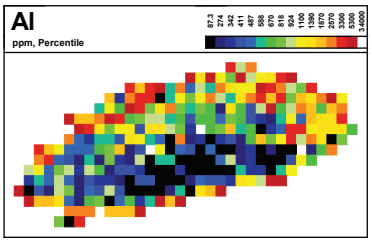
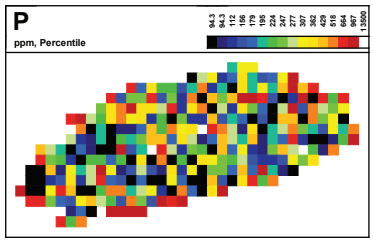
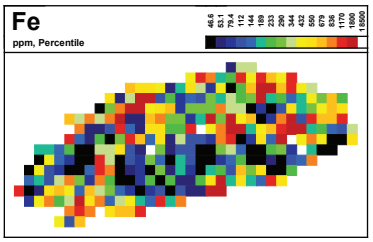
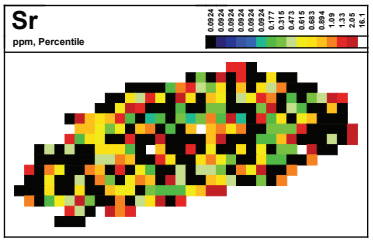
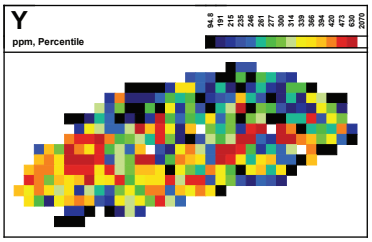
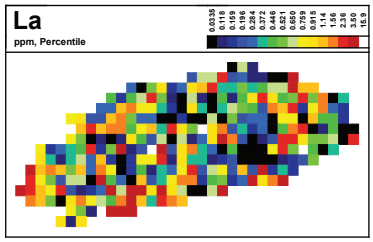

Al
ppm, Percentile

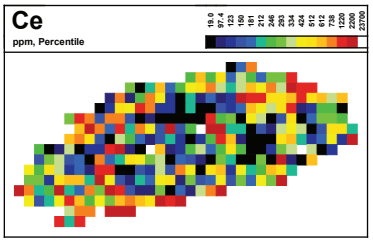

P
ppm, Percentile

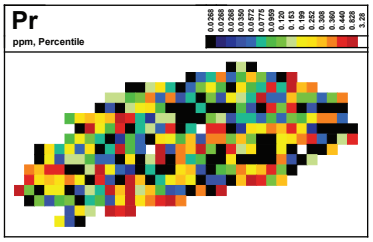

Fe
ppm, Percentile

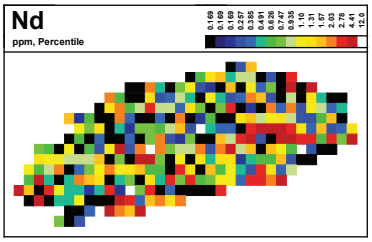

Sr
ppm, Percentile

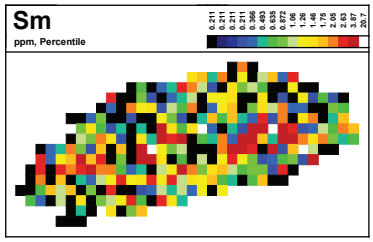

Y
ppm, Percentile

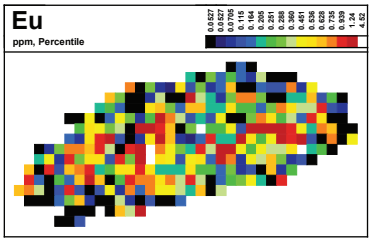

La
ppm, Percentile

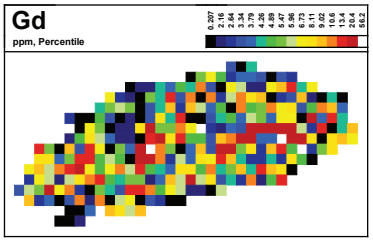

Ce
ppm, Percentile

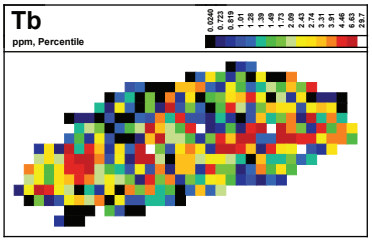

Pr
ppm, Percentile

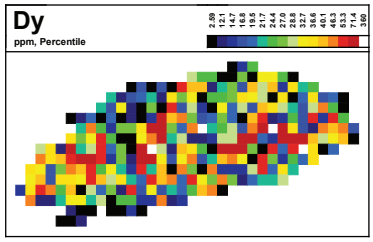

Nd
ppm, Percentile

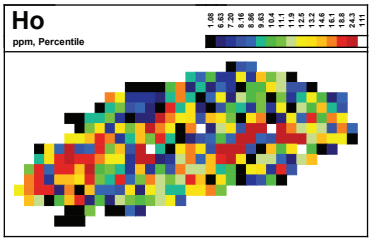

Sm
ppm, Percentile

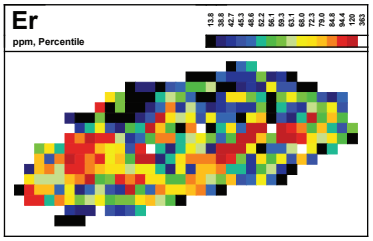

Eu
ppm, Percentile

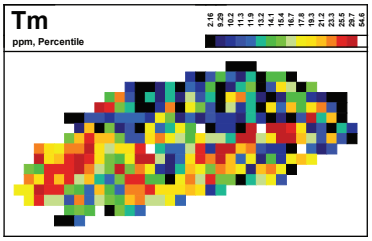

Gd
ppm, Percentile

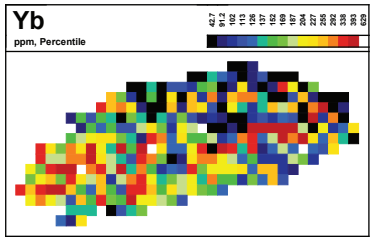

Tb
ppm, Percentile

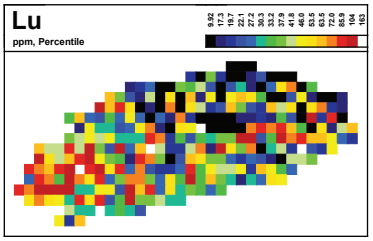

Dy
ppm, Percentile

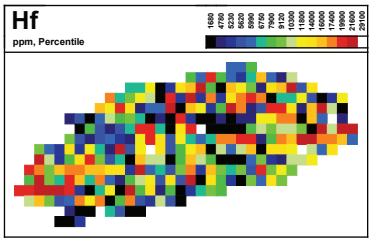

Ho
ppm, Percentile

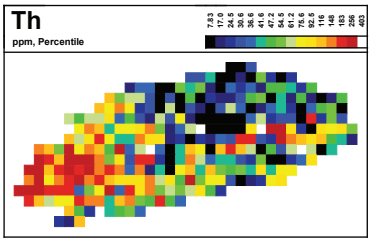

Er
ppm, Percentile

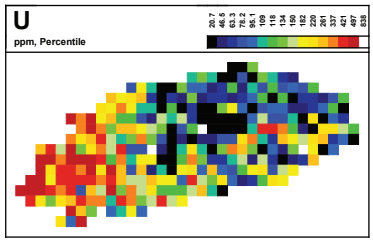

Tm
ppm, Percentile

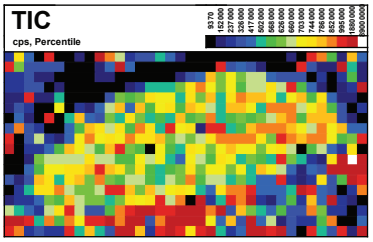

Yb
ppm, Percentile

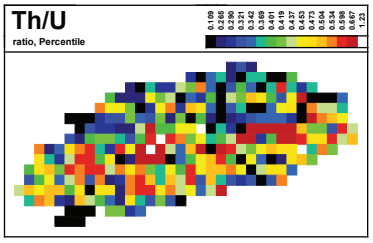

Lu
ppm, Percentile

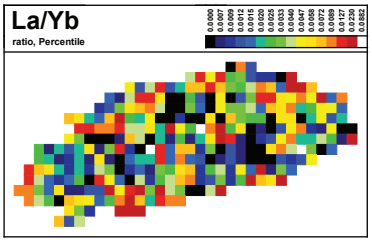

Hf
ppm, Percentile

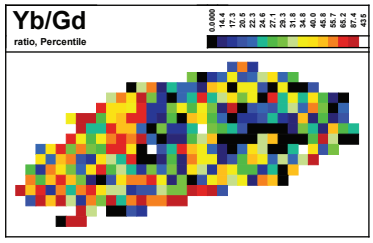

Th
ppm, Percentile


U
ppm, Percentile

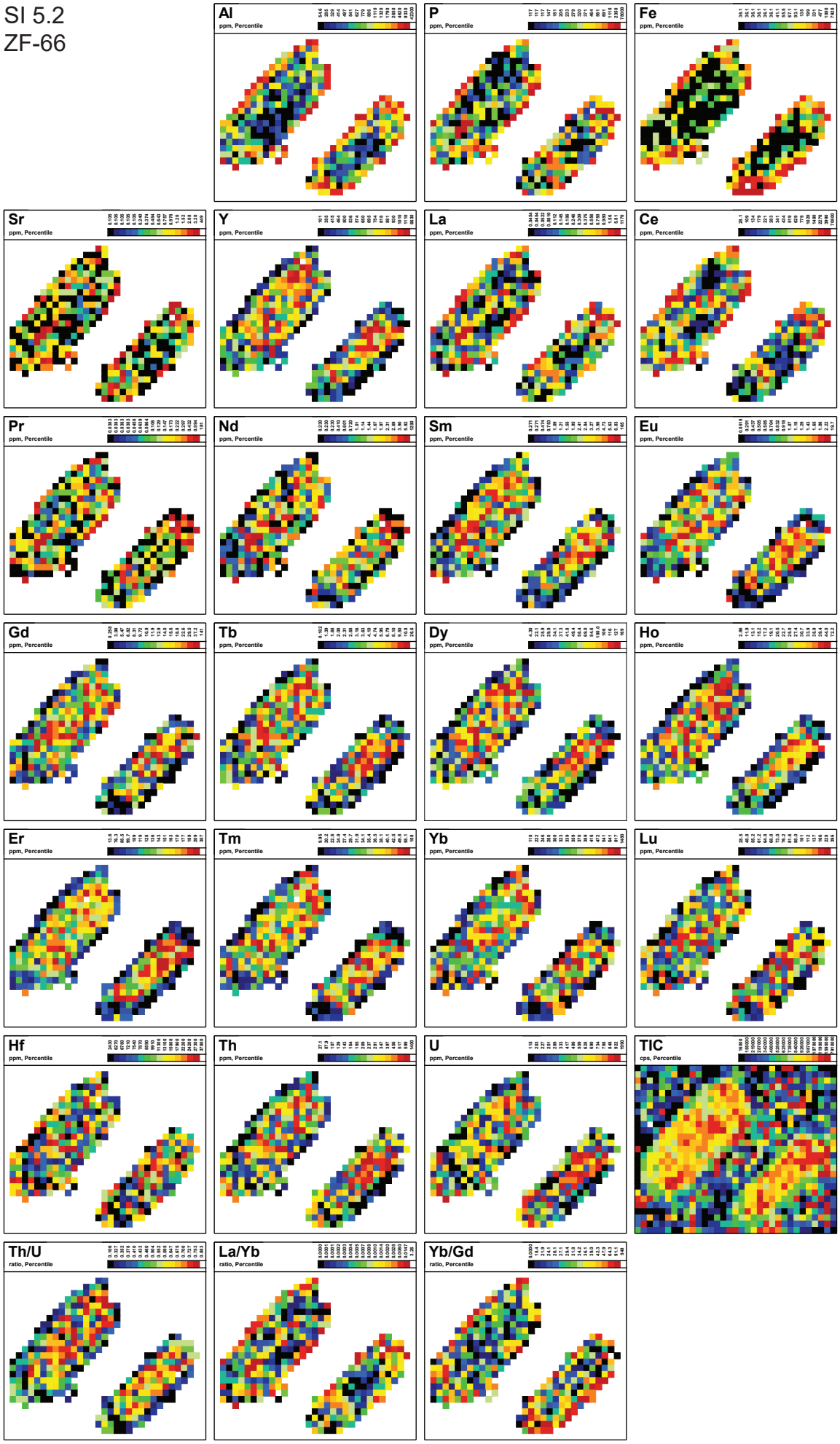

TIC
cps, Percentile


Th/U
ratio, Percentile

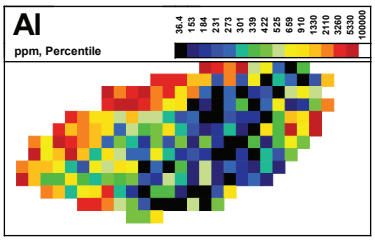

La/Yb
ratio, Percentile

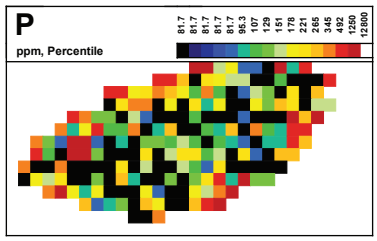

Yb/Gd
ratio, Percentile

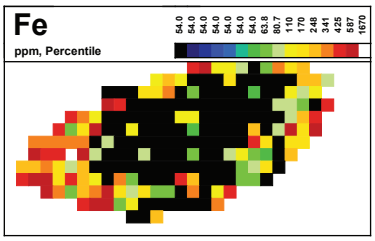
SI 5.2
ZF-66

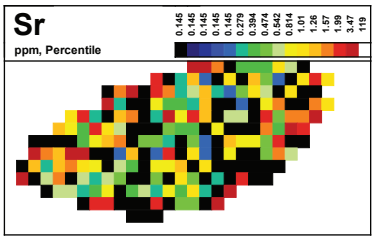

Al
ppm, Percentile
P
ppm, Percentile
Fe
ppm, Percentile
Sr
ppm, Percentile
Y
ppm, Percentile
La
ppm, Percentile
Ce
ppm, Percentile
Pr
ppm, Percentile
Nd
ppm, Percentile
Sm
ppm, Percentile
Eu
ppm, Percentile
Gd
ppm, Percentile
Tb
ppm, Percentile
Dy
ppm, Percentile
Ho
ppm, Percentile
Er
ppm, Percentile
Tm
ppm, Percentile
Yb
ppm, Percentile
Lu
ppm, Percentile
Hf
ppm, Percentile
Th
ppm, Percentile
U
ppm, Percentile
TIC
cps, Percentile
Th/U
ratio, Percentile
La/Yb
ratio, Percentile
Yb/Gd
ratio, Percentile

