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Holocene climate variability and long-term diatom community dynamics in a small lake on Victoria Island, NWT, Canada

by
Brandi Podritske

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Abstract

A lake sediment core spanning 9900 years, collected from a small lake on western Victoria Island, provides a high-resolution record of diatom community dynamics over the Holocene. Ten radiocarbon dates and ^{210}Pb dating provided the core chronology. Loss-on-ignition (LOI) gradually increased over the Holocene whereas carbonate content and magnetic susceptibility showed an inverse trend. Biogenic silica content had apparent cyclicity over ~1500 year periods. Major shifts in diatom assemblages at 8100-8000 calendar years before present (cal yrs BP), 5800-5700 cal yrs BP, and 3800-3500 cal yrs BP occurred simultaneously with millennial-scale climate changes reported from the region. There is evidence of diatom community response to centennial scale variations such as the 'Medieval Warm Period' (~1000-700 calendar years before present, cal yrs BP), 'Little Ice Age' (~800-150 cal yrs BP) and recent warming. Variations of the taxa within the genera Staurosira, Pseudostaurosira, Fragilaria, and Staurosirella, usually combined into one genus in Arctic lake sediment studies, suggest these taxa may be more useful in paleolimnological studies than previously believed. Although recent changes in diatom community composition, production and species richness were apparent they were surpassed at other periods throughout the Holocene. The rate of community compositional change in the last few centuries was rapid, however it was not exceptional in the lake history.

Resumé

Le but de cette recherche fut d'évaluer la relation entre diverses dynamiques au sein des communautés de diatomées et la variabilité du climat durant l'Holocène dans un site du nord du Canada. Une étude à haute résolution des diatomées fut effectuée sur une carotte de sédiment prélevée d'un lac situé sur l'île Victoria dans les Territoires du Nord Ouest. Cette étude permit d'identifier les changements au sein des assemblages de diatomées au cours des 9,000 dernières années. La chronologie de cette carotte de sédiment fut déterminée par le biais d'analyses au radiocarbone (10 datations SMA) et à l'isotope Pb^{210}. Les procédés de perte au feu (loss on ignition), de calcul de la susceptibilité magnétique et d'analyse du contenu de silice biogénique ainsi que le calcul des concentrations de diatomées furent tous utilisés afin de qualifier les changements dans l'environnement sédimentaire de la carotte. Des changements significatifs dans la composition communautaire des diatomées se sont révélés synchrones avec d'importantes variations climatologiques durant holocène observées dans d'autres études. De plus, d'importantes variations au sein des genres *Staurosira, Pseudostaurosira*, *Fragilaria*, à *Staurosirella*, ont indiqué que ces dernières ont le potentiel d'être importants outils paléolimnologiques qui ne devraient plus être groupés ensemble sous un même genre. Une forte corrélation positive fut observée entre la richesse spécifique de diatomées et l'assemblage de diatomées, ce qui suggère une relation étroite entre la richesse des espèces de la communauté des diatomées et la variabilité de la composition de cette communauté. La productivité des diatomées ne fut pas fortement corrélée à la richesse de ses espèces. Par contre, une légère hausse en productivité fut observée aprés toutes les transitions en composition de la communauté de diatomées. Les variations récentes de ces facteurs, bien qu'elles soient significatives, ne dépassent nullement les variations de ces mêmes facteurs à d'autres moments de l'Holocène. Bien que le taux de changement des assemblages de diatomées fut rapide au cours des derniers siècles, il ne fut point exceptionnel dans le cadre historique de ce lac.

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Chapter 1: Introduction and Literature review

1.1 Arctic climate change and freshwater ecosystems

Global average temperatures have increased by ~0.6 ± 0.2 °C over the 20th century (IPCC 2001b) and in some high-latitude areas the increase has been up to 5°C (IPCC 2001a). Climate models predict that temperature will continue to increase in Arctic regions (IPCC 2001a). Temperature increases in these regions have been accompanied by changes in precipitation as well (IPCC 2001a). Impacts of recent climate change in these regions have already been observed, including increased glacial melt and permafrost thaw, along with decreased snow cover and sea-ice extent (ACIA 2005). These changes in the cryosphere of Arctic regions could have impacts on the rest of the world. For example, increased melting of glaciers and ice sheets could cause sea level to rise and oceans to freshen, resulting in change in global ocean circulation patterns (ACIA 2005).

In Arctic regions there is a paucity of long-term climate data making it difficult to evaluate the inception of recent climate change and to place these changes in the context of long-term natural climate variability. Documenting the spatial variability of climate changes is essential to understanding the factors contributing to recent climate change. In the Canadian Arctic, there are few meteorological stations and those that exist have only been collecting data since approximately the 1950s; therefore, climate records in these regions are too limited to evaluate spatial variability of climate changes and are too short to determine long-term variability of the climate system (Gajewski & Atkinson 2003). In the absence of instrumental records of recent climate change, these data need to be inferred.

Predictions of the impacts of future climate change on Arctic ecosystems are also difficult because there is a lack of long-term ecosystem monitoring data. There are multiple processes within ecosystems that would be simultaneously affected by climate variations, but these are not well understood (ACIA 2005). Arctic freshwater ecosystems occupy a region of seasonal extremes where solar radiation varies from 24 hours of sunlight in the summer to almost 24 hours of darkness in the winter; thus their hydrological, physical and chemical characteristics are intimately coupled with climate (Smol & Cumming 2000, ACIA 2005). For example, increased geochemical weathering and nutrient loading are associated with decreased ice/snow cover periods that in turn could cause increased within-lake production (Rouse *et al.* 1997).

1.2 The paleolimnological approach

Insight into the temporal and spatial variability of recent climate change, and impacts on aquatic ecosystems in Arctic regions can be gleaned from the paleolimnological study of lake sediments. The "paleolimnological approach" involves the analysis of the physical, biological and chemical nature of lake sediments to provide insight of the status of a lake and its surroundings at a particular point in time (Smol *et al.* 1991). The biological components of lake sediments can include the fossilized remains of organisms such as diatoms, chironomids, and ostracods. Based on changes in the quantity and community composition of fossilized biota and based on autoecological information, paleolimnologists can infer changes in community dynamics, food webs and the environment over time. Using this approach, insight into climate changes and the response, stability and sensitivity of the communities and the ecosystem can be explored.

1.3 Impacts of recent climate change on aquatic communities

Recent lake sediment studies from Arctic regions show that diatom and other aquatic communities are undergoing shifts in community dynamics in response to recent climate change. Studies spanning the Canadian sub-Arctic to the high Arctic have documented distinct compositional shifts in diatom communities (Douglas *et al.* 1994, Moser *et al.* 2002, Rühland *et al.* 2003a, Michelutti *et al.* 2003a, Keatley *et al.* 2006, Michelutti *et al.* 2006) and significant increased diatom diversity and production within the last ~150 years (LeBlanc *et al.* 2004, Antoniades *et al.* 2005, Keatley *et al.* 2006, Finkelstein & Gajewski 2006). Studies of zoological communities in Arctic regions have also found distinct compositional changes in recent sediments (Birks *et al.* 2004, Solovieva *et al.* 2005). A study on Ellesmere Island that evaluated both algal and zoological fossilized organisms in one lake sediment core revealed synchronous changes in the two communities over the last two centuries, suggesting recent warming could be affecting multiple trophic levels (Quinlan *et al.* 2005). A synthesis of over 55 lake sediment records which spanned the circumpolar Arctic revealed shifts in algal and zoological communities over the 150 years towards more productive and diverse communities in most of the lakes examined (Smol *et al.* 2005). It also revealed a latitudinal increase in beta diversity (species turnover) that closely corresponded to the latitudinal gradient of larger temperature increase with latitude associated with recent warming.

However, most of the series presented in the above studies cover only a short time period. Studies that examine diatom communities on longer time scales allow recent community response to climate change be evaluated in the context of response to past natural climate variability. Few studies have examined diatom communities on longer time scales and most of the records that do exist have low resolution (Gajewski & Atkinson 2003). Some studies of diatom communities on long time scales in high latitude regions have found few changes in the diatom assemblages over most of the Holocene (Wolfe 1991), while in other studies there are simply no diatoms in deeper sediments suggesting dissolution maybe a factor (Doubleday *et al.* 1995, Smith 2002, Perren & Francus 2003). Some studies have found that recent diatom compositional changes were unparalleled over the last several millennia (Douglas *et al.* 1994, Perren & Francus 2003, Antoniades *et al.* 2005, Rühland & Smol 2005), while in other studies the diatom community compositional changes were slight compared to changes at other times in the Holocene (LeBlanc *et al.* 2004, Finkelstein & Gajewski 2006).

1.4 Thesis objective and organization

The main objective of this study is to evaluate the relationship between diatom community dynamics and climate on multiple time scales (centennial to millennial). The thesis is organized into four chapters. The first chapter is an introduction and brief review of diatom-based paleolimnology in high latitude regions. Chapter 2 outlines in detail the methodology used. Chapter 3 is written in article format and is the focal point of the thesis. It focuses on comparing diatom community composition, production, and species richness changes in a lake-sediment record from Victoria Island to independent records of Holocene climate changes. Diatom community changes over the last two centuries were considered in the context of community variability over the Holocene. Chapter 4 is a summary of the thesis findings and suggestions for future work.

1.5 Diatoms and climate inferences

Diatoms are a group of unicellular algae taxonomically united by their distinctive two-part siliceous cell walls which overlap with one half over the other (Round *et al.* 1990). They are commonly the focus of paleolimnolgical studies because their siliceous cell walls preserve relatively well in sediments (Smol & Cumming 2000) and although protoplast characteristics contribute to diatom classification, identification of species is based primarily on the morphology of the cell wall. Diatoms are often dominant contributors to total primary production in freshwater lakes and are found in a wide variety of habitats within lake systems, such as attached to different substrates in the benthic zone or free-floating in the planktonic zone (Round *et al.* 1990).

Many diatom species have specific habitat preferences. For example, some species have extreme asymmetric morphologies and secrete mucilage from one side, making them adapted for growth on substrates (Round *et al.* 1990). Several taxa also have recognized preferences and tolerances for limnological variables (Dixit *et al.* 1992). For example, there are several species that are found almost exclusively in acidic lakes (van Dam *et al.* 1994). Diatoms are sensitive to several environmental variables such as temperature, light, turbulence, dissolved organic carbon, nutrients, and salinity (Battarbee *et al.* 2001). Having well-defined optima and tolerances for environmental variables such as pH has led to the use of diatoms deposited in lake sediments to infer changes in the environment such as the timing and rates of lake acidification (Charles & Smol 1990).

In the Canadian Arctic there have been a large number of studies evaluating diatom-environment relationships, including along the treeline (Pienitz & Smol 1995) (Rühland *et al.* 2003b), on Ellesmere Island (Douglas & Smol 1995, Antoniades & Douglas 2005), Baffin Island (Joynt & Wolfe 2001), northern Quebec (Enache & Prairie 2002, Philibert & Prairie 2002), Bathurst Island (Lim *et al.* 2001), Victoria Island (Michelutti *et al.* 2003b) and across the Arctic Archipelago (Bouchard *et al.* 2004). Some regional studies examining diatom distributions in relation to environmental variables in Arctic regions have found that pH and DOC have a large influence on diatom community composition (Pienitz & Smol 1995, Rosén *et al.* 2000, Fallu & Allaire 2000, Lim *et al.* 2001, Joynt & Wolfe 2001). Other studies have found temperature to be a significant variable explaining the diatom species distributions (Pienitz & Smol 1995, Weckström *et al.* 1997, Rosén *et al.* 2000, Joynt & Wolfe 2001, Bigler & Hall 2002, Bigler & Hall 2003).

With increasing concern over recent climate change in northern regions there have been a large number of studies that are using diatoms in lake sediments to infer past changes in climate and document the impacts of climate on lake ecosystems. Inferences of past climate and its impacts derived from diatoms are made either qualitatively or quantitatively. Qualitative inferences are derived from the link between diatoms, habitat availability, ice-cover and temperature. In the early 1980s it was suggested that, although not traditionally used to infer temperature, diatoms could be used as indicators of temperature changes in Arctic regions because temperature has significant control over the ice-cover period, and ice cover period has direct influence on habitat and light availability (Smol 1983). It was hypothesized that in colder years there would be less diatom production, and diatom assemblages would be dominated by littoral taxa, because the extensive ice cover period would limit light availability and the habitats available for diatom growth. Conversely, in warmer years there would be higher diatom production and a complex diatom assemblage, representative of a well developed littoral zone (e.g. taxa found in mosses) and an extensive planktonic zone. This hypothesis was initially supported by a study that evaluated variation in the diatom communities at times of documented climate transitions inferred from other lake sediment data (Smol 1983).

Using the relationship between temperature, ice-cover and habitat preference is one of the most common ways in which diatoms are used to infer paleo-temperature changes today. Several studies have associated changes in diatom concentrations and/or diatom compositional shifts from or to higher relative abundances of planktonic taxa and habitat specialists in lake sediments with changes in ice cover period and climate (Cremer *et al.* 2001, Joynt & Wolfe 2001, Smith 2002, LeBlanc *et al.* 2004). A recent study that documented the diatom taxa that had accumulated over several years in sediment traps found that the changes in relative proportion of littoral and planktonic taxa varied with extent and duration of ice cover period (Lotter & Bigler 2000).

More recently, the focus in diatom-based paleolimnology has shifted towards developing techniques to quantitatively infer environmental variables from fossil assemblages (Birks 1995). Development of 'calibration' or 'training' sets and subsequent transfer functions is now the primary method used by diatomists to infer quantitative values of environmental variables. A calibration set consists of a series of lakes taken from an area of interest where both surface sediment and limnological variables are sampled. Multivariate analyses are performed on these data with the objective of determining if any of the measured environmental variables or combination of environmental variables explains a significant portion of the variation in diatom species data (Birks 1998). If such a variable or variables are found, a multiple regression analysis such as weighted averaging or partial least squares regression can be used to define species optima and tolerances for those variables. Once the environmental optima and tolerances for significant variables are defined, the process is reversed and the species counts are used to develop a quantitative model (called a transfer function) to predict the environmental variable using fossil diatoms in a core.

There are several ways in which the predictability of inference models are evaluated, but the most common methods include bootstrapping and jackknifing where a subset of the original calibration set is used to develop a new inference model and the samples left out of the derivation of the new inference model are used as the test samples (Birks 1995). The new inference model is then used to infer the environmental variable value of the test sample (Smol 2002). Error estimation involves evaluating correlation coefficients between the actual and bootstrap estimates of the environmental variables. If the inference model has reasonable predictability, the inference model is solved using the assemblages down-core (back in time) and quantitative estimates of the environmental variable are inferred over time (Birks 1995).

Few studies applying temperature-based inference models to core data are available. Joynt & Wolfe (2001) used a 61-lake data set to infer temperature changes over the Holocene for a site on Baffin Island. They found diatom-inferred temperatures decreased beginning in the mid-Holocene and then increased by 2 °C over the last 150 years, consistent with the magnitude of recent warming inferred from other records from the regions (Overpeck *et al.* 1997). Bigler & Hall (2003) used a 100-lake data set to develop a temperature transfer function to be applied to multiple cores in northern Sweden. They compared diatom-inferred temperature changes to century long meteorological records and found close agreement.

Despite considerable potential for the use of diatoms for quantitatively inferring past temperatures, their use has not been without debate (Anderson 2000, Battarbee 2000). As mentioned above, biogeographical studies of diatom distributions have found temperature to be a significant variable explaining diatom distribution (Pienitz & Smol 1995, Vyverman & Sabbe 1995, Weckström *et al.* 1997), but questions remain of the ability of these studies to reconstruct temperature directly because there is limited knowledge about the direct links between diatoms and temperature (Anderson 2000). In addition, it is well known that temperature simultaneously affects limnological variables such as pH, ice-cover and nutrient cycling that are also known to have a strong influence on diatom communities (Anderson 2000). The relative influence of the different variables is difficult to separate (Battarbee *et al.* 2001). Taking an alternative approach by developing more high-resolution diatom stratigraphies and comparing them to independent paleorecords of temperature will aid in this debate.

Chapter 2: Extended Methods

2.1 Field methods

A 411 cm sediment core and two replicate cores were collected from a small lake, unofficially named KR02 (71.34°N, 113.78°W, 229 m.a.s.l.), from the Kuujjua River region of western Victoria Island, NWT, Canada. Cores were extracted from the lake sediments using a Livingstone piston corer of 5 cm diameter at the deepest part of the lake, where sediment is considered less vulnerable to re-mixing. Core tubes are approximately 1 meter in length so several "drives" are used to collect a complete sediment sequence. Cores were taken until reaching bedrock, resulting in a total of five cores representing the entire sediment profile. Two replicate profiles were collected resulting in a total of 15 drives. The uppermost 20 cm of the cores were extruded at 0.5 cm and 1 cm intervals and placed in labelled bags. The remainder of the cores were wrapped in plastic and aluminium foil and placed in plastic tubing for shipping. Samples were stored in an upright cooler at 4°C.

2.2 Laboratory methods

2.2.1 Core Dating

The core chronology was determined using radiocarbon dating by accelerator mass spectrometry (AMS) and ^{210}Pb analyses. Arctic sediments are commonly low in organic content, thus obtaining0 material for radiocarbon dating can be challenging. Because of the potential for hard-water effect, the best material for radiocarbon dating is terrestrial macrofossils, followed by other macroscopic remains of lake organisms. Recent studies have shown that organisms such as chironomids, which are abundant in Arctic lake sediments, can be used for dating (Fallu *et al.* 2004). Several samples of the KR02 core were sieved for terrestrial macrofossils, but little material was found. Therefore samples of aquatic and terrestrial organic material or bulk sediment were used for radiocarbon dating. Radiocarbon dating analyses were performed by Beta Analytic Inc. The top 23 cm of sediment were sent for ^{210}Pb analyses to Flett Research Ltd.

2.2.2 Magnetic susceptibility and Organic content

The sedimentary matrix provides a record of changes in the physical and biological environment. Magnetic susceptibility is a measure of how easily sediment can be magnetized (Sangren & Snowball 2001). Magnetic materials in lakes originate from the catchment and bedrock. Magnetic susceptibility has been shown to correlate with variations in allochthonous inputs and thus is used as a proxy of inorganic input into the lake (Thompson *et al.* 1975). Apart from any potential paleoenvironmental information, magnetic susceptibility is useful in the correlation of the duplicate cores. A Bartington MS2 meter was used to measure magnetic susceptibility at 1 cm intervals along the length of the core.

Sediment loss on ignition (LOI) is a standard method for estimating the percentage of organic and carbonate content of sediments (Heiri *et al.* 2001) and involves serial burning of samples and difference calculations (weight of samples before and after burns) (Dean 1974). Paleolimnological interpretation of loss on ignition is not straightforward but is generally considered to indicate changes in the production of the lake and/or of the surrounding catchments and has been correlated to inferred temperature in high latitude regions (Kaplan *et al.* 2002, Briner *et al.* 2006). LOI was measured on 0.5 cc of sediment at 0.5 cm and 1 cm increments along the length of the core. Samples were placed in weighed crucibles and dried in an oven at 105 °C for 24 hours and subsequently weighed. The weighed samples were placed into a muffle furnace at 500°C for three hours, cooled and weighed again. Lastly, samples were put in the muffle furnace at 925°C for 4 hours, then cooled and weighed again.

Percent organics and carbonate were calculated using the following formulas:

CW = crucible weight

WW = wet weight of sediment

DW = dry weight

IW = ignition weight (weight of sediment after 500°C burning)

CW = carbonate weight (weight of sediment after 925°C burning)

%LOI = (DW-CW)-(IW-CW) / (DW-CW)*100

% Carbonate = (IW-CW)-(AW-CW) / (DW-CW)*100

2.2.3 Biogenic silica

Diatoms and crysophytes are siliceous algae, and therefore biogenic silica content of lake sediments is a measure of the siliceous production (Conley & Schelske 2001). As siliceous algae, in particular diatoms, are often the dominant photosynthetic component of Arctic aquatic ecosystems, measurement of biogenic silica can serve as an estimate of whole-lake production (Conley & Schelske 2001).

Biogenic silica content was estimated at ~5 cm intervals along the length of the core using wet-alkaline digestion (DeMaster 1981, Krausse *et al.* 1983). Sediment samples of ~0.5 cc were placed into crucibles and dried at 105°C for 24 hours. Dried samples were ground into a fine powder with a mortar and pestle. Approximately 0.02

gram of ground sediment was transferred to 125 mL flat-bottomed Nalgene bottles. One calibration sample of known BSi concentration, and replicate samples to estimate error were run with every batch of samples (calibration samples were obtained from an interlaboratory comparison (Conley 1998), dco@dmu.dk).

Samples were treated with 40 mL of 1% NaCl and placed in a water bath at 85°C. After 2, 3, 4, and 5 hours samples were removed, placed in an ice water bath to stop the base-extraction and a 1 mL subsample was retrieved and placed in 15 mL Nalgene graduated centrifuge tube. Subsamples were then neutralized with 3.2 mL of 0.06 N HCl and diluted with 10 mL of deionized (DI) water. With each set of extractions these steps were applied to 11 standard samples that ranged from 10 to 200 mg/L silica (Table 2.1.) and one sample blank consisting of 1% Na_2CO_3. Samples were mixed by inversion and stored in a refridgerator until the next day.

Biogenic silica concentration of each sample was measured using spectrophotometric analysis of extracted subsamples combined with a reduced molybdosilicic acid. Prior to being placed in the spectrophotometer, 0.64 mL of each subsample was placed in a 1 cm cuvette and mixed with 0.64 mL of ammonium molybdate reagent (10 g of ammonium molybdate in 1 L of 0.1 N H_2SO_4), 0.64 mL of oxalic acid (50 g in 1L of deionized water), and 0.84 mL of absorbic acid (2.7 g absorbic acid dissolved in 7.5 mL acetone and 142.5 mL DI water). The above steps were also applied to the standard samples. Samples were analyzed on a Pye Unicam SP8-100 uv/vis spectrophotometer set at 660 nm wavelength.

Although sediments contain silica derived from biogenic material and clays, silica derived from biogenic origins dissolves within the first two hours of extraction whereas silica from clays takes longer to dissolve (Conley & Schelske 2001). This difference in rates of dissolution allows for the percent biogenic silica to be determined by finding the intercept of the regression of wt% $Si0_2$ versus time for each sample (Conley & Schelske 2001). Concentration of biogenic silica for each sample was calculated as the y-intercept of least squares regression equations of the subsample absorbencies over time. A calibration curve was developed from the absorbency of the silica standards versus concentration. Concentrations were then converted to weight percent biogenic silica for ease of comparison with other studies.

2.2.4 Diatoms

Samples for diatom analyses were taken at 5 cm intervals over the length of the core, in addition to higher resolution sampling in the uppermost 50 cm and in select areas where diatom concentrations were low (see Results section for details). Diatom samples were extracted using a 0.5 cc volumetric sampler and placed into scintillation vials. The sediment was then tested for carbonate (which may obscure counting) by addition of a small amount of 10% HCl. If large amounts of carbonate were present the sediment would fizz vigorously. No samples reacted upon addition of HCl, thus samples were not further treated for removal of carbonate.

The organic content of the sediments was digested by treatment in 50:50 sulphuric: nitric acid. Samples were placed in 10 mL of sulphuric: nitric acid solution and left in a fume hood with lids loosely in place for 24 hrs. They were then placed in a water bath on a hotplate and maintained between 85-92 °C for two hours. Over the two-hour period samples were stirred periodically with a clean glass rod. Samples were then cooled and placed in an IEC Centra GP8 centrifuge for 7 minutes at 3000 rpm. The centrifuged samples were then aspirated and deionized water (DI) was added to a level of 20 mL. Centrifugation and aspirations were repeated until a neutral pH was established. All samples were then transferred to 50 mL plastic centrifuge tubes and DI water was added to obtain an equal volume of 45 mL.

After acid digestions, samples varied in the amount of clastic material and diatom valves present. The amount of dilution required was estimated based on overall evaluation of the cloudiness of the 45 mL diatom samples. One mL of diluted sample was then placed on an 18 x 18 mm coverslip and allowed to settle out while airdrying in a fumehood. The coverslips were mounted onto slides using one drop of Naphrax® permanent mounting medium on a hotplate under low heat.

Diatoms were identified and enumerated using differential interference contrast (DIC) at 1000X magnification on a Nikon Eclipse 80*i* compound microscope. Sources for diatom identification included regional monographs and journal articles (Patrick & Reimer 1966, Patrick & Reimer 1975, Round *et al.* 1990, Krammer & Lange-Bertalot 1991a, Krammer & Lange-Bertalot 1991b, Krammer & Lange-Bertalot 1991c, Hamilton *et al.* 1994, Cumming *et al.* 1995, Round & Bukhtiyarova 1996, Bukhtiyarova & Round 1996, Lange-Bertalot & Moser 1996, Krammer 1997, Krammer & Lange-Bertalot 1997, Reavie & Smol 1998, Campeau *et al.* 1999, Lange-Bertalot & Genkal 1999, Fallu & Allaire 2000, Krammer 2000, Camburn & Charles 2000, Lange-Bertalot 2001, Krammer 2002, van de Vijver *et al.* 2004).

A minimum of 600 valves were counted along at least 3 transects (except where concentrations were low and dissolution was observed; see below for details). Transects were delineated with an ocular micrometer. If valves were lying on the transect boundaries, they were counted only if they were more than fifty percent within the transect or if they were very large (>70 μm). If fifty percent of a chain of valves was within the transect boundary all valves in that chain were counted. If a chain was less than fifty percent within a transect only those valves of the chain within the transect boundaries were counted.

There were a few samples where there was dissolution and/or such a low concentration of diatoms that even after examining the most concentrated solutions, 600 valves could not be counted. In these samples, if at least ~10 valves were found in the first few transects, then a minimum of 30 transects were counted. This resulted in counts of >200 valves in all samples analyzed with this method. If upon initial observation, transects contained only a few or no diatoms, a minimum of ten transects were scanned to evaluate any taxa that were present. Samples counted with this method resulted in count sums of less than 30 valves and were not used in any statistical analysis.

