Cruise Report Amundsen 2005-804: Beaufort Sea / Amundsen Gulf / Northwest Passage, August 5 – September 15, 2005

Open File 5797

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1.0 INTRODUCTION

This cruise report summarizes the activities of the geological/paleoceanographic science program of ArcticNet Leg 1 2005 which took place between August 5 and September 15, 2005. A GSCA cruise number (2005-804) has been given to this project since GSCA personnel were onboard and samples from this expedition will be 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

André Rochon	Institut des sciences de la mer de Rimouski located at the Université du Quebec à Rimouski
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)
Robbie Bennett	Geological Survey of Canada (Atlantic)

1.2 Background

ArcticNet is a Network of Centres of Excellence of Canada funded project 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, focused on the Northwest Passage.

2.0 SCIENTIFIC OBJECTIVES

The objectives of cruise 2005-804 fall under ArcticNet sub-project 1.6. The objectives of sub-project 1.6 entitled "Opening the Northwest Passage: Resources, Navigation, Sovereignty, & Security" include: 1) compile corridors of precise high resolution bathymetry, and seabed geomorphology; 2) 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.

To obtain the maximum multi-beam bathymetry and sub-bottom profiler data coverage, geophysical data was collected by these two systems whenever the vessel was transiting 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, piston core sites were selected based on geophysical data collected during Canadian Arctic Shelf Exchange Study (CASES) Leg 1, Leg 8, Leg 9, ArcticNet 2004, and data archived at the GSCA. Sites were selected in order to sample thick Holocene sequences in the Northwest Passage.

3.0 EQUIPMENT

Scientific operations for cruise 2005-804 were performed aboard the CCGS Amundsen (see Figure 3.1). 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 98m long, 19m wide with a draft of 7m and can obtain a maximum speed of about 16 knots. There is approximately 300 m^2 of lab space inside the vessel with another 110m^2 of lab space in temporary external lab containers. The Amundsen can accommodate 46 scientific staff in addition to the 31 ship's crew. The following equipment was used to accomplish the scientific objectives of this cruise.

3.1 Piston Corer

The piston corer used onboard the Amundsen was constructed based on blueprints of the AGC Long Corer, that were supplied by the GSCA. This system is comprised of a large core head used with 3m x 106mm ID core barrels that are attached with external couplings secured by set screws. Up to 5 barrels can be used with this system, yielding a 15m core sample; however the deck layout of the Amundsen only allowed for 3 core barrels to be used. The 3 barrel configuration was more than sufficient as all of the samples collected were less than 9m in length. Transparent plastic core liner was inserted into the core barrels for each sample to retain the core when it was removed from the corer. The whole round samples obtained by this system have a diameter of 99.2mm, and were cut into 1.5m lengths for ease of transportation. A 115kg trigger weight corer with a 1.5m aluminum barrel was used as the trigger weight for this system. The sample diameter of the trigger weight cores was also 99.2mm.

The deployment of the piston corer was difficult due to the configuration of the Amundsen's foredeck. To deploy the corer, the system was first assembled perpendicular across the foredeck between the coring winch and the winch controls. When the piston corer was fully assembled, the nose of the corer was directed under the coring A-frame and the entire system was picked up horizontally using the two large cranes located on the foredeck. The core barrels were then rested on the edge of the ship and then the core head was slowly lifted to rotate the system to an almost vertical position and then it was slowly lowered to the water line (Figure 3.2). The trigger weight corer was then attached to the trigger arm using a separate winch and block. Retrieval of the piston corer was the reverse of deployment. This method of deployment/retrieval was cumbersome and slow; however it was the only method that could be conceived with the current configuration of the Amundsen. The deployment and retrieval processes did become easier and faster as the scientific personnel and ship's crew became more familiar with the equipment.

Once the piston corer was retrieved and back on the deck, each barrel is disassembled from the corer and the plastic liner is extracted. Each 3 meter long liner is then cut into

Figure 3.1: CCGS Amundsen
(Image courtesy M. Fortier)

Figure 3.2: Piston corer deployment
(Image courtesy T. Juul-Petersen)

1.5 meter sections, which are capped at each end, labeled and stored in a refrigerated container (at about 4° C) for further analysis. All of the piston and box cores will be curated at the GSCA core repository located at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia. The cores have been labeled using the standardized GSCA system (e.g. 2005-804-001PC) so the cores can be integrated into the Exploration Database (ED).