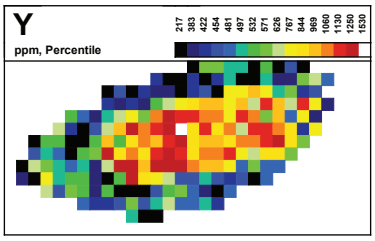
SI 5.2
ZF-66

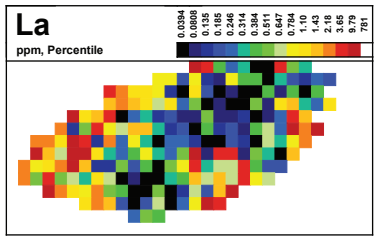

Al
ppm, Percentile
36.4 153 184 231 273 301 339 422 525 659 910 1330 2110 3280 5330 100000

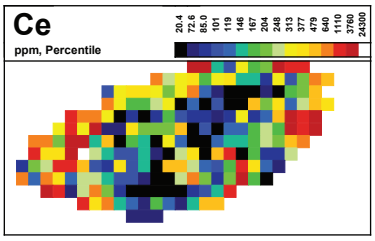

P
ppm, Percentile
81.7 81.7 81.7 81.7 81.7 95.3 107 129 151 178 221 285 345 492 1250 12800

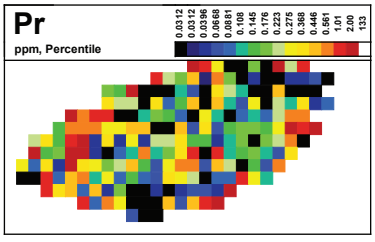

Fe
ppm, Percentile
54.0 54.0 54.0 54.0 54.0 54.0 54.0 63.8 80.7 110 170 248 341 425 597 1670

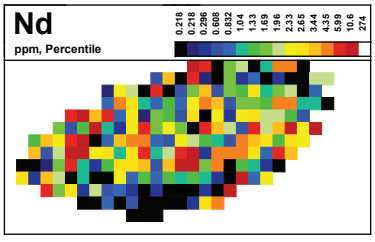

Sr
ppm, Percentile
0.145 0.145 0.145 0.145 0.145 0.145 0.279 0.394 0.474 0.542 0.614 0.701 0.868 1.26 1.57 1.99 3.47 119

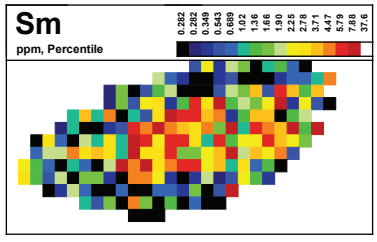

Y
ppm, Percentile
217 383 422 454 481 497 532 577 626 767 844 969 1060 1130 1250 1530

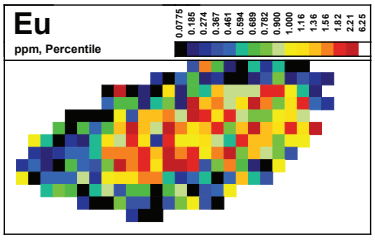

La
ppm, Percentile
0.0394 0.0808 0.135 0.185 0.246 0.314 0.384 0.511 0.647 0.784 1.10 1.43 1.98 3.65 9.79 781

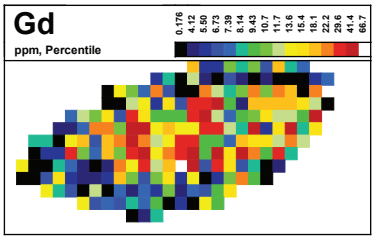

Ce
ppm, Percentile
20.4 32.6 52.0 81.0 101 119 146 167 204 248 313 377 479 640 1110 3760 24300

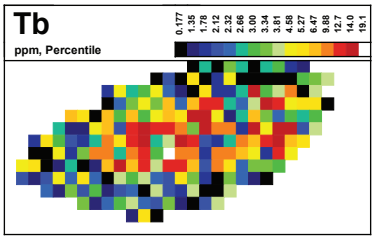

Pr
ppm, Percentile
0.0312 0.0312 0.0568 0.0568 0.0681 0.108 0.145 0.176 0.223 0.275 0.368 0.446 0.561 1.01 2.00 133

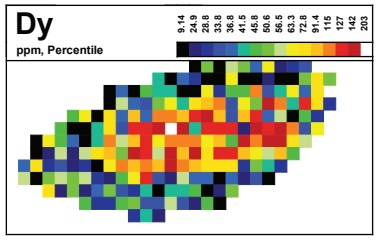

Nd
ppm, Percentile
0.218 0.218 0.296 0.608 0.832 1.04 1.33 1.68 1.96 2.33 2.65 3.44 4.35 5.99 10.6 274

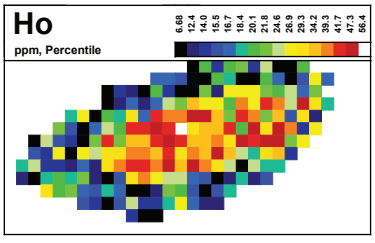

Sm
ppm, Percentile
0.282 0.282 0.349 0.543 0.969 1.07 1.36 1.66 1.90 2.25 2.78 3.71 4.47 5.79 7.88 37.6

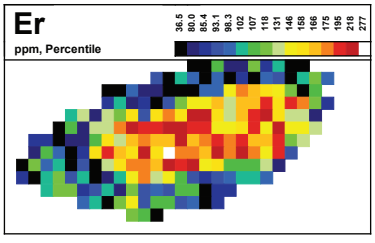

Eu
ppm, Percentile
0.0775 0.165 0.274 0.367 0.461 0.594 0.689 0.782 0.900 1.06 1.15 1.36 1.56 1.82 2.21 6.25

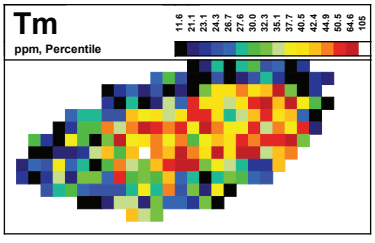

Gd
ppm, Percentile
0.176 4.12 5.69 6.73 7.39 8.14 9.43 10.7 11.7 13.6 15.4 16.7 18.1 22.2 29.6 41.4 66.7

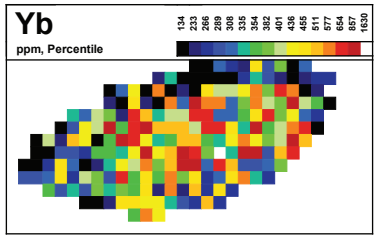

Tb
ppm, Percentile
0.177 1.35 1.78 2.12 2.32 2.66 3.00 3.34 3.81 4.58 5.27 6.47 9.88 12.7 14.0 19.1

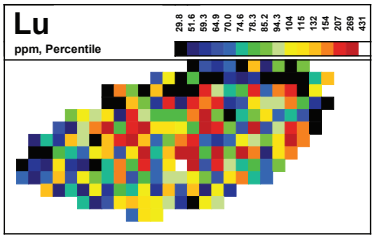

Dy
ppm, Percentile
9.14 24.9 28.8 33.8 36.8 41.5 45.8 50.6 56.5 63.3 72.8 91.4 115 127 142 203

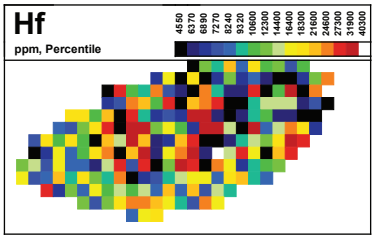

Ho
ppm, Percentile
6.68 14.4 14.6 15.5 16.7 18.4 20.1 21.8 24.6 26.9 29.3 34.2 39.3 41.7 47.3 56.4

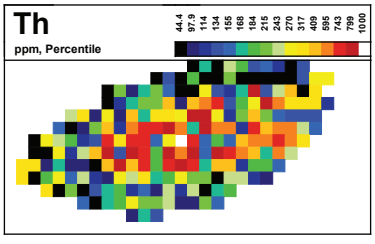

Er
ppm, Percentile
36.5 80.0 85.1 93.1 98.3 102 107 118 131 146 161 166 175 195 218 277

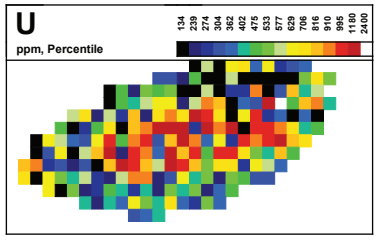

Tm
ppm, Percentile
11.6 21.1 23.1 24.3 26.7 27.6 30.0 32.3 35.1 37.7 40.5 42.4 44.9 50.5 64.6 105

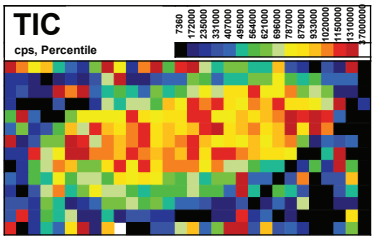

Yb
ppm, Percentile
134 233 266 289 308 335 354 382 401 436 455 511 577 654 857 1630

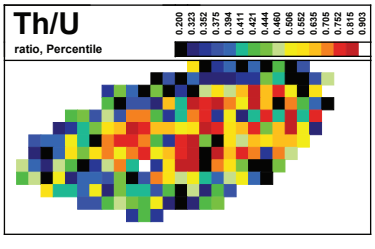

Lu
ppm, Percentile
29.8 51.6 61.3 64.9 70.0 74.6 78.3 85.2 94.3 104 115 132 154 207 289 431

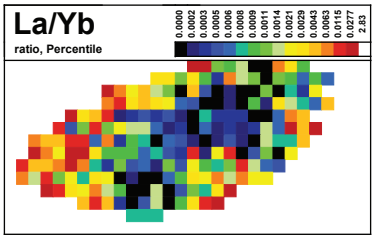

Hf
ppm, Percentile
4590 6370 7590 7270 8240 9320 10600 12300 14400 16400 18900 21600 24600 27300 31900 40300

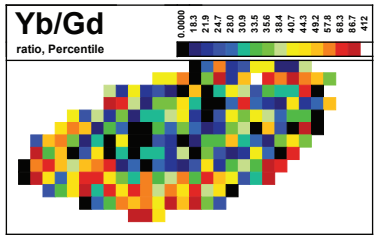

Th
ppm, Percentile
44.4 97.9 114 134 155 168 184 203 243 270 317 409 595 743 799 1090


U
ppm, Percentile
134 239 274 304 342 402 475 533 577 629 706 816 1010 995 1180 2400

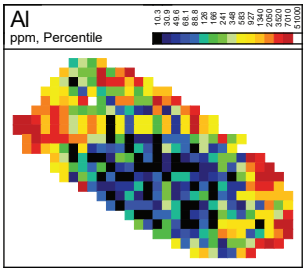

TIC
cps, Percentile
7360 215000 331000 407000 496000 564000 621000 696000 763000 875000 933000 1020000 1150000 1310000 2700000

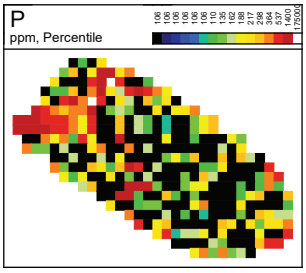

Th/U
ratio, Percentile
0.200 0.323 0.352 0.375 0.394 0.411 0.421 0.444 0.460 0.506 0.552 0.635 0.705 0.752 0.815 0.903

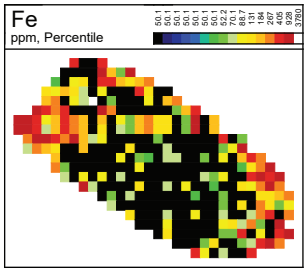

La/Yb
ratio, Percentile
0.0000 0.0002 0.0003 0.0005 0.0006 0.0008 0.0009 0.0011 0.0014 0.0021 0.0029 0.0043 0.0063 0.0115 0.0277 2.83

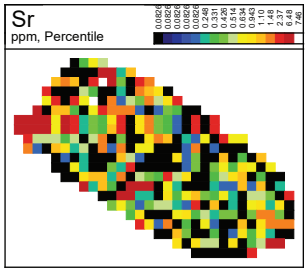

Yb/Gd
ratio, Percentile
0.0000 18.3 21.9 24.7 27.0 30.9 33.5 35.6 38.4 40.7 44.3 49.2 57.8 68.3 86.7 412