Diatom concentrations were calculated as a function of volume and dry weight of sediment using the following formulas:

$X1 = (A * (B/(C*D) * ((E*F/G)/I) *(I/J))$

$X2 = (A * (B/(C*D) * ((E*F/G)/I)$

X1 = valves/gram

X2 = valves/cc

A = # of valves counted

B = coverslip area

C = transect area

D = # of transects counted

E = volume of diatom slurry (initial stock solution)

F = dilution factor

G = subsample volume

I = volume of original sediment (cc)

J = weight of original volume of sediment

Diatom influx (valves $cm^{-2}yr^{-1}$) was calculated based on the following formula:

Influx (valves/ cm^2yr) = A*B, where

A = diatom concentration (valves/cm^3)

B = sedimentation rate (cm/yr)

Concentrations of diatoms in lakes sediments are used as a proxy of diatom production. However, diatom valve sizes range over orders of magnitude, thus it is useful to estimate changes in diatom concentration in terms of biovolume (Wolfe 2003). Biovolume changes over time were estimated based on classification of diatom species in any one sample into the following five size classes: 1) taxa less than 10 μm^3, 2) taxa between 10 - 100 μm^3, 3) taxa between 100 - 1000 μm^3, 4) taxa between 1000 - 10,000 μm^3, 5) taxa greater than 10,000 μm^3 (Appendix 2). Size classification of the diatom valves was derived from data compiled by the USGS National Water-Quality Assessment Program (NAWQA; http://diatom.acnatsci.org/autecology/download.asp?file_id=4) and estimates of S. Spaulding and the author.

2.3 Numerical analyses

Cluster analysis is a method of dividing objects into groups (Kovach 1995). Agglomerative methods of cluster analysis start with all objects in individual groups and successively combine the least dissimilar samples until all individuals are in one group (Legendre & Legendre 1998a). Agglomerative hierarchical cluster analysis (CA) was used to group similar diatom communities over time and was performed using the program S-plus 7.0. Only species with >1% abundance in any one sample and samples with count sums of >200 valves were included in the analysis. The dissimilarity measure used was Euclidean distance and the linkage type was Ward's method.

Principal component analysis (PCA) is an ordination technique that summarizes patterns in data. One purpose of a principal component analysis is to reduce the number of variables by combining groups of correlated variables into component variables that are uncorrelated to each other (Legendre & Legendre 1998b). All PCAs were performed using the program S-plus 7.0. An initial analysis was performed on species with relative abundance of greater than 1% in any one sample and samples with count sums of greater than 200 valves. Three samples from the lowermost depths consisted of a unique assemblage and weighed heavily in the analysis, overshadowing community changes at other depths (see Appendix 2). These three samples were dropped in a second PCA analysis that will be considered in this paper. All analyses were performed using a correlation matrix.

Square chord distance (SCD) is a dissimilarity measure used to evaluate differences between multivariate samples (Overpeck *et al.* 1985). Some dissimilarity measures are heavily influenced by common taxa while others are highly influenced by rare taxa. SCD is a favoured method of dissimilarity measure in pollen analysis as it lies in the middle of these two extremes where it is not heavily influenced by common taxa yet is not overly influenced by rare taxa (Overpeck *et al.* 1985). Rate-of-change between samples can be derived by calculating the SCD between samples and divided by the time interval (Grimm & Jacobson 1992).

Rate-of-change analysis using SCD was performed on diatom species with >1% abundance in any one sample and samples with count sums of >200. In order to compare rates of change between successive samples equal interval sampling is required. Linear interpolation was used to derive relative abundance data for each species at 100-year intervals. Rate-of-change was calculated using the following formula:

$$\mathrm{SCD} = \sum (p_{ai}^{1/2} - p_{aj}^{1/2})^2$$

Rate-of-change = SCD/A

p_i = proportion of diatom taxon a in sample i

p_j = proportion of diatom taxon a in sample j

A = time interval between sample i and j

The number of species found in a sample is partially dependent on the total number of diatoms that are counted. In order to compare taxonomic richness in samples with different count sums rarefaction analysis can be used to estimate richness based on a common minimum sum (Birks & Line 1992). The average count sum in lake KR02 was 600 and count sums ranged from 216 to 1584 valves. Rarefaction analysis was performed using a common count sum of 554 with the program Analytic Rarefaction 1.3 (Steven M. Holland; www.uga.edu/~strata/software/). Diversity was quantified over time using the Shannon-Wiener diversity index (Krebs 2001).

Table 2.1. Concentrations of silica standards used in biogenic silica extraction

Volume of stock silica solution added (mL)*	Volume of 1% Na_2CO_3 added (mL)	Concentration of standard (mg/L)
2.5	500	10
5	500	20
7.5	500	30
10	500	40
12.5	500	50
15	500	60
20	500	80
25	500	100
31.25	500	125
37.5	500	150
25	250	200

*Silica stock solution concentration was 2 g/mL

Chapter 3. Diatom community response to multiple scales of Holocene climate variability in a small lake on Victoria Island, NWT

3.1 Abstract

A 411 cm sediment core, collected from a small lake, unofficially named KR02 (71.34°N, 113.78°W, 229 m.a.s.l.), on Victoria Island, NWT, Canada provides a high-resolution record of diatom community changes over the Holocene. Core chronology is based on both ^{210}Pb and AMS radiocarbon dating. Major shifts in diatom assemblages at 8100-8000 calendar years before present (cal yrs BP), 5800-5700 cal yrs BP and 3500-3200 cal yrs BP occurred simultaneously with millennial-scale climate changes reported from the region. Additionally, there is evidence of diatom community response to centennial scale variations such as the 'Medieval Warm Period' (~1000-700 cal yrs BP), 'Little Ice Age' (~800-150 cal yrs BP) and recent warming. Recent evidence that suggests that taxa within the genera *Staurosira*, *Pseudostaurosira*, *Fragilaria* and *Staurosirella*, commonly combined into one genus in paleolimnological studies, may have different temperature preferences is further validated by the congruence of shifts in these separate taxa and the timing of climatic variations in the region. Shifts in diatom community composition, production, and rarefaction species richness were tightly coupled throughout the Holocene. A shift in diatom community dynamics over the last several centuries is apparent but not unique in the lake history.

3.2 Introduction

Holocene climate variability of several timescales has been documented in many paleoclimate records. Millennial-scale climate variability is documented in Greenland ice cores (O'Brien *et al.* 1995), Atlantic deep-sea cores (Bond *et al.* 1997) and in North American pollen records (Viau *et al.* 2002, Mayewski *et al.* 2004). Analysis of more than 700 North American pollen records suggests that the Holocene can be divided into four periods: the early Holocene when North America generally warmed, a cooling between 8000-6000 calendar years before present (cal yrs BP), warming between 6000-3000 cal yrs BP, followed by a subsequent cooling (Viau *et al.* 2006). Spatially variable centennial-scale variations such as a relative warming between ~1000-700 cal yrs BP (Medieval Warm Period, MWP)(Crowley & Lowery 2000) and a relative cooling between ~800-150 cal yrs BP (Little Ice Age, LIA)(IPCC 2001b, Esper *et al.* 2002) and a post-150 cal yrs BP warming have also been observed in records with sufficient temporal resolution (IPCC 2001b).

There is a general consensus that maximum temperatures in the Canadian Arctic, were reached in the early Holocene (Gajewski and Atkinson 2003), followed by a long-term cooling. The timing of the inception of the cooling was spatially variable, and this period ended with lowest temperatures during the LIA (Wolfe & Smith 2003). Proxy data from the Canadian Arctic islands suggests that warming and cooling began before comparable changes in continental northern Canada and although there is spatial variability, the Holocene Thermal Maximum was reached by ~ 9.0 ± 2.0 cal yrs BP and neoglacial cooling starting at ~5.0 ± 2.0 cal yrs BP (Kaufman *et al.* 2004).

There has been pronounced temperature increase in Arctic regions during the 20th century (Houghton *et al.* 1996). Arctic temperatures in the period of time between the 1840s through to the 20th century were warmer than they had been over the last four centuries (Overpeck *et al.* 1997). It is predicted that should this trend continue, there could be an increase of up to ~4 °C across the Canadian Arctic (Houghton *et al.* 1996).

Documenting the inception and spatial variability of recent climate change and evaluating how it has impacted aquatic ecosystems is essential to understanding both the cause of climate change as well as how to manage ecosystems in the face of future climate change. However, the current changes must be placed in the context of past environmental change to determine if they are unusual, caused by human activities or simply natural variability. In the Canadian Arctic there are few climate stations and those that do exist have been collecting continuous climate data only over the last sixty years. Instrumental records of climate are too sparse and short to document the inception and spatial variability of recent climate change in this region (Gajewski & Atkinson 2003). Additionally, because of the remote location and expanse of the Canadian Arctic there are few data on ecosystem response to these climate changes.

Paleolimnological data from lake sediments provide long-term data of environmental change and ecosystem response to these changes. These kinds of results are particularly needed in the Canadian Arctic where there are few monitoring stations. The paleolimnological approach is based on using the physical, chemical and biological nature of lake sediments to provide information about the status of the lake ecosystem and/or the environment around the lake at a particular point in time (Smol 2002).

Freshwater ecosystems are influenced by weather and climate. Predicted effects of a temperature increase on Arctic aquatic systems are a reduction in ice cover, earlier and longer periods of lake stratification, increased decompositions and weathering, and longer resident times (Rouse *et al.* 1997). As a consequence of the recent climatic warming, several trends have been observed in Arctic lacustrine systems, including a reduction of ice cover duration and extent, and increases in nutrients, pH and conductivity (Douglas & Smol 1999).

There is substantial evidence that suggests climate change over the last few centuries is causing a complete shift in diatom assemblages in the Canadian Arctic (Douglas *et al.* 1994, Michelutti *et al.* 2003a, Antoniades *et al.* 2005). Similar changes have been seen in several regions of the circumpolar Arctic; not only in diatoms but also with organisms of other trophic levels such as chironomids and cladocera (Smol *et al.* 2005) . These changes appear unprecedented (Smol *et al.* 2005). The paleolimnological records reported in the above study document how the current warming has affected Arctic aquatic communities, but are too short to document the complete range of ecosystem dynamics in response to climate variation of multiple scales.

Lake sediment records in the Canadian Arctic that document diatom community dynamics over the entire Holocene are concentrated in the central and eastern Arctic; including sites on Baffin Island, (Wolfe 1996, Joynt & Wolfe 2001, Briner *et al.* 2006), Ellesmere Island, (Smol 1983, Doubleday *et al.* 1995, Smith 2002, Perren & Francus 2003), the Boothia Peninsula (LeBlanc *et al.* 2004) and Prescott Island (Finkelstein & Gajewski 2006). Most of these records have low temporal resolution and some of these records have reported no diatoms in deeper sediments (Doubleday *et al.* 1995, Smith

2002, Perren & Francus 2003). Others studies have found distinct changes in diversity and production, for example associated with the transition from the early Holocene warmth to neoglacial cooling between 6000-4000 cal yrs BP (Joynt & Wolfe 2001, Smith 2002, LeBlanc *et al.* 2004, Finkelstein & Gajewski 2006).

Here we present a high-resolution, Holocene lake sediment record of diatom assemblages from a small lake on Victoria Island, the first such record from the western Canadian Arctic Islands. We will document the diatom community composition and diversity as well as variation in total diatom production. A detailed sediment analysis further documents environment changes during this time. The high-resolution diatom record will provide documentation of diatom community change on multiple time scales. This will allow an analysis of the response of diatom communities to climate variability on multiple scales, as well place the recent diatom community changes in the context of Holocene variations.

3.3 Site Description

The study site is a small lake, unofficially named KR02, located at 71.34°N, 113.78°W, 229 m.a.s.l. in the Kuujjua River region of western Victoria Island, NWT, Canada (Figure 3.1). This area is underlain by continuous permafrost that limits groundwater flow (Rouse *et al.* 1997). Local vegetation consists of prostrate-shrub tundra (CAVM Team 2003) and the bedrock geology is comprised mainly of evaporates (Frisch & Trettin 1991).

The average January and July temperatures from the closest weather station in Ulukhaktok (Holman), are -28.6 °C, and 9.2 °C, respectively (Meteorological Service of Canada 2000). As with many lakes in the Canadian Arctic, lake KR02 is oligotrophic and alkaline (Hamilton *et al.* 2001). A summary of environmental data for lake KR02 is given in Table 3.1.

3.4 Methods

Field Methods

A 411 cm sediment core and two replicate sequences were collected from an ice surface using a Livingstone corer of 5 cm diameter, at the deepest part of the lake. The first 20 cm of the core was extruded into labelled bags in the field at 0.5 cm intervals. The remainder of the cores were wrapped in plastic and aluminium foil and placed in split plastic tubing for shipping to the lab. Cores were stored in a cooler at 4°C.

Laboratory methods

Core chronology was determined using both accelerator mass spectrometry (AMS) radiocarbon dating and PB-210 analyses. Arctic sediments are commonly low in organic content, thus attaining material for radiocarbon dating can be challenging (Gajewski *et al.* 1995). Studies have shown that dating macrofossils can be a valid alternative to bulk dates, especially in carbonate terrain (MacDonald *et al.* 1991). Several samples were sieved for terrestrial macrofossils but little material was found in some levels of the core. Therefore combinations of aquatic and terrestrial organic material or bulk sediments were used for radiocarbon dating. Radiocarbon ages were calibrated to calendar years using cubic spline fitting (Talma & Vogel 1993) of data from INTCAL 98 (Stuiver *et al.* 1998). Samples for ^{210}Pb analysis were sent to Flett Research Ltd where continuous ^{210}Pb dating of the recent sediments indicated that unsupported ^{210}Pb was contained within the first 28-29 cm of core. A constant rate of supply (CRS) model was applied to derive ages.

Magnetic susceptibility was measured using a Bartington MS2 meter at 1 cm intervals along the length the core. Organic and carbonate content was determined at 1 cm and 0.5 cm intervals over the core length using sequential burnings at 500°C for three hours and 925°C for four hours (Dean 1974).

Diatom samples were prepared using standard techniques of acid digestion (Battarbee *et al.* 2001). Serial dilutions of initial 45 mL diatom slurries were plated to enable the computation of diatom concentrations from point counts. A minimum of 600 diatom valves in at least 3 transects on the coverslip were identified and enumerated for each sample (except where concentrations were low and dissolution was observed; see below). Two methods were used to estimate the diatom concentrations, including chemical extraction of biogenic silica and diatom point counts on a known area of coverslip.

Biogenic silica content was measured using wet-alkali digestion technique in 1% Na_2CO_3 (DeMaster 1981, Krausse *et al.* 1983). Subsamples were extracted after 2, 3, 4, and 5 hours of digestion and biogenic silica concentrations of the subsamples was determined using a reduced molybdosilicic acid spectrophotometric method (Parsons *et al.* 1984).

Numerical analysis

Agglomerative hierarchical cluster analysis (CA) was used to identify dissimiliar diatom communities in different sections of the core. The dissimilarity measure used was Euclidean distance and the linkage type was Ward's method. Note that a stratigraphic constraint was not applied. Principal component analysis (PCA) was used to examine the variation in the diatom species data. All analyses were performed using a correlation matrix. Only species with >1% abundance in any one sample and samples with count sums of >200 valves were included in the analysis. The three lowermost assemblages were dropped from the analysis as they excessively dominated the components.

Rate-of-change analysis (Grimm & Jacobson 1992) was performed using square-chord-distance (Overpeck *et al.* 1985) of each sample and dividing by the time interval between successive samples. Linear interpolation was used to derive diatom relative abundance data at 100-year intervals along the length of the core.

3.5 Results

General stratigraphy and core chronology

The KR02 core consisted of uniform gyttja from the surface to ~385 cm. From ~385 cm to the bottom of core, the sediment consists of coarse-sandy material. The core chronology was developed by ^{210}Pb dating of the uppermost sediments and AMS ^{14}C dating of 10 macrofossil and bulk sediment samples extracted throughout the length of the core (Table 3.2). An age-depth curve derived from these data indicates a relatively constant sedimentation rate throughout the Holocene (Figure 3.2). An anomalous date at 404-407 cm depth that was much older than would be expected based on deglaciation of the region (Dyke 2004) was rejected.

Sediment characteristics

Several characteristics of the sediment matrix, as well as indices of total diatom production were used to provide information on the lake ontogeny over the Holocene. Loss on Ignition (LOI) gradually increased from the basal to the uppermost sediments whereas carbonate content and magnetic susceptibility showed an inverse trend (Figure 3.3). The LOI curve could be divided into three distinct zones of variability with the middle zone, between ~4000 and 6000 calendar years before present (cal yrs BP), showing less high frequency (between-sample) variability than the upper and lower zones. During this time, the carbonate content, as measured by ignition at 950°C was relatively high. Variability of the magnetic susceptibility was high before 6000 cal yr BP. Between 6000 cal yrs BP and the uppermost sediments there was little between-sample variability.

Diatom production was estimated using concentrations based on point counts and chemical extraction of biogenic silica, with point count estimates computed as a function of volume (valves$\cdot$cc^{-1}) and weight (valves$\cdot$gram dry weight^{-1}) (Figure 3.3). The two point count-based estimates of concentration were highly correlated ($r^2 = 0.83$, $p<0.0001$). Volumetric concentrations varied over four orders of magnitude (excluding the sections of poor diatom preservation, discussed below) from 2.33×10^6 to 2.61×10^9 valves/cc. Diatom influx (valves$\cdot$cm^{-2} yr^{-1}), varied over 5 orders of magnitudes from 3.73×10^{19} to 2.78×10^{13} and was highly correlated with diatom concentrations ($r^2 = 0.82$, $p<0.0001$).

Diatom concentrations estimated by chemical extraction of biogenic silica content (weight percent BSi) varied between near zero up to 39% (Figure 3.3). There is a pronounced cyclicity in the BSi data, which varied from 20-40% to less than 5% over ~1500 year periods. Volumetric diatom concentrations and weight percent BSi were highly correlated, particularly when three outliers representing the largest concentrations found for both methods of estimation were excluded (the correlation coefficient went from $r^2 = 0.37$ to $r^2 = 0.72$, $p<0.0001$). Although highly correlated, there were clear differences in diatom concentration estimates derived from the biogenic silica extraction and point counts, particularly in the lower section of the core. These differences were evaluated by estimation of biovolume changes over time (Figure 3.3; see Chapter 2. Extended methods and Appendix 2). Accounting for biovolume changes over time increased the agreement between the curves, implying that some of the difference between them was a consequence of the diatom community shifting from larger diatoms in the bottom of the core to relatively small species in the upper segments of the core.

Diatom community changes

A total of 137 diatom taxa from 43 genera were identified in 181 samples along the length of the KR02 core. Most of the species identified have been previously documented in the Canadian Arctic Archeapelago (Hamilton *et al.* 1994) (See Appendix 1 for species list and light micrographs of select species). Diatoms were well preserved throughout the core with the exception of 3 sections, between 8500-8200 cal yrs BP (337-339 cm), 7600-7000 cal yrs BP (321-329 cm) and 5600-5000 cal yrs BP (248-267 cm), where there was evidence of valve fragmentation and dissolution.

Benthic taxa of the genera *Pseudostaurosira*, *Staurosira*, *Staurosirella,* and *Fragilaria* were dominant through most of the KR02 core, with species such as *Staurosira venter* comprising up to 89% of the valves in some levels (Figure 3.4a). These genera were formerly grouped into the taxon *Fragilaria sensu lato* but show different histories in this lake. For example, abundances of species of the genera *Staurosira* and *Staurosirella* were inversely related throughout the Holocene (Figure 3.4a).

The diatom stratigraphy was divided into four zones for ease of explanation. Zone boundaries were identified from a cluster and principal component analysis (PCA) analyses of the diatom relative percentage data (results described below).

Zone 4-early lake ontogeny: >9900 cal yrs BP (below 37*6 cm)*

Magnetic susceptibility was very high at 9900 cal yrs BP (below 376 cm), and fluctuated between very high and low values through out this zone (between ~900 and 100; Figure

3.3). The organic content (%LOI), weight percent biogenic silica and diatom concentrations and influx were low to nil. Few diatoms were found in sediment dating from before 9900 cal yrs BP (below 376 cm). Six valves found in a sample dated as 10,200 cal yrs BP (397 cm) were all *Staurosira venter*.

Zone 3-early Holocene: 9900-8100 cal yrs BP (376-336 cm)

Although there were three distinct peaks in magnetic susceptibility at 9700 cal yrs BP (361 cm), 9200 cal yrs BP (347 cm), and 8100 cal yrs BP (336 cm) their absolute values were much smaller than in zone 4. Organic content was also variable but gradually increased over this zone. Maximum values of biogenic silica were reached at 9900 cal yrs BP (376 cm), at 39% of the sediment dry weight. Values then decreased, reaching some of the lowest values in the core at 8600 cal yrs BP (341 cm). Diatom concentrations based on count sums remained low, with the exception of a peak of 3.0 x 10^8 valves/cc at 9600 cal yrs BP (351 cm).

At 9900 cal yrs BP (376 cm) the diatom assemblage was diverse (E = 35, H' = >2.5; Figure 3.3) consisting of *Fragilaria sensu lato* spp. (including the genera *Staurosira*, *Staurosirella*, *Fragilaria*, and *Psuedostaurosira* (Figure 3.4a)), *Amphora* spp. (eg. *A. pediculus* and *A. fogediana* with combined relative abundance of 12%), *Cocconeis* spp. (*C. pediculus* and *C. placentula* (3%), *Cyclotella* spp. (7%), *Eolimna minima* (7%) and *Ellerbeckia arenaria* (20%) (Figures 3.4b, c). Although *Fragilaria sensu lato* taxa are a significant component of the assemblage at this time (comprising 38% of the flora), these are some of the lowest percentages they attain in the lake history (Figure 3.4a).

At ~9850 cal yrs BP (371 cm) the diatom diversity increased (Figure 3.3) with the introduction of additional species and increased relative abundance of *Amphora* taxa (reaching maximum relative abundance of 23%), *Cyclotella* spp. (15%), and *Gomphonema* spp. (Figure 3.4b,c). At the same time *Ellerbeckia arenaria* decreased to 12% (Figure 3.4b). Other notable taxa present, in low abundance, were *Denticula tenuis* and *Diploneis* spp.. Percentages of *Fragilaria sensu lato* taxa remained low (35%) (Figure 3.4a).

By ~9700 cal yrs BP (361 cm) the diatom community reached maximum rarefaction species richness at ~42 taxa (Figure 3.3). Abundances of *Fragilaria sensu lato* spp. began to increase, reaching a relative abundance of over 50% (Figure 3.4a), while many of the taxa, which had been abundant, such as *Amphora* spp. (10%), *Cocconeis* spp (2%), *Cyclotella* spp. (5%), and *Ellerbeckia arenaria* (5%) decreased substantially (Figure 3.4b, c). Other species present included *Diploneis elliptica*, *D. parma*, *Navicula schmassmannii*, *Stauroneis smithii*, and *Achnanthes suchlandtii.*

At ~9600 cal yrs BP (351 cm) *Fragilaria sensu lato* taxa increased, comprising 85% of the assemblage (Figure 3.4a). Relative abundances of *Cyclotella* spp. and *Cocconeis* spp. decreased below 1% as did *Ellerbeckia arenaria* (Figures 3.4b, c). Rarefaction species richness decreased to 18 as a consequence of increased dominance of *Fragilaria sensu lato* spp. (Figure 3.3). *Fragilaria sensu lato* spp. relative abundance remained high until 9600 cal yrs BP (351 cm) when it dropped to 72% (Figure 3.4a). Between 8500-8600 cal yrs BP (340-341 cm) rarefaction species diversity increased and remained high until 8100 cal yrs BP (336 cm) where it decreased significantly (Figure 3.3).

Zone 2-mid-Holocene: 8100-3200 cal yr BP (336 cm-170 cm)

Magnetic susceptibility gradually decreased in this zone reaching lowest values at 3200 cal yrs BP (170 cm). There was, however, an exception of a distinct peak at 6200 cal yr BP (281 cm; Figure 3.3). There were three shifts in percent carbonate and LOI in this zone. Percent carbonate was relatively consistent around 4% between 8100-6300 cal yrs BP (336-285/286 cm), then increased to 6% until 3400 cal yrs BP (185/184 cm) when it began a gradual decreasing trend. Similarly, between 8100-6300 cal yrs BP (336-285/286 cm), LOI values were highly variable, followed by a period of stable values until 3400 cal yrs BP (~185/184 cm) when variability increased again.

Diatom concentration and biogenic silica content cycled between peak values at 6700 cal yrs BP (~296 cm; 2.61 x 10^9 valves·cc^{-1} and 30% /gdw respectively) and 3300 cal yrs BP (180 cm; 0.36 x 10^9 and 21% /gdw respectively) and some of the lowest values in the core (below 1.0 x 10^6 and 5% /gdw) between 4100-5700 cal yrs BP (221-268 cm) (Figure 3.3).

There were several distinct shifts in dominance between species of the *Fragilaria sensu lato* group during the mid-Holocene zone (Figure 3.4a). *Staurosirella pinnata* var. *lancettula/acuminatum* complex had peak abundances of up to almost 60 % of the diatom individuals before ~8100 cal yrs BP (336 cm). During the periods 7700-5800 cal yrs BP (330-270 cm) and 3400-1500 cal yrs BP (186-114 cm) *Staurosira venter*, *Pseudostaurosira pseudoconstruens*, and *Pseudostaurosira brevistriata* increased in abundance whereas between 5800-3400 cal yrs BP (270-186 cm) *Staurosirella pinnata* and *S. pinnata* var. *intercedens* were abundant.

Other species that were present in this section were *Cocconeis neothumensis*, *C. pediculus*, *C. placentula*, and *Ellerbeckia arenaria*; although not in high relative abundances (Figure 3.4b, c). *Cocconeis placentula* is considered an opportunistic taxa (Veres *et al.* 1995). *Amphora copulata*, a large epiphytic diatom, was present sporadically throughout the KR02 core but began to appear regularly at 3300 cal yrs BP (180 cm) and reached up to 9% at 4900 cal yr BP (245 cm).