See Section 4.1.1 for a discussion of the piston core samples that were collected.

3.2 Box Corer

The 50cm x 50cm x 80cm box corer (Figure 3.3) was used by many scientists onboard, with several samples taken from each core. For 2005-804, two push cores (99.2mm ID) were taken from each box core sample. Surface sediment sample at each box core location were also collected in order to develop reference databases of modern dinoflagellate cysts, diatoms and foraminifera populations in the study area. The surface samples will be curated at Dalhousie University and at the Institut des sciences de la mer de Rimouski (ISMER). The box corer used during 2005-804 was brand new and had never been used. A few modifications were required to the trigger release arm to enable the box corer to trigger properly when it contacted the seabed. Once these modifications were completed, the system functioned well.

See Section 4.1.2 for a discussion of the box core samples that were collected.

3.3 Multibeam Echosounder

The Kongsberg-Simrad EM 300 multibeam echosounder system was used to collect all bathymetry data during cruise 2005-804. This system was operated and maintained by the personnel of 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 OMG developed software.

Figure 3.3: Box core used during 2005-804
(Image courtesy C. Cockney)

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	10m to >5,000m
Maximum swath width	>5,000m

Sound velocity data for the EM 300 was acquired from the MVP-300 (Brooke Ocean Technology) and the Seabird CTD on the rosette was also used to obtain the sound velocity profiles. Two hull mounted probes were also available to supply sound velocity information to the EM 300 transducer.

See Section 4.2 for a discussion of the features observed in the 2005-804 geophysical data and the performance of the EM 300 multibeam system. At the time of this report, the geophysical data are archived at the University of New Brunswick and can be viewed on the internet at www.omg.unb.ca.

3.4 Sub-bottom Profiler

The sub-bottom profiler installed onboard the Amundsen is the Knudsen 320R deep water echosounder. This system was operated by OMG and was used to collect all of the sub-bottom geophysical data during 2005-804. The Knudsen 320R is a high power bathymetry/sub-bottom imaging system capable of data collection at full ocean depths. The 320R utilizes a 3.5 kHz hull mounted transducer which is networked to the control station on the Navigation Deck of the Amundsen where the data is 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

See Section 4.2 for a discussion of the features observed in the 2005-804 geophysical data and the performance of the Knudsen 320R sub-bottom profiler. At the time of this report, the geophysical data are archived at the University of New Brunswick and can be viewed on the internet at www.omg.unb.ca.

4.0 GEOPHYSICAL AND GEOTECHNICAL DATA SETS

A large amount of both geophysical and geotechnical data has been collected during cruise 2005-804 aboard the CCGS Amundsen. Section 4 will discuss in further detail the amount and types of data collected over the duration of 2005-804. A narrative of the daily events of 2005-804 is provided in Appendix 1.

4.1 Geotechnical Samples

A total of 5 piston cores and 8 box cores were collected during the course of cruise 2005-804. The positions of the geotechnical samples are displayed in Figure 4.1.

4.1.1 Piston Core Samples

Five piston cores were attempted during cruise 2005-804. Details on each of the piston core samples are available in Appendix 2. Sub-bottom profiles of each piston core site are available in Appendix 3. A detailed sediment description of each piston core is available in Appendix 4.

4.1.2 Box Core Samples

A series of 8 box cores were collected through out the Northwest Passage. In each boxcore, 2 surface samples and 2 push cores were collected, except in 2005-804-007 BC where no push cores were taken. The surface samples will be curated at Dalhousie University and at ISMER. Box cores collected in conjunction with piston cores allowed for the recovery the surficial layer of sediment, which is usually destroyed when the piston corer enters the sediments. In general, sediments from the selected box core sites in the Northwest Passage are composed of silty clay, possibly of late Holocene age, with occasional benthic fauna.

