GEOLOGICAL SURVEY OF CANADA
OPEN FILE 6044

Cruise Report *Amundsen* 2006-804: Beaufort Sea / Amundsen Gulf / Northwest Passage, August 22 – October 30, 2006

Robbie Bennett[1], Don Forbes[1,4], Jason Bartlett[2], Jonathan Beaudoin[3], Steve Blasco[1], John Hughes-Clarke[3], Trevor Bell[4]

[1] Geological Survey of Canada (Atlantic)
[2] Canadian Hydrographic Service
[3]Ocean Mapping Group – University of New Brunswick
[4]Memorial University of Newfoundland

2009

Natural Resources Canada | Ressources naturelles Canada

Canada

GEOLOGICAL SURVEY OF CANADA

OPEN FILE 6044

Cruise Report *Amundsen* 2006-804: Beaufort Sea / Amundsen Gulf / Northwest Passage, August 22 – October 30, 2006

R. Bennett, D. L. Forbes, J. Bartlett, J. Beaudoin, S. Blasco, J. Hughes-Clarke, T. Bell

2009

Available from
Geological Survey of Canada
601 Booth Street
Ottawa, Ontario K1A 0E8

Bennett, R., Forbes, D., Bartlett, J., Beaudoin, J., Blasco, S., Hughes-Clarke, J., Bell, T. 2009: Cruise Report *Amundsen* 2006-804: Beaufort Sea / Amundsen Gulf / Northwest Passage, August 22 – October 30, 2006; Geological Survey of Canada, Open File 6044, 86 p.

Open files are products that have not gone through the GSC formal publication process.

TABLE OF CONTENTS

1.0 INTRODUCTION

This cruise report summarizes the activities of the geological/paleoceanographic science program of ArcticNet Leg 1 & 2 2006 which took place between August 22nd and October 30th. A GSCA cruise number (2006-804) has been given to this project since GSCA personnel were onboard and samples from this expedition are being curated at the Bedford Institute of Oceanography. The cruise number does not apply to data collected by other scientists involved in the ArcticNet program and their activities will not be discussed in this report. Additional information on the activities of other ArcticNet participants can be obtained from Martin Fortier (martin.fortier@arcticnet.ulaval.ca) or at the ArcticNet website (http://www.arcticnet-ulaval.ca/).

1.1 Scientific Staff

Éric Potvin	Institut des Sciences de la mer de Rimouski located at the Université du Quebec à Rimouski
Trecia Schell	Dalhousie University – Department of Earth Sciences
Jonathan Beaudoin	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
Ian Church	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
John Hughes-Clarke	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
Steve Brucker	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
Pim Kuus	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
Doug Cartwright	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
Jason Bartlett	Ocean Mapping Group located at the University of New Brunswick (Fredericton)
Don Forbes	Geological Survey of Canada (Atlantic)
Trevor Bell	Memorial University of Newfoundland
Robbie Bennett	Geological Survey of Canada (Atlantic)

1.2 Background

ArcticNet is a Network of Centres of Excellence (funded by the Government of Canada through the NCE program) that aims to contribute to the development and dissemination of the knowledge needed to formulate adaptation strategies and national policies to help Canadians face the impacts and opportunities of climate change and globalization in the Arctic. This will encompass the study of geological, ecological, environmental, biological, chemical, and cultural processes in the Arctic.

2.0 SCIENTIFIC OBJECTIVES

The primary objectives of this work were to map the coastal seabed for hydrographic charting, geological interpretation, and benthic habitat characterization. The objectives of cruise 2006-804 fell under ArcticNet projects 1.6 and 1.2. The objectives of project 1.6 entitled "Opening the Northwest Passage: Resources, Navigation, Sovereignty, & Security" included: (1) to compile corridors of precise high resolution bathymetry, and seabed geomorphology; (2) to improve the mapping of the surficial geological environment of the Canadian Archipelago channels; (3) obtain sediment cores and grabs of the Holocene record for paleoceanographic analyses at optimal sites in the region. The objectives of project 1.2 entitled "Coastal Vulnerability in a Warming Arctic" included: (1) to improve understanding and prediction of relative sea-level change and associated coastal hazards in the Arctic; (2) to measure and predict coastal sensitivity to a range of climate-change effects; and (3) to assess community and habitat vulnerability to coastal change in a warming Arctic.

In order to obtain the maximum seabed mapping coverage, geophysical data (multibeam bathymetry and sub-bottom profiles) were acquired whenever *Amundsen* was underway between sampling stations, over most of the piston core sites, and in several areas where interesting seabed features were observed.

In order to collect high-resolution sediment cores through the Northwest Passage for paleoceanographic analysis, core sites were selected based on geophysical data collected during the Canadian Arctic Shelf Exchange Study (CASES) Leg 1, Leg 8, Leg 9, ArcticNet 2004, 2005, and data archived at the GSCA. Sites were selected in order to sample thick Holocene sequences in the Northwest Passage.

Multibeam and sub-bottom profile data were acquired using the survey launch *Heron* at targeted locations to address questions of seas-level rise and associated coastal change in the western Canadian Arctic. The objectives were to identify evidence of the postglacial lowstand shoreline and to support interpretation of sea-level rise from cores (collected in a separate field program) in former lakes now converted to marine basins. Three target sites were identified: Sachs Harbour, De Salis Bay (140 km east of Sachs Harbour), and Gillett Bay near Cape Parry, 50 km north of Paulatuk. In the end, some work was accomplished at the first two sites but time allocations precluded any work at the third.

3.0 EQUIPMENT

Scientific operations for cruise 2006-804 were performed aboard the CCGS *Amundsen* (see Fig. 1). The *Amundsen* (formerly the CCGS Sir John Franklin built in 1979, and renamed *Amundsen* in 2003) is a Class 3 icebreaker which has been refitted to accommodate Arctic science research. The ship is 98 m long, 19 m wide with a draft of 7 m and can obtain a maximum speed of about 16 knots. There is approximately 300 m² of lab space inside the vessel with another 110 m² of lab space in temporary external lab containers. The *Amundsen* can accommodate 46 scientific staff in addition to the 31 ship's crew. Equipment relevant to geoscience work onboard the *Amundsen* includes:

-Kongsberg-Simrad EM300 30 kHz multibeam echosounder (discussed in section 3.3)
-Knudsen K320R 3.5 kHz sub-bottom profiler (discussed in section 3.4)
-Applanix POS/MV 320 motion and orientation sensor
-C&C Technologies CNAV GPS
-AML Smart Probe surface sound speed probe
-Surface temperature and salinity probe
-Seabird SBE911 CTD, deployed from rosette
-Box core (discussed in section 3.2)

Figure 1 – CCGS *Amundsen*

A multibeam survey launch (CSL *Heron*) was also used during 2006-804 (Fig. 2). This vessel was deployed from the *Amundsen* and was used in shallow waters for coastal surveys because of its shallow draft (about 1.15 m). The equipment installed on the *Heron* included:

-Kongsberg-Simrad EM3002 300 kHz multibeam echosounder (discussed in section 3.3)
-Knudsen K320B/R 3.5 kHz sub-bottom profiler (discussed in section 3.4)
-Knudsen K320B 28/200 kHz single-beam echosounder
-Knudsen K320B 2 x 200 kHz side scan sounders
-CodaOctopus F185+ motion and orientation sensor
-C&C Technologies CNAV GPS
-Brooke-Ocean Technologies Moving Vessel Profiler 30 (MVP30)
-AML Smart Probe salinity and temperature probe (deployed on MVP30)
-Optical backscatter probe (deployed on MVP30)

Figure 2 – CSL *Heron*

3.1 Box Corer

The 50 cm x 50 cm x 80 cm box corer (Fig. 3) was used onboard the *Amundsen* in 2006. In most instances, one push core (99.2 mm ID) was taken from each box core sample. Two push cores were taken at some core sites if there was sufficient material and if the sediment sample proved interesting. Surface sediment samples at each box core location were also collected in order to develop reference databases of modern dinoflagellate cysts, and foraminifera populations in the study area. The surface samples will be stored at Dalhousie University and at the Institut des Sciences de la mer de Rimouski (ISMER). The box corer used during 2006 was only one year old and in good condition. Some damage was sustained to the stainless steel box on the first leg of 2006 due to the corer contacting bedrock. This damage was mostly cosmetic and did not significantly affect the performance of the corer.

Figure 3 – Photo of box corer used onboard the *Amundsen* in 2006 (photo courtesy Keith Lévesque, ArcticNet)

The multibeam echosounder and sub-bottom profiler were checked before each box core to ensure that the seabed was suitable for deployment of the corer (i.e. sediment bottom and not bedrock). The locations of the box cores collected during Leg 2 are shown in table 1 and Fig. 4.

3.2 Multibeam Echosounder

For the 2006-804 cruise, two multibeam sonar systems were used to acquire bathymetry data: the Kongsberg-Simrad EM 300 mounted on the CCGS *Amundsen*; and the Kongsberg-Simrad EM 3002, mounted on the CSL *Heron*. These two systems were

operated and maintained by the personnel of the Ocean Mapping Group (OMG) at the University of New Brunswick (Fredericton).

The EM 300 is designed for seabed mapping from the shoreline to beyond the continental rises and includes such features as phase detection, equidistant beam spacing, calibrated seabed acoustic imaging, and advanced signal processing technology. The EM 300's transmit and receive transducer arrays were hull-mounted and are networked to the control station on the Navigation Deck of the *Amundsen*. Post processing and display of the multibeam data was performed using software developed by OMG.

The basic specifications of the EM 300 are:

Frequency	30 kHz
Peak Power	4.5 or 9 kW
Pulse Length	0.7, 2, or 15 ms
Number of Beams	135
Beamwidth	1x1°, 1x2°, 2x2°, or 2x4°
Coverage sector	150°
Depth range	10 m to >5,000 m
Maximum swath width	>5,000 m

Sound velocity data for the EM 300 were acquired from the Seabird CTD on the rosette. Two hull-mounted probes were also available to supply sound velocity information to the EM 300 transducer.

The EM 3002 is designed for detailed seafloor mapping and inspection with water depths from less than 1 m up to typically 200 m in cold oceanic conditions. During 2006-804, the EM 3002 was used successfully to water depths of 120 m. This system has extremely high resolution and dynamically focused beams. Post processing and display of the multibeam data was performed using software developed by OMG.

Frequencies	293, 300, 307 kHz
No. of soundings per ping	Max 254
Maximum ping rate	40 Hz
Maximum angular coverage	130 degrees
Pitch stabilization	Yes
Roll stabilization	Yes
Heave compensation	Yes
Pulse length	150 µs
Range sampling rate	14, 14.3, 14.6 kHz
Depth resolution	1 cm
Beam spacing	Equidistant or equiangular
Beamforming	Time delay with shading; Dynamically focused receive beams

Sound velocity data for the EM 300 was acquired from the Brooke-Ocean Technologies Moving Vessel Profiler (MVP30).

3.3 Sub-bottom Profiler

The sub-bottom profiler installed onboard the *Amundsen* is the Knudsen 320R deep water echosounder. The Knudsen 320R is a high power bathymetry/sub-bottom imaging system capable of data collection at full ocean depths. The 320R utilizes sixteen 3.5 kHz hull-mounted transducers which are networked to the control station on the Navigation Deck of the *Amundsen* where the data are stored digitally.

The basic specifications of the Knudsen 320R are as follows:

Frequency	3.5 kHz
Power	4 to 8 selectable levels
Pulse Length	Automatically selected with override
Phased Ranges	Multiple 50% overlapped phases for each range, manual or automatic selection
Gain Controls	AGC, TVG, plus manual receive gain

CSL *Heron* is outfitted with a Knudsen K320B/R 3.5 kHz sub-bottom profiler which is similar to the profiler used on the *Amundsen*. The system on the *Heron* however uses only one hull-mounted Knudsen 3.5 kHz transducer.

4.0 GEOPHYSICAL AND GEOTECHNICAL DATA SETS

A large amount of both geophysical and geotechnical data was collected during cruise 2006-804 aboard the CCGS *Amundsen*. This section presents further details on the data collected over the duration of 2006-804. A narrative of the daily events of 2006-804 is provided in Appendix 1.

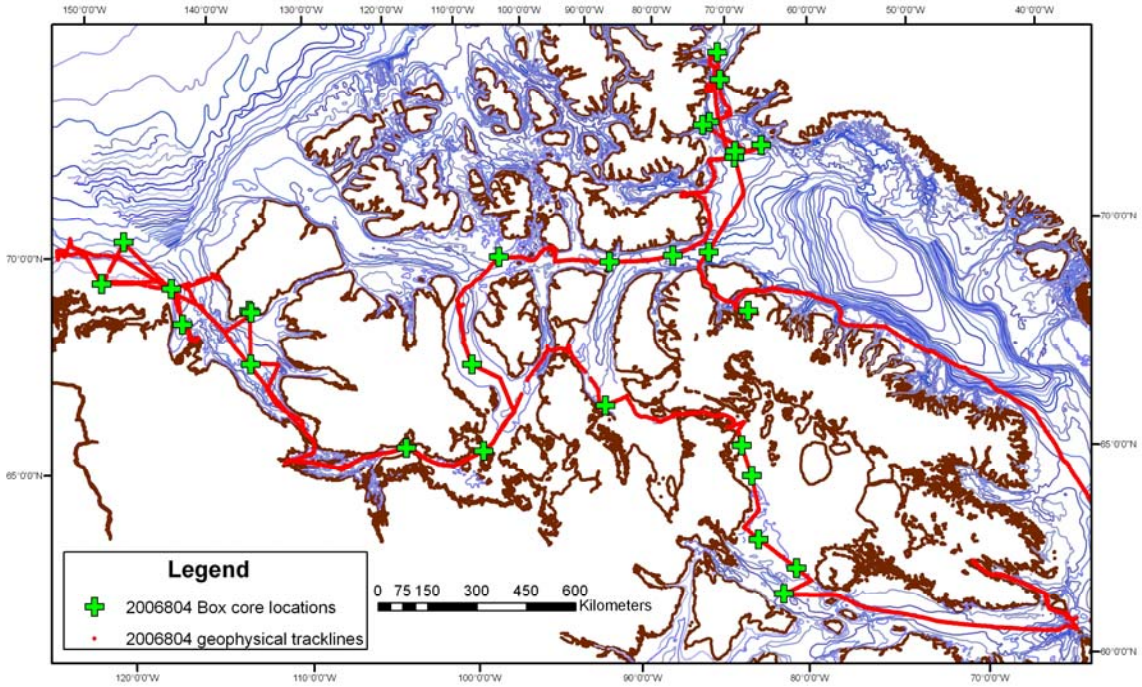
4.1 Geotechnical Samples

A total of 26 box core sites were attempted during 2006-804 (see Fig. 4 for locations, Appendix 2 for sample details, and Appendix 3 for sub-bottom profiler images of the core sites). Sufficient sediment for push cores was obtained at all but 4 core sites (2006-804-003, -004, -026, -029). Surface sediment samples for foraminifera (1 x 30cc surface sample in buffered formalin) and dinoflagellate (2 x 60cc surface sample) analysis were collected at all but three sites for which there was insufficient material (2006-804-004, -026, -029). The surface samples are curated at Dalhousie University and at ISMER.

The push cores collected during 2006-804 were stored upright in a refrigerated room at ~4°C. These cores were not processed onboard the vessel. When the *Amundsen* returned to Quebec City, the core samples were transported to the core repository at the Bedford Institute of Oceanography where they are to be processed, analyzed and curated. The deck sheets, which include a short description of sediment type of each core, are available in Appendix 4.

Personnel were transported to Banks Island by helicopter to collect three grab samples (2006-804-017, -018, -020) and a sample of peat (2006-019) from beach locations near De Salis Bay.

Figure 4 – Geophysical and geotechnical data collected on cruise 2006-804



4.2 Geophysical Data

Geophysical survey blocks were conducted in the following areas by the CCGS *Amundsen* and/or CSL *Heron*. Preliminary analysis of some of the data is discussed in Section 5.

Table 1: Multibeam survey blocks

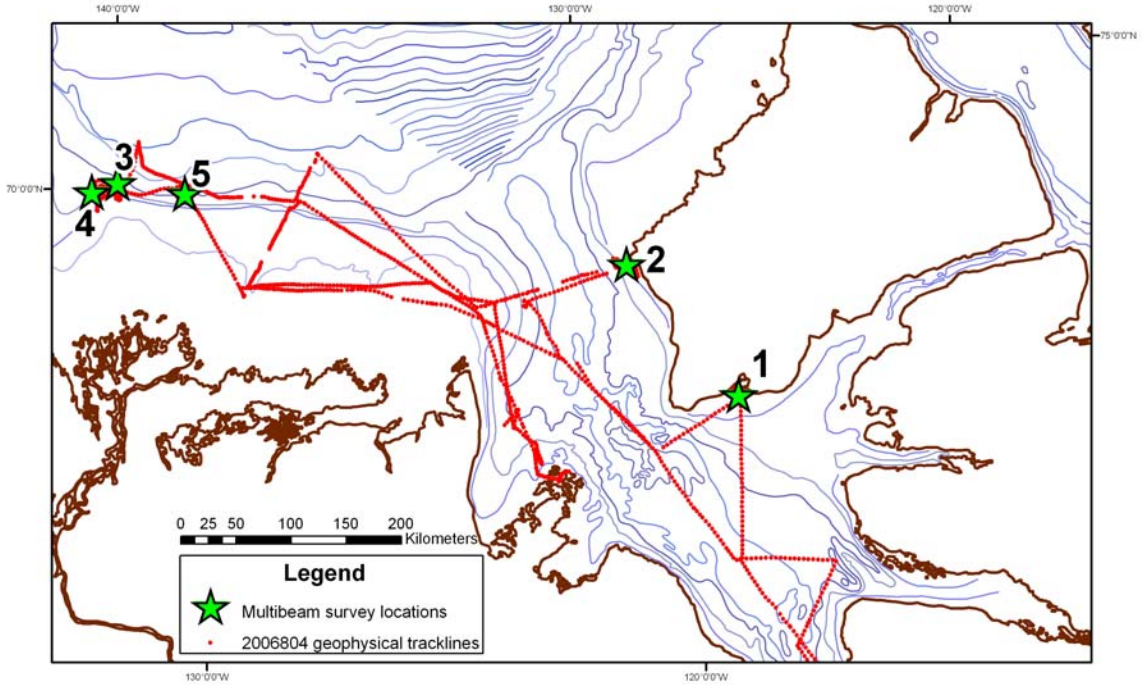
Block#	Date	Survey Site	Latitude N	Longitude W	Dimensions (km)	WD(m)
1	09/29/06	DeSalis Bay	71°21’	-121°41’	Recon. coverage	variable
2	10/03/06 - 10/04/06	Sachs Harbour	71°54’	-125°37’	Recon. coverage	variable
3	10/13/06 - 10/15/06	OAP Block 1	70°19’	-137°30’	17 x 5km	60 – 450m
4	10/14/06 - 10/15/06	OAP Block 2	70°11’	-137°52’	27 x 1km	70 – 280m
5	10/15/06 - 10/16/06	Slump	70°37’	-136°10’	14 x 10km	125 – 600m

Multibeam and sub-bottom profiler data were also collected while the ship was transiting between stations, when ice conditions permitted. Fig. 4 shows the complete track of the

Amundsen where geophysical data were collected and Fig. 5 displays the locations of the survey blocks shown in Table 1 (map projection: Mercator). Images of the multibeam and sub-bottom profiler data can be viewed at the University of New Brunswick Ocean (UNB) Mapping Group's website http://www.omg.unb.ca.

There were several difficulties encountered with the EM 300 multibeam system that required downtime for repairs. When the EM 300 was in working order, it acquired excellent data in ice-free waters; however sea ice did adversely affect the quality of the bathymetric data.

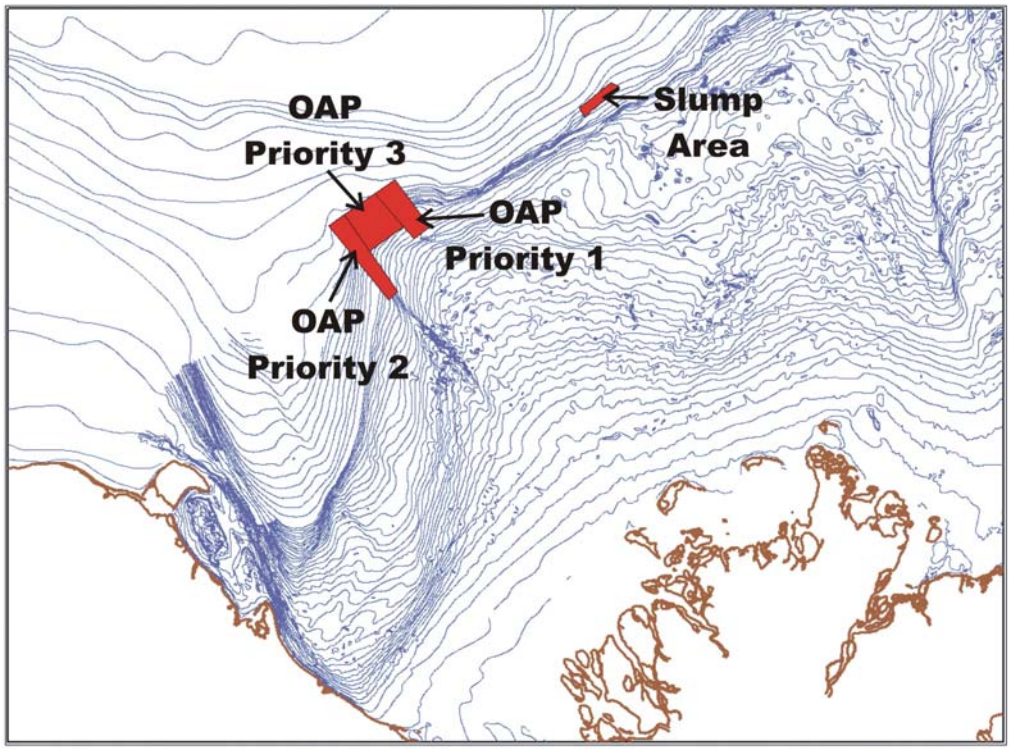
Figure 5 – Multibeam echosounder survey sites for cruise 2006-804 (details for each site given in Table 1)



5.0 SCIENTIFIC ACCOMPLISHMENTS

Two main areas were mapped by multibeam echosounder and sub-bottom profiler (Fig. 6). The first area was located on the eastern edge of the MacKenzie Trough and was mapped as part of Canada's Ocean Action Plan (OAP). The second area was a large seabed failure on the Mackenzie shelf break. This feature was mapped as part of NRCan's Geoscience for Ocean Management (GOM) program. The preliminary geological interpretation of these two survey areas is presented in this section.

