8-2006

A Shelf-to-Basin Examination of Food Supply for Arctic Benthic Macrofauna and the Potential Biases of Sampling Methodology

Rebecca Pirtle-Levy
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a thesis written by Rebecca Pirtle-Levy entitled "A Shelf-to-Basin Examination of Food Supply for Arctic Benthic Macrofauna and the Potential Biases of Sampling Methodology." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Ecology and Evolutionary Biology.

Jacqueline M. Grebmeier, Major Professor

We have read this thesis and recommend its acceptance:

Lee W. Cooper, James Drake

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a thesis written by Rebecca Pirtle-Levy entitled "A Shelf-to-Basin Examination of Food Supply for Arctic Benthic Macrofauna and the Potential Biases of Sampling Methodology." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Ecology and Evolutionary Biology.

Jacqueline M. Grebmeier
Major Professor

We have read this thesis
and recommend its acceptance:

Lee W. Cooper

James Drake

Accepted for the Council:

Anne Mayhew
Vice Chancellor and
Dean of Graduate Studies

(Original signatures are on file with official student records.)

A SHELF-TO-BASIN EXAMINATION OF FOOD SUPPLY FOR ARCTIC BENTHIC MACROFAUNA AND THE POTENTIAL BIASES OF SAMPLING METHODOLOGY

A Thesis
Presented for the
Master of Science
Degree
University of Tennessee, Knoxville

Rebecca S. Pirtle-Levy
August 2006

Acknowledgements

I would like to thank Dr. Jacqueline Grebmeier and Dr. Lee Cooper for their encouragement and expertise. They provided me with the opportunity for this research and assisted with analysis and interpretation from ship to print. I would also like to thank Dr. James Drake for thought provoking comments. Laboratory assistance and emotional support was provided by Dr. Becky Brown, Arianne Balsom, and Kim Harmon. I would also like to thank the captains and crews of the USCGC *Healy* and CGCS *Sir Wilfrid Laurier*. Last but not least I would like to thank my mother, Dianne Levy, for always having words of encouragement and support and providing me with unconditional love.

Abstract

Macrofaunal samples (benthic fauna) and sediment samples were collected in association with the sampling programs of the Bering Strait Environmental Observatory (BSEO; Cooper et al. 2006, see http://arctic.bio.utk.edu/) during the summer of 2003 and 2004 and the Western Arctic Shelf-Basin Interactions (SBI; Grebmeier and Harvey 2005, see http://sbi.utk.edu for further information) during the spring (May-June) and summer (July-August) of 2004. Benthic measurements of sediment chlorophyll *a,* grain size, total organic carbon, C/N ratios, and macroinfaunal community composition were measured on the shelf, slope and basin of the region. The current study focuses on sediment chlorophyll *a* inventories of surface layer sediments and how the utilization of different sieve mesh sizes (0.5 mm and 1.0 mm) during macroinfaunal collections can impact interpretations of macroinfaunal community structure.

Overall, surface sediment chlorophyll *a* was highest at shelf stations (depth ≤ 200 m) and decreased with increasing water depth in the slope (depths > 200 m and ≤ 2000m) and basin (depths > 2000 m) regions. Subsurface peaks of sediment chlorophyll *a* were found at stations in the northern Chukchi and western Beaufort Seas. Comparison of these downcore profiles of sediment chlorophyll *a* and the radioisotope ^{137}Cs suggest that chlorophyll *a* that is buried in sediments could remain active for decadal time scales.

At all stations sampled, macroinfaunal abundance retained on combined 0.5 mm and 1.0 mm sieve size fractions were higher than the number of animals retained on the 1.0 mm sieve alone. The increase in station abundance with addition of the 0.5 mm sieve compared to only the 1.0 mm screen was largely due to increased numbers of macrofaunal juveniles and meiofauna (e.g. foraminifera and nematodes). By comparison,

approximately 97% of the total macroinfaunal carbon biomass for all stations was retained on the 1.0 mm sieve; the 0.5 mm sieve collected the remaining 3% of total carbon biomass.

Since the 1.0 mm retained similar abundance and a high percentage of benthic biomass compared to the 0.5 mm sieve on the shelf and slope of the study region, I conclude that the 1.0 mm sieve provides a reasonable approximation of benthic macroinfaunal populations on the shelf and slope regions. However, in the basin (depths > 2000 m) where there is a shift to meiofaunal dominance (e.g. foraminifera), the 0.5 mm sieve is clearly preferable for estimation of the benthic community abundance and biomass.

Table Of Contents

List of Tables

Table Page

List of Figures

Figure Page

List of Abbreviations

SBI	Western Arctic Shelf-Basin Interactions project
BSEO	Bering Strait Environmental Observatory project
AW	Anadyr Water
ACW	Alaska Coastal Water
BSW	Bering Shelf Water
BSAW	Bering Shelf-Anadyr Water
POC	particulate organic carbon
chl *a*	chlorophyll a
TOC	total organic carbon content (%)
HV	Herald Valley transect
WHS	West Hanna Shoal transect
EHS	East Hanna Shoal transect
BC	Barrow Canyon transect
EB	East Barrow transect
SLIP	St. Lawrence Island Polynya stations
UTBS	Stations sampled south of Bering Strait
UTN	Stations sampled north of Bering Strait
USCGC	U.S. Coast Guard Cutter
HLY	*Healy*

List of Abbreviations, cont.

CCGS	Canadian Coast Guard Service
SWL	*Sir Wilfrid Laurier*
HC	HAPS benthic corer
vv	van Veen grab
MC	tripod multi benthic corer
Sed.	Sediment
S.E.	Standard error

I. Introduction

Benthic infaunal communities in the Arctic are influenced by many variables including regional topography, productivity of the overlying water column, and sediment characteristics (Zenkevitch 1963, Gray 1981, Grebmeier et al. 1989, Feder et al. 1994). The seabed provides a habitat of varying grain size that is important for construction of burrows and tubes and influences composition and abundance of the infaunal community (Gray 1981). As sea ice begins to retreat in spring an ice-edge bloom occurs, providing a pulse of organic matter that sinks to the benthos (Grebmeier et al. 1988). The production of the overlying water column provides a major source of organic carbon to the sediments (Gray 1981, Feder et al. 1994, Grebmeier and Dunton 2000).

Global warming could have wide ranging impacts upon Arctic ecosystems. Wassmann (1998) hypothesizes that changes in climate could give rise to modifications in the current patterns of primary production and sedimentation to the benthos. It is thought for example that climate warming could shift some Arctic seas from an "export" food web with organic materials deposited to the benthos to one in which zooplankton grazing on phytoplankton limits the organic carbon flux to the benthos (Wassman 1998, Piepenburg 2005, Grebmeier and Barry 2006). A shift such as this would be detrimental to benthic communities present in shallow seas of the polar north. Many of these communities are tightly coupled with processes of the overlying water column that determine the food supply to the benthos and directly influence benthic community abundance and biomass (Piepenburg 2005 and references therein). The study of Arctic benthic communities is important for budgeting and modeling the food needs of benthic-feeding apex predators such as gray whales, walruses, bearded seals and diving sea ducks

(Grebmeier and Cooper 1994, Grebmeier and Dunton 2000, Moore and Grebmeier 2003, Grebmeier et al. 2006).

A. Hydrographic dynamics

The northern Bering, Chukchi, and Beaufort seas in the western Amerasian Arctic were the focus of this thesis study (Figure 1). The northern Bering and Chukchi Seas are comprised of wide (~800km), shallow (~ 50m) shelves that are seasonally ice-covered from November to May. The Beaufort Sea has a narrow shelf (~120km) and is persistently exposed to ice cover, though the extent varies seasonally (Carmack and Macdonald 2002). Physical and biological dynamics are influenced by the northerly inflow of Pacific-derived water (Walsh et al. 1989, Cooper et al. 1999) flowing through Bering Strait into the Chukchi and Beaufort Seas acting as drivers of the high productivity of this ecosystem (Walsh et al. 1989; 2005). Coachman et al. (1975) identified three water masses present in the northern Bering Sea: 1) Anadyr Water (AW), derived in the Gulf of Anadyr on the western side of the system, has bottom water salinity ≥ 32.5 and temperatures between -1.0°C and 1.5°C, 2) Alaska Coastal Water (ACW), present near the Alaskan coast, has bottom water salinity ≤ 31.8 and temperatures ≥ 4°C, and 3) Bering Shelf Water (BSW), derived in the middle of the region, has a bottom water salinity signature between 31.8 and 32.5 and temperatures ranging from 0°C to 1.5°C (Figure 1). Water of Anadyr origin is more nutrient-rich than waters along the Alaskan coast (Walsh et al. 1989). BSW and AW, having similar features, are blended just north of Bering Strait and merge into a combined water mass, Bering Shelf – Anadyr Water (BSAW) (Grebmeier et al. 1988, Feder et al.

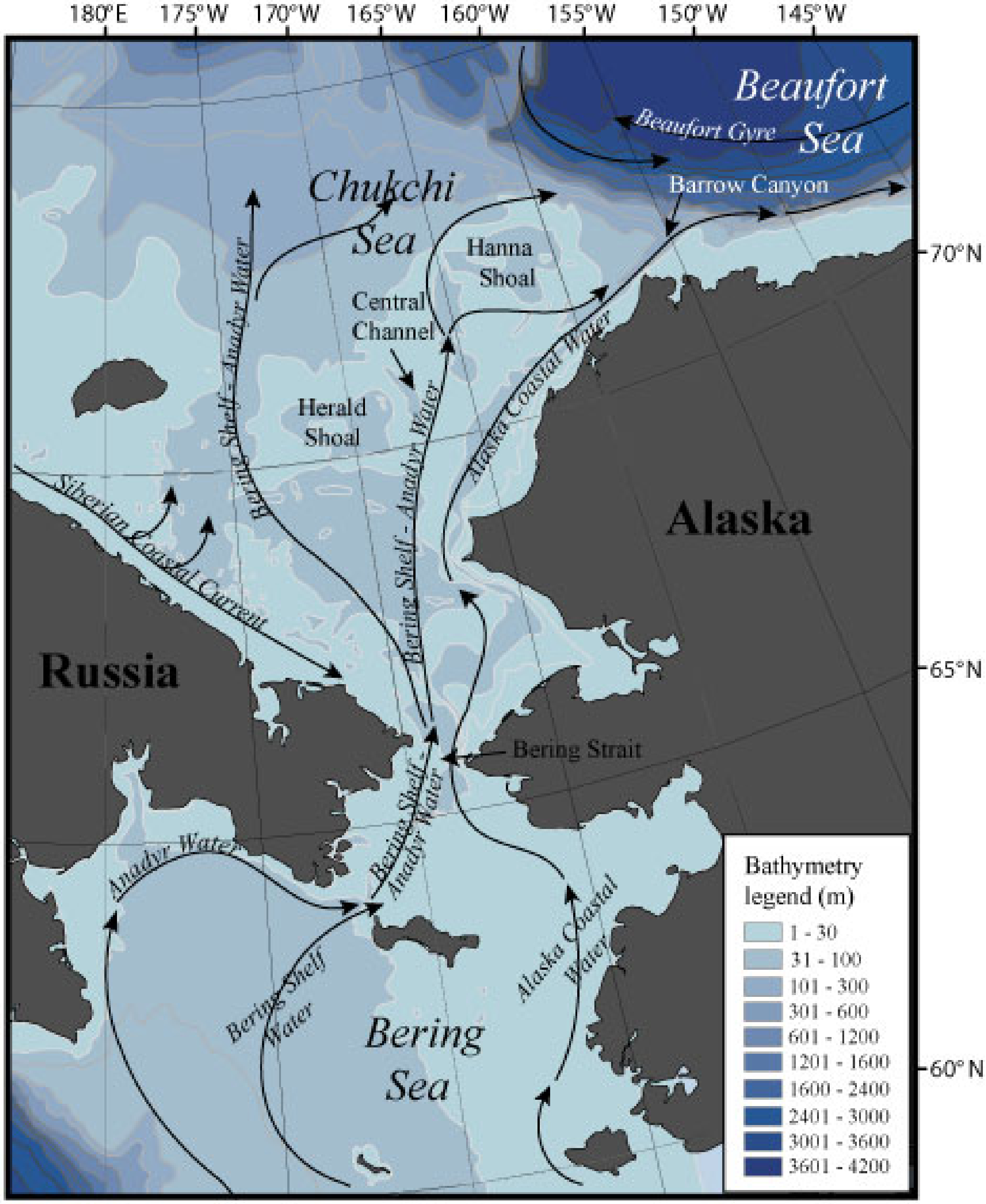

Figure 1. Bathymetry (Jackobsson et al. 2000) and general directional current flow (indicated by black lines with arrows) for the study region (modified fromWeingartner et al. 2005 and Woodgate et al. 2005).

2005). BSAW is a major source of particulate organic carbon (POC; e.g. phytoplankton, zooplankton, and sea-ice algae; Feder et al. 2005). ACW contains higher levels of terrigenous POC (Naidu et al. 1993). These water masses flow through the narrow Bering Strait and into the Chukchi Sea where they are topographically steered along three main pathways for outflow of water from the Chukchi shelf: Herald Valley in the west, the Central Channel, and Barrow Canyon in the east (Weingartner et al. 1998, 2005, Woodgate et al. 2005; Figure 1). Nutrient and carbon rich BSAW flows through Herald Valley and the Central Channel northward to the shelfbreak where some of the water then flows eastward toward Barrow Canyon, with the remaining heading out Herald Canyon (Weingartner et al. 2005, Woodgate et al. 2005). ACW adheres closely to the Alaskan coastline as it moves northeasterly toward the Beaufort Sea. Water from the central Chukchi Shelf flows eastward along the southern side of Hanna Shoal and merges with ACW near the head of Barrow Canyon (Weingartner et al. 2005). Nutrients and particulate carbon advected within this water type is important for supporting benthic communities of the central and northeast Chukchi Sea (Dunton et al. 2005, Weingartner et al. 2005, Grebmeier et al. 2006b).

B. Benthic macroinfaunal abundance and biomass

High benthic biomass occurs over the extensive, shallow shelves of the northern Bering and Chukchi Seas (Stoker 1981, Feder et al. 1994, Grebmeier and Cooper 1995, Dunton et al. 2005) and the western portion of the Beaufort Sea (Dunton et al. 2005). Populations of benthic macrofauna are limited by the variable export flux of organic matter to the benthos seasonally, resulting in spatial and temporal difference in food availability to the sediments. Thus the supply of organic materials deposited to the

benthos is a major forcing factor of benthic ecosystem dynamics (Grebmeier et al. 1989, Feder et al. 1994, Grebmeier et al. 1995, Josefson and Conley 1997, Dunton et al. 2005, Grebmeier and Barry 2006, Grebmeier et al. 2006a). Grazing by zooplankton in this region is low and much of the water column production is deposited directly to the benthos fueling this productive community (Cooney and Coyle 1982, Grebmeier et al. 1988, Grebmeier and McRoy 1989, Dunton et al. 2005, Grebmeier and Barry 2006, Grebmeier et al. 2006a, 2006b).

Accurate estimation of abundance and biomass of benthic macrofaunal communities is important to determine the available prey base for the many benthic-feeding, upper trophic animals in the region (gray whales, walrus, bearded seals, sea ducks). Patterns of distribution and abundance of benthic communities can be influenced by sampling methods, sampling equipment, and sieve mesh sizes used to process the samples (Bachelet 1990, James et al. 1995, Schlacher and Wooldridge 1996, Tanaka and Leite 1998). Standard benthic macrofaunal measurements include collections with grabs and cores, with fauna extracted from sediment by washing with seawater through sieves with standard mesh aperature sizes, usually 0.5 mm or 1.0 mm (Warwick and Clarke 1996). In the study region, both 0.5 mm and 1.0 mm sieve mesh sizes have been used to sample benthic macroinfauna (Grebmeier et al. 1988, Iken et al. 2005) but limited studies have been done to determine the effectiveness of using variable mesh sizes. The focus of this aspect of the study was on the estimation of the benthic macroinfaunal community composition and biomass. This research was undertaken during the Bering Strait Environmental Observatory (BSEO) project (Cooper et al. 2006) and the Western Arctic Shelf-Basin Interactions (SBI) project (for a project overview, see Grebmeier and

Harvey, 2005), and the thesis objective was to compare the two size fractions (1.0 mm and 0.5 mm) to determine overall benthic macrofaunal abundance and biomass.

C. Sediment indicators (chlorophyll *a*, TOC, C/N ratio)

Sediment chlorophyll *a* (chl *a*) is often used as an indicator of carbon supply input to the underlying sediments to the benthos (Dayton et al. 1986, Sun et al. 1991, Ambrose and Renaud 1997, Clough et al. 1997, Cooper et al. 2002, Mincks et al. 2005). Export carbon is highly variable in this region, being dependent on seasonal input of both sea ice and water column primary production from the surface water, zooplankton consumption, and microbial processing. The largest overall chlorophyll biomass and production occurs when sea-ice retreats in spring followed by a period of open water production (Springer and McRoy 1996, Hill and Cota 2005). Due to an uncoupling of zooplankton utilization on the abundant phytoplankton bloom, the spring bloom sinks ungrazed to the seafloor (Cooney and Coyle 1982). Recent studies have found that microbial processing on organic matter persisting in sediments may degrade older organic matter making it available for macrobenthic deposit-feeders (Hansen and Josefson 2004, Lovvorn et al. 2005).

Sedimentation of organic matter from the surface waters is the primary food source for many benthic populations (Graf 1992, Feder et al. 1994, Wassman 1998, Grebmeier and Barry 2006). There is convincing evidence that total benthic macrofaunal biomass responds to the amount of organic carbon flux to the seafloor (Grebmeier et al. 1988, Hansen and Josefson 2001). It has been observed that deposit feeding infauna are capable of selective feeding and could store organic matter at depth in the sediment (Graf 1989, Ambrose and Renaud 1997). Mincks et al. (2005) hypothesized that a ‘food bank’

of labile organic matter could persist in sediments throughout the year providing benthic organisms with a constant food source. This present study focuses on the organic matter present within sediments using chl *a* as an indicator of the water column production flux to the benthos with a specific objective to quantify the available food concentrations within the surface layers of sediments.

In surface sediments, the ratio of total organic carbon to total organic nitrogen (C/N) is used as a measure of food quality being deposited to the sea floor (Grebmeier et al. 1988). Low surface sediment C/N ratios (4.9 – 8.0) indicate high quality, recent marine phytodetritus deposition to the benthos compared to high surface C/N ratios (> 8.0) that indicate either lower quality, older, more refractory material or terrestrial deposition or both (Grebmeier et al. 1988). TOC measurements indicate the amount of organic carbon deposited per unit area (Gray 1981).

D. Data collection

All field work for this project was accomplished in association with the sampling programs of the Western Arctic Shelf-Basin Interactions (SBI; Grebmeier and Harvey 2005, see http://sbi.utk.edu for further information) and the Bering Strait Environmental Observatory (BSEO; Cooper et al. 2006, see http://arctic.bio.utk.edu/). As part of the SBI project, five standard transect lines were re-occupied seasonally and interannually from 2002 and 2004 in the Chukchi and Beaufort Seas: Herald Valley (HV), West Hanna Shoal (WHS), East Hanna Shoal (EHS), Barrow Canyon (BC), and East Barrow (EB) (Figure 2). The icebreaker U.S. Coast Guard Cutter (USCGC) *Healy* (HLY) was used in spring (HLY0402; 15 May – 23 June) and summer (HLY0403; 18 July – 26 August) 2004. In spring 2004 sampling in the Beaufort Sea was limited by ice extent, thus only a

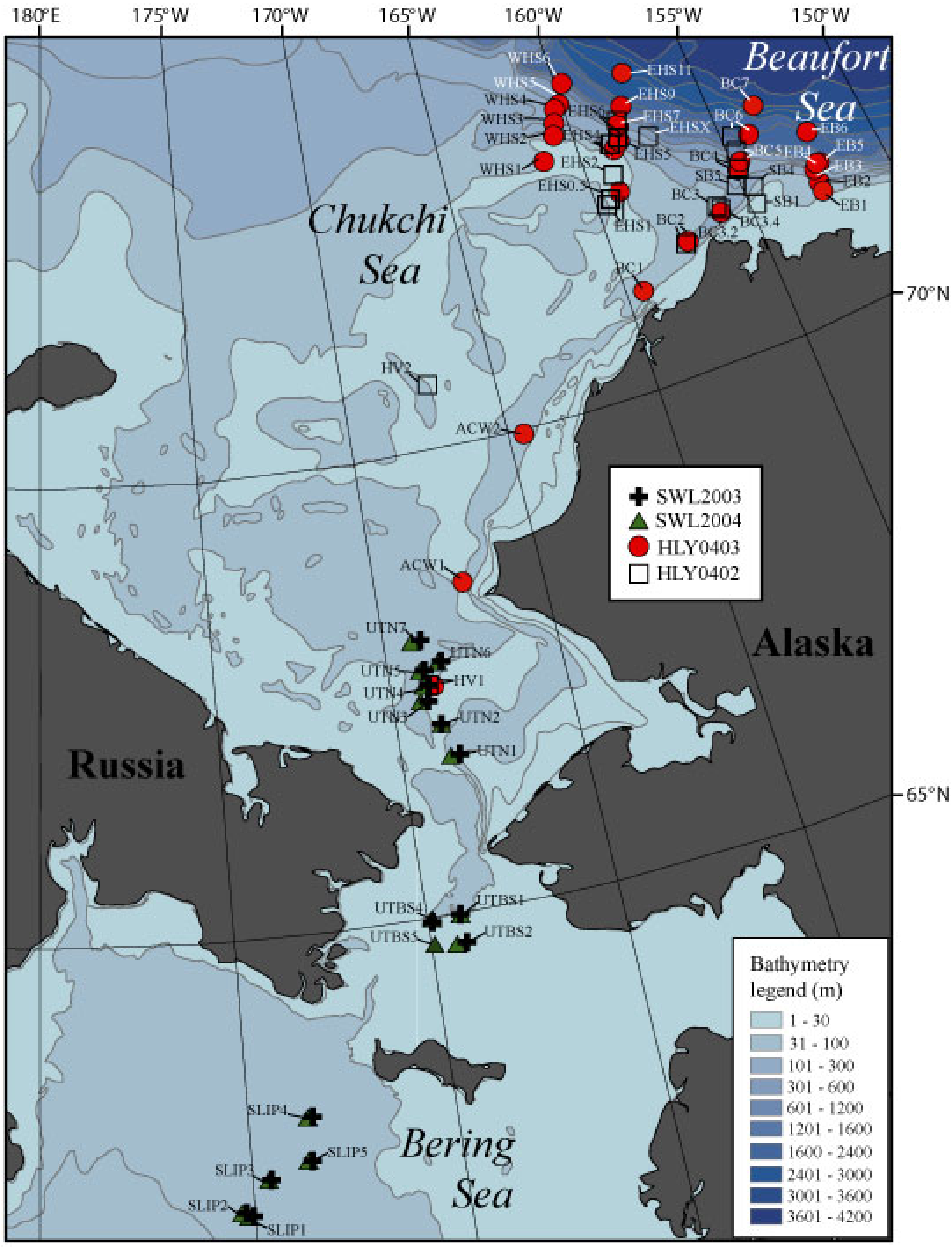

Figure 2. Stations sampled in 2003 and 2004. Cruises are denoted by a three letter ship abbreviation: *Healy* (HLY) and *Sir Wilfrid Laurier* (SWL) followed by four numbers indicating the year of the cruise [e.g. 2003 (summer 2003), 0402 (spring 2004) and 0403, 2004 (summer 2004)].

few stations just east of BC were occupied. Stations occupied in association with the BSEO were located in the northern Bering and southern Chukchi Seas (Grebmeier and Cooper 2004). In the Bering Strait region, three regions have been found to have very high benthic biomass (Grebmeier and Cooper 2004; south of St. Lawrence Island in the region of the St. Lawrence Island Polynya (SLIP), south of Bering Strait (UTBS) and north of Bering Strait (UTN) (Figure 2). The Canadian Coast Guard Service (CCGS) *Sir Wilfrid Laurier* (SWL) provided ship support for research cruises in July 2003 (SWL2003) and 2004 (SWL2004).

E. Study Objectives

The objectives of this thesis study are 1) to quantify the available food concentrations within the surface layers of sediments where macrofauna were collected during the study, and 2) to determine comparative benthic macrofaunal abundance and biomass by using both a 1.0 mm and 0.5 mm screen prior to benthic community analyses. The following questions were posed at the initiation of the study to meet these objectives:

1. Is there a "food bank" of sediment chl *a* buried in the sediment that can act as a food buffer for deposit-feeding benthic macrofauna during times of diminished water column primary production and, if so, how long does it persist?
2. What is the difference in benthic macrofaunal abundance and biomass using two different sieve mesh sizes (0.5 mm and 1.0 mm) and what is the associated impact on our understanding of macrofaunal community structure?

II. Sediment chlorophyll *a* and benthic processes

A. Introduction

Sedimentation of organic matter from the water column is the primary food source for most benthic populations (Graf 1992, Feder et al. 1994, Wassman 1998, Grebmeier and Barry 2006). Particulate organic carbon (POC) enters benthic food webs by local primary production sinking to the benthos or via horizontal advection (Feder et al. 1994). Suspended particles can be taken up by filter feeding macrofauna or ingested by deposit feeders that have access to both recently settled phytodetritus at the sediment surface as well as a pool of organic material present within the sediment. The latter pool of settling organic carbon is maintained by influx of POC from the water column (Hansen and Josefson 2004), which provides the bulk of the population's nutritional requirements (Lopez and Levinton 1987). The result of bulk feeding of deposit feeders is an intense reworking through bioturbation of the sediments that has profound effects on the chemical, geological, and nutritional properties of the sediment (Lopez and Levinton 1987). The quality of detritus available to the benthic community is largely determined by source and degree of decomposition of the organic material when it reaches the bottom (Tenore et al. 1982).

Much of the organic matter falling to the seafloor becomes buried within the sediment (Gray 1981). Hansen and Josefson (2001) found that spring bloom input to the sediment was not immediately consumed by benthic fauna. In sediment studies by Josefson et al. (2002) the initial fate of fresh phytodetritus is burial by bioturbation or sedimentation rather than incorporation into benthic biomass. Itakura et al. (1997) and Lewis et al. (1999) showed that diatom resting stages from the spring bloom could

survive in the dark for several months to years in sediments, especially at colder temperatures. Subsurface deposit feeders have been shown to utilize older food resources found in the sediment to a greater extent than fresh material deposited to surface sediments (Josefson et al. 2002). Seasonal input of POC may provide a 'food bank' of phytoplankton and detritus (Mincks et al. 2005) that could sustain the benthic community during times of low water column production such as occur annually at high latitudes (e.g. late autumn and winter).

The photosynthetic plant pigment chl *a* in surface sediments is often used as an indicator of phytoplankton biomass reaching the sea floor (Dayton and Oliver 1977, Cooper et al. 2002, Josefson et al. 2002). Chl *a* has been used to estimate the flux of algal matter from the overlying water to the sediment (Sun et al. 1991, Josefson et al. 2002, Cooper et al. 2002, Cooper et al. 2005). Sediment grain size is important because smaller grains have more surface area for POC accumulation while larger grains have less surface area to retain POC. Total organic carbon and total organic nitrogen are used to calculate C/N ratios that are used as an indicator of food quality of organic matter persisting in the benthos (Grebmeier and McRoy 1988). Low surface sediment C/N ratios (4.9 – 8.0) indicate high quality, recent marine phytodetritus deposition to the benthos compared to high surface C/N ratios (> 8.0) that indicate either lower quality, older, more refractory material or terrestrial deposition or both (Grebmeier et al. 1988). TOC measurements indicate the amount of organic carbon deposited per unit area (Gray 1981). The radioisotope ^{137}Cs (half-life 30.2 years) is an anthropogenic product of nuclear testing and was introduced into the atmosphere through fallout deposition (Avery 1996, Cooper et al. 1998). Peak deposition into sediments occurred in the early 1960s

(Cooper et al. 1998). ^{137}Cs was used to estimate the age of viable chl *a* present at depth within the sediment cores.

The major question for this study was:

> Is there a "food bank" (Mincks et al. 2005) of sediment chl *a* buried in the sediment that can act as a food buffer for deposit-feeding benthic macrofauna during times of diminished water column primary production and how long has it persisted?

B. Methods

Study area and field sampling

Shipboard sampling was undertaken on the shelf of the northern Bering Sea (SWL2004) during 9 July - 22 July, 2004. Two additional cruises were undertaken in shelf, slope, and basin regions of the Chukchi and southern Beaufort Seas in 15 May – 23 June 2004 (HLY0402, spring, largely ice-covered) and 18 July – 26 August 2004 (HLY0403, summer, largely ice-free) (Figure 2). Sediment samples were collected with a HAPS benthic corer (0.0133 m^2; modified from Kanneworff and Nicolaisen 1973) and a tripod multicorer (0.00528 m^2; Ocean Instruments, San Diego, CA). Station locations were categorized on the basis of macroinfaunal community composition, water current regimes, and depth, with shelf stations defined as those ranging from 0 – 200 m depth, slope stations defined as 200 – 2000 m depth, and basin stations defined as those deeper than 2000 m. Depths of the stations sampled ranged from 42 m to 3096 m. Macrobenthic invertebrate populations were sampled concurrently for another project and their feeding mechanisms were noted, although that data will be presented elsewhere

(Grebmeier, unpublished data). Sediment samples were analyzed for grain size, chl *a*, C/N ratios, total organic carbon (TOC), and ^{137}Cs.