Details on each of the box core samples are available in Appendix 2.

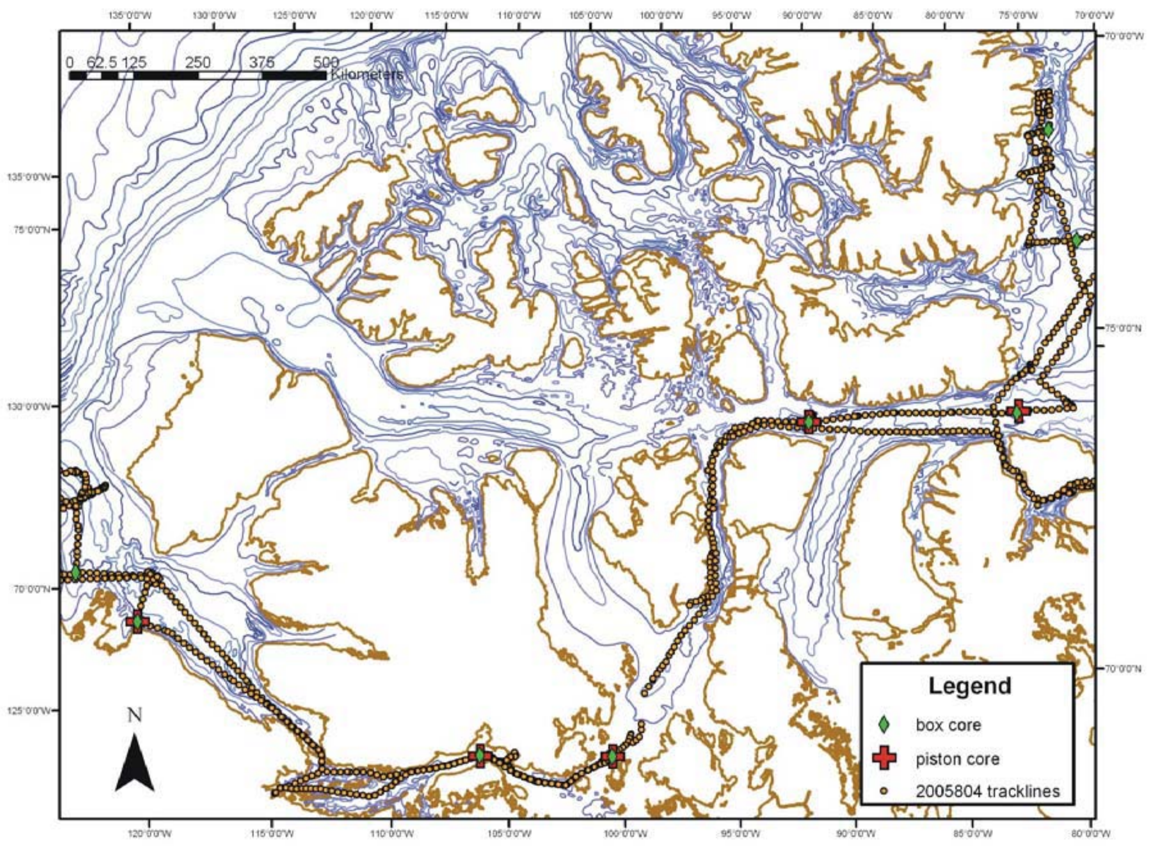

Figure 4.1: Geophysical and geotechnical data collected during 2005-804

4.1.3 Onboard Sample Processing and Sub-sampling

The 5 piston cores, 5 trigger weight cores and 12 pushcores from the 7 box cores were analyzed with the onboard MSCL (Multi Sensor Core Logger). A total of 3294 cm of core material was logged onboard the Amundsen for gamma density, p-wave velocity, core thickness, magnetic susceptibility and temperature.

All of the piston cores and one push core from each box core (except 2005-804-007BC) were split into a Working and Archive half, a sediment description compiled, spectrophotometry measurements taken, and then digitally color photographed. Approximately 2814cm of core was processed in this manner.