Figure 6 – NRCan mapping areas



OAP Area

Through the Ocean Action Plan, a transect across the Beaufort Shelf from 5 m to 400 m is to be a targeted study of the seabed morphology, stratigraphy, benthic ecology, and geotechnical properties of the area. The main goal of this OAP work is to determine the effect of seabed features and processes (i.e. ice scour, gas venting) on benthic ecology. Most of this work will be accomplished using the CCGS *Nahidik*, however the *Amundsen* was used to collect multibeam data in the deeper water (greater than 70m) areas of the transect. UNB's survey launch *Heron* was also used in portions of the survey block.

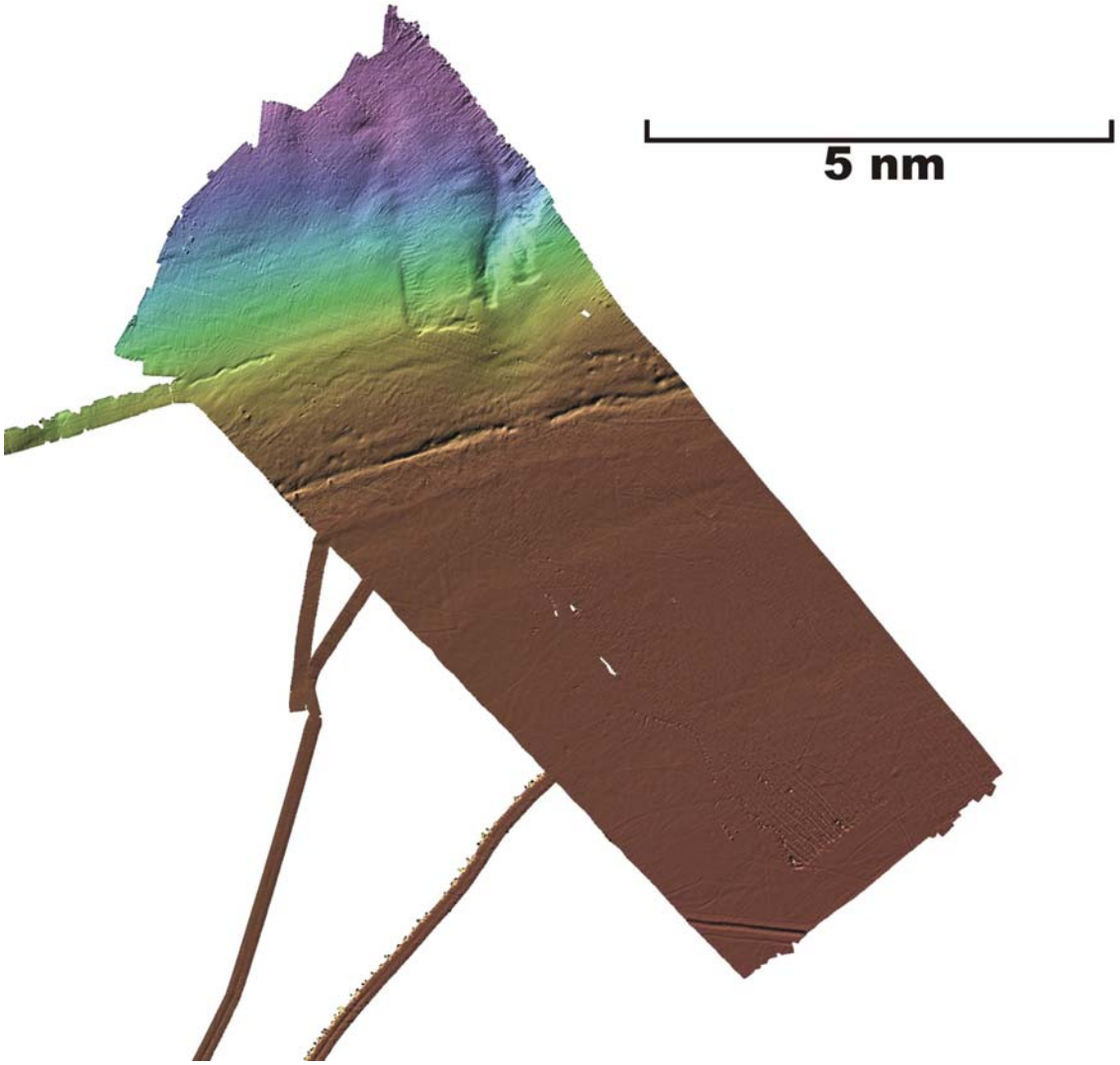
OAP Priority Block 1 (OAP P1) was mapped to completion during the allotted time for NRCan mapping. This area was given the highest priority due to the large amount of benthic samples (box cores and seabed photographs) collected by NRCan. Because of the new multibeam coverage collected by the *Amundsen* and *Heron*, the benthic samples can be correlated to the shelf-wide OAP transect.

OAP P1 is a significant data set (see Fig. 7) containing several interesting features that reveal useful information on the seabed processes that are active or were active in the past. Several slope failures are visible in the deeper water portions of the survey block which are located on the continental shelf break and slope. A large trough runs approximately east-west across the mid-section of the data set. This trough is located at the shelf break and has been interpreted to be an area of extensional failure. It cannot be determined from multibeam and sub-bottom data alone if these failures are active or when they were active in the past. Core samples and radiocarbon dating will be required to determine the age of these features.

In waters shallower than the shelf break the seabed is dominated by ice scours. The maximum observed depth of active scouring in the Beaufort Sea is approximately 55 m. Since all of OAP P1 is located in water depths greater than 60 m, it is interpreted that all of the scours in this area are not formed by the present sea ice regime but were created in the past when sea level was lower or by a past, more extreme sea ice regime. One very large scour is visible in the southern most corner of the survey block.

OAP Priority Block 2 (OAP P2) is the deep water extension of the main shelf-wide OAP transect. This area was started during 2006 however only 3 lines were collected on this site due to poor weather. No meaningful interpretation is possible at this time. There was no data collection in OAP Priority Block 3 during the 2006 cruise.

Figure 7 – Multibeam data of Ocean Action Plan Priority Block 1



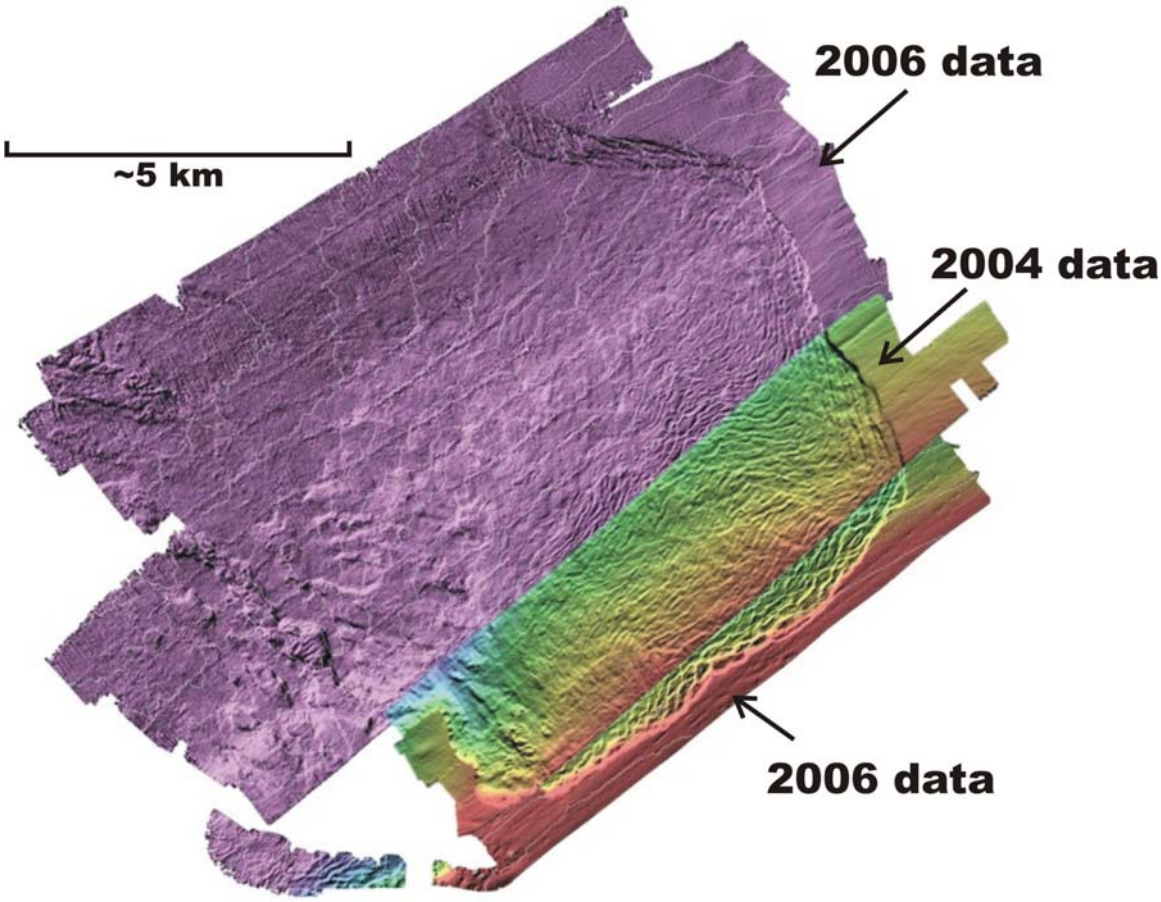
"Slump" Area

During the course of CASES Leg 8 in 2004, a large slope failure feature was imaged by multibeam echosounder and 3.5 kHz sub-bottom profiler (Bennett et al., 2008). A 3 x 11 km area was mapped during CASES, however due to its large scale; the entire feature could not be imaged during the allotted time set aside to survey the area. This same feature has been imaged and reported on at least two prior occasions by O'Connor Associates (1981) and Hill, Moran, and Blasco (1982).

Funding from NRCan was provided to ArcticNet to revisit the slump site to map the rest of the feature. The *Amundsen* was able to map the feature for almost 18 hours before it was necessary to move on to the next station. During this time, a very large amount of the slump was imaged, however the down-slope extent of the feature was still not observed (see Fig. 8). At this time, a 14 x 10 km section of the slump has been imaged in water depths from about 125 m to 600 m.

The age and origin of the feature is still not certain; however the multibeam bathymetry data collected during 2006 is an excellent data set and will be essential when integrated with future multibeam data and core samples. This data set reveals the widespread nature of sediment failure along the Beaufort Slope.

Figure 8 – Multibeam data of slump area



De Salis Bay

CSL *Heron* focused its survey in the inner bay, largely inside a large spit (Fig. 9). The survey design consisted of an initial stage in which single lines were run across the bay to provide a preliminary view of seabed bathymetry. This was followed by a more systematic survey of two areas where interesting features were identified. One area is

located along the southeastern side of the inner bay, where a bench at approximately 10 m water depth is thought to represent the Holocene sea-level lowstand. The surface of the bench is ice scoured and appears to be acoustically impenetrable, although faint stratification is visible in places. The other area of interest is located towards the head of the bay and consists of a northwest-southeast oriented trench with a central depression over 60 m deep (Fig. 10). The trench appears to follow the topographic grain of the adjacent land where Windrum Lagoon and De Salis River valley are prominent features (Fig. 9). The sub-bottom profile along the trench floor shows a thick acoustically-stratified unit (20 m), which is interpreted to represent glaciomarine sedimentation during final deglaciation of the bay ca. 10,000 years ago. The profiles also display normal faulting throughout the entire glaciomarine sequence in the central depression of the trench (Fig. 11). These faults are coincident with terrace scarps observed discontinuously along the sides of the depression. Together, these data suggest that glaciomarine sediments were laid down on top of a stranded glacial ice block, which melted over time causing subsidence and faulting of the overlying sediment cover. The feature therefore may be best described as a large submarine kettle hole, equivalent to the deep, round kettle lakes on the surrounding landscape of De Salis Bay (Fig. 9). Postglacial sedimentation and current action have subtly remodeled the seabed expression of the submarine kettle.

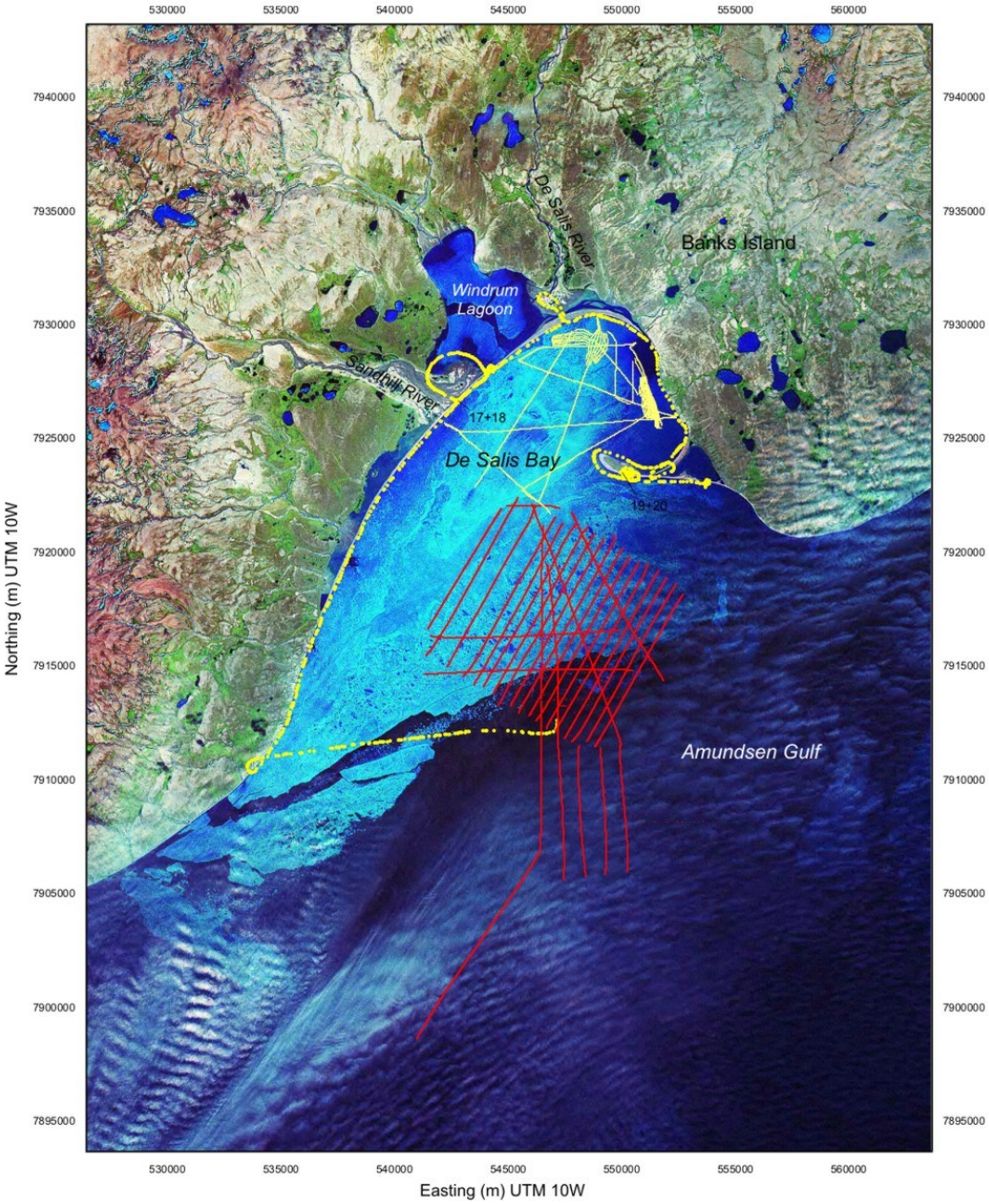


Fig. 9. Landsat mosaic of De Salis Bay showing preliminary *Amundsen* tracks [some errors] (red), *Heron* tracks (yellow), helicopter track (yellow dots), and onshore sample sites (numbered).

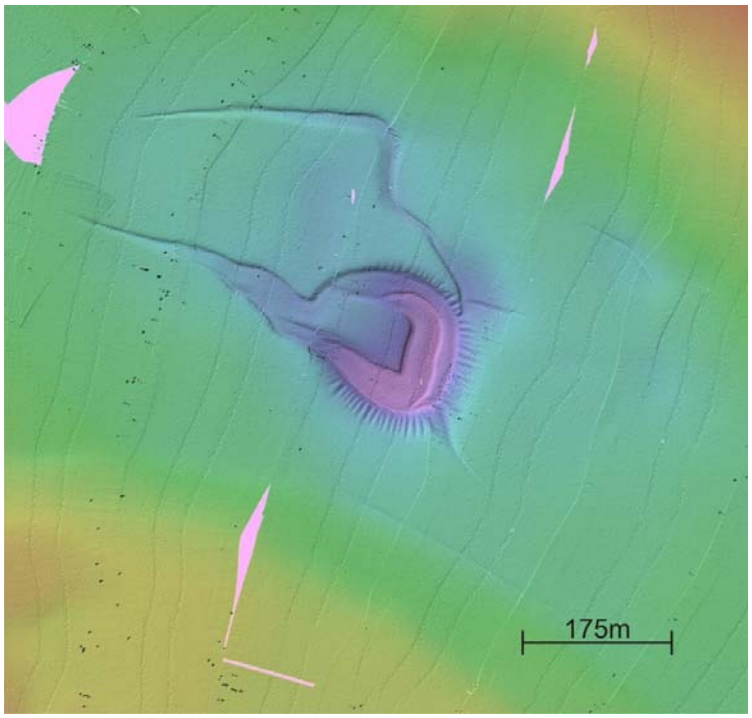


Fig. 10. Depression in the floor of inner De Salis Bay.

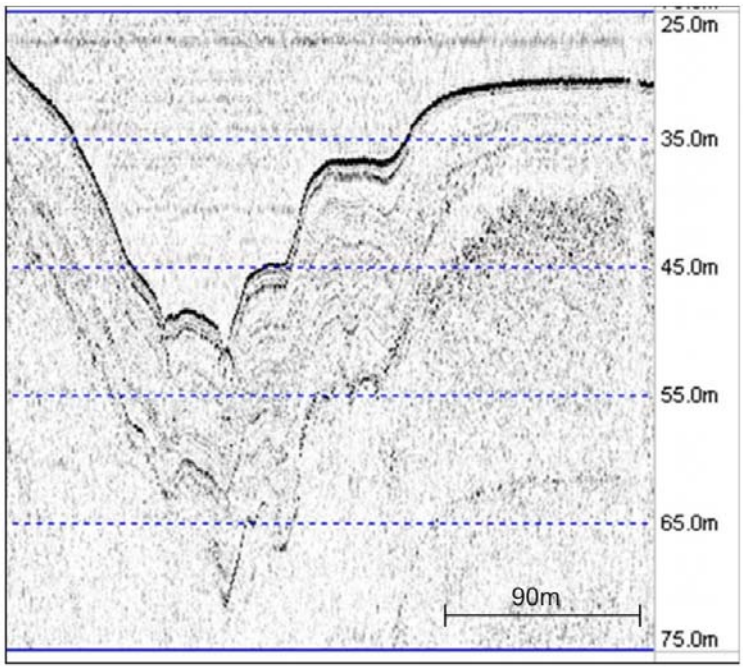


Fig. 11. Sub-bottom (3.5 kHz) profile through kettle depression in the floor of inner De Salis Bay, showing draped and faulted glaciomarine deposits.

While the *Heron* survey was working inside DeSalis Bay, CCGS *Amundsen* surveyed a large area (about 100 km^2) in the outer bay and approaches on a sparse grid with line spacing of approximately 0.25 Nm. This was supplemented by three north-south check lines, three east-west check lines, and five north-south lines extending 5 km south of the main survey grid (Fig. 9). Over much of this area, the bottom was interpreted as compact sand, interrupted in places by patches of till outcrop. Extensive ice scour was found in the southeast and scour depressions were less common toward the northwest. The sub-bottom data showed substantial sand thickness and volume, consistent with the large sand sources in cliffs to the southwest and very extensive sand and gravel beaches surrounding the bay.

Additionally, helicopter C-GCHU (CG358) flew from the *Amundsen* flight deck and completed an aerial survey and photo reconnaissance of the bay. Preliminary results from the aerial survey are presented in Appendix 5.

Sachs Harbour

The interpretation of data collected during 2006-804 (Fig. 12) suggests that the inner and outer basins of Sachs Harbour are more complex than originally thought. Basin floors have remarkably irregular relief characterized by narrow ridges and troughs of up to 10 m relief. Water depths exceed 30 m in both outer basins. The sills are prominent features of the estuary and as shallow as a metre or less in places. Our surveys portray these features as steep-sided, flat topped, and for the most part acoustically impenetrable. The irregularity of the basin floors is consistent with the interpretation that the basins are kettle holes, as melting of the former glacier ice block would cause gradual subsidence and faulting of the overlying sedimentary cover, leaving an irregular surface. The steep-sided basin margins are also characteristic of kettle holes (Benn and Evans, 1998) and other lakes on the Sachs Lowland are interpreted as kettles (e.g. Gurney and Worsley, 1997).