Several species of the genus *Gomphonema,* including *G. acuminata* and *G. angustatum*, were present between 3800-3300 cal yrs BP (210-180 cm). *Gomphonema* spp. are often epiphytic (Michelutti *et al.* 2003b) and common in circumneutral to alkiphilous environments (Reavie & Smol 1998). Other species present at this time included *Achnanthidium minutissima* and *Psammothidium abundan* f. *rosenstockii.* At 3800 cal yrs BP (208 cm) rarefaction species richness increased substantially to 32 taxa. Species richness remained high until approximately 3400 cal yrs BP (188 cm).

Dissolution of Diatoms

There were three time periods, between ~8500-8200 cal yrs BP (337-339 cm), ~7600-7000 cal yrs BP (321-329 cm) and ~5600-5000 cal yrs BP (248-267 cm), within zone 2 and 3, where biogenic silica content was less than 5%. Slides prepared for diatom counts were scanned and less than 30 diatom valves were encountered, with varying degrees of valve dissolution apparent.

Although valve sums were low and inferences should be made with caution, there were interesting community changes which took place in and around these sections. When diatom concentrations were low, rare taxa such as *Ellerbeckia arenaria*, *Cyclotella*, *Amphora* and *Cocconeis* were present. Additionally *Ellerbeckia arenaria* only occurred in high relative abundances in lake KR02 in the initial assemblage and at depths where there were low diatom concentrations and poor preservation. At some time periods within these sections, for instance, at ~5400 cal yrs BP (257 cm) and ~7500 cal yrs BP (325 cm) *Ellerbeckia arenaria* was the only diatom species found. *Ellerbeckia arenaria* is the only freshwater diatom species in a marine diatom genus and this was reflected in its unique large size compared to the other freshwater species found in lake KR02. It is believed to thrive in carbonate rich, hydrologically variable environments where it lives among submerged mosses (Crawford 2004).

Zone 1-Late Holocene: 3200 cal yr BP- present (170 cm-0 cm)

Magnetic susceptibility was low in this section and varied little, while the organic content continued to gradually increase until approximately 270 cal yrs BP (25 cm) where it began to increase more rapidly. Diatom concentrations and biogenic silica content were generally decreasing, with the exception of peaks in diatom concentrations at 1000 cal yrs BP (46 cm) and in the most recent sediments beginning at ~19 cm (120 cal yrs BP) (Figures 3.3, 3.9a).

Fragilaria sensu lato taxa continued to dominate the core, particularly *Staurosira venter,* which between 3200-600 cal yrs BP (170 cm-80 cm) reached ~89% relative abundance, while taxa such as *Staurosirella pinnata* and *Staurosirella pinnata* var. *lancettula/acuminatum* complex decreased (Figures 3.4a, 3.9b). *Pseudostaurosira brevistriata* and *P. pseudoconstruens* increased in relative abundance in this section but were particularly high, beginning at 1600 cal yrs BP (70 cm) and peaking at 1000 cal yrs

BP (47 cm). *S. pinnata* decreased slightly to <5% at 1100 cal yrs BP (50 cm) as the relative abundance of *Staurosirella pinnata* var. *lancettula/acuminatum* complex increased.

Cymbella diluviana was only present in the sediments from 2100-2800 cal yrs BP (100-150 cm), reaching maximum relative abundance of 6% at 2700 cal yrs BP (140 cm) (Figure 3.4b). From 850 cal yrs BP (40 cm) to the most recent sediments, taxa such as *P. pseudoconstruens*, *P. brevistriata*, and *Staurosirella pinnata* var. *lancettula/acuminatum* complex decreased (Figure 3.4a).

Rarefaction species richness was low at 1600 cal yrs BP (73 cm) with a total of 6 taxa (Figure 3.9a). In samples where species richness was this low, often the only taxa present were species from the *Fragilaria sensu lato* group. After 1600 cal yrs BP (73 cm) species richness generally increased, reaching values as high as 21 taxa at 1000 cal yrs BP (47 cm), followed by a subsequent decrease to an average of 10-12 taxa at 120 cal yrs BP (19 cm). Between 120 cal yrs BP and the most recent sediment (19-0 cm) species richness increased substantially (Figure 3.5a).

Between 1400-1000 cal yrs BP (~63-46 cm) and 120 cal yrs BP to present (19-0 cm), *P. pseudoconstruens, P. brevistriata*, and *Staurosirella pinnata* var. *lancettula/acuminatum* complex, *Encyonema minutum*, *Placoneis* spp. and *Psammothidium abundans* f. *rosenstockii* increased in relative abundance. Other taxa present during the last 120 cal yrs BP (uppermost 19 cm) included *Cyclotella bodanica* var. *lemanica, Cyclotella antiqua*, *Cyclotella rossi*, *Discostella stelligera, Stauroneis phoenocentron* and *Navicula aurora* (Figure 3.5b). This was reflected in a gradual increase in species richness after 120 cal yrs BP (19 cm) reaching values of 20 in the uppermost cm.

Numerical analysis

A principal component analysis was used to summarize changes in the diatom communities over time. The first, second and third components of the PCA explained 17%, 10% and 7% of the variance in the species data, respectively (Figures 3.5a-c). There was a long-term trend of decreasing sample scores on the first component axis. Superimposed on this trend were more rapid transitions in sample scores at 7700 cal yrs BP (330 cm), 6000-5800 cal yrs BP (277-271 cm) and 3200 cal yrs BP (170 cm) (Figure 3.5a).

Species with high positive loadings on the first component were *Staurosirella pinnata* var. *intercedens*, *Achnanthes suchlandtii, Staurosirella pinnata* var. *lancettula/acuminatum* complex, *Cyclotella* spp., *Fragiliaria oldenburgioides*, *Amphora thumesis,* and *A. pediculus* and species with high negative scores included *Staurosira venter* and *Pseudostaurosira pseudoconstruens* (Table 3.4).

Sample scores of the second component axis decreased between 9900 cal yrs BP (376 cm) and 5700 cal yrs BP (270 cm) and scores remained low until ~4100 cal yrs BP (219 cm) where they began an increasing trend (Figure 3.5b). Again, superimposed on this trend are shorter periods of deviation in sample scores. For example, scores are close to zero at ~8000 cal yrs BP (335 cm) until 5700 cal yrs BP (269 cm) and again between 3500-1200 cal yrs BP (55-210 cm). In addition, there were pronounced but brief peaks of positive scores at 9600-8100 cal yrs BP (376-336 cm), 3400-3800 cal yrs BP (210-188 cm), 1400-950 cal yrs BP (68-44 cm) and <80 cal yrs BP (the last 15 cm).

Species highly loaded on the second component, included *Achnanthiudium minutissima, Pseudostaurosira pseudoconstruens, Fragilaria oldenburgioides, Psammothidium abundans* f. *rosenstockii.* Species with the greatest negative species loadings were *Amphora copulata* and *S. pinnata* (Table 3.4).

Most of the scores of the third component remained around zero, with the exception of the period between 3800 cal yrs BP (208 cm) and 3400 cal yrs BP (180 cm) (Figure 3.5c). Species highly loaded on the third axis included *Planothidum oestrupii,* Other *Gomphonema* spp., *Staurosirella pinnata*, *Pseudostaurosira brevistriata* and *Gomphonema angustatum.*

Agglomerative hierarchical cluster analysis (CA) was used to summarize samples that were similar based on diatom species data. Three groups of assemblages were identified (Figure 3.6). The first group included samples between present-3100 cal yrs BP (0-165 cm) and 5800-6800 cal yrs BP (271-306 cm). These samples had high *Staurosira venter* percentages. A second group consisted of samples between 3200-5800 cal yrs BP (170-269 cm) that had *Staurosirella pinnata* in high relative abundance. A final group was identified between 9900-7000 cal yrs BP (376 and 311 cm). *Staurosirella pinnata* var. *lancettula/acuminatum* complex was dominant in these samples.

Diatom community shifts, production and species richness

Diatom diversity was calculated based on rarefaction analysis, which estimates species richness based on a common count sum (Birks & Line 1992). Rarefaction species richness was highest in the early Holocene, reaching 42 taxa. Other periods of peak species richness included between 3700-3500 cal yrs BP (203 – 193 cm), 1000-1100 cal yrs BP (46-50 cm) and 110 cal yrs BP – present (<18 cm).

Diatom production and rarefaction species richness were weakly correlated ($r^2 = 0.11$; $p<0.05$). Diatom production peaked just after large transitions in the second component sample scores. Rarefaction species richness and sample scores of the second axis of the PCA were highly correlated ($n = 155$, $r^2 = 0.6$; $p<0.005$) (Figure 3.7).

Rate-of-change analysis was performed using square-chord-distance (Overpeck *et al.* 1985). Diatom community rate-of-change is highest in the early Holocene and at 5800 cal yrs BP (Figure 3.8). There was also relatively high rates of change in the diatom community at ~1100 cal yrs BP and in the most recent sediments. The largest differences in the rate of change within a one hundred year period were at 9700-9600 cal yrs BP, 9600-9500 cal yrs BP, 5800-5700 cal yrs BP, and 1200-1100 cal yrs BP. These changes were greater than those estimated for the past 150 years.

3.6 Discussion

Long-term diatom responses to Holocene climate change

A synthesis of numerous proxy climate data series from the Canadian Arctic Islands indicates maximum temperatures in the Holocene occurred at ~ 9000 ± 2000 cal yrs BP (Holocene Thermal Maximum, HTM), and there was a subsequent cooling (Neoglacial cooling) which started at ~5000 ± 2000 cal yrs BP (Kaufman *et al.* 2004). Maximum Holocene warmth between 10000 and 8000 cal yrs BP has also been detected based on melt percentages in ice cores from Ellesmere and Devon Island (Koerner & Fisher 1990, Fisher *et al.* 1995).

The most diverse and productive diatom assemblages in lake KR02 were found in the early Holocene. Taxa present at this time represent an array of life histories including *Cyclotella* spp. which are planktonic taxa passively residing in the water-column (Round *et al.* 1990) and stalked species in the genus *Gomphonema* which are found attached to a variety of different substrates (Round *et al.* 1990). The long-term trend in diatom community compositional change in lake KR02 is summarized on PCA axis 1, which shows a gradual shift from high positive sample scores to negative sample scores over the Holocene (Figure 3.5a). Taxa such as *Staurosirella pinnata* var. *intercedens*, *Achnanthes suchlandtii, Staurosirella pinnata* var. *lancettula/acuminatum* complex, *Cyclotella* spp., *Fragiliaria oldenburgioides*, *Amphora thumesis,* and *A. pediculus* are gradually replaced by taxa including *Staurosira venter* and *Pseudostaurosira pseudoconstruens* (Table 3.4). This long-term trend is interrupted at ~5700-5800 cal yrs BP, with a relatively abrupt shift from negative to positive scores

(Figure 3.5a). The timing of this interruption is consistent with the inception of neoglacial cooling in the region (Kaufman *et al.* 2004).

Diatom community response to long-term Holocene climate change has been documented in studies from several different areas in Arctic Canada. For example, a study on Baffin Island which examined diatom community changes over the last 9000 years found a more diverse and productive assemblage during the HTM which was followed by decreased diversity and production during neoglacial cooling (Wolfe 1996). Another study from Baffin Island recorded diatom community dynamics over five millenia and inferred water temperature from them. They found diatom-inferred water temperatures decreased during neoglacial cooling (Joynt & Wolfe 2001). A study on the Boothia Peninsula recorded a shift towards a less diverse and productive diatom community after 4600 cal yrs BP which coincides with the inception of neoglacial cooling inferred from paleoclimate records from the region (LeBlanc *et al.* 2004). A study on Ellesmere Island revealed that abrupt changes in diatom production occurred at the same time as glacial advances (Smith 2002). The presence of the most diverse and productive diatom community in the early Holocene coupled with the long-term shift in the KR02 diatom community composition that is abruptly interrupted at the same time as the inception of neoglacial cooling provides evidence that diatom community dynamics are strongly related to climate on long-time scales.

Diatom response to millennial-scale Holocene climate variations

A compilation of over 700 North American pollen paleoenvironmental records suggests four major climate transitions during the Holocene (Viau *et al.* 2006). Averaged over all of North America, the reconstruction indicates that there was a period of relative warmth in the early Holocene, followed by a cooling between 8000-6000 cal yrs BP, a subsequent mid-Holocene warming and finally a cooling after 3000 cal yrs BP (Viau *et al.* 2006). In the Baffin Island region, marine and terrestrial records suggest there was a period of warming between 8500 and 6000 cal yrs BP and a subsequent cooling until 3000 cal yrs BP (Williams *et al.* 1995, Gajewski *et al.* 2000). Pollen records from Prince of Wales and Somerset Islands indicate cooling after 6000 cal yrs BP (Gajewski 1995, Gajewski & Frappier 2001).

The KR02 diatom stratigraphy between ~10,000 cal yrs BP to present could be divided into four zones representing four distinct assemblages, with transitions dated at 8100-8000 cal yrs BP, 5800-5700 cal yrs BP, and 3800-3500 cal yrs BP. These transitions are represented by significant shifts in sample scores of the PCA and the timing of these transitions is consistent with the timing of shifts in climate summarized above (Figure 3.5a-b).

The first transition at 8100-8000 cal yrs BP occurs when the diatom community changed from a complex assemblage that included planktonics, epiphytes and other habitat specialists to shallow, benthic *Fragilaria sensu lato* taxa. Additionally, *Staurosirella pinnata* var. *lancettula*/*acuminatum* complex and *Staurosirella pinnata,* that had been the two dominant species over much of two millennia, began to decrease significantly at this time.

Fragilaria sensu lato taxa often dominate the diatom flora of Arctic lakes (Solovieva & Jones 2002, Rosén *et al.* 2003, LeBlanc *et al.* 2004, Smol *et al.* 2005) and are considered highly competitive under cold and restrictive environmental conditions

(Smol 1988). Evidence for the dominance of *Fragilaria sensu lato* taxa under cold conditions has been provided by study of a high altitude lake that examined the seasonal diatom accumulation in sediment traps over a two-year period. They found *Fragilaria sensu lato* species accumulated in higher abundance, relative to other taxa, during periods of extensive ice-cover (Lotter & Bigler 2000).

The second major transition in diatom community composition in lake KR02 occurred at 5800-5700 cal yrs BP, when an assemblage of primarily *Staurosira venter*, *Pseudostaurosira pseudoconstruens*, *Pseudostaurosira brevistriata* and *Fragilaria oldenburgioides* shifted to a community characterized by *Staurosirella pinnata,* and *Amphora copulata*. This transition is summarized by a shift to high negative samples scores on the second component of the PCA, where these two species had high negative loadings (Table 3.4).

The third transition, dated between 3800-3500 cal yrs BP, was primarily the result of the diatom community changing to an assemblage closely resembling the one between 8100 and 5800 cal yrs BP, where *Staurosira venter*, *Pseudostaurosira pseudoconstruens*, and *Pseudostaurosira brevistriata* have increased relative abundance.

The timing of the above transitions in diatom community composition are consistent with the timing of millennial-scale variations in climate determined by pollen assemblages (Viau et. al. 2006; Figure 4.0). Although the direction of trends in the PCA cannot be directly compared to the direction of changes in the temperature anomaly data, there is striking similarity of the timing of the trends and transitions in the temperature anomaly data and changes in sample scores of the PCA axes of lake KR02 data.

Fragilaria sensu lato response to millennial scale variations in climate

Shifts in relative abundance of taxa in the genera *Staurosira*, *Pseudostaurosira*, *Staurosirella* and *Fragilaria*, which are usually grouped into one genus in paleolimnological analyses, show that these taxa may have different ecological preferences. These taxa are often combined into *Fragilaria sensu lato* in paleolimnological studies because they all are generally considered cold-water taxa (Douglas & Smol 1999) with wide ecological tolerances (Wolfe 1991). Thus it is considered to be not worthwhile to identify the constituent taxa in paleolimnological studies. However, combining them into one group could be resulting in loss of valuable information.

In lake KR02, three major transitions in diatom community composition (at 8100-8000 cal yrs BP, 5800-5700 cal yrs BP, and 3800-3500 cal yrs BP) were identified based on shifts in relative abundance of several taxa. However, because *Fragilaria sensu lato* taxa is a dominant component of the diatom community the variation can be identified in *Staurosira*, *Pseudostaurosira*, *Staurosirella* and *Fragilaria* taxa alone. This suggests they may have differing ecological preferences that could be used to infer relative changes in the environment over time.

Recent studies evaluating diatom species distributions in relation to environmental variables (calibration studies) support this hypothesis. For example, a study of diatom communities in 61 lakes on Baffin Island found that *Pseudostaurosira pseudoconstruens*, *Staurosira venter*, *Pseudoconstruens brevistriata* var. *inflata*, *Staurosirella pinnata*, and *Staurosira pinnata* var. *intercedens* had optima for summer water temperatures of 7.29 °C, 7.02 °C, 6.67 °C, 6.23 °C, and 5.48 °C, respectively

(Joynt & Wolfe 2001). Similarly, a study of diatom distribution in 62 lakes across the Canadian Arctic Archipelago found that species within the genera *Pseudostaurosira* and *Staurosira* had increased abundance with increasing temperature compared to *Staurosirella* and *Fragilaria* taxa (Bouchard 2004, Bouchard *et al.* 2004). This relationship was also observed in a study of 59 lakes in the Yukon and Northwest Territories which found *S. venter* and *P. brevistriata* had higher temperature optima than *S. pinnata* and *S. pinnata* var. *intercedens,* although unlike the other studies they found *P. pseudostaurosira* preferred cooler temperatures (Pienitz & Smol 1995).

The timing of transitions in *Staurosira, Pseudostaurosira, Staurosirella* and *Fragilaria* taxa coupled with shifts in other non-*Fragilaria sensu lato* taxa at the same time in lake KR02 and its coherence with timing of climate transitions described from independent records suggests that these taxa have different ecological preferences and thus are more valuable for paleoecological inferences than previously believed.

Mid-Holocene-diatom valve dissolution and fragmentation periods

Evidence of dissolution, increased fragmentation and the presence of taxa associated with high pH, variable conditions suggests a more turbulent and alkaline environment in lake KR02 between 8500-8200 cal yrs BP, 7600-7000 cal yrs BP and 5600-5000 cal yrs BP. There are several factors which affect diatom preservation, including temperature, pH, salinity, grazing or bioturbation, and water depth (Flower 1993, Ryves *et al.* 2006). The most significant factor affecting diatom dissolution is pH, as dissolution increases exponentially when pH is above 9.0 (Barker *et al.* 1994).

The diatom species present during periods of dissolution have preferences for high pH and variable environments. *Ellerbeckia arenaria* is only found in high relative abundance during these periods and in the oldest sediment, and is believed to prefer subaerial habitats among submerged mosses and hydrologically variable environmental conditions such as under waterfalls (Crawford 2004). *E. arenaria* has been found in several Canadian post-glacial sediment records, for example in British Columbia (Hickman & Reasoner 1998), and Northeastern Alberta (Prather & Hickman 2000), where the interpretation was its high abundance indicated high pH and nutrient-poor conditions (Prather & Hickman 2000).

Cocconeis, Surirella and *Amphora* species were also present during and immediately after the periods of dissolution. *C. placentula* is observed prior to and after the dissolution events and is considered opportunistic (Veres *et al.* 1995) and resistant to disturbance (Hay *et al.* 2000). It has been associated with alkaline environments (van Dam *et al.* 1994, Joynt & Wolfe 2001). *Surirella* spp. are also commonly found under high pH conditions (van Dam *et al.* 1994). The presence of these species could also be a result of differential preservation, but this is unlikely because both heavily (*Ellerbeckia arenaria*) and lightly silicified taxa (eg. *Staurosira* venter) were found in these sections.

A change to a highly alkaline environment during these time periods could be a result of temperature increase. It has been observed that pH increases under warmer conditions in high latitude lakes (Douglas & Smol 1999). Several lines of evidence suggest temperature has modulated pH changes in alpine lakes over the last several centuries (Sommaruga-Wögrath *et al.* 1997, Koinig *et al.* 1998). A recent study of a lake sediment record on Baffin Island found changes in inferred pH were associated with shifts in climate over several thousand years, indicating climate control over pH variation on millennial time-scales (Wolfe 2002).

Diatom response to late Holocene climate change

Medieval warm period (MWP)

The inception of a relative warming, called the Medieval Warm Period (MWP), at ~1000 cal yrs BP, is marked by prominent changes in the diatom community in lake KR02. Although there is debate about whether or not climate changes during this time were global, previous studies have documented a relative warming between ~ the 11th and 14th century (Medieval Warm Period; MWP) in the European and Canadian Arctic (Joynt & Wolfe 2001, LeBlanc *et al.* 2004, Karst-Riddoch *et al.* 2005, Moberg *et al.* 2005). Studies suggest that these variations were large enough to have impacted vegetation and aquatic ecosystems (Gajewski & Atkinson 2003).

In KR02 the period between ~1400-950 cal yrs BP is marked by distinct changes in the diatom community, summarized on the first and second components of the PCA, which indicate increased abundance of *P. brevistriata*, *P. pseudoconstruens* *Achnanthidium minutissima* and *Encyonema minutum* (Figures 3.5a-b, 3.9). Additionally between ~1400-950 cal yrs BP there are increased rarefaction species richness, diatom concentrations and percent organics. Similar trends in increased diatom diversity and production around this time period have been reported in other areas (LeBlanc *et al.* 2004, Finkelstein & Gajewski 2006). Both *P. brevistriata* and *P. pseudoconstruens* have been recently associated with higher temperatures compared to other *Fragilaria sensu lato* (Joynt & Wolfe 2001, Bouchard 2004). Increased abundance of *A. minutissima,* a tychtoplanktonic taxon, has recently been associated with warmer temperatures during the last 80 years (Keatley *et al.* 2006) and higher dissolved organic carbon (DOC) concentrations (Rühland *et al.* 2003b). *Encyonema minutum* is commonly found attached to rock surfaces or as an epiphyte on other diatoms (Reavie & Smol 1998). The presence of a variety of diatom species with different microhabitat preferences and increased organic content and diatom concentrations suggests a biologically productive, well-developed littoral zone over this time period (Smol 1988).

Little Ice Age (LIA)

The timing of a dramatic shift in diatom community composition of lake KR02 is consistent with the Little Ice Age (LIA) cooling between ~850-150 cal yrs BP, well documented in many proxy records across the Northern Hemisphere (Bradley & Jones 1993, Overpeck *et al.* 1997, Crowley & Lowery 2000), including Canada (Bradley 1990, Fisher & Koerner 1994). Several diatom-based sediment records document distinct community response to these changes (Korhola & Weckström 2000, Wolfe 2003, LeBlanc *et al.* 2004). For example, a study on Prescott Island found significant decreases in species richness and evenness with the onset of the LIA (Finkelstein & Gajewski 2006). Similarly, a study on Baffin Island found that both diatom diversity and production decreased during the LIA (Wolfe 1996). In lake KR02 a similar response is found. In addition to the distinct compositional changes in KR02 beginning at ~850 cal yrs BP, there is a marked decline in diatom diversity and concentrations (Figure 3.9). At this time magnetic susceptibility was high while LOI was low; which may indicate increased erosion and decreased biological production (Lowe & Walker 1997).

Recent warming

The diatom community of lake KR02 has been undergoing compositional changes over the last 80 years, and species richness has been increasing during the last 120 years (Figure 3.9). The compositional changes are clearly indicated by increasing sample scores on the second principal component over this time (Figure 3.5b). Taxa present at this time include planktonic species such as *Cyclotella bodanica var. lemanica, Cyclotella antiqua*, *Cyclotella rossi*, and *Discostella stelligera,* in addition to taxa such as *Stauroneis phoenocentron* and *Navicula aurora*. An increase in planktonic species such as those in the genus *Cyclotella* is consistent with increased temperatures, which would reduce the extent and duration of ice cover (Lotter & Bigler 2000). A shift towards more *Cyclotella* species in Arctic freshwater lakes over the last century has been observed in several studies (Smol *et al.* 2005, Rühland & Smol 2005). In addition to compositional changes in diatom communities, several lake sediment studies have shown that diatom species richness and production has increased, in response to recent climate change (LeBlanc *et al.* 2004, Smol *et al.* 2005, Finkelstein & Gajewski 2006). Although there are no studies on Victoria Island to compare to the timing of the community changes in lake KR02 to, a recent study on Melville Island found the most dramatic species turnover occurred at ~1919 (Keatley *et al.* 2006). Similarly a study of diatoms from a varved sediment core on Devon Island found diatom production changed significantly since the 1920s (Gajewski *et al.* 1997).

Diatom community response to recent climate change in the context of their response to past climate changes over the Holocene

A recent review of 55 paleolimnological studies across the circumpolar Arctic indicated that diatoms and other aquatic communities have shifted towards distinctly different assemblages that were more diverse and productive during the last 150 years, in most of the lakes included in the study (Smol *et al.* 2005). Additionally the authors further suggest that these compositional changes were "unprecedented in the context of the last several centuries or even millennia" (Smol *et al.* 2005). There was also a clear shift evident in the lake KR02 diatom community during the last century. However, this change is not unique in the lake history. The shift towards an assemblage which has increased relative abundance of *Pseudostaurosira pseudoconstruens*, *P. brevistriata* and rare species such as *Achnanthidium minutissima* and *Encyonema minutum* in the recent sediments was also observed during the early Holocene, the Medieval Warm Period (MWP), and at ~3700 cal yrs BP. Additionally many of the species in the recent sediment were also found in the early Holocene. This can be observed in the original data and also in the second principal component sample scores over time (Figure 3.5b). Additionally, diatom production and rarefaction species richness in the recent sediments of lake KR02 was surpassed during several time periods throughout the Holocene including in the early Holocene (Figure 3.3). Further, although there is a rapid rate of change in the diatom community in the last few centuries the rate was exceeded during the MWP, at 5800 cal yrs BP and in the early Holocene (Figure 3.8).