Sediment Grain Size

Sediment samples collected during the cruises were frozen, and returned to the University of Tennessee for subsequent laboratory analyses. These samples were defrosted, dried at 60 °C and ground into a heterogeneous mixture using a mortar and pestle. Aliquots of 20 g dry weight sediment were placed in 250 mL Nalgene bottles and treated with 30 mL of 30% hydrogen peroxide, stirred, and heated to 60 °C to remove organic matter, following techniques described in Gee and Bauder (1986). Samples were then centrifuged for ten minutes at 1600 rpm, after which the supernatant of dissolved organic matter was decanted. Iron oxides were removed from the sediments by adding 90 mL of sodium citrate-bicarbonate buffer and 6 g of sodium dithionite to each aliquot and heating them in a water bath (60 °C) for fifteen minutes, and subsequently centrifuging for fifteen minutes at 1600 rpm. The supernatant was decanted and the iron oxide removal steps were repeated until the supernatant was clear. After iron oxide removal, 20 mL of sodium triphosphate and distilled water was added to the sediment (250 mL total volume, including sediment). The sediment samples were then wet sieved through a geological sieve, size 4 phi (63 µm, very fine sand fraction), in order to separate phi ≥ 5 size fraction (silt and clay fraction) from larger grains.

Sediment retained on the size 4 phi sieve was dried at 60 °C. This dried sediment was then sieved through a nested sieve stack (phi size 0-4) in order to separate gravel and rock (≤ 0 phi), sand (1-4 phi), and silt/clay (≥ 5 phi) fractions and weighed. Phi size categories were: phi ≤ 0 consists of very coarse sand, gravel, and cobbles, phi = 1 is

coarse sand, phi = 2 is medium sand, phi = 3 is fine sand, phi = 4 is very fine sand, and phi ≥ 5 consists of silt and clay (Gray 1981). In addition, the phi ≥ 5 samples separated during wet sieving were treated with 10g of magnesium chloride to flocculate any loose material. After flocculation, the phi ≥ 5 fraction was placed into tared aluminum weigh boats and dried at 60 °C. This fraction was added to the phi ≥ 5 fraction obtained from the dry sieving step. The percentage of grain size composition for each phi size category was determined by comparison of phi size dry weights with weight for complete sediment sample. Modal sediment size was determined by the dominant phi size category percentage.

Sediment chlorophyll a

Two sediment cores were collected at each station for chlorophyll analysis. After sampling, the cores were immediately sectioned into 1 cm sections to 4 cm, 2 cm sections down to 20 cm, and 4 cm sections thereafter. Replicate subsamples (1 cm^3) were collected from the center of each section using a 10 cm^3 syringe that had been modified to have a circular aperature to facilitate collection of sediment. Each subsample was placed in a 15 mL polypropylene centrifuge tube with 10 mL of 90% acetone for chl *a* extraction and mixed thoroughly. After a twelve hour dark incubation period at 2 °C, the acetone was decanted off the sediment into a clean glass test tube and the chl *a* concentration was determined fluorometrically using a Turner Designs AU-10 model fluorometer (Welschmeyer 1994) as modified for use with sediments by Cooper et al. (2002).

Various protocols for measuring chl *a* in sediments have been developed but length of time required to extract chl *a* from sediments has not been rigorously tested.

Two recent studies that have sampled sediment chl *a* have extracted the pigment over a 12-hour incubation period (Cooper et al. 2002, Cooper et al. 2005). During the spring cruise (HLY0402), I tested whether 12 hours is sufficient to extract all the chl *a* from sediments by incubating sediment samples for 12, 24, 36, and 48 hours. A statistical analysis was undertaken to determine if the chl *a* inventories changed with increased incubation times. In order to test whether there was a significant difference between a 12-hour incubation period and longer incubation periods in the extraction of chl *a* from sediments extra subsamples (1 cm^3) were taken. These samples were incubated in the dark for 12, 24, 36, and 48 hours. These samples were taken from stations HV2, SB4, and along the EHS transect in the Chukchi Sea.

The effect of sampling equipment on the disturbance of surface sediments was also examined at stations of various depths. Samples collected with a HAPS corer preserve an undisturbed surface sediment layer, usually with overlying water present. Samples collected with a van Veen grab can be disturbed as the device hits the bottom and then is raised from the bottom sediments. Water escapes the van Veen grab through screens on the top of the device and possibly carries fine surficial sediments with it. This loss could decrease the amount of sediment chl *a* measured in surface sediments. Sediment chl *a* was collected from both devices to compare sediment chl *a* concentrations from cores that have relatively undisturbed surface layers relative to grabs in which surface layers are likely to be more disturbed. A 0.1 m^2 van Veen grab was used to collect benthic fauna in water depths $\leq$ 500 m following the methods of Grebmeier et al. (1988). Replicate subsamples (1 cm^3) of surface sediment was collected from the surface of the van Veen grab before it was opened; these samples were

processed for sediment chl-*a* concentrations following the methods used above for core samples.

Sediment TOC and C/N ratios

Sediments were dried overnight at 105 °C following the methods of Grebmeier et al. (1988). Surface sediment (2 g) was then acidified with 2 ml of 1N HCl to remove carbonates, followed by homogenization. Carbon and nitrogen content was measured at the University of California, Santa Barbara using an Exeter Analytical CE-440 elemental analyzer. C/N ratio values were computed on a weight to weight basis.

Sediment ^{137}Cs

Sediments from multiple core depth intervals were packed wet in 90 cm^3 aluminum cans and returned frozen for laboratory analysis at the University of Tennessee, Knoxville. Analysis of sediments by gamma spectroscopy was performed using a Canberra GR4020/S reverse electrode closed-end coaxial detector following methods described by Cooper et al. (2005). Inventories were calculated as the sum of total activity detected in each sediment interval taken from an individual core, taking into account the area of the core (133 cm^2), as well as volume of sediment in each core interval that was counted (90 cm^3). Due to time constraints, some radioisotope data from field work done in the same region in 2002 was decay constant corrected to the date of collection in 2004.

C. Results

Sediment grain size

Sediment samples were collected at 67 stations (Figure 2; Appendix D). Most sampled during HLY0402 were dominated by silt and clay (phi $\geq$ 5). Sediments in

Herald Valley (HV2) were dominated by fine sand (phi = 3), and sediments in Barrow Canyon (BC5 & BC3.4; Figure 2) were dominated by very coarse gravel (phi ≤ 0). Sediments sampled during HLY0403 and SWL2004 were dominated by silt and clay fractions (phi ≥ 5). Sediments from the UTBS stations (Figure 2), located just south of Bering Strait, were dominated by fine and very fine sands (phi = 3, 4). There were no significant correlations ($p > 0.05$) between sediment grain size and mean surface sediment chl *a* (Appendix H).

Sediment TOC, C/N ratios, and ^{137}Cs

TOC ranged from 0.13 – 1.57% in spring (HLY0402) with no obvious trends with water depth, latitude, or transect among stations (Table 1; Figure 3). C/N ratios ranged from 5.44 – 9.93 wt./wt. The lowest C/N ratios occurred along the EHS transect in the NW side of the Chukchi Sea (Table 1; Figures 2 & 4a) and the highest C/N ratios occurred at the head of Barrow Canyon (Table 1; Figure 4a). In the summer (HLY0403 & SWL2004) the lowest TOC values, ranging from 0.21 – 0.47%, occurred to the south of Bering Strait (UTBS stations). The TOC at other stations ranged from 0.61 – 1.72% with highest percentages occurring north of Bering Strait in the SE Chukchi Sea and in the northern Chukchi Sea (Table 1; Figure 3). C/N ratios ranged from 4.85 – 8.09 wt./wt. with the highest value occurring at the head of Barrow Canyon, similar to the spring cruise (Table 1; Figure 4b). There were no significant correlations ($p > 0.05$) found among TOC, C/N, and mean surface sediment chl *a* (Appendix G & H). The radioisotope ^{137}Cs was measured down-core at stations with subsurface peaks of sediment chl *a*. Down-core comparisons of these two parameters show that some subsurface peaks

Table 1. Total organic carbon (TOC) and C/N ratios for surface sediments sampled during HLY0402 (May-June 2004), SWL2004 (July 2004), and HLY0403 (July-August 2004).

Cruise	Station Number	Station Name	TOC (%)	C/N (wt./wt.)
HLY0402	6	HV-1	n/a	n/a
HLY0402	7	HV-2	0.70	6.05
HLY0402	9	EHS-1	0.13	6.39
HLY0402	10	EHS-0.5	0.99	5.71
HLY0402	13	EHS-2	1.09	5.74
HLY0402	16	EHS-4	1.61	6.75
HLY0402	17	EHS-5	1.46	5.54
HLY0402	19	EHS-6	1.32	6.70
HLY0402	21	EHS-X	1.28	5.44
HLY0402	22	SB-1	1.02	8.90
HLY0402	23	SB-4	0.79	7.66
HLY0402	24	SB-5	1.73	8.41
HLY0402	26	BC-5	1.39	7.50
HLY0402	27	BC-6	1.21	5.97
HLY0402	28	BC-4	1.19	7.15
HLY0402	32	BC-3.4	1.23	9.90
HLY0402	34	BC-2	1.15	9.93
SWL2004	25	SLIP-1	1.05	4.85
SWL2004	26	SLIP-2	0.98	5.21
SWL2004	29	SLIP-3	0.90	5.19
SWL2004	30	SLIP-5	0.80	4.86
SWL2004	31	SLIP-4	1.33	5.20
SWL2004	33	UTBS-5	0.47	5.49
SWL2004	34	UTBS-2	0.26	5.48
SWL2004	35	UTBS-4	0.27	5.39
SWL2004	36	UTBS-1	0.21	5.50
SWL2004	42	UTN-1	0.31	5.35
SWL2004	43	UTN-2	0.61	5.48
SWL2004	44	UTN-3	0.66	5.03
SWL2004	45	UTN-4	1.13	5.12
SWL2004	46	UTN-5	1.05	5.01
SWL2004	47	UTN-6	1.30	5.00
SWL2004	48	UTN-7	1.72	5.04
HLY0403	6	HV-1	1.13	5.12
HLY0403	7	ACW-1	0.29	5.70
HLY0403	8	ACW-2	0.24	5.67
HLY0403	15	BC-2	1.00	5.82
HLY0403	21	BC-3	1.60	8.09
HLY0403	22	BC-4	1.01	6.50
HLY0403	23	BC-5	1.25	6.17
HLY0403	25	EB-1	0.83	6.80

Table 1. Continued.

Cruise	Station Number	Station Name	TOC (%)	C/N (wt./wt.)
HLY0403	26	EB-2	1.00	6.34
HLY0403	29	EB-3	1.43	6.02
HLY0403	32	EB-6	1.29	5.82
HLY0403	33	EB-5	1.40	6.43
HLY0403	34	EB-4	1.30	6.76
HLY0403	35	BC-6	1.34	6.01
HLY0403	38	EHS-1	1.04	5.24
HLY0403	42	EHS-4	0.68	5.31
HLY0403	44	EHS-5	1.30	5.41
HLY0403	47	EHS-6	1.23	5.72
HLY0403	48	EHS-7	1.15	5.37
HLY0403	49	EHS-9	1.18	5.70
HLY0403	50	EHS-11	0.98	5.39
HLY0403	51	EHS-12	0.77	5.26
HLY0403	52	WHS-8	0.72	5.33
HLY0403	54	WHS-6	1.00	5.49
HLY0403	55	WHS-5	1.22	5.60
HLY0403	56	WHS-4	0.76	5.86
HLY0403	58	WHS-3	1.46	5.75
HLY0403	59	WHS-2	1.03	5.91
HLY0403	60	WHS-1	1.64	5.78

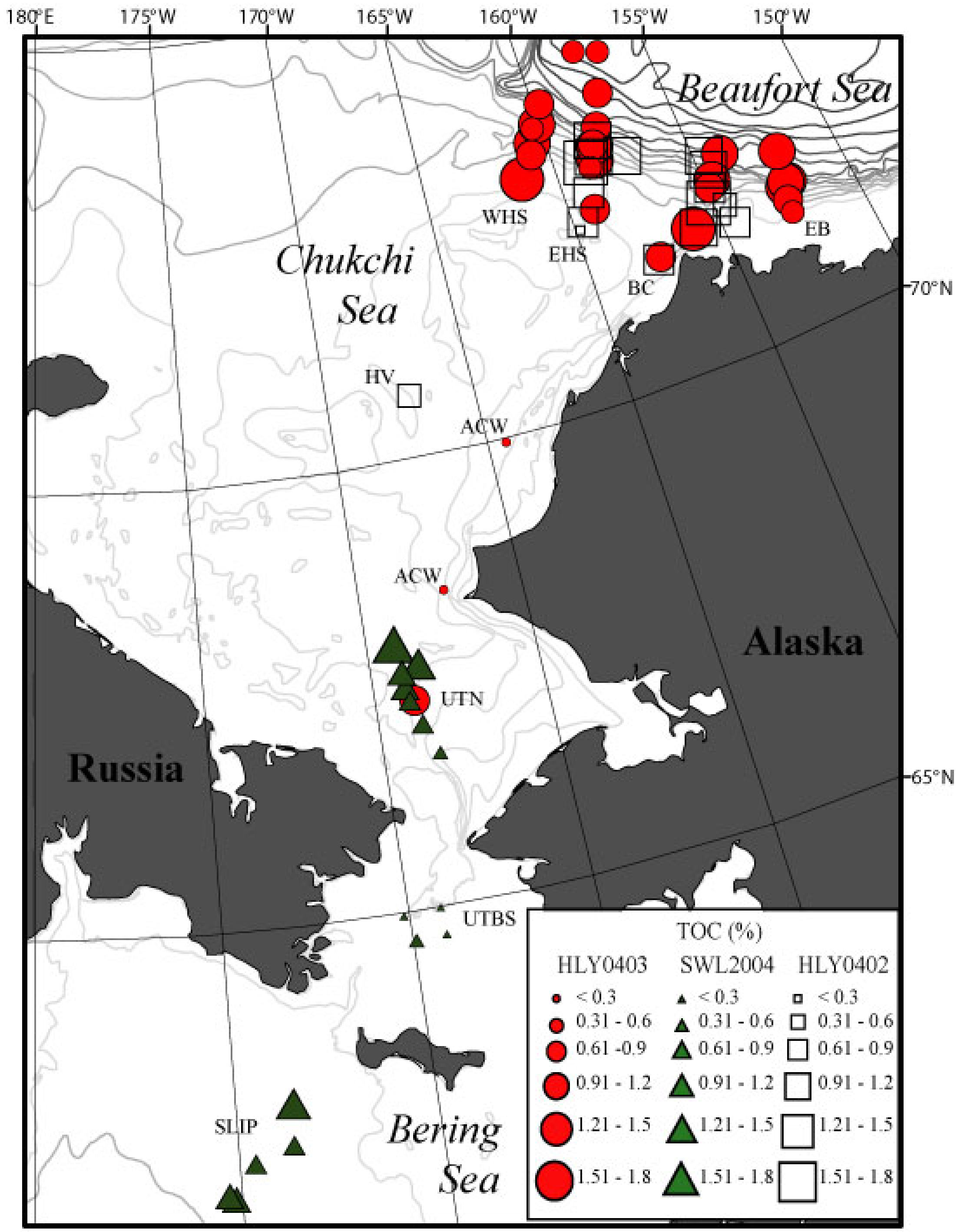

Figure 3. Total organic carbon (TOC) measurements for HLY0402 (May-June 2004), SWL2004 (July 2004), and HLY0403 (July-August 2004).

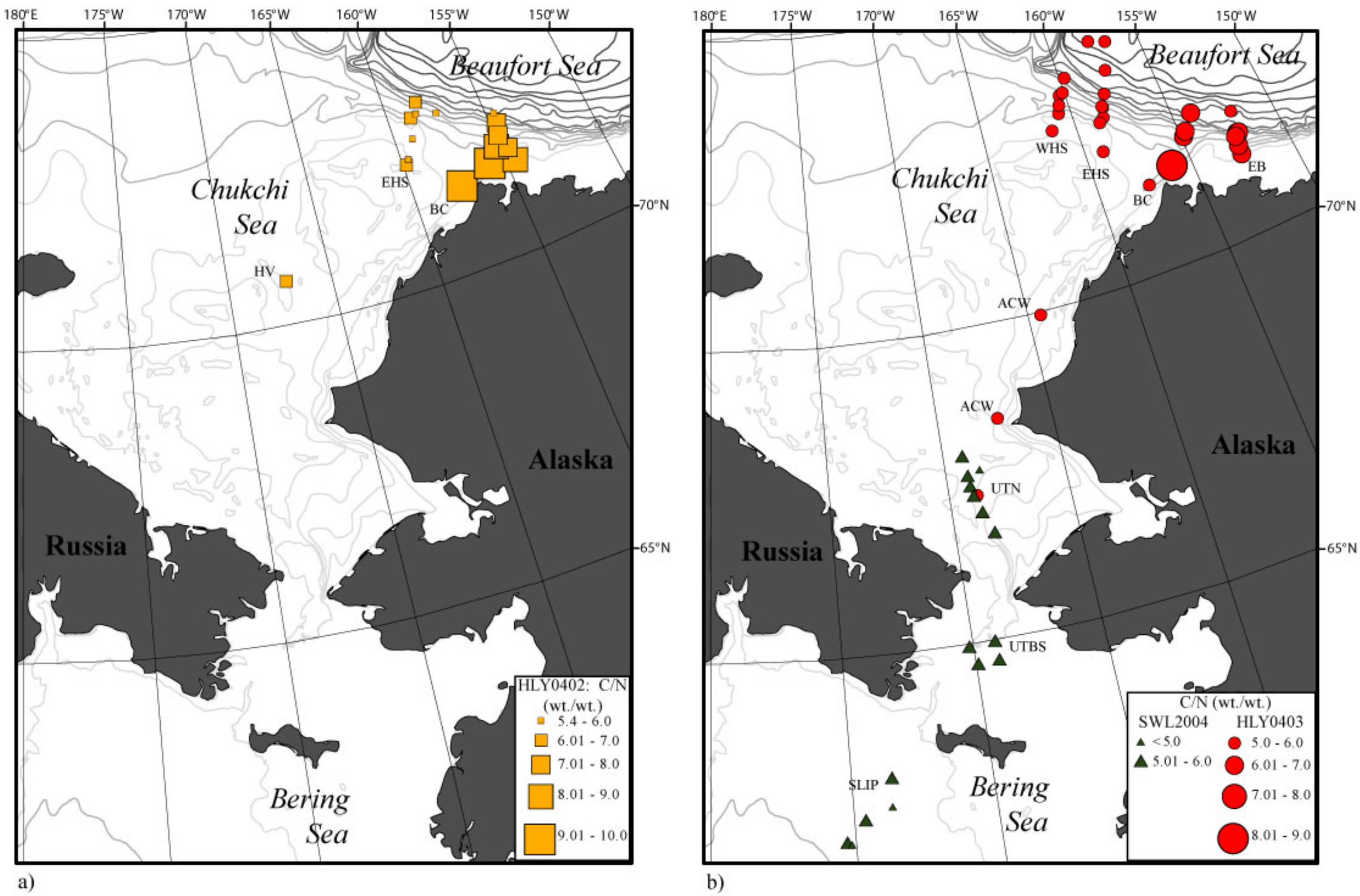

Figure 4. C/N ratios for a) HLY0402 (May-June 2004) and b) SWL2004 & HLY0403 (July-August 2004).

of viable chl *a* have been present at depth for decades (Figure 5). Refer to Appendix D for a complete listing of data parameters.

Sediment chlorophyll a: Surface and down-core

Surface sediment chl *a* ranged from 2.95 – 16.85 (mg m^{-2}) in spring 2004 (Table 2; Figure 6a) and 0.19 – 24.74 (mg m^{-2}) in summer 2004 (Table 2; Figure 6b). Significant correlations ($p < 0.05$) between surface chl *a* and water depth were determined for spring 2004 and summer 2004 (Table 3; Figure 7). There was a significant difference ($p < 0.05$) in the inventory of surface sediment chl *a* between stations occupied in spring relative to summer 2004, ($n = 18$, $p < 0.004$). Comparison, using a paired t-test, of mean surface sediment chl *a* inventories from van Veen grab and HAPS core samples were evaluated for each cruise separately. There was no significant difference ($p = 0.171$, $n = 14$) between samples collected at the same stations during HLY0402 at depths < 150m, but at depths > 150m there was a significant difference between sampling devices ($p = 0.019$, $n = 12$). During HLY0403, no significant difference ($p = 0.102$, $n = 14$) was evident at depths < 150m but there was a significant difference ($p = 0.007$, $n = 16$) between samples at depths > 150m. There was no significant difference ($p = 0.166$, $n = 22$) found during SWL2004, depths < 150m.

Incubation times to extract chl *a* varied at five stations during the HLY0402 cruise. All stations were included in the paired t-test with each time interval compared to the twelve-hour incubation time previously discussed. There was no significant difference in the chl *a* observed between 12 hour and 24 hour incubations ($p = 0.640$, $n = 10$), 12 hour and 36 hour incubations ($p = 0.418$, $n = 10$), and 12 hour and 48 hour

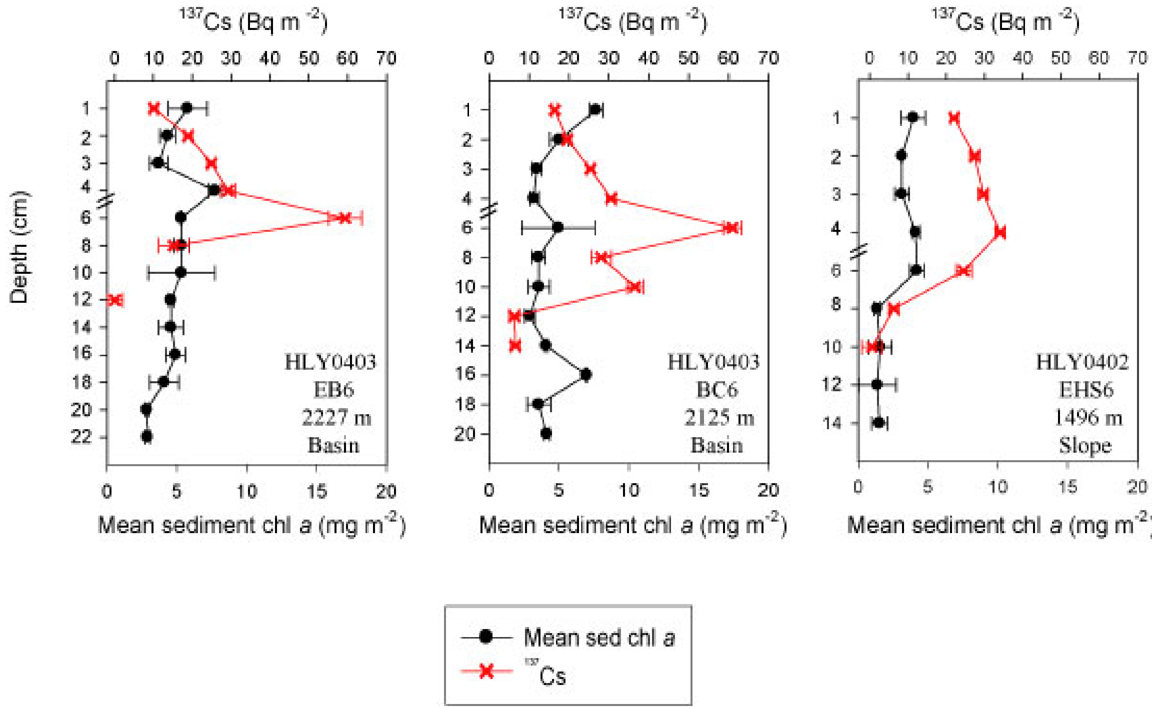

Figure 5. Sediment profiles of mean sediment chl *a* compared to down-core profiles of ^{137}Cs for three deep water stations. Double lines on axis indicate change in scale.

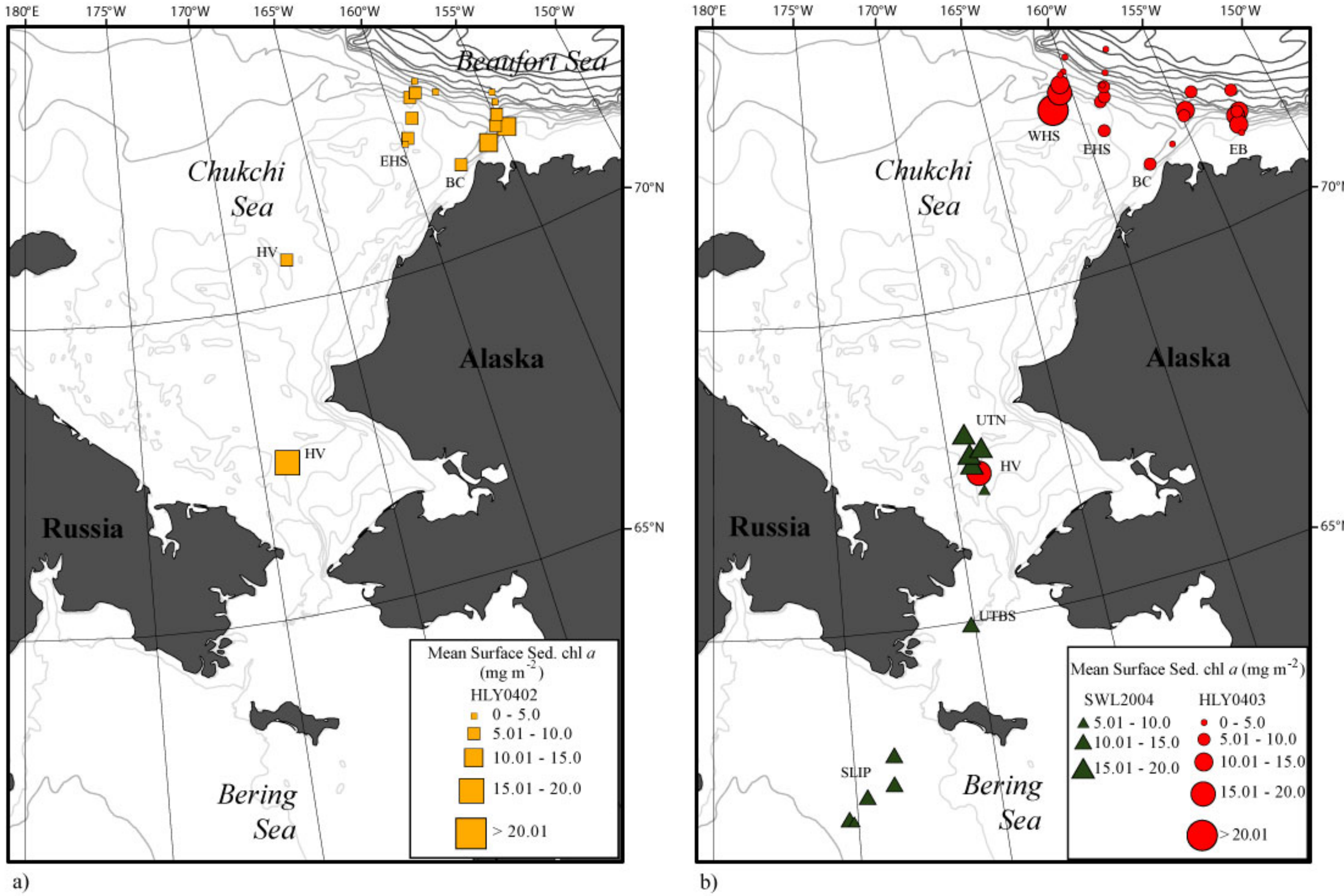

Figure 6. Surface sediment chl *a* for a) HLY0402 (May-June 2004) and b) SWL2004 & HLY0403 (July-August 2004).

Table 2. Mean surface sediment chl *a* measurements for study region.

Cruise	Station Number	Station Name	Surface sediment chl *a* (mg m^{-2})
HLY0402	6	HV-1	16.85
HLY0402	7	HV-2	8.54
HLY0402	9	EHS-1	2.94
HLY0402	10	EHS-0.5	7.53
HLY0402	13	EHS-2	7.69
HLY0402	16	EHS-4	7.31
HLY0402	17	EHS-5	6.27
HLY0402	19	EHS-6	3.95
HLY0402	21	EHS-X	2.95
HLY0402	22	SB-1	2.20
HLY0402	23	SB-4	12.05
HLY0402	24	SB-5	9.77
HLY0402	26	BC-5	4.82
HLY0402	27	BC-6	4.63
HLY0402	28	BC-4	6.29
HLY0402	32	BC-3.4	11.49
HLY0402	34	BC-2	5.53
SWL2004	25	SLIP-1	8.57
SWL2004	26	SLIP-2	10.65
SWL2004	29	SLIP-3	11.27
SWL2004	30	SLIP-5	14.09
SWL2004	31	SLIP-4	10.03
SWL2004	33	UTBS-5	11.75
SWL2004	34	UTBS-2	10.52
SWL2004	35	UTBS-4	10.41
SWL2004	36	UTBS-1	12.76
SWL2004	42	UTN-1	7.47
SWL2004	43	UTN-2	9.48
SWL2004	44	UTN-3	12.44
SWL2004	45	UTN-4	16.72
SWL2004	46	UTN-5	16.27
SWL2004	47	UTN-6	15.78
SWL2004	48	UTN-7	19.84
HLY0403	6	HV-1	16.72
HLY0403	7	ACW-1	3.43
HLY0403	8	ACW-2	3.61
HLY0403	15	BC-2	6.07
HLY0403	21	BC-3	4.11
HLY0403	22	BC-4	8.77
HLY0403	23	BC-5	12.44
HLY0403	25	EB-1	2.68
HLY0403	26	EB-2	10.32

Table 2. Continued.

Cruise	Station Number	Station Name	Surface sediment chl *a* (mg m^{-2})
HLY0403	29	EB-3	11.43
HLY0403	32	EB-6	5.77
HLY0403	33	EB-5	12.18
HLY0403	34	EB-4	7.89
HLY0403	35	BC-6	7.66
HLY0403	38	EHS-1	9.94
HLY0403	42	EHS-4	7.14
HLY0403	44	EHS-5	6.20
HLY0403	47	EHS-6	5.36
HLY0403	48	EHS-7	4.11
HLY0403	49	EHS-9	2.69
HLY0403	50	EHS-11	2.04
HLY0403	51	EHS-12	0.19
HLY0403	52	WHS-8	0.42
HLY0403	54	WHS-6	2.56
HLY0403	55	WHS-5	4.70
HLY0403	56	WHS-4	1.71
HLY0403	58	WHS-3	11.36
HLY0403	59	WHS-2	16.07
HLY0403	60	WHS-1	24.74

Table 3. Correlations between surface sediment chl *a* and water depth. SWL2004 & HLY0403 were combined because sampling occurred within the same season (July-August 2004).