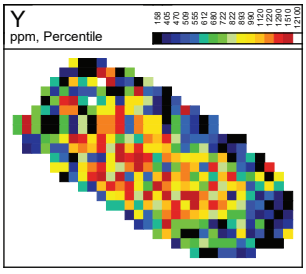
Zircon experiment 67
1 M KOH
2 mg YPO_4

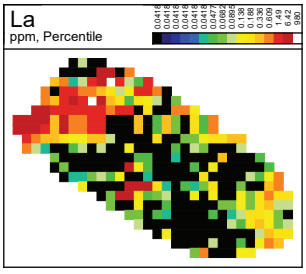


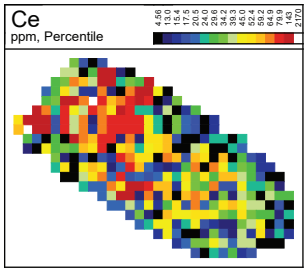


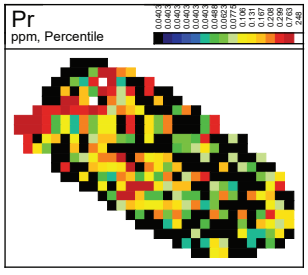


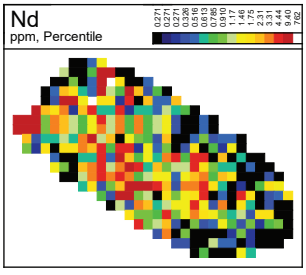


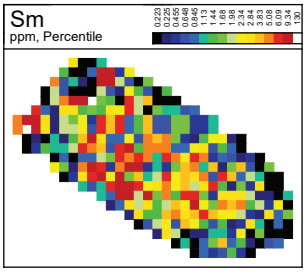


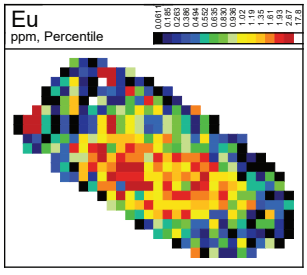


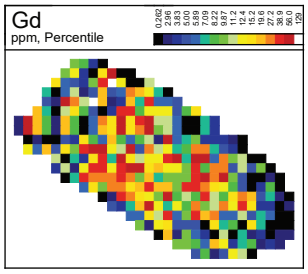


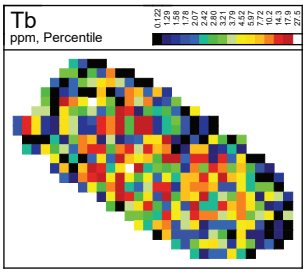


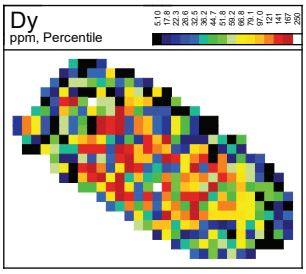


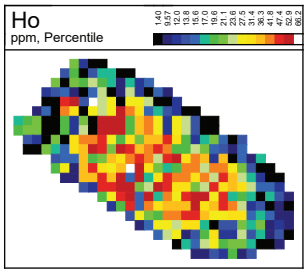


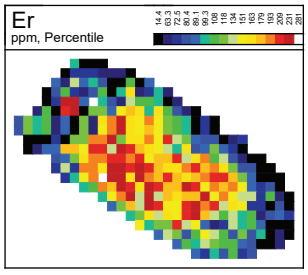


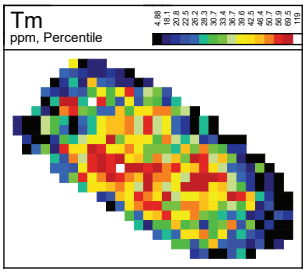


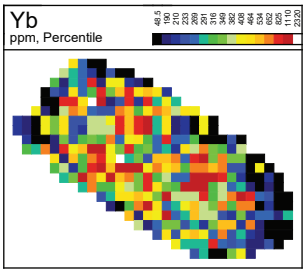


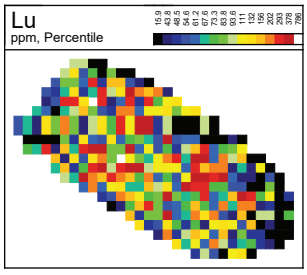


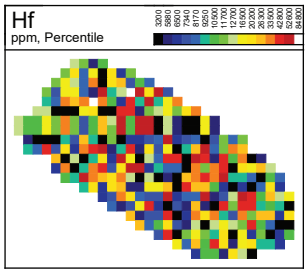


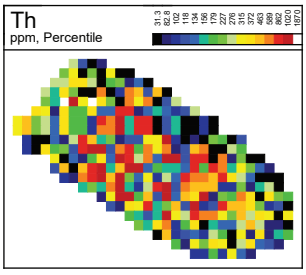


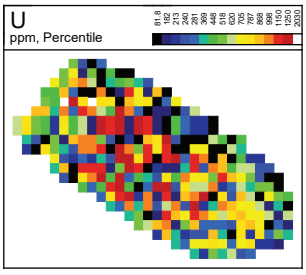


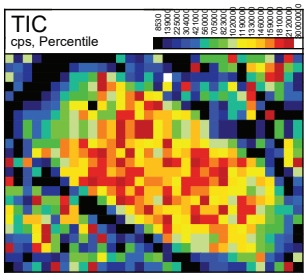


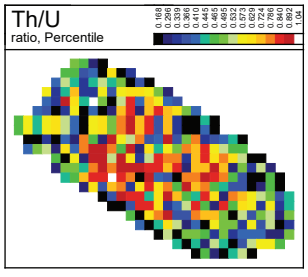


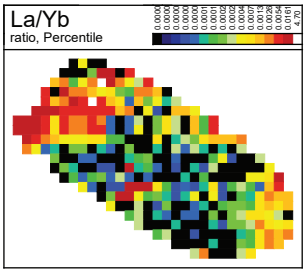


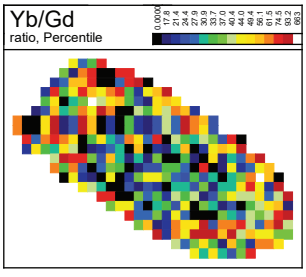












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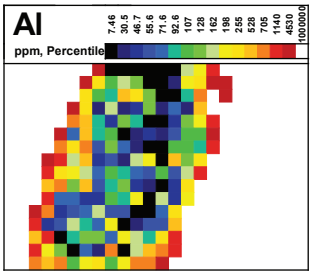
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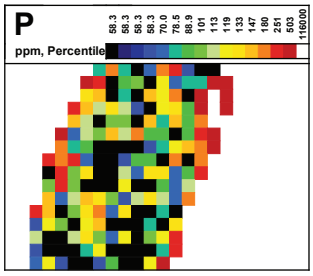
ppm, Percentile
7.46 30.5 46.7 55.6 71.6 92.6 107 128 162 198 255 528 705 1140 4530 1000000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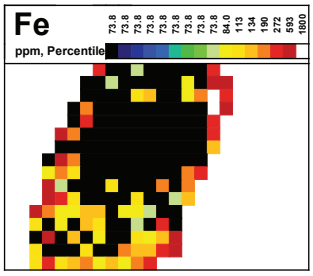
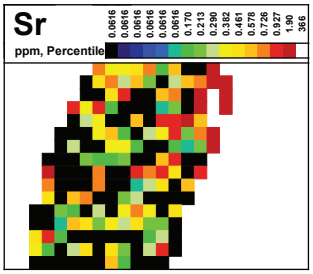
ppm, Percentile
58.3 58.3 58.3 58.3 70.0 78.5 88.9 101 113 119 133 147 180 251 503 116000


Fe
ppm, Percentile
73.8 73.8 73.8 73.8 73.8 73.8 73.8 73.8 73.8 84.0 113 134 190 272 593 1800


Sr
ppm, Percentile
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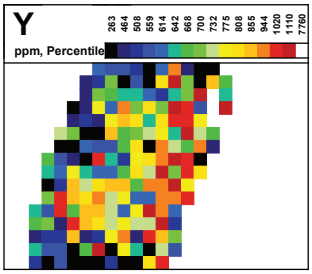
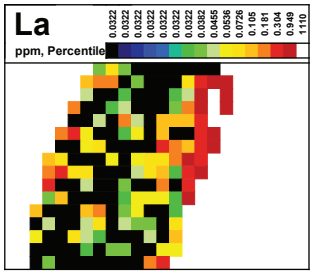

Y
ppm, Percentile
263 464 508 559 614 642 668 700 732 775 808 855 944 1020 1110 7760


La
ppm, Percentile
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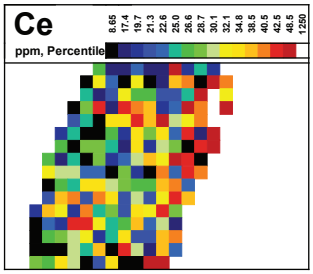
Ce
ppm, Percentile
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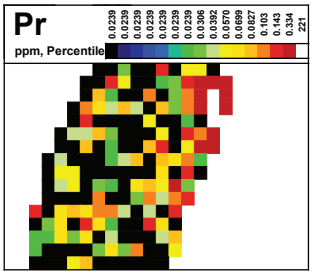
Pr
ppm, Percentile
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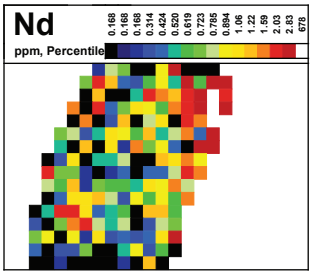
Nd
ppm, Percentile
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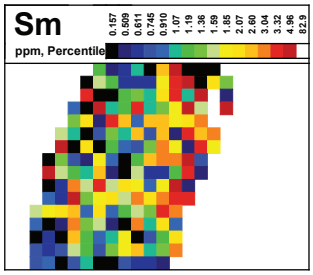
Sm
ppm, Percentile
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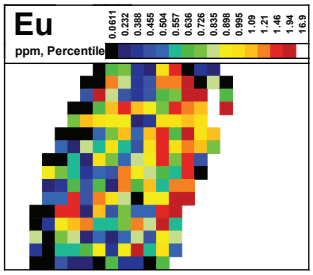
Eu
ppm, Percentile
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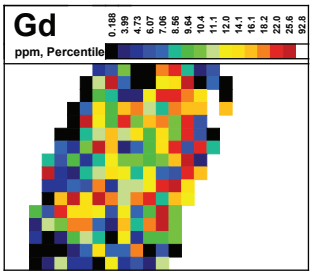
Gd
ppm, Percentile
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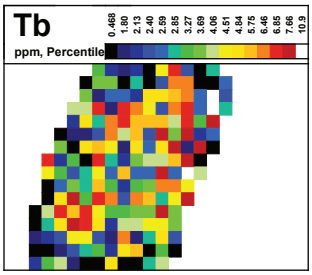
Tb
ppm, Percentile
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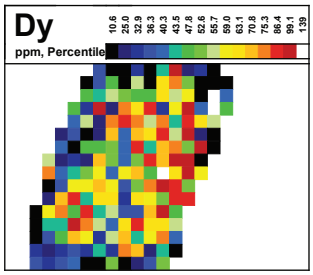
Dy
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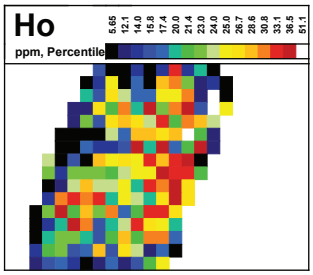
Ho
ppm, Percentile
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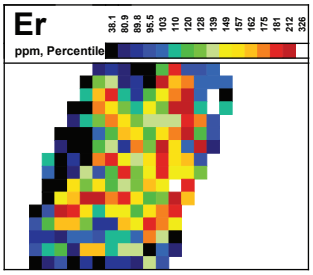
Er
ppm, Percentile
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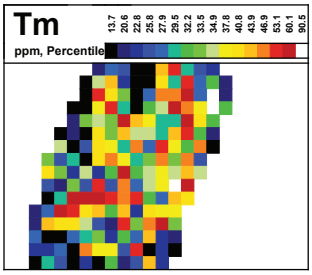
Tm
ppm, Percentile
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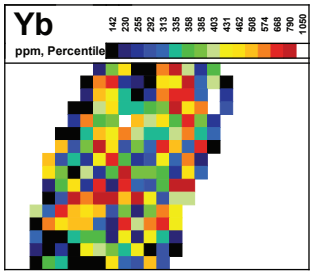
Yb
ppm, Percentile
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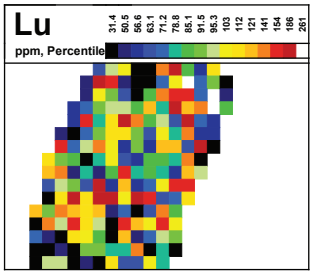
Lu
ppm, Percentile
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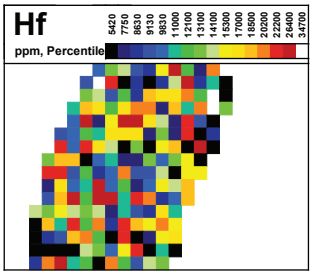
Hf
ppm, Percentile
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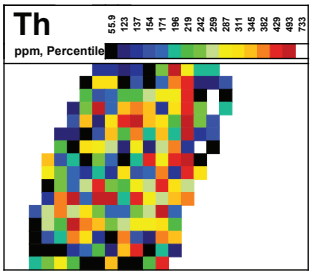
Th
ppm, Percentile
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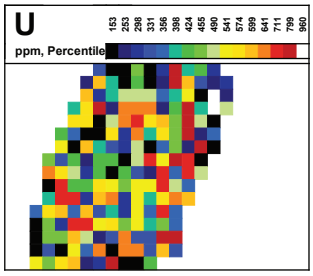
U
ppm, Percentile
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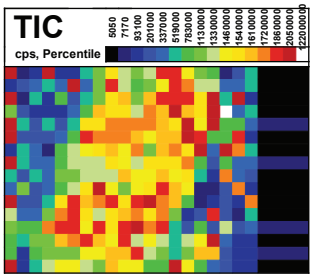
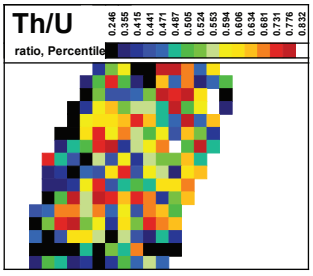

TIC
cps, Percentile
5050 7170 93100 201000 337000 519000 715000 1130000 1330000 1460000 1540000 1610000 1720000 1880000 2050000 22200000


Th/U
ratio, Percentile
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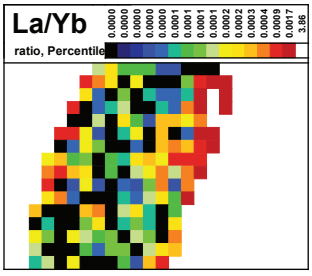
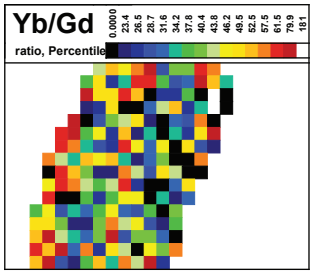

La/Yb
ratio, Percentile
0.0000 0.0000 0.0000 0.0000 0.0000 0.0001 0.0001 0.0001 0.0001 0.0002 0.0002 0.0003 0.0004 0.0009 0.0017 3.86


Yb/Gd
ratio, Percentile
0.000 23.4 26.5 28.7 31.6 34.2 37.8 40.4 43.8 46.2 49.5 52.5 57.5 61.5 79.9 181

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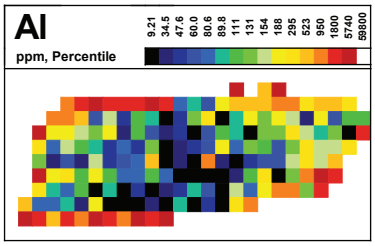
Al
ppm, Percentile
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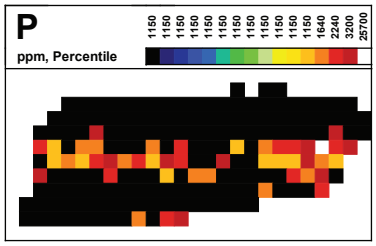
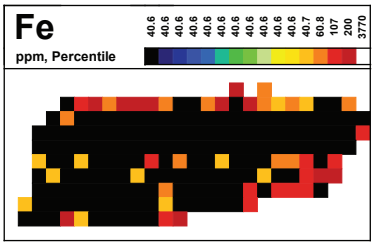
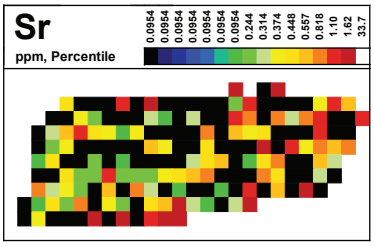
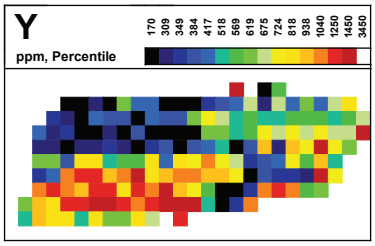
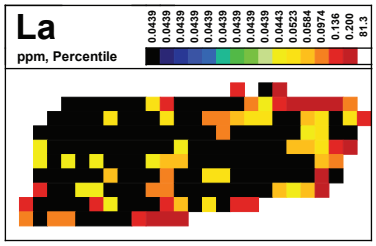
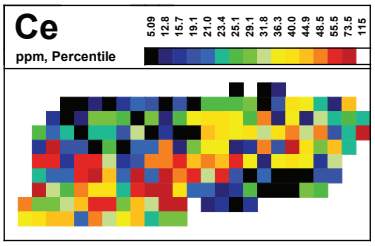