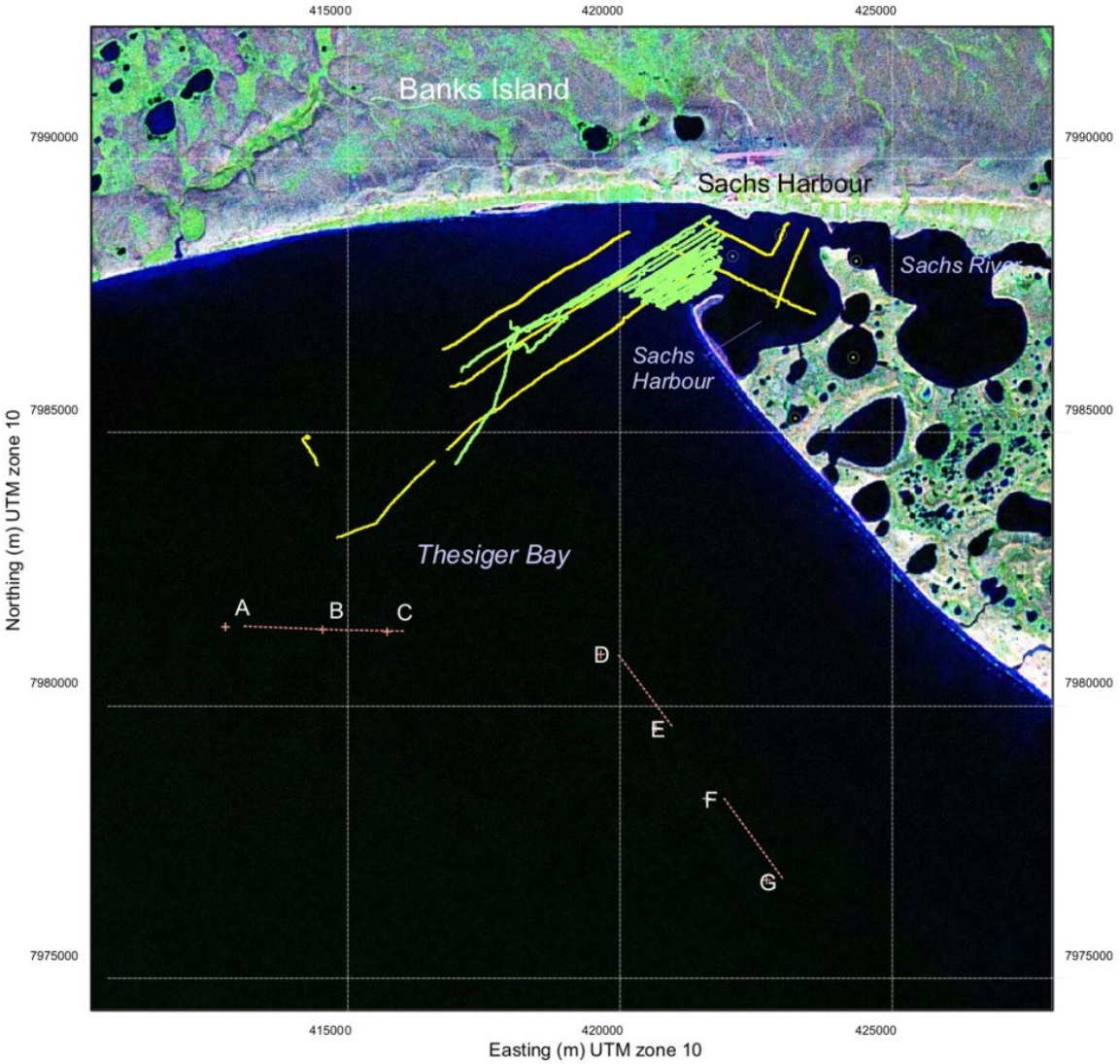


Fig. 12. Landsat image of Sachs Harbour showing the lake-studded lowland area to the southeast and amalgamated breached lake basins forming the harbour at the outlet of the Sachs River. Also shown are *Heron* survey tracks for sub-bottom profiling on October 3 [day 276] (yellow) and single-beam and side scan surveys on October 4 [day 277] (green); locations of cores taken through ice in May 2006 (circled dots); and segments of *Amundsen* track for which sub-bottom profiles are illustrated below (A-B-C, D-E, F-G).

The acoustic stratigraphy of the harbour consists of three sedimentary units: a lower acoustically stratified unit that appears thickest in the basins (at least 8 m thick in the outer basin, Fig. 13) and may thin across the sills; an overlying acoustically transparent unit, 1-2 m thick, which appears to drape basin floors, except in high relief areas, where it

is mostly ponded in small depressions; and an uppermost acoustically stratified unit which only occurs in the outer basin at its seaward end. The lower unit is interpreted to be stratified glaciomarine and/or glaciofluvial sediment deposited on an outwash plain. Although outwash deposits would normally be horizontally stratified, the kettled topography results in an apparent draping of the sills, but this is due to post-depositional subsidence in the basins and not necessarily primary sedimentation. The upper unit is interpreted to be postglacial mud in the inner basin and those parts of the outer basin distal to marine spillover processes. The mud (likely sandy mud based on source sediments) was deposited by suspension settling of reworked material from the sill tops and thermokarst erosion of the basin margins. There is evidence of slumping in the mud unit on steeper basin margins. Spillover of sand on the outer sill and behind the prominent spit of Sachs Harbour has led to the accumulation of an acoustically stratified uppermost unit on the adjacent basin floor, in places overlying the mud unit, suggesting relatively recent accumulation. Irregular thickening of the unit on sill slopes suggests active slumping of this unit due to high depositional rates and unstable slope conditions (Fig. 13).

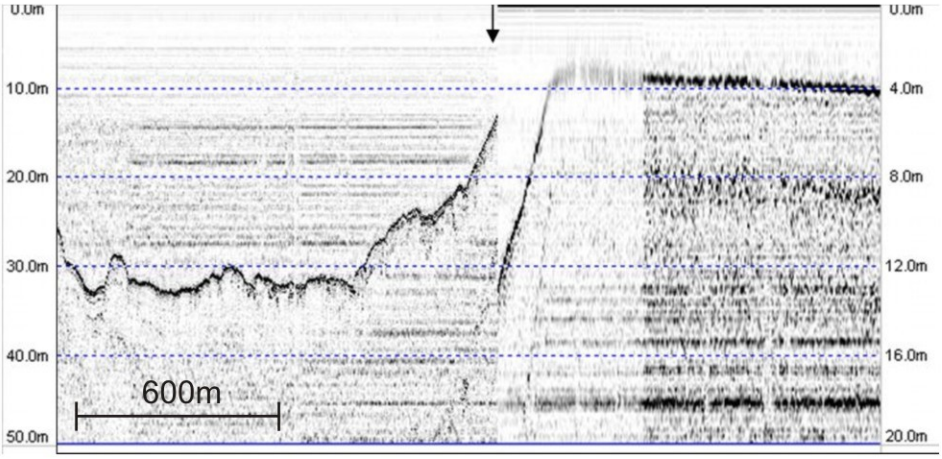


Fig. 13. Profile across outer basin heading seaward across outer sill – this line is closest to spit (phase change of sub-bottom recorder at arrow)

At least two distinct acoustic units are observed in deeper water outside the sill. The lowermost unit is a conformably stratified unit also showing some onlapping at basin or valley margins. This is interpreted as late-glacial glaciomarine or perhaps locally glacio-lacustrine facies associated with the final glacial advance in the Sachs Harbour area (Vincent, 1990). The base of this unit is somewhat irregular and interpreted as the upper surface of an underlying acoustically impenetrable unit, most likely till in many places. The stratified deposits are truncated by near-horizontal surfaces of the modern sea-floor in depths down to at least 40 m (Fig. 14).

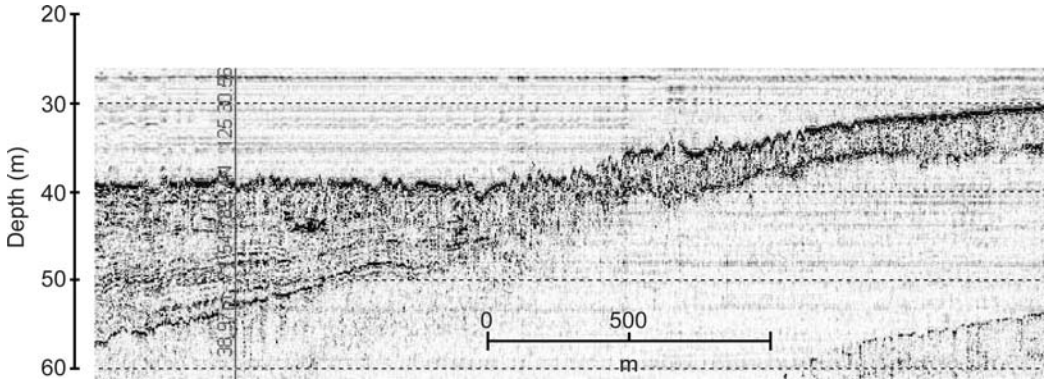


Fig. 14. East-west *Amundsen* 3.5 kHz profile off Sachs Harbour in present water depths of about 40 m shoaling to 30 m at the right. This is a continuation of the profile in Fig. 20 from A-B to C in Fig. 13 (east to the right). The surface truncation of the conformably stratified unit at the left continues into the subsurface at the right, where the overlying unit up to 3 m thick is interpreted as a possible post-transgressive marine unit.

Closer to the coast along a survey line running approximately shore-parallel southeast of Sachs Harbour (D-G in Fig. 12), sub-horizontal terraces and seafloor truncation surfaces in depths between 30 and 40 m are interrupted in places by channels or basins extending to 40 m or deeper. These basins show very similar characteristics to the breached kettle lake basins forming Sachs Harbour and may represent the overstepped basins of breached lakes on what was formerly an extension of the Sachs Lowlands terrain on shore today. In contrast to truncated lake basins found off the Tuktoyaktuk Peninsula (Héquette and Hill, 1989), where very similar terrain exists onshore, many of these basins have not been filled with sediment during the transgression.

6.0 RECOMMENDATIONS

- Complete multibeam survey of OAP Priority block #2
- Acquire sediment cores from the slope failure feature imaged during 2004-804. Also complete multibeam survey of the area to image the entire feature
- Acquire more multibeam data in the Amundsen Gulf to determine the extent of ice sheet related features

7.0 REFERENCES

Benn, D.I. and Evans, D.J.A. 1998. *Glaciers and Glaciation*. Arnold, London, 734 pp.

Bennett, R., Rochon, A., Schell, T., Bartlett, J., Blasco, S., Hughes-Clarke, J., Scott, D., MacDonald, A., Rainey, W., 2008. *Cruise Report Amundsen 2004-804: Beaufort Sea / Amundsen Gulf / Northwest Passage, June 23 – August 27, 2004.* Geological Survey of Canada, Open File 5798, 111 p.

Gurney, S.D. and Worsley, P. 1997. Genetically complex and morphologically diverse pingos in the Fish Lake area of south west Banks Island, N.W.T., Canada. *Geografiska Annaler*, Series A, **79**, 41-56.

Héquette, A. and Hill, P.R. 1989. Late Quaternary seismic stratigraphy of the inner shelf seaward of the Tuktoyaktuk Peninsula, Canadian Beaufort Sea. *Canadian Journal of Earth Sciences*, **26**, 1990-2002.

Hill P.R., Moran K.M, and Blasco S.M., 1982. Creep deformation of slope sediments in the Canadian Beaufort Sea. *Geo-Marine Letters*, **2**, p. 163 – 170.

O'Connor, M.J., 1981. *Morphology of the Shelf Edge. A Report on the Southern Beaufort Sea.* Unpublished report for the Geological Survey of Canada. M.J. O'Connor Associated Ltd., Calgary, Alberta, 70p.

Vincent, J.-S. 1990. Late Tertiary and Early Pleistocene deposits and history of Banks Island, southwestern Canadian Arctic Archipelago. *Arctic*, **43**, 339-363.

APPENDIX 1 - 2006-804 NARRATIVE

2006-804 NARRATIVE

ArcticNet 2006
Robbie Bennett- GSC Coring Technician onboard September 28th to October 30th, 2006

A daily log was not kept for Leg 1 (August 22nd to September 28th) of 2006-804; cores collected by personnel from UQAR and Dalhousie University during Leg 1.

September 27, 2006
-depart Halifax @ 12:15pm AT, arrive in Quebec City at 2:20pm ET

September 28, 2006
-arrive at airport for charter flight to Kugluktuk at 4:00am ET
-reach Kugluktuk at about 1:00pm MT
-crew transfer to ship by helicopter beginning at 1:45pm MT
-first science meeting at 8:00pm MT

September 29, 2006
-prepared for box core

September 30, 2006
-DeSalis Bay survey
-ArcticNet 2006 station 403
-prepared for box core and net tow
-collected box core 2006-804-016 BC, ~429m water depth
-collect net tow for A. Rochon at same location
-process samples

October 1, 2006
-process samples and clean lab
-check sample sheets and construct spreadsheet of sample data

October 2, 2006
- complete corrections to sample sheets and complete spreadsheet of sample data
- create arcview shapefiles of nav data for De Salis Bay survey

October 3, 3006
-assist Don Forbes with coastal surveying equipment
-survey Sachs Harbour (no coring)

October 4, 2006
-survey Sachs Harbour (no coring)
-discuss NRCan survey plan with Chief Scientist and Captain

October 5, 2006
-organize samples

October 6, 2006
-ArcticNet station 420
-collect box core 2006-804-021 BC, ~34 m water depth
-collect plankton nets for A. Rochon at stations 420 and 421
-process samples

October 7, 2006
-ArcticNet station 421
-collect box core 2006-804-022 BC, ~1218 m water depth
-process samples
-clean lab

October 8, 2006
-transit to Franklin Bay due to weather

October 9, 2006
-ArcticNet station 436
-collect box core 2006-804-023 BC, ~254 m water depth

October 10, 2006
-process samples
-clean lab
-no science operations due to weather

October 11, 2006
-transit to mooring station 435
-deploy mooring and full station (no boxcore)

October 12, 2006
-depart for NRCan survey site around 00:00
-transit slowly due to poor weather

October 13, 2006
-begin OAP block #1 at 1:45pm local (MT)
-onboard *Heron* to collect data (6:00 pm to 1:30am local)

October 14, 2006
-continue survey of OAP blocks 1 and 2
-deploy *Heron* in block 1 (9:00am local), *Amundsen* moves to block 2

-poor weather causes the *Heron* to be recovered at 4:30 local, *Amundsen* moves back to complete OAP block 1

October 15, 2006
-continue collecting data in OAP blocks 1
-OAP block 1 completed at about 8:00am local, move to block 2
-poor weather in block 2 causing poor data, move to slump survey (11:00pm local)
-begin collecting data in slump block (6:00pm)

October 16, 2006
-continue collecting data in slump block until 11:30am local
-prepare for next box core and plankton tow

October 17, 2006
-ArcticNet station 434
-collect box core 2006-804-024 BC, ~55 m water depth
-collect plankton net for A. Rochon – no recovery due to ice

October 18, 2006
-process samples
-clean lab

October 19, 2006
-small crew change in Kugluktuk

October 20, 2006
-transit (no sampling)

October 21, 2006
-transit (no sampling)

October 22, 2006
-transit (no sampling)

October 23, 2006
-ArcticNet station 322
-collect box core 2006-804-025 BC, ~210 m water depth
-collect plankton net for A. Rochon
-process samples

October 24, 2006
-process samples
-prepare for next box core and plankton tow
-ArcticNet station 322

-collect plankton net for A. Rochon

October 25, 2006
-collect box core 2006-804-026 BC, ~34 m water depth
-ArcticNet Station 334
-collect plankton net for A. Rochon
-collect box core 2006-804-027 BC, ~86 m water depth
-ArcticNet Station 338
-collect plankton net for A. Rochon
-collect box core 2006-804-028 BC, ~135 m water depth

October 26, 2006
-ArcticNet Station 346
-collect plankton net for A. Rochon
-collect box core 2006-804-029 BC, ~83 m water depth

October 27, 2006
-ArcticNet Station 350
-collect plankton net for A. Rochon
-collect box core 2006-804-030 BC, ~386 m water depth
-cleaned lab and packed equipment and materials

October 28, 2006
-continued packing and write cruise report

October 29, 2006
-continued packing equipment
-secured core samples in refrigerator

October 30, 2006
-R. Bennett disembarks CCGS *Amundsen*
-R. Bennett arrives in Halifax at about 9:30pm AT

APPENDIX 2 - 2006-804 SAMPLE INFORMATION

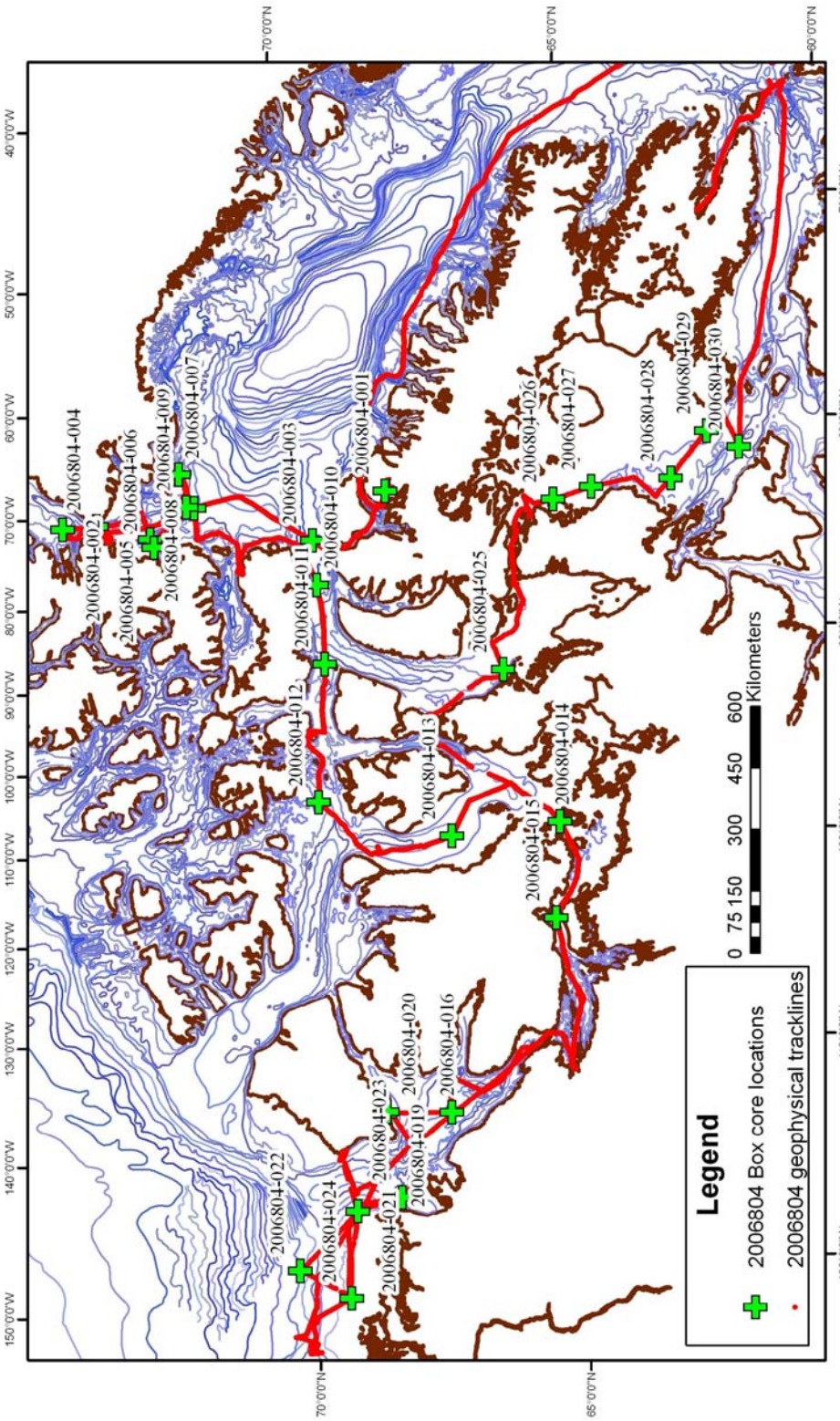
2006-804 ArcticNet 2006 Leg 1 & 2 (August 22nd to October 29th)

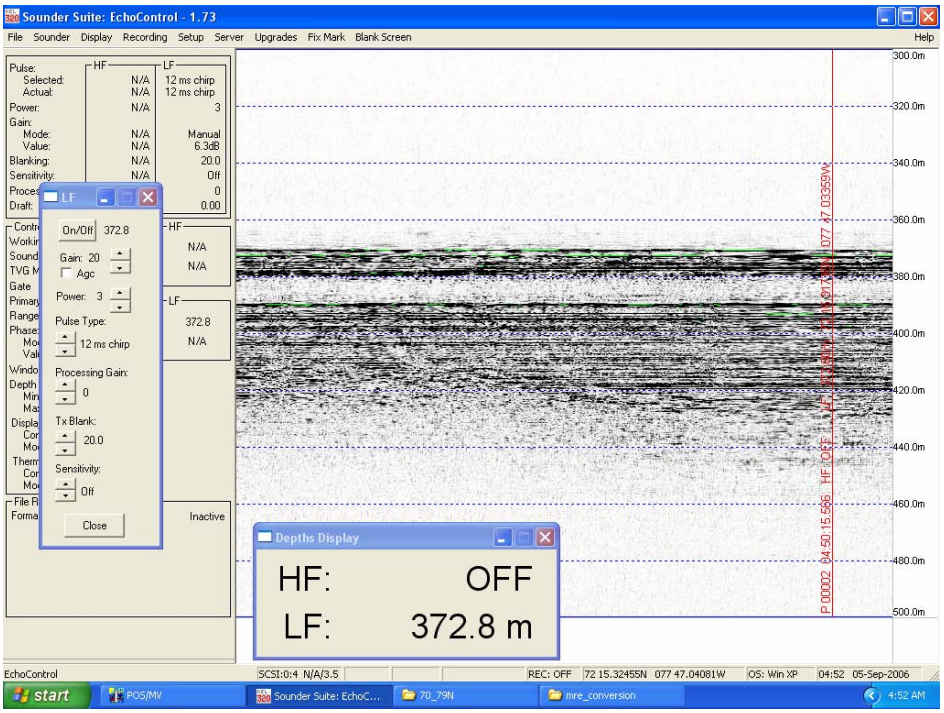
Julian Date	Time UTC	Station No.	Core Number	Latitude	Longitude	Water Depth (m)	Sample Type	Length (cm)	Apparent Penetration
252	6:15	none	2006804-001 BC	72°15.336' N	77°47.081' W	373	Push core	36	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
252	18:21	132	2006804-002 BC	78°59.992' N	72°17.082' W	250	Push core	15	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
254	3:56	127	2006804-003 BC	74°02.419' N	79°55.954' W	644	Surface (Forams)	0-1	small recovery
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
255	7:23	131	2006804-004 BC	78°19.076' N	73°12.422' W	258	none	0	no recovery
257	4:12	119	2006804-005 BC	77°21.026' N	76°04.896' W	527	Push core	32	
"	"	"		"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	Surface (Dinos)x2	0-0.5	
258	0:37	118	2006804-006 BC	77°19.620' N	76°58.147' W	452	Push core	21	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
260	3:10	115	2006804-007 BC	76°19.246' N	71°21.570' W	666	Push core	39	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
260	21:11	108	2006804-008 BC	76°15.704' N	74°37.012' W	448	Push core	35	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
262	3:00	101	2006804-009 BC	76°24.687' N	74°17.735' W	311	Push core	31	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
264	4:18	301	2006804-010 BC	74°09.449' N	83°25.326' W	684	Push core	35	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
264	20:05	303	2006804-011 BC	74°13.961' N	89°39.370' W	229	Push core	19	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
267	6:56	307	2006804-012 BC	74°24.001' N	100°34.991' W	172	Push core	22	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
269	0:22	310	2006804-013 BC A	71°28.922' N	102°14.090' W	214	Push core	32	
"	"	"	2006804-013 BC B	"	"	"	"	30	
"	"	"	"	"	"	"	Surface (Forams)	0-1	