Cruise	**n**	**Spearman's rho**	**p-value**
HLY0402	32	-0.403	0.022
SWL2004, HLY0403	88	-0.545	0.000

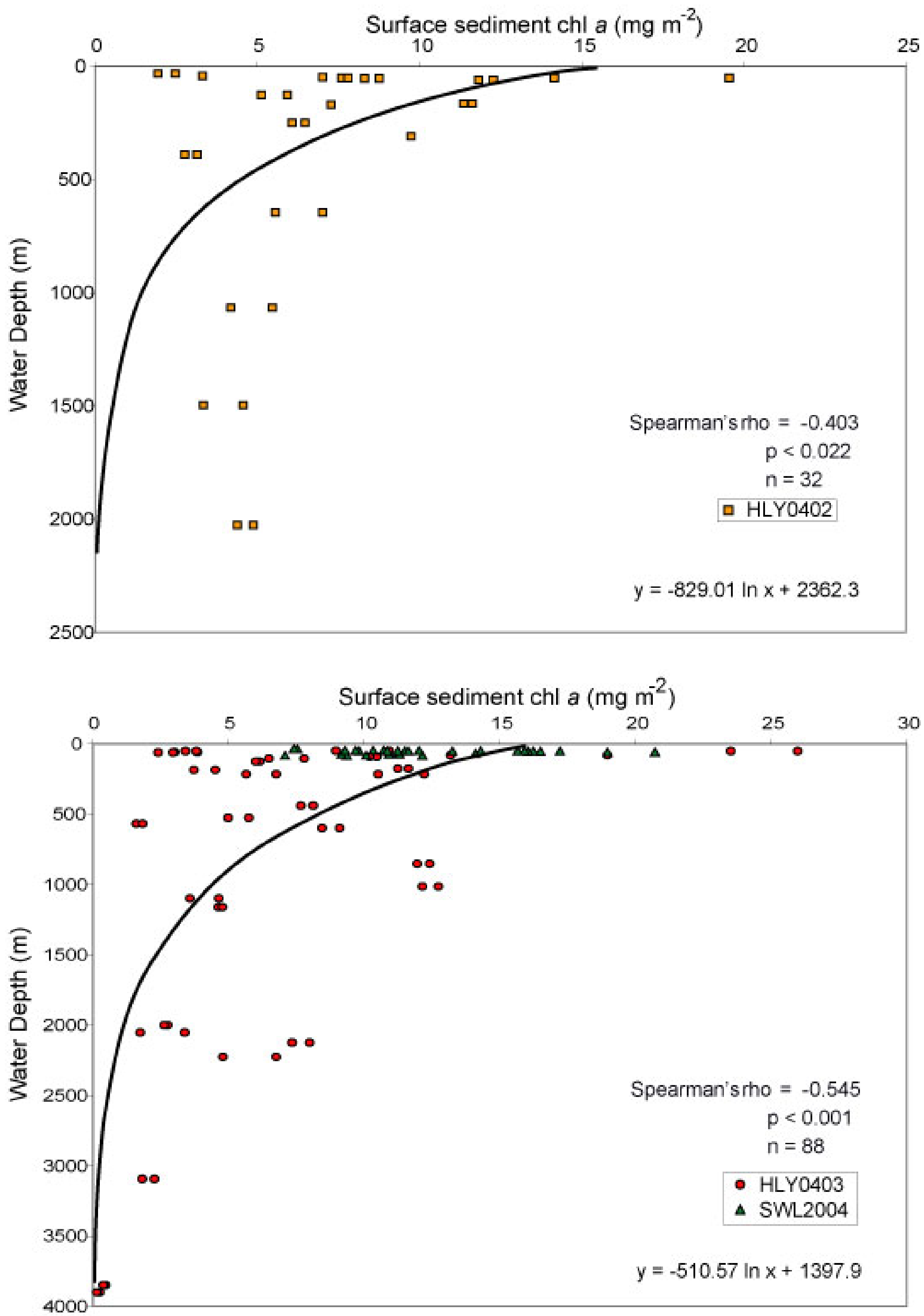

Figure 7. Plots of surface sediment chl-*a* with water depth for spring (HLY0402) and summer (HLY0403 & SWL2004) 2004. Fitted with a best fit logarithmic line generated by EXCEL © software for the data. HLY refers to cruises aboard the USCGC *Healy* and SWL refers to cruises aboard the CGCS *Sir Wilfrid Laurier*.

incubations ($p = 0.332$, $n = 10$).

Sediment chl *a* generally declined with sediment depth (Figure 8). However, in both sampling seasons a number of depth profiles had subsurface peaks of chl *a* (Figure 9). This seasonal variation was present at many shelf and slope stations but not basin stations. Seven stations were occupied in both spring and summer (Figure 10). All stations except EHS4 (Figure 10d) and HV1 (Figure 10g) had higher sediment chl *a* concentrations in summer. A paired t-test indicated that there was a significant difference between downcore profiles in spring and summer at stations BC4 ($p < 0.001$, $n = 16$), BC6 ($p < 0.001$, $n = 16$), EHS4 ($p < 0.001$, $n = 20$), and HV1 ($p = 0.023$, $n = 14$) with highest values at all core depths present in summer. An apparent, distinct layer probably reflecting bioturbation is visible in the upper profile of station EHS6 (Figure 10f). In this case, there was a significant difference between spring and summer in the upper 4 cm of the core ($p = 0.009$, $n = 8$) but no significant difference below 4 cm ($p = 0.910$, $n = 10$).

D. Discussion

Surface sediment chl *a* was highest south of St. Lawrence Island, north of Bering Strait, at shelf stations along the WHS transect, and at the mouth of Barrow Canyon. Lowest concentrations of surface sediment chl *a* were found at basin stations. Overall, surface sediment chl *a* was highest at shelf stations and decreased with increasing water depth in the slope and basin regions (Figure 7). Comparison of reoccupied stations during spring and summer show that at the majority of these stations chl *a* values are higher in summer on the sediment surface and downcore (Figure 10). Exceptions to this include stations along the EHS transect (EHS4 & EHS5) and HV1 where chl *a* was either

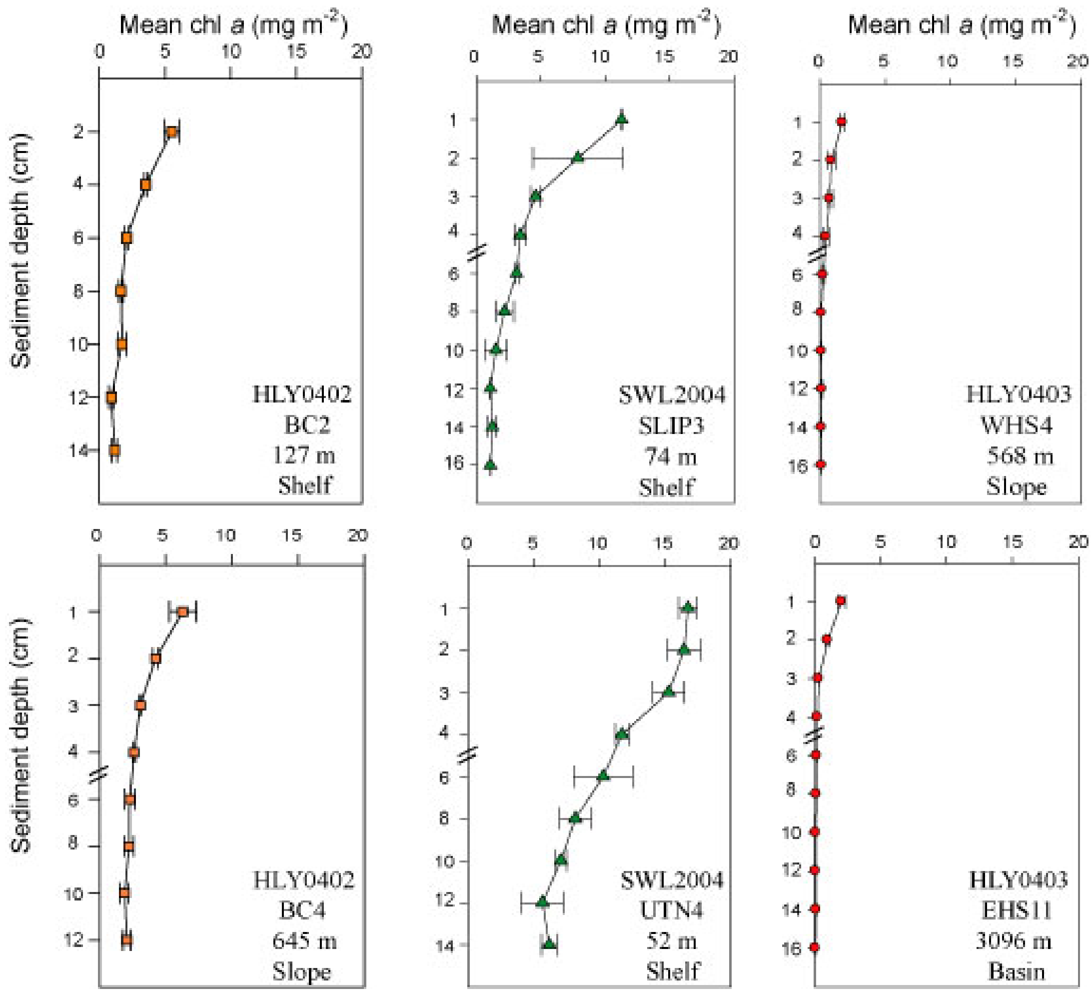

Figure 8. Profiles of sediment chl *a* from all cruises showing a decline in concentration of chl *a* with core depth. Double lines on axis indicate change in scale.

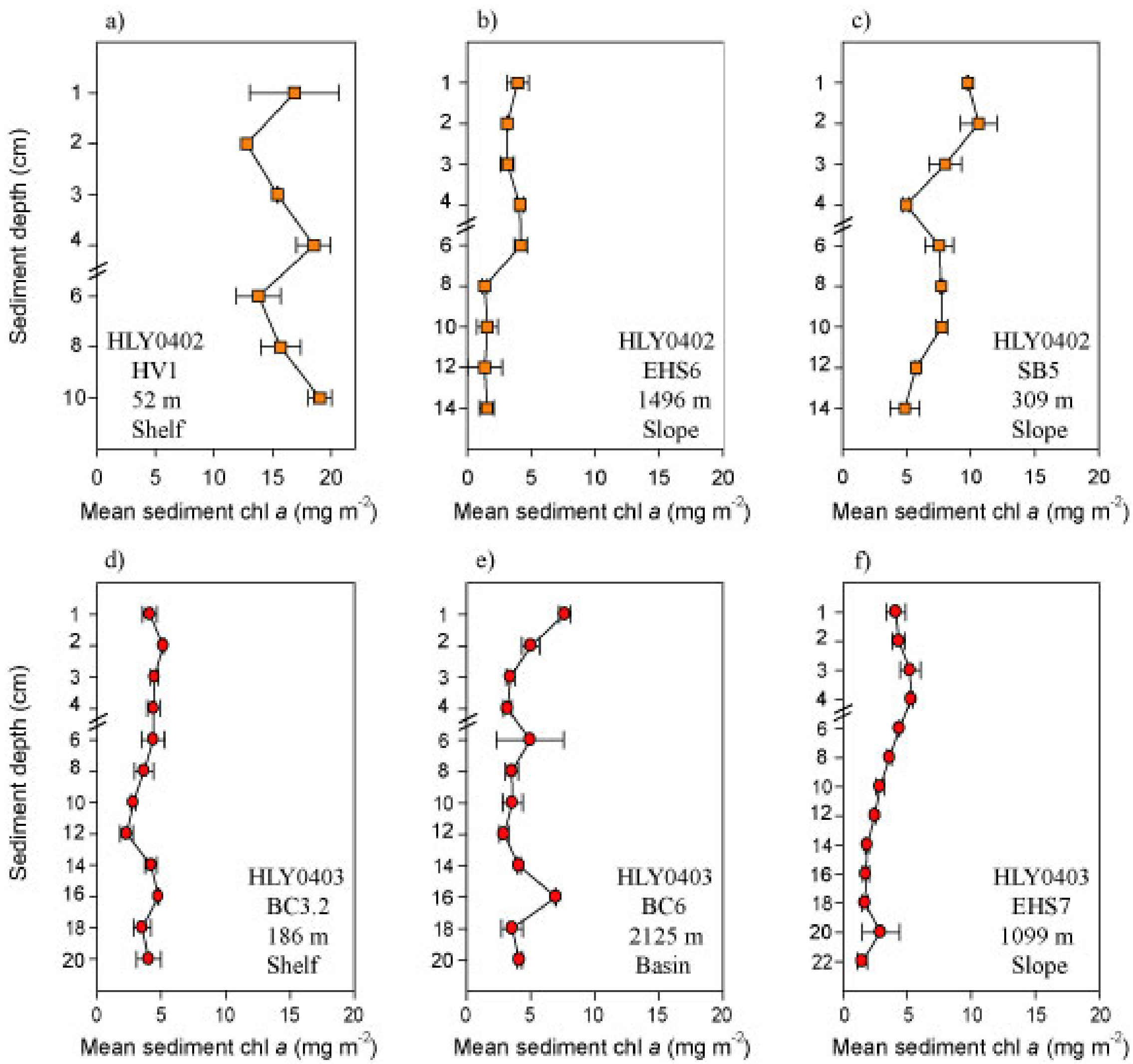

Figure 9. Selected profiles of sediment chl *a* from cruises in the northern Chukchi and western Beaufort Seas showing the presence of subsurface peaks of chl *a* within the sediment cores. Double lines on axis indicate change in scale.

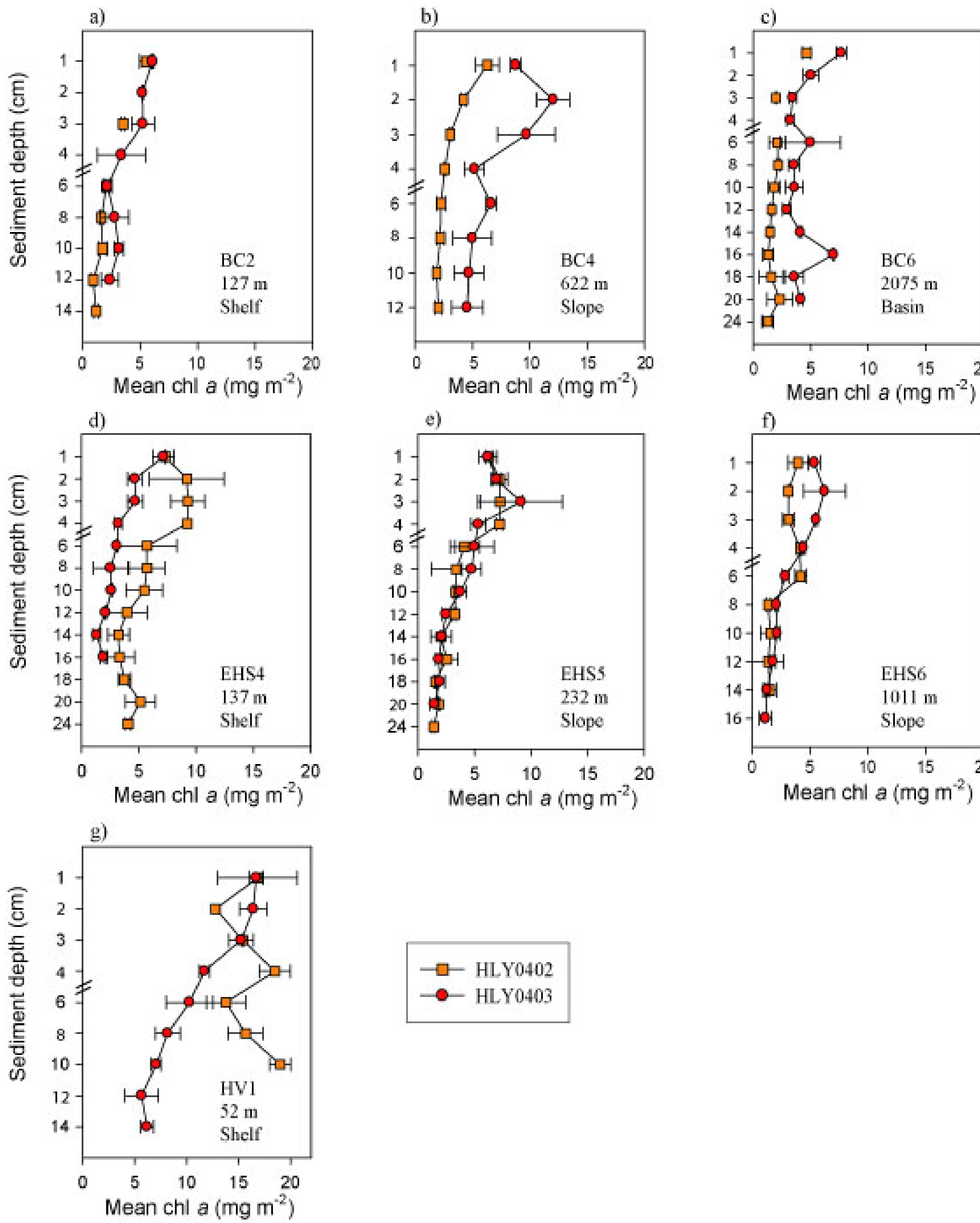

Figure 10. Comparison of profiles of sediment chl *a* at stations occupied in both spring (HLY0402) and summer (HLY0403) cruises in 2004. Water depths are averages of sampling stations from each season. Double lines on axis indicate change in scale.

higher in the spring or showed no seasonal difference. Previous studies in the region have found enhanced deposition of chl *a* between seasons (Cooper et al. 2005).

During the spring cruise, TOC values were lowest at stations HV2 and EHS1 and during summer TOC values were lowest at UTBS stations south of Bering Strait and at ACW stations (Figure 3). During both spring and summer cruises, TOC values follow a similar pattern to surface sediment chl *a* concentrations with highest values found south of St. Lawrence Island, north of Bering Strait, at shelf stations of the WHS transect, and at the shelfbreak of the EHS, BC, and EB transects (Figure 3). This indicates high pelagic-benthic coupling on the shelf and enhanced deposition at the shelfbreak due to slower currents. C/N ratios in the spring were highest in Barrow Canyon and SB5 (Figure 4a). This may be due to water mass flow patterns with higher C/N ratios present under Alaska Coastal Water due to an increased terrigenous load carried by freshwater input and lower C/N ratios present under nutrient rich Bering Strait-Anadyr Water (Grebmeier et al. 1989). These patterns could also indicate the presence of more degraded organic material along the BC transect and fresher organic material present along the EHS transect. Comparison of C/N ratios between reoccupied BC and EHS transects in spring and summer indicate that fresher, marine organic matter is present in summer along the BC transect while at most there is only a marginally significant difference ($p = 0.053$, $n = 5$) in values on the EHS transect. C/N ratios in the summer were low at every station except BC2 (Figure 4b). This indicates that high quality, marine phytodetritus was deposited to the surface sediments across the study region, probably following deposition of the spring bloom to bottom sediments. The benthic community at BC2 is composed of filter-feeding bivalves that could efficiently utilize

high quality, marine phytodetritus deposited from the spring bloom inhibiting this material from sedimenting to the benthos. Surface sediments at this station are likely to be composed of more degraded organic material.

Some previous studies of sediment chl *a* have used a twelve hour incubation period to extract chl *a* from sediment (e.g. Cooper et al. 2002). During this study, there was no significant ($p > 0.05$) difference between the 12 hour incubation periods in 90% acetone and longer incubation periods. Shorter incubation periods were not studied, but from these experiments it appears that incubation periods greater than 12 hours do not result in extraction of additional chl *a* from the sediment.

Sediment sampling devices may effect the composition of surface sediments during retrieval of the device from the seafloor. A comparison of surface sediment collected from a van Veen grab and HAPS corer was undertaken in spring 2004 (May-June). This comparison showed that in < 150 m water depth there is no significant difference ($p > 0.05$) between inventories of surface sediment chl *a* regardless of the two sampling devices used. At depths > 150 m, there is a significant difference ($p < 0.05$) between the inventory of surface sediment chl *a* from each sampling device. I conclude that on the continental shelf of the study region, sediment chlorophyll data collected using the van Veen grab are representative of that also collected using coring samplers. In the slope and basin regions, however, there was a significant difference ($p > 0.05$) between the sampling devices which indicates that a HAPS corer more accurately reflects samples of indicators concentrated on the sediment surface such as sediment chl *a* depths > 150 m. Inventories of chl *a* measured using the HAPS corer was significantly (p <

0.05) higher in slope and basin sediments than those collected using grabs at the same locations, which is likely due to sampling equipment disturbance to surface sediments.

At most stations sampled during the three cruises the concentration of sediment chl *a* in sediment profiles was highest at the surface and decreased with increasing core depth (Figure 8). Stations with subsurface peaks of sediment chl *a* were found in the northern Chukchi Sea and western Beaufort Sea. Downcore profiles of stations with subsurface peaks of chl *a* compared to profiles of ^{137}Cs indicate that some subsurface peaks of chl *a* occur as deep as subsurface peaks of ^{137}Cs that may reflect peak deposition of this radioisotope that occurred in the early 1960s following bomb testing fallout. This indicates that much of the chl *a* at depth in these sediment cores appears to be decades old and possibly not utilized or utilized over long periods of time by the macrobenthic community.

III. Quantitative assessment of sampling technique: impact of variable sieve mesh size on benthic community structure

A. Introduction

Patterns in the distribution and abundance of benthic communities can be strongly influenced by sampling methods, including the number of samples collected, sampling equipment, and sieve mesh sizes used to process samples (Bachelet 1990, James et al. 1995, Schlacher and Wooldridge 1996, Tanaka and Leite 1998). Marine macrobenthic communities comprise a wide range of species of different sizes. Sieve mesh size used in sample processing to separate fauna from sediments strongly influences the quality and type of data in most macrofaunal collections, including density and biomass estimates (Bachelet 1990, Schlacher and Wooldridge 1996). However, limited attention has been provided to post-sampling procedures (e.g. washing of sediment samples) even though this stage is of critical importance for accurate macrofaunal community estimations (Bachelet 1990). Different studies have different goals and objectives that play into the decision of which mesh size to use. Some researchers consider animals retained on a 0.5 mm mesh sieve to be part of the meiofauna. Carey (1991) characterized macrofauna as > 1.0 mm in length while meiofauna are characterized as 0.62 – 0.5 mm in length. Both 0.5 mm (Iken et al. 2005) and 1.0 mm (Grebmeier 1987 and Feder et al. 1994) mesh sizes have been used to estimate benthic macrofaunal communities in Arctic studies. Currently, there is no standardized consensus or methodology for sampling and processing benthic macrofauna either in the Arctic or worldwide. The study region focused on for this project has the highest macrofaunal biomass of the marginal Arctic seas. Processing macrofaunal samples is time consuming and the finer the sieve used the

more animals will be present. This study was done to determine the coarsest sieve that can be used to give accurate estimates of the macrofaunal community composition and biomass.

The objectives of this study are to:

1. Determine how representative the two mesh sieve aperture sizes, 0.5 mm and 1.0 mm, are in retaining Arctic marine benthic macrofaunal invertebrates.
2. Examine the effects of mesh sieve size on the interpretation of trends in abundance, wet weight biomass, and carbon converted biomass on benthic community structure.

B. Methods

Shipboard sampling was undertaken on the continental shelf of the northern Bering Sea from 11 July – 22 July 2003 and 9 July – 22 July 2004 and on the shelf, slope, and basin regions of the Chukchi and southern Beaufort Seas from 15 May – 23 June (spring, largely ice-covered) and 18 July – 26 August 2004 (summer, largely ice-free) (Figure 1).

Benthic Sampling

Two replicate bottom samples for mesh size analyses were collected using a HAPS corer (0.0133 m^2; modified from Kanneworff & Nicolaissen 1973) and a tripod multicorer (0.00528 m^2; Ocean Instruments, San Diego, CA.). Each sample was washed through a nest of 1.0 mm and 0.5 mm mesh sieves in order to separate faunal fractions. Animals from each mesh size were preserved in 10 % hexamethylenetetramine-buffered formalin, stored in plastic cups, and saved for laboratory analysis following the techniques outlined in Grebmeier et al. (1989). In the laboratory, preserved animals were sorted to the family taxonomic level or lowest taxon possible, and counted. Some fauna

collected on the finer 0.5 mm sieve were small and translucent and sorted to the lowest taxon possible. They were blotted dry and weighed on a calibrated scale to determine wet weight biomass. Wet weight biomass was converted to organic carbon biomass following the methods of Grebmeier (1987), using previously verified conversion values of Stoker (1978).

Sediment Grain Size

Sediment subsamples were collected from both the van Veen grab and HAPS corer. These sediments were frozen, and returned to the University of Tennessee for subsequent laboratory analyses. Refer to chapter II for detailed methods for determination of sediment grain size.

Statistics

A correlation matrix was created for each cruise dataset using the statistical package SPSS 13.0© (Appendix G & H; SPSS Inc. 2004). Nonparametric correlation statistics were used because the data were not normally distributed and the sample sizes were small. The nonparametric correlation coefficient, Spearman's rho, p-value, and sample size are reported for each correlation. The Shannon-Weaver diversity index was used as a measure of family diversity retained on each sieve mesh size fraction (Shannon and Weaver 1963).

C. Results

Data were collected from 15 stations in summer 2003 (Figure 2) and 51 stations in 2004; 14 in spring (May-June 2004) and 37 in summer (July-August 2004) (Figure 2). Water depths in 2003 ranged from 36 m to 84 m, and in 2004 depths ranged from 35 m to 2227 m (Appendix A). Sediment cores were analyzed in the shelf (defined as depth ≤

200 m), slope (defined as depth > 200 m and ≤ 2000 m), and basin (defined as depth > 2000 m) regions of the Bering, Chukchi, and Beaufort Seas to determine the extent of biases that are associated with the use of 1.0 mm versus 0.5 mm mesh sieves in estimation of benthic macrofaunal populations. The 1.0 mm fraction refers to the sum of macrofauna retained on the 1.0 mm sieve and the 0.5 mm fraction refers to fauna passing through the 1.0 mm sieve.

Sieve mesh-size: Retention of individuals

In most samples, animal abundance retained on combined 0.5 mm and 1.0 mm sieve size fractions increased in comparison to animals retained on the 1.0 mm sieve alone (Table 4). The increase of the combined abundance was significantly different from the 1.0 mm abundance during all cruises (Table 5). The 0.5 mm size fraction added few additional taxa to macrofauna captured on the 1.0 mm sieve, predominantly consisting of foraminifera and juvenile macrofauna (Table 6). The number of individuals collected on the 0.5 mm sieve at shelf stations ranged from 1654 – 50676 individuals m^{-2}, slope stations ranged from 751 – 33308 individuals m^{-2}, and basin stations ranged from 864 – 37293 individuals m^{-2} (Figure 11 a, b, c). The number of individuals collected on the 1.0 mm sieve at shelf stations ranged from 827 – 165827 individuals m^{-2}, slope stations ranged from 2030 – 49423 individuals m^{-2}, and basin stations ranged from 1390 – 8646 individuals m^{-2} (Figure 11a, b, c). At shelf and slope stations the 1.0 mm sieve retained 48% of total individuals, while the 0.5 mm sieve retained 52% of total individuals. At basin stations the 1.0 mm sieve retained 27% of total individuals and the 0.5 mm sieve retained 73% of total individuals. Dominant macrofaunal type collected on each sieve differed by region and retention capabilities of the sieve opening. The

Table 4. Abundances of fauna retained on the 0.5 mm sieve, 1.0 mm sieve and combined sieve fractions for stations occupied during 2003 and 2004. No. ind. = number of individual fauna per meter^2.

Cruise	Station Number	Station Name	0.5 mm faunal abundance (no. ind. m^{-2})	1.0 mm faunal abundance (no. ind. m^{-2})	Combined faunal abundance (no. ind. m^{-2})
SWL2003	7	SLIP-1	9286	2556	11842
SWL2003	8	SLIP-2	11955	2744	14699
SWL2003	10	SLIP-3	5677	2068	7744
SWL2003	11	SLIP-5	2256	1842	4098
SWL2003	12	SLIP-4	4586	2895	7481
SWL2003	15	UTBS-2	5714	9436	15151
SWL2003	16	UTBS-4	15489	9211	24700
SWL2003	17	UTBS-1	6541	11429	17970
SWL2003	23	UTN-1	6692	1541	8233
SWL2003	24	UTN-2	6353	1579	7932
SWL2003	25	UTN-3	7481	9512	16993
SWL2003	26	UTN-4	8045	8384	16429
SWL2003	27	UTN-5	3985	8083	12068
SWL2003	28	UTN-6	2293	5978	8271
SWL2003	29	UTN-7	6038	6579	12617
HLY0402	6	HV-1	30301	19586	49887
HLY0402	7	HV-2	1654	2820	4474
HLY0402	10	EHS-0.5	5000	2274	7274
HLY0402	13	EHS-2	4286	4323	8609
HLY0402	16	EHS-4	2782	2030	4812
HLY0402	17	EHS-5	4474	4173	8647
HLY0402	19	EHS-6	32105	6278	38383
HLY0402	21	EHS-X	1579	3271	4850
HLY0402	23	SB-4	19511	10827	30338
HLY0402	24	SB-5	27794	49424	77218
HLY0402	26	BC-5	1729	4850	6579
HLY0402	27	BC-6	15436	2083	17519
HLY0402	28	BC-4	24135	20677	44812
HLY0402	34	BC-2	50377	165827	216204
SWL2004	25	SLIP-1	4662	2105	6767
SWL2004	26	SLIP-2	6429	1992	8421
SWL2004	29	SLIP-3	3233	1541	4774

Table 4. Continued.