P
ppm, Percentile
1150 1150 1150 1150 1150 1150 1150 1150 1150 1150 1150 1150 1150 1150 1640 2240 3200 25700

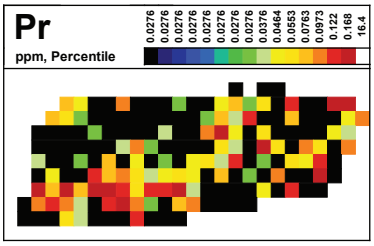

Fe
ppm, Percentile
40.6 40.6 40.6 40.6 40.6 40.6 40.6 40.6 40.6 40.6 40.7 60.8 97 200 3770

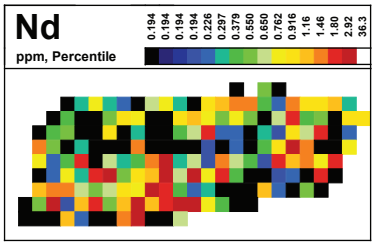

Sr
ppm, Percentile
0.0954 0.0954 0.0954 0.0954 0.0954 0.0954 0.0954 0.244 0.314 0.374 0.448 0.557 0.818 1.10 1.82 33.7

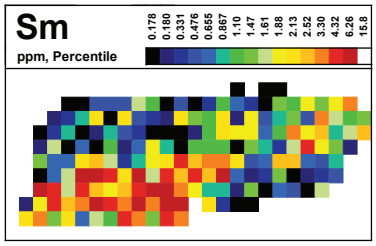

Y
ppm, Percentile
170 309 349 384 417 518 569 619 675 724 818 938 1040 1250 1490 3450

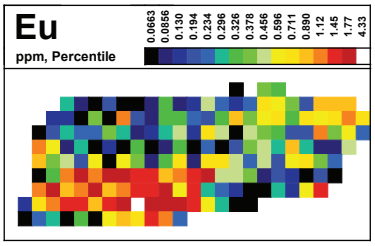

La
ppm, Percentile
0.0439 0.0439 0.0439 0.0439 0.0439 0.0439 0.0439 0.0439 0.0443 0.0523 0.0584 0.0974 0.136 0.200 81.3

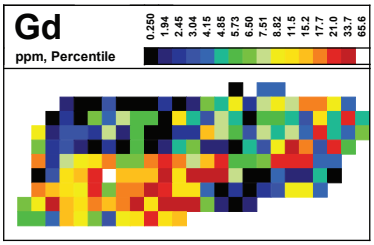

Ce
ppm, Percentile
5.09 12.8 15.7 19.1 21.0 23.4 25.1 29.1 31.8 36.3 40.0 44.9 48.5 55.5 73.5 115

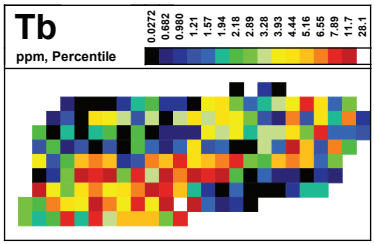

Pr
ppm, Percentile
0.0276 0.0276 0.0276 0.0276 0.0276 0.0276 0.0276 0.0276 0.0376 0.0464 0.0553 0.0763 0.0973 0.122 0.168 16.4

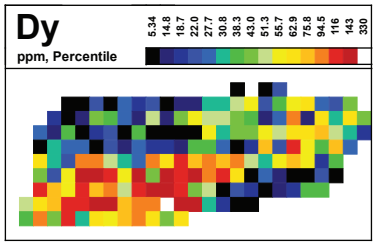

Nd
ppm, Percentile
0.194 0.194 0.194 0.194 0.225 0.297 0.379 0.500 0.650 0.752 0.916 1.16 1.46 1.80 2.92 36.3

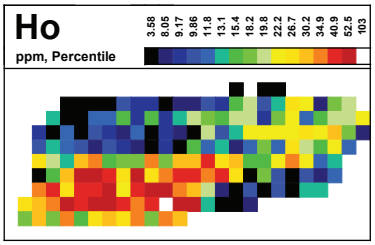

Sm
ppm, Percentile
0.178 0.180 0.331 0.476 0.665 0.867 1.10 1.47 1.61 1.88 2.13 2.52 3.30 4.32 6.26 15.8

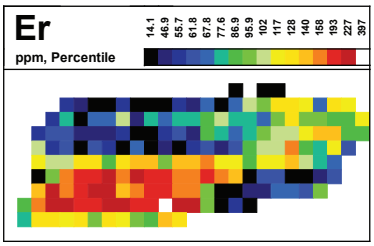

Eu
ppm, Percentile
0.0663 0.0856 0.130 0.194 0.234 0.296 0.326 0.378 0.456 0.596 0.711 0.890 1.12 1.45 1.77 4.33

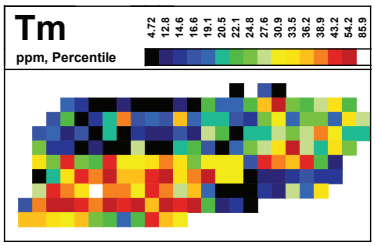

Gd
ppm, Percentile
0.250 1.94 2.45 3.04 4.15 4.85 5.73 6.50 7.51 8.82 11.5 15.2 17.7 21.0 33.7 65.6

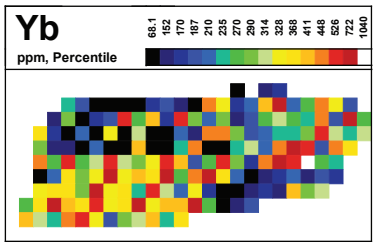

Tb
ppm, Percentile
0.0272 0.682 0.980 1.21 1.57 1.94 2.18 2.89 3.28 3.93 4.44 5.16 5.65 7.89 11.7 28.1

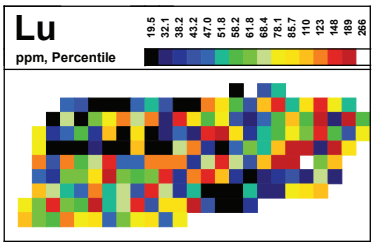

Dy
ppm, Percentile
5.34 14.8 18.7 22.0 27.7 30.8 38.3 43.0 51.3 55.7 62.9 75.8 94.5 116 143 330

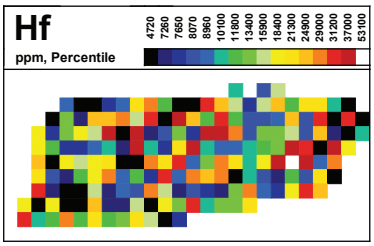

Ho
ppm, Percentile
3.58 8.05 9.17 9.86 11.0 13.1 15.4 18.2 19.8 22.2 26.7 30.2 34.9 40.9 52.5 103

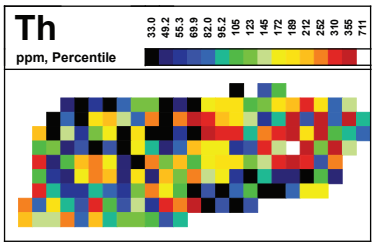

Er
ppm, Percentile
14.1 46.9 55.7 61.8 67.8 77.6 86.9 95.9 102 117 128 140 158 193 227 397

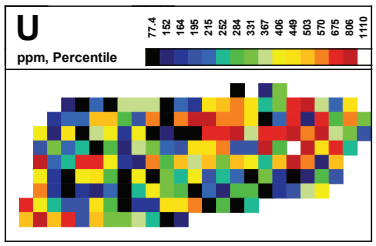

Tm
ppm, Percentile
4.72 12.8 14.6 16.6 19.1 20.5 22.1 24.8 27.6 30.9 35.5 38.2 38.9 43.2 54.2 85.9

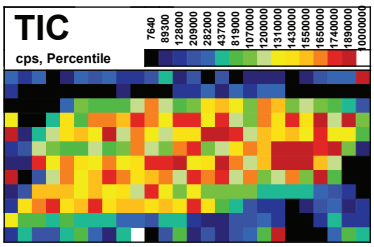

Yb
ppm, Percentile
68.1 152 170 187 210 235 270 290 314 328 368 411 448 526 722 1040

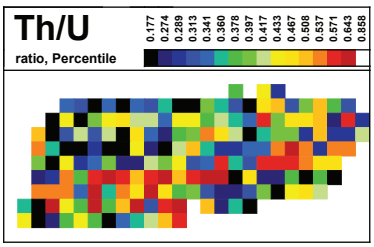

Lu
ppm, Percentile
19.5 32.1 38.2 43.2 47.0 51.8 58.2 61.8 68.4 73.1 85.7 110 123 146 189 286

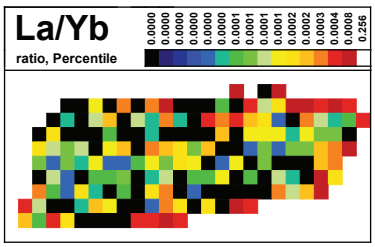

Hf
ppm, Percentile
4720 7260 7650 8070 8960 10100 11800 13400 15900 18400 21300 24900 29000 31200 37000 53100

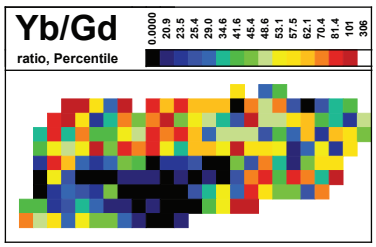

Th
ppm, Percentile
33.0 49.2 55.3 59.9 82.0 95.2 105 123 145 172 189 212 252 310 385 711


U
ppm, Percentile
77.4 152 164 195 215 252 284 331 367 406 449 503 570 675 806 1110

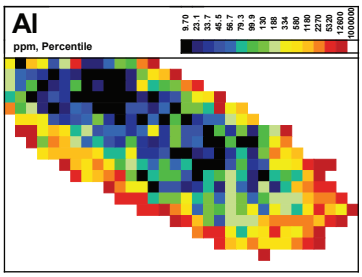

TIC
cps, Percentile
7540 89300 128000 209000 283000 437000 819000 1070000 1200000 1310000 1430000 1560000 1560000 1740000 1890000 10000000

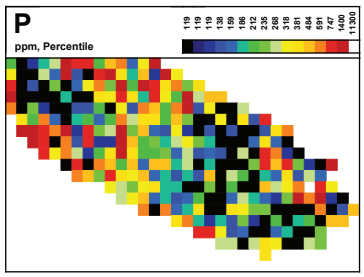

Th/U
ratio, Percentile
0.177 0.274 0.289 0.313 0.341 0.360 0.378 0.397 0.417 0.433 0.467 0.508 0.537 0.571 0.643 0.858

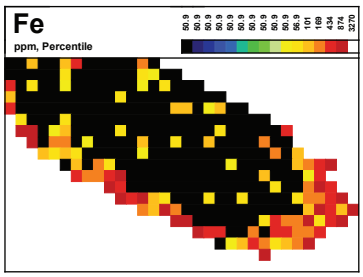

La/Yb
ratio, Percentile
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0001 0.0001 0.0001 0.0001 0.0001 0.0002 0.0002 0.0003 0.0004 0.0008 0.256

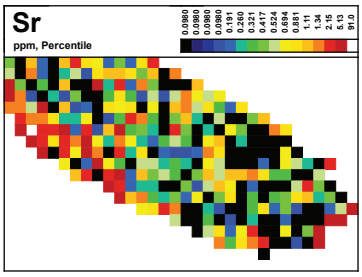

Yb/Gd
ratio, Percentile
0.0000 20.9 23.5 25.4 29.0 34.6 41.6 45.4 48.6 53.1 57.5 62.1 70.4 81.4 101 306