The several studies which record 'unprecedented' compositional shifts in the diatom communities in the recent sediments compared to other times in the Holocene

(Smol *et al.* 2005), were not conducted at high resolution and few were complete records of the Holocene. Two recent studies of Arctic diatom community dynamics that were conducted at high resolution, in addition to the present study, also observed clear but not unprecedented changes in the diatom communities composition in the recent sediments (LeBlanc *et al.* 2004, Finkelstein & Gajewski 2006). For instance, a study on the Boothia Peninsula found all species which were present in the last 150 years were also present between 4500 cal yrs BP and 7000 cal yrs BP. Although species richness increased in the recent sediments it was surpassed by the diversity found in the mid-Holocene. The fact that high resolution studies are not observing the 'unprecedented' changes in diatoms whereas the low-resolution studies are suggests the novelty observed in the low-resolution studies could be a result of sampling. Given the importance of this issue to understanding human-induced climate change and its impacts, further work should focus on conducting more high-resolution studies.

Relationship between climate, diatom composition, production and species richness

A close relation exists between climate, diatom community composition, production and species richness in lake KR02. Diatom production and diversity has been related to the extent and duration of snow/ice cover in Arctic lakes, where during warmer periods there should be less extensive ice-cover and consequently higher diatom production and diversity (Smol 1983). Recent studies examining diatom community changes over the last several centuries have found higher diversity and production associated with recent warming (Smol *et al.* 2005). Wolfe (2003), found that diatom production decreased during neoglacial cooling and during the LIA. They concluded the changes in production were due to the relationship between summer temperatures, timing of ice-cover and production. A study on the Boothia Peninsula found shifts towards a community dominated by a few small benthic diatoms, highly competitive under colder conditions, and low diatom production in Arctic lake sediments during post-early Holocene cooling (LeBlanc *et al.* 2004).

In lake KR02 diatom production, as estimated by percent BSi, oscillates over approximately 1500 years peaking just after large transitions in the diatom community composition. Although production and rarefaction species richness were not highly correlated due to this phase difference, species richness was highly correlated to sample scores of the second PCA axis (Figure 3.7). The coupling of peak diatom production with the transitions in the diatom community organization and changes in rarefaction species richness, which occurs during Holocene climate transitions, further suggests an intimate relationship between diatom production, community composition and climate on multiple time-scales.

3.6 Conclusion

The KR02 lake sediment record provides a high-resolution record of Holocene diatom community variability on Victoria Island, NWT. The striking coherence of the timing of diatom community compositional shifts in lake KR02 and proxy climate records, on multiple time-scales, provides evidence that the diatom community in lake KR02 is responding to both millennial and centennial climate variability. Taxa of the genera *Pseudostaurosira, Staurosirella, Fragilaria* and *Staurosira*, which are often combined into the genus *Fragilaria sensu lato* in paleolimnological studies, show different responses to climate variation. This not only confirms recent studies that have documented differing temperature preferences of these taxa, but also suggests that combining them may result in the loss of valuable paleoecological information. Diatom production, species richness and compositional changes were tightly coupled with climate changes on centennial and millennial time scales over the Holocene. Over the last several centuries the diatom community of lake KR02 has undergone fairly rapid compositional change and has become more productive and diverse. However, these changes were not exceptional when examined in the context of community changes that over the entire Holocene period.

Table 3.1. Physical and chemical characteristics of Lake KR02.

Physical variables	
Latitude	71.34
Longitude	-113.78
Elevation (m)	229
Distance from coast (m)	58100
Mean July air temperature (°C)**	-6.18
Surface area (Km^2)	0.0079
Depth (m)	6.1
Bedrock type****	Evaporite
Vegetation type***	Prostrate-shrub tundra
Chemistry variables*	
pH	7.4
Ca^{2+} (mgL^{-1})	12.6
Mg^{2+} (mgL^{-1})	4.8
Na^+ (mgL^{-1})	0.59
K^+ (mgL^{-1})	0.179
Cl^- (mgL^{-1})	0.7
$SO_4{}^{2-}$ (mgL^{-1})	4.3
SiO_2 (mgL^{-1})	0.95
Conductivity (µScm^{-1})	79
Dissolved Inorganic Carbon (mgL^{-1})	8.27
Total Kjeldahl nitrogen (mgL^{-1})	0.14
Nitrate-nitrite (mgL^{-1})	0.04
NH_3 (mgL^{-1})	0.021
Particulate phosphorus (mgL^{-1})	0.008
Total dissolved phosphorus (mgL^{-1})	0.008
Chlorophyll-*a* (µgL^{-1})	0.3

*Lake water sampled on June 17, 2001 and analyzed at the City of Ottawa using standard protocols (Environment Canada 1994)

**Temperature data based on a climate model and GIS mapping (Atkinson & Gajewski 2002).

***Vegetation data obtained from www.geobotany.uaf.edu/cavm/ (CAVM Team 2003).

****Bedrock type from a digital geological map (Wheeler *et al.* 1997)

Table 3.2. Radiocarbon dates and calibrated ages (cal yrs BP) from lake KR02 sediment core. The date at 404-407 cm was not used in the chronology.

Depth (cm)	Conventional radiocarbon age (yrs BP)	2-sigma calibrated age range (cal yrs BP)	Median calibrated age (cal yrs BP)	Material dated	Lab code
37.5-39.5	890 ± 40	710-920	815	bulk sediment	Beta-199874
70-73	1680 ± 50	1500-1710	1605	macrofossils	Beta-199875
208-209	3500 ± 40	3670-3870	3770	macrofossils	Beta-199877
241-243	4270 ± 40	4820-4870	4845	bulk sediment	Beta-206009
291-293	5760 ± 50	6430-6670	6550	bulk sediment	Beta-199878
314-317	6150 ± 50	6890-7200	7045	macrofossils	Beta-206010
333-335	7050 ± 50	7760-7960	7860	macrofossils	Beta-206011
349-351	8590 ± 40	9520-9570	9545	macrofossils	Beta-213872
362-364	8730 ± 60	9550-9920	9735	macrofossils	Beta-199879
404-407	18950 ± 170	21760-23250	22505	bulk sediment	Beta-206012

Table 3.3. Species loadings for the first three axis of the principal component analysis. The species with the highest negative or positive loadings in any one component are shown. Only species with >1% abundance in any one sample, and samples with count sums of >200 valves were included in the analysis.

Taxa	1	2	3
Achnanthes suchlandtii	0.27	0.20	-0.16
Achnanthidium minutissimum	-0.04	0.32	0.23
Amphora copulata	0.10	-0.23	0.13
Amphora pediculus	0.23	0.15	0.00
Amphora thumensis	0.23	0.01	-0.03
Cocconeis placentula	0.10	0.00	0.22
Cyclotella spp.	0.25	0.21	-0.16
Fragilaria oldenburgiodes	0.23	0.25	-0.07
Other *Gomphonema* spp.	0.01	0.08	0.45
Gomphonema angustatum	0.01	-0.02	0.27
Planothidium oestrupii	0.03	0.07	0.52
Psammothidium abundans f. *rosenstockii*	-0.19	0.24	0.03
Other *Psammothidium* spp.	-0.07	0.21	0.04
Pseudostaurosira brevistriata	-0.08	0.22	0.27
Pseudostaurosira pseudoconstruens	-0.23	0.26	0.09
Staurosira venter	-0.34	-0.06	-0.16
Staurosirella pinnata	0.19	-0.23	0.31
Staurosirella pinnata var. *intercedens*	0.29	-0.11	0.05
Staurosirella pinnata var. *lancettula/acuminatum* complex	0.27	0.19	-0.08

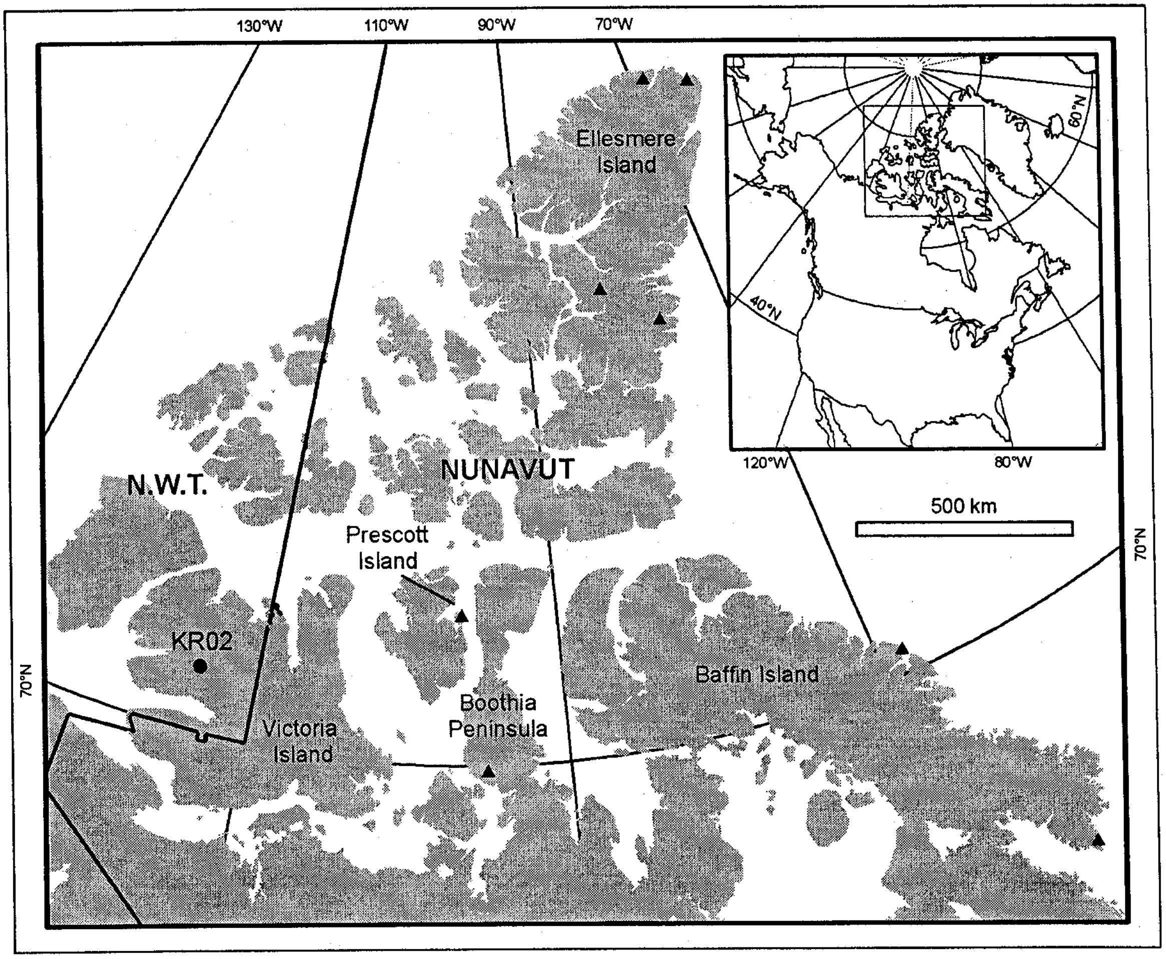

Figure 3.1. Location of lake KR02 and other sites in the Canadian Arctic where Holocene diatom records have been examined that are referred to in the text. Lake KR02 indicated by a filled round symbol. Other sites indicated by filled triangles and references are found in text.

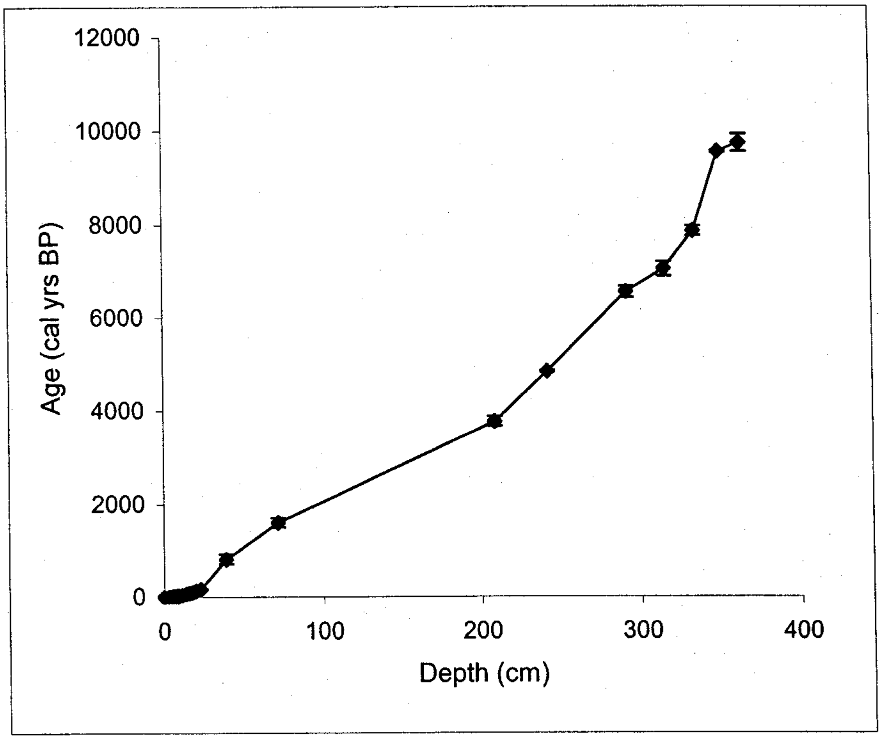

Figure 3.2. Age-depth curve for lake KR02 based on radiocarbon and ^{210}PB dating.

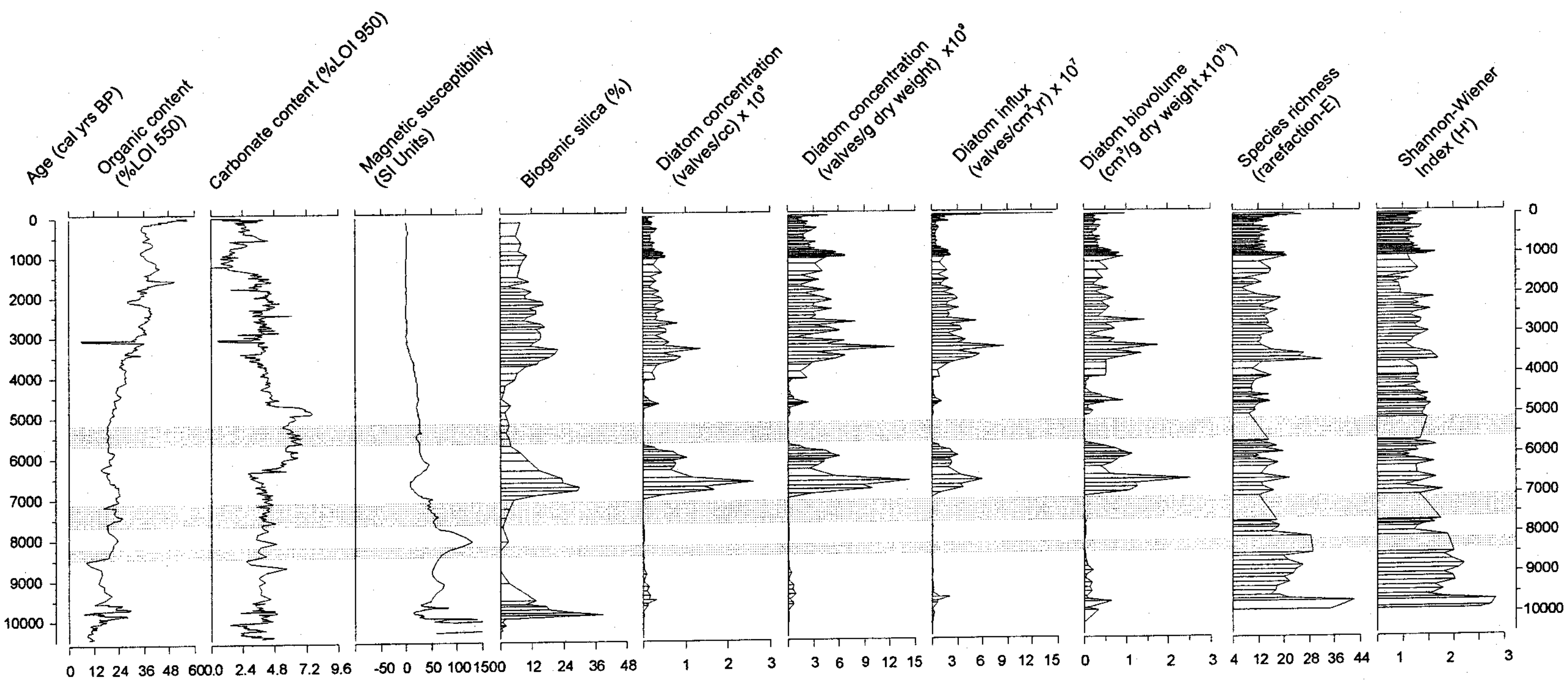

Figure 3.3. Time series plot of lake KR02 sediment parameters. Grey highlighted areas indicate the locations along the core where diatom count sums were less than 200 valves and where there was evidence of diatom dissolution and valve fragmentation. Magnetic susceptibility was truncated.

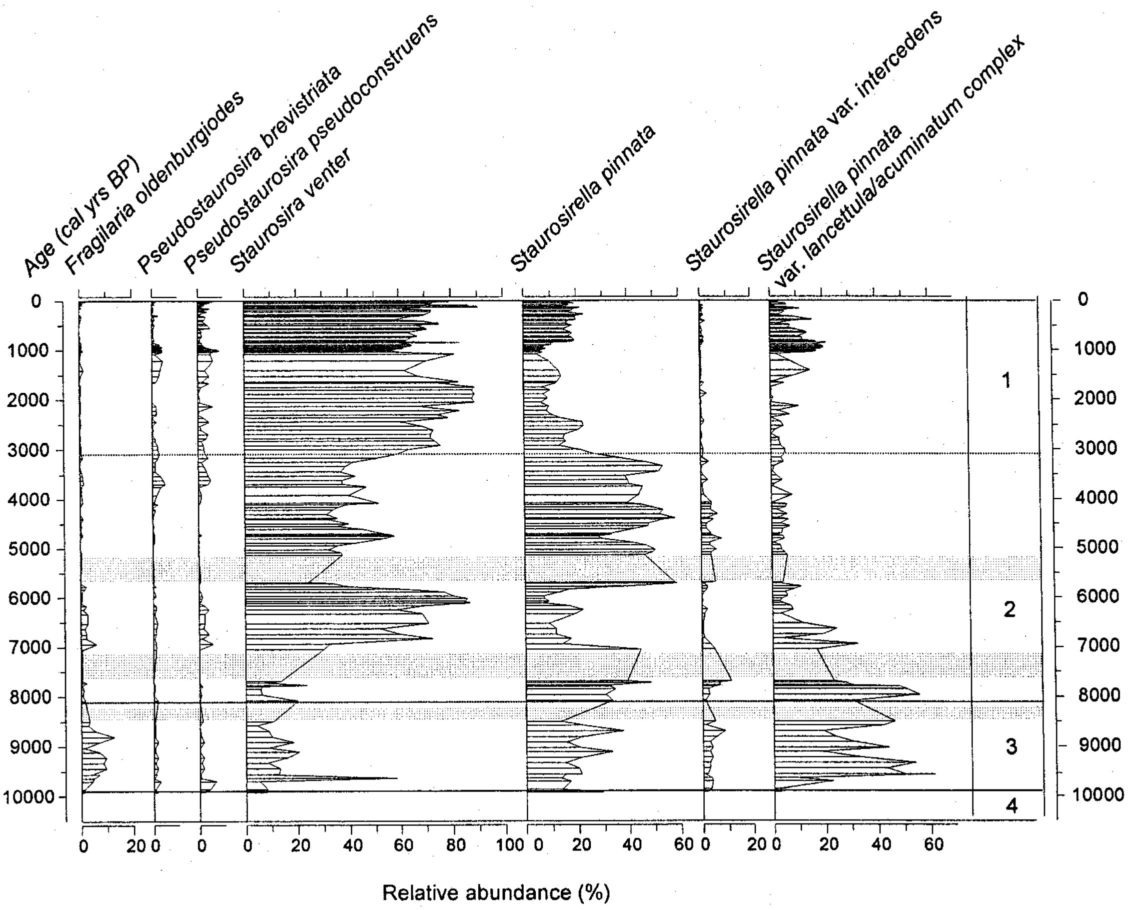

Figure 3.4a. Relative abundances of *Fragilaria* (sensu lato) taxa in lake KR02 over the last 10,000 years. Grey highlighted areas represent the locations along the core where diatom sums were <200 valves and where there was evidence of diatom dissolution and valve fragmentation.

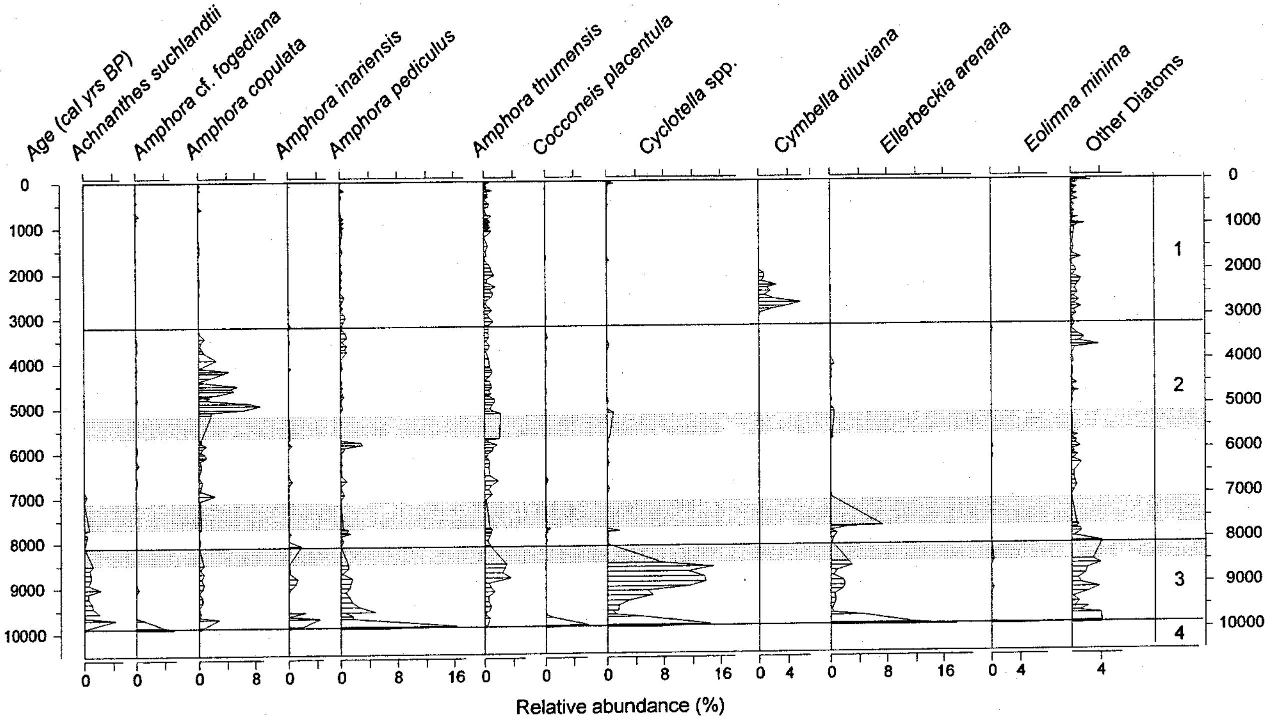

Figure 3.4b. Relative abundances of diatom taxa in lake KR02 over the last 10,000 years. Grey highlighted areas represent sections along the core where diatom sums were <200 valves.

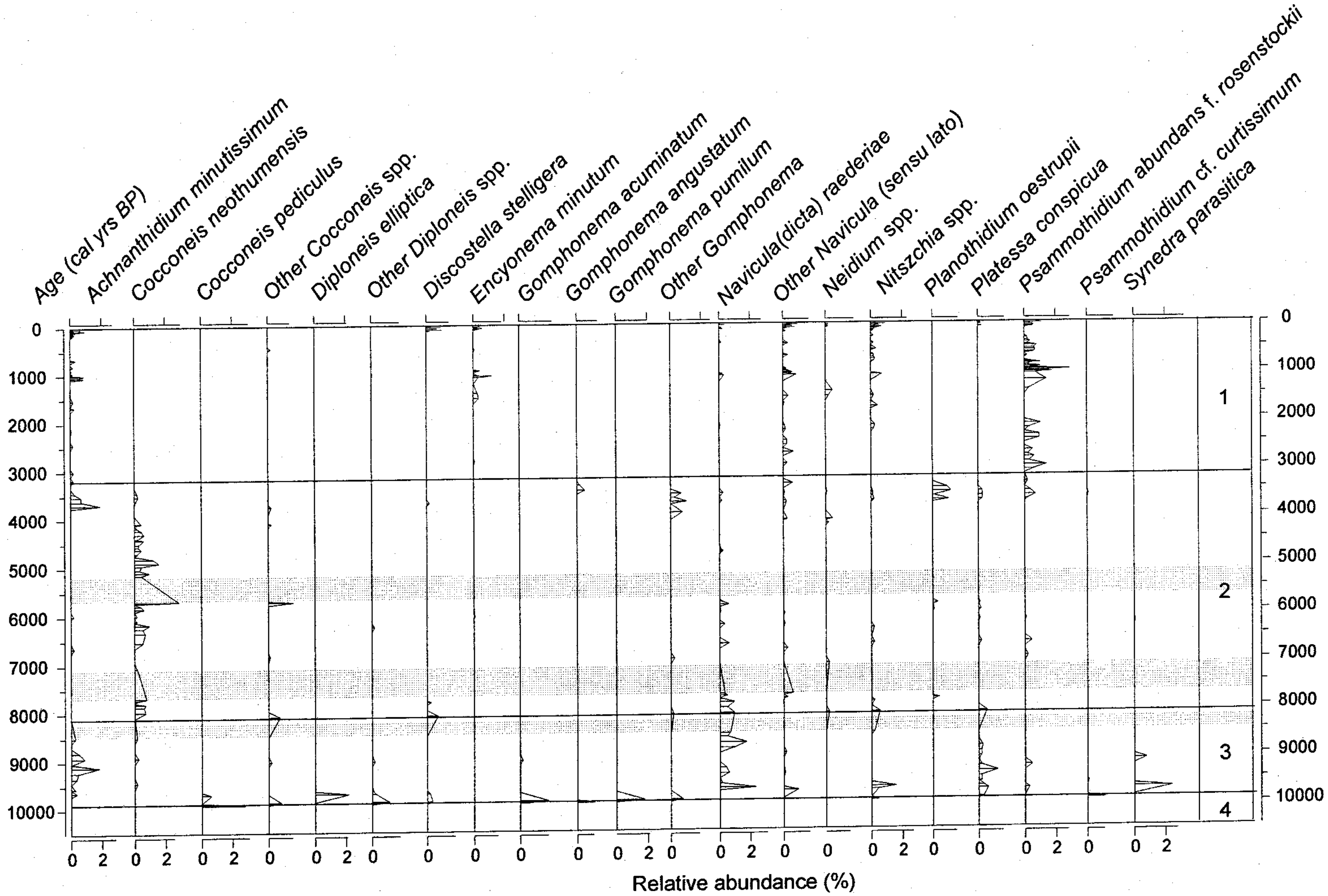

Figure 3.4c. Relative abundance of diatom taxa over the last 10,000 years.Grey highlighted areas represent the sections of the core where diatom sums were <200 valves.