Sub-samples were taken every 10 cm from the Working core half. The sub-samples included:

Table 4.1: Core Sub-sample Collection Procedures

Analysis Type	Sample Size	Box core	Piston & TWC
Foraminifera	10 cc	1 cm intervals	10 cm intervals
Palynology	10 cc	1 cm intervals	10 cm intervals
Diatoms	5 cc	None	10 cm intervals
Grain size	1 cc	5 cm intervals	10 cm intervals
$^{13}C/^{12}C$ (organic C)	1 cc	None	10 cm intervals
^{18}O stable isotopes	1 cc	None	10 cm intervals
^{210} Pb	1 cc	1 cm intervals in upper 15 cm	None
Paleomagnetism (U-channels	Continuous	Continuous	Continuous

In total, 2080 sub-samples and 2814 cm of U-channel/mini-cores for paleomagnetism were collected. These sub-samples will be curated at Dalhousie University and ISMER.

Both the Working and Archive core halves are stored in plastic D-tubes and held in cold storage (~ 4°C). The refrigerated unit that contains the cores remained on board the CCGS Amundsen until her return to Quebec City in October 2005. At this time, the cores were taken off the ship and trucked to the Bedford Institute of Oceanography in Dartmouth where they were placed into storage in the GSC Core Repository.

4.2 Geophysical Data

Geophysical survey blocks were conducted in the following areas in order to image core sites or interesting seabed features.

Table 4.2: Multibeam survey blocks

Block#	Date	ArcticNet Station	Feature /Core #	Latitude N	Longitude W	Dimensions (km)	WD(m)
1	08/13/05	Clark & Gibb Fj.		71°03.35'	-71°21.35'	150km long strip	~700
2	08/14/05	Pond Inlet		72°47.23'	-77°35.01'	6 x 1	~800
3	08/22/05	Lancaster Sound	"Byam Martin" 1978 Site	74°02.00'	-77°05.00'	16 x 5	850
4	08/25/05	4	Gas vents, 004 PC	74°16.02'	-91°12.00'	14 x 13	350
5	08/30/05	7	006 PC	69°00.00'	-106°34.98'	9 x 2	118
6	09/06/05	Amundsen Gulf	Deep Water Scours	71°30.38'	-127°00.42'	65 x 16	~410
7	09/06/05	CA-18	"Hole" & sole marks	70°40.00'	-122°59.00'	22 x 28	550
8	09/13/05	12	008 PC	69°54.87'	-122°57.18'	10 x 3	174

Multibeam and sub-bottom profiler data was also collected while the ship was transiting between stations, when ice conditions permitted. Figure 4.1 shows the complete track of the Amundsen where geophysical data was collected and figure 4.2 displays the locations of the survey blocks shown in Table 4.2 (map projection: Mercator). Images of the multibeam and sub-bottom profiler data can be viewed at the University of New Brunswick Ocean Mapping Group's website www.omg.unb.ca.

There were several difficulties encountered with the EM 300 multibeam system that required downtime to be repaired. 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 bathymetry data. An evaluation of the geophysical equipment's performance in ice is presented in Section 5.3.