"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
269	19:21	312	2006804-014 BC A	69°09.513' N	100°42.157' W	63	Push core	34	
"	"	"	2006804-014 BC B	"	"	"	"	32	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
270	8:21	314	2006804-015 BC A	68°59.897' N	106°36.199' W	108	Push core	42	
"	"	"	2006804-015 BC B	"	"	"	"	40	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
273	9:34	403	2006804-016 BC	70°05.985' N	120°03.254' W	410	Push core	34	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
273	20:12	none	2006804-017	71°26.268' N	121°47.799' W	-2	sediment vial	/	
273	20:18	none	2006804-018	71°26.248' N	121°47.805' W	-1	sediment vial	/	
273	20:55	none	2006804-019	71°24.487' N	121°35.420' W	-1	sediment vial	/	
273	21:05	none	2006804-020	71°24.438' N	121°35.537' W	-1	sediment vial	/	
279	8:42	420	2006804-021 BC	71°03.3378' N	128°31.0336' W	34	Push core	23	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
280	5:06	421	2006804-022 BC	71°28.3098' N	133°58.3220' W	1218	Push core	38	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
283	2:59	436	2006804-023 BC	70°20.39' N	126°21.58' W	254	Push core	40	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
290	4:25	434	2006804-024 BC	70°12.36' N	133°38.76' W	55	Push core	37	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
296	11:09	322	2006804-025 BC	70°24.138' N	91°04.642' W	210	Push core	30	
"	"	"		"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	Surface (Dinos)x2	0-0.5	
298	5:09	333	2006804-026 BC	68°45.48' N	81°00.28' W	34	Push core	bulk	minimal
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
298	12:10	334	2006804-027 BC	67°52.71' N	80°48.08' W	86	Push core	18	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
299	4:30	338	2006804-028 BC A	66°08.06' N	81°20.42' W	135	Push core	28	
"	"	"	2006804-028 BC B	"	"	"	"	31	
"	"	"	"	"	"	"	Surface (Forams)	0-1	

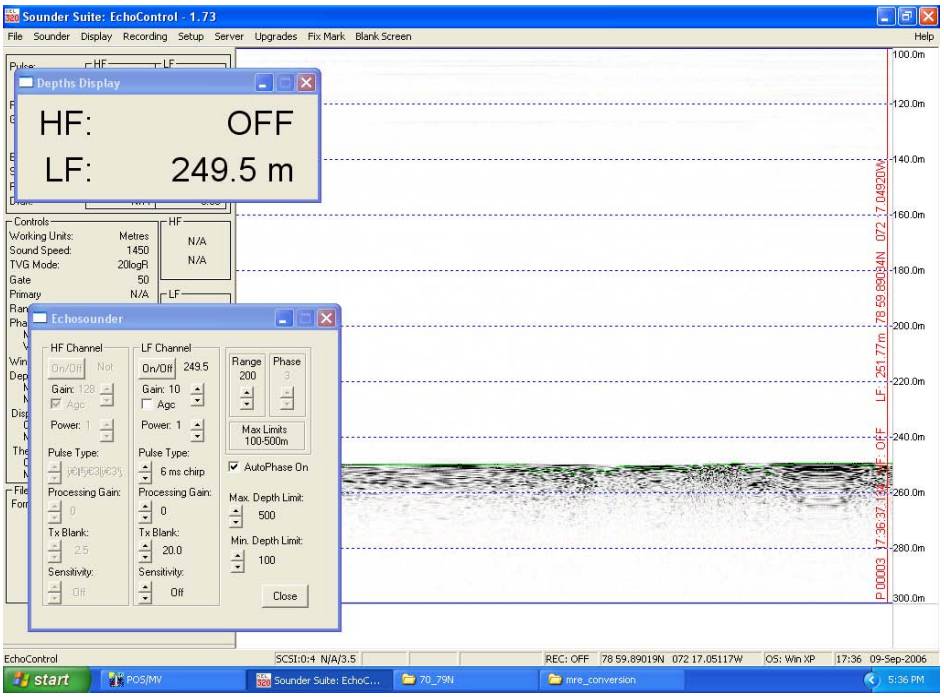
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
299	16:48	346	2006804-029 BC	65°06.92' N	79°20.92' W	83	Push core	bulk	minimal
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	
300	5:58	350	2006804-030 BC A	64°30.81' N	80°32.34' W	386	Push core	37	
"	"	"	2006804-030 BC B	"	"	"	"	36	
"	"	"	"	"	"	"	Surface (Forams)	0-1	
"	"	"	"	"	"	"	Surface (Dinos)x2	0-0.5	

APPENDIX 3 – 2006-804 SUB-BOTTOM PROFILES OVER BOX CORE SITES

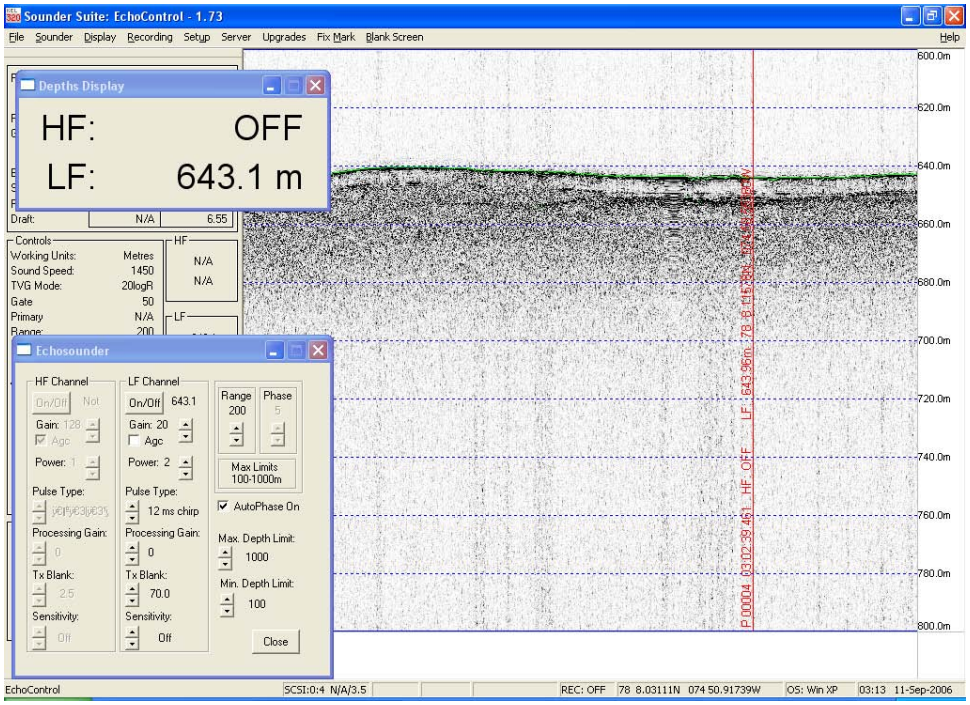

2006804-001
2006804-002
2006804-003
2006804-004
2006804-005
2006804-006
2006804-007
2006804-008
2006804-009
2006804-010
2006804-011
2006804-012
2006804-013
2006804-014
2006804-015
2006804-016
2006804-019
2006804-020
2006804-021
2006804-022
2006804-023
2006804-024
2006804-025
2006804-026
2006804-027
2006804-028
2006804-029
2006804-030
Legend
2006804 Box core locations
2006804 geophysical tracklines
0 75 150 300 450 600
Kilometers



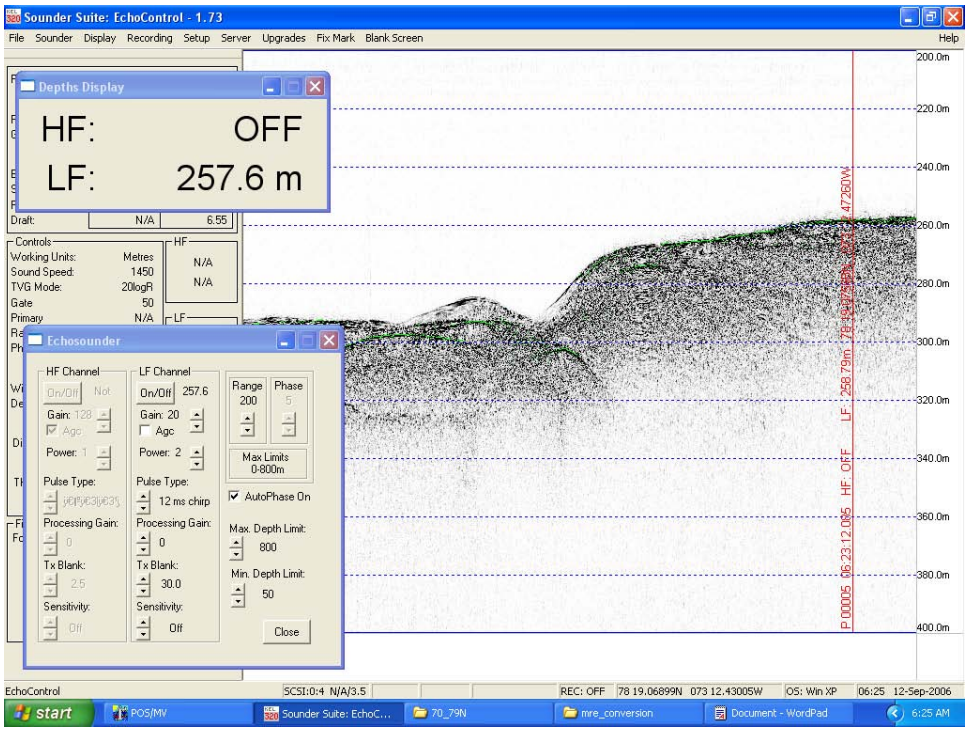
Sub-bottom profiler image for box core 2006-804-001 (373 m water depth)



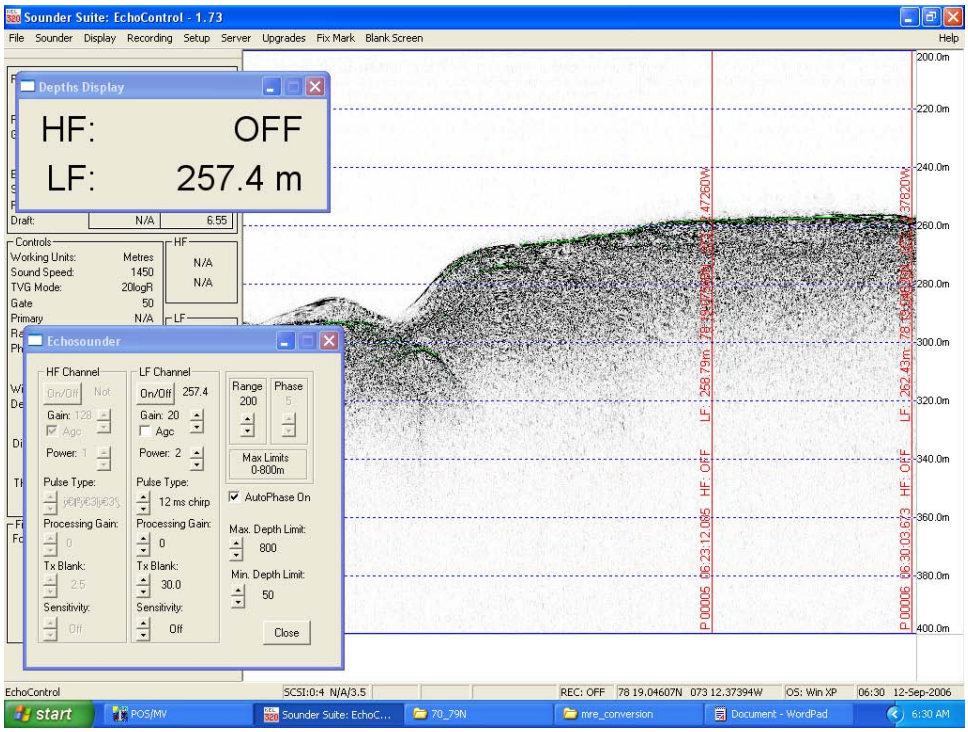
Sub-bottom profiler image for box core 2006-804-002 (250 m water depth)



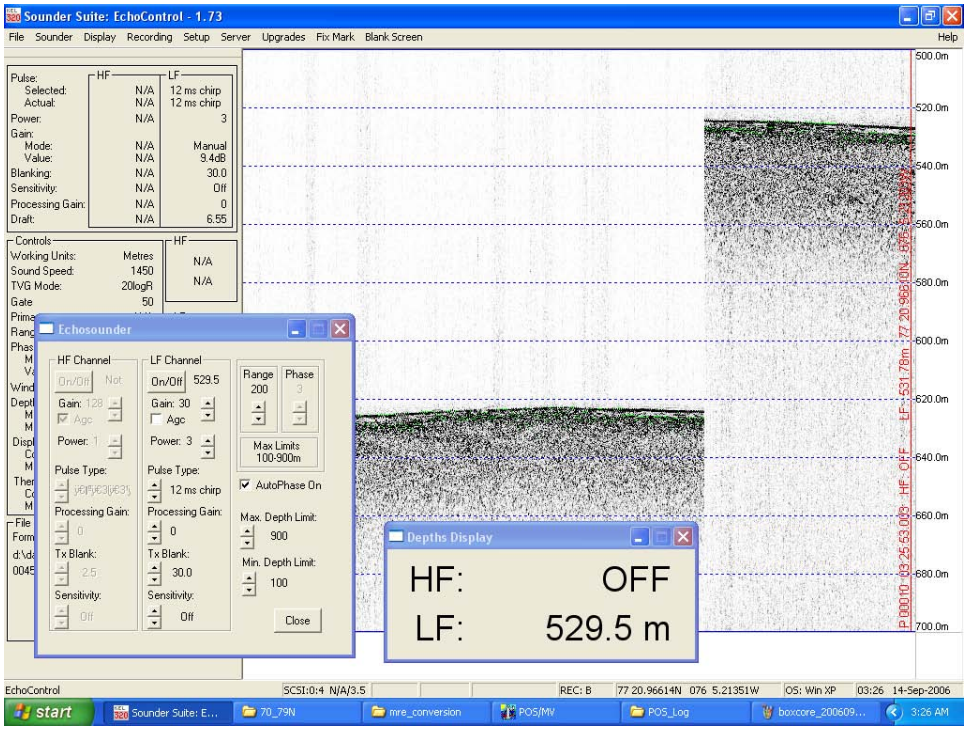
Sub-bottom profiler image for box core 2006-804-003 (644 m water depth)



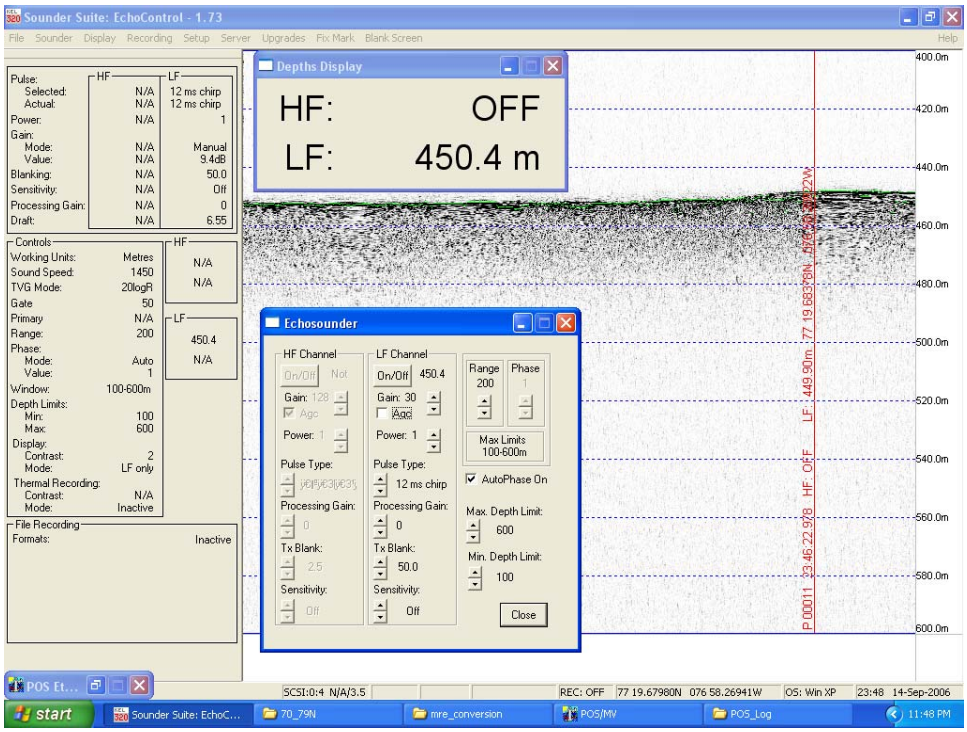
Sub-bottom profiler image for box core 2006-804-004a (258 m water depth)



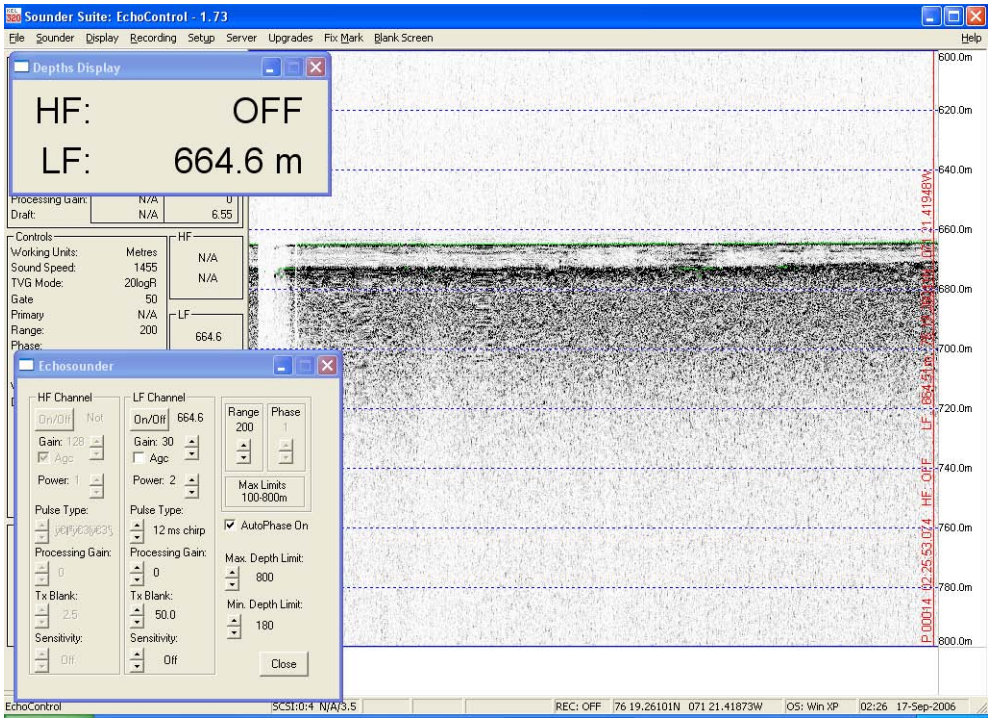
Sub-bottom profiler image for box core 2006-804-004b (258 m water depth)



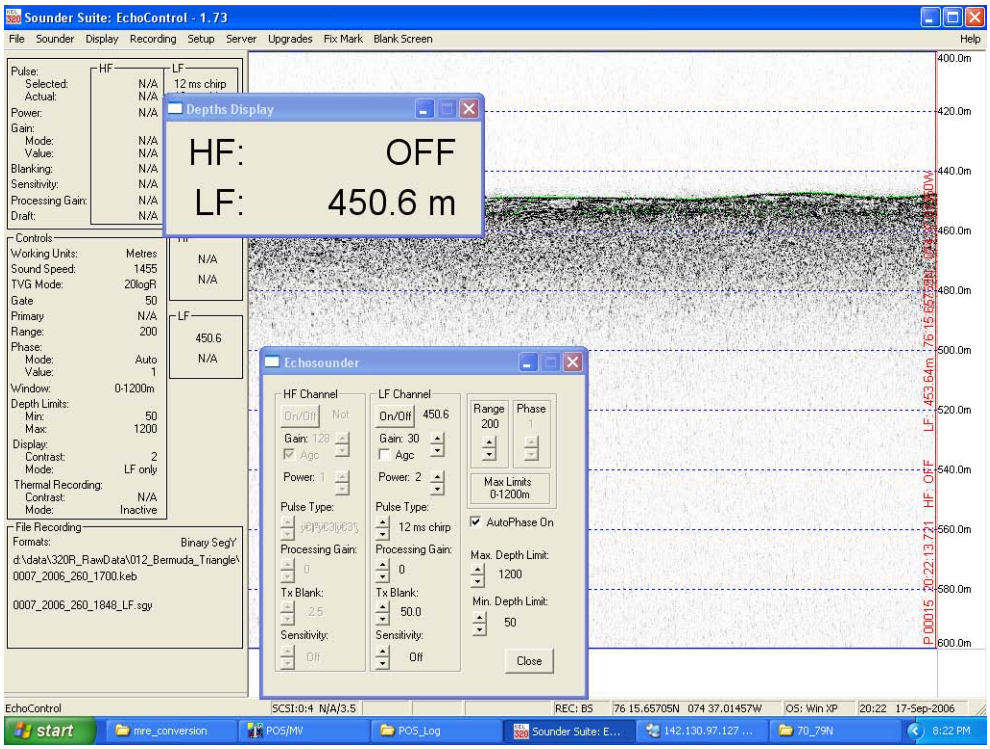
Sub-bottom profiler image for box core 2006-804-005 (527 m water depth)