Cruise	Station Number	Station Name	0.5 mm faunal abundance (no. ind. m^{-2})	1.0 mm faunal abundance (no. ind. m^{-2})	Combined faunal abundance (no. ind. m^{-2})
SWL2004	30	SLIP-5	2068	3158	5226
SWL2004	31	SLIP-4	3722	2218	5940
SWL2004	34	UTBS-2	2594	5639	8233
SWL2004	36	UTBS-1	2331	4887	7218
SWL2004	42	UTN-1	2481	827	3308
SWL2004	43	UTN-2	6278	1805	8083
SWL2004	44	UTN-3	20977	21805	42782
SWL2004	45	UTN-4	10000	12744	22744
SWL2004	46	UTN-5	4211	13308	17519
SWL2004	47	UTN-6	5301	11241	16541
SWL2004	48	UTN-7	1917	1955	3872
HLY0403	6	HV-1	10000	12744	22744
HLY0403	15	BC-2	20188	50789	70977
HLY0403	21	BC-3	13308	4411	17719
HLY0403	22	BC-4	33308	9474	42782
HLY0403	23	BC-5	3647	3947	7594
HLY0403	26	EB-2	5301	7481	12782
HLY0403	29	EB-3	12218	7632	19850
HLY0403	32	EB-6	1278	1391	2669
HLY0403	33	EB-5	11165	13985	25150
HLY0403	34	EB-4	21278	4211	25489
HLY0403	35	BC-6	865	2782	3647
HLY0403	38	EHS-1	5564	2368	7932
HLY0403	42	EHS-4	27143	29098	56241
HLY0403	44	EHS-5	3195	4023	7218
HLY0403	47	EHS-6	2218	9699	11917
HLY0403	48	EHS-7	1917	6053	7970
HLY0403	49	EHS-9	28308	6504	34812
HLY0403	54	WHS-6	37293	8647	45940
HLY0403	55	WHS-5	14361	2444	16805
HLY0403	56	WHS-4	752	3271	4023
HLY0403	58	WHS-3	3534	2030	5564
HLY0403	59	WHS-2	6504	11090	17594
HLY0403	60	WHS-1	2256	2707	4962

Table 5. Wilcoxon signed - ranks test results for differences in combined sieve fraction total abundance (0.5 mm sieve + 1.0 mm sieve) and abundance retained on the 1.0 mm sieve alone for all cruises.

Cruise	p-value
SWL2003	<**0.001**
HLY0402	<**0.001**
SWL2004	<**0.001**
HLY0403	<**0.000**

Table 6. Number of taxonomic families retained on each sieve size.

Cruise	# Families 0.5 mm	# Families 1.0 mm
SWL2003	60	56
HLY0402	72	69
SWL2004	54	48
HLY0403	79	72

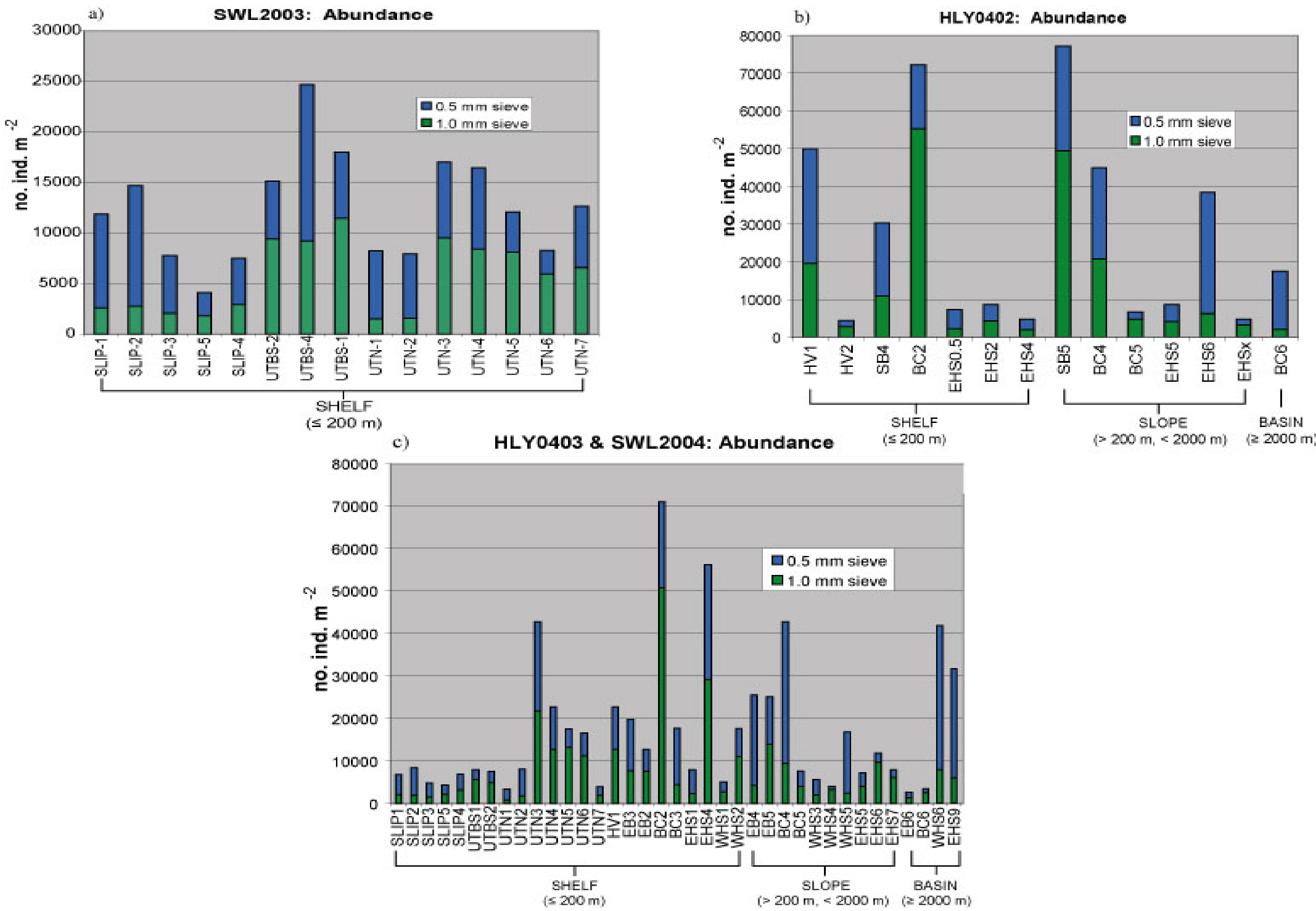

Figure 11. Abundance of fauna collected on the 0.5 mm (blue) and 1.0 mm (green) for each cruise.

dominant taxa with respect to abundance collected on the 0.5 mm sieve in the shelf and slope regions included amphipods, bivalves, foraminifera, nematodes, and polychaetes (Table 7, Figure 12a). The dominant taxonomic groups with respect to abundance retained on the 0.5 mm sieve in the basin region included foraminifera, nematodes, and isopods (Table 7, Figure 12a). The dominant taxonomic groups retained on the 1.0 mm sieve in the shelf and slope regions included amphipods, bivalves, foraminifera, nematodes, polychaetes, and other groups (Cumacea and Echinodermata) (Table 7, Figure 12b). Foraminifera was the dominant taxonomic group retained on the 1.0 mm sieve in the basin region (Table 7, Figure 12b).

Diversity

A significant difference was found between the Shannon-Weaver diversity (*H'*) index for the two sieve mesh sizes on the shelf in July 2003 (paired t-test: p = 0.044, n = 15) and July 2004 (p = 0.001, n = 22). No significant difference was found between the sieve sizes within the shelf (p = 0.406, n = 7) and slope (p = 0.237, n = 6) stations in May-June 2004 and the slope (p = 0.342, n = 10) and basin (p = 0.247, n = 4) stations in July-August 2004. No comparison could be made on the basin in the spring of 2004 because only one station was sampled.

Sieve mesh-size: Retention of benthic macrofaunal biomass

The majority of benthic macrofaunal biomass, both wet weight and carbon converted biomass, was retained on the 1.0 mm sieve at all except two basin stations. Only the carbon converted biomass will be discussed here; wet weight preserved biomass follows similar trends to carbon converted biomass (Grebmeier 1987). Carbon conversions permit comparisons of biomass between stations by reducing the influence of

Table 7. Taxonomic classification and generic type of benthic fauna sampled during all cruises in 2003 and 2004.

Classification	Generic types
Phylum Protozoa	
Order Foraminifera	
Family Astrorhizidae	Foraminifera
Hyperammina nodosa	Foraminifera
F. Elphidiidae	Foraminifera
F. Lituolidae	Foraminifera
F. Polymorphinidae	Foraminifera
P. Nematoda	Nematode
P. Annelida	
Class Polychaeta	
F. Lumbrineridae	Polychaete
F. Maldanidae	Polychaete
F. Oweniidae	Polychaete
F. Spionidae	Polychaete
P. Mollusca	
C. Bivalvia	
F. Nuculidae	Bivalve
Nucula belloti	Bivalve
F. Thyasiridae	Bivalve
F. Tellinidae	Bivalve
Macoma calcarea	Bivalve
Macoma moesta	Bivalve
P. Arthropoda	
C. Crustacea	
O. Amphipoda	
F. Ampeliscidae	Amphipod
Ampelisca sp.	Amphipod
F. Haustoriidae	Amphipod
F. Phoxocephalidae	Amphipod
O. Isopoda	
F. Idoteidae	Isopod
C. Ostracoda	Ostracod
P. Echinodermata	
C. Echinoidea	
F. Echinarachniidae	Sand dollar

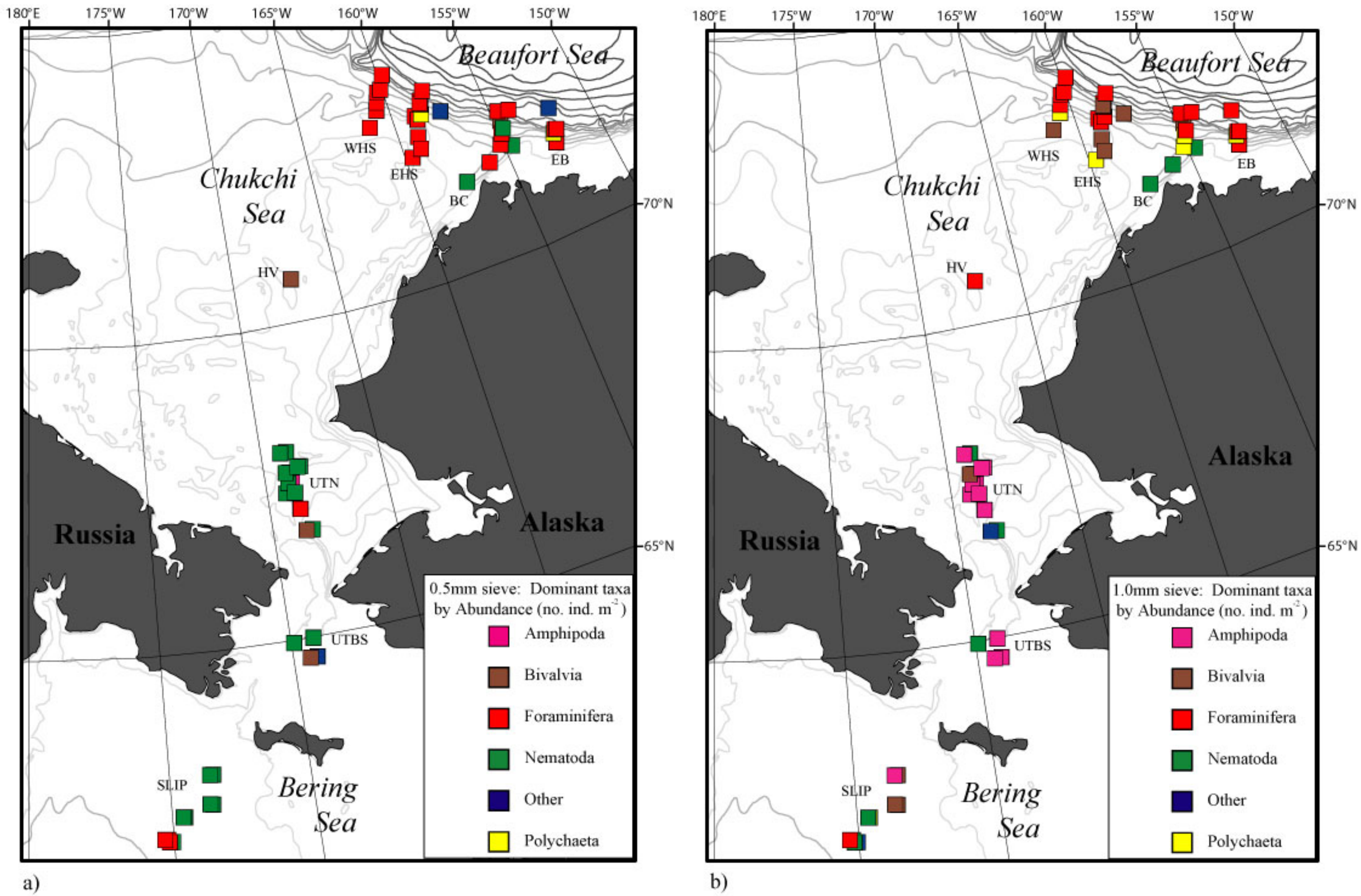

Figure 12. Dominant taxa with respect to abundance retained on a) the 0.5 mm sieve and b) the 1.0 mm sieve.

calcium carbonate in mollusks and echinoderms on total biomass (Grebmeier et al. 1989, Feder et al. 1994). The amount of biomass (g C m^{-2}) retained on the 0.5 mm sieve in the shelf region ranged from 0.04 – 1.96 g C m^{-2}, slope ranged from 0.04 – 0.62 g C m^{-2}, and the basin ranged from 0.03 – 0.13 g C m^{-2} (Table 8, Figure 13a). The amount of biomass retained on the 1.0 mm sieve in the shelf region ranged from 1.15 – 164.6 g C m^{-2}, slope ranged from 0.25 – 27.1 g C m^{-2}, and basin ranged from 0.7 – 0.8 g C m^{-2} (Table 8, Figure 13b). The dominant taxonomic groups by biomass collected on the 0.5 mm sieve on both the shelf and slope included foraminifera, polychaetes, and amphipods (Table 7, Figure 14a). Foraminifera were the dominant taxonomic group retained on the 0.5 mm sieve in the basin (Table 7, Figure 14a). The dominant taxonomic groups retained on the 1.0 mm sieve on the shelf and slope regions included foraminifera, polychaetes, bivalves, amphipods, and echninoderms (Table 7, Figure 14b). In the basin region, foraminifera were the dominant taxon retained on the 1.0 mm sieve (Table 7, Figure 14b). An average of 97% of total carbon converted biomass was retained on the 1.0 mm sieve, whereas the 0.5 mm sieve collected the remaining 3% of total carbon converted biomass for the samples.

Correlations between sieve mesh-size retentions and sediment grain size

Correlations (Spearman's rho) are reported for SWL2003, HLY0402, SWL2004, and HLY0403 respectively. In July 2003, benthic abundance (no. m^{-2}) and biomass (g C m^{-2}) for both sieve sizes were negatively correlated with sediment modal grain size (Table 9). In May-June 2004 and July 2004, there was no correlation between benthic abundance and biomass for each sieve size with sediment modal grain size.

Table 8. Organic carbon biomass retained on 0.5 mm and 1.0 mm sieves and the combined total for each cruise in 2003 and 2004.

Cruise	Station Number	Station Name	0.5 mm Organic carbon biomass (g C m^{-2})	1.0 mm Organic carbon biomass (g C m^{-2})	Combined Organic carbon biomass (g C m^{-2})
SWL2003	7	SLIP-1	0.18	14.10	14.28
SWL2003	8	SLIP-2	0.15	25.67	25.82
SWL2003	10	SLIP-3	0.19	10.88	11.07
SWL2003	11	SLIP-5	0.04	15.04	15.09
SWL2003	12	SLIP-4	0.13	16.65	16.78
SWL2003	15	UTBS-2	0.06	34.44	34.50
SWL2003	16	UTBS-4	0.14	19.60	19.74
SWL2003	17	UTBS-1	0.07	38.67	38.74
SWL2003	23	UTN-1	0.15	10.81	10.97
SWL2003	24	UTN-2	0.12	6.02	6.14
SWL2003	25	UTN-3	0.16	42.61	42.77
SWL2003	26	UTN-4	0.07	9.28	9.35
SWL2003	27	UTN-5	0.14	15.56	15.70
SWL2003	28	UTN-6	0.04	7.48	7.52
SWL2003	29	UTN-7	0.15	13.33	13.49
HLY0402	6	HV-1	0.47	37.26	37.73
HLY0402	7	HV-2	0.05	4.18	4.22
HLY0402	10	EHS-0.5	0.15	6.38	6.53
HLY0402	13	EHS-2	0.09	10.27	10.36
HLY0402	16	EHS-4	0.05	1.15	1.20
HLY0402	17	EHS-5	0.16	4.70	4.86
HLY0402	19	EHS-6	0.16	15.12	15.28
HLY0402	21	EHS-X	0.04	1.22	1.26
HLY0402	23	SB-4	0.20	5.80	6.01
HLY0402	24	SB-5	0.62	27.06	27.67
HLY0402	26	BC-5	0.09	1.43	1.52
HLY0402	27	BC-6	0.05	0.80	0.85
HLY0402	28	BC-4	0.32	9.61	9.93
HLY0402	34	BC-2	1.02	164.59	165.61
SWL2004	25	SLIP-1	0.19	20.55	20.74
SWL2004	26	SLIP-2	0.11	16.98	17.09
SWL2004	29	SLIP-3	0.17	23.08	23.25
SWL2004	30	SLIP-5	0.04	13.53	13.57
SWL2004	31	SLIP-4	0.03	21.61	21.64
SWL2004	34	UTBS-2	0.10	57.16	57.25
SWL2004	36	UTBS-1	0.11	46.29	46.40
SWL2004	42	UTN-1	0.09	12.70	12.79
SWL2004	43	UTN-2	0.06	2.30	2.36
SWL2004	44	UTN-3	0.26	32.12	32.38
SWL2004	45	UTN-4	0.21	32.66	32.87

Table 8. Continued.

Cruise	Station Number	Station Name	0.5 mm Organic carbon biomass (g C m^{-2})	1.0 mm Organic carbon biomass (g C m^{-2})	Combined Organic carbon biomass (g C m^{-2})
SWL2004	46	UTN-5	0.15	60.96	61.10
SWL2004	47	UTN-6	0.07	10.35	10.42
SWL2004	48	UTN-7	0.03	37.57	37.60
HLY0403	6	HV-1	0.21	32.66	32.87
HLY0403	15	BC-2	0.35	57.47	57.82
HLY0403	21	BC-3	0.19	79.29	79.48
HLY0403	22	BC-4	0.27	13.19	13.46
HLY0403	23	BC-5	0.26	1.94	2.20
HLY0403	26	EB-2	0.17	6.40	6.57
HLY0403	29	EB-3	1.96	30.51	32.47
HLY0403	32	EB-6	0.03	0.37	0.40
HLY0403	33	EB-5	0.18	4.07	4.25
HLY0403	34	EB-4	0.63	5.24	5.87
HLY0403	35	BC-6	0.03	0.82	0.86
HLY0403	38	EHS-1	0.15	11.60	11.75
HLY0403	42	EHS-4	0.30	7.54	7.84
HLY0403	44	EHS-5	0.43	4.68	5.11
HLY0403	47	EHS-6	0.07	2.68	2.75
HLY0403	48	EHS-7	0.02	0.82	0.84
HLY0403	49	EHS-9	0.09	0.07	0.16
HLY0403	54	WHS-6	0.13	0.07	0.20
HLY0403	55	WHS-5	0.07	0.25	0.32
HLY0403	56	WHS-4	0.04	0.97	1.01
HLY0403	58	WHS-3	0.16	9.12	9.28
HLY0403	59	WHS-2	0.33	9.12	9.45
HLY0403	60	WHS-1	0.05	4.95	5.00

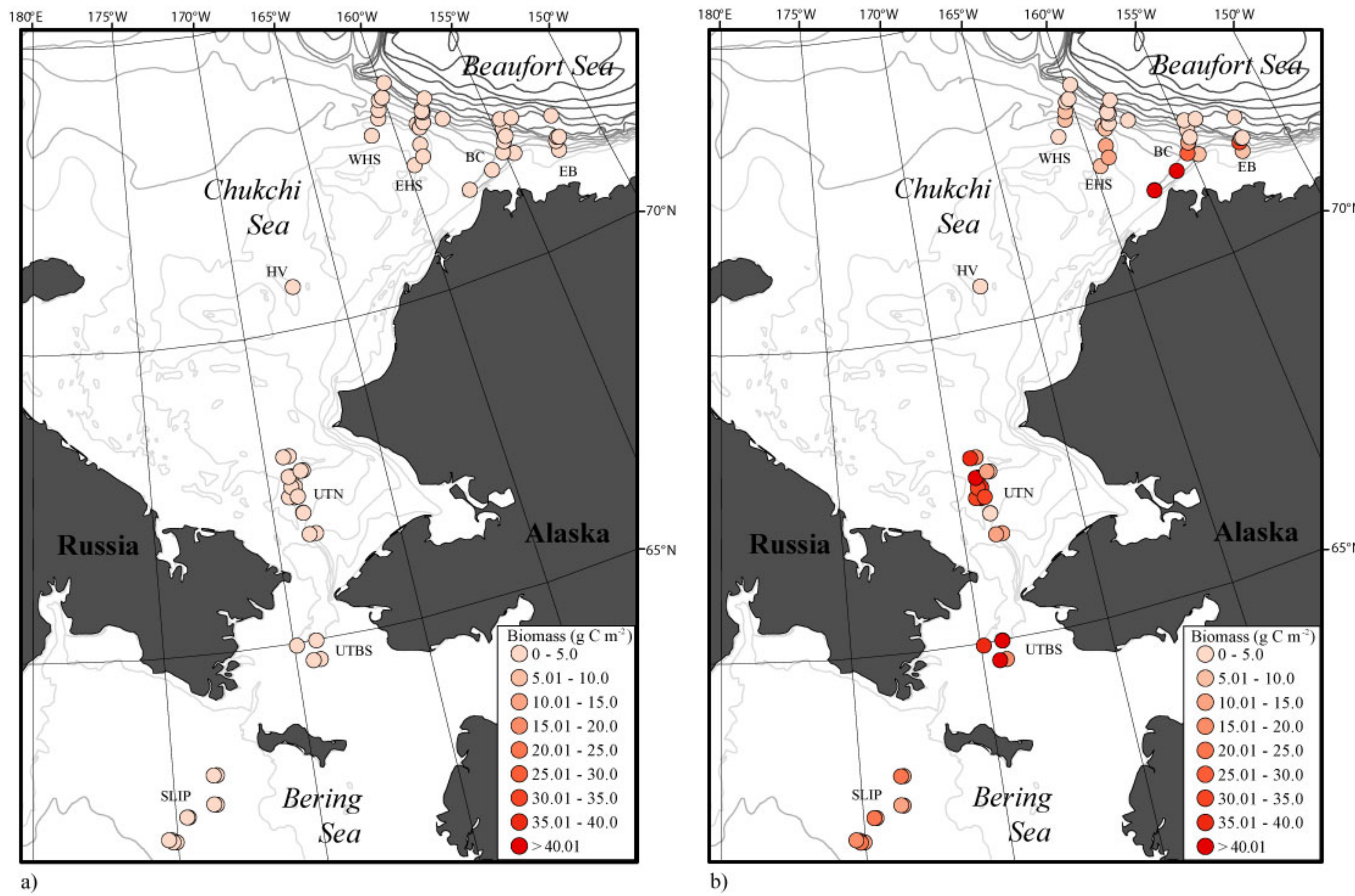

Figure 13. Benthic macrofaunal biomass (g C m^{-2}) retained on a) the 0.5 mm alone and b) the 1.0 mm sieve screen in the study region. Carbon biomass was calculated using wet weight biomass of sampled macrofauna following the methods of Grebmeier (1987) and previously recorded carbon conversion values of Stoker (1978).

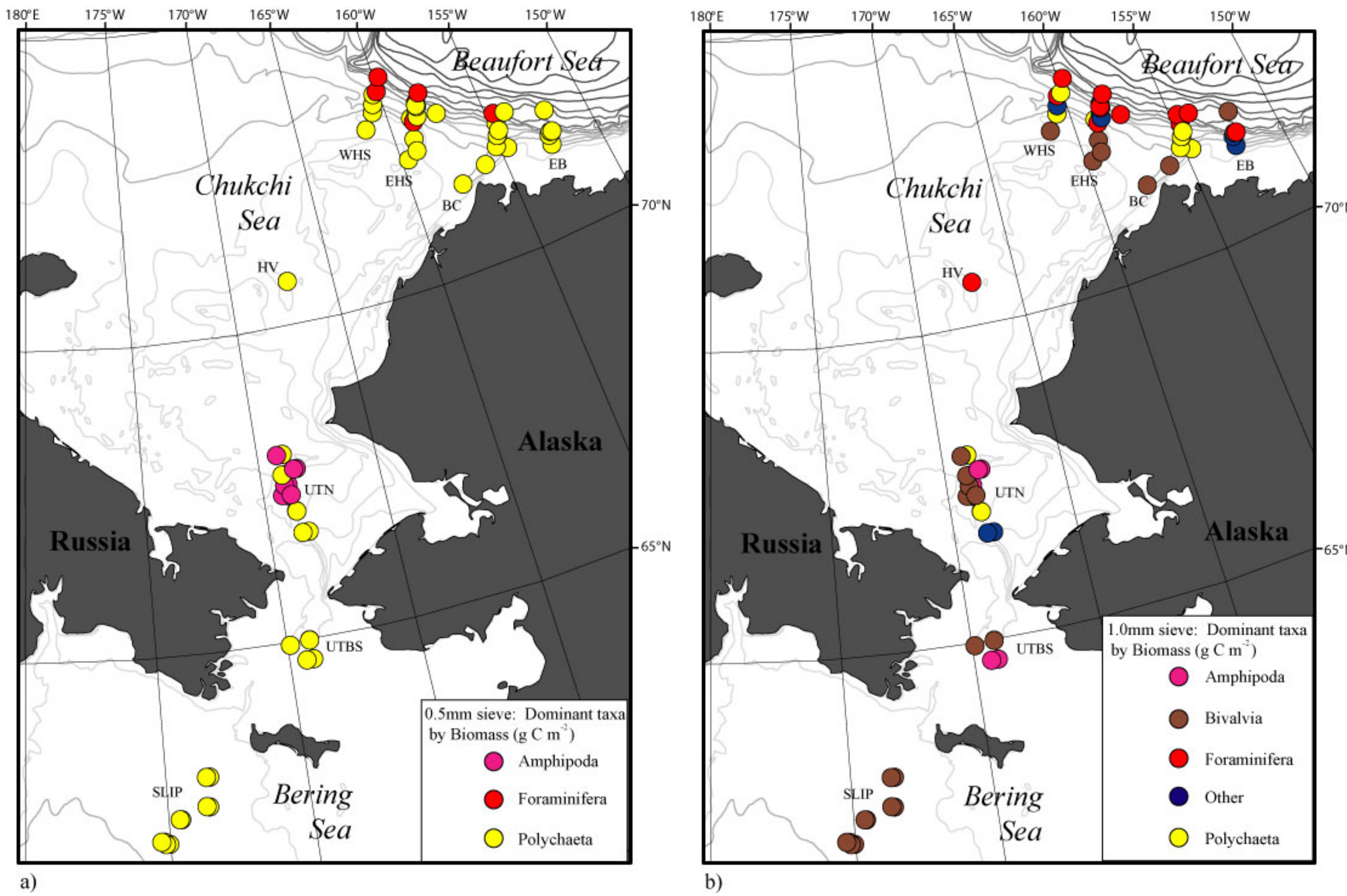

Figure 14. Dominant taxa with respect to abundance retained on a) the 0.5 mm sieve and b) the 1.0 mm sieve for 2004 cruises.

Table 9. Spearman's rho correlation statistics between abundance and biomass parameters and sediment modal grain size for the *Sir Wilfrid Laurier* (SWL) cruise in July 2003.

Cruise	Sieve size	Parameter	n	Spearman's rho	p
SWL2003	0.5 mm	Abundance	15	-0.601	0.018
		Biomass	15	-0.527	0.044
SWL2003	1.0 mm	Abundance	15	-0.519	0.047
		Biomass	15	-0.527	0.044

D. Discussion

The retention efficiency of a sieve will vary depending on the habitat and benthic community being sampled. The inclusion of the 0.5 mm sieve fraction added only a few taxa not already present on the 1.0 mm sieve in the shelf and slope regions. Taxa retained on the 0.5 mm sieve were essentially a subset of macrofauna already collected on the 1.0 mm sieve, but of smaller size. The increases in station biomass when using the 0.5 mm sieve were largely due to increased numbers of macrofaunal juveniles and meiofauna (e.g. foraminifera and nematodes). As noted by Gage et al. (2002), many of the small macrobenthic taxa passing through the 1.0 mm sieve are juveniles, which are only transient members of the smaller 0.5 mm size class and as adults would be collected on the coarser 1.0 mm sieve. While I did observe a significant difference in diversity between the two mesh sizes used on the shelf region in July 2003 and 2004, this was likely due to an increase in the presence of small macrofaunal juveniles which passed through the 1.0 mm sieve.

The 1.0 mm sieve retained a substantial portion of the total benthic macrofaunal biomass sampled on the shelf, slope, and basin. In the basin region, where foraminifera were the dominant taxa, the 0.5 mm sieve retained the majority of abundance and biomass. These stations were far enough from the slope and Barrow Canyon to be relatively uninfluenced by processes such as sediment slumping and turbidity currents that can affect even deeper sea sediments (e.g. Hesse et al. 1999). However, there were only five basin stations sampled throughout the process cruises, two of which were along the WHS and EHS. Even with this limited number of basin samples it is evident that stations at the mouth of Barrow Canyon have similar macroinfaunal community structure

to stations located along the slope, indicating that these deep stations may receive an influx of organic matter from shallower shelf and slope stations. The stations located on the WHS and EHS transects were dominated by foraminifera and the 0.5 mm sieve retained the majority of the abundance and biomass compared to combined sieve retention. This finding indicated that as depth increases there is a shift from macrofaunal to meiofaunal assemblages. Both size fractions are correlated with the same sediment grain size parameters, again suggesting that the taxa retained on the 0.5 mm sieve are a subset of taxa retained on the 1.0 mm. Since the 1.0 mm retained similar taxa and followed similar patterns to taxa on the 0.5 mm sieve on the shelf and slope of the study region, I conclude that the 1.0 mm sieve provides a reasonable estimation of these benthic macrofaunal populations. In the basin region where there is a shift, however to dominance of meiofauna (e.g. foraminifera), the 0.5 mm sieve is clearly preferable for estimation of the benthic community abundance and biomass.