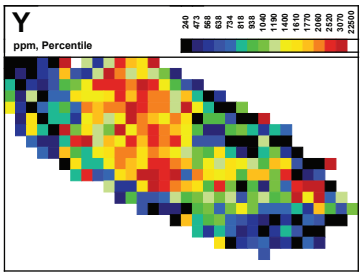
SI 5.2
ZF-67

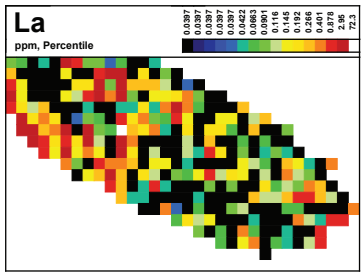

Al
ppm, Percentile

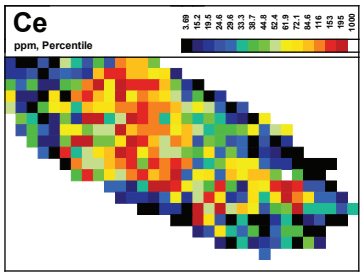

P
ppm, Percentile

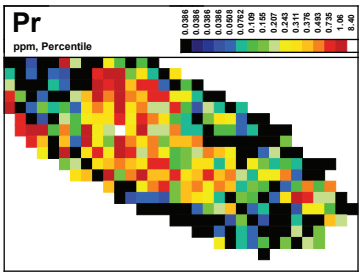

Fe
ppm, Percentile

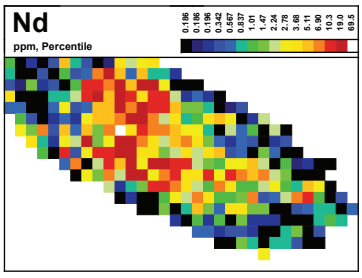

Sr
ppm, Percentile

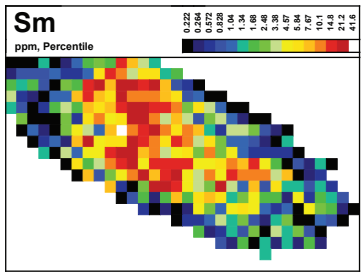

Y
ppm, Percentile

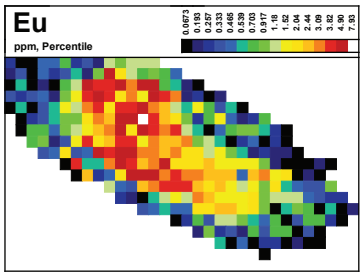

La
ppm, Percentile

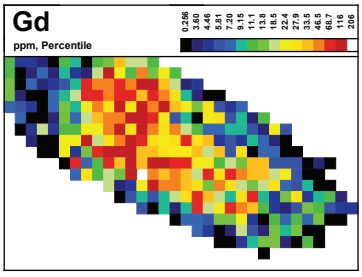

Ce
ppm, Percentile

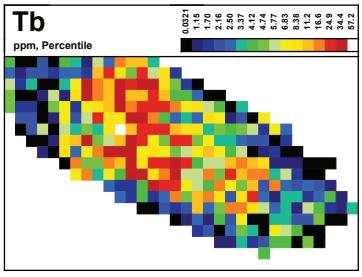

Pr
ppm, Percentile

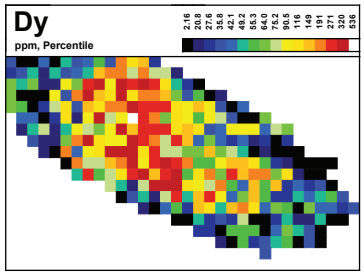

Nd
ppm, Percentile

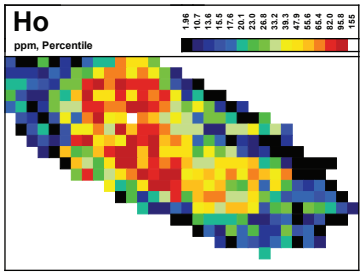

Sm
ppm, Percentile

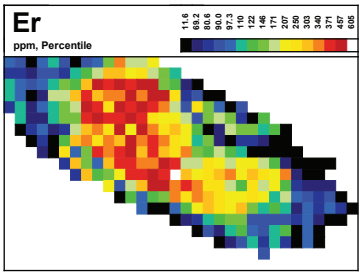

Eu
ppm, Percentile

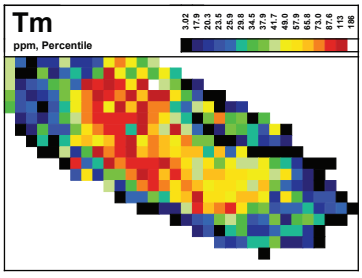

Gd
ppm, Percentile

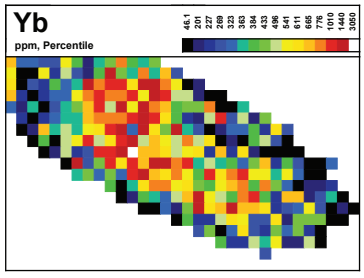

Tb
ppm, Percentile

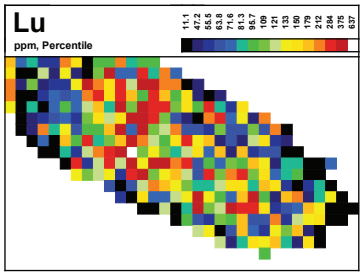

Dy
ppm, Percentile

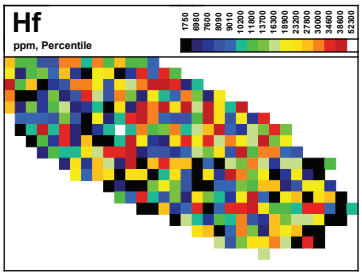

Ho
ppm, Percentile

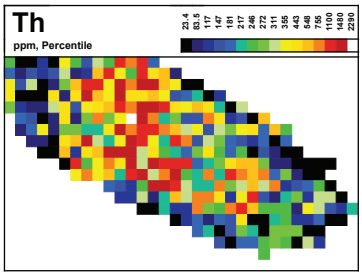

Er
ppm, Percentile

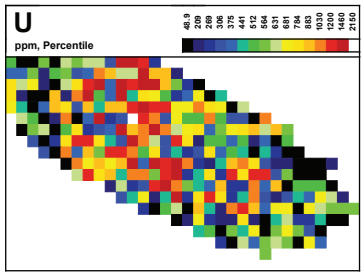

Tm
ppm, Percentile

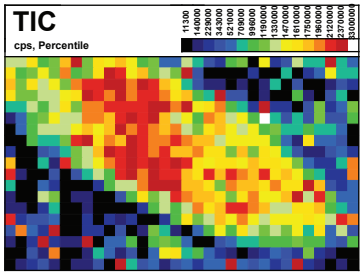

Yb
ppm, Percentile

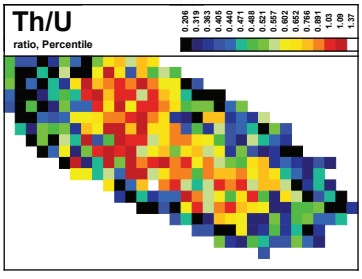

Lu
ppm, Percentile

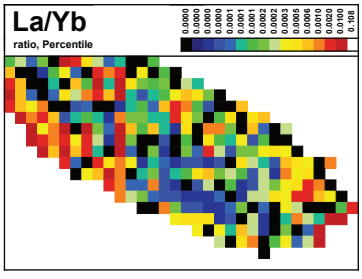

Hf
ppm, Percentile

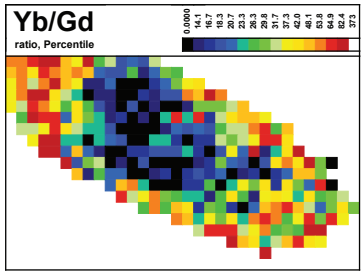

Th
ppm, Percentile


U
ppm, Percentile


TIC
cps, Percentile


Th/U
ratio, Percentile


La/Yb
ratio, Percentile


Yb/Gd
ratio, Percentile

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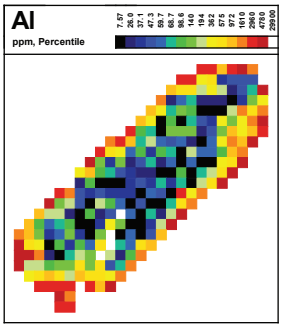
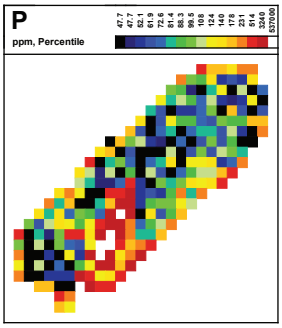
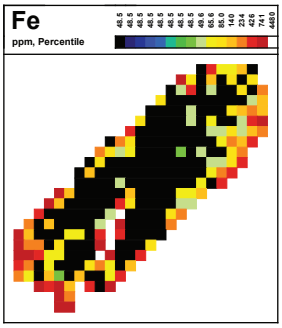
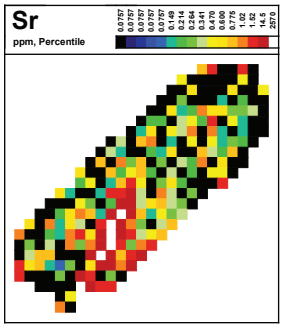
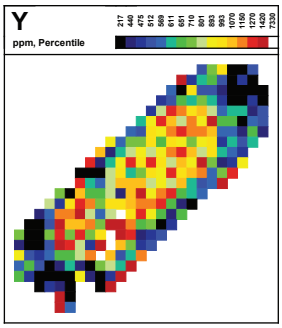
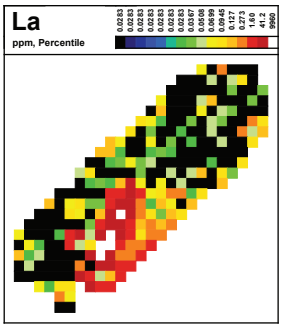