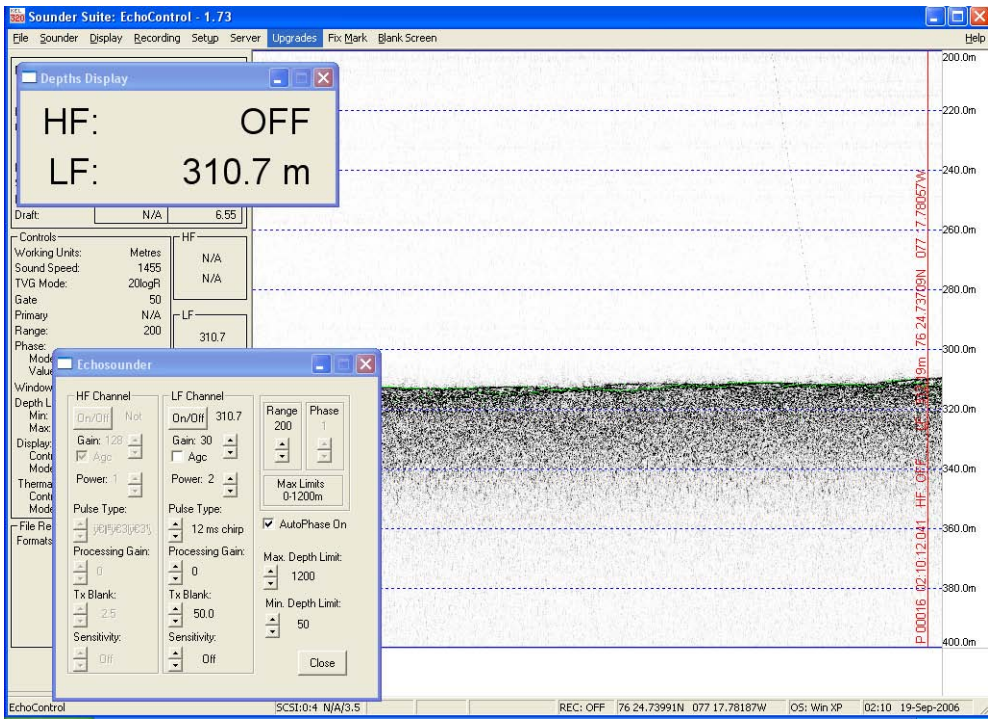
Sub-bottom profiler image for box core 2006-804-006 (452 m water depth)



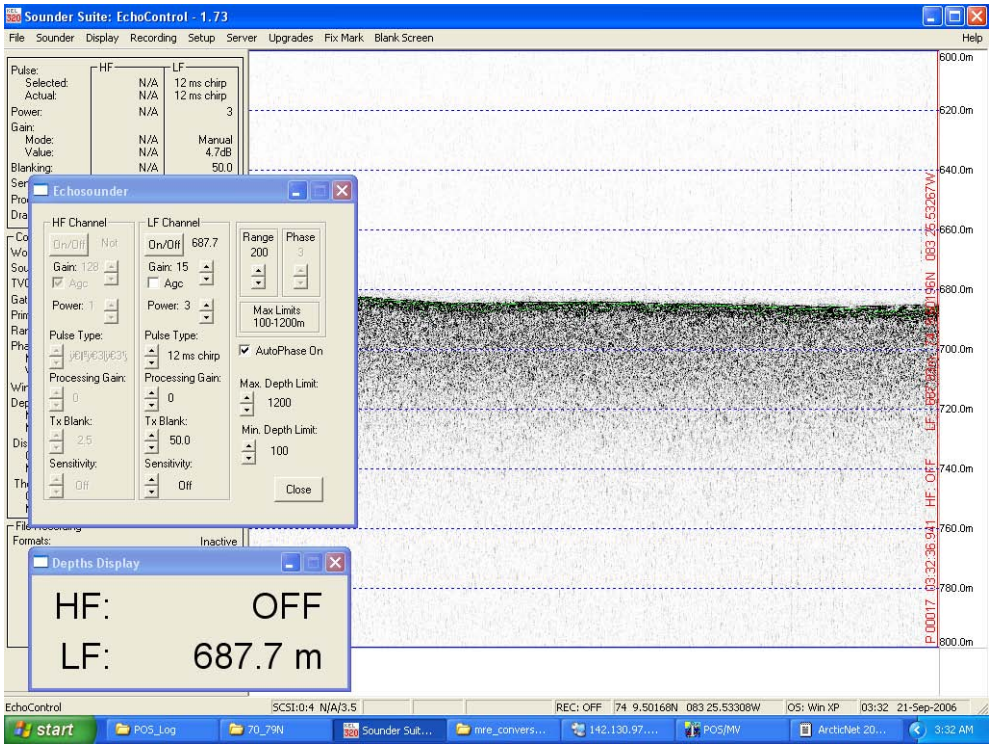
Sub-bottom profiler image for box core 2006-804-007 (666 m water depth)



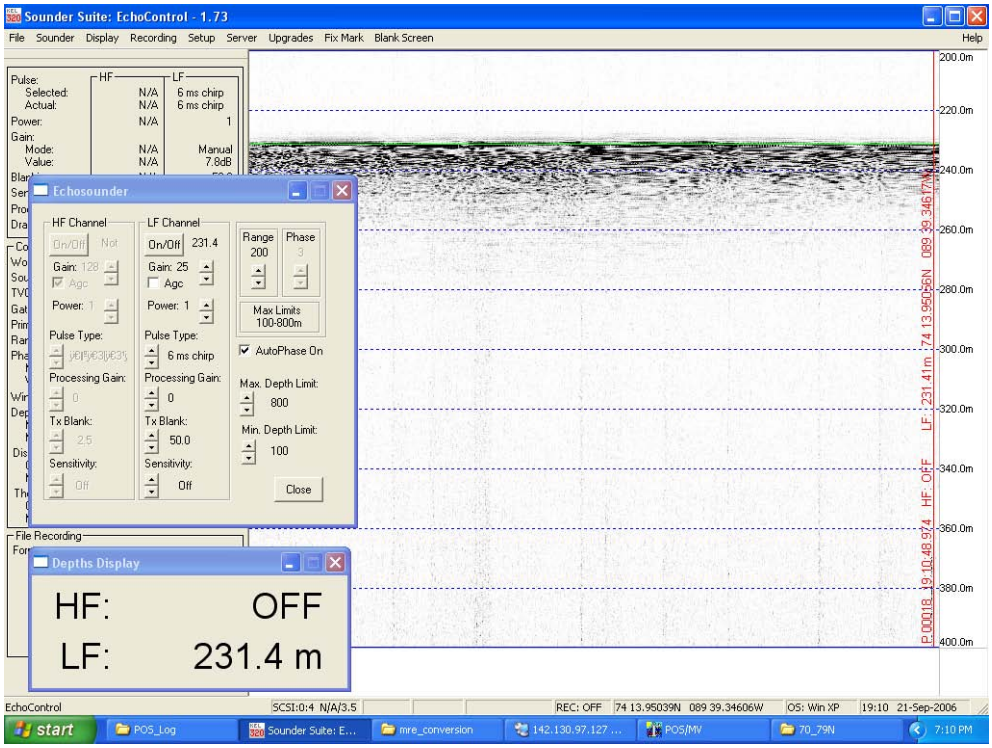
Sub-bottom profiler image for box core 2006-804-008 (448 m water depth)



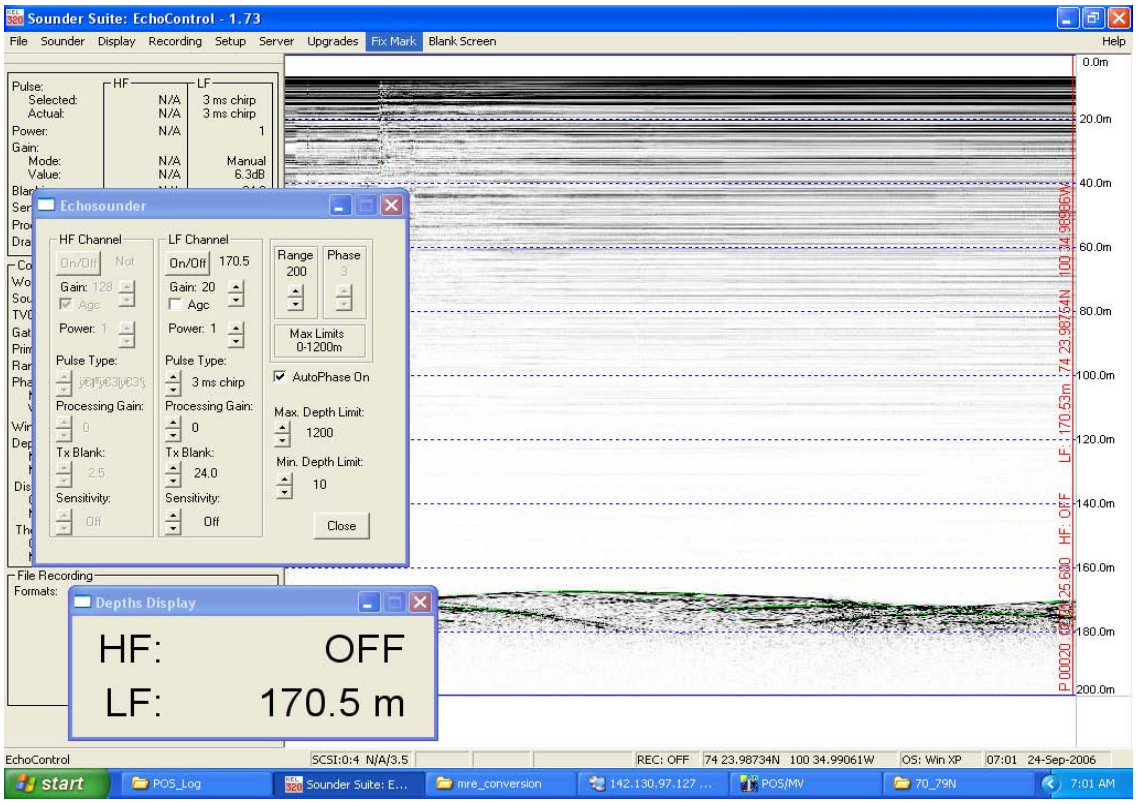
Sub-bottom profiler image for box core 2006-804-009 (311 m water depth)



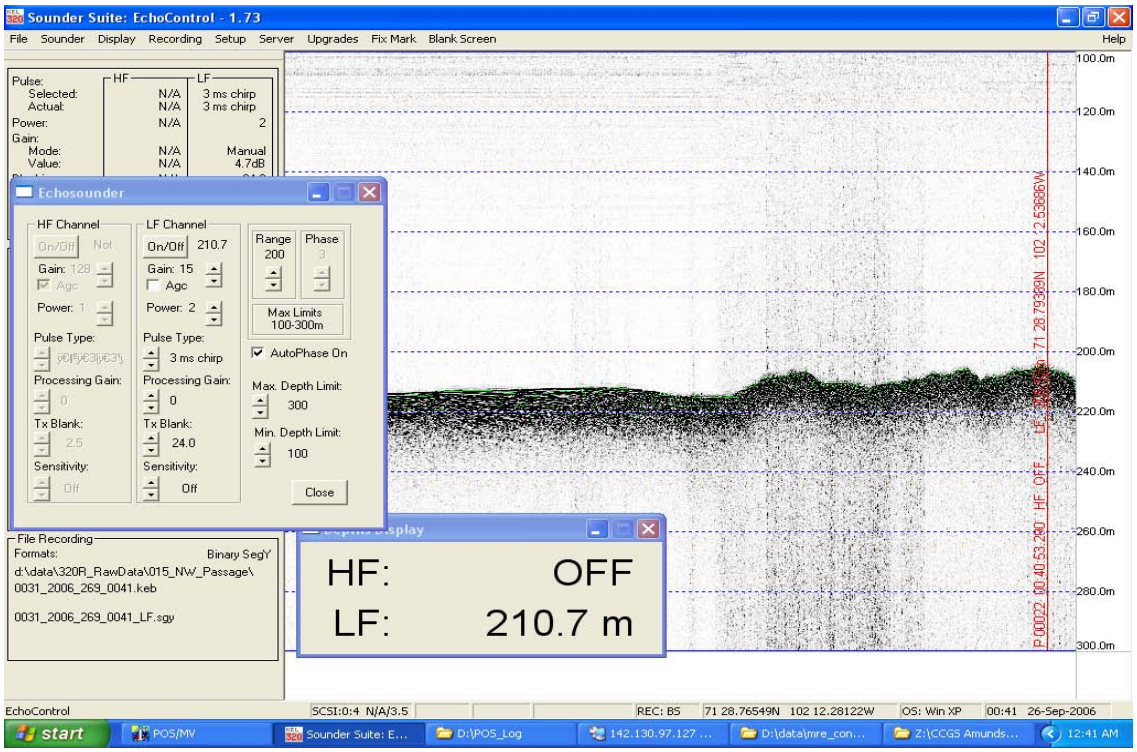
Sub-bottom profiler image for box core 2006-804-010 (684 m water depth)



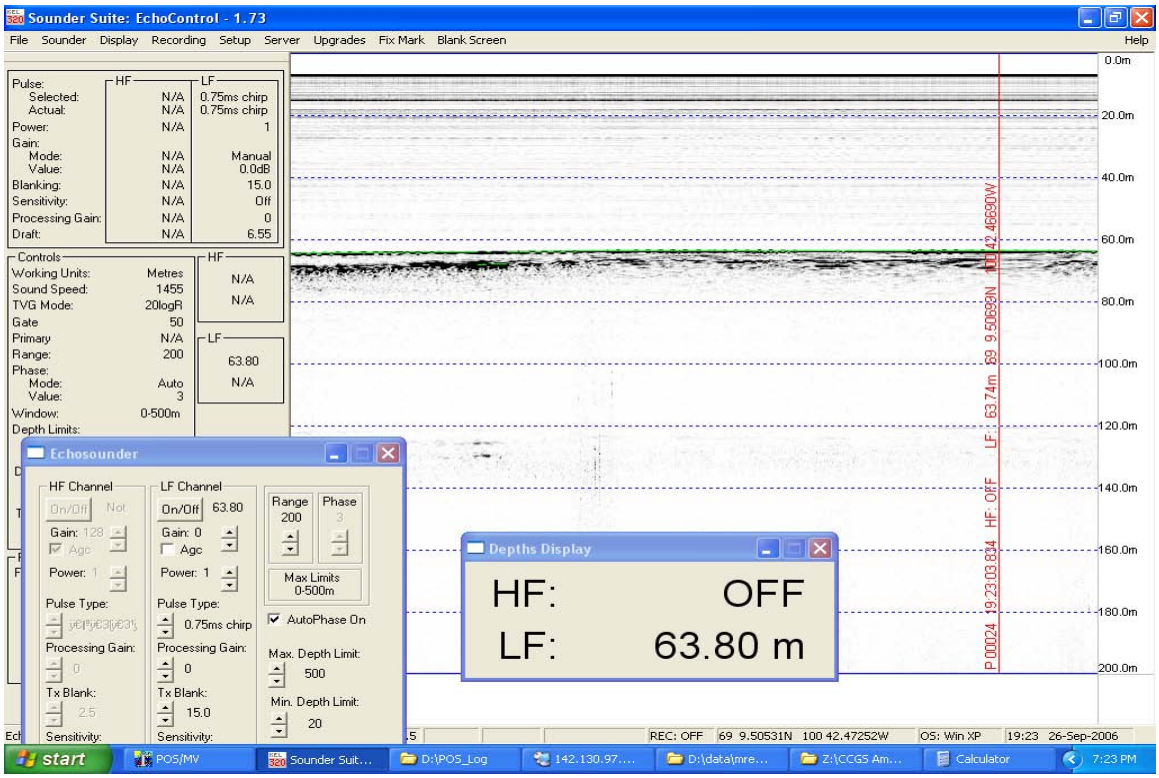
Sub-bottom profiler image for box core 2006-804-011 (229 m water depth)



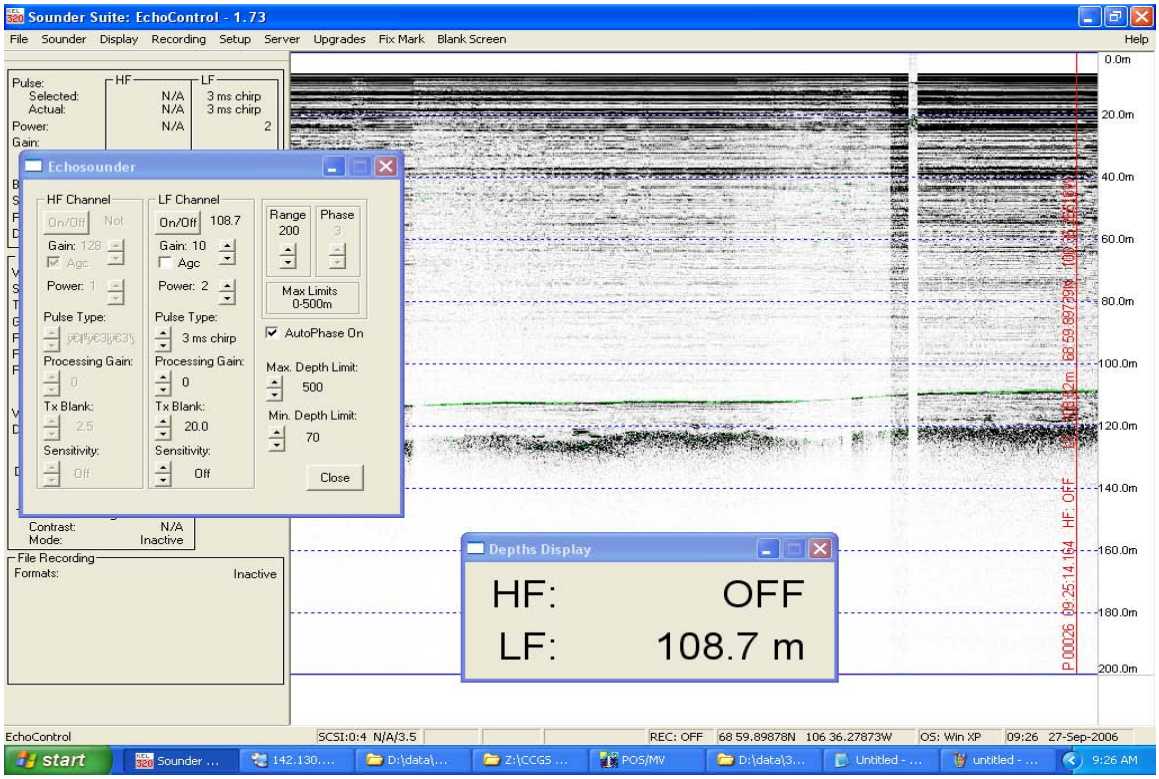
Sub-bottom profiler image for box core 2006-804-012 (172 m water depth)



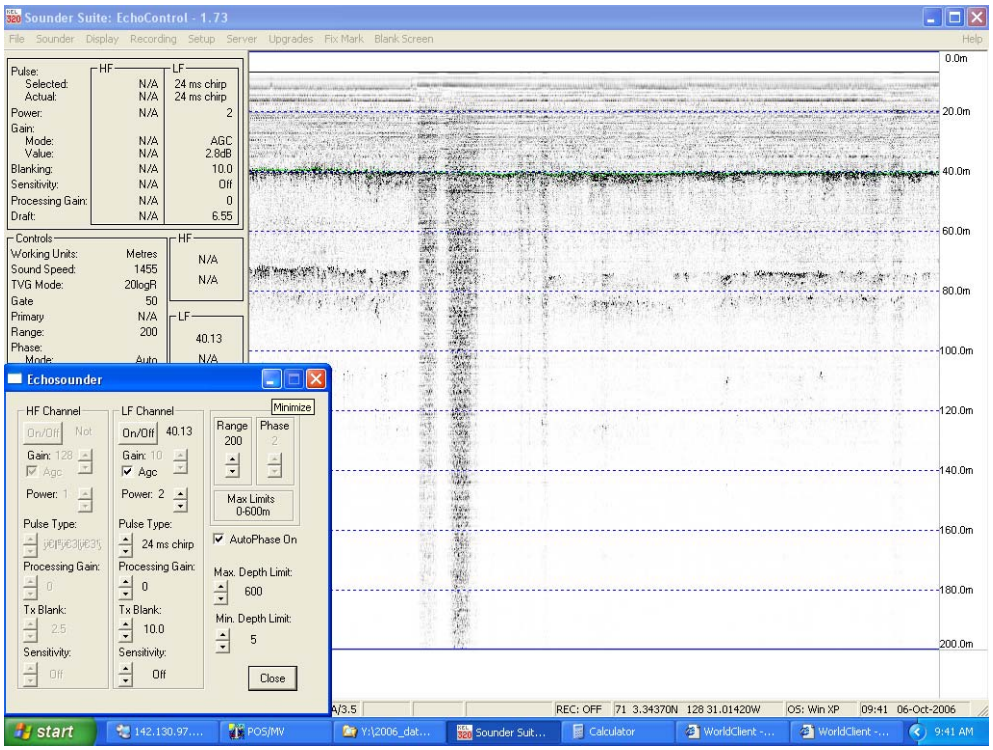
Sub-bottom profiler image for box core 2006-804-013 (214 m water depth)