IV. Conclusion and summary

This study examined the inventories of sediment chl *a* in surface sediments and cores to determine the distribution of chlorophyll within sediment profiles. This potential "food bank" could be important for benthic macroinfauna during times of reduced water column primary production. I also examined the effect of 0.5 mm and 1.0 mm sieve mesh sizes on sampling of macroinfauna in the study region. Conclusions from my research are outlined below:

> **Objective 1.** Is there a "food bank" of sediment chl *a* buried in the sediment that can act as a food buffer for deposit-feeding benthic macrofauna during times of diminished water column primary production and how long has it persisted?

Summary and conclusions: Surface sediment chl *a* decreased with water depth. At most stations sampled, sediment chl *a* decreased with sediment core depth. Stations with subsurface peaks of chl *a* were found during both sampling seasons in the northern Chukchi and western Beaufort Seas. Comparison of sediment profiles of chl-*a* and ^{137}Cs suggest that chl *a* buried in sediments could remain available and apparently active for decadal time scales. It appears that the viable chl *a* found within sediment cores has been present possibly for decades and may not be readily utilized by deposit feeders as a food source buffer during times of diminished water column primary production.

> **Objective 2.** Is there a significant difference in benthic faunal abundance and biomass that is measured using two different sieve mesh sizes (0.5 mm and 1.0 mm) and what is the impact on our understanding of macrofaunal community structure?

Summary and conclusions: At most stations sampled, abundance of animals retained on the combined 0.5 mm and 1.0 mm sieves were higher compared to animals retained on the 1.0 mm sieve alone. However, the animals collected on the 0.5 mm sieve added few additional taxa to those already retained on the 1.0 mm sieve, primarily foraminifera and juvenile macrofauna. In the shelf and slope regions the 1.0 mm sieve retained 48% of total individuals and the 0.5 mm sieve retained the remaining 52% of total individuals recovered on both screens. This result changed at basin stations where the 1.0 mm sieve retained only 27% of total individuals retained on both screens. Most of the taxa passed through the 1.0 mm sieve and the majority of total individuals (73%) were retained on the 0.5 mm sieve. A similar pattern was also observed in the retention of biomass on both sieves. At shelf and slope the 1.0 mm sieve retained ~ 97% of the total biomass and the 0.5 mm sieve retained only ~3% of total biomass. At basin stations on the WHS and EHS transect ~30% of biomass was retained on the 1.0 mm sieve and ~70% of the biomass was retained on the 0.5 mm sieve. This result indicates a shift from larger benthic macrofaunal invertebrates on the shelf and slope to smaller meiofaunal foraminifera in the basin. Sampling with a 1.0 mm sieve in the shelf and slope regions appears to be adequate for abundance and biomass estimates of the benthic macrofaunal community. In the basin region the 0.5 mm sieve in preference to the 1.0 mm sieve should be used to provide estimates of abundance and biomass.

List of References

Ambrose, W.G. and Renaud, P.E. (1997) Does a pulsed food supply to the benthos affect Polychaetes recruitment patterns in the northeast water polynya? Journal of Marine Systems, 10, 483-495.

Avery, S.V. (1996) Fate of Caesium in the environment: Distribution between the abiotic and biotic components of aquatic and terrestrial ecosystems. Journal of Environmental Radioactivity, 30, 139-171.

Bachelet, G. (1990) The choice of a sieving mesh size in the quantitative assessment of marine macrobenthos – a necessary compromise between aims and constraints. Marine Environmental Research, 30, 21-35.

Carey, A.G. (1991) Ecology of North-American Arctic continental-shelf benthos – a review. Continental Shelf Research, 11, 865-883.

Carmack, E.C. and Macdonald, R.W. (2002) Oceanography of the Canadian shelf of the Beaufort Sea: A setting for marine life. Arctic, 55, 29-45.

Clough, L.M., Ambrose, W.G., Cochran, J.K., Barnes, C., Renaud, P.E., and Aller, R.C. (1997) Infaunal density, biomass and bioturbation in the sediments of the Arctic Ocean. Deep-Sea Research II, 44, 1683-1704.

Coachman, L.K., Aagaard, K., and Tripp, R.B. (1975) Bering Strait: the regional physical oceanography. Seattle, University of Washington Press.

Cooney, R.T. and Coyle, K.O. (1982) Trophic implications of cross-shelf copepod Distributions in the southeastern Bering Sea. Marine Biology, 70, 187-196.

Cooper, L.W., Grebmeier, J.M., Larsen, I.L., Dolvin, S.S., and Reed, A.J. (1998) Inventories and distribution of radiocaesium in arctic marine sediments: influence of biological and physical processes. Chemistry and Ecology, 15, 27-46.

Cooper, L.W., Whitledge, T.E., Grebmeier, J.M., and Weingartner, T. (1999) Modification of NO, PO, and NO/PO during flow across the Bering and Chukchi shelves: Implications for use as Arctic water mass tracers. Journal of Geophysical Research, 104, 7827-7836.

Cooper, L.W., Codispoti, L.A., Kelly, V., Sheffield, G.G., and Grebmeier, J.M. (2006) The potential for using Little Diomede Island as a platform for observing environmental conditions in Bering Strait. Arctic, 59, in press.

Dayton, P.K., Watson, D., Palmisano, A., Barry, J.P., Oliver, J.S., and Rivera, D. (1986) Distribution patterns of benthic microalgal standing stock at McMurdo Sound, Antarctica. Polar Biology, 6, 207-213.

Dunton, K.H., Goodall, J.L., Schonberg, S.V., Grebmeier, J.M., and Maidment, D.R. (2005) Multi-decadal synthesis of benthic-pelagic coupling in the western arctic: Role of cross-shelf advective processes. Deep-Sea Research II, 52, 3462-3477.

Feder, H.M., Naidu, A.S., Jewett, S.C., Hameedi, J.M., Johnson, W.R., and Whitledge, T.E. (1994) The northeastern Chukchi Sea: benthos-environmental interactions. Marine Ecology Progress Series, 111, 171-190.

Feder, H.M., Jewett, S.C., and Blanchard, A. (2005) Southeastern Chukchi Sea (Alaska) epibenthos. Polar Biology, 28, 402-421.

Gage, J.D., Hughes, D.J., and Gonzalez Vecino, J.L. (2002) Sieve size influence in estimating biomass, abundance and diversity in samples of deep-sea macrobenthos. Marine Ecology Progress Series, 225, 97-107.

Graf, G. (1989) Benthic-pelagic coupling in a deep-sea benthic community. Nature, 341, 437-439.

Graf, G. (1992) Benthic-pelagic coupling – a benthic view. Oceanography and Marine Biology, 30, 149-190.

Gray, J.S. (1981) The ecology of marine sediments. Cambridge University Press, Cambridge.

Grebmeier, J.M. (1987) The ecology of benthic carbon cycling in the Northern Bering and Chukchi Seas. PhD dissertation. University of Alaska, Fairbanks, Fairbanks, Alaska, USA.

Grebmeier, J.M. and McRoy, C.P. (1989) Pelagic-benthic coupling on the shelf of the northern Bering and Chukchi Seas. III. Benthic food supply and carbon cycling. Marine Ecology Progress Series, 53, 79-91.

Grebmeier, J.M. and Cooper, L.W. (1995) Influence of the St. Lawrence Island polynya upon the Bering Sea benthos. Journal of Geophysical Research, 100, 4439-4460.

Grebmeier, J.M. and Dunton, K.H. (2000) Benthic processes in the northern Bering/Chukchi Seas: status and global change. In Impact of Changes in Sea Ice and other Environmental parameters in the Arctic, Marine Mammal Commission Workshop (ed. H.P. Huntington), 80-93, Girdwood, Alaska.

Grebmeier, J.M., and Cooper, L.W. (2004). Biological Implications of Arctic Change. In: *Arctic Climate Impact Assessment*, *Extended Abstracts*. Arctic Monitoring and Assessment Programme, Reykjavik, 2004. Also available at www.amap.no

Grebmeier, J.M. and Harvey, H.R. (2005) The Western Arctic Shelf-Basin Interaction (SBI) project: An overview. Deep-Sea Research II, 52, 3109-3115.

Grebmeier, J..M and Barry, J. P. (2006) Benthic Processes in Polynyas, In: *Polynyas:*

Windows into Polar Oceans (eds W.O. Smith and D. Barber), Elsevier Oceanography Series, Amsterdam.

Grebmeier, J.M., McRoy, C.P., and Feder, H.M. (1988) Pelagic-benthic coupling on the shelf of the northern Bering and Chukchi Seas. I. Food supply source and benthic biomass. Marine Ecology Progress Series, 48, 57-67.

Grebmeier, J.M., Feder, H.M., and McRoy, C.P. (1989) Pelagic-benthic coupling on the shelf of the northern Bering and Chukchi Seas. II. Benthic community structure. Marine Ecology Progress Series, 51, 253-268.

Grebmeier, J.M., Cooper, L.W., Feder, H.M., and Sirenko, B.I. (2006a) Pelagic-benthic Coupling and ecosystem dynamics of the Pacific-influenced western Amerasian Arctic. Progress in Oceanography, (accepted, in revision).

Grebmeier, J.M., Overland, J.E., Moore, S.E., Farley, E.V., Carmack, E.C., Cooper, L.W., Frey, K.E., Helle, J.H., McLaughlin, F.A., and McNutt, S.L. (2006b) A major ecosystem shift in the northern Bering Sea. Science, 311, 1461-1464.

Hansen, J.L.S. and Josefson, A.B. (2001) Pools of chlorophyll and live planktonic diatoms in aphotic marine sediments. Marine Biology, 139, 289-299.

Hansen, J.L.S. and Josefson, A.B. (2004) Ingestion by deposit-feeding macro-zoobenthos in the aphotic zone does not affect the pool of live pelagic diatoms in the sediment. Journal of Experimental Marine Biology and Ecology, 308, 59-84.

Hesse, R., Klauck, I., Khodabakhsh, S., and Piper, D. (1999) Continental slope sedimentation adjacent to an ice margin. III. The upper Labrador Slope. Marine Geology, 155, 249-276.

Iken, K., Bluhm, B.A., and Gradinger, R. (2005) Food web structure in the high Arctic

Canadian Basin: evidence from ^{13}C and ^{15}N analysis. Polar Biology, 28, 238-249.

Itakura, S. Imai, I., and Itoh, K. (1997) "Seed bank" of coastal planktonic diatoms in bottom Sediments of Hiroshima Bay, Seto Inland Sea, Japan. Marine Biology, 128, 497-508.

Jackobsson, M., Cherkis, N.Z., Woodward, J., Macnab, R., and Coakley, B. (2000) New grid of Arctic bathymetry aids scientists and mapmakers. EOS, Transactions, AGU, 81, 9.

James, R.J., Lincoln Smith, M.P., and Fairweather, P.G. (1995) Sieve mesh-size and taxonomic resolution needed to describe natural spatial variation of marine macrofauna. Marine Ecology Progress Series, 118, 187-198.

Josefson, A.B. and Conley, D.J. (1997) Benthic response to a pelagic front. Marine Ecology Progress Series, 147, 49-62.

Josefson, A.B., Forbes, T.L., and Rosenberg, R. (2002) Fate of phytodetritus in marine sediments: functional importance of macrofaunal community. Marine Ecology Progress Series, 230, 71-85.

Kanneworff, E. and Nicolaisen, W. (1973) The 'Haps', a frame supported bottom corer. Ophelia, Supplement 10, 119-129.

Lewis, J., Harris, A.S.D., Jones, K.J., and Edmonds, R.L. (1999) Long-term survival of marine planktonic diatoms and dinoflagellates in stored sediment samples. Journal of Plankton Research, 21, 343-354.

Lopez, G.R. and Levinton, J.S. (1987) Ecology of deposit-feeding animals in marine sediments. The Quarterly Review of Biology, 62, 235-260.

Lovvorn, J.R., Cooper, L.W., Brooks, M.L., De Ruyck, C.C., Bump, J.K., and

Grebmeier, J.M. (2005) Organic matter pathways to zooplankton and benthos under pack ice in late winter and open water in late summer in the north-central Bering Sea. Marine Ecology Progress Series, 291, 135-150.

Mincks, S.L., Smith, C.R., and DeMaster, D.J. (2005) Persistance of labile organic matter and microbial biomass in Antarctic shelf sediments: evidence of a sediment 'food bank'. Marine Ecology Progress Series, 300, 3-19.

Naidu, A.S., Scalan, R.S., Feder, H.M., Goering, J.J., Hameedi, M.J., Parker, P.L., Behrens, E.W., Caughey, M.E., and Jewett, S.C. (1993) Stable organic carbon isotopes in sediments of the north Bering –south Chukchi Seas, Alaskan – Soviet Arctic shelf. Continental Shelf Research, 13, 669-691.

Piepenburg, D. (2005) Recent research on Arctic benthos: common notions needed to be revised. Polar Biology, 28, 733-755.

Sandnes, J., Forbes, T., Hansen, R., Sandnes, B., and Rygg, B. (2000) Bioturbation and irrigation in natural sediments described by animal-community parameters. Marine Ecology Progress Series, 197, 169-179.

Schlacher, T.A. and Wooldridge, T.H. (1996) How sieve mesh size affects sample estimates of estuarine benthic macrofauna. Journal of Experimental Marine Biology and Ecology, 201, 159-171.

Schlacher, T.A. and Wooldridge, T.H. (1996) How accurately can retention of benthic macrofauna by a particular mesh size be predicted from body size of organisms? Hydrobiologia, 323, 149-154.

Shannon, C.E. and Weaver, W. (1963) The Mathematical Theory of Communication. University of Illinois Press, Urbana, Illinois, USA.

Stoker, S.W. (1978) Benthic invertebrate macroinfauna of the eastern continental shelf of the Bering/Chukchi Seas. Ph.D. dissertation, University of Alaska, Fairbanks, Fairbanks, Alaska, USA.

Sun, M., Aller, R.C., and Lee, C. (1991) Early diagenesis of chlorophyll-*a* in Long Island Sound sediments: a measure of carbon flux and particle reworking. Journal of Marine Research, 49, 379-401.

Tanaka, M.O. and Leite, F.P.P. (1998) The effect of sieve mesh size on the abundance and composition of macrophyte-associated macrofaunal assemblages. Hydrobiologia, 389, 21-28.

Walsh, J.J., McRoy, C.P., Coachman, L.K. Goering, J.J., Nihoul, J.J. Whitledge, T.E., Blackburn, T.H., Parker, P.L., Wirick, C.D., Shuert, P.G., Grebmeier, J.M., Springer, A.M., Tripp, R.D., Hansell, D.A., Djenidi, S., Deleersnijder, E., Henriksen, K., Lund, B.A., Andersen, P., Mullerkarger, F.E., and Dean, K. (1989) Carbon and nitrogen cycling within the Bering and Chukchi Seas – source regions for organic matter effecting AOU demands of the Arctic Ocean. Progress in Oceanography, 22, 277-359.

Warwick, R.M. and Clarke, K.R. (1996) Relationships between body-size, species abundance and diversity in marine benthic assemblages: facts or artifacts? Journal of Experimental Marine Biology and Ecology, 202, 63-71.

Wassmann, P. (1998) Retention versus export food chains: processes controlling sinking loss from marine pelagic systems. Hydrobiologia, 363, 29-57.

Weingartner, T.J., Cavalieri, D.J., Aagaard, K., and Sasaki, Y. (1998) Circulation, dense

water formation, and outflow on the northeast Chukchi shelf. Journal of Geophysical Research – Oceans, 103, 7647-7661.

Weingartner, T., Aagaard, K., Woodgate, R., Danielson, S., Sasaki, Y, and Cavalieri, D. (2005) Circulation of the north central Chukchi Sea shelf. Deep-Sea Research II, 52, 3150-3174.

Welschmeyer, N.A. (1994) Fluorometric analysis of chlorophyll *a* in the presence of chlorophyll *b* and pheopigments. Limnology and Oceanography, 39, 1985-1992.

Woodgate, R., Aagaard, K., and Weingartner, T. (2005) A year in the physical oceanography of the Chukchi Sea: Moored measurements from autumn 1990-1991. Deep-Sea Research II, 52, 3116-3149.

Zenkevitch, L. (1963) Biology of the Seas of the USSR, Interscience Publishers, New York, New York.

Appendices

Appendix A. Stations occupied during the CGCS *Sir Wilfrid Laurier* cruises in 2003 and 2004 and the USCGC *Healy* cruises in 2004. Station number, station name, date occupied (MM/DD/YYYY), coordinates (decimal degrees), and depth (m) are shown.

Cruise	Station Number	Station Name	Date MM/DD/YYYY	Latitude (°N)	Longitude (°W)	Depth (m)
SWL2003	7	SLIP-1	7/14/2003	62.012	-175.055	84
SWL2003	8	SLIP-2	7/14/2003	62.050	-175.201	84
SWL2003	10	SLIP-3	7/15/2003	62.390	-174.571	72
SWL2003	11	SLIP-5	7/15/2003	62.554	-173.563	67
SWL2003	12	SLIP-4	7/15/2003	63.028	-173.456	73
SWL2003	15	UTBS-2	7/16/2003	64.682	-169.099	46
SWL2003	16	UTBS-4	7/16/2003	64.959	-169.882	50
SWL2003	17	UTBS-1	7/16/2003	64.993	-169.137	50
SWL2003	23	UTN-1	7/18/2003	66.708	-168.400	34
SWL2003	24	UTN-2	7/18/2003	67.052	-168.735	45
SWL2003	25	UTN-3	7/18/2003	67.331	-168.996	50
SWL2003	26	UTN-4	7/18/2003	67.502	-168.912	50
SWL2003	27	UTN-5	7/18/2003	67.670	-168.957	50
SWL2003	28	UTN-6	7/18/2003	67.737	-168.445	49
SWL2003	29	UTN-7	7/18/2003	67.998	-168.920	57
HLY0402	6	HV-1	5/18/2004	67.503	-168.906	52
HLY0402	7	HV-2	5/21/2004	70.708	-167.188	54
HLY0402	9	EHS-1	5/24/2004	72.005	-159.846	42
HLY0402	10	EHS-0.5	5/26/2004	72.080	-159.638	48
HLY0402	13	EHS-2	5/28/2004	72.368	-159.085	52
HLY0402	16	EHS-4	5/30/2004	72.695	-158.805	170
HLY0402	17	EHS-5	5/31/2004	72.730	-158.461	249
HLY0402	19	EHS-6	6/2/2004	72.907	-158.268	1496
HLY0402	21	EHS-X	6/6/2004	72.629	-157.407	398
HLY0402	22	SB-1	6/8/2004	71.465	-154.549	32
HLY0402	23	SB-4	6/11/2004	71.690	-154.628	60
HLY0402	24	SB-5	6/12/2004	71.774	-155.148	309
HLY0402	26	BC-5	6/13/2004	72.123	-154.677	1065
HLY0402	27	BC-6	6/15/2004	72.283	-154.612	2026
HLY0402	28	BC-4	6/16/2004	71.931	-154.869	645
HLY0402	32	BC-3.4	6/20/2004	71.565	-155.814	165
HLY0402	34	BC-2	6/20/2004	71.392	-157.534	127
SWL2004	25	SLIP-1	7/15/2004	62.013	-175.159	83
SWL2004	26	SLIP-2	7/15/2004	62.054	-175.317	84

Appendix A. Continued.

Cruise	Station Number	Station Name	Date MM/DD/YYYY	Latitude (°N)	Longitude (°W)	Depth (m)
SWL2004	29	SLIP-3	7/16/2004	62.393	-174.625	74
SWL2004	30	SLIP-5	7/16/2004	62.563	-173.651	69
SWL2004	31	SLIP-4	7/16/2004	63.028	-173.565	75
SWL2004	33	UTBS-5	7/17/2004	64.671	-170.001	49
SWL2004	34	UTBS-2	7/17/2004	64.683	-169.359	46
SWL2004	35	UTBS-4	7/17/2004	64.959	-170.140	50
SWL2004	36	UTBS-1	7/17/2004	64.992	-169.136	50
SWL2004	42	UTN-1	7/18/2004	66.708	-168.648	35
SWL2004	43	UTN-2	7/18/2004	67.062	-168.739	47
SWL2004	44	UTN-3	7/18/2004	67.345	-169.210	52
SWL2004	45	UTN-4	7/19/2004	67.503	-169.057	52
SWL2004	46	UTN-5	7/19/2004	67.670	-169.085	54
SWL2004	47	UTN-6	7/19/2004	67.736	-168.554	51
SWL2004	48	UTN-7	7/19/2004	67.998	-169.177	60
HLY0403	6	HV-1	7/20/2004	67.503	-169.057	52
HLY0403	7	ACW-1	7/21/2004	68.490	-167.376	60
HLY0403	8	ACW-2	7/21/2004	69.954	-164.406	40
HLY0403	14	BC-1	7/22/2004	71.066	-159.363	87
HLY0403	15	BC-2	7/23/2004	71.415	-157.442	127
HLY0403	21	BC-3	7/24/2004	71.579	-156.018	186
HLY0403	22	BC-4	7/25/2004	71.930	-154.887	599
HLY0403	23	BC-5	7/26/2004	72.000	-154.708	1015
HLY0403	25	EB-1	7/29/2004	71.296	-152.555	62
HLY0403	26	EB-2	7/30/2004	71.443	-152.508	92
HLY0403	29	EB-3	7/30/2004	71.592	-152.448	176
HLY0403	32	EB-6	8/3/2004	71.973	-152.111	2227
HLY0403	33	EB-5	8/5/2004	71.636	-152.212	853
HLY0403	34	EB-4	8/6/2004	71.642	-152.310	440
HLY0403	35	BC-6	8/7/2004	72.233	-154.037	2125
HLY0403	38	EHS-1	8/10/2004	72.171	-159.070	50
HLY0403	42	EHS-4	8/11/2004	72.628	-158.726	104
HLY0403	44	EHS-5	8/12/2004	72.687	-158.446	216
HLY0403	47	EHS-6	8/13/2004	72.838	-158.283	526
HLY0403	48	EHS-7	8/14/2004	72.864	-158.314	1099
HLY0403	49	EHS-9	8/15/2004	73.040	-157.935	2001
HLY0403	50	EHS-11	8/16/2004	73.388	-157.417	3096

Appendix A. Continued.

Cruise	Station Number	Station Name	Date MM/DD/YYYY	Latitude (°N)	Longitude (°W)	Depth (m)
HLY0403	51	EHS-12	8/16/2004	73.819	-156.832	3902
HLY0403	52	WHS-8	8/18/2004	73.916	-157.752	3850
HLY0403	54	WHS-6	8/19/2004	73.491	-159.743	2054
HLY0403	55	WHS-5	8/20/2004	73.279	-160.104	1162
HLY0403	56	WHS-4	8/22/2004	73.248	-160.317	568
HLY0403	58	WHS-3	8/22/2004	73.101	-160.505	217
HLY0403	59	WHS-2	8/23/2004	72.976	-160.669	82
HLY0403	60	WHS-1	8/24/2004	72.743	-161.295	52

Appendix B. Retention of macroinfauna on the 0.5 mm sieve for all cruises. Station number, station name, abundance, wet weight biomass, carbon biomass and S-W diversity are shown.

Cruise	Station Number	Station Name	Faunal Abundance (no. ind. m^{-2})	Wet weight biomass (g m^{-2})	Organic carbon biomass (g C m^{-2})	S-W diversity (H')
SWL2003	7	SLIP-1	9286	3.44	0.18	2.29
SWL2003	8	SLIP-2	11955	4.54	0.15	1.86
SWL2003	10	SLIP-3	5677	2.77	0.19	2.55
SWL2003	11	SLIP-5	2256	0.71	0.04	2.33
SWL2003	12	SLIP-4	4586	2.00	0.13	2.91
SWL2003	15	UTBS-2	5714	1.02	0.06	2.62
SWL2003	16	UTBS-4	15489	2.77	0.14	2.16
SWL2003	17	UTBS-1	6541	1.36	0.07	2.53
SWL2003	23	UTN-1	6692	2.44	0.15	2.21
SWL2003	24	UTN-2	6353	1.89	0.12	2.10
SWL2003	25	UTN-3	7481	2.63	0.16	2.14
SWL2003	26	UTN-4	8045	1.28	0.07	2.40
SWL2003	27	UTN-5	3985	2.02	0.14	1.57
SWL2003	28	UTN-6	2293	0.74	0.04	1.48
SWL2003	29	UTN-7	6038	2.23	0.15	1.96
HLY0402	6	HV-1	30301	6.01	0.47	1.69
HLY0402	7	HV-2	1654	0.78	0.05	2.56
HLY0402	10	EHS-0.5	5000	2.15	0.15	2.79
HLY0402	13	EHS-2	4286	1.59	0.09	2.39
HLY0402	16	EHS-4	2782	1.01	0.05	2.85
HLY0402	17	EHS-5	4474	2.42	0.16	2.75
HLY0402	19	EHS-6	32105	11.67	0.16	0.45
HLY0402	21	EHS-X	1579	0.84	0.04	2.51
HLY0402	23	SB-4	19511	3.80	0.20	2.44
HLY0402	24	SB-5	27794	11.16	0.62	2.08
HLY0402	26	BC-5	1729	1.26	0.09	2.49
HLY0402	27	BC-6	15436	3.78	0.05	0.65
HLY0402	28	BC-4	24135	7.93	0.32	2.39
HLY0402	34	BC-2	50377	17.95	1.02	1.49
SWL2004	25	SLIP-1	4662	3.14	0.19	2.54
SWL2004	26	SLIP-2	6429	2.77	0.11	1.69
SWL2004	29	SLIP-3	3233	2.94	0.17	2.52
SWL2004	30	SLIP-5	2068	0.62	0.04	2.52

Appendix B. Continued.

Cruise	Station Number	Station Name	Faunal Abundance (no. ind. m⁻²)	Wet weight biomass (g m⁻²)	Organic carbon biomass (g C m⁻²)	S-W diversity (H')
SWL2004	31	SLIP-4	3722	0.57	0.03	2.50
SWL2004	34	UTBS-2	2594	1.42	0.10	2.34
SWL2004	36	UTBS-1	2331	1.73	0.11	2.38
SWL2004	42	UTN-1	2481	1.30	0.09	2.40
SWL2004	43	UTN-2	6278	1.49	0.06	2.07
SWL2004	44	UTN-3	20977	5.01	0.26	2.30
SWL2004	45	UTN-4	10000	3.19	0.21	2.11
SWL2004	46	UTN-5	4211	2.15	0.15	2.51
SWL2004	47	UTN-6	5301	1.03	0.07	2.02
SWL2004	48	UTN-7	1917	0.53	0.03	1.88
HLY0403	6	HV-1	10000	3.19	0.21	2.11
HLY0403	15	BC-2	20188	6.94	0.35	1.42
HLY0403	21	BC-3	13308	3.87	0.19	2.35
HLY0403	22	BC-4	33308	7.81	0.27	1.34
HLY0403	23	BC-5	3647	3.89	0.26	2.08
HLY0403	26	EB-2	5301	3.46	0.17	2.42
HLY0403	29	EB-3	12218	28.74	1.96	2.32
HLY0403	32	EB-6	1278	0.44	0.03	1.74
HLY0403	33	EB-5	11165	3.83	0.18	1.97
HLY0403	34	EB-4	21278	11.97	0.63	1.21
HLY0403	35	BC-6	865	0.58	0.03	1.18
HLY0403	38	EHS-1	5564	2.63	0.15	2.71
HLY0403	42	EHS-4	27143	14.76	0.30	1.89
HLY0403	44	EHS-5	3195	6.25	0.43	2.39
HLY0403	47	EHS-6	2218	1.18	0.07	1.84
HLY0403	48	EHS-7	1917	0.66	0.02	1.46
HLY0403	49	EHS-9	28308	9.20	0.09	0.10
HLY0403	54	WHS-6	37293	11.86	0.13	0.04
HLY0403	55	WHS-5	14361	4.80	0.07	0.34
HLY0403	56	WHS-4	752	1.29	0.04	1.23
HLY0403	58	WHS-3	3534	2.46	0.16	2.63
HLY0403	59	WHS-2	6504	5.20	0.33	2.84
HLY0403	60	WHS-1	2256	1.03	0.05	2.78

Appendix C. Retention of macroinfauna on the 1.0 mm sieve for all cruises. Station number, station name, abundance, wet weight biomass, carbon biomass and S-W diversity are shown.