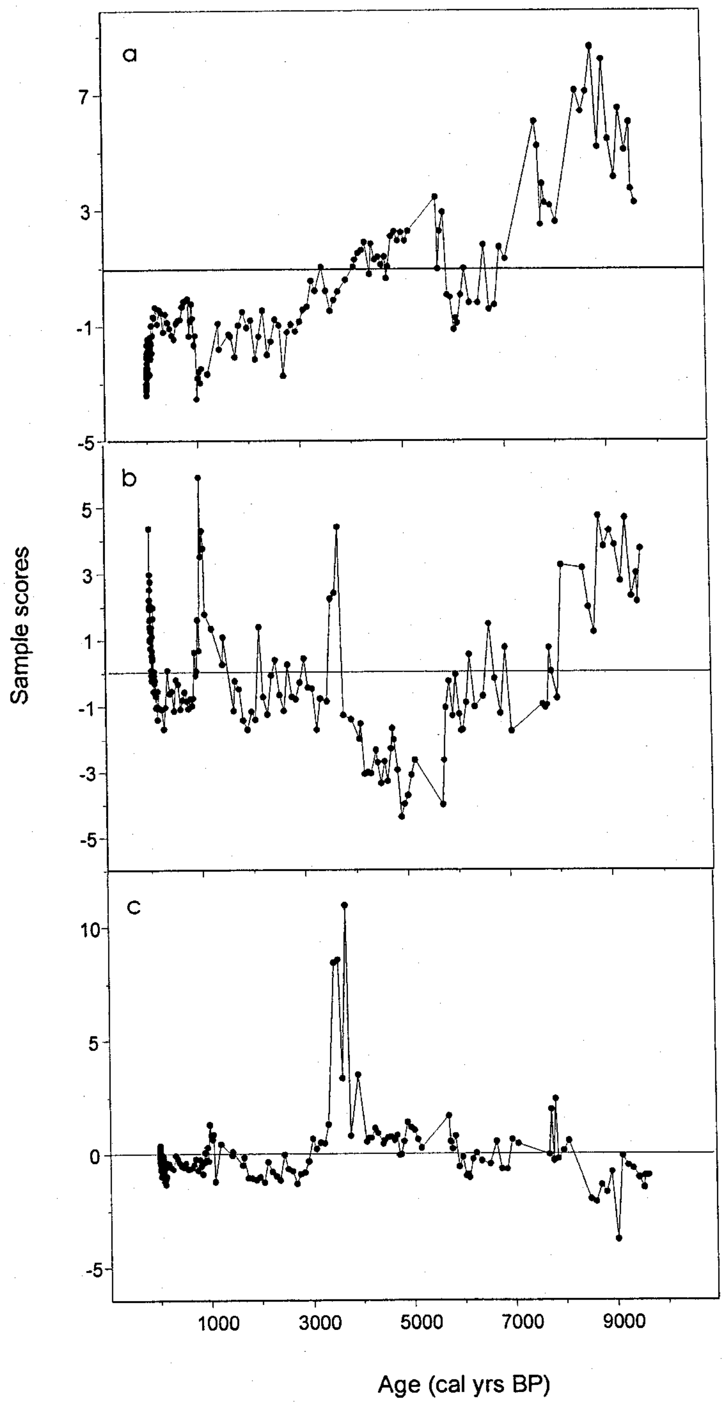

Figure 3.5 a-c. Time series plot of samples scores for the first three axes of a principal component analysis. The first (a), second (b), and third (c) components explained 17 %, 10% and 7% of the variance in the diatom species data respectively. Only species with >1% abundance in any one sample, and samples with count sums of >200 valves were included in the analysis.

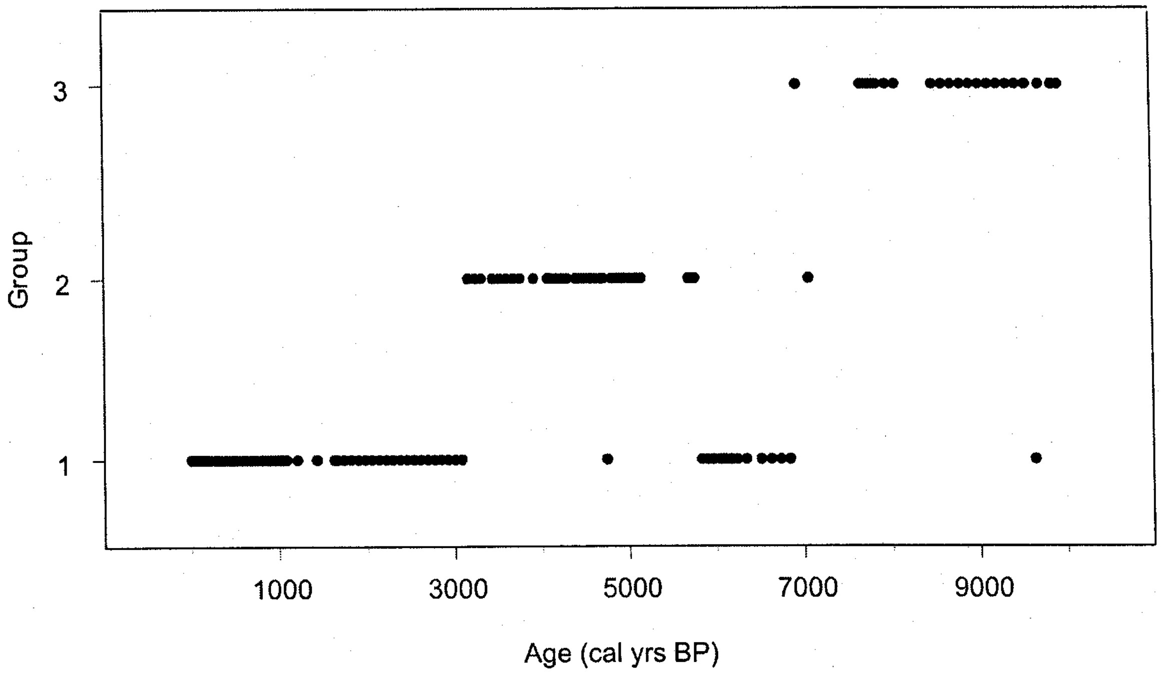

Figure 3.6. Time series plot of groups identified by agglomerative hierarchical cluster analysis. Only species with >1% abundance in any one sample, and samples with count sums of >200 valves were included in the analysis. The dissimilarity measure used was Euclidean distance and the linkage type was Ward's linkage.

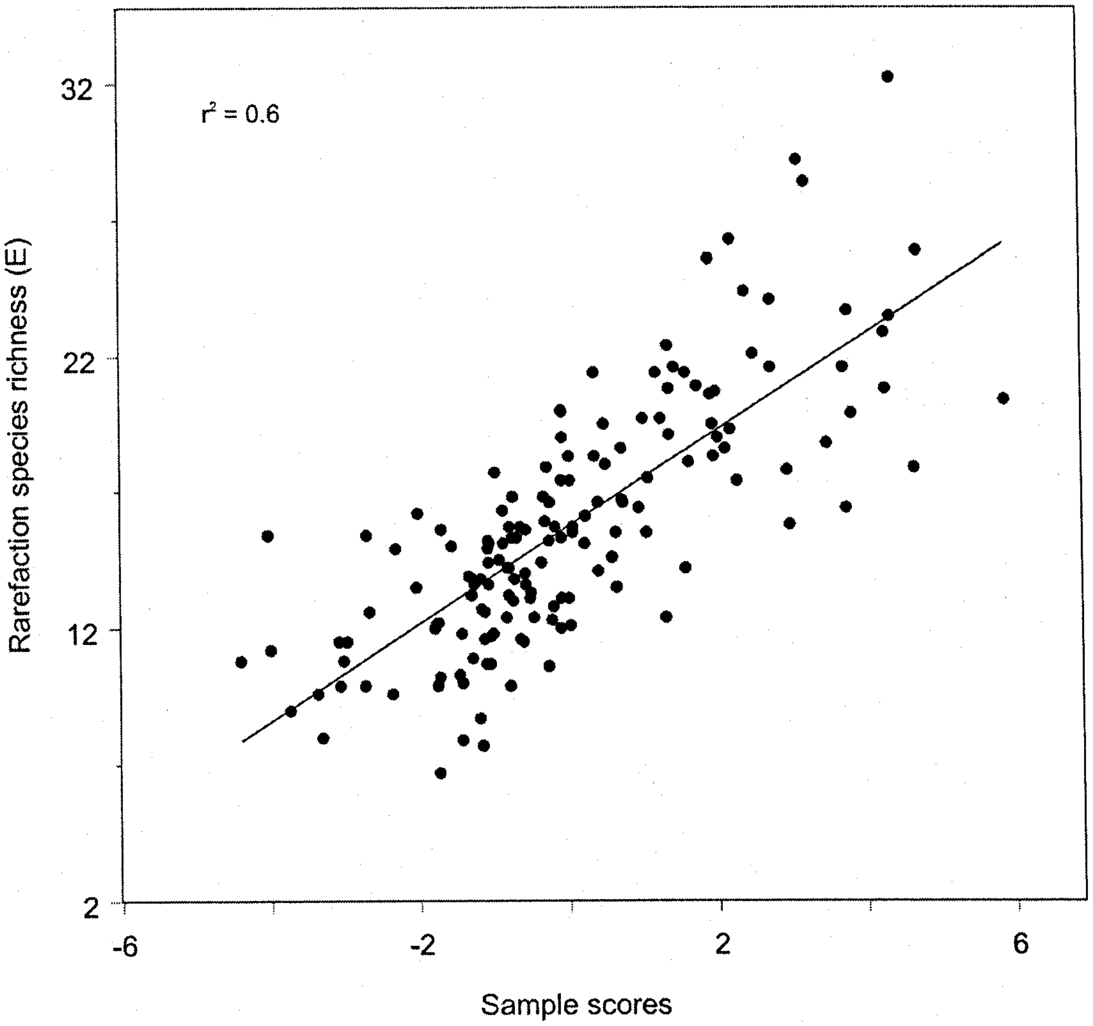

Figure 3.7. Principal component axis 2 samples scores over time versus rarefaction species richness.

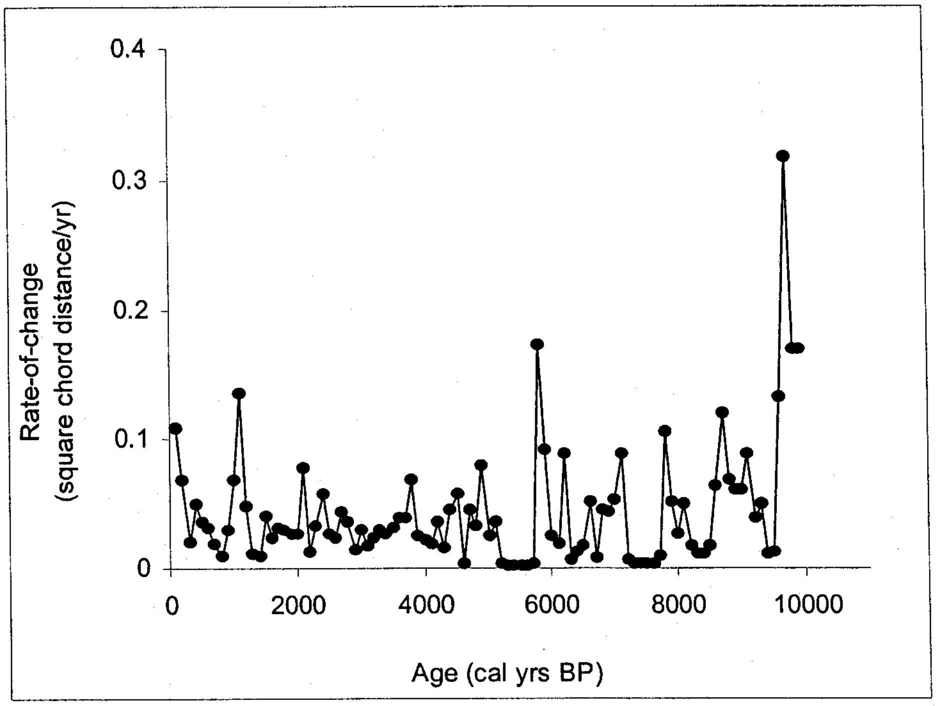

Figure 3.8. Diatom community rate-of-change over the Holocene. Rate-of-change analysis was performed using square chord distance between samples at 100-year intervals.

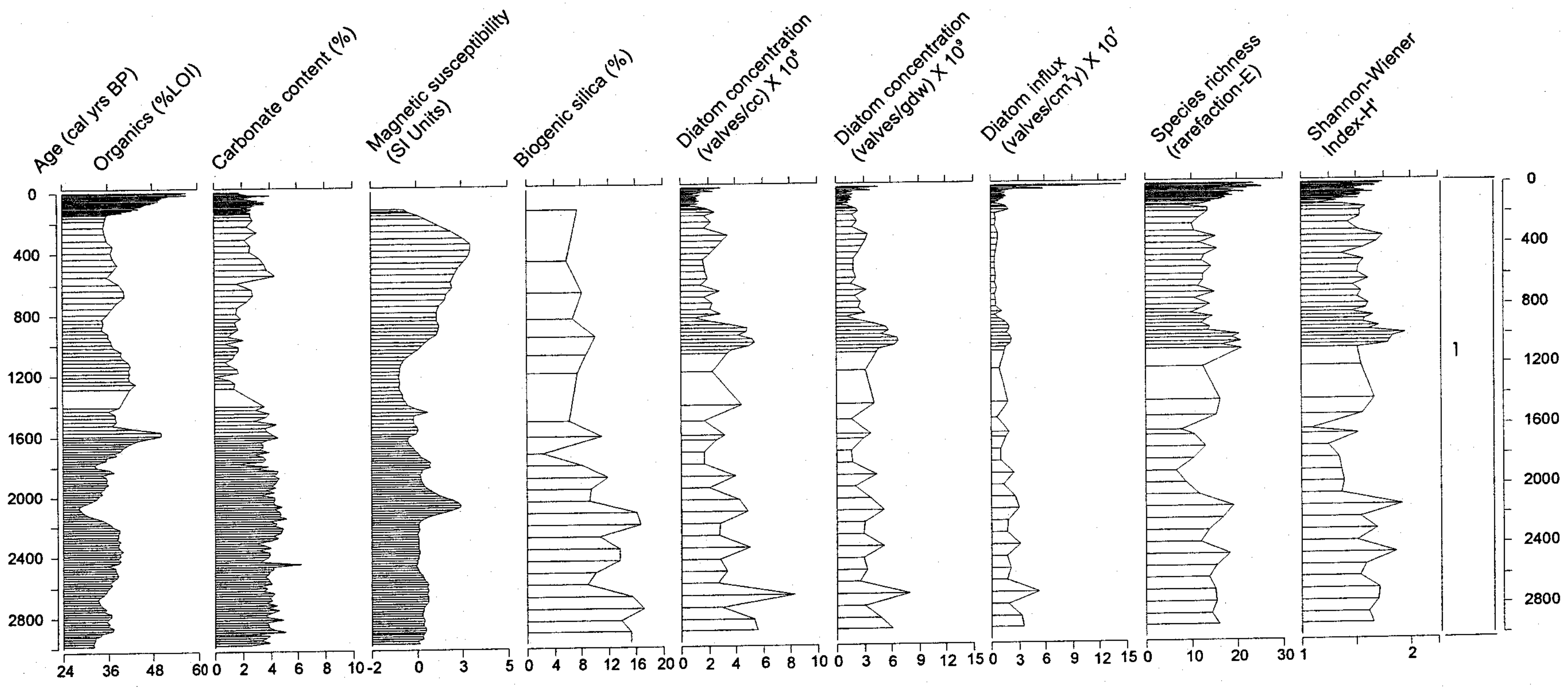

Figure 3.9a. Sediment parameters during the last 3000 years in lake KR02.

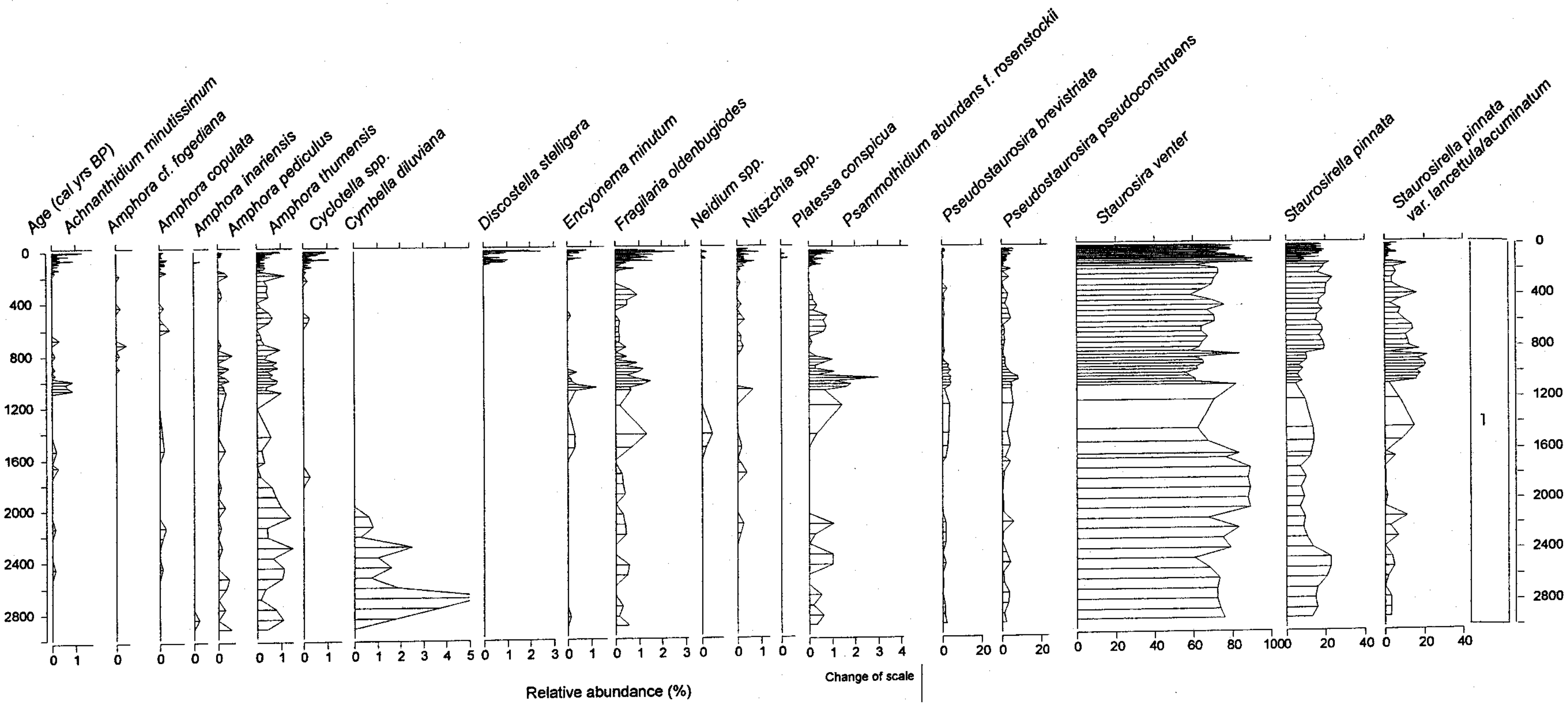

Figure 3.9b. Relative abundances of diatom taxa over the last 3000 years in lake KR02. Note scale changes on the x-axis.

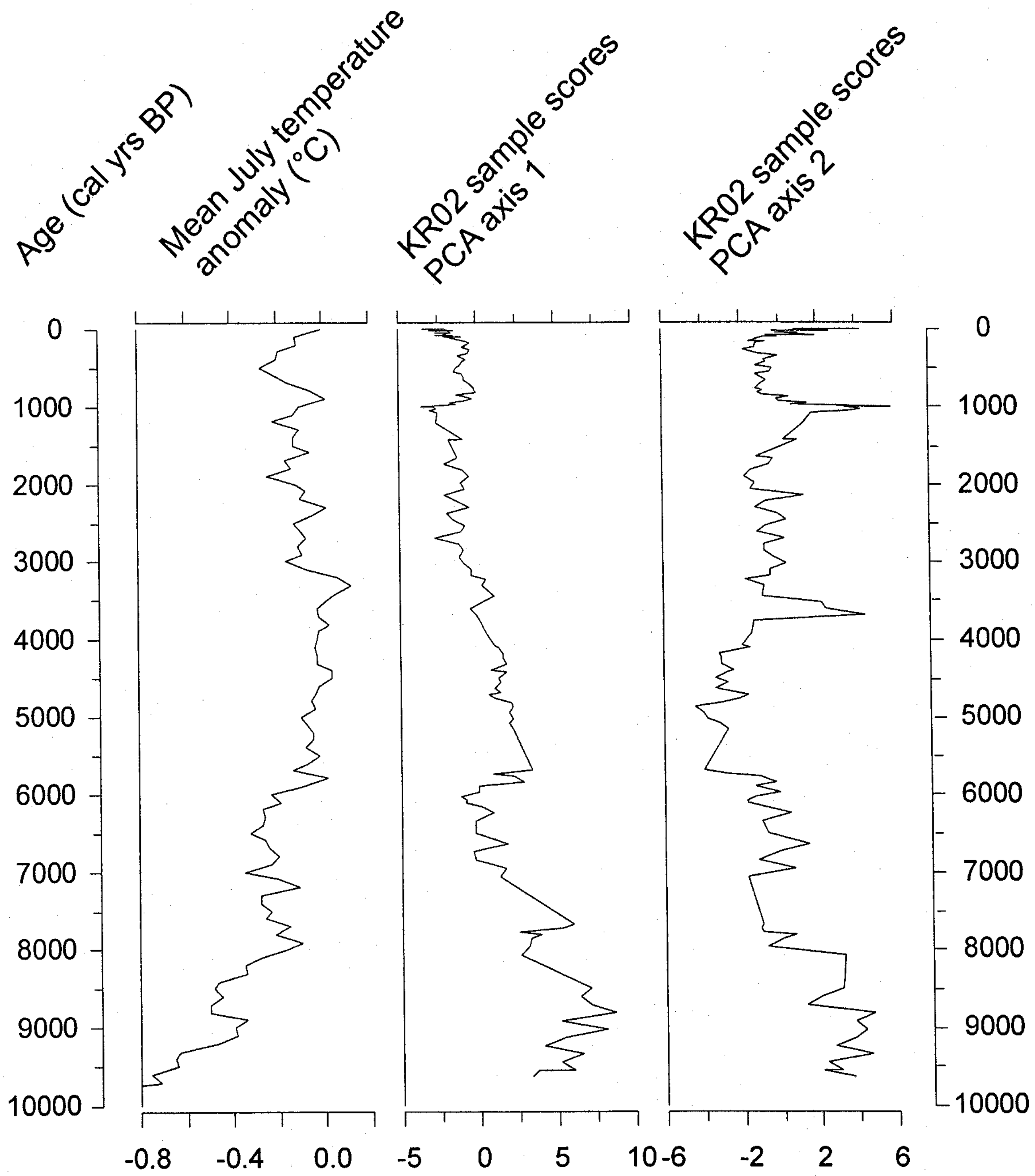

Figure 4.0. Comparison of North American mean July temperature anomaly for the last 10,000 years and sample scores of principal component axis 1 and 2 of KR02 diatom species data. Mean July temperature anomaly data from Viau et. al. (2006) and is truncated at 10 000 cal yrs.

Chapter 4. Thesis summary

This study provides a well-preserved record of Holocene diatom community variability on Victoria Island, NWT. The KR02 lake sediment record is the highest resolution diatom record in the Canadian Arctic yet available, with 181 levels over 9900 years, giving an average of one sample every sixty years. It is also the first Holocene diatom record from the western Canadian Arctic north of treeline. A combination of ^{210}Pb and radiocarbon dating ensured a reliable chronology. Loss-on-ignition and magnetic susceptibility analyses were also performed at high resolution.

The diatom data were analyzed with the aid of ordination methods that highlighted striking similarities in the timing of community compositional shifts in lake KR02 and transitions in climate states from independent paleoclimate records in the region. Specifically, shifts in diatom community dynamics at 8100-8000 cal yrs BP, 5800-5700 cal yrs BP and 3500-3200 cal yrs BP occurred at the same time as millennial-scale climate variability derived from a large set of pollen data (Viau *et al.* 2006). In addition there were diatom compositional shifts, increased production and rarefaction species richness at the same time as centennial scale climate warmings such as the 'Medieval Warm Period' (~1400-800 calendar years before present, cal yrs BP) and recent warming. During the 'Little Ice Age' cooling (~800-150 cal yrs BP) the diatom community became less diverse. The congruence of shifts in the diatom community at the time of climate variation derived from other proxy records provides evidence that the diatom community in lake KR02 is responding to both millennial and centennial climate variability.