Al
ppm, Percentile

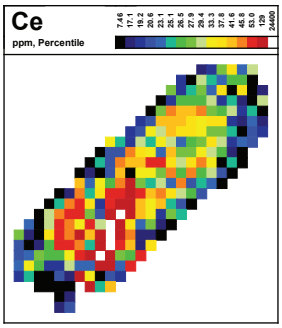

P
ppm, Percentile

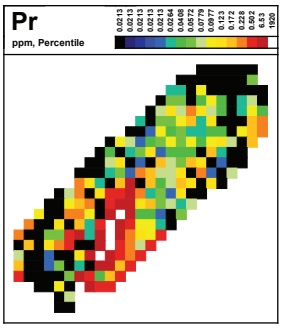

Fe
ppm, Percentile

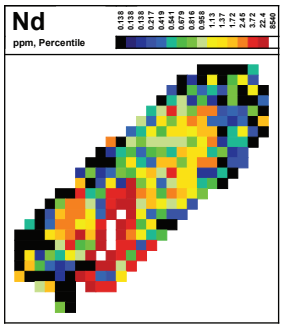

Sr
ppm, Percentile

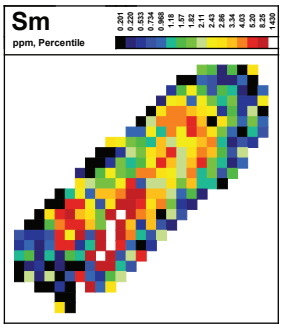

Y
ppm, Percentile

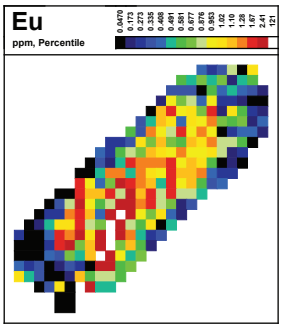

La
ppm, Percentile

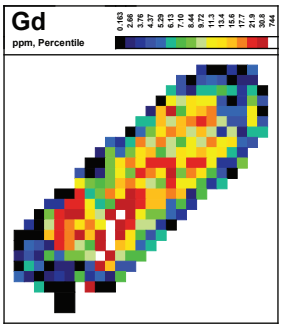

Ce
ppm, Percentile

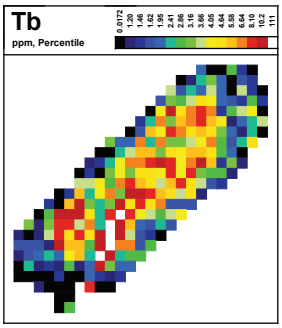

Pr
ppm, Percentile

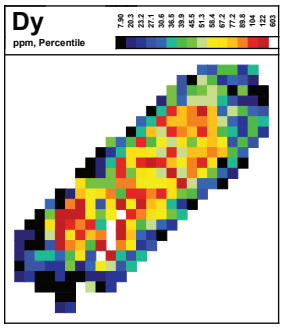

Nd
ppm, Percentile

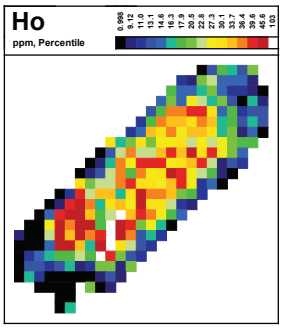

Sm
ppm, Percentile

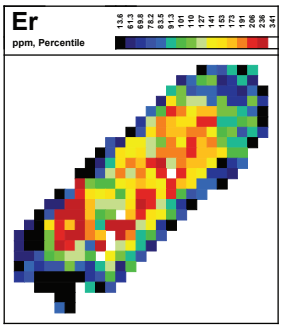

Eu
ppm, Percentile

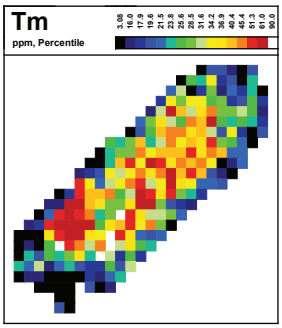

Gd
ppm, Percentile

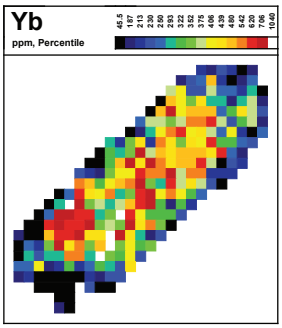

Tb
ppm, Percentile

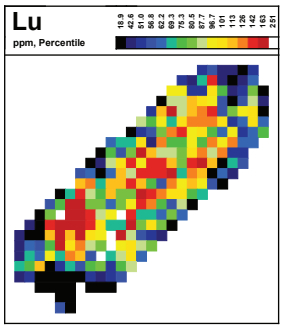

Dy
ppm, Percentile

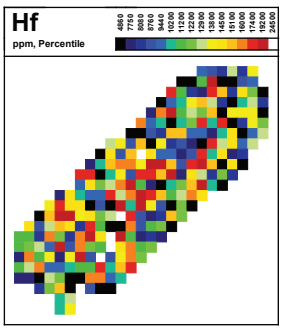

Ho
ppm, Percentile

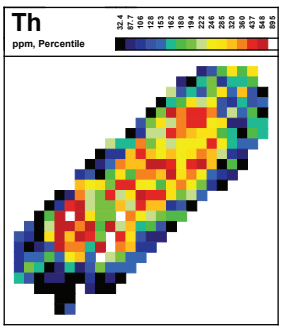

Er
ppm, Percentile

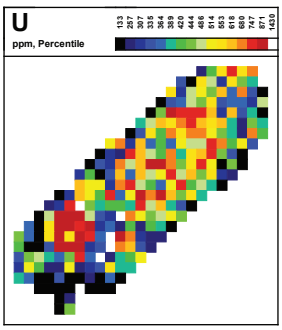

Tm
ppm, Percentile

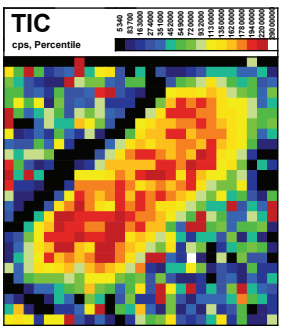

Yb
ppm, Percentile

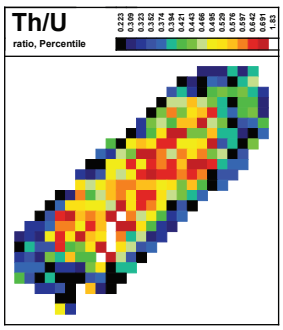

Lu
ppm, Percentile

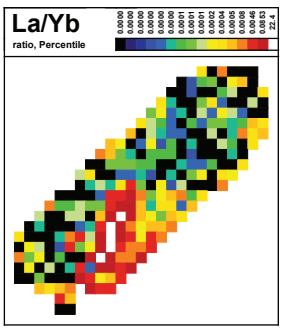

Hf
ppm, Percentile

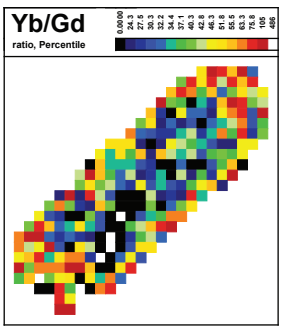

Th
ppm, Percentile


U
ppm, Percentile


TIC
cps, Percentile


Th/U
ratio, Percentile


La/Yb
ratio, Percentile


Yb/Gd
ratio, Percentile

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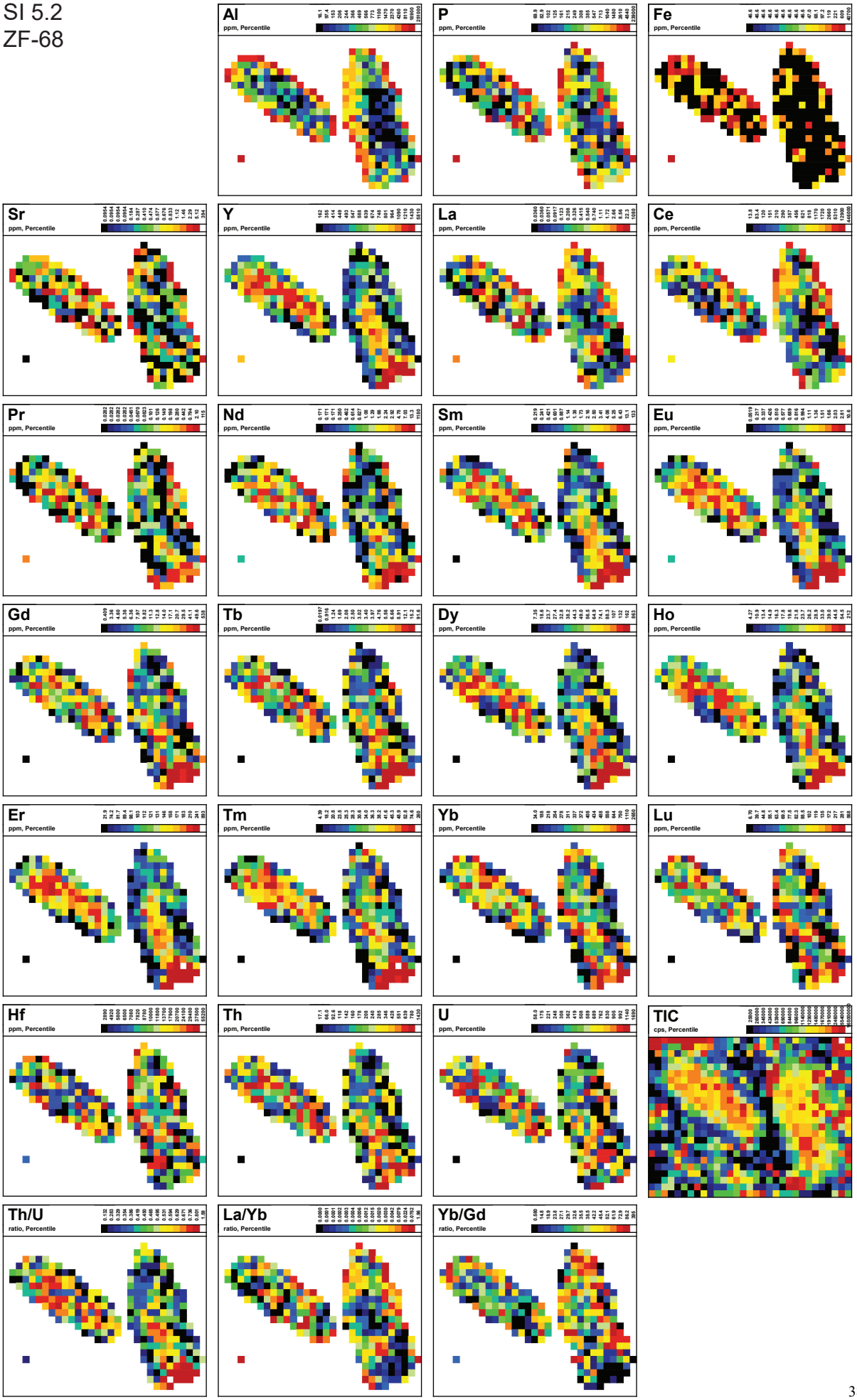
Al
ppm, Percentile
P
ppm, Percentile
Fe
ppm, Percentile
Sr
ppm, Percentile
Y
ppm, Percentile
La
ppm, Percentile
Ce
ppm, Percentile
Pr
ppm, Percentile
Nd
ppm, Percentile
Sm
ppm, Percentile
Eu
ppm, Percentile
Gd
ppm, Percentile
Tb
ppm, Percentile
Dy
ppm, Percentile
Ho
ppm, Percentile
Er
ppm, Percentile
Tm
ppm, Percentile
Yb
ppm, Percentile
Lu
ppm, Percentile
Hf
ppm, Percentile
Th
ppm, Percentile
U
ppm, Percentile
TIC
cps, Percentile
Th/U
ratio, Percentile
La/Yb
ratio, Percentile
Yb/Gd
ratio, Percentile

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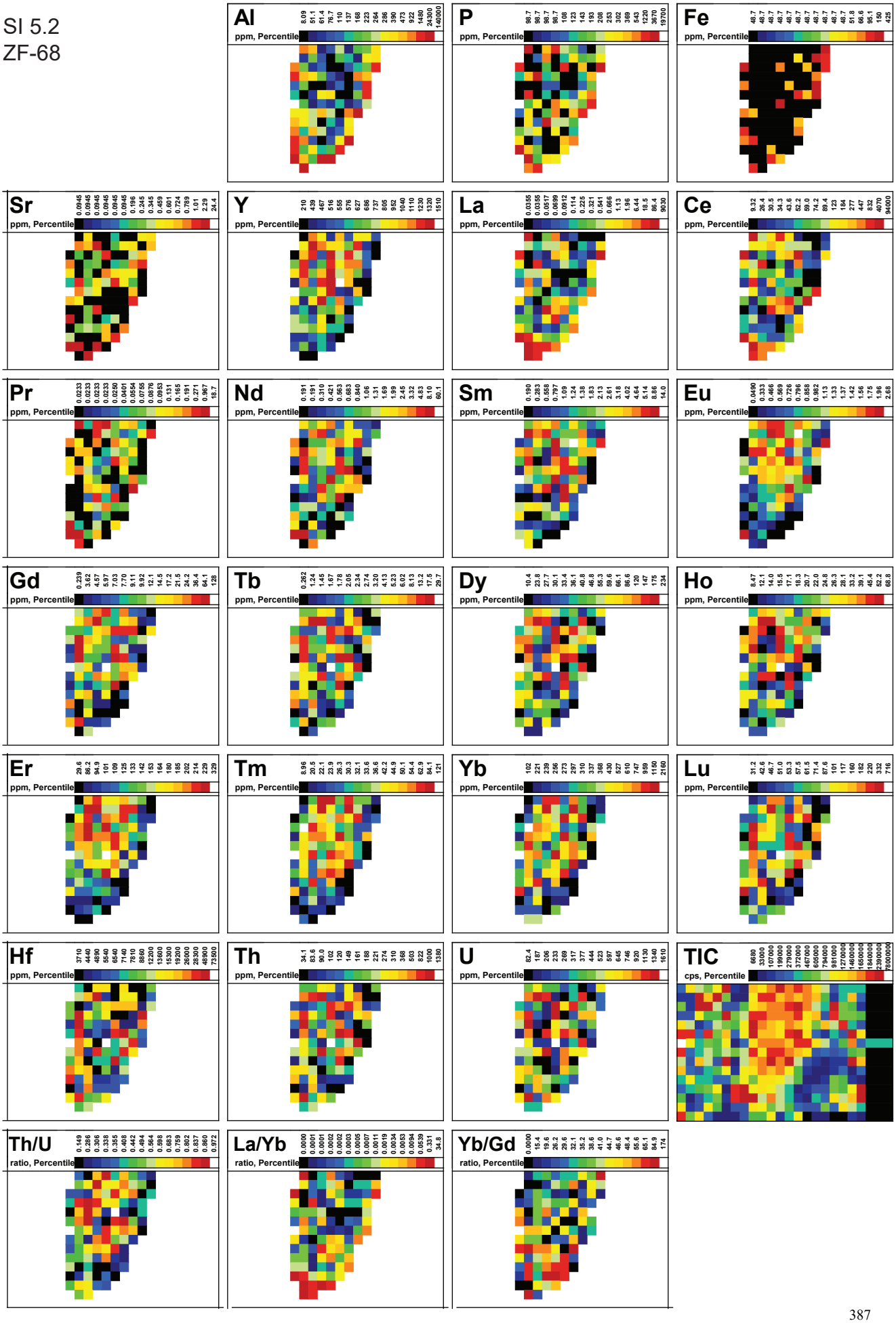
Al
ppm, Percentile
8.09 51.1 61.4 76.7 110 137 168 223 286 390 473 922 1480 24300 140000
P
ppm, Percentile
98.7 98.7 98.7 98.7 108 123 143 193 208 253 302 369 543 1220 3870 19700
Fe
ppm, Percentile
48.7 48.7 48.7 48.7 48.7 48.7 48.7 48.7 48.7 48.7 48.7 48.7 48.7 51.8 66.6 95.1 150 425
Sr
ppm, Percentile
0.0945 0.0945 0.0945 0.0945 0.0945 0.0945 0.196 0.245 0.345 0.459 0.601 0.724 0.789 1.01 2.29 24.4
Y
ppm, Percentile
210 489 497 516 555 576 627 686 737 805 952 1040 1110 1230 1320 1510
La
ppm, Percentile
0.0355 0.0355 0.0517 0.0699 0.0912 0.114 0.225 0.321 0.541 0.666 1.13 1.96 6.44 16.5 66.4 90.30
Ce
ppm, Percentile
9.32 26.4 30.5 34.3 43.6 52.2 59.0 74.2 89.4 184 277 447 832 4070 94000
Pr
ppm, Percentile
0.0233 0.0233 0.0233 0.0233 0.0260 0.0401 0.0554 0.0745 0.0795 0.0953 0.131 0.165 0.191 0.271 0.967 18.7
Nd
ppm, Percentile
0.191 0.191 0.310 0.421 0.563 0.683 0.840 1.06 1.31 1.69 1.99 2.45 3.32 4.83 8.10 60.1
Sm
ppm, Percentile
0.190 0.283 0.558 0.797 1.09 1.24 1.38 1.83 2.13 2.61 3.18 4.02 4.64 5.14 6.66 14.0
Eu
ppm, Percentile
0.0490 0.333 0.466 0.569 0.726 0.796 0.858 0.962 1.13 1.33 1.37 1.42 1.56 1.75 1.96 2.68
Gd
ppm, Percentile
0.239 3.62 4.57 5.97 7.03 7.70 9.11 9.92 12.1 14.1 17.2 21.5 24.2 36.4 64.1 128
Tb
ppm, Percentile
0.262 1.24 1.45 1.67 1.78 2.05 2.34 2.74 3.20 4.13 5.23 6.02 8.13 13.2 17.5 29.7
Dy
ppm, Percentile
10.4 23.8 27.7 30.1 33.4 36.1 40.8 46.8 55.3 89.6 66.1 86.6 120 147 175 234
Ho
ppm, Percentile
8.47 12.1 14.0 15.5 17.1 18.3 20.7 22.0 24.8 26.3 28.1 33.2 39.1 45.4 52.2 68.8
Er
ppm, Percentile
29.6 86.2 94.9 101 109 125 133 142 153 164 180 185 202 214 229 329
Tm
ppm, Percentile
8.96 20.5 22.1 23.9 26.3 30.3 32.1 33.6 36.6 42.2 44.9 50.1 54.4 62.9 84.1 121
Yb
ppm, Percentile
102 221 239 256 273 297 310 337 368 430 527 610 747 989 1160 2160
Lu
ppm, Percentile
31.2 42.6 46.7 51.0 53.3 57.5 61.5 71.4 87.6 97.1 117 160 182 220 332 716
Hf
ppm, Percentile
3710 4440 4890 5540 6540 7140 7810 8960 12200 13600 15300 19200 26000 28300 48900 73500
Th
ppm, Percentile
34.1 82.6 92.1 102 120 149 161 188 221 274 310 368 503 822 1000 1380
U
ppm, Percentile
82.4 197 206 233 269 317 377 444 523 597 645 746 920 1130 1340 1610
TIC
cps, Percentile
6680 33000 107000 199000 279000 372000 467000 605000 794000 951000 1270000 1460000 1650000 1840000 2390000 7800000
Th/U
ratio, Percentile
0.149 0.286 0.306 0.338 0.355 0.408 0.442 0.464 0.544 0.598 0.683 0.759 0.802 0.837 0.860 0.972
La/Yb
ratio, Percentile
0.0000 0.0001 0.0001 0.0002 0.0002 0.0003 0.0005 0.0007 0.0011 0.0019 0.0034 0.0053 0.0094 0.0539 0.331 34.8
Yb/Gd
ratio, Percentile
0.0000 15.4 19.6 26.2 29.6 32.1 35.2 38.6 41.0 44.7 46.6 48.4 55.6 65.1 84.9 174

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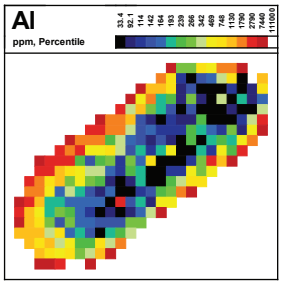
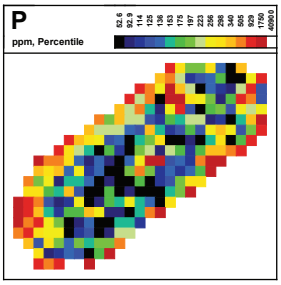
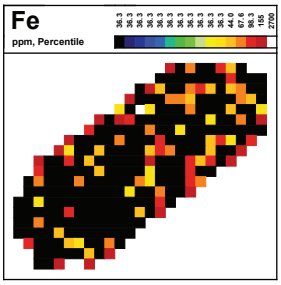
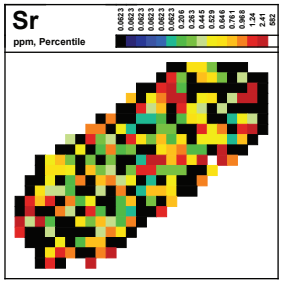
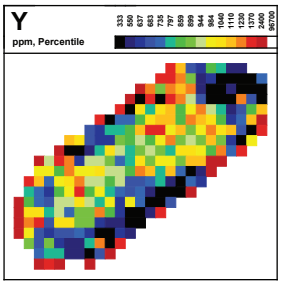
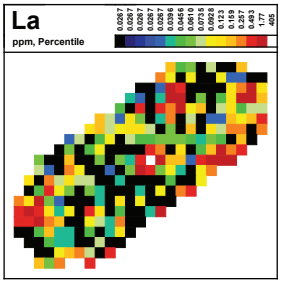