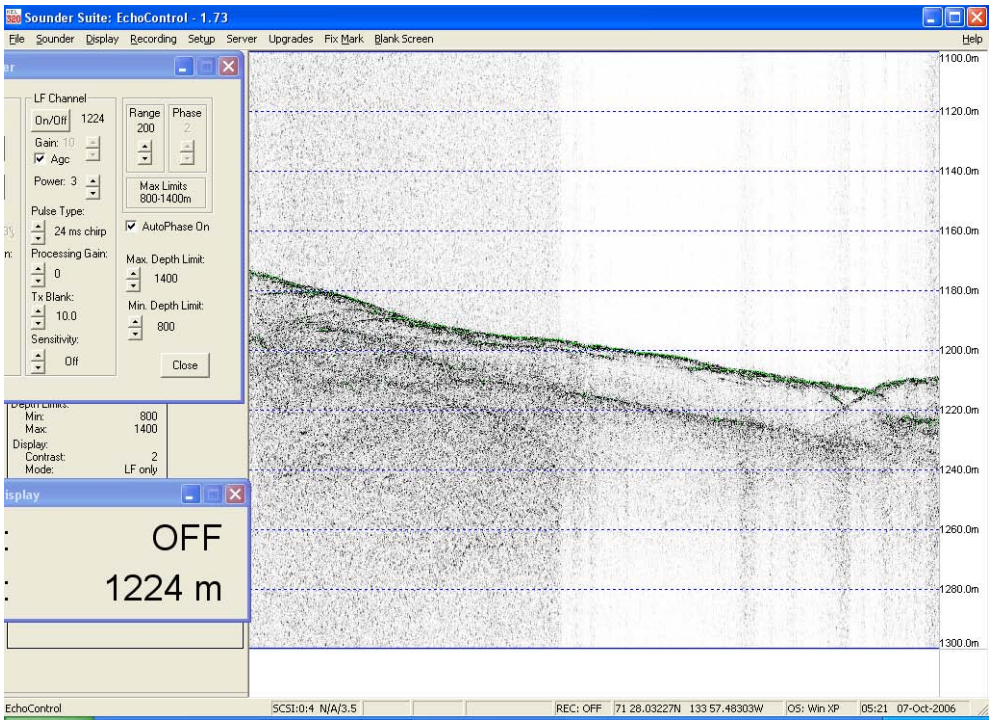
Sub-bottom profiler image for box core 2006-804-014 (63 m water depth)



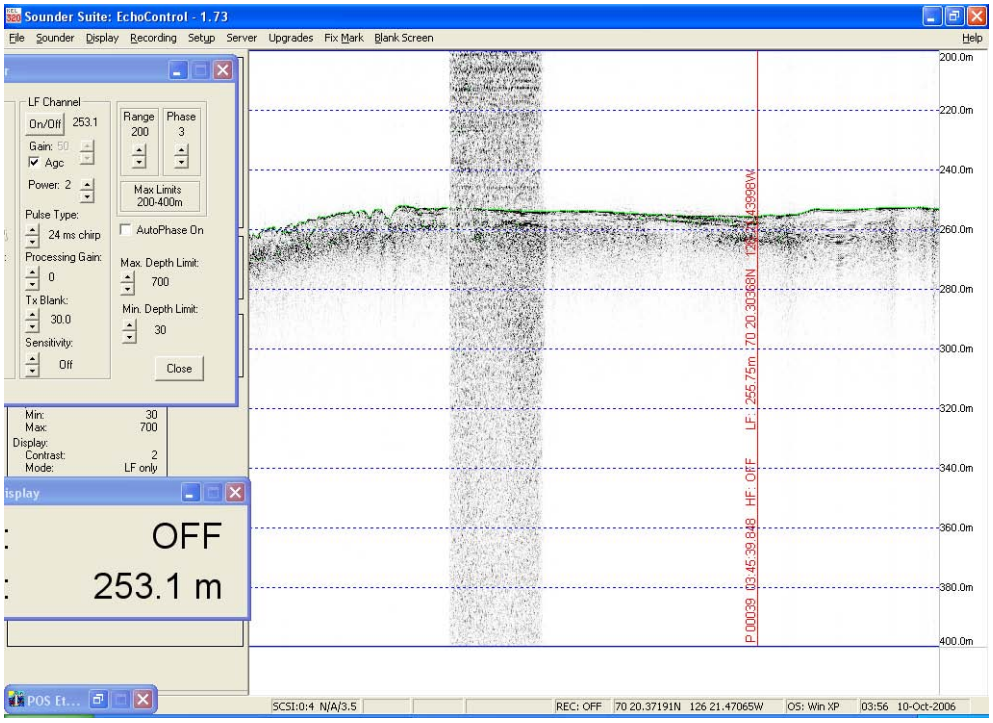
Sub-bottom profiler image for box core 2006-804-015 (108 m water depth)



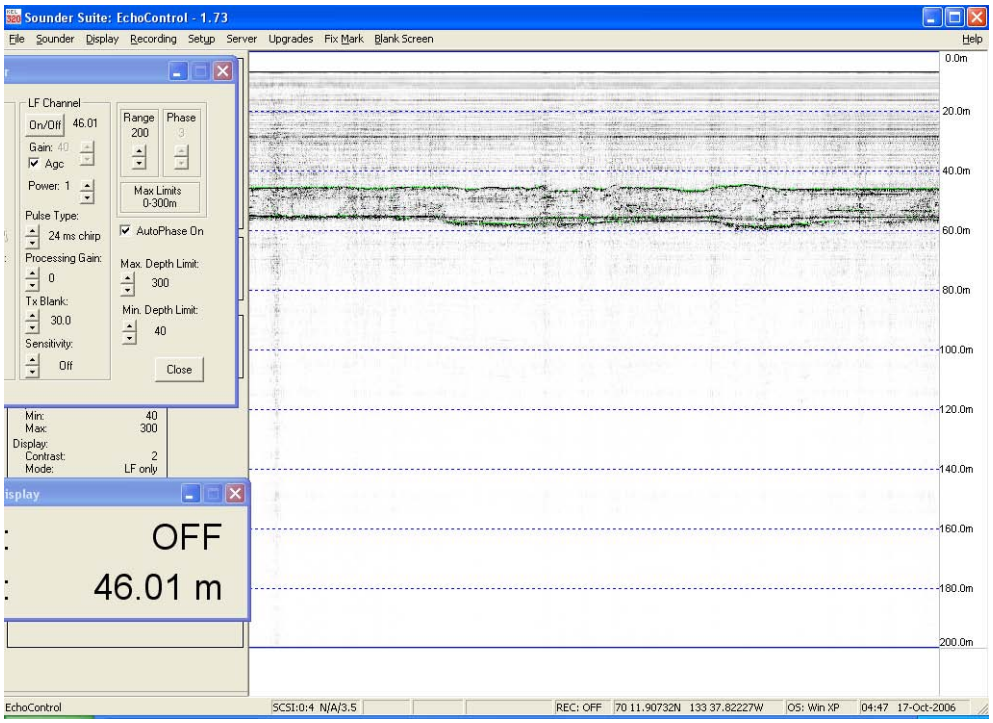
Sub-bottom profiler image for box core 2006-804-021 (34 m water depth)



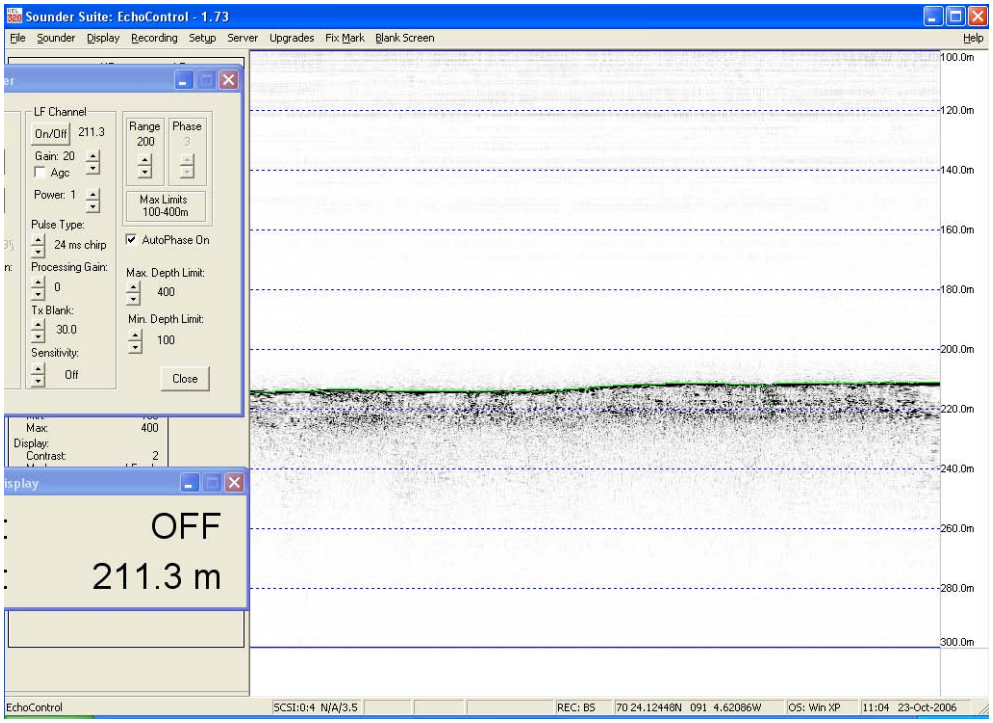
Sub-bottom profiler image for box core 2006-804-022 (1218 m water depth)



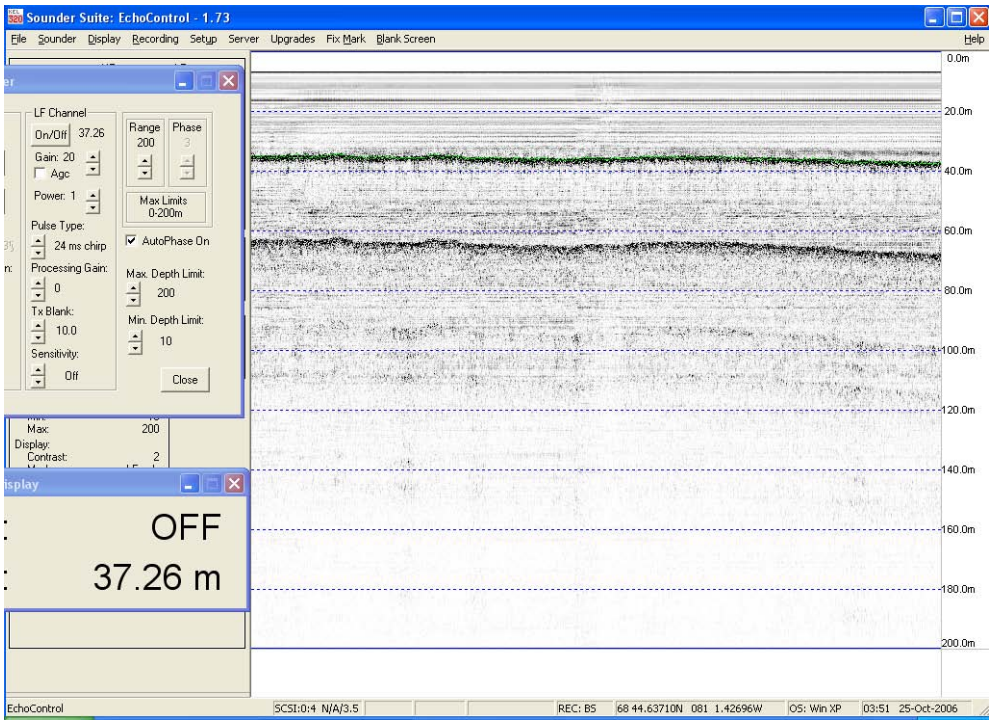
Sub-bottom profiler image for box core 2006-804-023 (254 m water depth)



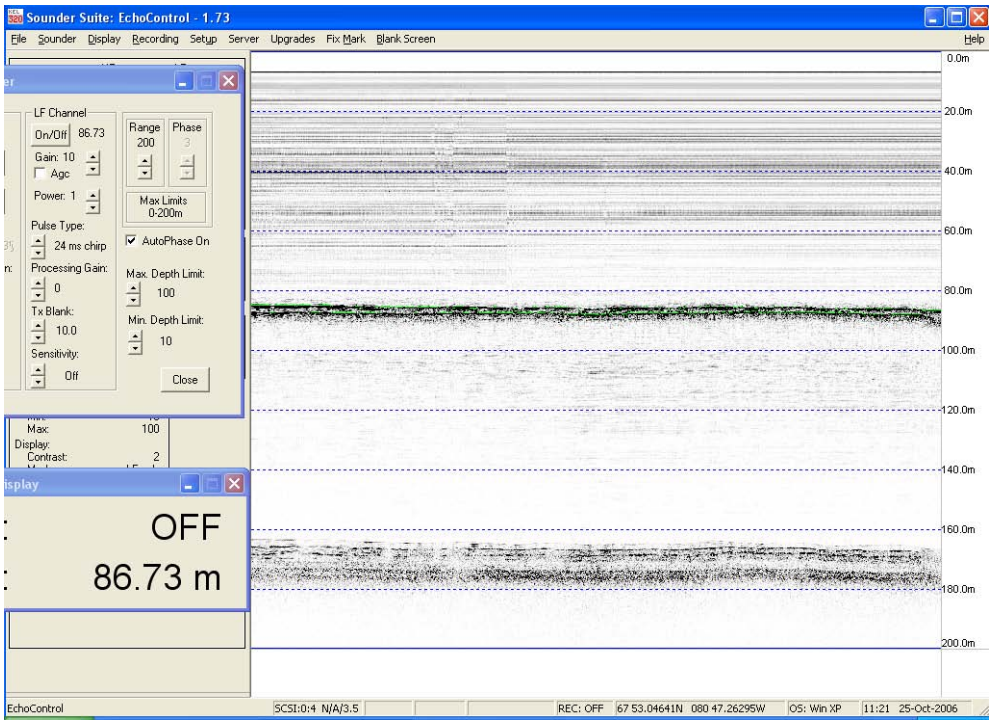
Sub-bottom profiler image for box core 2006-804-024 (55 m water depth)



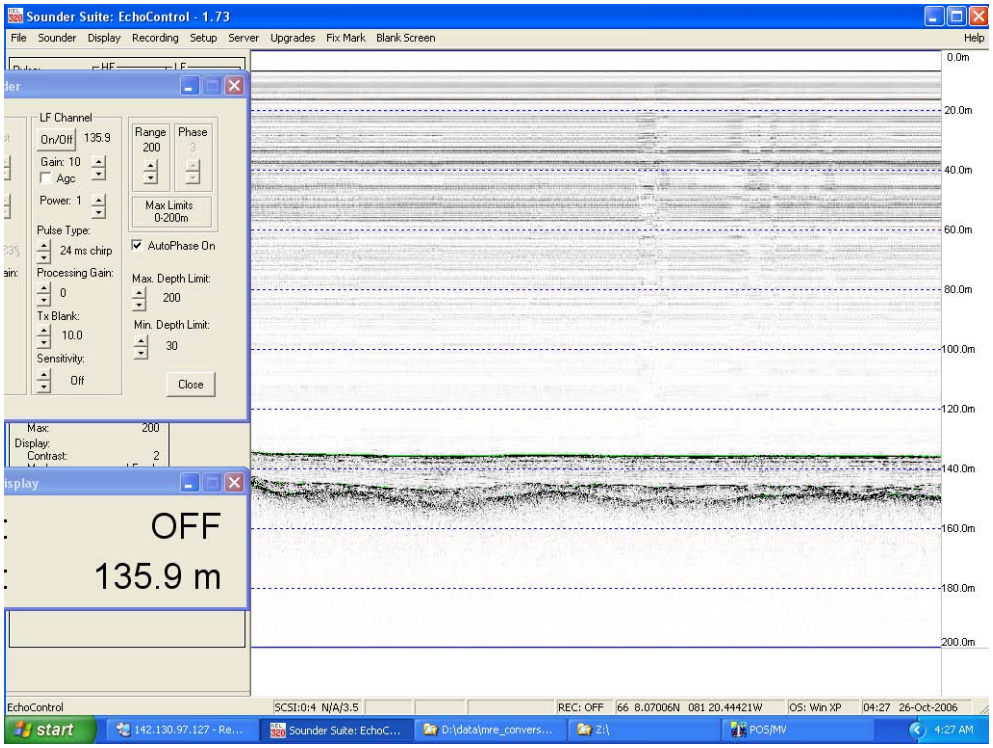
Sub-bottom profiler image for box core 2006-804-025 (210 m water depth)



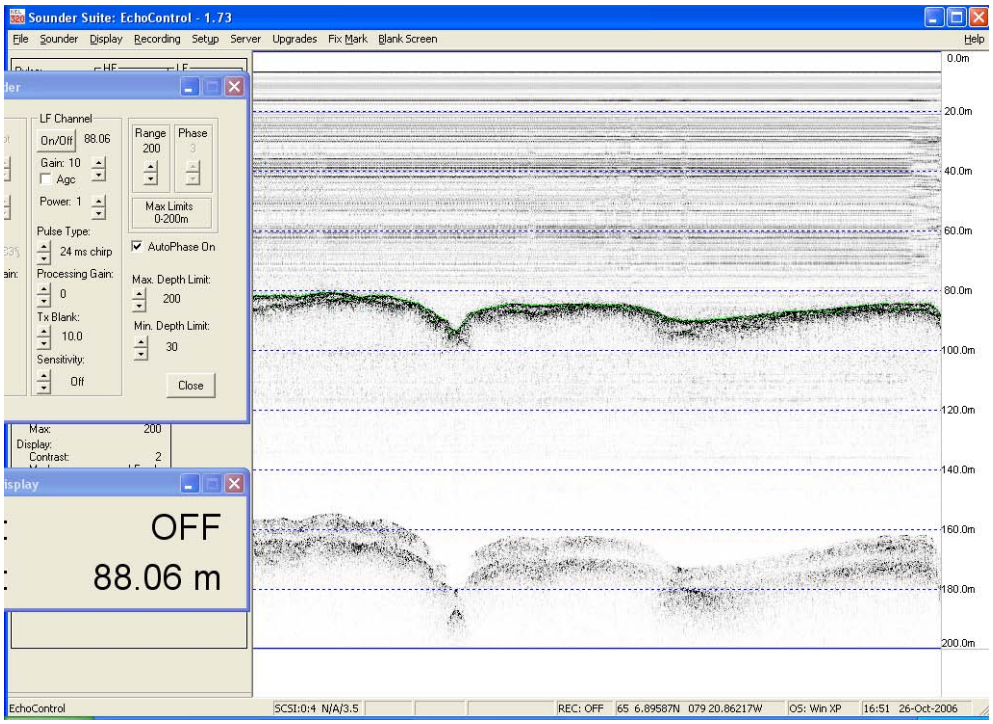
Sub-bottom profiler image for box core 2006-804-026 (34 m water depth)



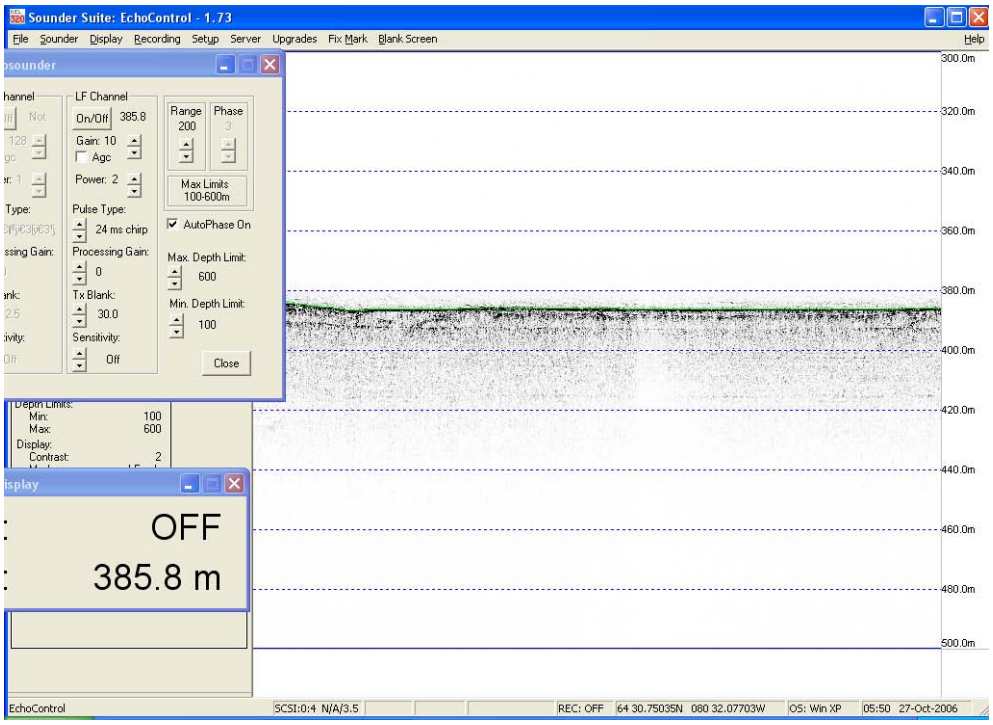
Sub-bottom profiler image for box core 2006-804-027 (86 m water depth)



Sub-bottom profiler image for box core 2006-804-028 (135 m water depth)



Sub-bottom profiler image for box core 2006-804-029 (83 m water depth)



Sub-bottom profiler image for box core 2006-804-030 (386 m water depth)

APPENDIX 4 – 2006-804 BOX CORE DECK SHEETS

GRABS	GEOLOGICAL SURVEY of CANADA (ATLANTIC)	GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	001	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 252	07:15	72°15'336	eg: Gulf of St. Lawrence / eg: Scotian Shelf	= Baie de Chaleur / = Sable Basin
2 ... Try			ARCTIC	OLIVER SOUND

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
373		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

Wire out (m)

Default: local water level

If station is based on a Seismic Record Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument → **Choose From This List**

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

3.5 kHz

GRAB

Choose type of grab from the list below :

VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE (Standard)

IKU GRAB 1 cu (m)

IKU GRAB 0.5 cu (m)

Subcore Type :

Peel or (Push) ?