The abundance of taxa of the genera *Pseudostaurosira, Staurosirella, Fragilaria* and *Staurosira* that are often combined into one genus, *Fragilaria* sensu lato, in paleolimnological studies, varied in response to variation in climate. This suggests that not using new taxonomic categories may be resulting in loss of paleoecological information. In light of this evidence it is suggested that future studies would benefit from using the most up-to-date taxonomy.

A common criticism of ecological experiments is that they generally take place over limited spatial and temporal scales (Blackburn & Gaston 2002). Reviews evaluating ecological experiments have revealed that the average temporal scale is a few seasons or years (Tilman 1989). Although short-term ecological experimentation, natural and manipulated, obviously give ecologists much insight, ecological variables such as adaptation, extinction, dispersal, species richness and biodiversity could be understood more thoroughly if they could be assessed over larger spatial and temporal scales. Fossilized diatoms provide unique paleolimnological records because diatoms are abundant, well preserved over time and can be identified accurately to the species level. They have the potential to give ecologists added insight into community dynamics such as relationships between production and species richness over a temporal scale not available with experimentation or short-term studies.

The long-term relationship between diatom compositional change, production and rarefaction species richness were explored. Diatom production was estimated using two methods of deriving diatom concentrations in the sediment. The results of the two methods were highly correlated indicating that both methods gave similar results. Diatom species richness was estimated using rarefaction analysis. Species richness was not highly correlated to production over the Holocene but was highly correlated to ordination sample scores. This indicates a close relationship between diatom community composition and species richness. The timing of shifts in diatom production, species richness and community composition were closely coupled to the timing of climate changes on centennial and millennial time scales over the Holocene.

Over the last several centuries the diatom community of lake KR02 have undergone fairly rapid compositional change as summarized by ordination methods and quantified by rate-of-change analysis. The community has also become more productive and diverse. However, in contrast to previous conclusions (Smol *et al.* 2005), the diatom community changes in the recent sediments were not unique neither in terms of rate of change nor in terms of the taxa that comprised the recent assemblage. Future work should focus on performing more high-resolution studies to provide more thorough context with which to compare recent diatom community changes.

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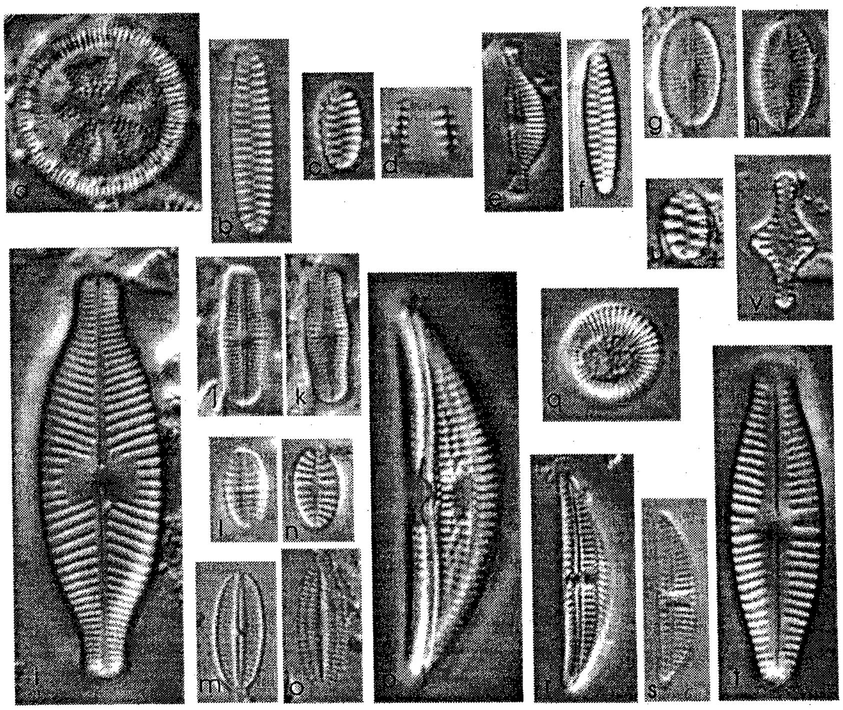
Appendix 1. Diatom taxa found in sediment core from lake KR02, Victoria Island, NWT

Taxon	Taxonomic authority
Achnanthes carrissima	Lange-Bertalot
Achnanthes cf. *acares*	Hohn & Hellermann
Achnanthes cf. *holsatica*	Hustedt
Achnanthes sp. 2	
Achnanthes sp. 3	
Achnanthes sp. 6	
Achnanthes suchlandtii	Hustedt
Achnanthes ziegleri	Lange-Bertalot
Achnanthidium minutissimum	(Kützing) Czarnecki
Amphora cf. *fogediana*	Krammer
Amphora copulata	(Kützing) Schoeman & Archibald
Amphora inariensis	Krammer
Amphora ovalis	(Kützing) Kützing
Amphora pediculus	(Kützing) Grunow
Amphora thumensis	(Mayer) Cleve-Euler
Aneumastus tusculus	(Ehrenberg) Mann
Brachysira neoexilis	Lange-Bertalot
Caloneis schumanniana	(Grunow) Cleve
Caloneis silicula	(Ehrenberg) Cleve
Caloneis tenuis	(Gregory) Krammer
Cocconeis neothumensis	Krammer
Cocconeis pediculus	Ehrenberg
Cocconeis placentula	Ehrenberg
Cocconeis pseudothumensis	Reichardt
Craticula sp. 1	
Cyclotella antiqua	W.Smith
Cyclotella bodanica var. aff. affinis	(Grunow) Cleve-Euler
Cyclotella bodanica var. lemanica	(Müller) Bachmann
Cyclotella meneghiniana	Kützing
Cyclotella michiganina	Skvortzow
Cyclotella ocellata	Pantocsek
Cyclotella radiosa	(Grunow) Lemmermann
Cyclotella rossii	Håkansson
Cymbella descripta	(Hustedt) Krammer & Lange-Bertalot
Cymbella diluviana	(Krasske) Florin
Cymbella ehrenbergii	Kützing
Cymbella subcuspidata	Krammer
Cymbopleura cuspidata	(Kützing) Lange-Bertalot & Genkal?
Denticula kuetzingii	Grunow
Denticula tenuis	Kützing
Diploneis elliptica	(Kützing) Cleve

Taxon	Taxonomic authority
Diploneis parma	Cleve
Discostella stelligera (form 1)	(Cleve & Grunow) Houk & Klee
Discostella stelligera (form 2)	(Cleve & Grunow) Houk & Klee
Ellerbeckia arenaria	(Moore) Crawford
Encyonema minutum	(Hilse) Mann
Encyonema silesiacum	(Bleisch) Mann
Encyonema sp. 1	
Encyonopsis aequalis	(Smith) Krammer
Encyonopsis microcephala	(Grunow) Krammer
Eolimna minima	(Grunow) Lange-Bertalot
Eolimna subminuscula	(Manguin) Lange-Bertalot & Schiller
Eunotia praerupta	Ehrenberg
Eunotia sp. 2	
Fallacia cf. *indifferens*	(Hustedt) Mann
Fallacia sp. 1	
Fragilaria capucina	(Kützing) Lange-Bertalot
Fragilaria exiqua	(Smith) Lemmerman
Fragilaria oldenburgiodes (form 1)	Lange-Bertalot
Fragilaria oldenburgiodes (form 2)	Lange-Bertalot
Gomphonema acuminatum	Ehrenberg
Gomphonema angustatum	(Kützing) Rabenhorst
Gomphonema angustum	Agardh
Gomphonema parvulum	(Kützing)
Gomphonema pumilum	Reichardt & Lange-Bertalot
Gomphonema sp. 4	
Gomphonema sp. 5	
Gyrosigma acuminatum	(Kützing) Rabenhorst
Hannaea arcus	(Ehrenberg) Patrick
Karayevia cf. *laterostriata*	(Hustedt) Round & Bukhtiyarova
Karayevia clevei	(Grunow) Round & Bukhtiyarova
Martyana cf. *martyi*	(Héribaud) Round
Mayamaea agrestis	(Hustedt) Lange-Bertalot
Navicula (sensu lato) sp. 1	
Navicula (sensu lato) sp. 3	
Navicula aurora	Sovereign
Navicula cf. *densilineolata*	(Lange-Bertalot) Lange-Bertalot
Navicula cf. *radiosa*	Kützing
Navicula cf. *submuralis*	Hustedt
Navicula cryptocephala	Kützing
Navicula pseudolanceolata	Lange-Bertalot
Navicula pseudoventralis	Hustedt
Navicula schmassmannii	Hustedt
Navicula seminulum	Grunow
Navicula sp. 2	

Taxon	Taxonomic authority
Navicula sp. 4	
Navicula(dicta) raederiae	Lange-Bertalot
Neidium dubium	(Ehrenberg) Cleve
Neidium sp. 1	
Neidium sp. 2	
Nitzschia alpinum	Hustedt
Nitzschia bacillum	Hustedt
Nitzschia cf. *fonticola*	Grunow
Nitzschia sp. 4	
Nitzschia fonticola	Grunow
Nitzschia frustulum	(Kützing) Grunow
Nitzschia lacuum	Lange-Bertalot
Nitzschia perminuta	(Grunow) Peragallo
Nitzschia recta	Hantzsch
Nitzschia sp. 3	
Nitzschia sp. 5	
Nitzschia sp. 6	
Pinnularia microstauron	(Ehrenberg) Cleve
Placoneis elginensis	(Gregory) Cox
Placoneis explanata	(Hustedt) Lange-Bertalot
Planothidium lanceolatum	(Brébisson) Round & Bukhtiyarova
Planothidium oestrupii	(Cleve-Euler) Round & Bukhtiyarova
Planothidium sp. 1	
Platessa conspicua	(Mayer) Lange-Bertalot
Psammothidium abundans f. *rosenstockii*	(Lange-Bertalot) Bukhtiyarova
Psammothidium cf. *curtissimum*	(Carter) Aboal
Psammothidium cf. *marginulatum*	(Grunow) Bukhtiyarova & Round
Psammothidium levanderi	(Hustedt) Czarn
Psammothidium sp. 1	
Psammothidium sp. 2	
Psammothidium subatomoides	(Hustedt) Bukhtiyarova & Round
Pseudostaurosira brevistriata	(Grunow) Williams & Round
Pseudostaurosira pseudoconstruens	(Marciniak) Williams & Round
Rossithidium pusillum	(Grunow) Round & Bukhtiyarova
Sellaphora bacillum	(Ehrenberg) Mann
Sellaphora laevissima	(Kützing) Mann
Sellaphora pupula	(Ehrenberg) Mereschkowsky
Stauroneis cf. *gracilis*	Ehrenberg
Stauroneis fluminopsis	Van de Vijver & Lange-Bertalot
Stauroneis phoenicentron	(Nitzsch) Ehrenberg
Stauroneis smithii	Grunow
Staurosira construens var. binodis	(Ehrenberg) Hamilton
Staurosira construens var. construens	Ehrenberg
Staurosira venter	(Ehrenberg) Cleve & Möller

Taxon	Taxonomic authority
Staurosira venter sp. 1 (bulbous form)	(Ehrenberg) Cleve & Möller
Staurosira venter sp. 2 (long form)	(Ehrenberg) Cleve & Möller
Staurosirella pinnata	(Ehrenberg) Williams & Round
Staurosirella pinnata var. *intercedens*	(Grunow) Hamilton
Staurosirella pinnata var. *lancettula/acuminatum*	(Ehrenberg) Williams & Round
Surirella sp. 1	
Surirella sp. 2	
Synedra parasitica	(Smith) Hustedt



Light micrographs of select diatom taxa in KR02 sediment core (1500X)

Picture	Taxon	Authority
a	*Cyclotella antiqua*	W.Smith
b	*Staurosira venter* (long form)	(Ehrenberg) Cleve & Möller
c	*Staurosira venter*	(Ehrenberg) Cleve & Möller
d	*Staurosira venter*	(Ehrenberg) Cleve & Möller
e	*Amphora thumensis*	(Mayer) Cleve-Euler
f	*Staurosirella pinnata* var. *lancettula/acuminatum*	(Ehrenberg) Williams & Round
g	*Psammothidium levanderi*	(Hustedt) Czarn
h	*Psammothidium levanderi*	(Hustedt) Czarn
i	*Placoneis explanata*	(Hustedt) Lange-Bertalot
j	*Psammothidium abundans* f. *rosenstockii*	(Lange-Bertalot) Bukhtiyarova
k	*Psammothidium abundans* f. *rosenstockii*	(Lange-Bertalot) Bukhtiyarova
l	*Platessa conspicua*	(Mayer) Lange-Bertalot
m	*Platessa conspicua*	(Mayer) Lange-Bertalot
n	*Achnanthes suchlandtii*	Hustedt
o	*Achnanthes suchlandtii*	Hustedt
p	*Amphora copulata*	(Kützing) Schoeman & Archibald
q	*Cyclotella michiganina*	Skvortzow
r	*Amphora inariensis*	Krammer
s	*Amphora pediculus*	(Kützing) Grunow
t	*Cymbella diluviana*	(Krasske) Florin
u	*Staurosirella pinnata*	(Ehrenberg) Williams & Round
v	*Pseudostaurosira pseudoconstruens*	(Marciniak) Williams & Round

Appendix 2. Biovolume estimates for diatom taxa of lake KR02

Taxa	Class*	Highest value in range
Achnanthes carrissima	2	100
Achnanthes cf. *acares*	1	10
Achnanthes cf. *holsatica*	4	10000
Achnanthes suchlandtii	2	100
Achnanthes ziegleri	2	100
Achnanthidium minutissimum	2	100
Amphora cf. *fogediana*	3	1000
Amphora copulata	4	10000
Amphora inariensis	3	1000
Amphora ovalis	4	10000
Amphora pediculus	2	100
Amphora thumensis	3	1000
Aneumastus tusculus	4	10000
Brachysira neoexilis	3	1000
Caloneis schumanniana	3	1000
Caloneis silicula	3	1000
Caloneis tenuis	3	1000
Cocconeis neothumensis	3	1000
Cocconeis pediculus	4	10000
Cocconeis placentula	3	1000
Cocconeis pseudothumensis	3	1000
Cyclotella antiqua	3	1000
Cyclotella bodanica var. aff. *affinis*	3	1000
Cyclotella bodanica var. *lemanica*	3	1000
Cyclotella meneghiniana	3	1000
Cyclotella michiganiana	3	1000
Cyclotella ocellata	3	1000
Cyclotella radiosa	3	1000
Cyclotella rossii	3	1000
Cymbella descripta	3	1000
Cymbella diluviana	3	1000
Cymbella ehrenbergii	4	10000
Cymbella subcuspidata	4	10000
Cymbopleura cuspidata	4	10000
Denticula kuetzingii	4	10000
Denticula tenuis	3	1000
Diploneis elliptica	3	1000
Diploneis parma	3	1000
Discostella stelligera (morph 1)	3	1000
Discostella stelligera (morph 2)	3	1000
Ellerbeckia arenaria	4	10000
Encyonema minutum	3	1000
Encyonema silesiacum	3	1000
Encyonopsis aequalis	3	1000
Encyonopsis microcephala	2	100
Eolimna minima	2	100

Taxa	Class*	Highest values in range
Eunotia praerupta	4	10000
Fallacia cf. *indifferens*	2	100
Fragilaria capucina	2	100
Fragilaria exiqua	3	1000
Fragilaria oldenburgiodes (form 1)	2	100
Fragilaria oldenburgiodes (form 2)	2	100
Gomphonema acuminatum	4	10000
Gomphonema angustatum	3	1000
Gomphonema angustum	3	1000
Gomphonema parvulum	3	1000
Gomphonema pumilum	3	1000
Gyrosigma acuminatum	4	10000
Hannaea arcus	3	1000
Karayevia cf. *laterostriata*	3	1000
Karayevia clevei	3	1000
Martyana cf. *martyi*	2	100
Mayamaea agrestis	2	100
Navicula aurora	4	10000
Navicula cf. *densilineolata*	3	1000
Navicula cf. *radiosa*	4	10000
Navicula cf. *submuralis*	2	100
Navicula cryptocephala	3	1000
Navicula pseudolanceolata	3	1000
Navicula pseudoventralis	2	100
Navicula schmassmannii	2	100
Navicula seminulum	2	100
Navicula(dicta) raederiae	1	10
Neidium dubium	4	10000
Nitzschia alpinum	3	1000
Nitzschia bacillum	2	100
Nitzschia cf. *fonticola*	3	1000
Nitzschia fonticola	3	1000
Nitzschia frustulum	2	100
Nitzschia lacuum	3	1000
Nitzschia perminuta	3	1000
Nitzschia recta	4	10000
Pinnularia microstauron	4	10000
Placoneis elginensis	3	1000
Placoneis explanata	3	1000
Planothidium lanceolatum	2	100
Planothidium oestrupii	2	100
Platessa conspicua	2	100
Psammothidium abundans f. *rosenstockii*	2	100
Psammothidium cf. *curtissimum*	1	10
Psammothidium cf. *marginulatum*	2	100
Psammothidium levanderi	2	100
Psammothidium subatomoides	2	100
Pseudostaurosira brevistriata	2	100
Pseudostaurosira pseudoconstruens	2	100

Taxa	Class*	Highest values in range
Rossithidium pusillum	2	100
Sellaphora bacillum	3	1000
Sellaphora laevissima	3	1000
Sellaphora pupula	3	1000
Stauroneis cf. *gracilis*	4	10000
Stauroneis fluminopsis	4	10000
Stauroneis phoenicentron	4	10000
Stauroneis smithii	2	100
Staurosira construens var. *binodis*	3	1000
Staurosira construens var. *construens*	2	100
Staurosira venter	2	100
Staurosira venter (bulbous form)	2	100
Staurosira venter (long form)	2	100
Staurosirella pinnata	2	100
Staurosirella pinnata var. *intercedens*	3	1000
Staurosirella pinnata var. *lancettula/acuminatum*	2	100
Surirella sp1	4	10000
Surirella sp2	4	10000
Synedra parasitica	2	100

*Class ranges: 1) less than 10 μm^3, 2) between 10 - 100 μm^3, 3) between 100 - 1000 μm^3, 4) between 1000 - 10,000 μm^3, 5) greater than 10,000 μm^3.

Appendix 3. Exploratory principal component analysis

The following appendix outlines the results of an exploratory principal component analysis (PCA) performed on the diatom taxa of lake KR02. The PCA was performed on species with relative abundance of greater than 1% and samples with count sums of greater than 200 valves. Based on these results, three samples were dropped from subsequent analysis. The three samples from the lowermost depths consisted of a unique assemblage that weighed heavily in the analysis thus overshadowing community changes at other depths.

The first three components of the PCA explained 19%, 13%, and 10% of the variation in the diatom species data respectively. The samples scores are displayed in a time series plots (Figure 1a-c) and species loadings are shown in Table 1. On all three axes, the sample scores around 10, 000 cal yrs BP are much larger than any other time period. Samples during this time period were unique and thus weighed heavily in the analysis. These samples were still presented in all graphs of results, and considered in the interpretation of the KR02 diatom stratigraphy but were dropped from the PCA considered in Chapter 3. They were retained in the cluster and rate of change analysis, as these operate on samples not variables.

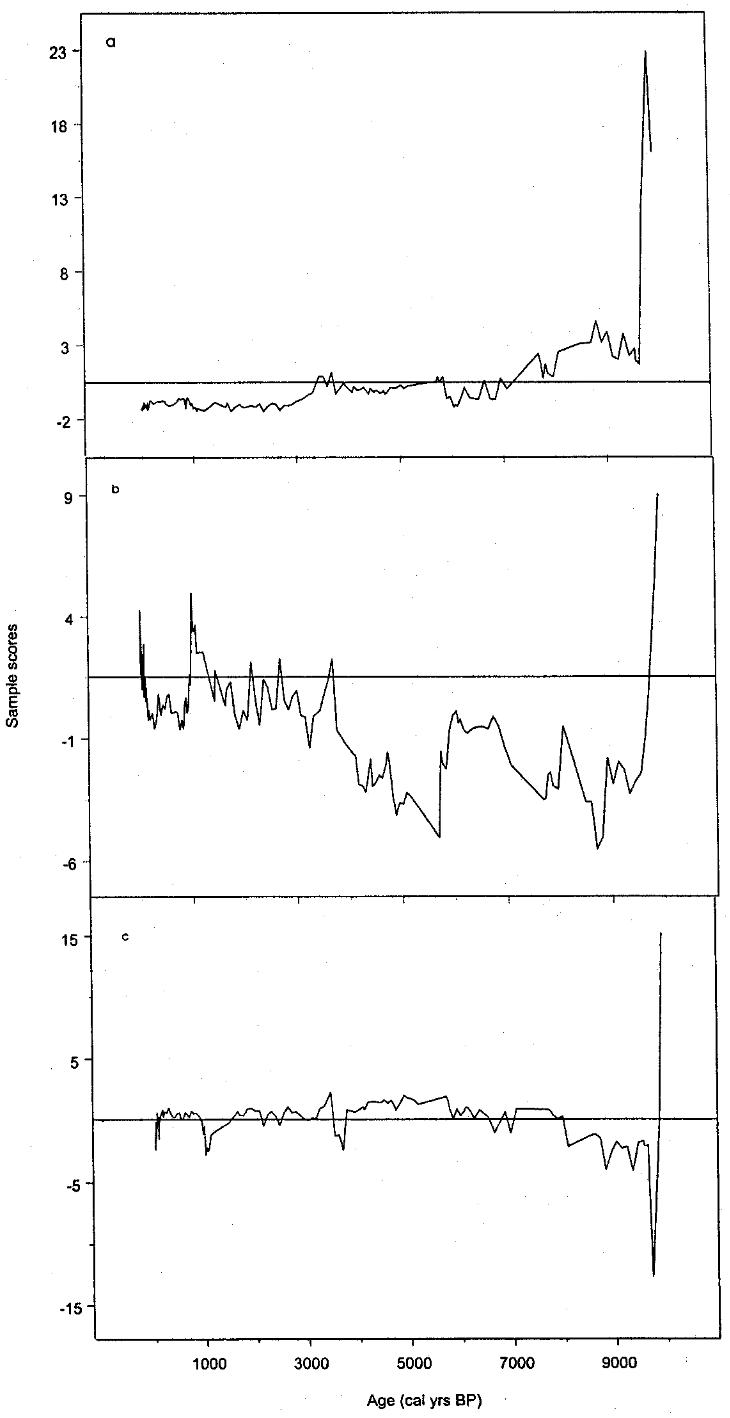


Figure 1a-c. Time series plot of sample scores for the first three axes of a principal component analysis. The first (a), second (b) and third (c) components explained 17%, 10% and 7% of the variance in the diatom species data respectively. Only species with >1% abundance in any one sample, and samples with count sums >200 valves were included in the analysis.

Table 1. Species loadings on the first three axes of a principal component analysis. Species with the highest negative of positive scores on any one axis are shown.