Al
ppm, Percentile

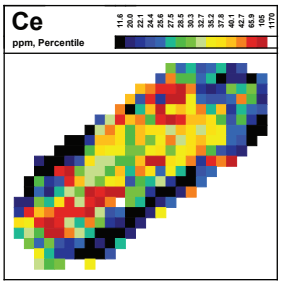

P
ppm, Percentile

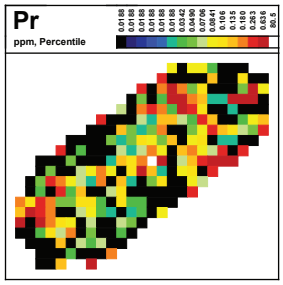

Fe
ppm, Percentile

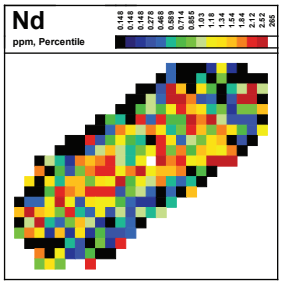

Sr
ppm, Percentile

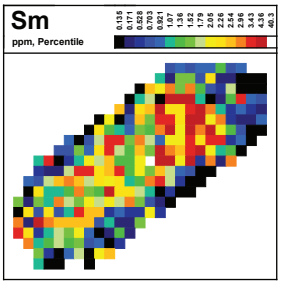

Y
ppm, Percentile

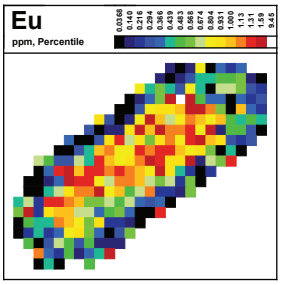

La
ppm, Percentile

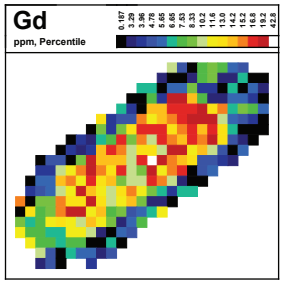

Ce
ppm, Percentile

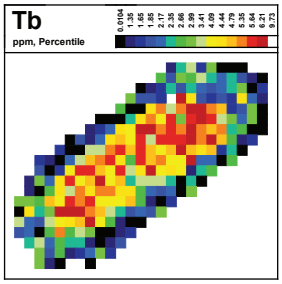

Pr
ppm, Percentile

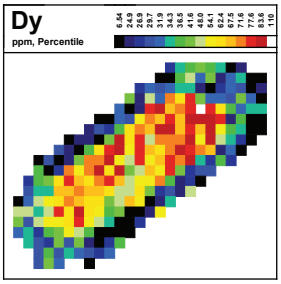

Nd
ppm, Percentile

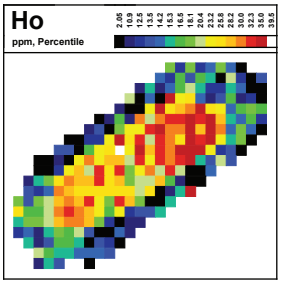

Sm
ppm, Percentile

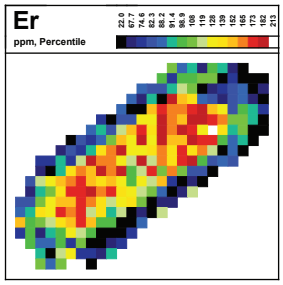

Eu
ppm, Percentile


Gd
ppm, Percentile


Tb
ppm, Percentile


Dy
ppm, Percentile


Ho
ppm, Percentile


Er
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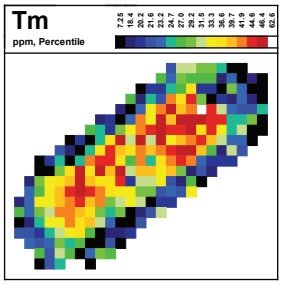
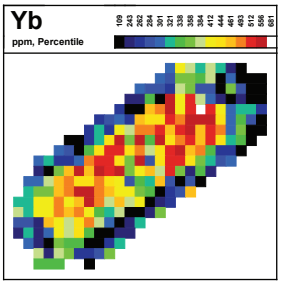

Tm
ppm, Percentile


Yb
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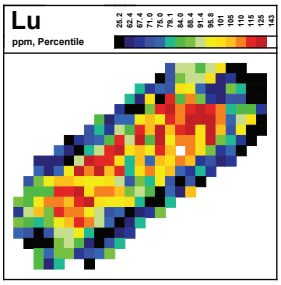
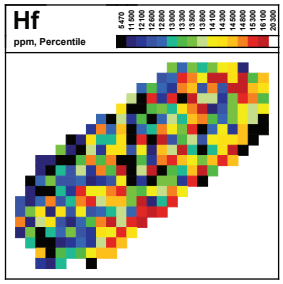
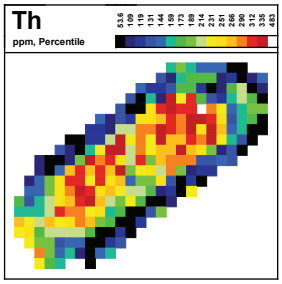

Lu
ppm, Percentile


Hf
ppm, Percentile


Th
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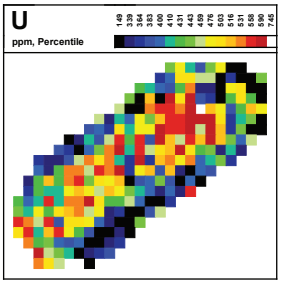
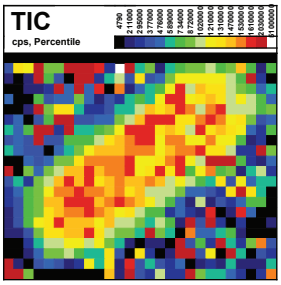
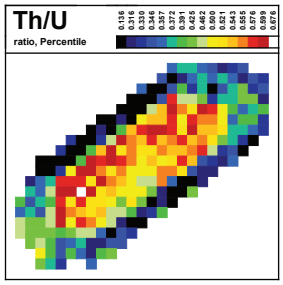
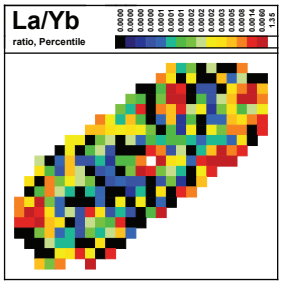
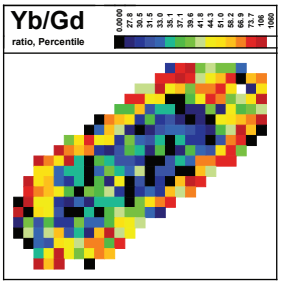

U
ppm, Percentile

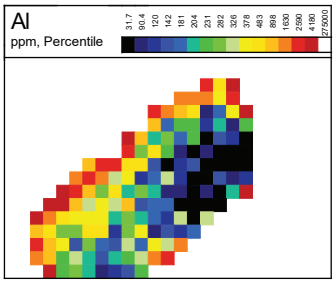

TIC
cps, Percentile

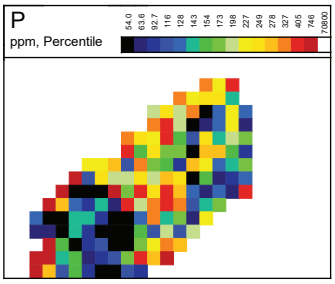

Th/U
ratio, Percentile

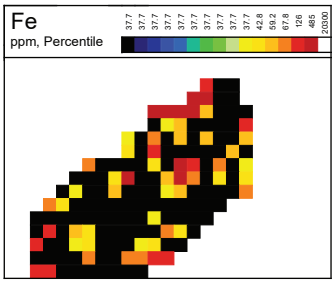

La/Yb
ratio, Percentile

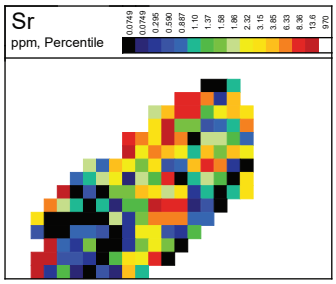

Yb/Gd
ratio, Percentile

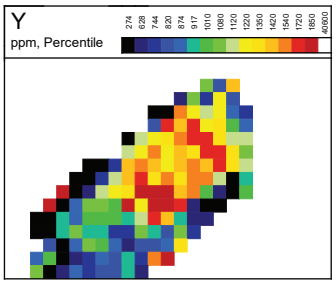
Zircon experiment 69
1 M NaOH
2 mg YPO_4