Cruise	Station Number	Station Name	Faunal Abundance (no. ind. m^{-2})	Wet weight biomass (g m^{-2})	Organic carbon biomass (g C m^{-2})	S-W diversity (H')
SWL2003	7	SLIP-1	2556	400.85	14.10	2.29
SWL2003	8	SLIP-2	2744	606.79	25.67	2.39
SWL2003	10	SLIP-3	2068	452.03	10.88	2.22
SWL2003	12	SLIP-4	1842	370.89	15.04	2.01
SWL2003	11	SLIP-5	2895	445.50	16.65	1.87
SWL2003	17	UTBS-1	9436	668.66	34.44	1.73
SWL2003	15	UTBS-2	9211	364.99	19.60	2.21
SWL2003	16	UTBS-4	11429	822.60	38.67	1.87
SWL2003	23	UTN-1	1541	773.32	10.81	2.19
SWL2003	24	UTN-2	1579	110.55	6.02	2.31
SWL2003	25	UTN-3	9512	1114.15	42.61	2.09
SWL2003	26	UTN-4	8384	142.80	9.28	2.28
SWL2003	27	UTN-5	8083	292.75	15.56	1.37
SWL2003	28	UTN-6	5978	131.04	7.48	1.16
SWL2003	29	UTN-7	6579	258.71	13.33	1.89
HLY0402	6	HV-1	19586	748.41	37.26	1.91
HLY0402	7	HV-2	2820	123.07	4.18	2.01
HLY0402	10	EHS-0.5	2274	184.86	6.38	2.79
HLY0402	13	EHS-2	4323	316.01	10.27	2.34
HLY0402	16	EHS-4	2030	38.28	1.15	2.15
HLY0402	17	EHS-5	4173	127.72	4.70	2.44
HLY0402	19	EHS-6	6278	339.02	15.12	1.16
HLY0402	21	EHS-X	3271	63.59	1.22	2.05
HLY0402	23	SB-4	10827	128.85	5.80	2.71
HLY0402	24	SB-5	49424	796.76	27.06	1.53
HLY0402	26	BC-5	4850	114.84	1.43	1.94
HLY0402	27	BC-6	2083	66.52	0.80	1.71
HLY0402	28	BC-4	20677	287.84	9.61	1.95
HLY0402	34	BC-2	165827	4970.31	164.59	1.43
SWL2004	25	SLIP-1	2105	679.24	20.55	2.56
SWL2004	26	SLIP-2	1992	653.34	16.98	2.00
SWL2004	29	SLIP-3	1541	533.95	23.08	2.11

Appendix C. Continued.

Cruise	Station Number	Station Name	Faunal Abundance (no. ind. m^{-2})	Wet weight biomass (g m^{-2})	Organic carbon biomass (g C m^{-2})	S-W diversity (H')
SWL2004	31	SLIP-4	3158	438.57	13.53	2.15
SWL2004	30	SLIP-5	2218	559.80	21.61	2.53
SWL2004	36	UTBS-1	5639	1032.40	57.16	1.91
SWL2004	34	UTBS-2	4887	1561.04	46.29	1.77
SWL2004	42	UTN-1	827	1448.61	12.70	1.85
SWL2004	43	UTN-2	1805	50.54	2.30	2.03
SWL2004	44	UTN-3	21805	663.29	32.12	2.47
SWL2004	45	UTN-4	12744	714.52	32.66	2.15
SWL2004	46	UTN-5	13308	1615.99	60.96	2.33
SWL2004	47	UTN-6	11241	202.47	10.35	1.75
SWL2004	48	UTN-7	1955	988.32	37.57	1.56
HLY0403	6	HV-1	12744	714.52	32.66	2.15
HLY0403	15	BC-2	50789	1870.50	57.47	1.32
HLY0403	21	BC-3	4411	2269.81	79.29	2.41
HLY0403	22	BC-4	9474	317.37	13.19	1.91
HLY0403	23	BC-5	3947	88.56	1.94	1.75
HLY0403	26	EB-2	7481	341.17	6.40	1.76
HLY0403	29	EB-3	7632	735.92	30.51	2.05
HLY0403	32	EB-6	1391	23.08	0.37	1.00
HLY0403	33	EB-5	13985	185.25	4.07	1.43
HLY0403	34	EB-4	4211	151.48	5.24	1.39
HLY0403	35	BC-6	2782	60.50	0.82	0.55
HLY0403	38	EHS-1	2368	259.20	11.60	2.38
HLY0403	42	EHS-4	29098	417.70	7.54	1.68
HLY0403	44	EHS-5	4023	119.62	4.68	1.97
HLY0403	47	EHS-6	9699	181.81	2.68	1.33
HLY0403	48	EHS-7	6053	61.12	0.82	0.82
HLY0403	49	EHS-9	6504	6.65	0.07	0.23
HLY0403	54	WHS-6	8647	6.84	0.07	0.03
HLY0403	55	WHS-5	2444	12.09	0.25	0.93
HLY0403	56	WHS-4	3271	81.74	0.97	1.03
HLY0403	58	WHS-3	2030	317.41	9.12	2.51
HLY0403	59	WHS-2	11090	341.93	9.12	2.48
HLY0403	60	WHS-1	2707	138.53	4.95	2.37

Appendix D. Listed are surface sediment measurements for HLY0402, SWL2004, and HLY0403.

Cruise	Station Number	Station Name	Surface sediment chl *a* (mg m^{-2})	TOC (%)	C/N (wt./wt.)	Modal phi grain size (ø)
HLY0402	6	HV-1	16.85	n/a	n/a	n/a
HLY0402	7	HV-2	8.54	0.70	6.05	5
HLY0402	9	EHS-1	2.94	0.13	6.39	3
HLY0402	10	EHS-0.5	7.53	0.99	5.71	5
HLY0402	13	EHS-2	7.69	1.09	5.74	5
HLY0402	16	EHS-4	7.31	1.61	6.75	5
HLY0402	17	EHS-5	6.27	1.46	5.54	5
HLY0402	19	EHS-6	3.95	1.32	6.70	5
HLY0402	21	EHS-X	2.95	1.28	5.44	5
HLY0402	22	SB-1	2.20	1.02	8.90	5
HLY0402	23	SB-4	12.05	0.79	7.66	5
HLY0402	24	SB-5	9.77	1.73	8.41	5
HLY0402	26	BC-5	4.82	1.39	7.50	0
HLY0402	27	BC-6	4.63	1.21	5.97	5
HLY0402	28	BC-4	6.29	1.19	7.15	5
HLY0402	32	BC-3.4	11.49	1.23	9.90	0
HLY0402	34	BC-2	5.53	1.15	9.93	5
SWL2004	25	SLIP-1	8.57	1.05	4.85	5
SWL2004	26	SLIP-2	10.65	0.98	5.21	5
SWL2004	29	SLIP-3	11.27	0.90	5.19	5
SWL2004	30	SLIP-5	14.09	0.80	4.86	5
SWL2004	31	SLIP-4	10.03	1.33	5.20	5
SWL2004	33	UTBS-5	11.75	0.47	5.49	4
SWL2004	34	UTBS-2	10.52	0.26	5.48	3
SWL2004	35	UTBS-4	10.41	0.27	5.39	4
SWL2004	36	UTBS-1	12.76	0.21	5.50	3
SWL2004	42	UTN-1	7.47	0.31	5.35	5
SWL2004	43	UTN-2	9.48	0.61	5.48	5
SWL2004	44	UTN-3	12.44	0.66	5.03	5
SWL2004	45	UTN-4	16.72	1.13	5.12	5
SWL2004	46	UTN-5	16.27	1.05	5.01	5
SWL2004	47	UTN-6	15.78	1.30	5.00	5
SWL2004	48	UTN-7	19.84	1.72	5.04	5

Appendix D. Continued.

Cruise	Station Number	Station Name	Surface sediment chl *a* (mg m^{-2})	TOC (%)	C/N (wt./wt.)	Modal phi grain size (ø)
HLY0403	6	HV-1	16.72	1.13	5.12	5
HLY0403	7	ACW-1	3.43	0.29	5.70	3
HLY0403	8	ACW-2	3.61	0.24	5.67	3
HLY0403	15	BC-2	6.07	1.00	5.82	5
HLY0403	21	BC-3	4.11	1.60	8.09	5
HLY0403	22	BC-4	8.77	1.01	6.50	5
HLY0403	23	BC-5	12.44	1.25	6.17	5
HLY0403	25	EB-1	2.68	0.83	6.80	5
HLY0403	26	EB-2	10.32	1.00	6.34	5
HLY0403	29	EB-3	11.43	1.43	6.02	5
HLY0403	32	EB-6	5.77	1.29	5.82	5
HLY0403	33	EB-5	12.18	1.40	6.43	5
HLY0403	34	EB-4	7.89	1.30	6.76	5
HLY0403	35	BC-6	7.66	1.34	6.01	5
HLY0403	38	EHS-1	9.94	1.04	5.24	5
HLY0403	42	EHS-4	7.14	0.68	5.31	5
HLY0403	44	EHS-5	6.20	1.30	5.41	5
HLY0403	47	EHS-6	5.36	1.23	5.72	5
HLY0403	48	EHS-7	4.11	1.15	5.37	5
HLY0403	49	EHS-9	2.69	1.18	5.70	5
HLY0403	50	EHS-11	2.04	0.98	5.39	5
HLY0403	51	EHS-12	0.19	0.77	5.26	5
HLY0403	52	WHS-8	0.42	0.72	5.33	5
HLY0403	54	WHS-6	2.56	1.00	5.49	5
HLY0403	55	WHS-5	4.70	1.22	5.60	5
HLY0403	56	WHS-4	1.71	0.76	5.86	5
HLY0403	58	WHS-3	11.36	1.46	5.75	5
HLY0403	59	WHS-2	16.07	1.03	5.91	5
HLY0403	60	WHS-1	24.74	1.64	5.78	5

Appendix E. Tabulated sediment downcore measurements. Abbreviations for sampling device refers to van Veen (vv), HAPS corer (HC), and tripod multicorer (MC).

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
HLY0402	6	HV1	vv	Surface	17.14	17.92	n/a	n/a
			vv	Surface	18.70			
			HC	0-1	19.55	16.85	n/a	n/a
			HC	0-1	14.16			
			HC	1-2	12.79	12.79	n/a	n/a
			HC	1-2	12.79			
			HC	2-3	15.39	15.42	n/a	n/a
			HC	2-3	15.45			
			HC	3-4	19.55	18.51	n/a	n/a
			HC	3-4	17.47			
			HC	4-6	15.13	13.80	n/a	n/a
			HC	4-6	12.47			
			HC	6-8	14.48	15.68	n/a	n/a
			HC	6-8	16.88			
			HC	8-10	19.74	19.03	n/a	n/a
			HC	8-10	18.31			
HLY0402	7	HV2	vv	Surface	12.21	11.98	n/a	n/a
			vv	Surface	11.75			
			HC	0-1	8.77	8.54	n/a	n/a
			HC	0-1	8.31			
			HC	1-2	7.79	8.38	n/a	n/a
			HC	1-2	8.96			
			HC	2-3	6.82	9.87	n/a	n/a
			HC	2-3	12.92			
			HC	3-4	3.56	4.25	n/a	n/a
			HC	3-4	4.94			
			HC	4-6	4.69	5.00	n/a	n/a
			HC	4-6	5.30			
			HC	6-8	2.69	2.67	n/a	n/a
			HC	6-8	2.64			
			HC	8-10	4.87	3.87	n/a	n/a
			HC	8-10	2.86			
HLY0402	9	EHS1	vv	Surface	1.65	1.58	n/a	n/a
			vv	Surface	1.52			

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	0-1	2.56	2.94	n/a	n/a
			HC	0-1	3.31			
			HC (24 hr)	0-1	1.73	1.85	n/a	n/a
			HC (24 hr)	0-1	1.96			
			HC (36 hr)	0-1	1.55	2.56	n/a	n/a
			HC (36 hr)	0-1	3.56			
			HC (48 hr)	0-1	4.31	3.94	n/a	n/a
			HC (48 hr)	0-1	3.58			
HLY0402	10	EHS0.5	vv	Surface	5.89	5.32	n/a	n/a
			vv	Surface	4.75			
			HC	0-1	8.05	7.53	n/a	n/a
			HC	0-1	7.01			
			HC (24 hr)	0-1	6.95	7.69	n/a	n/a
			HC (24 hr)	0-1	8.44			
			HC (36 hr)	0-1	8.90	7.21	n/a	n/a
			HC (36 hr)	0-1	5.53			
			HC (48 hr)	0-1	9.16	8.57	n/a	n/a
			HC (48 hr)	0-1	7.99			
			HC	1-2	3.94	5.96	n/a	n/a
			HC	1-2	7.99			
			HC	2-3	5.69	5.46	n/a	n/a
			HC	2-3	5.23			
			HC	3-4	3.71	3.43	n/a	n/a
			HC	3-4	3.14			
			HC	4-6	3.77	4.02	n/a	n/a
			HC	4-6	4.28			
			HC	6-8	2.31	3.82	n/a	n/a
			HC	6-8	5.32			
			HC	8-10	2.90	2.88	n/a	n/a
			HC	8-10	2.87			
			HC	10-12	1.36	3.47	n/a	n/a
			HC	10-12	5.58			
HLY0402	13	EHS2	vv	Surface	5.44	5.83	n/a	n/a
			vv	Surface	6.23			
			HC	0-1	7.60	7.69	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Statio n Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	0-1	7.79			
			HC	1-2	3.97	5.98	n/a	n/a
			HC	1-2	7.99			
			HC	2-3	8.12	6.67	n/a	n/a
			HC	2-3	5.22			
			HC	3-4	7.34	7.21	n/a	n/a
			HC	3-4	7.08			
			HC	4-6	6.18	5.20	n/a	n/a
			HC	4-6	4.23			
			HC	6-8	3.47	4.45	n/a	n/a
			HC	6-8	5.42			
			HC	8-10	1.32	1.29	n/a	n/a
			HC	8-10	1.25			
			HC	10-12	2.10	1.85	n/a	n/a
			HC	10-12	1.60			
			HC	12-14	1.14	1.24	n/a	n/a
			HC	12-14	1.34			
HLY0402	16	EHS4	vv	Surface	5.27	6.59	n/a	n/a
			vv	Surface	7.92			
			HC	0-1	7.34	7.31	n/a	n/a
			HC	0-1	7.27			
			HC (24 hr)	0-1	9.22	7.58	n/a	n/a
			HC (24 hr)	0-1	5.95			
			HC (36 hr)	0-1	7.08	7.50	n/a	n/a
			HC (36 hr)	0-1	7.92			
			HC (48 hr)	0-1	7.86	7.40	n/a	n/a
			HC (48 hr)	0-1	6.95			
			HC	1-2	11.49	9.19	n/a	n/a
			HC	1-2	6.88			
			HC	2-3	8.25	9.29	n/a	n/a
			HC	2-3	10.32			
			HC	3-4	9.22	9.22	n/a	n/a
			HC	3-4	9.22			
			HC	4-6	3.92	5.72	n/a	n/a
			HC	4-6	7.53			
			HC	6-8	6.82	5.70	n/a	n/a
			HC	6-8	4.59			

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	8-10	6.62	5.49	n/a	n/a
			HC	8-10	4.36			
			HC	10-12	5.22	3.96	n/a	n/a
			HC	10-12	2.71			
			HC	12-14	3.88	3.22	n/a	n/a
			HC	12-14	2.55			
			HC	14-16	4.23	3.32	n/a	n/a
			HC	14-16	2.41			
			HC	16-18	4.12	3.74	n/a	n/a
			HC	16-18	3.36			
			HC	18-20	4.21	5.13	n/a	n/a
			HC	18-20	6.06			
			HC	20-24	4.23	4.06	n/a	n/a
			HC	20-24	3.89			
HLY0402	17	EHS5	vv	Surface	4.75	4.94	n/a	n/a
			vv	Surface	5.13			
			HC	0-1	6.06	6.27	n/a	n/a
			HC	0-1	6.48			
			HC	1-2	6.69	7.21	n/a	n/a
			HC	1-2	7.73			
			HC	2-3	8.64	7.24	n/a	n/a
			HC	2-3	5.85			
			HC	3-4	7.40	7.21	n/a	n/a
			HC	3-4	7.01			
			HC	4-6	5.05	4.13	n/a	n/a
			HC	4-6	3.21			
			HC	6-8	1.81	3.38	n/a	n/a
			HC	6-8	4.94			
			HC	8-10	3.15	3.33	n/a	n/a
			HC	8-10	3.51			

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	10-12	3.37	3.27	n/a	n/a
			HC	10-12	3.16			
			HC	12-14	1.39	2.03	n/a	n/a
			HC	12-14	2.68			
			HC	14-16	1.84	2.55	n/a	n/a
			HC	14-16	3.25			
			HC	16-18	1.44	1.54	n/a	n/a
			HC	16-18	1.65			
			HC	18-20	1.93	1.84	n/a	n/a
			HC	18-20	1.76			
			HC	20-24	1.51	1.41	n/a	n/a
			HC	20-24	1.31			
HLY0402	19	EHS6	HC	0-1	3.34	3.95	22..07	1.02
			HC	0-1	4.56			
			HC	1-2	3.11	3.13	27.47	1.27
			HC	1-2	3.15			
			HC	2-3	2.77	3.14	29.73	1.3
			HC	2-3	3.51			
			HC	3-4	3.93	4.12	34.08	1.3
			HC	3-4	4.31			
			HC	4-6	4.56	4.20	24.59	1.99
			HC	4-6	3.84			
			HC	6-8	1.23	1.36	6.33	1.29
			HC	6-8	1.49			
			HC	8-10	2.15	1.57	0.63	2.61
			HC	8-10	0.99			
			HC	10-12	0.42	1.37	n/a	n/a
			HC	10-12	2.32			
			HC	12-14	1.93	1.53	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	12-14	1.14			
HLY0402	21	EHSx	vv	Surface	2.76	2.34	n/a	n/a
			vv	Surface	1.92			
			HC	0-1	2.77	2.95	n/a	n/a
			HC	0-1	3.14			
			HC	1-2	3.61	3.40	n/a	n/a
			HC	1-2	3.19			
			HC	2-3	3.45	3.62	n/a	n/a
			HC	2-3	3.79			
			HC	3-4	3.70	3.64	n/a	n/a
			HC	3-4	3.57			
			HC	4-6	3.50	3.35	n/a	n/a
			HC	4-6	3.20			
			HC	6-8	2.64	3.06	n/a	n/a
			HC	6-8	3.49			
			HC	8-10	2.86	3.01	n/a	n/a
			HC	8-10	3.16			
			HC	10-12	2.37	2.74	n/a	n/a
			HC	10-12	3.12			
			HC	12-14	2.64	2.60	n/a	n/a
			HC	12-14	2.55			
			HC	14-16	1.50	1.90	n/a	n/a
			HC	14-16	2.29			
			HC	16-18	2.17	2.43	n/a	n/a
			HC	16-18	2.68			
			HC	18-20	1.29	1.15	n/a	n/a
			HC	18-20	1.00			
			HC	20-24	2.06	1.75	n/a	n/a
			HC	20-24	1.44			
HLY0402	22	SB1	vv	Surface	1.94	2.20	n/a	n/a
			vv	Surface	2.47			
HLY0402	23	SB4	vv	Surface	5.22	4.37	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			vv	Surface	3.51			
			HC	0-1	12.27	12.05	n/a	n/a
			HC	0-1	11.82			
			HC (24 hr)	0-1	11.69	10.03	n/a	n/a
			HC (24 hr)	0-1	8.38			
			HC (36 hr)	0-1	9.61	11.30	n/a	n/a
			HC (36 hr)	0-1	12.99			
			HC (48 hr)	0-1	10.06	10.00	n/a	n/a
			HC (48 hr)	0-1	9.94			
			HC	1-2	7.21	6.19	n/a	n/a
			HC	1-2	5.18			
			HC	2-3	5.11	5.48	n/a	n/a
			HC	2-3	5.84			
			HC	3-4	5.49	6.38	n/a	n/a
			HC	3-4	7.27			
			HC	4-6	7.08	6.43	n/a	n/a
			HC	4-6	5.78			
			HC	6-8	5.36	5.61	n/a	n/a
			HC	6-8	5.87			
			HC	8-10	5.07	4.63	n/a	n/a
			HC	8-10	4.18			
			HC	10-12	5.11	4.44	n/a	n/a
			HC	10-12	3.78			
			HC	12-14	2.25	2.89	n/a	n/a
			HC	12-14	3.53			
HLY0402	24	SB5	vv	Surface	9.16	8.80	n/a	n/a
			vv	Surface	8.44			
			HC	0-1	9.81	9.77	n/a	n/a
			HC	0-1	9.74			
			HC	1-2	11.62	10.62	n/a	n/a
			HC	1-2	9.61			
			HC	2-3	7.14	8.02	n/a	n/a
			HC	2-3	8.90			
			HC	3-4	4.80	4.97	n/a	n/a
			HC	3-4	5.14			
			HC	4-6	8.31	7.53	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	4-6	6.75			
			HC	6-8	7.60	7.69	n/a	n/a
			HC	6-8	7.79			
			HC	8-10	8.05	7.73	n/a	n/a
			HC	8-10	7.40			
			HC	10-12	5.88	5.75	n/a	n/a
			HC	10-12	5.63			
			HC	12-14	5.66	4.85	n/a	n/a
			HC	12-14	4.05			
HLY0402	26	BC5	MC	0-1	4.18	4.82	16.41	0.98
			MC	0-1	5.47			
			MC	1-2	3.39	3.34	19.51	1.02
			MC	1-2	3.29			
			MC	2-4	3.98	4.24	17.83	0.78
			MC	2-4	4.50			
			MC	4-6	2.97	2.75	24.19	1.06
			MC	4-6	2.53			
			MC	6-8	2.05	2.05	62.77	2.36
			MC	6-8	2.05			
			MC	8-10	1.55	1.57	75.88	2.59
			MC	8-10	1.59			
			MC	10-12	2.45	1.99	84.34	2.2
			MC	10-12	1.53			
			MC	12-14	1.29	1.49	136.28	3.22
			MC	12-14	1.69			
			MC	14-16	1.57	1.75	110.02	2.98
			MC	14-16	1.93			
HLY0402	27	BC6	MC	0-2	4.38	4.63	n/a	n/a
			MC	0-2	4.88			
			MC	2-4	1.94	1.98	n/a	n/a
			MC	2-4	2.02			
			MC	4-6	1.58	2.09	n/a	n/a
			MC	4-6	2.60			
			MC	6-8	2.08	2.18	n/a	n/a
			MC	6-8	2.28			
			MC	8-10	2.19	1.82	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			MC	8-10	1.45			
			MC	10-12	1.72	1.59	n/a	n/a
			MC	10-12	1.46			
			MC	12-14	1.61	1.46	n/a	n/a
			MC	12-14	1.31			
			MC	14-16	1.61	1.29	n/a	n/a
			MC	14-16	0.97			
			MC	16-18	2.28	1.55	n/a	n/a
			MC	16-18	0.82			
			MC	18-20	3.11	2.30	n/a	n/a
			MC	18-20	1.49			
			MC	20-24	1.59	1.24	n/a	n/a
			MC	20-24	0.89			
HLY0402	28	BC4	vv	Surface	6.47	5.91	n/a	n/a
			vv	Surface	5.35			
			HC	0-1	7.01	6.29	n/a	n/a
			HC	0-1	5.56			
			HC	1-2	4.06	4.21	n/a	n/a
			HC	1-2	4.36			
			HC	2-3	3.12	3.06	n/a	n/a
			HC	2-3	3.00			
			HC	3-4	2.68	2.60	n/a	n/a
			HC	3-4	2.52			
			HC	4-6	1.99	2.26	n/a	n/a
			HC	4-6	2.53			
			HC	6-8	1.97	2.21	n/a	n/a
			HC	6-8	2.44			
			HC	8-10	1.66	1.88	n/a	n/a
			HC	8-10	2.10			
			HC	10-12	2.23	2.04	n/a	n/a
			HC	10-12	1.84			
HLY0402	32	BC3.4	MC	0-2	11.62	11.49	n/a	n/a
			MC	0-2	11.36			
			MC	2-4	7.53	6.91	n/a	n/a
			MC	2-4	6.28			
			MC	4-6	2.79	3.74	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			MC	4-6	4.70			
			MC	6-8	3.10	2.62	n/a	n/a
			MC	6-8	2.15			
HLY0402	34	BC2	vv	Surface	4.45	4.44	n/a	n/a
			vv	Surface	4.44			
			MC	0-2	5.93	5.53	n/a	n/a
			MC	0-2	5.12			
			MC	2-4	3.43	3.53	n/a	n/a
			MC	2-4	3.62			
			MC	4-6	2.19	2.08	n/a	n/a
			MC	4-6	1.97			
			MC	6-8	1.53	1.64	n/a	n/a
			MC	6-8	1.75			
			MC	8-10	1.50	1.74	n/a	n/a
			MC	8-10	1.97			
			MC	10-12	1.05	0.91	n/a	n/a
			MC	10-12	0.77			
			MC	12-14	1.32	1.18	n/a	n/a
			MC	12-14	1.03			
SWL2004	25	SLIP1	vv	Surface	4.10	5.62	n/a	n/a
			vv	Surface	7.14			
			HC	0-1	10.06	8.57	n/a	n/a
			HC	0-1	7.08			
			HC	1-2	3.50	3.39	n/a	n/a
			HC	1-2	3.28			
			HC	2-3	2.92	3.16	n/a	n/a
			HC	2-3	3.40			
			HC	3-4	2.97	2.80	n/a	n/a
			HC	3-4	2.62			
			HC	4-6	1.56	1.60	n/a	n/a
			HC	4-6	1.64			
			HC	6-8	1.58	1.93	n/a	n/a
			HC	6-8	2.29			
			HC	8-10	2.49	2.38	n/a	n/a
			HC	8-10	2.27			
			HC	10-12	1.72	1.69	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	10-12	1.66			
			HC	12-14	0.86	0.96	n/a	n/a
			HC	12-14	1.06			
			HC	14-16	1.71	1.41	n/a	n/a
			HC	14-16	1.10			
SWL2004	26	SLIP2	vv	Surface	6.28	5.51	n/a	n/a
			vv	Surface	4.75			
			HC	0-1	12.14	10.75	n/a	n/a
			HC	0-1	9.35			
SWL2004	29	SLIP3	vv	Surface	16.69	17.05	n/a	n/a
			vv	Surface	17.40			
			HC	0-1	11.23	11.27	n/a	n/a
			HC	0-1	11.30			
			HC	1-2	5.39	7.86	n/a	n/a
			HC	1-2	10.32			
			HC	2-3	4.88	4.59	n/a	n/a
			HC	2-3	4.31			
			HC	3-4	3.07	3.38	n/a	n/a
			HC	3-4	3.69			
			HC	4-6	3.20	3.10	n/a	n/a
			HC	4-6	3.01			
			HC	6-8	1.66	2.17	n/a	n/a
			HC	6-8	2.68			
			HC	8-10	0.88	1.49	n/a	n/a
			HC	8-10	2.11			
			HC	10-12	1.10	1.06	n/a	n/a
			HC	10-12	1.01			
			HC	12-14	0.96	1.20	n/a	n/a
			HC	12-14	1.45			
			HC	14-16	1.06	1.07	n/a	n/a
			HC	14-16	1.07			
SWL2004	30	SLIP5	vv	Surface	13.44	11.33	n/a	n/a
			vv	Surface	9.22			
			HC	0-1	14.09	14.09	n/a	n/a
			HC	0-1	14.09			
			HC	1-2	6.69	8.38	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	1-2	10.06			
			HC	2-3	6.75	6.75	n/a	n/a
			HC	2-3	6.75			
			HC	3-4	5.98	5.24	n/a	n/a
			HC	3-4	4.51			
			HC	4-6	4.25	4.54	n/a	n/a
			HC	4-6	4.84			
			HC	6-8	2.03	1.98	n/a	n/a
			HC	6-8	1.94			
			HC	8-10	2.86	2.96	n/a	n/a
			HC	8-10	3.06			
			HC	10-12	2.16	2.28	n/a	n/a
			HC	10-12	2.40			
			HC	12-14	1.73	2.12	n/a	n/a
			HC	12-14	2.51			
			HC	14-16	2.76	2.22	n/a	n/a
			HC	14-16	1.69			
SWL2004	31	SLIP4	vv	Surface	11.75	11.98	n/a	n/a
			vv	Surface	12.21			
			HC	0-1	10.91	10.03	n/a	n/a
			HC	0-1	9.16			
			HC	1-2	7.79	7.11	n/a	n/a
			HC	1-2	6.44			
			HC	2-3	8.12	7.29	n/a	n/a
			HC	2-3	6.46			
			HC	3-4	6.40	6.44	n/a	n/a
			HC	3-4	6.49			
			HC	4-6	5.33	5.73	n/a	n/a
			HC	4-6	6.12			
			HC	6-8	4.64	4.74	n/a	n/a
			HC	6-8	4.85			
			HC	8-10	5.64	5.21	n/a	n/a
			HC	8-10	4.77			
			HC	10-12	5.14	4.60	n/a	n/a
			HC	10-12	4.05			
			HC	12-14	3.90	3.94	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	12-14	3.99			
			HC	14-16	4.42	4.73	n/a	n/a
			HC	14-16	5.04			
SWL2004	33	UTBS5	vv	Surface	11.49	11.75	n/a	n/a
			vv	Surface	12.01			
SWL2004	34	UTBS2	vv	Surface	10.71	10.52	n/a	n/a
			vv	Surface	10.32			
SWL2004	35	UTBS4	vv	Surface	9.22	10.49	n/a	n/a
			vv	Surface	11.75			
			HC	0-1	9.81	10.32	n/a	n/a
			HC	0-1	10.84			
			HC	1-2	6.62	6.45	n/a	n/a
			HC	1-2	6.28			
			HC	2-3	5.73	5.89	n/a	n/a
			HC	2-3	6.05			
			HC	3-4	4.32	6.03	n/a	n/a
			HC	3-4	7.73			
			HC	4-6	3.99	5.57	n/a	n/a
			HC	4-6	7.14			
			HC	6-8	3.36	3.72	n/a	n/a
			HC	6-8	4.07			
			HC	8-10	3.49	3.51	n/a	n/a
			HC	8-10	3.53			
			HC	10-12	2.53	3.01	n/a	n/a
			HC	10-12	3.48			
			HC	12-14	2.92	3.00	n/a	n/a
			HC	12-14	3.08			
			HC	14-16	2.01	1.93	n/a	n/a
			HC	14-16	1.84			
			HC	16-18	1.23	1.72	n/a	n/a
			HC	16-18	2.20			
SWL2004	36	UTBS1	vv	Surface	14.29	12.76	n/a	n/a
			vv	Surface	11.23			
SWL2004	42	UTN1	vv	Surface	7.53	7.47	n/a	n/a
			vv	Surface	7.40			
SWL2004	43	UTN2	vv	Surface	8.83	9.45	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			vv	Surface	10.06			
			HC	0-1	9.29	9.48	n/a	n/a
			HC	0-1	9.68			
			HC	1-2	7.86	7.56	n/a	n/a
			HC	1-2	7.27			
			HC	2-3	7.14	7.27	n/a	n/a
			HC	2-3	7.40			
			HC	3-4	7.01	7.44	n/a	n/a
			HC	3-4	7.86			
			HC	4-6	5.86	6.21	n/a	n/a
			HC	4-6	6.56			
			HC	6-8	5.45	5.41	n/a	n/a
			HC	6-8	5.37			
			HC	8-10	7.99	7.15	n/a	n/a
			HC	8-10	6.31			
SWL2004	44	UTN3	vv	Surface	13.25	12.44	n/a	n/a
			vv	Surface	11.62			
SWL2004	45	UTN4	vv	Surface	12.40	14.12	n/a	n/a
			vv	Surface	15.84			
			HC	0-1	17.21	16.72	n/a	n/a
			HC	0-1	16.23			
			HC	1-2	17.34	16.43	n/a	n/a
			HC	1-2	15.52			
			HC	2-3	14.42	15.26	n/a	n/a
			HC	2-3	16.10			
			HC	3-4	11.36	11.72	n/a	n/a
			HC	3-4	12.08			
			HC	4-6	8.70	10.29	n/a	n/a
			HC	4-6	11.88			
			HC	6-8	9.03	8.18	n/a	n/a
			HC	6-8	7.34			
			HC	8-10	6.75	7.08	n/a	n/a
			HC	8-10	7.40			
			HC	10-12	4.55	5.68	n/a	n/a
			HC	10-12	6.82			
			HC	12-14	5.77	6.19	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	12-14	6.62			
SWL2004	46	UTN5	vv	Surface	10.13	10.36	n/a	n/a
			vv	Surface	10.58			
			HC	0-1	16.04	16.27	n/a	n/a
			HC	0-1	16.49			
SWL2004	47	UTN6	vv	Surface	15.39	16.01	n/a	n/a
			vv	Surface	16.62			
			HC	0-1	15.65	15.78	n/a	n/a
			HC	0-1	15.91			
			HC	1-2	15.32	15.29	n/a	n/a
			HC	1-2	15.26			
			HC	2-3	13.31	13.67	n/a	n/a
			HC	2-3	14.03			
			HC	3-4	13.12	12.73	n/a	n/a
			HC	3-4	12.34			
			HC	4-6	9.81	10.29	n/a	n/a
			HC	4-6	10.78			
			HC	6-8	10.84	8.86	n/a	n/a
			HC	6-8	6.88			
			HC	8-10	7.01	7.66	n/a	n/a
			HC	8-10	8.31			
			HC	10-12	5.14	5.98	n/a	n/a
			HC	10-12	6.82			
			HC	12-14	4.71	4.85	n/a	n/a
			HC	12-14	4.99			
			HC	14-16	6.16	6.58	n/a	n/a
			HC	14-16	7.01			
			HC	16-18	6.47	4.97	n/a	n/a
			HC	16-18	3.47			
SWL2004	48	UTN7	vv	Surface	20.45	19.09	n/a	n/a
			vv	Surface	17.73			
			HC	0-1	18.96	19.84	n/a	n/a
			HC	0-1	20.71			
HLY0403	7	ACW1	vv	Surface	3.01	3.43	n/a	n/a
			vv	Surface	3.84			
HLY0403	8	ACW2	vv	Surface	3.41	3.61	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			vv	Surface	3.81			
HLY0403	15	BC2	vv	Surface	2.84	3.78	n/a	n/a
			vv	Surface	4.71			
			HC	0-1	6.14	6.07	n/a	n/a
			HC	0-1	6.00			
			HC	1-2	5.26	5.21	n/a	n/a
			HC	1-2	5.17			
			HC	2-3	5.94	5.24	n/a	n/a
			HC	2-3	4.55			
			HC	3-4	4.85	3.38	n/a	n/a
			HC	3-4	1.90			
			HC	4-6	1.89	2.16	n/a	n/a
			HC	4-6	2.43			
			HC	6-8	3.66	2.79	n/a	n/a
			HC	6-8	1.92			
			HC	8-10	3.46	3.16	n/a	n/a
			HC	8-10	2.86			
			HC	10-12	2.90	2.37	n/a	n/a
			HC	10-12	1.84			
HLY0403	21	BC3	vv	Surface	3.17	3.64	n/a	n/a
			vv	Surface	4.12			
			HC	0-1	3.72	4.11	16.48	1.03
			HC	0-1	4.51			
			HC	1-2	5.16	5.16	17.77	0.88
			HC	1-2	5.17			
			HC	2-3	4.26	4.49	16.91	1.05
			HC	2-3	4.71			
			HC	3-4	4.05	4.41	19.83	0.91
			HC	3-4	4.77			
			HC	4-6	5.02	4.38	33.51	1.93
			HC	4-6	3.74			
			HC	6-8	4.19	3.66	42.5	2.24
			HC	6-8	3.14			
			HC	8-10	2.97	2.84	31.33	1.99
			HC	8-10	2.70			
			HC	10-12	2.67	2.31	14.03	1.65