Taxa	Axis	1	2	3
Achnanthes suchlandtii		0.19	-0.10	-0.27
Amphora cf. *fogediana*		0.30	0.17	0.20
Amphora inariensis		0.22	-0.01	-0.27
Amphora pediculus		0.31	0.07	0.03
Cocconeis placentula		0.28	0.10	-0.02
Ellerbeckia arenaria		0.31	0.10	0.17
Eolimna minima		0.17	0.14	0.31
Gomphonema angustatum		0.16	0.13	0.30
Psammothidium abundans f. *rosenstockii*		-0.08	0.25	-0.15
Pseudostaurosira pseudoconstruens		-0.03	0.31	-0.19
Staurosirella pinnata		0.06	-0.25	0.15
Staurosirella pinnata var. *intercedens*		0.13	-0.30	0.01

Appendix 4. KR02 diatom relative abundance data

Depth (cm)	*Achnanthes* (sensu lato) unknowns	*Achnanthes carissima*	*Achnanthes* cf. *acares*	*Achnanthes* cf. *holsatica*	*Achnanthes* sp2	*Achnanthes* sp3	*Achnanthes* sp6	*Achnanthes suchlandtii*	*Achnanthes ziegleri*	*Achnanthidium minutissimum*	*Amphora* cf. *fogediana*	*Amphora copulata*	*Amphora inariensis*	*Amphora ovalis*	*Amphora pediculus*	*Amphora thumensis*	*Amphora* Unknown	*Aneumastus tusculus*	*Brachysira neoexilis*
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.5
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.7	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
9.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
9.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.4	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.3	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.3	0.3	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.4	1.2	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Achnanthes* (sensu lato) *unknowns*	*Achnanthes carrissima*	*Achnanthes* cf. *acares*	*Achnanthes* cf. *holsatica*	*Achnanthes* sp2	*Achnanthes* sp3	*Achnanthes* sp6	*Achnanthes suchlandtii*	*Achnanthes ziegleri*	*Achnanthidium minutissimum*	*Amphora* cf. *fogediana*	*Amphora copulata*	*Amphora inariensis*	*Amphora ovalis*	*Amphora pediculus*	*Amphora thumensis*	*Amphora* Unknown	*Aneumastus tusculus*	*Brachysira neoexilis*
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0
33.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.6	0.5	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.0	0.0	0.5	0.9	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.0	0.0	0.0	0.5	0.9	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0
50.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.6	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.3	0.2	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.1	0.4	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	1.5	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	1.2	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.1	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0
140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	1.1	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Achnanthes* (sensu lato) unknowns	*Achnanthes carrissima*	*Achnanthes* cf. *acares*	*Achnanthes* cf. *holsatica*	*Achnanthes* sp2	*Achnanthes* sp3	*Achnanthes* sp6	*Achnanthes suchlandtii*	*Achnanthes ziegleri*	*Achnanthidium minutissimum*	*Amphora* cf. *fogediana*	*Amphora copulata*	*Amphora inariensis*	*Amphora ovalis*	*Amphora pediculus*	*Amphora thumensis*	*Amphora* Unknown	*Aneumastus tusculus*	*Brachysira neoexilis*
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.2	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.1	0.6	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.8	0.5	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.9	0.0	0.0	0.9	0.6	0.0	0.0	0.0
193.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.4	0.2	0.0	0.1	0.2	0.0	0.0	0.0
198.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.8	0.7	0.0	0.0	0.0
203.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.0	0.2	0.5	0.0	0.0	0.5	0.5	0.2	0.0	0.0
208.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.8	0.0	0.0	0.9	0.2	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.7	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.3	0.0	0.3	0.7	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	1.1	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.6	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.2	0.7	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.9	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	4.5	0.0	0.2	0.4	1.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.6	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.1	0.4	0.9	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.9	0.0	0.1	0.1	0.6	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.3	0.6	0.6	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.0	0.2	1.4	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	1.5	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.1	1.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.3	0.8	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.2	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	2.3	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0	2.1	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	2.8	0.6	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.5	0.0	3.0	1.8	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.6	1.2	0.0	0.0	0.0
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.1	0.4	0.0	0.0	0.3	1.0	0.0	0.0	0.0
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.8	0.0	0.0	0.0	0.5	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Achnanthes* (sensu lato) unknowns	*Achnanthes carrissima*	*Achnanthes* cf. *acares*	*Achnanthes* cf. *holsatica*	*Achnanthes* sp2	*Achnanthes* sp3	*Achnanthes* sp6	*Achnanthes suchlandtii*	*Achnanthes ziegleri*	*Achnanthidium minutissimum*	*Amphora* cf. *fogediana*	*Amphora copulata*	*Amphora inariensis*	*Amphora ovalis*	*Amphora pediculus*	*Amphora thumensis*	*Amphora* Unknown	*Aneumastus tusculus*	*Brachysira neoexilis*
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.1	0.0	0.0	0.1	0.4	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.2	0.6	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.4	0.0	0.9	1.9	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.9	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.5	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.3	0.0	0.0	0.6	1.1	0.0	0.0	0.0
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.6	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.3	0.0	1.5	0.9	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.4	0.0	0.0	0.0
336.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.7	0.3	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.3	0.0	0.8	0.0	0.2	1.1	3.0	0.0	0.0	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.2	0.0	1.0	2.8	0.0	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.6	0.2	0.0	0.2	2.4	0.0	0.0	0.0
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.4	1.2	0.0	1.5	3.7	0.0	0.0	0.0
344.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.9	0.0	0.6	1.0	0.1	1.4	0.4	0.0	0.0	0.0
345.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.3	0.5	0.3	0.0	1.2	0.8	0.0	0.0	0.0
346.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.0	1.8	0.0	0.0	0.0	0.0	0.7	1.5	0.0	0.0	0.0
347.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.4	0.0	0.4	0.0	0.4	0.0	0.0	1.2	0.6	0.0	0.0	0.0
348.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.4	0.0	0.5	0.0	0.0	1.6	0.6	0.0	0.0	0.0
349.0	0.6	0.0	0.0	0.0	0.0	0.3	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.9	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.3	0.0	0.1	0.0	0.0	5.0	0.6	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.3	0.0	0.5	0.1	0.0	0.0	0.0
356.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.0	0.0	0.0	0.0	1.7	0.1	0.6	0.0	0.0
361.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	0.0	1.0	2.8	4.5	0.1	1.6	0.7	0.0	0.0	0.0
371.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	3.8	0.8	1.9	0.0	16.3	0.4	0.0	0.0	0.0
376.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	5.3	0.3	0.0	0.0	6.2	0.0	0.0	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Caloneis schumanniana*	*Caloneis silicula*	*Caloneis tenuis*	Centric Unknown (dis)	*Cocconeis neothumensis*	*Cocconeis pediculus*	*Cocconeis placentula*	*Cocconeis pseudothumensis*	*Cocconeis unknown*	*Craticula* sp1	*Cyclotella antiqua*	*Cyclotella bodanica* var. aff. *affinis*	*Cyclotella bodanica* var. *lemanica*	*Cyclotella meneghiniana*	*Cyclotella michiganina*	*Cyclotella ocellata*	*Cyclotella radiosa*	*Cyclotella rossii*	*Cymbella descripta*	*Cymbella diluviana*	*Cymbella ehrenbergii*
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
4.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.6	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0
7.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Caloneis schumanniana*	*Caloneis silicula*	*Caloneis tenuis*	Centric Unknown (dis)	*Cocconeis neothumensis*	*Cocconeis pediculus*	*Cocconeis placentula*	*Cocconeis pseudothumensis*	*Cocconeis unknown*	*Craticula sp1*	*Cyclotella antiqua*	*Cyclotella bodanica var. aff. affinis*	*Cyclotella bodanica var. lemanica*	*Cyclotella meneghiniana*	*Cyclotella michiganina*	*Cyclotella ocellata*	*Cyclotella radiosa*	*Cyclotella rossii*	*Cymbella descripta*	*Cymbella diluviana*	*Cymbella ehrenbergii*
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0
140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Caloneis schumanniana*	*Caloneis silicula*	*Caloneis tenuis*	Centric Unknown (dis)	*Cocconeis neothumensis*	*Cocconeis pediculus*	*Cocconeis placentula*	*Cocconeis pseudothumensis*	*Cocconeis unknown*	*Craticula sp1*	*Cyclotella antiqua*	*Cyclotella bodanica var. aff. affinis*	*Cyclotella bodanica var. lemanica*	*Cyclotella meneghiniana*	*Cyclotella michiganina*	*Cyclotella ocellata*	*Cyclotella radiosa*	*Cyclotella rossii*	*Cymbella descripta*	*Cymbella diluviana*	*Cymbella ehrenbergii*
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
198.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
203.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
275.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.3
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Caloneis schumanniana*	*Caloneis silicula*	*Caloneis tenuis*	Centric Unknown (dis)	*Cocconeis neothumensis*	*Cocconeis pediculus*	*Cocconeis placentula*	*Cocconeis pseudothumensis*	*Cocconeis unknown*	*Craticula sp1*	*Cyclotella antiqua*	*Cyclotella bodanica var. aff. affinis*	*Cyclotella bodanica var. lemanica*	*Cyclotella meneghiniana*	*Cyclotella michiganina*	*Cyclotella ocellata*	*Cyclotella radiosa*	*Cyclotella rossii*	*Cymbella descripta*	*Cymbella diluviana*	*Cymbella ehrenbergii*
278.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
283.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2
286.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
291.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
316.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.2	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.7	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	7.4	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
344.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
349.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
361.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	0.0	0.0	0.0	0.1	0.0	4.5	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0
371.0	0.0	0.0	0.0	0.4	0.0	0.0	6.1	0.0	0.8	0.0	0.0	0.0	12.2	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0	0.0	2.9	0.6	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Cymbella subcuspidata*	*Cymbella* Unknown	*Cymbopleura cuspidata*	*Denticula kuetzingii*	*Denticula tenuis*	*Denticula* unknown	*Diploneis elliptica*	*Diploneis parma*	*Diploneis Unknown*	*Discostella stelligera*	*Discostella stelligera* sp2	*Ellerbeckia arenaria*	*Encyonema minutum*	*Encyonema silesiacum*	*Encyonema* sp1	*Encyonema* Unknown	*Encyonopsis aequalis*	*Encyonopsis microcephala*	*Eolimna minima*
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.2	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.6	0.0	0.2	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Cymbella subcuspidata*	*Cymbella* Unknown	*Cymbopleura cuspidata*	*Denticula kuetzingii*	*Denticula tenuis*	*Denticula* unknown	*Diploneis elliptica*	*Diploneis parma*	*Diploneis Unknown*	*Discostella stelligera*	*Discostella stelligera sp2*	*Ellerbeckia arenaria*	*Encyonema minutum*	*Encyonema silesiacum*	*Encyonema sp1*	*Encyonema* Unknown	*Encyonopsis aequalis*	*Encyonopsis microcephala*	*Eolimna minima*
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Cymbella subcuspidata*	*Cymbella* Unknown	*Cymbopleura cuspidata*	*Denticula kuetzingii*	*Denticula tenuis*	*Denticula* unknown	*Diploneis elliptica*	*Diploneis parma*	*Diploneis Unknown*	*Discostella stelligera*	*Discostella stelligera* sp2	*Ellerbeckia arenaria*	*Encyonema minutum*	*Encyonema silesiacum*	*Encyonema* sp1	*Encyonema* Unknown	*Encyonopsis aequalis*	*Encyonopsis microcephala*	*Eolimna minima*
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
198.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Cymbella subcuspidata*	*Cymbella* Unknown	*Cymbopleura cuspidata*	*Denticula kuetzingii*	*Denticula tenuis*	*Denticula* unknown	*Diploneis elliptica*	*Diploneis parma*	*Diploneis Unknown*	*Discostella stelligera*	*Discostella stelligera* sp2	*Ellerbeckia arenaria*	*Encyonema minutum*	*Encyonema silesiacum*	*Encyonema* sp1	*Encyonema* Unknown	*Encyonopsis aequalis*	*Encyonopsis microcephala*	*Eolimna minima*
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
336.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
344.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.1	0.0	0.0	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
349.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
361.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	0.0	0.1	0.0	4.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0
371.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	1.1	0.4	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0	0.0	0.0	0.0	6.7
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Eolimna subminuscula*	*Eunotia praerupta*	*Eunotia* sp2	*Fallacia cf. indifferens*	*Fallacia* sp1	*Fragilaria capucina*	*Fragilaria exiqua*	*Fragilaria oldenburgiodes*	*Fragilaria oldenburgiodes* form2	*Fragilaria* Unknown	*Frustulia* Unknown	*Gomphonema acuminatum*	*Gomphonema angustatum*	*Gomphonema angustum*	*Gomphonema parvulum*	*Gomphonema pumilum*	*Gomphonema* sp4	*Gomphonema* sp5	*Gomphonema* Unknown	*Gyrosigma acuminatum*	*Gyrosigma* unknown (centre)
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Eolimna subminuscula*	*Eunotia praerupta*	*Eunotia* sp2	*Fallacia cf. indifferens*	*Fallacia* sp1	*Fragilaria capucina*	*Fragilaria exiqua*	*Fragilaria oldenburgiodes*	*Fragilaria oldenburgiodes* form2	*Fragilaria* Unknown	*Frustulia* Unknown	*Gomphonema acuminatum*	*Gomphonema angustatum*	*Gomphonema angustum*	*Gomphonema parvulum*	*Gomphonema pumilum*	*Gomphonema* sp4	*Gomphonema* sp5	*Gomphonema* Unknown	*Gyrosigma acuminatum*	*Gyrosigma* unknown (centre)
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Eolimna subminuscula*	*Eunotia praerupta*	*Eunotia* sp2	*Fallacia cf. indifferens*	*Fallacia* sp1	*Fragilaria capucina*	*Fragilaria exiqua*	*Fragilaria oldenburgiodes*	*Fragilaria oldenburgiodes* form2	*Fragilaria* Unknown	*Frustulia* Unknown	*Gomphonema acuminatum*	*Gomphonema angustatum*	*Gomphonema angustum*	*Gomphonema parvulum*	*Gomphonema pumilum*	*Gomphonema* sp4	*Gomphonema* sp5	*Gomphonema* Unknown	*Gyrosigma acuminatum*	*Gyrosigma* unknown (centre)
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
198.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.3	0.0	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Eolimna subminuscula*	*Eunotia praerupta*	*Eunotia* sp2	*Fallacia cf. indifferens*	*Fallacia* sp1	*Fragilaria capucina*	*Fragilaria exiqua*	*Fragilaria oldenburgiodes*	*Fragilaria oldenburgiodes* form2	*Fragilaria* Unknown	*Frustulia* Unknown	*Gomphonema acuminatum*	*Gomphonema angustatum*	*Gomphonema angustum*	*Gomphonema parvulum*	*Gomphonema pumilum*	*Gomphonema* sp4	*Gomphonema* sp5	*Gomphonema* Unknown	*Gyrosigma acuminatum*	*Gyrosigma* unknown (centre)
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
342.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	2.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
344.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	6.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
349.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	5.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
361.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
371.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.0	0.0	1.9	0.0	0.0	0.0	1.9	0.4	0.4	0.0	0.0	0.0
376.0	0.6	0.0	0.2	0.0	0.0	0.0	0.0	1.0	0.2	0.0	0.0	0.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Hannaea arcus*	*Karayevia* cf. *laterostriata*	*Karayevia clevei*	*Martyana* cf. *martyi*	*Mayamaea agrestis*	*Navicula* (sensu lato) sp1	*Navicula* (sensu lato) sp3	*Navicula aurora*	*Navicula* cf. *desilineolata*	*Navicula* cf. *radiosa*	*Navicula* ct. *submuralis*	*Navicula cryptocephala*	*Navicula pseudolanceolata*	*Navicula pseudoventralis*	*Navicula schmassmannii*	*Navicula seminulum*	*Navicula* sp2	*Navicula* sp4	*Navicula(dicta) raederiae*	*Naviculoid* Unknown	*Neidium dubium*
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.2	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.2	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.7	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.7	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
7.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Hannaea arcus*	*Karayevia* cf. *laterostriata*	*Karayevia clevei*	*Martyana* cf. *martyi*	*Mayamaea agrestis*	*Navicula* (sensu lato) sp1	*Navicula* (sensu lato) sp3	*Navicula aurora*	*Navicula* cf. *desilineolata*	*Navicula* cf. *radiosa*	*Navicula* cf. *submuralis*	*Navicula cryptocephala*	*Navicula pseudolanceolata*	*Navicula pseudoventralis*	*Navicula schmassmannii*	*Navicula seminulum*	*Navicula* sp2	*Navicula* sp4	*Navicula(dicta) raederiae*	*Naviculoid* Unknown	*Neidium dubium*
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.3	0.1	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
135.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
140.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Hannaea arcus*	*Karayevia* cf. *laterostriata*	*Karayevia clevei*	*Martyana* cf. *martyi*	*Mayamaea agrestis*	*Navicula* (sensu lato) sp1	*Navicula* (sensu lato) sp3	*Navicula aurora*	*Navicula* cf. *desilineolata*	*Navicula* cf. *radiosa*	*Navicula* cf. *submuralis*	*Navicula cryptocephala*	*Navicula pseudolanceolata*	*Navicula pseudoventralis*	*Navicula schmassmannii*	*Navicula seminulum*	*Navicula* sp2	*Navicula* sp4	*Navicula(dicta) raederiae*	*Naviculoid* Unknown	*Neidium dubium*
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
193.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
198.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
271.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
273.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Hannaea arcus*	*Karayevia* cf. *laterostriata*	*Karayevia clevei*	*Martyana* cf. *martyi*	*Mayamaea agrestis*	*Navicula* (sensu lato) sp1	*Navicula* (sensu lato) sp3	*Navicula aurora*	*Navicula* cf. *desilineolata*	*Navicula* cf. *radiosa*	*Navicula* cf. *submuralis*	*Navicula cryptocephala*	*Navicula pseudolanceolata*	*Navicula pseudoventralis*	*Navicula schmassmannii*	*Navicula seminulum*	*Navicula* sp2	*Navicula* sp4	*Navicula(dicta) raederiae*	*Naviculoid* Unknown	*Neidium dubium*
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
335.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
336.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
344.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	0.0	0.0
349.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0
361.0	0.0	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
371.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
376.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Neidium* sp1	*Neidium* sp2	*Neidium* Unknown (centre)	*Nitzschia alpinum*	*Nitzschia bacillum*	*Nitzschia* cf. *fonticola*	*Nitzschia* D8-198-rec-24	*Nitzschia fonticola*	*Nitzschia frustulum*	*Nitzschia lacuum*	*Nitzschia perminuta*	*Nitzschia recta*	*Nitzschia* sp3	*Nitzschia* sp5	*Nitzschia* sp6	*Nitzschia* Unknown	*Pinnularia microstrauron*	*Pinnularia* Unknown	*Placoneis elginensis*	*Placoneis explanata*	*Planothidium lanceolatum*	*Planothidium oestrupii*	*Planothidium* sp 1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.4	0.0	0.0	0.0
6.5	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0
7.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.2	0.3	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Neidium* sp1	*Neidium* sp2	*Neidium* Unknown (centre)	*Nitzschia alpinum*	*Nitzschia bacillum*	*Nitzschia* cf. *fonticola*	*Nitzschia* D8-198-rec-24	*Nitzschia fonticola*	*Nitzschia frustulum*	*Nitzschia lacuum*	*Nitzschia perminuta*	*Nitzschia recta*	*Nitzschia* sp3	*Nitzschia* sp5	*Nitzschia* sp6	*Nitzschia* Unknown	*Pinnularia microstrauron*	*Pinnularia* Unknown	*Placoneis elginensis*	*Placoneis explanata*	*Planothidium lanceolatum*	*Planothidium oestrupii*	*Planothidium* sp 1
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0
64.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.8	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Neidium* sp1	*Neidium* sp2	*Neidium* Unknown (centre)	*Nitzschia alpinum*	*Nitzschia bacillum*	*Nitzschia* cf. *fonticola*	*Nitzschia* D8-198-rec-24	*Nitzschia fonticola*	*Nitzschia frustulum*	*Nitzschia lacuum*	*Nitzschia perminuta*	*Nitzschia recta*	*Nitzschia* sp3	*Nitzschia* sp5	*Nitzschia* sp6	*Nitzschia* Unknown	*Pinnularia microstrauron*	*Pinnularia* Unknown	*Placoneis elginensis*	*Placoneis explanata*	*Planothidium lanceolatum*	*Planothidium oestrupii*	*Planothidium* sp 1
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
193.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0
198.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.0
203.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.1	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Neidium* sp1	*Neidium* sp2	*Neidium* Unknown (centre)	*Nitzschia alpinum*	*Nitzschia bacillum*	*Nitzschia* cf. *fonticola*	*Nitzschia* D8-198-rec-24	*Nitzschia fonticola*	*Nitzschia frustulum*	*Nitzschia lacuum*	*Nitzschia perminuta*	*Nitzschia recta*	*Nitzschia* sp3	*Nitzschia* sp5	*Nitzschia* sp6	*Nitzschia* Unknown	*Pinnularia microstrauron*	*Pinnularia* Unknown	*Placoneis elginensis*	*Placoneis explanata*	*Planothidium lanceolatum*	*Planothidium oestrupii*	*Planothidium* sp 1
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
316.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
334.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
336.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
344.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
349.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
361.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
371.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Planothidium* Unknown	*Platessa conspicua*	*Psammothidium abundans* f. *rosenstockii*	*Psammothidium* cf. *curtissimum*	*Psammothidium* cf. *marginulatum*	*Psammothidium levanderi*	*Psammothidium* sp1	*Psammothidium* sp2	*Psammothidium subatomoides*	*Psammothidium* Unknown	*Pseudostaurosira brevistriata*	*Pseudostaurosira pseudoconstruens*	*Rossithidium pusillum*	*Sellaphora bacillum*	*Sellaphora laevissima*	*Sellaphora pupula*	*Stauroneis* cf. *gracilis*	*Stauroneis fluminopsis*	*Stauroneis phoenicentron*
0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0
1.0	0.0	0.0	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.1	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.2
2.5	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.1	4.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0
3.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	1.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	1.6	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	1.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.2	5.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0
7.5	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.7	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	1.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1
9.5	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1
10.5	0.0	0.2	0.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1
11.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.3	0.0	0.0	0.4	0.0	0.0	0.0	0.0	1.2	2.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0
12.5	0.0	0.0	1.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	2.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.6	0.0	0.0	0.0	0.0	0.2	0.0	0.0
14.5	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	2.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0
15.5	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0
16.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2
17.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.2
17.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.0	0.0	0.1	0.0	0.0	0.1
18.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.1	0.0	0.0	0.0
19.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.6	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Planothidium* Unknown	*Platessa conspicua*	*Psammothidium abundans* f. *rosenstockii*	*Psammothidium* cf. *curtissimum*	*Psammothidium* cf. *marginulatum*	*Psammothidium levanderi*	*Psammothidium* sp1	*Psammothidium* sp2	*Psammothidium subatomoides*	*Psammothidium* Unknown	*Pseudostaurosira brevistriata*	*Pseudostaurosira pseudoconstruens*	*Rossithidium pusillum*	*Sellaphora bacillum*	*Sellaphora laevissima*	*Sellaphora pupula*	*Stauroneis* cf. *gracilis*	*Stauroneis fluminopsis*	*Stauroneis phoenicentron*
28.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	3.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	4.1	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1
47.0	0.0	0.0	1.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	3.9	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	4.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0
49.0	0.0	0.0	1.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.5	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	2.6	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	1.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.6	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	1.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Planothidium* Unknown	*Platessa conspicua*	*Psammothidium abundans* f. *rosenstockii*	*Psammothidium* cf. *curtissimum*	*Psammothidium* cf. *marginulatum*	*Psammothidium levanderi*	*Psammothidium* sp1	*Psammothidium* sp2	*Psammothidium subatomoides*	*Psammothidium* Unknown	*Pseudostaurosira brevistriata*	*Pseudostaurosira pseudoconstruens*	*Rossithidium pusillum*	*Sellaphora bacillum*	*Sellaphora laevissima*	*Sellaphora pupula*	*Stauroneis* cf. *gracilis*	*Stauroneis fluminopsis*	*Stauroneis phoenicentron*
165.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193.0	0.1	0.2	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.2	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
198.0	0.0	0.2	0.7	0.1	0.0	0.1	0.1	0.0	0.0	0.0	4.1	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203.0	0.0	0.3	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	4.6	3.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Planothidium* Unknown	*Platessa conspicua*	*Psammothidium abundans f. rosenstockii*	*Psammothidium cf. curtissimum*	*Psammothidium cf. marginulatum*	*Psammothidium levanderi*	*Psammothidium* sp1	*Psammothidium* sp2	*Psammothidium subatomoides*	*Psammothidium* Unknown	*Pseudostaurosira brevistriata*	*Pseudostaurosira pseudoconstruens*	*Rossithidium pusillum*	*Sellaphora bacillum*	*Sellaphora laevissima*	*Sellaphora pupula*	*Stauroneis cf. gracilis*	*Stauroneis fluminopsis*	*Stauroneis phoenicentron*
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.8	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.5	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6	0.0	0.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
336.0	0.0	0.5	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2	1.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.5	0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
343.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0
344.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
347.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
348.0	0.0	1.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
349.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
356.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
361.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
371.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Stauroneis smithii*	*Stauroneis* Unknown	*Staurosira construens* var. *binodis*	*Staurosira construens* var. *contruens*	*Staurosira venter*	*Staurosira venter* sp1 (ends)	*Staurosira venter* sp2 (long)	*Staurosirella pinnata*	*Staurosirella pinnata* var. *intercedens*	*Staurosirella pinnata* var. *lancettula/acuminatum*	*Surirella* sp1	*Surirella* sp2	*Surirella* Unknown (Frag)	*Synedra parasitica*	Unknown diatom	Unknown pennate	Unknown pennate-D11-12-recount-09	Unknown pennate-D11-12-recount-12
0.0	0.0	0.0	0.0	0.0	63.5	0.2	2.4	14.6	0.6	6.2	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	68.6	0.3	1.4	17.2	0.6	1.7	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
1.0	0.0	0.0	0.0	0.0	66.7	0.3	4.4	15.6	0.5	0.7	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	64.9	0.0	0.7	16.5	0.2	3.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
2.5	0.0	0.0	0.0	0.0	74.1	0.0	1.6	13.9	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	71.5	0.8	1.5	15.4	0.6	1.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
3.5	0.0	0.0	0.0	0.0	63.3	0.4	3.2	17.9	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
4.0	0.0	0.0	0.0	0.0	70.1	0.4	1.3	16.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
4.5	0.0	0.0	0.0	0.0	66.1	0.0	1.2	16.6	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0
5.0	0.0	0.0	0.0	0.0	78.9	0.0	1.0	12.5	0.3	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	72.4	0.0	1.2	14.2	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	66.7	0.0	3.2	15.8	0.3	2.8	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
6.5	0.0	0.0	0.0	0.0	69.7	0.0	1.0	13.2	0.3	3.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
7.0	0.0	0.0	0.0	0.0	66.4	0.2	3.1	15.6	0.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	73.1	0.1	1.3	12.8	0.2	2.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
8.0	0.0	0.0	0.0	0.0	72.5	0.1	1.6	17.8	0.4	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	76.3	0.4	2.0	14.4	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	71.5	0.7	2.8	14.6	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	74.9	0.5	1.7	15.9	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	75.0	0.0	4.2	13.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	71.6	1.4	1.4	15.5	0.2	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	68.7	1.0	2.1	19.5	0.0	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	70.8	0.0	2.1	17.2	0.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	70.5	0.1	2.1	14.5	0.3	3.3	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.1
12.5	0.0	0.0	0.0	0.0	74.6	0.3	1.8	13.7	0.3	2.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
12.5	0.0	0.2	0.0	0.0	67.2	0.3	5.2	18.5	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
13.0	0.0	0.0	0.0	0.0	70.9	0.0	0.0	18.2	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	65.8	0.0	3.9	15.1	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	72.4	0.0	0.0	17.3	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	73.6	0.1	3.3	14.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	67.9	0.8	6.3	16.7	0.7	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	77.4	0.0	3.8	12.2	0.4	0.9	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
16.0	0.0	0.0	0.0	0.0	72.4	0.1	5.8	12.5	0.4	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	70.3	0.7	7.0	13.3	0.1	1.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
17.0	0.0	0.0	0.0	0.0	77.0	0.5	9.1	5.7	0.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	81.2	0.7	2.7	8.2	1.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	67.7	0.3	8.4	16.8	1.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	85.8	0.9	3.8	5.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
19.0	0.0	0.0	0.0	0.0	78.4	0.5	6.2	9.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	85.2	0.9	4.1	6.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
21.0	0.0	0.0	0.0	0.0	67.8	0.0	2.1	22.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
22.0	0.0	0.0	0.0	0.0	61.0	0.0	0.0	19.4	1.6	11.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
23.0	0.0	0.0	0.0	0.0	66.6	0.6	5.4	18.6	0.7	4.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
24.0	0.0	0.0	0.0	0.0	67.2	0.2	5.0	15.8	1.3	5.6	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
25.0	0.0	0.0	0.0	0.0	66.1	0.1	4.1	23.5	1.2	3.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
26.0	0.0	0.0	0.0	0.0	66.3	1.1	2.2	20.4	1.5	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	58.2	2.5	3.4	19.9	0.8	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Stauroneis smithii*	*Stauroneis* Unknown	*Staurosira construens* var. *binodis*	*Staurosira construens* var. *contruens*	*Staurosira venter*	*Staurosira venter sp1* (ends)	*Staurosira venter sp2* (long)	*Staurosirella pinnata*	*Staurosirella pinnata* var. *intercedens*	*Staurosirella pinnata* var. *lancettula/acuminatum*	*Surirella sp1*	*Surirella sp2*	*Surirella* Unknown (Frag)	*Synedra parasitica*	Unknown diatom	Unknown pennate	Unknown pennate-D11-12-recount-09	Unknown pennate-D11-12-recount-12
28.0	0.0	0.0	0.0	0.0	54.8	1.4	1.9	20.2	0.8	16.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	66.3	0.5	2.7	16.6	2.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	73.9	0.2	1.5	16.4	0.3	2.5	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
31.0	0.0	0.0	0.0	0.0	64.6	0.8	1.3	18.4	0.3	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	68.1	0.8	1.3	15.9	0.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	67.8	1.3	1.6	15.4	1.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	60.5	2.1	1.4	17.9	0.9	13.9	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
35.0	0.0	0.0	0.0	0.0	63.8	0.0	0.0	18.5	0.5	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.1	0.0	0.0	65.5	0.7	0.9	16.9	0.9	10.8	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
37.0	0.0	0.0	0.0	0.0	64.1	0.4	0.0	18.4	1.4	12.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
38.0	0.0	0.0	0.0	0.0	60.8	1.7	0.8	19.6	1.2	12.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
39.0	0.0	0.0	0.0	0.0	57.7	1.1	0.0	18.9	1.4	17.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
40.0	0.0	0.0	0.0	0.0	73.0	1.7	9.0	9.4	1.5	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	59.1	1.2	0.2	10.6	1.1	21.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	64.3	0.3	0.0	10.5	1.1	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	63.7	1.1	0.1	8.2	0.1	19.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	59.2	1.8	0.3	6.4	0.5	20.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
45.0	0.0	0.0	0.0	0.0	61.4	0.5	0.2	8.4	0.0	19.9	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
46.0	0.0	0.0	0.0	0.0	54.2	1.4	0.6	6.7	0.2	16.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	56.7	0.6	0.4	5.9	0.3	18.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
48.0	0.0	0.0	0.0	0.0	59.9	0.5	0.3	6.9	0.4	16.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
49.0	0.0	0.0	0.0	0.0	59.8	1.3	0.0	7.7	0.8	16.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
50.0	0.0	0.0	0.0	0.0	77.1	1.9	2.5	4.7	0.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	69.3	1.3	0.0	9.7	0.3	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	61.3	0.3	0.1	13.5	0.7	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	67.4	0.0	0.0	14.3	0.3	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	83.0	0.0	0.2	12.8	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	68.2	0.0	8.0	12.0	1.4	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	81.2	0.8	6.9	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	70.8	0.2	16.7	10.1	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	68.1	0.1	20.7	7.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	67.4	0.0	20.3	9.1	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	74.6	0.6	13.5	6.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
105.0	0.0	0.0	0.0	0.0	52.4	0.9	13.7	9.7	0.3	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	1.0	69.9	0.1	12.8	8.6	0.4	2.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
115.0	0.0	0.0	0.0	0.0	62.6	0.7	11.5	10.7	0.5	7.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
120.0	0.0	0.0	0.0	0.0	69.7	1.3	7.8	13.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	53.4	0.0	7.1	22.4	1.6	3.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
130.0	0.0	0.0	0.0	0.0	63.1	1.8	3.5	22.6	0.2	4.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
135.0	0.0	0.0	0.0	0.0	65.1	1.0	6.9	20.5	0.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0	0.0	0.0	0.0	0.0	61.6	5.6	4.5	15.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	63.4	1.4	7.3	14.8	0.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	65.4	0.0	8.1	15.7	0.1	3.4	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	63.9	0.4	11.3	13.4	0.4	3.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
160.0	0.0	0.0	0.0	0.0	55.0	0.9	7.7	21.1	0.9	5.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Stauroneis smithii*	*Stauroneis* Unknown	*Staurosira construens* var. *binodis*	*Staurosira construens* var. *contruens*	*Staurosira venter*	*Staurosira venter* sp1 (ends)	*Staurosira venter* sp2 (long)	*Staurosirella pinnata*	*Staurosirella pinnata* var. *intercedens*	*Staurosirella pinnata* var. *lancettula/acuminatum*	*Surirella* sp1	*Surirella* sp2	*Surirella* Unknown (Frag)	*Synedra parasitica*	Unknown diatom	Unknown pennate	Unknown pennate-D11-12-recount-09	Unknown pennate-D11-12-recount-12
165.0	0.0	0.0	0.0	0.0	54.0	0.1	5.2	26.3	1.2	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	51.1	0.0	0.4	36.4	0.4	3.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.1	41.6	0.1	0.2	46.6	3.1	5.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
180.0	0.0	0.0	0.0	0.0	39.0	0.0	0.0	53.6	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	36.8	0.0	0.0	51.9	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
193.0	0.0	0.0	0.0	0.0	42.7	0.0	0.2	38.8	1.1	1.9	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
198.0	0.0	0.0	0.0	0.0	37.1	0.5	0.1	40.0	2.5	4.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
203.0	0.0	0.0	0.0	0.0	37.4	0.0	0.0	40.3	0.8	0.9	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
208.0	0.0	0.0	0.0	0.0	47.1	0.0	0.0	45.6	0.3	0.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	40.4	0.0	0.0	44.1	1.1	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	46.9	1.1	3.9	39.2	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
219.0	0.0	0.0	0.0	0.0	39.2	0.0	0.7	44.6	4.4	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	34.7	0.0	1.1	49.5	3.6	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	32.8	0.0	1.3	53.7	3.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	28.2	0.0	3.5	51.9	6.5	6.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
228.0	0.0	0.0	0.0	0.0	34.6	0.0	1.5	58.3	2.1	1.9	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
229.0	0.0	0.0	0.0	0.0	30.8	0.0	1.5	53.7	4.6	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	35.3	0.0	5.1	47.8	1.9	2.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
233.0	0.0	0.0	0.0	0.0	27.1	0.0	8.8	47.7	1.6	6.7	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
235.0	0.0	0.0	0.0	0.0	41.1	0.0	4.5	42.0	2.4	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	43.9	0.0	9.4	33.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
238.0	0.0	0.0	0.0	0.0	46.5	0.9	9.1	33.3	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	50.4	0.0	7.5	28.1	4.8	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	40.5	0.0	12.6	29.5	8.0	4.8	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
243.0	0.0	0.0	0.0	0.0	35.2	0.0	8.1	41.8	3.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	30.0	0.0	6.1	46.9	3.3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	26.5	0.0	5.5	50.6	6.2	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	31.0	0.0	5.9	49.5	3.7	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	31.0	0.0	6.5	46.3	3.7	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	23.7	0.2	1.3	57.6	5.6	4.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
268.0	0.0	0.0	0.0	0.0	33.7	0.0	1.0	58.8	0.6	2.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
269.0	0.0	0.0	0.0	0.0	37.2	0.6	1.9	39.2	2.3	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	51.6	0.0	9.8	17.3	2.0	8.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	64.1	0.0	12.6	13.5	0.9	4.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
275.0	0.0	0.0	0.0	0.0	64.9	0.0	15.4	7.2	0.2	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
277.0	0.0	0.0	0.0	0.0	73.7	0.0	11.8	7.4	0.1	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	*Stauroneis smithii*	*Stauroneis* Unknown	*Staurosira construens* var. *binodis*	*Staurosira construens* var. *contruens*	*Staurosira venter*	*Staurosira venter* sp1 (ends)	*Staurosira venter* sp2 (long)	*Staurosirella pinnata*	*Staurosirella pinnata* var. *intercedens*	*Staurosirella pinnata* var. *lancettula/acuminatum*	*Surirella* sp1	*Surirella* sp2	*Surirella* Unknown (Frag)	*Synedra parasitica*	Unknown diatom	Unknown pennate	Unknown pennate-D11-12-recount-09	Unknown pennate-D11-12-recount-12
278.0	0.0	0.0	0.0	0.0	62.9	0.0	21.8	9.3	0.5	2.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
279.0	0.0	0.0	0.0	0.0	71.6	0.0	15.4	7.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	64.1	0.1	5.1	16.3	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	49.2	0.0	9.1	22.2	2.3	8.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	64.4	0.0	4.0	19.3	1.1	3.2	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
291.0	0.0	0.0	0.0	0.0	65.4	0.0	5.3	9.2	0.5	11.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
296.0	0.0	0.0	0.0	0.0	46.5	0.1	5.2	11.8	0.6	24.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	58.4	0.0	1.6	11.8	0.3	19.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
306.0	0.0	0.0	0.0	0.0	72.0	0.0	0.7	17.8	1.0	3.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
311.0	0.0	0.0	0.0	0.0	31.7	0.0	1.2	14.4	3.0	32.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
316.0	0.0	0.0	0.0	0.0	30.3	0.0	0.0	44.8	4.9	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	14.3	0.0	0.0	14.3	14.3	35.7	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0
322.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	12.2	0.0	1.5	39.5	11.5	23.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0
331.0	0.0	0.0	0.0	0.0	6.4	0.0	1.6	48.9	6.2	27.8	0.0	0.3	0.0	0.0	0.0	0.7	0.0	0.0
332.0	0.0	0.0	0.0	0.0	22.5	0.0	1.4	32.9	6.9	30.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
333.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	32.2	5.0	48.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0	34.4	2.2	51.2	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
335.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	30.7	2.5	56.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
336.0	0.0	0.0	0.0	0.0	18.2	0.0	2.0	33.7	1.2	30.5	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.2	0.0	0.0	0.0	10.1	0.0	0.3	13.2	4.8	46.2	0.0	0.0	0.2	0.0	0.0	1.2	0.0	0.0
341.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	21.8	1.3	42.2	0.0	0.0	0.2	0.0	0.0	2.9	0.0	0.0
342.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	37.5	8.9	18.8	0.0	0.0	0.2	0.0	0.0	0.6	0.0	0.0
343.0	0.0	0.0	0.0	0.0	9.8	0.1	0.0	21.7	5.5	23.8	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0
344.0	0.2	0.0	0.0	0.0	17.9	0.4	0.0	15.5	2.7	31.3	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0
345.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0	20.6	3.7	44.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
346.0	0.0	0.0	0.0	0.0	20.7	0.0	0.2	33.6	2.8	18.5	0.3	0.0	0.0	0.8	0.0	2.8	0.0	0.0
347.0	0.0	0.0	0.0	0.0	15.8	0.0	0.0	21.1	3.5	33.5	0.0	0.0	0.1	0.0	0.0	1.2	0.0	0.0
348.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	14.6	2.6	54.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
349.0	0.1	0.0	0.0	0.0	13.3	0.0	0.0	20.2	2.9	43.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	21.0	1.8	50.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0	14.9	0.5	61.8	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
356.0	0.0	0.0	0.0	0.0	48.4	0.8	9.0	13.5	3.4	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
361.0	0.4	0.0	0.1	0.0	4.5	0.9	0.0	16.9	3.9	22.8	0.0	0.0	0.0	2.5	0.0	1.5	0.0	0.0
371.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	13.7	3.4	1.9	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0
376.0	0.0	0.0	0.0	0.0	7.8	0.0	0.0	29.6	1.6	2.6	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown pennate-D11-7.5-10	Unknown pennate-D7-160-recount-01	Unknown pennate-D8-193-25	Unknown sp6	Unknown-D0 49-08	Unknown-D8 203-26	Unknown-D9 332-01	Unknown-D9 334-01	Unknown-D9 334-03	Unknown-D9 337-02	Unknown-D9 340-02	Unknown-D9 341-03	Unknown-D9 341-10	Unknown-D9 342-04	Unknown-D9 342-08	Unknown-D9 343-03	Unknown-D9 343-08	Unknown-D9 343-11	Unknown-D9 345-02	Unknown-D9 345-03	Unknown-D9 347-01	Unknown-D9 350-01	Unknown-D9 351-02	Unknown-D9 361-28	Unknown-D9 361-44
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown pennate-D11-7.5-10	Unknown pennate-D7-160-recount-01	Unknown pennate-D8-193-25	Unknown sp6	Unknown-D0 49-08	Unknown-D8 203-26	Unknown-D9 332-01	Unknown-D9 334-01	Unknown-D9 334-03	Unknown-D9 337-02	Unknown-D9 340-02	Unknown-D9 341-03	Unknown-D9 341-10	Unknown-D9 342-04	Unknown-D9 342-08	Unknown-D9 343-03	Unknown-D9 343-08	Unknown-D9 343-11	Unknown-D9 345-02	Unknown-D9 345-03	Unknown-D9 347-01	Unknown-D9 350-01	Unknown-D9 351-02	Unknown-D9 361-28	Unknown-D9 361-44
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown pennate-D11-7.5-10	Unknown pennate-D7-160-recount-01	Unknown pennate-D8-193-25	Unknown sp6	Unknown-D0 49-08	Unknown-D8 203-26	Unknown-D9 332-01	Unknown-D9 334-01	Unknown-D9 334-03	Unknown-D9 337-02	Unknown-D9 340-02	Unknown-D9 341-03	Unknown-D9 341-10	Unknown-D9 342-04	Unknown-D9 342-08	Unknown-D9 343-03	Unknown-D9 343-08	Unknown-D9 343-11	Unknown-D9 345-02	Unknown-D9 345-03	Unknown-D9 347-01	Unknown-D9 350-01	Unknown-D9 351-02	Unknown-D9 361-28	Unknown-D9 361-44
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
193.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
198.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
203.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
271.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown pennate-D11-7.5-10	Unknown pennate-D7-160-recount-01	Unknown pennate-D8-193-25	Unknown sp6	Unknown-D0 49-08	Unknown-D8 203-26	Unknown-D9 332-01	Unknown-D9 334-01	Unknown-D9 334-03	Unknown-D9 337-02	Unknown-D9 340-02	Unknown-D9 341-03	Unknown-D9 341-10	Unknown-D9 342-04	Unknown-D9 342-08	Unknown-D9 343-03	Unknown-D9 343-08	Unknown-D9 343-11	Unknown-D9 345-02	Unknown-D9 345-03	Unknown-D9 347-01	Unknown-D9 350-01	Unknown-D9 351-02	Unknown-D9 361-28	Unknown-D9 361-44
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
334.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
335.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
344.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
349.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
361.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
371.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
376.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown-D9 361-49	Unknown-D9 361-63	Unknown-D9 371-11	Unknown-D9 371-22	Unknown-D9 376-02	Unknown-D9 376-03	Unknown-D9 376-05	Unknown-D9 376-11	Unknown-D9 376-14	Unknown-D9 376-21	Concentration (valve cm^{-3})	Sedimentation rate (cm yr^{-1})	Diatom influx (valve cm^{-2}y^{-1})	Count sum
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.27E+07	0.50	1.13E+07	630
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.56E+08	0.50	1.27E+08	633
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.49E+08	0.50	7.38E+07	735
1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.92E+08	0.50	1.45E+08	606
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.90E+07	0.50	4.91E+07	611
3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.93E+08	0.51	9.76E+07	715
3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.46E+08	0.51	7.39E+07	784
4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.73E+08	0.32	5.53E+07	929
4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.46E+08	0.32	7.87E+07	601
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.34E+08	0.19	2.57E+07	719
5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.45E+08	0.19	2.78E+07	776
6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.87E+08	0.22	4.03E+07	751
6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.55E+08	0.22	3.34E+07	623
7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.40E+08	0.24	5.77E+07	967
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60E+08	0.24	3.86E+07	861
8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.50E+07	0.23	1.95E+07	807
8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.34E+08	0.23	3.08E+07	957
9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.26E+08	0.14	1.71E+07	1015
9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.51E+08	0.14	2.05E+07	1079
10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.19E+07	0.14	9.73E+06	853
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.57E+07	0.14	1.16E+07	1017
11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.41E+07	0.11	5.98E+06	770
11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.40E+08	0.11	1.55E+07	606
12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.09E+08	0.11	1.20E+07	729
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.10E+08	0.11	1.22E+07	613
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.74E+07	0.11	1.08E+07	601
13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.04E+08	0.11	1.15E+07	707
13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.15E+08	0.14	1.60E+07	641
14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.55E+07	0.14	1.33E+07	641
14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.25E+08	0.14	1.74E+07	671
15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.00E+07	0.14	1.25E+07	1472
15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.58E+07	0.11	1.02E+07	895
16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.34E+08	0.11	1.43E+07	937
16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.22E+08	0.11	1.30E+07	856
17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.97E+07	0.11	1.06E+07	932
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.71E+07	0.07	6.27E+06	830
18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.22E+08	0.07	8.79E+06	1426
18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.77E+07	0.07	1.27E+06	780
19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.60E+07	0.07	6.91E+06	1143
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.87E+08	0.08	1.54E+07	677
21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.03E+08	0.08	1.68E+07	628
22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.49E+08	0.08	2.06E+07	692
23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.66E+08	0.02	4.09E+06	668
24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.24E+08	0.02	5.50E+06	622
25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.68E+08	0.02	4.14E+06	676
26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.43E+08	0.02	8.44E+06	742
27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.98E+08	0.02	7.32E+06	643