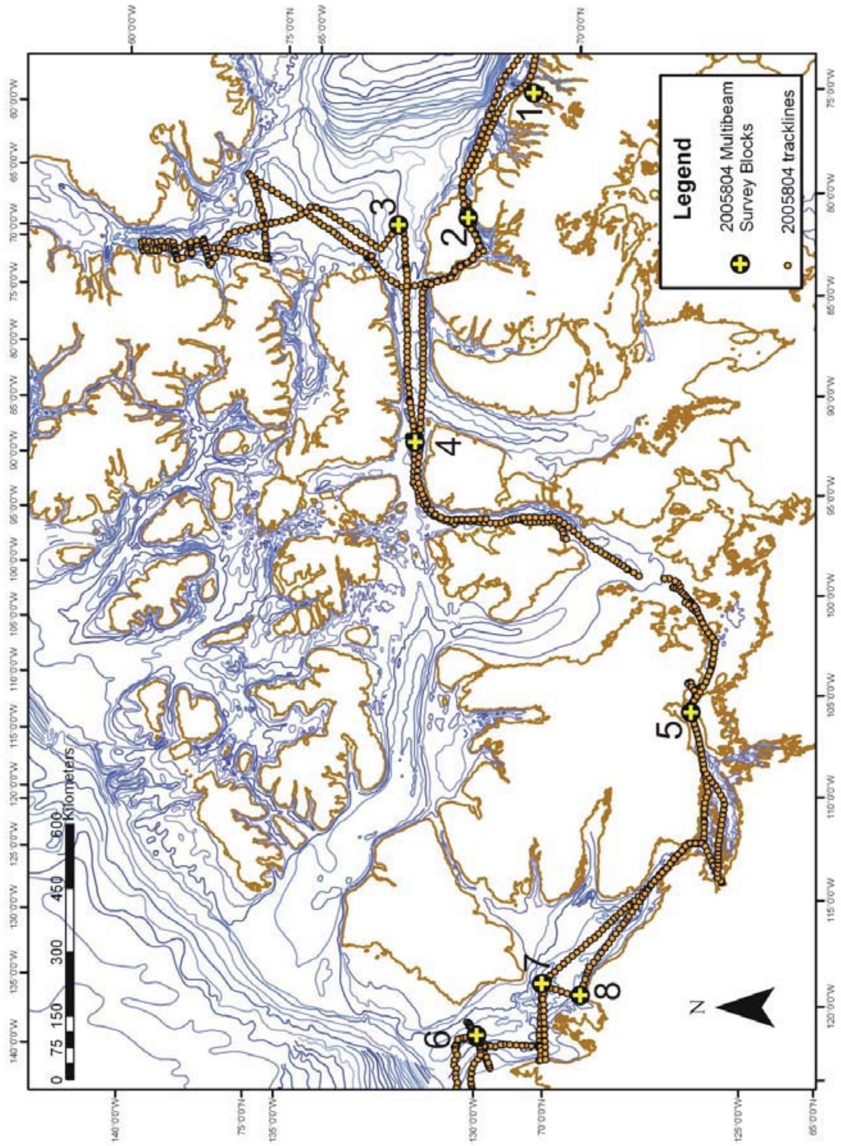

Figure 4.2: 2005-804 Geophysical survey blocks

5.0 SCIENTIFIC ACCOMPLISHMENTS

The 2005-804 scientific program was successful in acquiring useful geophysical and geotechnical data to address the objectives of ArcticNet sub-project 1.6. This section will discuss the scientific accomplishments of this expedition.

5.1 Geophysical Data Acquisition over Seabed Features

Several seabed features were observed in the geophysical data collected onboard the Amundsen. These features are discussed in the following sections.

5.1.1 Ice Sheet Related Seabed Features (Sole Marks and Deep Water Scours)

Seabed features interpreted to be related to glacier ice and/or meltwater movement have been identified at several multibeam survey sites. The sites that appear to have been affected by glacial actions are located in Amundsen Gulf and Dolphin and Union Strait (Figure 5.1), which were glaciated during the Late Wisconsinan by the Laurentide Ice Sheet (Dyke et al., 2003).

The most dramatic and abundant features observed in the Amundsen Gulf are glacial sole marks (Figure 5.2). These features have been observed at three different multibeam sites each located in about 400 meters of water at the western end of Amundsen Gulf. The sole marks are linear, parallel ridges and troughs that are orientated in a NW – SE direction. Each individual ridge is wider and higher above the seabed at their SE end and then decreases in size (both in width and height) to the NW. The ridges are approximately 40 to 300m wide, up to 30m high, and as long as 5km. Erosion is visible at the SE end of some of the ridges. The orientation and morphology of the sole marks suggests an ice movement direction to the Northwest. Similar features are observed on nearby Wollaston Peninsula, Victoria Island (Sharpe, 1992). It is not certain if these features originated from the movement of a large ice sheet or created by glacial meltwater processes.