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	10-12	1.95			
			HC	12-14	3.89	4.22	n/a	n/a
			HC	12-14	4.56			
			HC	14-16	4.82	4.77	n/a	n/a
			HC	14-16	4.73			
			HC	16-18	3.05	3.53	n/a	n/a
			HC	16-18	4.01			
			HC	18-20	3.37	4.04	n/a	n/a
			HC	18-20	4.70			
HLY0403	22	BC4	vv	Surface	7.53	7.66	n/a	n/a
			vv	Surface	7.79			
			HC	0-1	9.09	8.77	19.5	1.06
			HC	0-1	8.44			
			HC	1-2	11.04	12.05	27.58	0.91
			HC	1-2	13.05			
			HC	2-3	11.49	9.71	26.61	1.1
			HC	2-3	7.92			
			HC	3-4	5.79	5.18	19.33	0.91
			HC	3-4	4.56			
			HC	4-6	6.95	6.63	28.4	1.49
			HC	4-6	6.32			
			HC	6-8	3.79	4.99	12.57	1.49
			HC	6-8	6.19			
			HC	8-10	5.60	4.69	19.3	1.73
			HC	8-10	3.79			
			HC	10-12	5.50	4.54	n/a	n/a
			HC	10-12	3.57			
HLY0403	23	BC5	HC	0-1	12.14	12.44	n/a	n/a
			HC	0-1	12.73			
			HC	1-2	8.51	9.29	n/a	n/a
			HC	1-2	10.06			
			HC	2-3	7.99	8.64	n/a	n/a
			HC	2-3	9.29			
			HC	3-4	5.57	5.71	n/a	n/a
			HC	3-4	5.85			
			HC	4-6	6.10	5.92	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	4-6	5.75			
			HC	6-8	4.62	4.79	n/a	n/a
			HC	6-8	4.97			
			HC	8-10	3.81	3.97	n/a	n/a
			HC	8-10	4.13			
			HC	10-12	3.42	3.64	n/a	n/a
			HC	10-12	3.86			
			HC	12-14	2.32	2.88	n/a	n/a
			HC	12-14	3.44			
			HC	14-16	3.21	3.23	n/a	n/a
			HC	14-16	3.25			
			HC	16-18	3.29	3.65	n/a	n/a
			HC	16-18	4.02			
			HC	18-20	2.62	2.54	n/a	n/a
			HC	18-20	2.46			
			HC	20-22	2.27	1.78	n/a	n/a
			HC	20-22	1.29			
HLY0403	25	EB1	vv	Surface	3.06	2.59	n/a	n/a
			vv	Surface	2.13			
			MC	0-2	2.95	2.68	n/a	n/a
			MC	0-2	2.40			
			MC	2-4	2.14	1.95	n/a	n/a
			MC	2-4	1.77			
			MC	4-6	2.15	4.13	n/a	n/a
			MC	4-6	6.11			
			MC	6-8	2.64	2.21	n/a	n/a
			MC	6-8	1.79			
			MC	8-10	1.18	1.01	n/a	n/a
			MC	8-10	0.85			
HLY0403	26	EB2	vv	Surface	8.05	7.10	n/a	n/a
			vv	Surface	6.15			
			HC	0-1	10.45	10.32	n/a	n/a
			HC	0-1	10.19			
			HC	1-2	5.97	6.59	n/a	n/a
			HC	1-2	7.21			
			HC	2-3	3.75	4.47	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	2-3	5.20			
			HC	3-4	5.18	4.81	n/a	n/a
			HC	3-4	4.43			
			HC	4-6	3.66	3.87	n/a	n/a
			HC	4-6	4.09			
			HC	6-8	3.94	4.33	n/a	n/a
			HC	6-8	4.72			
			HC	8-10	2.27	3.05	n/a	n/a
			HC	8-10	3.82			
			HC	10-12	1.84	2.98	n/a	n/a
			HC	10-12	4.13			
			HC	12-14	3.59	2.99	n/a	n/a
			HC	12-14	2.38			
HLY0403	29	EB3	vv	Surface	9.87	11.04	n/a	n/a
			vv	Surface	12.21			
			HC	0-1	11.62	11.43	n/a	n/a
			HC	0-1	11.23			
			HC	1-2	8.25	10.94	n/a	n/a
			HC	1-2	13.64			
			HC	2-3	7.60	7.76	n/a	n/a
			HC	2-3	7.92			
			HC	3-4	8.51	7.56	n/a	n/a
			HC	3-4	6.62			
			HC	4-6	4.32	4.48	n/a	n/a
			HC	4-6	4.64			
			HC	6-8	7.01	6.52	n/a	n/a
			HC	6-8	6.03			
			HC	8-10	5.44	5.81	n/a	n/a
			HC	8-10	6.18			
			HC	10-12	6.03	5.94	n/a	n/a
			HC	10-12	5.86			
			HC	12-14	5.27	5.34	n/a	n/a
			HC	12-14	5.41			
			HC	14-16	5.26	5.62	n/a	n/a
			HC	14-16	5.97			
HLY0403	32	EB6	HC	0-1	6.75	5.77	10.11	0.98

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	0-1	4.79			
			HC	1-2	4.75	4.34	18.94	1.02
			HC	1-2	3.93			
			HC	2-3	3.25	3.70	24.88	1.1
			HC	2-3	4.16			
			HC	3-4	7.40	7.73	29.18	1.85
			HC	3-4	8.05			
			HC	4-6	5.29	5.31	59.37	4.28
			HC	4-6	5.34			
			HC	6-8	5.73	5.32	15.18	3.89
			HC	6-8	4.92			
			HC	8-10	3.65	5.33	n/a	n/a
			HC	8-10	7.01			
			HC	10-12	4.47	4.59	0.1	1.95
			HC	10-12	4.71			
			HC	12-14	3.97	4.59	n/a	n/a
			HC	12-14	5.21			
			HC	14-16	4.43	4.92	n/a	n/a
			HC	14-16	5.40			
			HC	16-18	4.84	4.10	n/a	n/a
			HC	16-18	3.35			
			HC	18-20	2.95	2.86	n/a	n/a
			HC	18-20	2.78			
			HC	20-22	2.79	2.91	n/a	n/a
			HC	20-22	3.04			
HLY0403	33	EB5	HC	0-1	11.95	12.18	12.49	0.91
			HC	0-1	12.40			
			HC	1-2	7.73	9.16	20.02	1.02
			HC	1-2	10.58			
			HC	2-3	12.27	13.31	21.84	1.1
			HC	2-3	14.35			
			HC	3-4	10.39	10.42	29.74	1.17
			HC	3-4	10.45			
			HC	4-6	8.70	8.90	60.62	2.36
			HC	4-6	9.09			
			HC	6-8	7.34	5.81	61.46	2.43

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	6-8	4.29			
			HC	8-10	6.32	6.70	65.05	2.59
			HC	8-10	7.08			
			HC	10-12	6.27	6.44	63.3	2.36
			HC	10-12	6.62			
			HC	12-14	6.62	6.48	75.22	2.12
			HC	12-14	6.33			
			HC	14-16	5.07	5.41	68.17	2.67
			HC	14-16	5.74			
			HC	16-18	6.26	5.99	66.95	2.51
			HC	16-18	5.71			
			HC	18-20	4.67	5.68	59.63	2.51
			HC	18-20	6.69			
			HC	20-24	4.96	6.34	n/a	n/a
			HC	20-24	7.73			
HLY0403	34	EB4	vv	Surface	3.49	6.19	n/a	n/a
			vv	Surface	8.90			
			HC	0-1	7.66	7.89	10.22	0.71
			HC	0-1	8.12			
			HC	1-2	10.52	11.27	20.34	1.06
			HC	1-2	12.01			
			HC	2-3	5.46	6.56	24.5	1.1
			HC	2-3	7.66			
			HC	3-4	6.29	6.75	32.66	1.26
			HC	3-4	7.21			
			HC	4-6	6.56	5.82	55.73	2.27
			HC	4-6	5.09			
			HC	6-8	5.14	5.85	67.67	2.59
			HC	6-8	6.56			
			HC	8-10	5.64	6.04	76.06	2.59
			HC	8-10	6.45			
			HC	10-12	3.68	3.95	80.64	2.59
			HC	10-12	4.23			
			HC	12-14	4.00	4.56	88.97	2.27
			HC	12-14	5.11			
			HC	14-16	4.56	4.34	86.21	2.67

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	14-16	4.12			
			HC	16-18	3.76	3.63	84.39	2.2
			HC	16-18	3.51			
			HC	18-20	4.14	4.09	74.24	2.51
			HC	18-20	4.04			
HLY0403	35	BC6	HC	0-1	7.34	7.66	16.46	0.71
			HC	0-1	7.99			
			HC	1-2	4.55	5.03	19.62	1.02
			HC	1-2	5.51			
			HC	2-3	3.19	3.43	25.42	0.91
			HC	2-3	3.66			
			HC	3-4	2.98	3.21	30.56	1.16
			HC	3-4	3.44			
			HC	4-6	6.82	4.97	61.02	2.27
			HC	4-6	3.12			
			HC	6-8	3.18	3.54	28.12	2.51
			HC	6-8	3.90			
			HC	8-10	4.14	3.58	36.59	1.97
			HC	8-10	3.03			
			HC	10-12	3.18	2.93	6.39	1.26
			HC	10-12	2.68			
			HC	12-14	4.18	4.10	6.58	1.15
			HC	12-14	4.01			
			HC	14-16	7.01	6.98	n/a	n/a
			HC	14-16	6.95			
			HC	16-18	4.16	3.56	n/a	n/a
			HC	16-18	2.97			
			HC	18-20	3.99	4.14	n/a	n/a
			HC	18-20	4.29			
HLY0403	38	EHS1	vv	Surface	5.25	7.33	n/a	n/a
			vv	Surface	9.42			
			HC	0-1	10.91	9.94	n/a	n/a
			HC	0-1	8.96			
			HC	1-2	12.01	10.81	n/a	n/a
			HC	1-2	9.61			
			HC	2-3	5.46	8.31	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m⁻²)	Mean chl *a* (mg m⁻²)	Cs-137 (Bq m⁻²)	S.E. Cs-137 (Bq m⁻²)
			HC	2-3	11.17			
			HC	3-4	5.81	5.90	n/a	n/a
			HC	3-4	5.98			
			HC	4-6	5.34	4.83	n/a	n/a
			HC	4-6	4.33			
			HC	6-8	3.62	4.51	n/a	n/a
			HC	6-8	5.40			
			HC	8-10	3.06	3.50	n/a	n/a
			HC	8-10	3.93			
			HC	10-12	2.55	2.15	n/a	n/a
			HC	10-12	1.75			
			HC	12-14	2.10	2.10	n/a	n/a
			HC	12-14	2.10			
			HC	14-16	2.98	2.60	n/a	n/a
			HC	14-16	2.22			
HLY0403	42	EHS4	vv	Surface	8.05	6.70	n/a	n/a
			vv	Surface	5.36			
			HC	0-1	6.48	7.14	n/a	n/a
			HC	0-1	7.79			
			HC	1-2	4.19	4.64	n/a	n/a
			HC	1-2	5.09			
			HC	2-3	4.19	4.68	n/a	n/a
			HC	2-3	5.16			
			HC	3-4	2.97	3.22	n/a	n/a
			HC	3-4	3.47			
			HC	4-6	3.10	3.07	n/a	n/a
			HC	4-6	3.04			
			HC	6-8	3.61	2.54	n/a	n/a
			HC	6-8	1.47			
			HC	8-10	2.54	2.61	n/a	n/a
			HC	8-10	2.68			
			HC	10-12	2.04	2.09	n/a	n/a
			HC	10-12	2.14			
			HC	12-14	1.58	1.33	n/a	n/a
			HC	12-14	1.07			
			HC	14-16	1.68	1.92	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	14-16	2.16			
HLY0403	44	EHS5	vv	Surface	2.84	3.30	n/a	n/a
			vv	Surface	3.75			
			HC	0-1	6.75	6.20	n/a	n/a
			HC	0-1	5.64			
			HC	1-2	7.21	6.95	n/a	n/a
			HC	1-2	6.69			
			HC	2-3	11.69	9.12	n/a	n/a
			HC	2-3	6.56			
			HC	3-4	4.86	5.33	n/a	n/a
			HC	3-4	5.81			
			HC	4-6	6.20	4.98	n/a	n/a
			HC	4-6	3.77			
			HC	6-8	5.34	4.74	n/a	n/a
			HC	6-8	4.15			
			HC	8-10	3.37	3.75	n/a	n/a
			HC	8-10	4.14			
			HC	10-12	2.73	2.49	n/a	n/a
			HC	10-12	2.25			
			HC	12-14	2.20	2.13	n/a	n/a
			HC	12-14	2.06			
			HC	14-16	1.66	1.86	n/a	n/a
			HC	14-16	2.06			
			HC	16-18	2.25	1.95	n/a	n/a
			HC	16-18	1.65			
			HC	18-20	1.16	1.45	n/a	n/a
			HC	18-20	1.73			
HLY0403	47	EHS6	vv	Surface	3.18	2.32	n/a	n/a
			vv	Surface	1.45			
			HC	0-1	5.74	5.36	n/a	n/a
			HC	0-1	4.99			
			HC	1-2	4.98	6.26	n/a	n/a
			HC	1-2	7.53			
			HC	2-3	5.44	5.52	n/a	n/a
			HC	2-3	5.60			
			HC	3-4	4.31	4.43	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	3-4	4.55			
			HC	4-6	3.08	2.88	n/a	n/a
			HC	4-6	2.67			
			HC	6-8	1.99	2.10	n/a	n/a
			HC	6-8	2.21			
			HC	8-10	2.30	2.15	n/a	n/a
			HC	8-10	2.01			
			HC	10-12	1.64	1.80	n/a	n/a
			HC	10-12	1.95			
			HC	12-14	1.41	1.28	n/a	n/a
			HC	12-14	1.15			
			HC	14-16	0.77	1.14	n/a	n/a
			HC	14-16	1.52			
HLY0403	48	EHS7	HC	0-1	4.64	4.11	n/a	n/a
			HC	0-1	3.58			
			HC	1-2	4.70	4.34	n/a	n/a
			HC	1-2	3.99			
			HC	2-3	5.79	5.23	n/a	n/a
			HC	2-3	4.67			
			HC	3-4	5.42	5.31	n/a	n/a
			HC	3-4	5.20			
			HC	4-6	4.40	4.39	n/a	n/a
			HC	4-6	4.38			
			HC	6-8	3.50	3.63	n/a	n/a
			HC	6-8	3.75			
			HC	8-10	2.64	2.87	n/a	n/a
			HC	8-10	3.10			
			HC	10-12	2.40	2.49	n/a	n/a
			HC	10-12	2.57			
			HC	12-14	1.99	1.88	n/a	n/a
			HC	12-14	1.77			
			HC	14-16	1.96	1.77	n/a	n/a
			HC	14-16	1.58			
			HC	16-18	1.55	1.71	n/a	n/a
			HC	16-18	1.88			
			HC	18-20	1.89	2.93	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	18-20	3.97			
			HC	20-24	1.77	1.50	n/a	n/a
			HC	20-24	1.23			
HLY0403	49	EHS9	HC	0-1	2.76	2.69	n/a	n/a
			HC	0-1	2.62			
			HC	1-2	1.97	1.93	n/a	n/a
			HC	1-2	1.88			
			HC	2-3	1.06	1.40	n/a	n/a
			HC	2-3	1.73			
			HC	3-4	0.49	0.56	n/a	n/a
			HC	3-4	0.63			
			HC	4-6	1.10	1.81	n/a	n/a
			HC	4-6	2.51			
			HC	6-8	0.77	0.63	n/a	n/a
			HC	6-8	0.50			
			HC	8-10	0.20	0.18	n/a	n/a
			HC	8-10	0.17			
			HC	10-12	0.16	0.16	n/a	n/a
			HC	10-12	0.17			
			HC	12-14	0.34	0.32	n/a	n/a
			HC	12-14	0.31			
			HC	14-16	0.18	0.26	n/a	n/a
			HC	14-16	0.33			
HLY0403	50	EHS11	HC	0-1	1.81	2.04	n/a	n/a
			HC	0-1	2.27			
			HC	1-2	1.12	1.00	n/a	n/a
			HC	1-2	0.88			
			HC	2-3	0.30	0.32	n/a	n/a
			HC	2-3	0.34			
			HC	3-4	0.21	0.22	n/a	n/a
			HC	3-4	0.22			
			HC	4-6	0.16	0.18	n/a	n/a
			HC	4-6	0.19			
			HC	6-8	0.12	0.13	n/a	n/a
			HC	6-8	0.14			
			HC	8-10	0.07	0.08	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	8-10	0.09			
			HC	10-12	0.07	0.07	n/a	n/a
			HC	10-12	0.06			
			HC	12-14	0.13	0.12	n/a	n/a
			HC	12-14	0.12			
			HC	14-16	0.07	0.06	n/a	n/a
			HC	14-16	0.05			
HLY0403	51	EHS12	MC	0-1	0.25	0.19	n/a	n/a
			MC	0-1	0.13			
HLY0403	52	WHS8	MC	0-1	0.46	0.42	n/a	n/a
			MC	0-1	0.38			
HLY0403	54	WHS6	HC	0-1	1.74	2.56	n/a	n/a
			HC	0-1	3.38			
			HC	1-2	0.99	1.03	n/a	n/a
			HC	1-2	1.07			
			HC	2-3	0.81	0.80	n/a	n/a
			HC	2-3	0.79			
			HC	3-4	0.90	0.87	n/a	n/a
			HC	3-4	0.84			
			HC	4-6	0.49	0.76	n/a	n/a
			HC	4-6	1.03			
			HC	6-8	0.13	0.22	n/a	n/a
			HC	6-8	0.31			
			HC	8-10	0.17	0.17	n/a	n/a
			HC	8-10	0.18			
			HC	10-12	0.11	0.10	n/a	n/a
			HC	10-12	0.09			
			HC	12-14	0.09	0.08	n/a	n/a
			HC	12-14	0.07			
			HC	14-16	0.04	0.10	n/a	n/a
			HC	14-16	0.15			
HLY0403	55	WHS5	MC	0-1	4.62	4.70	n/a	n/a
			MC	0-1	4.77			
			MC	1-2	2.78	2.91	n/a	n/a
			MC	1-2	3.04			
			MC	2-3	1.86	1.94	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			MC	2-3	2.03			
			MC	3-4	2.16	2.40	n/a	n/a
			MC	3-4	2.63			
			MC	4-6	1.90	2.39	n/a	n/a
			MC	4-6	2.88			
			MC	6-8	2.25	1.73	n/a	n/a
			MC	6-8	1.21			
			MC	8-10	1.49	1.12	n/a	n/a
			MC	8-10	0.75			
			MC	10-12	1.38	1.23	n/a	n/a
			MC	10-12	1.08			
			MC	12-14	2.03	1.34	n/a	n/a
			MC	12-14	0.65			
			MC	14-16	0.58	0.71	n/a	n/a
			MC	14-16	0.84			
			MC	16-18	0.59	0.62	n/a	n/a
			MC	16-18	0.66			
			MC	18-20	0.55	0.55	n/a	n/a
			MC	18-20	0.55			
			MC	20-24	1.19	1.00	n/a	n/a
			MC	20-24	0.80			
HLY0403	56	WHS4	vv	Surface	1.82	2.64	n/a	n/a
			vv	Surface	3.46			
			HC	0-1	1.60	1.71	n/a	n/a
			HC	0-1	1.83			
			HC	1-2	1.09	0.88	n/a	n/a
			HC	1-2	0.67			
			HC	2-3	0.60	0.75	n/a	n/a
			HC	2-3	0.90			
			HC	3-4	0.30	0.46	n/a	n/a
			HC	3-4	0.62			
			HC	4-6	0.18	0.23	n/a	n/a
			HC	4-6	0.29			
			HC	6-8	0.10	0.10	n/a	n/a
			HC	6-8	0.10			
			HC	8-10	0.10	0.11	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	8-10	0.12			
			HC	10-12	0.11	0.13	n/a	n/a
			HC	10-12	0.15			
			HC	12-14	0.09	0.10	n/a	n/a
			HC	12-14	0.10			
			HC	14-16	0.13	0.12	n/a	n/a
			HC	14-16	0.12			
HLY0403	58	WHS3	vv	Surface	6.56	6.88	n/a	n/a
			vv	Surface	7.21			
			HC	0-1	12.21	11.36	17.55	1.02
			HC	0-1	10.52			
			HC	1-2	24.22	19.09	19.75	1.189
			HC	1-2	13.96			
			HC	2-3	9.55	11.56	25.98	0.995
			HC	2-3	13.57			
			HC	3-4	8.90	8.67	26.56	1.22
			HC	3-4	8.44			
			HC	4-6	8.38	7.47	55.5	1.7
			HC	4-6	6.56			
			HC	6-8	5.75	6.12	66.05	2.52
			HC	6-8	6.49			
			HC	8-10	4.10	4.64	66.65	2.45
			HC	8-10	5.18			
			HC	10-12	4.30	4.56	60.91	2.11
			HC	10-12	4.82			
			HC	12-14	3.16	2.81	56.8	2
			HC	12-14	2.45			
			HC	14-16	4.00	3.97	46.8	2.41
			HC	14-16	3.95			
			HC	16-18	2.38	2.62	22.015	1.98
			HC	16-18	2.85			
			HC	18-20	2.81	2.71	n/a	n/a
			HC	18-20	2.62			
			HC	16-18	2.32	3.04	n/a	n/a
			HC	16-18	3.76			
HLY0403	59	WHS2	vv	Surface	20.65	19.74	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			vv	Surface	18.83			
			HC	0-1	18.96	16.07	n/a	n/a
			HC	0-1	13.18			
			HC	1-2	24.94	16.62	n/a	n/a
			HC	1-2	8.31			
			HC	2-3	17.21	13.31	n/a	n/a
			HC	2-3	9.42			
			HC	3-4	8.70	8.80	n/a	n/a
			HC	3-4	8.90			
			HC	4-6	6.82	7.18	n/a	n/a
			HC	4-6	7.53			
			HC	6-8	3.47	3.50	n/a	n/a
			HC	6-8	3.53			
			HC	8-10	5.70	6.42	n/a	n/a
			HC	8-10	7.14			
HLY0403	60	WHS1	vv	Surface	9.03	11.75	n/a	n/a
			vv	Surface	14.48			
			HC	0-1	25.97	24.74	n/a	n/a
			HC	0-1	23.51			
			HC	1-2	10.65	10.84	n/a	n/a
			HC	1-2	11.04			
			HC	2-3	7.27	8.60	n/a	n/a
			HC	2-3	9.94			
			HC	3-4	10.39	10.75	n/a	n/a
			HC	3-4	11.10			
			HC	4-6	6.82	6.12	n/a	n/a
			HC	4-6	5.43			
			HC	6-8	12.34	9.94	n/a	n/a
			HC	6-8	7.53			
			HC	8-10	4.95	5.76	n/a	n/a
			HC	8-10	6.56			
			HC	10-12	4.95	6.67	n/a	n/a
			HC	10-12	8.38			
			HC	12-14	4.06	5.11	n/a	n/a
			HC	12-14	6.16			
			HC	14-16	3.66	3.34	n/a	n/a

Appendix E. Continued.