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown-D9 361-49	Unknown-D9 361-63	Unknown-D9 371-11	Unknown-D9 371-22	Unknown-D9 376-02	Unknown-D9 376-03	Unknown-D9 376-05	Unknown-D9 376-11	Unknown-D9 376-14	Unknown-D9 376-21	Concentration (valve cm^{-3})	Sedimentation rate (cm yr^{-1})	Diatom influx (valve cm^{-2}y^{-1})	Count sum
28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.60E+08	0.02	6.39E+06	642
29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.17E+08	0.02	5.33E+06	602
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60E+08	0.02	3.94E+06	609
31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.65E+08	0.02	4.05E+06	762
32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.73E+08	0.02	4.25E+06	640
33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.97E+08	0.02	4.84E+06	668
34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.41E+08	0.02	3.47E+06	653
35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.85E+08	0.02	7.01E+06	616
36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.66E+08	0.02	4.09E+06	667
37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.30E+08	0.02	5.66E+06	711
38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.13E+08	0.02	5.24E+06	658
39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.93E+08	0.04	1.23E+07	634
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.63E+07	0.04	4.02E+06	600
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.14E+08	0.04	8.93E+06	660
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.67E+08	0.04	1.53E+07	792
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.83E+08	0.04	2.02E+07	746
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.76E+08	0.04	1.99E+07	735
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.17E+08	0.04	1.74E+07	643
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.19E+08	0.04	2.17E+07	801
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.43E+08	0.04	2.27E+07	1005
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.94E+08	0.04	2.07E+07	763
49.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.68E+08	0.04	1.54E+07	795
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.34E+08	0.04	1.40E+07	606
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.28E+08	0.04	9.50E+06	632
64.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.41E+08	0.04	1.84E+07	680
68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.64E+08	0.04	6.85E+06	607
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.19E+08	0.06	2.02E+07	642
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.60E+08	0.06	1.65E+07	803
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.65E+08	0.06	1.05E+07	750
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.66E+08	0.06	1.05E+07	665
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.97E+08	0.06	2.51E+07	736
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.04E+08	0.06	1.29E+07	693
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.22E+08	0.06	2.67E+07	638
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.89E+08	0.06	3.09E+07	754
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.84E+08	0.06	1.80E+07	701
115.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.74E+08	0.06	1.73E+07	591
120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.07E+08	0.06	3.21E+07	613
125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.81E+08	0.06	1.78E+07	695
130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.39E+08	0.06	2.15E+07	837
135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.69E+08	0.06	1.70E+07	581
140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.29E+08	0.06	5.25E+07	752
145.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.98E+08	0.06	1.89E+07	644
150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.28E+08	0.06	3.34E+07	826
155.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.61E+08	0.06	3.55E+07	693
160.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.83E+08	0.06	1.79E+07	634

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown-D9 361-49	Unknown-D9 361-63	Unknown-D9 371-11	Unknown-D9 371-22	Unknown-D9 376-02	Unknown-D9 376-03	Unknown-D9 376-05	Unknown-D9 376-11	Unknown-D9 376-14	Unknown-D9 376-21	Concentration (valve cm^{-3})	Sedimentation rate (cm yr^{-1})	Diatom influx (valve cm^{-2}y^{-1})	Count sum
165.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.50E+08	0.06	2.85E+07	695
170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.23E+08	0.06	3.94E+07	697
175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.57E+08	0.06	2.89E+07	846
180.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.36E+09	0.06	8.58E+07	662
188.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.49E+08	0.06	2.84E+07	703
193.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.01E+08	0.06	5.70E+07	806
198.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.62E+08	0.06	4.82E+07	876
203.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.26E+08	0.06	2.69E+07	657
208.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.25E+08	0.06	2.06E+07	654
213.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.02E+08	0.03	6.28E+06	622
218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.95E+08	0.03	9.20E+06	714
219.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.70E+07	0.03	1.78E+06	704
221.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.33E+07	0.03	1.04E+06	616
223.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.45E+06	0.03	1.70E+05	622
225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.26E+07	0.03	7.05E+05	628
228.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.34E+06	0.03	2.60E+05	618
229.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.72E+07	0.03	1.16E+06	803
231.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.70E+07	0.03	1.15E+06	686
233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.83E+07	0.03	3.06E+06	910
235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.21E+08	0.03	3.76E+06	671
237.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.77E+08	0.03	1.17E+07	930
238.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.76E+08	0.03	8.60E+06	667
239.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.21E+08	0.03	6.90E+06	683
241.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.57E+07	0.03	1.11E+06	661
243.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.25E+07	0.03	3.66E+05	617
245.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.24E+07	0.03	9.52E+05	701
247.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.92E+07	0.03	8.56E+05	631
248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.03	0.00E+00	0
249.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.49E+06	0.03	1.02E+05	323
251.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.33E+06	0.03	6.84E+04	216
253.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30E+05	0.03	3.80E+03	4
255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.03	0.00E+00	0
257.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.24E+04	0.03	9.50E+02	1
258.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.03	0.00E+00	0
259.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.48E+04	0.03	1.90E+03	2
261.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30E+05	0.03	3.80E+03	4
263.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.24E+04	0.03	9.50E+02	1
265.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.48E+04	0.03	1.90E+03	2
267.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.44E+07	0.03	4.21E+05	621
268.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.22E+06	0.03	2.70E+05	624
269.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.76E+08	0.03	8.09E+06	681
271.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.22E+08	0.03	9.43E+06	794
273.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.24E+08	0.03	2.12E+07	894
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.14E+08	0.03	2.39E+07	1005
277.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.03E+09	0.03	3.01E+07	1584

Appendix 4. Diatom relative abundance data

Depth (cm)	Unknown-D9 361-49	Unknown-D9 361-63	Unknown-D9 371-11	Unknown-D9 371-22	Unknown-D9 376-02	Unknown-D9 376-03	Unknown-D9 376-05	Unknown-D9 376-11	Unknown-D9 376-14	Unknown-D9 376-21	Concentration (valve cm^{-3})	Sedimentation rate (cm yr^{-1})	Diatom influx (valve cm^{-2}y^{-1})	Count sum
278.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.62E+08	0.03	2.24E+07	744
279.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.80E+08	0.03	1.99E+07	839
281.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.78E+08	0.03	2.28E+07	961
283.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.50E+08	0.03	2.20E+07	926
286.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.45E+08	0.03	1.89E+07	742
291.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.18E+09	0.03	3.46E+07	792
296.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.61E+09	0.02	5.92E+07	667
301.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.44E+09	0.02	3.27E+07	704
306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.66E+09	0.02	3.77E+07	810
311.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.96E+08	0.02	1.13E+07	666
316.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.98E+06	0.02	1.36E+05	554
321.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.04E+06	0.02	2.37E+04	14
322.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.72E+04	0.02	2.21E+03	3
324.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.02	0.00E+00	0
325.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.24E+05	0.02	7.35E+03	10
326.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.02	0.00E+00	0
327.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.56E+05	0.02	8.09E+03	11
328.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.48E+05	0.02	1.47E+04	20
329.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.86E+05	0.02	1.10E+04	15
330.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.11E+07	0.02	2.52E+05	617
331.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.70E+07	0.02	3.86E+05	609
332.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.75E+06	0.02	8.51E+04	347
333.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.17E+07	0.02	7.19E+05	684
334.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.39E+07	0.01	3.22E+05	627
335.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.44E+07	0.01	3.26E+05	955
336.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79E+07	0.01	2.65E+05	600
337.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.62E+05	0.01	1.54E+03	5
339.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.72E+04	0.01	9.23E+02	3
340.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.80E+07	0.01	1.70E+05	665
341.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.14E+06	0.01	7.73E+04	616
342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.82E+07	0.01	1.73E+05	618
343.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.37E+07	0.01	3.20E+05	729
344.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.04E+07	0.01	8.58E+05	1116
345.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.16E+07	0.01	2.05E+05	733
346.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.44E+07	0.01	1.37E+05	604
347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.37E+08	0.01	1.30E+06	677
348.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.13E+07	0.01	8.67E+05	1409
349.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.58E+08	0.01	1.50E+06	684
350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.27E+08	0.07	8.67E+06	704
351.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.18E+08	0.07	2.18E+07	786
356.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.85E+07	0.07	6.74E+06	920
361.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.03E+08	0.07	7.02E+06	688
371.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	6.53E+06	0.07	4.47E+05	263
376.0	0.0	0.0	0.0	0.0	0.3	0.5	0.2	0.2	0.2	0.3	3.30E+07	0.07	2.26E+06	626
397.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.17E+05	0.07	1.49E+04	6