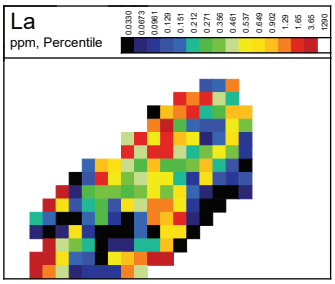


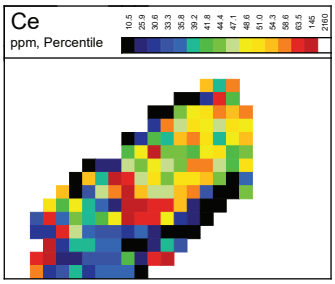


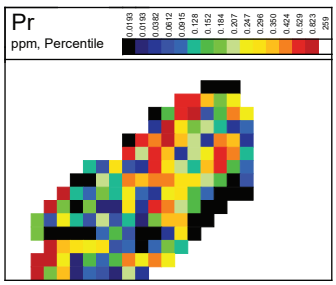


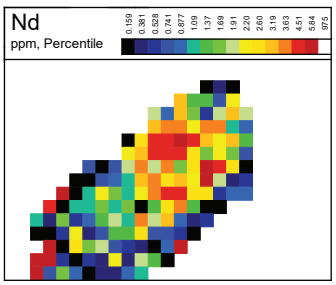


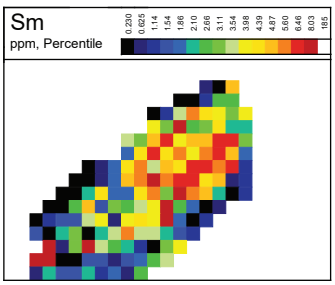


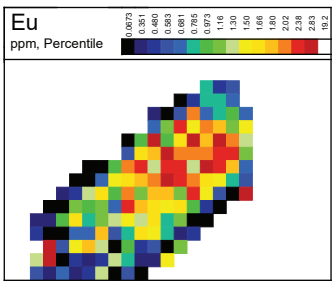


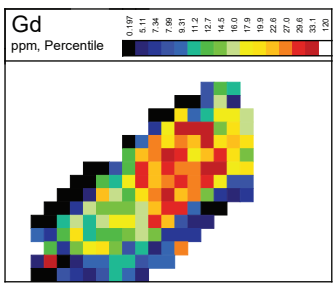


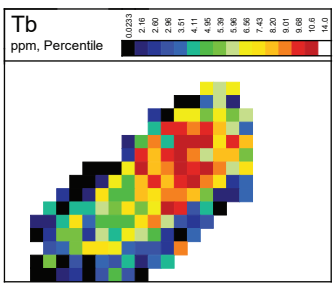


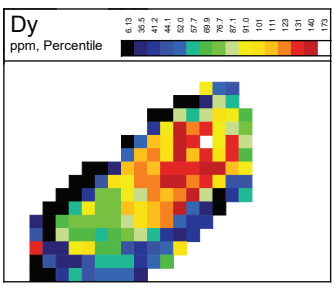


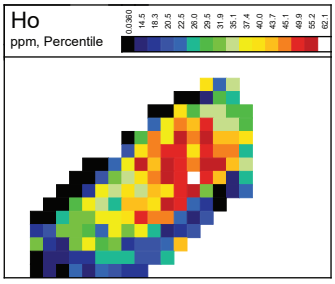


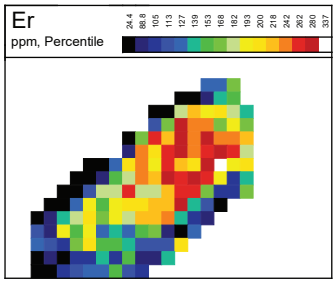


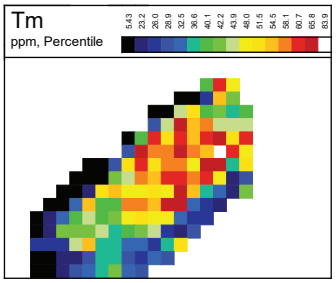


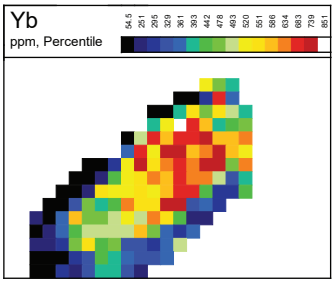


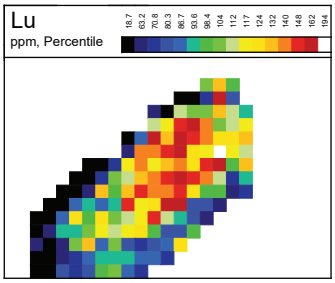


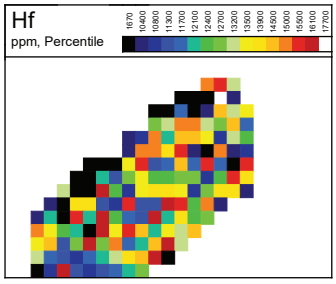


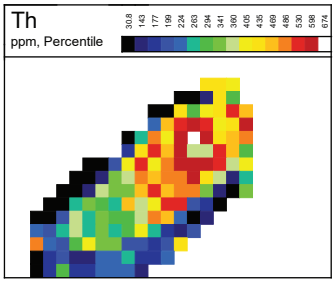


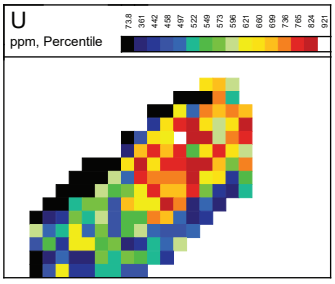


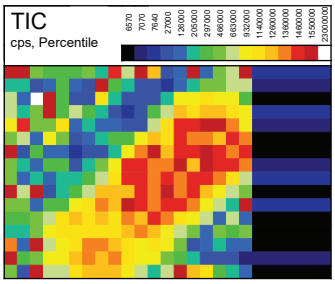


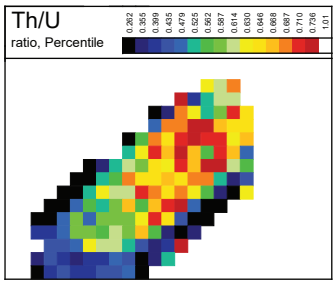


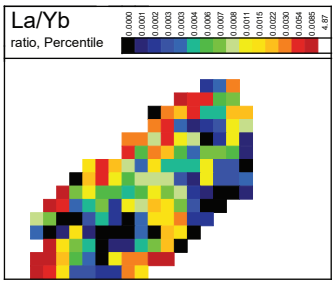


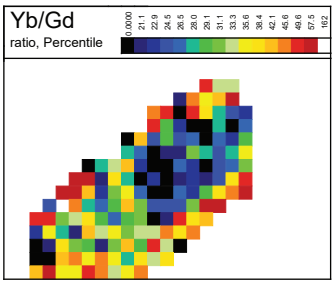




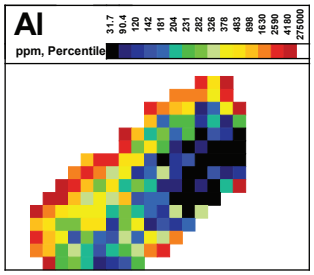








SI 5.2
ZF-69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ppm, Percentile
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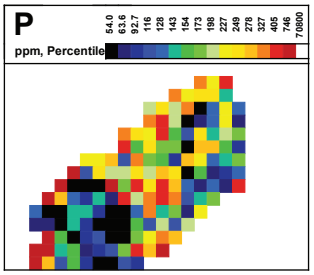
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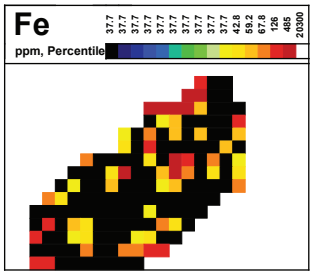
Fe
ppm, Percentile
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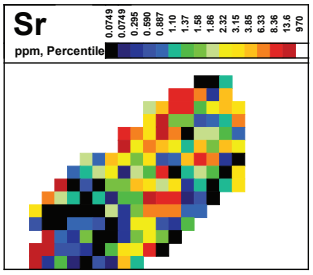
Sr
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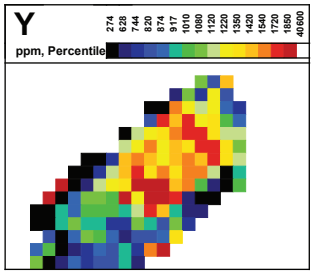
Y
ppm, Percentile
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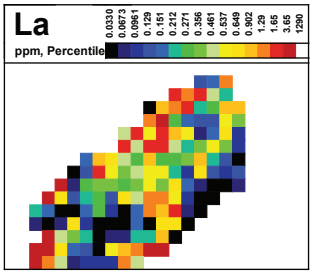
La
ppm, Percentile
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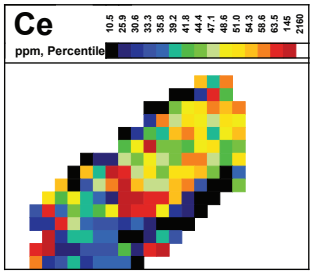
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ppm, Percentile
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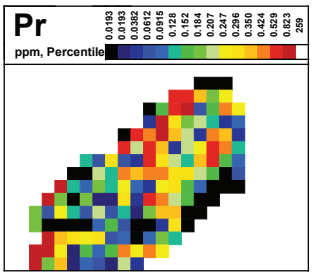
Pr
ppm, Percentile
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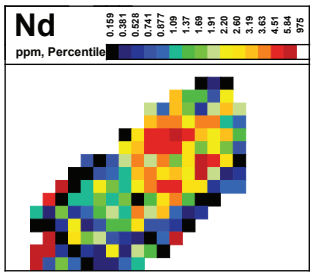
Nd
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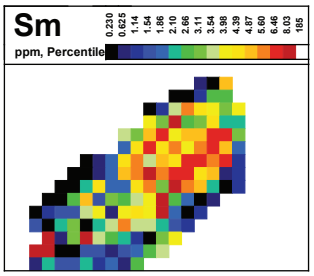
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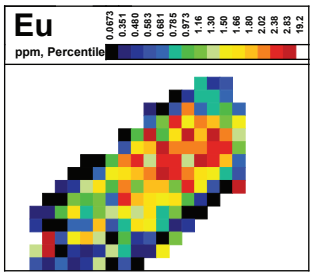
Eu
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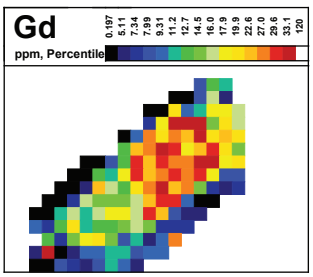
Gd
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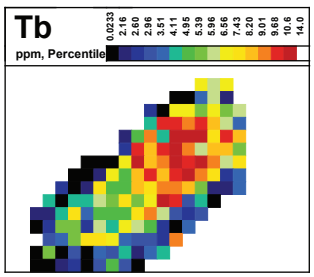
Tb
ppm, Percentile
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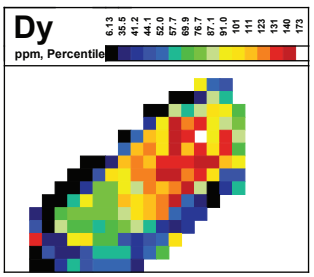
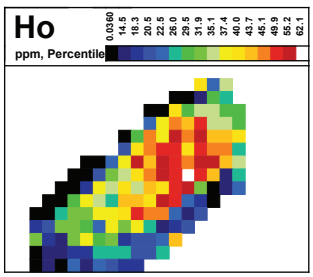
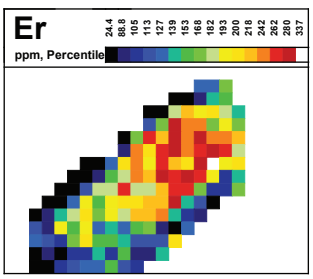
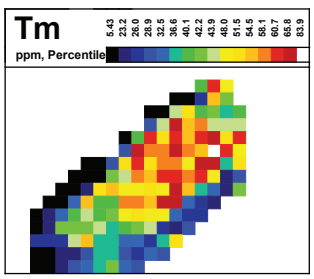
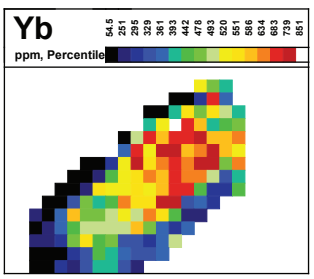
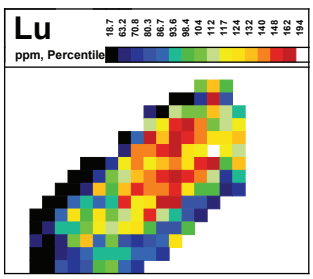

Dy
ppm, Percentile
6.13 35.5 41.2 44.1 52.0 57.7 69.9 78.7 87.1 91.0 101 111 123 131 140 173

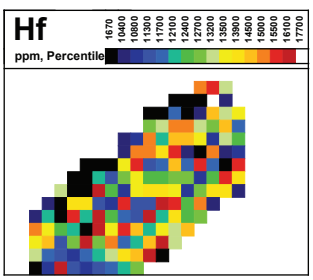

Ho
ppm, Percentile
0.0360 14.5 16.3 20.5 22.5 26.0 29.5 31.9 35.1 37.4 40.0 43.7 45.1 49.9 55.2 62.1

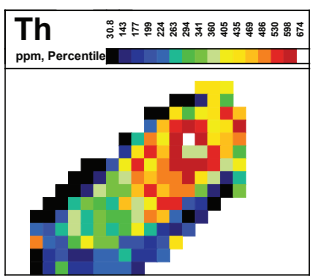

Er
ppm, Percentile
24.4 88.8 105 113 127 139 153 165 182 193 200 218 242 262 280 337

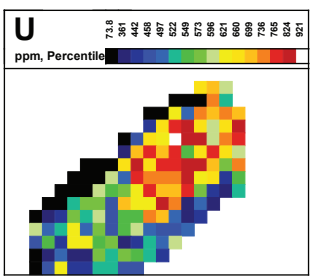

Tm
ppm, Percentile
5.43 23.2 28.0 28.9 32.5 36.6 40.1 42.2 43.9 48.0 51.5 54.5 58.7 60.7 65.8 83.9

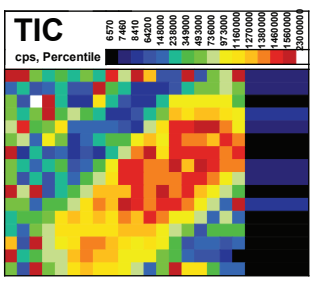

Yb
ppm, Percentile
54.5 251 295 329 361 393 442 468 493 520 551 586 634 683 739 851

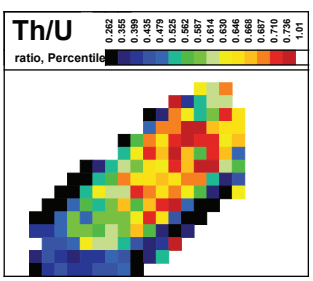

Lu
ppm, Percentile
18.7 83.2 93.6 80.3 86.7 93.6 98.4 104 112 117 124 132 140 148 162 194

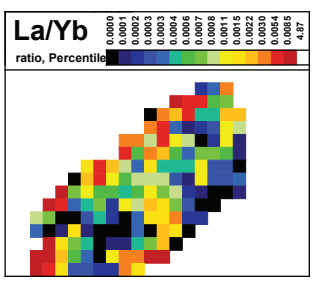

Hf
ppm, Percentile
1670 10400 10800 11300 11700 12100 12400 12700 13200 13500 13900 14500 15000 15500 16100 17700

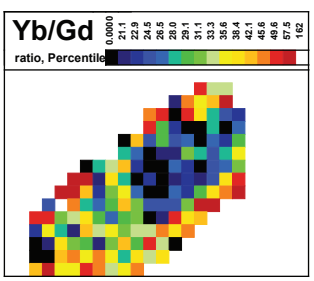

Th
ppm, Percentile
30.8 143 177 199 224 263 294 341 360 405 435 469 496 530 598 674

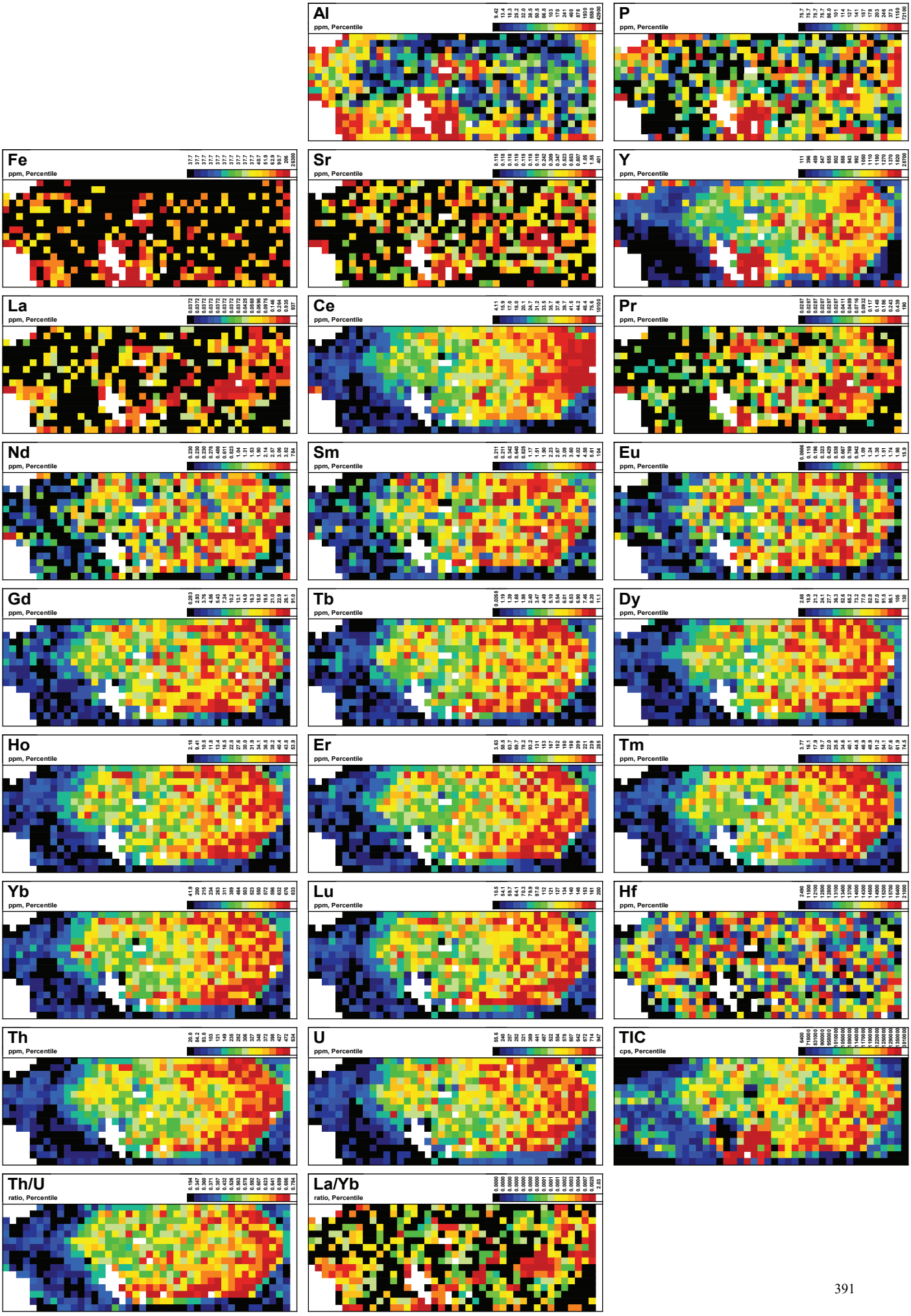

U
ppm, Percentile
73.8 361 442 458 497 522 549 573 596 621 660 699 736 765 824 921


TIC
cps, Percentile
6570 7460 8410 64200 148000 238000 348000 493000 736000 973000 1160000 1270000 1360000 1460000 1560000 23000000


Th/U
ratio, Percentile
0.262 0.355 0.399 0.435 0.479 0.528 0.562 0.597 0.614 0.630 0.646 0.668 0.687 0.710 0.736 1.01


La/Yb
ratio, Percentile
0.0000 0.0001 0.0001 0.0003 0.0003 0.0004 0.0006 0.0007 0.0008 0.0011 0.0015 0.0022 0.0030 0.0054 0.0085 4.87


Yb/Gd
ratio, Percentile
0.0000 21.1 22.9 24.5 26.5 28.0 29.1 31.1 33.3 35.6 38.4 42.1 45.6 49.6 57.5 162


Al
ppm, Percentile
P
ppm, Percentile
Fe
ppm, Percentile
Sr
ppm, Percentile
Y
ppm, Percentile
La
ppm, Percentile
Ce
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Pr
ppm, Percentile
Nd
ppm, Percentile
Sm
ppm, Percentile
Eu
ppm, Percentile
Gd
ppm, Percentile
Tb
ppm, Percentile
Dy
ppm, Percentile
Ho
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Er
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Tm
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Yb
ppm, Percentile
Lu
ppm, Percentile
Hf
ppm, Percentile
Th
ppm, Percentile
U
ppm, Percentile
TIC
cps, Percentile
Th/U
ratio, Percentile
La/Yb
ratio, Percentile