Recovered core Length 35.5 cm

Subcores →

Lengths of subcores : In centimetres

A	35.5	D		G	
B		E		H	
C		F		I	

Comments:

Two surface samples (Anna and Frank) have been taken from the box core overside 01:10 on bottom 01:26 on deck 01:34

Subsamples →

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 9/06 (No station #)

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	002	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence, eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur, = Sable Basin)
1 st Try 252 19:21	78°59'992	72°17'082	ARCTIC	KANE BASIN
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
250		3,5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

Wire out (m) _____ Default: local water level

If station is based on a Seismic Record Please complete below :

Seis Expedition Code _____ Seis Day / UTC Time _____

Seismic instrument 3,5 kHz — Choose From This List: 3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
[illegible] GRAB 0.5 cu (m)

Subcore Type :
Peel or Push ?

Recovered core Length 15,0 cm

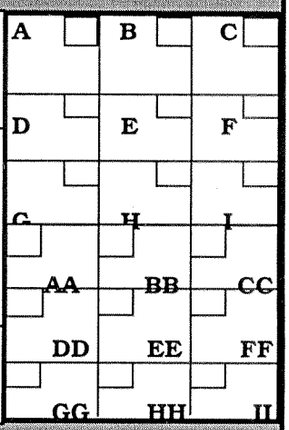
Subcores →

Lengths of subcores : In centimetres

A	15,0	D		G	
B		E		H	
C		F		I	

Comments: Two surface samples (diatoms and foramo) has been taken from the boxcore

Subsamples →



SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

Sept. 9/06 (Stn. 130)

6 June 2000 DH

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	003	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try: 254 / 04:56	78°08'135	74°50'558	eg: Gulf of St. Lawrence / eg: Scotian Shelf: ARCTIC	= Baie de Chaleur / = Sable Basin: SMITH SOUND
2 nd Try:				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
644		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

Wire out (m) —— Default: local water level

If station is based on a Seismic Record Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument (Choose From This List): 3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

3,5 kHz

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age, Archeology, Biology, Biostratigraphy, Carbon Content, Grain Size, Index Properties, Inorganic Chemistry, Isotopes, Macropaleontology, Micropaleontology, Organic Chemistry, Paleomagnetics, Palynology, Petrology, XRD

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
[illegible] GRAB 0.5 cu (m)

Recovered core Length ____ cm

Subcores

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subcore Type :
Peel or Push ?

Comments:
No pushcore have been taken ; it was just an piece of very rocky mud. Surface samples (dredge) were taken from the bottom

Subsamples

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age, Archeology, Biology, Biostratigraphy, Carbon Content, Grain Size, Index Properties, Inorganic Chemistry, Isotopes, Macropaleontology, Micropaleontology, Organic Chemistry, Paleomagnetics, Palynology, Petrology, XRD

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 10/06 (Stn. 127)

GRABS | *GEOLOGICAL SURVEY of CANADA (ATLANTIC)* | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	004	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 255 04:23	78° 19' 076	73° 12' 422	eg: Gulf of St. Lawrence / eg: Scotian Shelf: ARCTIC	= Baie de Chaleur / = Sable Basin: SMITH SOUND
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
258		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below : Seis Expedition Code	Seis Day / UTC Time	Seismic instrument	Choose From This List
		3.5 kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Subcore Type :
Peel or Push ?

Recovered core Length ____ cm

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subcores

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

Comments:
No recovery of sediment / just 3 big rocks.

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 12/06 (Stn # 131)

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	005	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 257 .05:12	77°21'026	76°04'896	eg: Gulf of St. Lawrence / eg: Scotian Shelf: ARCTIC	= Baie de Chaleur / = Sable Basin: NORTH WATER
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method : → Choose From This List
527		3,5 kHz

Wire out (m) | Default: local water level

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument → **Choose From This List**: 3,5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Recovered core Length: 31,7 cm

Subcores →

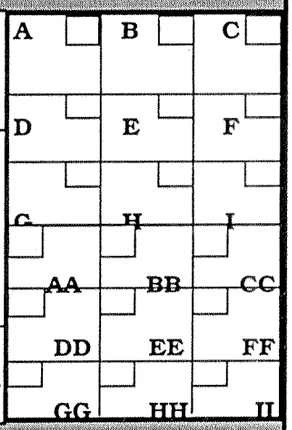
Lengths of subcores : In centimetres

A	31,7	D		G	
B		E		H	
C		F		I	

Subcore Type : Peel or (Push) ?

Comments: Two surface samples (dense and foamy) have been taken from the barrels

Subsamples →



SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 19/06 (Stn. ~~31~~ 119)

GRABS | *GEOLOGICAL SURVEY of CANADA (ATLANTIC)* | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	006	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 258 01:37	77°19'620	76°58'147	eg: Gulf of St. Lawrence / eg: Scotian Shelf: ARCTIC	= Baie de Chaleur / = Sable Basin: NORTH WATER
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
452		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :			Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time		3.5 kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

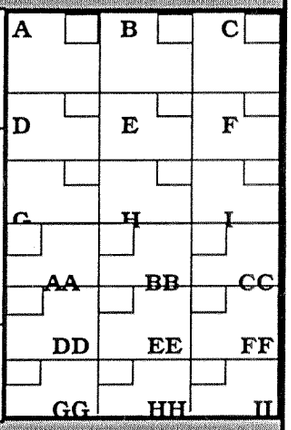
Subcore Type :
Peel or Push ?

Recovered core Length 20.5 cm

Lengths of subcores : In centimetres

A	20.5	D		G	
B		E		H	
C		F		I	

Subcores



Comments:
Two surface samples (diatoms and foraminifera) have been taken from the box core

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 15/06 (Stn. 118)

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	007	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 260	04:10	76°19'246	71°21'570	eg: Gulf of St. Lawrence = Baie de Chaleur eg: Scotian Shelf = Sable Basin
2 nd Try			ARCTIC	ENTRANCE OF NORTH WATER

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
666		3.5 khz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :			Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time		3.5 khz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

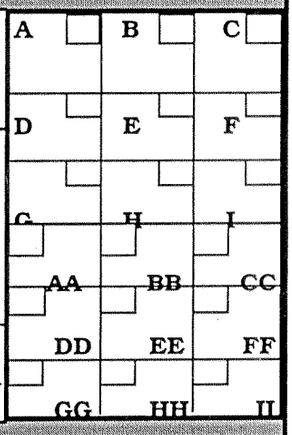
Subcore Type :
Peel or Push ?

Recovered core Length 39,0 cm

Lengths of subcores : In centimetres

A	39,0	D		G	
B		E		H	
C		F		I	

Subcores



Comments:
Two surface samples (depth and foram) have been taken from the boxcore

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

Sept. 17/06 (Stn. 115)

6 June 2000 DH

GRABS — *GEOLOGICAL SURVEY of CANADA (ATLANTIC)* — **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	008	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try: 260 / 22:11	76°15'704	74°37'012	eg: Gulf of St. Lawrence = Baie de Chaleur; eg: Scotian Shelf = Sable Basin	
2 nd Try:			ARCTIC	ENTRANCE OF NORTH WATER

Water Depth (m)	Elevation Reference :	Depth Method : → Choose From This List
448		3,5 kHz

Wire out (m) — Default: local water level

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument → **Choose From This List**: 3,5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

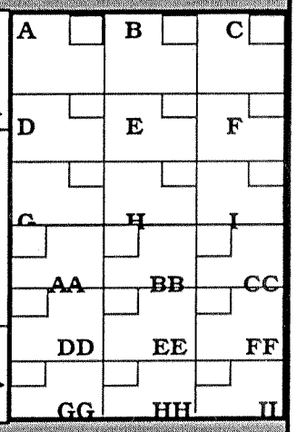
Subcore Type :
Peel or Push ?

Recovered core Length 34,7 cm

Lengths of subcores : In centimetres

A	34,7	D		G	
B		E		H	
C		F		I	

Subcores →



Comments:
Two surface samples (diatom and foraminifera) has been taken from the box core

Subsamples →

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 17/06 (Stn. 108)

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	009	AMUNDSEN		D. Barber

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 262 . 04:00	76°24'687	77°17'735	eg: Gulf of St. Lawrence = Baie de Chaleur eg: Scotian Shelf = Sable Basin ARCTIC	ENTRANCE OF NORTH WATER
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
311		3.5 khz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

Wire out (m) | Default: local water level

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument → **Choose From This List**

3.5 khz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age, Archeology, Biology, Biostratigraphy, Carbon Content, Grain Size, Index Properties, Inorganic Chemistry, Isotopes, Macropaleontology, Micropaleontology, Organic Chemistry, Paleomagnetics, Palynology, Petrology, XRD

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

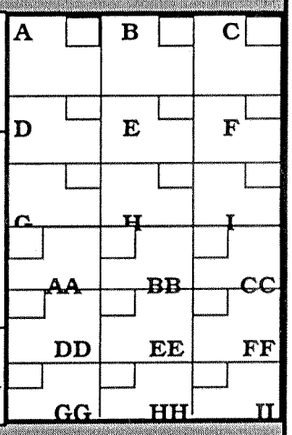
Subcore Type :
Peel or Push ?

Recovered core Length 31.2 cm

Lengths of subcores : In centimetres

A	31.2	D		G	
B		E		H	
C		F		I	

Subcores →



Comments:
Two surface samples (duplicate and barrow) have been taken from the boxcore

Subsamples →

SUBSAMPLES

Please choose analysis type for collection from list below.

Age, Archeology, Biology, Biostratigraphy, Carbon Content, Grain Size, Index Properties, Inorganic Chemistry, Isotopes, Macropaleontology, Micropaleontology, Organic Chemistry, Paleomagnetics, Palynology, Petrology, XRD

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 19/06 (Stn. 101)

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-809	010	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 264 05:18	74°09'449	83°25'326	eg: Gulf of St. Lawrence / eg: Scotian Shelf: ARCTIC	= Baie de Chaleur / = Sable Basin: LANCASTER SOUND
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
684		3.5 khz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :			Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day	UTC Time	3.5 khz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

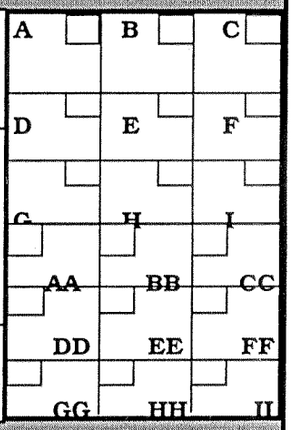
Subcore Type :
Peel or Push ?

Recovered core Length 35,2 cm

Lengths of subcores : In centimetres

A	35,2	D		G	
B		E		H	
C		F		I	

Subcores



Comments:
two surface samples (dimos and forams) has been taken from the boxcore

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Sept. 20/06 (Stn. 301)

GRABS | *GEOLOGICAL SURVEY of CANADA (ATLANTIC)* | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	014	AMUNDSEN		D. BARBER

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try 264 21:05	74°13'961	89°39370	eg: Gulf of St. Lawrence / eg: Scotian Shelf: ARCTIC	= Baie de Chaleur / = Sable Basin: INTERSECTION OF LANCASTER SOUND AND BARROW STRAIT
2 nd Try				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
229	Default: local water level	3,5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)			

If station is based on a Seismic Record Please complete below :		Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time	3,5 kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

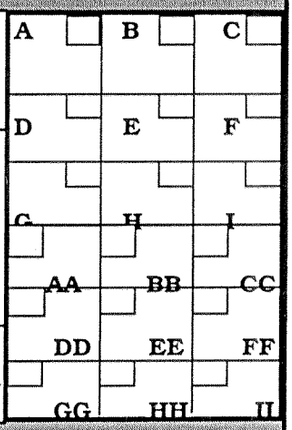
Subcore Type :
Peel or Push ?

Recovered core Length 19,0 cm

Lengths of subcores : In centimetres

A	19,0	D		G	
B		E		H	
C		F		I	

Subcores



Comments:
Two surface samples (Van Veen and Trowel) have been taken from the bottom

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

Sept. 21/06 (Stn. 303)

6 June 2000 DH

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2000-804	-012	Amundsen		D. Barber

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try: 267 | 07:56	74° 24' 001	100° 34' 091	eg: Gulf of St. Lawrence / eg: Scotian Shelf: NW Passage Arctic	= Baie de Chaleur / = Sable Basin: Viscount-Melville Sound/M'Clintock Channel
2 ..d Try:				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
172 m		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record — Please complete below :		Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time	3.5 kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

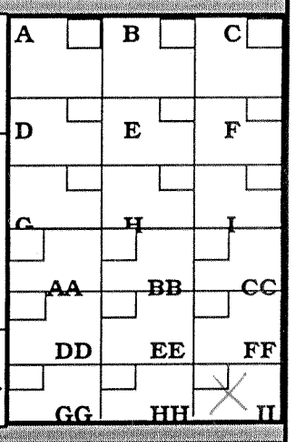
Subcore Type :
Peel or (Push ?)

Recovered core Length: 22.0 cm

Lengths of subcores : In centimetres

A	22.0	D		G	
B		E		H	
C		F		I	

Subcores ⇒



Comments:
3 surface samples
① Diver Rockhopper 60 cc
② Diver Scott 30 cc
③ Diver Paul 60 cc

See scans
olive grey
v.f.g. mud

Subsamples ⇒ Boxcore

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

24 September 2006
Station # 307

GRABS	GEOLOGICAL SURVEY of CANADA (ATLANTIC)			GRABS
CRUISE NUMBER	**STATION NUMBER**	**VESSEL NAME**	**PROJECT NUMBER**	**CHIEF SCIENTIST**
2006-804	013	Amundsen		D Barber

Day of Year \ UTC time		**LATITUDE**	**LONGITUDE**	*** GEOREGION ***	*** SUB-REGION ***
				eg: Gulf of St. Lawrence =	Baie de Chaleur
				eg: Scotian Shelf =	Sable Basin
1 st Try: 269	01:22	71° 28'922	102° 14'096	NW Passage Arctic	M'Clintock Channel
2 nd Try					

Water Depth (m): 214

Wire out (m):

Elevation Reference :

Default: local water level

Depth Method : 3.5 kHz — Choose From This List: EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz, Lead Line, Other, None..

If station is based on a Seismic Record
Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument: 3.5 kHz — Choose From This List: 3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Recovered core Length 32.2 cm cm

Subcores

Lengths of subcores : In centimetres

A	32.2	D		G	
B	29.5	E		H	
C		F		I	

Subcore Type : Peel or (Push) ?

Comments:

3 surface samples
① Dinos (Rachel) ~ 60cc
② Forams (Scott) ~ 30cc
③ Dinos (Eric - 80?) ~60cc
worm tubes & white stuff
olive brown grey mud, not much scour(?)

Subsamples

2 pushcores

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

26 September 2006
Stn # 310

GRABS	GEOLOGICAL SURVEY of CANADA (ATLANTIC)	GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	-014	Amundsen		D. Barber

Day of Year \ UTC time		LATITUDE	LONGITUDE
1 st Try: 269	20:21	69° 09' 513	100° 42' 157
2 nd Try			

* GEOREGION *		* SUB-REGION *
eg: Gulf of St. Lawrence	=	Baie de Chaleur
eg: Scotian Shelf	=	Sable Basin
NW Passage Arctic		Victoria Strait / Queen Maud Gulf

Water Depth (m): 63

Elevation Reference :

Default: local water level

Depth Method : 3.5 kHz

Choose From This List: EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

Wire out (m):

If station is based on a Seismic Record Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument: 3.5 kHz

Choose From This List: 3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard (circled)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Recovered core Length: ___ cm

Subcores: A, B, C (X), D (X), E, F, G, H, I, AA, BB, CC, DD, EE, FF, GG, HH, II

Lengths of subcores : In centimetres

A	34.0	D		G	
B	32.0	E		H	
C		F		I	

Subcore Type : Peel or Push (Push circled) ?

Comments:
3 surface samples
① Dinos (Rodolphe) ~600cc
② Forams (Scott) ~300cc
③ Dinos (Eric) ~600cc
brittle stars, scallops, large shrimp!! Upper 10 cm brown, then grey, with thin black horizon bottom

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Station #312
26 September 2006

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	- 015	A Hurdon		D Barber

	Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try	270 / 09:21	68° 59' 897	106° 36' 199	eg: Gulf of St. Lawrence / eg: Scotian Shelf	= Baie de Chaleur / = Sable Basin
				NW Passage Arctic	Beaufort Sea Cambridge Bay
2 nd Try					

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
108		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :		Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time	3.5 kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Subcore Type :
Peel or Push ?

Recovered core Length ____ cm

Subcores →

Lengths of subcores : In centimetres

A	41.5	D		G	
B	40.0	E		H	
C		F		I	

Comments:
3 surface samples
① Dinos (Resolute) ~60cc
② Foram (Scott) ~30cc
③ Dinos (Arctic) ~60cc
olive grey mud, undisturbed
some brittle stars

Subsamples →
2 Boxcores

A X	B X	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Station #314
27 September 2006

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	016	Amundsen		C. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence, eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur, = Sable Basin)
1 st Try: 273 09:34	70°06.9851'N	-120°03.2536'	Arctic NW Passage	Amundsen Gulf
2 nd Try:				

Water Depth (m)	Elevation Reference :	Depth Method :
410m		3.5kHz

Wire out (m): 429 m

Default: local water level

Choose From This List: EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument (Choose From This List): 3.5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below: BOXCORE (Standard) / IKU GRAB 1 cu (m) / IKU GRAB 0.5 cu (m)

Subcore Type : Peel or Push ?

Recovered core Length: 34 cm

Subcores: A (X), B, C, D, E, F, G, H, I, AA, BB, CC, DD, EE, FF, GG, HH, II

Lengths of subcores : In centimetres

A	34	D		G	
B		E		H	
C		F		I	

Comments:
3 surface samples
① D. nos (Rochon) 60cc
② Forams (Scheil) 30cc
③ Potvin - Dinos - 60cc Brown sandy mud over olive gray mud/silt 45cm of compression

Subsamples: 1 push core

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

429m.

Station 403

30 September, 2006

45cm compaction top to surface

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006804	0017	AMUNDSEN	CC4800	G. STERN

	Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence / eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur / = Sable Basin)
1 st Try	273. 2012	71.437807	-121.796652	WESTERN ARCTIC	DE SALIS BAY
2 ..d Try					

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
-2	LOCAL WL	ESTIMATE	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument → **Choose From This List**

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :

VanVeen, (Trowel), Shipek, Eckman, Ponar

Comments: HELICOPTER C-GCHH. BROWN SILTY FINE SAND FROM LOW DUNE FRONTING SANDHILL RIVER, DE SALIS BAY, BANKS ISLAND, NWT. ONE VIAL.

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:
GRAIN SIZE	0	3		
PETROLOGY	0	3		

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Subcore Type :

Peel or Push ?

Comments:

Recovered core Length ____ cm

Subcores →

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subsamples →

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:
GRAIN SIZE	0	3	
PETROLOGY	0	3	

6 June 2000 DH

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006804	0018	AMUNDSEN	CC4800	G. STERN

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence, eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur, = Sable Basin)
1 st Try: 273 2018	71,437466	-121,796758	WESTERN ARCTIC	DE SALIS BAY
2 ..d Try:				

Water Depth (m)	Elevation Reference :	Depth Method :
-1	LOCAL WL	ESTIMATE

Wire out (m):

Default: local water level

Choose From This List

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument → **Choose From This List**

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :

VanVeen, (Trowel), Shipek, Eckman, Ponar

Comments: HELICOPTER C-GCHU. GREY-BROWN MEDIUM SAND FROM BEACH BERM FRONTING SANDHILL RIVER, DE SALIS BAY, BANKS ISLAND, NWT. ONE VIAL.

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:
GRAIN SIZE	0	3		
PETROLOGY	0	3		

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE Standard

IKU GRAB 1 cu (m)

IKU GRAB 0.5 cu (m)

Recovered core Length ____ cm

Subcores →

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subcore Type :

Peel or Push ?

Comments:

Subsamples →

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:
~~GRAIN SIZE~~	~~0~~	~~3~~	
~~PETROLOGY~~	~~0~~	~~3~~	

6 June 2000 DH

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006804	0019	AMUNDSEN	CC4800	G. STERN

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence / eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur / = Sable Basin)
1 st Try: 273 2055	71,408110	-121,590337	WESTERN ARCTIC	DE SALIS BAY
2 ..d Try:				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
-1	LOCAL WL	ESTIMATE	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

Wire out (m) —

Default: local water level

If station is based on a Seismic Record — Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument — Choose From This List

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

SAND - 0
PEAT - 25
- 30

Choose type of grab from the list below :

VanVeen, Trowel, Shipek, Eckman, Ponar

Comments: HELICOPTER C-GCHH. BLACK COMPACT PEAT W SILT & SAND FROM LOW SECTION (30 cm) IN VEGETERRACE IN SPIT SWALE, DE SALIS BAY, BANKS ISLAND, NWT, ONE VIAL.

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:
AGE	25	30		
MICROPALEO	25	30		
MACROPALEO	25	30		

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Subcore Type :

Peel or Push ?

Comments:

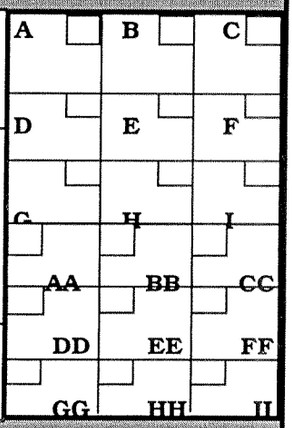
Recovered core Length ____ cm

Subcores

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subsamples



SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006804	0020	AMUNDSEN	CC4800	G. STERN

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence / eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur / = Sable Basin)
1 st Try: 273 / 2105	71.407308	-121.592279	WESTERN ARCTIC	DE SALIS BAY
2 ..d Try:				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
-1	LOCAL WL	ESTIMATE	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz, Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record — Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument → Choose From This List: 3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, (Trowel), Shipek, Eckman, Ponar

Comments: HELICOPTER C-GCHU. GREY-BROWN MEDIUM SAND FROM SPIT BERM (SEAWARD SHORE), DE SALIS BAY, BANKS ISLAND, NWT. ONE VIAL.

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:
GRAIN SIZE	0	3		
PETROLOGY	0	3		

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE Standard
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Subcore Type :
Peel or Push ?