Cruise	Station #	Station Name	Sampling device (vv/HC/ MC)	Sed core depth (cm)	Sed chl *a* (mg m^{-2})	Mean chl *a* (mg m^{-2})	Cs-137 (Bq m^{-2})	S.E. Cs-137 (Bq m^{-2})
			HC	14-16	3.03			
			HC	16-18	4.27			
			HC	16-18	4.41	4.34	n/a	n/a

Appendix F. Listed are dominant station macroinfaunal animals retained on the 0.5 mm sieve from SWL2004, HLY0402, SWL2004, and HLY0403.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
SWL2003	7	SLIP-1	Nematoda	41.5	Capitellidae	18.5
			Lituolidae	16.2	Polychaeta	18.1
			Capitellidae	7.4	Maldanidae	9.2
SWL2003	8	SLIP-2	Lituolidae	58.4	Capitellidae	41.0
			Nematoda	18.1	Lituolidae	17.7
			Macoma calcarea	6.3	Nephtyidae	8.4
SWL2003	10	SLIP-3	Nematoda	31.3	Capitellidae	49.9
			Capitellidae	10.0	Lumbrineridae	37.9
			Nephtyidae	9.3	Orbiniidae	15.4
SWL2003	11	SLIP-5	Nematoda	35.5	Capitellidae	37.5
			Tellinidae	9.1	Phyllodocidae	19.9
			Capitellidae	6.6	Orbiniidae	11.8
SWL2003	12	SLIP-4	Nematoda	46.2	Phyllodocidae	37.1
			N. radiata	11.5	Nephtyidae	11.4
			Nephtyidae	9.6	Capitellidae	11.0
SWL2003	15	UTBS-2	Ostracoda	21.1	Capitellidae	44.5
			Nematoda	20.4	Ostracoda	11.7
			Macoma calcarea	16.3	Phoxocephalidae	10.7
SWL2003	16	UTBS-1	Nematoda	17.2	Capitellidae	33.6
			Ostracoda	16.7	Ostracoda	20.0
			Lituolidae	11.5	Spionidae	11.1
SWL2003	17	UTBS-4	Nematoda	41.7	Capitellidae	36.0
			Lituolidae	14.6	Ostracoda	17.4
			Ostracoda	11.7	Spionidae	13.7

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m⁻²)	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m⁻²)	Dominant taxa % of total carbon weight
SWL2003	23	UTN-1	Nematoda	42.6	Capitellidae	62.4
			M. calcarea	13.1	Spionidae	7.7
			N. belloti	12.5	Phyllodocidae	7.6
SWL2003	24	UTN-2	Nematoda	32.9	Capitellidae	47.2
			Lituolidae	25.1	Haustoriidae	17.1
			Ostracoda	19.2	Ostracoda	16.0
SWL2003	25	UTN-3	Nematoda	60.2	Capitellidae	46.4
			Phoxocephalidae	12.2	Phyllodocidae	21.1
			Capitellidae	4.6	Phoxocephalidae	7.5
SWL2003	26	UTN-4	Nematoda	55.0	Phoxocephalidae	15.8
			Phoxocephalidae	6.6	Capitellidae	14.8
			Polychaeta	5.7	Haustoriidae	9.6
SWL2003	27	UTN-5	Nematoda	34.3	Capitellidae	38.3
			Haustoriidae	29.5	Haustoriidae	31.7
			Isaeidae	19.0	Isaeidae	16.8
SWL2003	28	UTN-6	Nematoda	64.9	Capitellidae	28.8
			Lituolidae	10.5	Haustoriidae	8.4
			Leuconiidae	8.8	Rhynchocoela	7.0
SWL2003	29	UTN-7	Nematoda	42.5	Capitellidae	34.9
			Polychaeta	12.1	Haustoriidae	22.0
			Haustoriidae	12.1	Polychaeta	6.6
HLY0402	6	HV-1	Haustoriidae	57.4	Haustoriidae	81.4
			Nematoda	23.3	Nephtyidae	3.9
			Flabelligeridae	4.1	Phoxocephalidae	3.3
HLY0402	7	HV-2	*N. belloti*	27.3	Cirratulidae	40.9

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
			Ostracoda	11.4	Capitellidae	22.5
			Nematoda	11.4	*N. belloti*	9.1
HLY0402	10	EHS-0.5	Lituolidae	22.2	Lumbrineridae	64.3
			Cirratulidae	12.0	Cirratulidae	14.7
			Ostracoda	11.7	Ostracoda	3.5
HLY0402	13	EHS-2	Lituolidae	54.4	Lumbrineridae	45.9
			Ostracoda	20.2	Ostracoda	19.4
			Montacutidae	5.3	Cirratulidae	12.4
HLY0402	16	EHS-4	Lituolidae	21.6	Cirratulidae	24.5
			Spionidae	10.8	Spionidae	14.5
			Orbiniidae	10.8	Orbiniidae	10.6
HLY0402	17	EHS-5	Nematoda	26.9	Spionidae	16.0
			Ostracoda	19.3	Capitellidae	11.5
			Spionidae	13.4	Syllidae	6.7
HLY0402	19	EHS-6	Lituolidae	96.1	Lituolidae	62.8
			Nematoda	1.3	Ophellidae	6.9
			Astrorhizidae	0.8	Lumbrineridae	6.8
HLY0402	21	EHS-x	Lampropidae	14.3	Spionidae	18.7
			Ostracoda	14.3	Nephtyidae	12.2
			Thyasiridae	14.3	Lampropidae	8.9
HLY0402	23	SB-4	Nematoda	48.4	Cirratulidae	16.2
			Cirratulidae	8.1	Maldanidae	8.1
			Lituolidae	7.9	Nephtyidae	5.1
HLY0402	24	SB-5	Polymorphinidae	57.5	Maldanidae	41.2
			Nematoda	11.5	Phyllodocidae	10.2
			Ostracoda	6.2	Lumbrineridae	8.3

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
HLY0402	26	BC-5	Pelecypoda	26.1	Maldanidae	47.1
			Spionidae	13.0	Spionidae	18.5
			Nematoda	13.0	Capitellidae	9.1
HLY0402	27	BC-6	Lituolidae	96.3	Lituolidae	71.1
			Lumbrineridae	1.2	Lumbrineridae	22.5
			Nematoda	1.2	Cirratulidae	6.4
HLY0402	28	BC-4	Polymorphinidae	43.6	Spionidae	14.5
			Nematoda	26.0	Maldanidae	12.9
			Spionidae	8.3	Polymorphinidae	7.6
HLY0402	34	BC-2	Nematoda	66.0	Cirratulidae	10.7
			Cirratulidae	6.4	Capitellidae	8.3
			Mytilidae	5.8	Lumbrineridae	7.2
SWL2004	25	SLIP-1	Lituolidae	22.6	Capitellidae	54.6
			Nematoda	21.8	Phyllodocidae	12.9
			N. belloti	13.7	Lumbrineridae	10.3
SWL2004	26	SLIP-2	Lituolidae	66.1	Lumbrineridae	37.2
			N. belloti	7.6	Cirratulidae	14.5
			Nematoda	6.4	Lituolidae	12.8
SWL2004	29	SLIP-3	Nematoda	20.9	Capitellidae	23.6
			Cylichnidae	12.8	Orbiniidae	15.9
			Orbiniidae	11.6	Lumbrineridae	15.1
SWL2004	30	SLIP-5	Nematoda	29.1	Capitellidae	29.8
			Macoma sp.	21.8	Orbiniidae	15.7
			N. belloti	14.5	Lumbrineridae	10.0
SWL2004	31	SLIP-4	Nematoda	58.6	Capitellidae	28.9
			Capitellidae	8.1	Nephtyidae	25.6

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa of total carbon weight
			Nephtyidae	8.1	Orbiniidae	13.6
SWL2004	34	UTBS-2	Ostracoda	37.7	Capitellidae	55.4
			Isaeidae	10.1	Spionidae	11.6
			Nematoda	10.1	Ostracoda	9.0
SWL2004	36	UTBS-1	Nematoda	25.8	Capitellidae	34.7
			Ostracoda	12.9	Phyllodocidae	19.6
			Phoxocephalidae	9.7	Spionidae	11.8
SWL2004	42	UTN-1	*N. belloti*	18.2	Capitellidae	40.2
			Capitellidae	18.2	Spionidae	6.0
			Ostracoda	15.2	Ostracoda	5.8
SWL2004	43	UTN-2	Elphidiidae	49.1	Sigalionidae	18.3
			N. belloti	15.6	Capitellidae	18.0
			Phoxocephalidae	10.8	Phoxocephalidae	13.4
SWL2004	44	UTN-3	Nematoda	58.8	Haustoriidae	28.5
			Haustoriidae	8.1	Phyllodocidae	11.0
			Aoridae	7.0	Aoridae	10.3
SWL2004	45	UTN-4	Nematoda	49.6	Haustoriidae	28.8
			Haustoriidae	17.3	Capitellidae	17.2
			Flabelligeridae	14.3	Flabelligeridae	10.9
SWL2004	46	UTN-5	Nematoda	36.6	Flabelligeridae	19.6
			Haustoriidae	16.1	Haustoriidae	19.4
			Flabelligeridae	13.4	Capitellidae	18.5
SWL2004	47	UTN-6	Nematoda	45.4	Haustoriidae	50.9
			Haustoriidae	20.6	Flabelligeridae	18.2
			Flabelligeridae	11.3	Sigalionidae	8.9
SWL2004	48	UTN-7	Nematoda	66.7	Haustoriidae	38.1

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
			Haustoriidae	9.8	Capitellidae	21.0
			Capitellidae	7.8	Phyllodocidae	15.7
HLY0403	6	HV-1	Nematoda	49.6	Haustoriidae	28.8
			Haustoriidae	17.3	Capitellidae	17.2
			Flabelligeridae	14.3	Flabelligeridae	10.9
HLY0403	15	BC-2	Nematoda	66.5	Cirratulidae	10.2
			Mytilidae	5.8	Lumbrineridae	8.5
			Lituolidae	4.8	Ostracoda	7.0
HLY0403	21	BC-3	Lituolidae	29.4	Capitellidae	35.9
			Nematoda	26.2	Phyllodocidae	35.9
			Elphidiidae	12.4	Cirratulidae	4.5
HLY0403	22	BC-4	Polymorphinidae	88.1	Maldanidae	24.0
			Nodosariidae	2.5	Syllidae	17.9
			Nematoda	2.4	Sigalionidae	14.2
HLY0403	23	BC-5	Nematoda	49.5	Maldanidae	75.1
			Spionidae	21.6	Spionidae	14.5
			Maldanidae	13.4	Haustoriidae	5.8
HLY0403	26	EB-2	Lituolidae	25.5	Capitellidae	30.1
			Polymorphinidae	16.3	Lumbrineridae	21.0
			Ostracoda	14.2	Ostracoda	8.2
HLY0403	29	EB-3	Maldanidae	33.5	Maldanidae	82.5
			Polymorphinidae	32.3	Lumbrineridae	6.1
			Ostracoda	5.2	Onuphidae	4.5
HLY0403	32	EB-6	Idotheidae	38.2	Lumbrineridae	60.9
			Lituolidae	32.4	Idotheidae	22.0
			Ostracoda	11.8	Ostracoda	10.0

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (gC m^{-2})	Dominant taxa % of total carbon weight
HLY0403	33	EB-5	Polymorphinidae	69.0	Maldanidae	20.7
			Nematoda	12.5	Capitellidae	7.9
			Maldanidae	3.0	Phyllodocidae	6.8
HLY0403	34	EB-4	Polymorphinidae	85.7	Maldanidae	77.9
			Maldanidae	5.1	Lumbrineridae	8.2
			Spionidae	2.3	Polymorphinidae	3.9
HLY0403	35	BC-6	Lituolidae	52.2	Polynoidae	75.0
			Polynoidae	34.8	Maldanidae	7.2
			Spionidae	8.7	Spionidae	7.1
HLY0403	38	EHS-1	Lituolidae	27.0	Lumbrineridae	43.4
			N. belloti	14.2	Cirratulidae	18.7
			Nematoda	12.2	Spionidae	5.3
HLY0403	42	EHS-4	Lituolidae	55.8	Astrorhizidae	23.8
			Astrorhizidae	15.1	Lituolidae	15.9
			Ostracoda	12.6	Ostracoda	9.9
HLY0403	44	EHS-5	Maldanidae	27.1	Maldanidae	65.4
			Nematoda	25.9	Lumbrineridae	22.4
			Polymorphinidae	11.8	Capitellidae	5.1
HLY0403	47	EHS-6	Spionidae	16.9	Maldanidae	48.4
			Ostracoda	15.3	Spionidae	13.6
			Maldanidae	13.6	Lysianassidae	9.9
HLY0403	48	EHS-7	Lituolidae	51.0	Spionidae	62.8
			Nodosariidae	11.8	Lumbrineridae	13.5
			Thyasiridae	9.8	Lituolidae	13.3
HLY0403	49	EHS-9	Lituolidae	99.2	Lituolidae	99.2
			Nematoda	0.4	*Yoldia sp.*	0.6

Appendix F. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
			Yoldia sp.	0.3	Nematoda	0.3
HLY0403	54	WHS-6	Lituolidae	99.5	Lituolidae	91.3
			Sipunculidae	0.2	Sipunculidae	4.4
			Ostracoda	0.1	Orbiniidae	4.3
HLY0403	55	WHS-5	Lituolidae	97.4	Lituolidae	61.0
			Spionidae	0.8	Spionidae	15.1
			Sipunculidae	0.5	Lumbrineridae	13.0
HLY0403	56	WHS-4	Hyperamminidae	40.0	Hyperamminidae	19.4
			Ostracoda	25.0	Sipunculidae	4.5
			Nematoda	10.0	Syllidae	4.2
HLY0403	58	WHS-3	Polymorphinidae	35.1	Capitellidae	32.2
			Nematoda	26.6	Lumbrineridae	24.5
			Capitellidae	6.4	Nephtyidae	9.8
HLY0403	59	WHS-2	Lituolidae	27.2	Lumbrineridae	25.8
			Ostracoda	13.9	Cirratulidae	9.3
			Cirratulidae	10.4	Orbiniidae	6.9
HLY0403	60	WHS-1	Lituolidae	28.3	Nephtyidae	35.1
			Nephtyidae	18.3	Capitellidae	18.0
			N. belloti	6.7	Lumbrineridae	10.8

Appendix G. Listed are dominant station macroinfaunal animals retained on the 0.5 mm sieve from SWL2004, HLY0402, SWL2004, and HLY0403.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
SWL2003	7	SLIP-1	Leuconiidae	19.1	Mytilidae	43.1
			Nematoda	19.1	*N. belloti*	36.8
			N. belloti	11.8	Maldanidae	8.1
SWL2003	8	SLIP-2	Nematoda	20.5	*N. radiata*	28.2
			Lituolidae	13.7	Maldanidae	20.6
			Maldanidae	11.0	Nephtyidae	12.7
SWL2003	10	SLIP-3	Orbiniidae	20.0	*N. radiata*	78.0
			Cylichnidae	18.2	Maldanidae	17.7
			N. radiata	10.9	Orbiniidae	1.2
SWL2003	11	SLIP-5	*N. radiata*	36.4	*N. belloti*	24.0
			N. belloti	24.7	*N. radiata*	24.3
			Capitellidae	6.5	*M. calcarea*	13.6
SWL2003	12	SLIP-4	*N. radiata*	32.7	*N. belloti*	50.6
			N. belloti	12.2	Pectinariidae	21.9
			M. calcarea	12.2	*N. radiata*	13.8
SWL2003	15	UTBS-2	*Ampelisca sp.*	27.8	*Ampelisca sp.*	42.0
			Aoridae	23.7	Maldanidae	20.7
			Phoxocephalidae	11.0	Ampharetidae	14.6
SWL2003	16	UTBS-1	*Byblis sp.*	37.8	*Ampelisca sp.*	26.2
			Ampelisca sp.	32.3	*Byblis sp.*	22.7
			N. belloti	6.0	*M. calcarea*	18.1
SWL2003	17	UTBS-4	Nematoda	44.4	*M. calcarea*	36.1
			Ampelisca sp.	25.3	*Ampelisca sp.*	22.2
			Byblis sp.	5.6	Ampharetidae	12.3

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
SWL2003	23	UTN-1	Capitellidae	26.8	Echinarachniidae	44.2
			N. belloti	12.2	Nephtyidae	21.8
			Macoma sp.	12.2	Styelidae	13.2
SWL2003	24	UTN-2	Nematoda	28.6	Anthozoa	64.7
			Phoxocephalidae	14.3	Tellinidae	10.3
			Lituolidae	9.5	Nephtyidae	9.4
SWL2003	25	UTN-3	Haustoriidae	35.6	Tellinidae	76.3
			Nematoda	12.3	Anthozoa	5.4
			Byblis sp.	9.9	Haustoriidae	4.7
SWL2003	26	UTN-4	Haustoriidae	30.5	Haustoriidae	23.7
			Isaeidae	11.2	Maldanidae	12.5
			Byblis sp.	9.9	Polynoidae	9.5
SWL2003	27	UTN-5	Haustoriidae	55.3	*Yoldia sp.*	34.9
			Isaeidae	12.1	Haustoriidae	26.8
			Aoridae	8.8	*M. calcarea*	15.8
SWL2003	28	UTN-6	Haustoriidae	72.3	Haustoriidae	45.1
			Isaeidae	5.7	Maldanidae	22.9
			Maldanidae	3.8	*Macoma moesta*	19.6
SWL2003	29	UTN-7	Haustoriidae	36.0	Phyllodocidae	22.1
			N. belloti	12.6	*M. calcarea*	17.5
			Nematoda	9.1	Anthozoa	13.6
HLY0402	6	HV-1	Haustoriidae	51.6	Haustoriidae	30.2
			Phoxocephalidae	11.3	*Yoldia sp.*	30.0
			Nematoda	7.5	*M. calcarea*	27.6

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
HLY0402	7	HV-2	Hyperamminidae	44.0	Hyperamminidae	17.3
			N. belloti	17.3	Haustoriidae	11.5
			Haustoriidae	8.0	*N. belloti*	6.2
HLY0402	10	EHS-0.5	Lumbrineridae	18.2	*M. calcarea*	87.4
			N. belloti	10.7	Ophiuridae	2.9
			M. calcarea	9.1	Lumbrineridae	2.7
HLY0402	13	EHS-2	*N. belloti*	39.1	*N. belloti*	69.6
			N. radiata	7.0	Ophiuridae	10.7
			Nodosariidae	7.0	Nephtyidae	5.4
HLY0402	16	EHS-4	Hyperamminidae	29.6	Nephtyidae	56.9
			Nodosariidae	27.8	Hyperamminidae	19.9
			Maldanidae	7.4	Maldanidae	13.8
HLY0402	17	EHS-5	Hyperamminidae	26.1	Anthozoa	65.8
			Ostracoda	17.1	Hyperamminidae	13.2
			Maldanidae	12.6	Maldanidae	11.6
HLY0402	19	EHS-6	Lituolidae	74.9	Sipunculidae	86.9
			Astrorhizidae	6.0	Lumbrineridae	9.6
			Hyperamminidae	5.4	Hyperamminidae	1.4
HLY0402	21	EHS-x	Thyasiridae	33.3	Hyperamminidae	40.5
			Hyperamminidae	26.4	Ophiuridae	4.2
			Montacutidae	12.6	Thyasiridae	2.6
HLY0402	23	SB-4	Nematoda	31.6	Maldanidae	51.8
			Hyperamminidae	12.8	*N. belloti*	8.8
			Leuconiidae	6.9	Hyperamminidae	7.7

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m⁻²)	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m⁻²)	Dominant taxa % of total carbon weight
HLY0402	24	SB-5	Maldanidae	35.0	Maldanidae	69.8
			Oweniidae	33.7	Hyperamminidae	16.1
			Hyperamminidae	21.7	Oweniidae	6.5
HLY0402	26	BC-5	Thyasiridae	27.9	Astrorhizidae	75.9
			Montacutidae	22.5	Maldanidae	11.1
			Astrorhizidae	20.2	Nephtyidae	5.0
HLY0402	27	BC-6	Astrorhizidae	45.5	Astrorhizidae	79.5
			Lituolidae	13.6	Idotheidae	17.5
			Thyasiridae	9.1	Thyasiridae	1.1
HLY0402	28	BC-4	Hyperamminidae	32.2	Maldanidae	64.8
			Maldanidae	31.5	Hyperamminidae	16.7
			Ostracoda	8.9	*N. belloti*	8.8
HLY0402	34	BC-2	Nematoda	70.5	Mytilidae	60.0
			Mytilidae	8.6	Sipunculidae	27.7
			Leuconiidae	2.6	Flabelligeridae	3.0
SWL2004	25	SLIP-1	Nematoda	16.1	*M. calcarea*	53.7
			Maldanidae	14.3	*N. radiata*	25.6
			Capitellidae	10.7	*N. belloti*	11.2
SWL2004	26	SLIP-2	Lituolidae	37.7	*N. radiata*	61.9
			N. radiata	15.1	*M. calcarea*	8.4
			Nematoda	15.1	Maldanidae	5.5
SWL2004	29	SLIP-3	Nematoda	29.3	*Yoldia sp.*	69.6
			N. belloti	17.1	*M. calcarea*	12.4
			Yoldia sp.	12.2	Maldanidae	11.3
SWL2004	30	SLIP-5	*N. belloti*	37.3	*N. belloti*	48.8
			N. radiata	16.9	*N. radiata*	27.4

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
			Orbiniidae	8.5	*M. calcarea*	14.3
SWL2004	31	SLIP-4	Haustoriidae	27.4	*N. belloti*	58.1
			N. belloti	11.9	*M. moesta*	15.8
			Orbiniidae	9.5	Pectinariidae	9.4
SWL2004	34	UTBS-2	*Ampelisca sp.*	56.9	*Ampelisca sp.*	28.1
			Isaeidae	8.5	*M. calcarea*	23.9
			Phoxocephalidae	3.8	Nephtyidae	22.4
SWL2004	36	UTBS-1	*Ampelisca sp.*	48.0	Astartidae	36.3
			Byblis sp.	22.7	Maldanidae	26.8
			Phoxocephalidae	5.3	*Ampelisca sp.*	25.7
SWL2004	42	UTN-1	Echinarachniidae	27.3	Echinarachniidae	89.7
			N. belloti	18.2	Pectinariidae	5.8
			Sigalionidae	18.2	Maldanidae	4.4
SWL2004	43	UTN-2	Phoxocephalidae	39.6	Nephtyidae	44.9
			Thyasiridae	12.5	Pectinariidae	25.2
			Orbiniidae	10.4	*M. calcarea*	14.4
SWL2004	44	UTN-3	Haustoriidae	26.4	*M. calcarea*	33.1
			Phoxocephalidae	15.9	Anthozoa	19.5
			Isaeidae	10.7	*Yoldia sp.*	11.8
SWL2004	45	UTN-4	Haustoriidae	42.8	*M. calcarea*	52.5
			Phoxocephalidae	10.9	Haustoriidae	13.5
			Nematoda	8.8	*Yoldia sp.*	7.1
SWL2004	46	UTN-5	*M. calcarea*	22.0	*M. calcarea*	74.4
			Haustoriidae	14.4	Anthozoa	5.8
			Phoxocephalidae	13.3	*Yoldia sp.*	4.3

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
SWL2004	47	UTN-6	Haustoriidae	57.9	Haustoriidae	32.0
			Aoridae	6.7	*M. calcarea*	29.3
			Phoxocephalidae	6.4	Anthozoa	19.2
SWL2004	48	UTN-7	Haustoriidae	61.5	*M. calcarea*	80.9
			Aoridae	5.8	Trochidae	6.6
			N. belloti	5.8	Haustoriidae	6.0
HLY0403	6	HV-1	Haustoriidae	42.8	*M. calcarea*	52.5
			Phoxocephalidae	10.9	Haustoriidae	13.5
			Nematoda	8.8	*Yoldia sp.*	7.1
HLY0403	15	BC-2	Nematoda	72.2	Mytilidae	75.9
			Mytilidae	9.9	Sipunculidae	17.1
			Sipunculidae	2.2	*N. belloti*	2.2
HLY0403	21	BC-3	Nematoda	26.7	*M. calcarea*	98.7
			M. calcarea	23.3	Styelidae	0.2
			Phyllodocidae	9.7	*N. belloti*	0.2
HLY0403	22	BC-4	Maldanidae	29.4	Maldanidae	47.1
			Hyperamminidae	28.6	*M. calcarea*	18.5
			Ostracoda	16.3	Rhynchocoela	12.9
HLY0403	23	BC-5	Hyperamminidae	45.7	Maldanidae	43.4
			Thyasiridae	17.1	Hyperamminidae	34.1
			Haustoriidae	11.4	Thyasiridae	7.9
HLY0403	26	EB-2	Hyperamminidae	60.3	Asteroidea	48.8
			Ostracoda	5.5	Ophiuridae	13.1
			Montacutidae	5.0	Hyperamminidae	12.9
HLY0403	29	EB-3	Maldanidae	33.0	Sipunculidae	45.1
			Hyperamminidae	26.6	Maldanidae	30.4

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m^{-2})	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m^{-2})	Dominant taxa % of total carbon weight
			Ostracoda	10.3	Onuphidae	6.6
HLY0403	32	EB-6	Hyperamminidae	59.5	Thyasiridae	57.8
			Thyasiridae	27.0	Hyperamminidae	40.4
			Lituolidae	10.8	Lituolidae	0.3
HLY0403	33	EB-5	Hyperamminidae	60.5	Hyperamminidae	34.2
			Oweniidae	14.8	Maldanidae	31.6
			Ostracoda	6.5	Oweniidae	9.2
HLY0403	34	EB-4	Hyperamminidae	62.5	*M. calcarea*	46.0
			Maldanidae	10.7	Maldanidae	36.2
			Nodosariidae	8.9	Hyperamminidae	9.0
HLY0403	35	BC-6	Hyperamminidae	85.1	Hyperamminidae	58.9
			Thyasiridae	10.8	Thyasiridae	39.9
			Tindaria sp.	1.4	*Tinidaria sp.*	1.2
HLY0403	38	EHS-1	*N. belloti*	38.1	*Yoldia sp.*	40.8
			Cylichnidae	7.9	Asteroidea	7.3
			Nematoda	7.9	*N. belloti*	6.0
HLY0403	42	EHS-4	Hyperamminidae	36.8	Hyperamminidae	28.7
			Astrorhizidae	35.4	*M. moesta*	16.3
			Lituolidae	12.5	Veneridae	15.2
HLY0403	44	EHS-5	Hyperamminidae	37.4	Anthozoa	40.7
			Maldanidae	16.8	Maldanidae	24.7
			Ostracoda	15.0	Polynoidae	11.6
HLY0403	47	EHS-6	Hyperamminidae	68.2	Hyperamminidae	62.8
			Ostracoda	11.2	Rhynchocoela	14.8
			Thyasiridae	5.4	Nephtyidae	7.2

Appendix G. Continued.

Cruise	Station Number	Station Name	Dominant 3 taxa by abundance (no. ind. m⁻²)	Dominant taxa % of total abundance	Dominant 3 taxa by carbon weight (g C m⁻²)	Dominant taxa % of total carbon weight
HLY0403	48	EHS-7	Thyasiridae	52.8	Hyperamminidae	59.0
			Hyperamminidae	44.7	Thyasiridae	34.0
			Hemichordata	0.6	Hemichordata	6.3
HLY0403	49	EHS-9	Lituolidae	96.0	Lituolidae	84.3
			Yoldia sp.	1.7	Hyperamminidae	7.7
			Cirratulidae	0.6	*Yoldia sp.*	6.0
HLY0403	54	WHS-6	Lituolidae	99.6	Lituolidae	100.0
			Nematoda	0.4	Nematoda	0.0
HLY0403	55	WHS-5	Lituolidae	72.3	Maldanidae	47.1
			Hyperamminidae	13.8	Hyperamminidae	27.6
			Tindaria sp.	6.2	Lituolidae	8.9
HLY0403	56	WHS-4	Hyperamminidae	73.6	Hyperamminidae	80.4
			Ostracoda	13.8	Ostracoda	5.5
			Astrorhizidae	3.4	Maldanidae	3.5
HLY0403	58	WHS-3	Hyperamminidae	33.3	Asteroidea	44.8
			Nodosariidae	7.4	Anthozoa	32.3
			Lituolidae	7.4	*Ampelisca sp.*	9.2
HLY0403	59	WHS-2	Oweniidae	34.6	Oweniidae	25.9
			Hyperamminidae	15.6	Astartidae	19.5
			Lituolidae	9.8	Rhynchocoela	9.1
HLY0403	60	WHS-1	*N. belloti*	31.9	*N. belloti*	39.9
			Synaptidae	20.8	Ampharetidae	19.6
			Yoldia sp.	5.6	*N. radiata*	11.5

Appendix H. Spearman's rho correlation matrix of benthic parameters for SWL2004 & HLY0403 combined. Blue indicates negative significant ($p < 0.05$) correlations and red indicates significant ($p < 0.05$) positive correlations.

	Surface sed chl *a*	TOC	C/N	Modal phi size	Depth	0.5 mm abundance	0.5 mm biomass	1.0 mm abundance	1.0 mm biomass
Surface sed chl *a*									
TOC	0.236 0.119 45								
C/N	-0.279 0.063 45	0.217 0.152 45							
Modal phi size	-0.012 0.940 45	0.585 0.000 45	-0.034 0.824 45						
Depth	-0.530 0.000 45	0.396 0.007 45	0.349 0.019 45	0.494 0.001 45					
0.5 mm abundance	-0.121 0.480 36	-0.081 0.638 36	0.172 0.315 36	0.198 0.246 36	0.109 0.528 36				
0.5 mm biomass	0.106 0.537 36	-0.055 0.752 36	0.268 0.114 36	0.064 0.710 36	-0.005 0.977 36	0.646 0.000 36			
1.0 mm abundance	0.061 0.724 36	-0.054 0.755 36	0.151 0.381 36	-0.047 0.787 36	0.090 0.602 36	0.509 0.002 36	0.474 0.003 36		
1.0 mm biomass	0.504 0.002 36	-0.165 0.335 36	-0.328 0.051 36	-0.327 0.052 36	-0.651 0.000 36	0.063 0.714 36	0.315 0.061 36	0.144 0.403 36	

Appendix I. Spearman's rho correlation matrix of benthic parameters for HLY0402. Blue indicates significant ($p < 0.05$) negative correlations and red indicates significant ($p < 0.05$) positive correlations.

	Surface sed chl *a*	TOC	C/N	Modal phi size	Depth	0.5 mm abundance	0.5 mm biomass	1.0 mm abundance	1.0 mm biomass
Surface sed chl *a*									
TOC	0.006 0.983 16								
C/N	0.188 0.485 16	0.038 0.888 16							
Modal phi size	0.050 0.855 16	0.006 0.981 16	-0.285 0.284 16						
Depth	-0.166 0.525 17	0.697 0.003 16	-0.085 0.753 16	0.013 0.962 16					
0.5 mm abundance	0.156 0.594 14	0.044 0.887 13	0.577 0.039 13	0.309 0.305 13	0.048 0.869 14				
0.5 mm biomass	0.392 0.166 14	0.033 0.914 13	0.651 0.016 13	0.117 0.704 13	-0.156 0.594 14	0.854 0.000 14			
1.0 mm abundance	0.231 0.427 14	0.022 0.943 13	0.681 0.010 13	-0.077 0.802 13	0.024 0.935 14	0.701 0.005 14	0.878 0.000 14		
1.0 mm biomass	0.376 0.185 14	-0.104 0.734 13	0.445 0.128 13	0.231 0.447 13	-0.348 0.223 14	0.771 0.001 14	0.858 0.000 14	0.815 0.000 14	

Vita

Rebecca S. Pirtle-Levy was born in Del Rio, TN on November 13, 1976. She was raised in Cosby, TN and attended Cosby Elementary School and Newport Grammar School. She graduated from Cocke County High School in 1995. In 1996, she began her bachelor's degree at University of Tennessee, Martin. After a period of time off, she transferred to the University of Tennessee, Knoxville in 2000 where she obtained a B.S. in Ecology and Evolutionary Biology in 2003 and a M.S. in Ecology and Evolutionary Biology with a concentration in Biological Oceanography in 2006.