Comments:

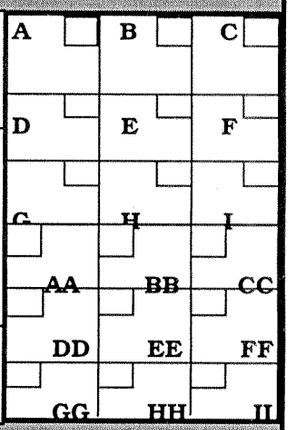
Recovered core Length ____ cm

Subcores →

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subsamples →



SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	021	Amundsen		G. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try: 279 / 09:42	71°03.3378'	-128°31.0336'	eg: Gulf of St. Lawrence = Baie de Chaleur; eg: Scotian Shelf = Sable Basin	
2 nd Try:			Archt NW Passage	Amundsen Gulf

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
34		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record — Please complete below :

Seis Expedition Code	Seis Day / UTC Time		Seismic instrument	Choose From This List
			3.5 kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

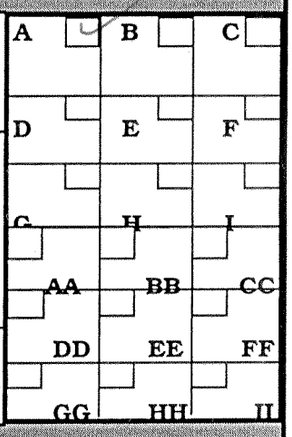
Subcore Type :
Peel or (Push ?)

Recovered core Length 23 cm

Lengths of subcores : In centimetres

A	23	D		G	
B		E		H	
C		F		I	

Subcores ⇒



Comments:
4 Subsamples:
1. Rochon (Dinos)
2. Poturn (Dinos)
3. Schell (Forams)
4. Stern (Custom)

Glacial Till? - gravel w/ clay matrix, rounded clasts.

Subsamples ⇒

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 6/06
Stn. 420

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	022	Amundsen		G. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try: 280	06:06	71° 28.3068'	-133° 58.5200'	
2 ..d Try:			eg: Gulf of St. Lawrence = Baie de Chaleur; eg: Scotian Shelf = Sable Basin: Western Arctic	Beaufort Sea

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
1218		3.5kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :		Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time	3.5kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

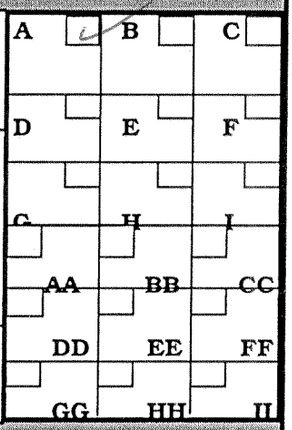
Subcore Type :
Peel or (Push) ?

Recovered core Length: 38 cm

Lengths of subcores : In centimetres

A	38	D		G	
B		E		H	
C		F		I	

Subcores



Comments:
3 subsamples
1. Rockun Dinos
2. Arctic Dinos
3. Shell Forams
Soft gray mud.

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 7/06
Sh. 42/71

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	023	Amundsen		G. Stern

	Day of Year \ UTC time	LATITUDE	LONGITUDE
1 st Try	283 03:59	70°20.39'	126°21.58'
2 nd Try			

* GEOREGION *	* SUB-REGION *
eg: Gulf of St. Lawrence = Baie de Chaleur	
eg: Scotian Shelf = Sable Basin	
Western Arctic	Franklin Bay

Water Depth (m)	Elevation Reference :	Depth Method :
254		3.5 kHz

Wire out (m)

Default: local water level

Choose From This List

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument → **Choose From This List**

3.5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :

VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE **Standard**

IKU GRAB 1 cu (m)

IKU GRAB 0.5 cu (m)

Subcore Type :

Peel or Push ?

Recovered core Length 40 cm

Subcores →

Lengths of subcores : In centimetres

A	40	D		G	
B		E		H	
C		F		I	

Comments:

3 surface samples
1. Dinos - Rochon
2. Dinos - Potvin
3. Foramns - Schell

Brown soft clay over gray cohesive silt or clay.

Subsamples →

A ✓	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 9/06 (MT)

Stn. 436

GRABS	GEOLOGICAL SURVEY of CANADA (ATLANTIC)	GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	024	Amundsen		G. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
1 st Try: 290 / 04:25	70° 12.36'	-133° 38.76'	eg: Gulf of St. Lawrence = Baie de Chaleur; eg: Scotian Shelf = Sable Basin	
2 ...d Try:			Western Arctic	Beaufort Sea

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
55		3.5kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :		Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time	3.5kHz	3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Recovered core Length: 37 cm

Subcores

Lengths of subcores : In centimetres

A	37	D		G	
B		E		H	
C		F		I	

Subcore Type :
Peel or (Push) ?

Comments:
3 surface samples
1. Dinos: Rochon
2. Dinos: Potvin
3. Foramns: Scheil

Brown soft mud with on top overlying cohesive gray silt/clay with black organic streaks.

Subsamples

A ✓	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 16/06 (local)
Stn: 434

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	025	Amundsen		G. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence / eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur / = Sable Basin)
1 st Try: 296 11:09	70°24.138'	91°04.642	Eastern Arctic	Gulf of Boothia
2 nd Try:				

Water Depth (m)	Elevation Reference :	Depth Method : → Choose From This List
210	Default: local water level	3.5 kHz
Wire out (m)		EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument → **Choose From This List**

3.5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE **Standard**
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Recovered core Length 30 cm

Subcores →

Lengths of subcores : In centimetres

A	30	D		G	
B		E		H	
C		F		I	

Subcore Type :
Peel or Push ?

Comments:
3 surface samples
1. Rochon - Diros
2. Potvin - Diros
3. Schell - Forams

Glacial till - clay with sand and cobbles at surface - cobbles are angular not all one rock type, very light brown matrix

Subsamples →

A	✓	B		C				
D		E		F				
G		H		I				
AA		BB		CC				
DD		EE		FF				
GG		HH		II				

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 23/06
Sh. 372

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	026	Amundsen		G. Stern

	Day of Year \ UTC time	LATITUDE	LONGITUDE
1 st Try	298 05:09	68° 45.48'	81° 00.28
2 nd Try			

* GEOREGION * (eg: Gulf of St. Lawrence; eg: Scotian Shelf): Eastern Arctic

* SUB-REGION * (= Baie de Chaleur; = Sable Basin): Foxe Basin

Water Depth (m)	Elevation Reference :	Depth Method :
34		3.5 kHz

Wire out (m):

Default: local water level

Choose From This List

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code:

Seis Day / UTC Time:

Seismic instrument: 3.5 kHz

Choose From This List

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :

VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below: BOXCORE (Standard); IKU GRAB 1 cu (m); IKU GRAB 0.5 cu (m)

Recovered core Length: 10 (incomplete) cm

Subcores

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Subcore Type :

Peel or Push ?

Comments: Small, disturbed sample recovered, no surface samples or push cores obtained. Sand, gravel, shell hash mixture. Bulk sample collected.

Subsamples

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 29 (local) GT

Stn. 333

GRABS | **GEOLOGICAL SURVEY of CANADA (ATLANTIC)** | **GRABS**

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-604	027	Amundsen		G. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence, eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur, = Sable Basin)
1 st Try: 298 12:10	67°52.711'	90°48.062'	Eastern Arctic	Fote Bash
2 nd Try:				

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
96	Default: local water level	3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)			

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument (Choose From This List): 3.5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Recovered core Length: 18 cm

Subcores

Lengths of subcores : In centimetres

A	18	D		G	
B		E		H	
C		F		I	

Subcore Type :
Peel or (Push) ?

Comments:
3 surface samples taken
1. Dinos - Rochon
2. Dinos - Potvin
3. Forams - Scbell

Light brown glacial till, predominantly clay with sand & ocasional cobbles, some shale cobbles

Subsamples

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 25 (local) GT
Stn. 334

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	028	Amundsen		G. Stern

	Day of Year \ UTC time	LATITUDE	LONGITUDE
1 st Try	299 / 04:30	66°06.06'	61°20.42
2 nd Try			

* GEOREGION *	* SUB-REGION *
eg: Gulf of St. Lawrence = Baie de Chaleur	
eg: Scotian Shelf = Sable Basin	
Eastern Arctic	Foxe Basin

Water Depth (m)	Elevation Reference :	Depth Method :
135		3.5 kHz

Wire out (m):

Default: local water level

Choose From This List

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code	Seis Day / UTC Time	

Seismic instrument (Choose From This List): 3.5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :

VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE (Standard)

IKU GRAB 1 cu (m)

IKU GRAB 0.5 cu (m)

Subcore Type :

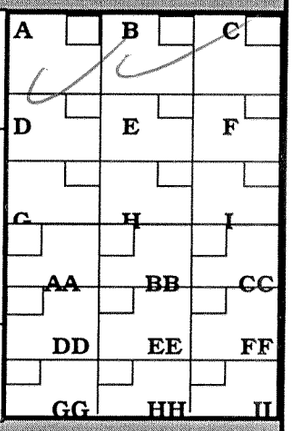
Peel or Push ?

Recovered core Length: 31 cm

Lengths of subcores : In centimetres

A	28	D		G	
B	31	E		H	
C		F		I	

Subcores



Comments:

3 subsamples taken
1. Dinos - Rochon
2. Dinos - Pothin
3. Forams - Scbell

Light brown soft mud, overlying brown, grey mud with lots of organic black streaks, occasional cobbles.

Subsamples

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 25 (local CT)

Stn. 338[77]

GRABS	GEOLOGICAL SURVEY of CANADA (ATLANTIC)	GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-604	029	Amundsen		G. Stern

	Day of Year \ UTC time		LATITUDE	LONGITUDE	* GEOREGION *	* SUB-REGION *
					eg: Gulf of St. Lawrence = Baie de Chaleur	
1 st Try	299	16:48	65°06.92'	79°20.92'	eg: Scotian Shelf = Sable Basin	
					Eastern Arctic	Foxe Basin
2 nd Try						

Water Depth (m)	Elevation Reference :	Depth Method :	Choose From This List
63		3.5 kHz	EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..
Wire out (m)	Default: local water level		

If station is based on a Seismic Record Please complete below :			Seismic instrument	Choose From This List
Seis Expedition Code	Seis Day / UTC Time			3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.
			3.5 kHz	

GRAB

Choose type of grab from the list below :
VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below
BOXCORE (Standard)
IKU GRAB 1 cu (m)
IKU GRAB 0.5 cu (m)

Subcore Type :
Peel or Push ?

Recovered core Length 10cm (incomplete) cm

Subcores

Lengths of subcores : In centimetres

A		D		G	
B		E		H	
C		F		I	

Comments:
Sand w/ cobbles/gravel and shells. Poor core performance due to coarse sediment... bulk sample only.

Subsamples

A	B	C
D	E	F
G	H	I
AA	BB	CC
DD	EE	FF
GG	HH	II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 26/06 (local CT)
Stn. 546

GRABS — GEOLOGICAL SURVEY of CANADA (ATLANTIC) — GRABS

CRUISE NUMBER	STATION NUMBER	VESSEL NAME	PROJECT NUMBER	CHIEF SCIENTIST
2006-804	030	Amundsen		G. Stern

Day of Year \ UTC time	LATITUDE	LONGITUDE	* GEOREGION * (eg: Gulf of St. Lawrence / eg: Scotian Shelf)	* SUB-REGION * (= Baie de Chaleur / = Sable Basin)
1 st Try: 300 / 05:56	64° 30.41'	80° 32.34'	Eastern Arctic	Foxe Channel
2 nd Try:				

Water Depth (m)	Elevation Reference :	Depth Method :
346		3.5 kHz

Wire out (m):

Default: local water level

Choose From This List

EM100, EM1000, EM3000, RTK-DGPS, 3.5 khz, 5khz ,12 khz, 30 khz, 50 khz, 200 khz Lead Line, Other, None..

If station is based on a Seismic Record Please complete below :

Seis Expedition Code | Seis Day / UTC Time

Seismic instrument (Choose From This List): 3.5 kHz

3.5 khz, Airgun, Bathymetry, Boomer, BRUTIV, Bubblepulser, Chirp, Gravity, Gravity 2, Huntec, Magnetics, Multibeam, OBS, Reflection, SAR, Seaotter, Sidescan, Sleevegun, Sonobuoy, Sparker, Seabed2, Seamarc, Seistec, OTHER.

GRAB

Choose type of grab from the list below :

VanVeen, Trowel, Shipek, Eckman, Ponar

Comments:

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Subcore name	Comments:

If subsample is from a subcore, please enter name of subcore. (e.g. A, B, C, etc.)

BOXCORE / IKU GRAB

Choose from below

BOXCORE (Standard)

IKU GRAB 1 cu (m)

IKU GRAB 0.5 cu (m)

Recovered core Length: 37 cm

Subcores

Lengths of subcores : In centimetres

A	37	D		G	
B	36	E		H	
C		F		I	

Subcore Type : Peel or (Push) ?

Comments:

3 subsamples taken
1. Dinos - Rochon
2. Dinos - Potvin
3 Foraams - Scott

Light brown clay over brown/grey silt with sand and common black streaks. Occasional cobbles

Subsamples

A ✓ B ✓ C

D E F

G H I

AA BB CC

DD EE FF

GG HH II

SUBSAMPLES

Please choose analysis type for collection from list below.

Age	*Carbon Content*	*Isotopes*	*Paleomagnetics*
Archeology	*Grain Size*	*Macropaleontology*	*Palynology*
Biology	*Index Properties*	*Micropaleontology*	*Petrology*
Biostratigraphy	*Inorganic Chemistry*	*Organic Chemistry*	*XRD*

Analysis Type	Top Interval	Bottom Interval	Comments:

6 June 2000 DH

Oct. 27 (local CT)

Stn. 350

APPENDIX 5 – 2006-804 AERIAL SURVEY OF DESALIS BAY COASTLINE

Helicopter Survey of De Salis Bay

Objectives

The main objectives of the coastal work were to identify evidence of the postglacial lowstand shoreline and to support interpretation of sea-level rise from cores in former lakes now converted to marine basins. Secondary objectives included surveys and interpretation of shoreline evolution and investigations of a shallow, highly-stratified, breached-lake, tidal basin with dense hypersaline water at depth.

This appendix reports on an aerial survey of the De Salis Bay coast conducted as part of the 2006-804 cruise in order to help address these objectives. This survey included ground observations and sampling at two locations on the shores of Se Salis Bay.

Study Site

De Salis Bay is a prominent feature on the southeast coast of Banks Island. Although no detailed seabed mapping or coastal surveys have been undertaken previously in this area, the shores of the bay have been visited briefly by a number of earlier researchers, including Donnelly (1943), Porsild (1950), and Manning (1953), among others. The bay is an important site for the present residents of Sachs Harbour and Thule structures along the coast (Manning, 1953) attest to older human presence in the area. The bay as a whole forms a triangular indentation 25 km long and 12 km deep in the otherwise straight southeast coast of the island. The west coast of the bay consists of prominent cliffs cut into a complex sequence of Pleistocene tills, outwash, and marine sediments (Vincent, 1993, 1990), erosion of which feeds sediment northward along a sand and gravel barrier extending more than 20 km to the outlet of Windrum Lagoon at the north end of the bay. For the first 9 km, the barrier encloses a narrow lagoon south of the Sandhill River delta. This river drains north into Windrum Lagoon, a large basin enclosed behind the barrier extending from the delta front to the prograded beach-ridge complex fronting the Windrum Lagoon outlet channel seaward of the De Salis River delta. A large tombolo and spit complex extending about 5 km westward from the east side of the bay partially encloses the inner harbour (Fig. A1).

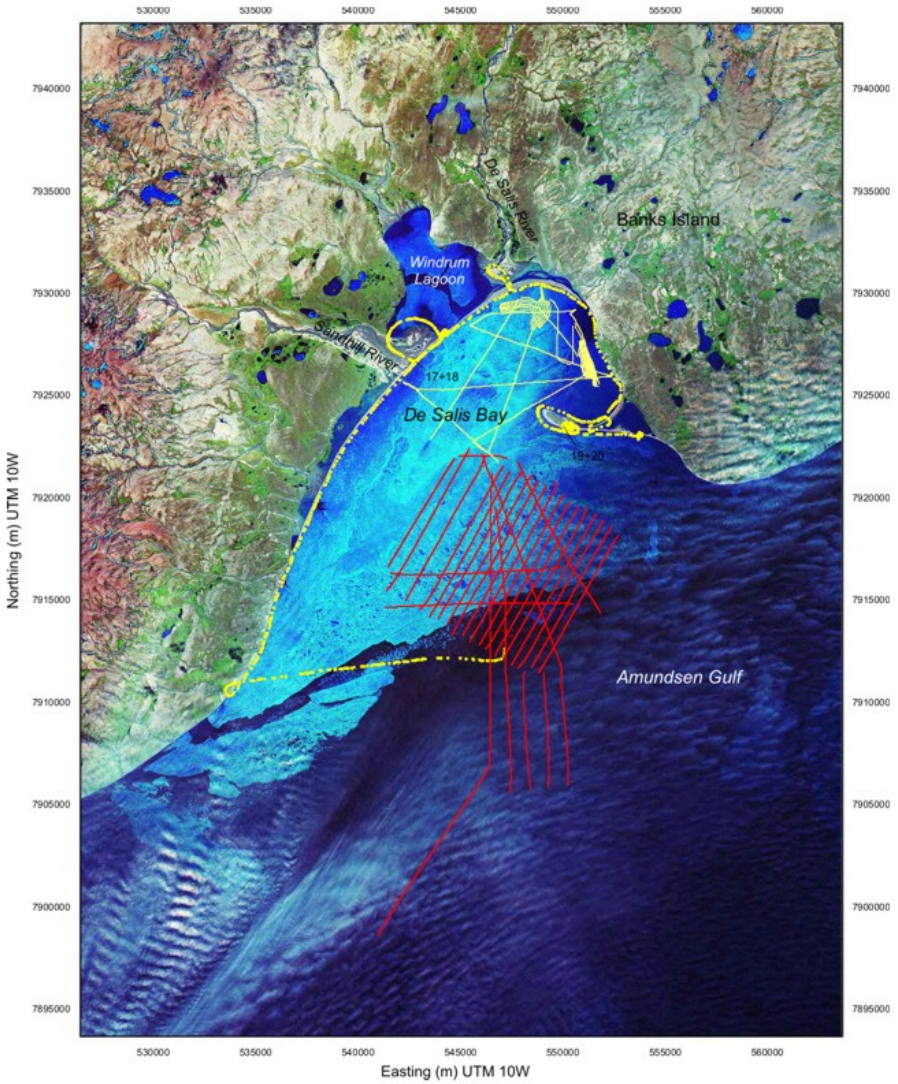


Fig. A1. Landsat mosaic of De Salis Bay showing preliminary *Amundsen* tracks [some errors] (red), *Heron* tracks (yellow), helicopter track (yellow dots), and onshore sample sites (numbered).

Data Collection and Preliminary Results

The survey was carried out while Amundsen and Heron were conducting marine surveys in the the De Salis Bay area.

Helicopter Cc-GCHU (CG358) with pilot Michel Fiset flew from the *Amundsen* flight deck and completed an aerial survey and photo reconnaissance of the bay. From the eroding cliffs in the southwest, the flight path proceeded clockwise around the bay, following ~24 km of sand and gravel barrier beach along the western and northern shore, a ~5 km section of low bluffs in the northeast corner, and the ~5 km long tombolo and spit extending from the eastern shore toward the middle of the bay.

Landings were made at two sites, one on the beach fronting the Sandhill River (Fig. A2) and the other at a site on the outer part of the spit-tombolo structure extending west into the bay from the eastern shore (Fig. A1). Sand samples were collected at both sites (2006-804-0017, -0018, -0020) and a sample of peat (2006-804-019) was collected on the spit (Appendix 2).

Fig. A2. Helicopter C-GCHU on the beach at Sandhill River, showing patchy dunes cut by sand-gravel washover channels and recent notching of dunes and washover deposits.

At the Sandhill River site, extensive sandy-gravel outwash deposits extend landward toward the river. Sand (much of it evidently blown seaward from the river channel and floodplain) forms small dunes interspersed between the washover channels and elongated normal to the shore (Fig. A3). There is no evidence of river breakout channels or overflow seaward across the beach, indicating that most of the river sediment load continues to be deposited in Windrum Lagoon (Fig. A1).

Fig. A3. Beach-cut section through shore-normal dune between washover channels at Sandhill River beach.

The tombolo and spit structure on the eastern side of De Salis Bay is very large, extending about 5 km westward into the bay (Fig. A1). The northern arm of the tombolo consists of a prograded sequence of beach ridges (Fig. A4) similar to the prograded sequence across the north end of Windrum Lagoon. The southern arm of the tombolo appears to be a transgressive feature with extensive washover and landward migration. This is also the main pathway for westward longshore sediment transport from cliffs to the northeast. Over time, this longshore transport has constructed a large recurved spit structure at the outer end (Fig. A5). Manning (1953) noted extensive windblown dust deposition on ice in the tombolo lagoon in early spring.

Fig. A4. Large shore-normal frost cracks in prograded beach-ridge sequence in northern arm of tombolo on the east side of De Salis Bay.

Fig. A5. View east from outer end of De Salis Bay spit. Note double-armed tombolo in the distance.

The ridges on the spit are all quite low (<3 m elevation), and most of the area between ridges is filled with sand. A few deeper troughs have accumulated water and organic material, allowing formation of very thin peat. The second landing was made at one such

site (Fig. A6), where sample 0019 was obtained from a 5 cm unit of compact black peat underlying 25 cm of sand.

Fig. A6. View westward along spit and across De Salis Bay, yellow circle showing location of peat sample (station 19 in Fig. A1) along the outer edge of a moist depression between vegetated ridges.

References

Donnelly, C. B. C. 1943. Windrum anchorage. Geod. Surv. Can. File No. 347. 1p.

Manning, T.R. 1953. Narrative of an unsuccessful attempt to circumnavigate Banks Island by canoe in 1952. *Arctic*, **6** (3), 171-197.

Porsild, A. E. 1950. A biological exploration of Banks and Victoria islands. *Arctic*, **3**, 45-54.

Vincent, J.-S. 1983. *La Géologie du Quaternaire et la Géomorphologie de l'Île Banks, Arctique Canadien*, Geological Survey of Canada, Memoir 405, 118 pp.

Vincent, J.-S. 1990. Late Tertiary and Early Pleistocene deposits and history of Banks Island, southwestern Canadian Arctic Archipelago. *Arctic*, **43**, 339-363.