Ice Scours with irregular paths and scour depths up to 3.6m deep have been observed to water depth of 410m in Amundsen Gulf (Figure 5.3). These scours are of interest as the present day ice scour regime in the Beaufort Sea generates ice scours to water depths of only ~55m. Even during the late-Pleistocene when sea level was as much as 120m lower than at present, ice scours would have only been generated from sea ice to water depths of 175m. Ice scours in 410m water depth could have been caused by large icebergs calved from glaciers that were once present in the area or the scours could have been caused by a more extreme sea ice regime in the past. The study of these deep water scours is important for clients and stakeholders in order to distinguish them from the shallow water scours that are being generated from the present sea ice conditions.

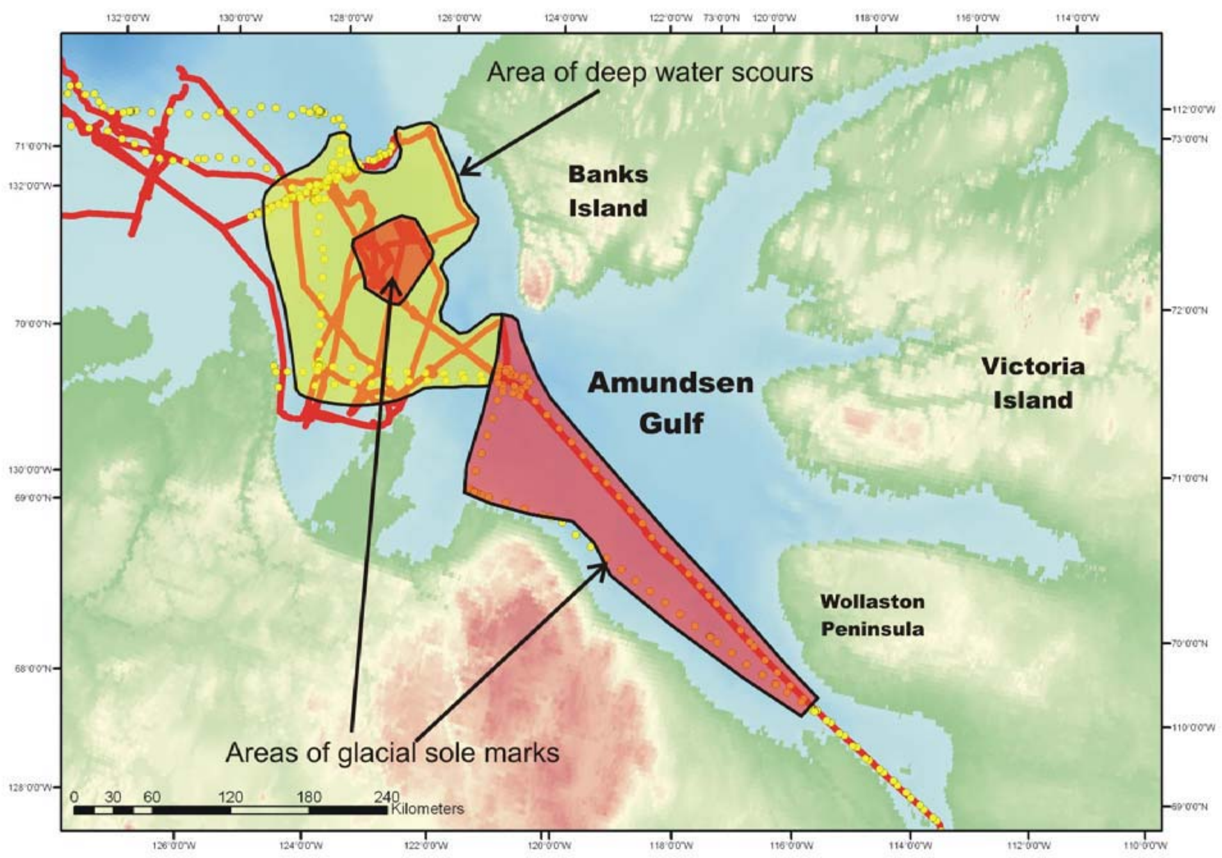

Figure 5.1: Areas of glacial sole marks and deep water scours
(Red line indicates trackline for 2004804, yellow dots indicate trackline for 2005804)

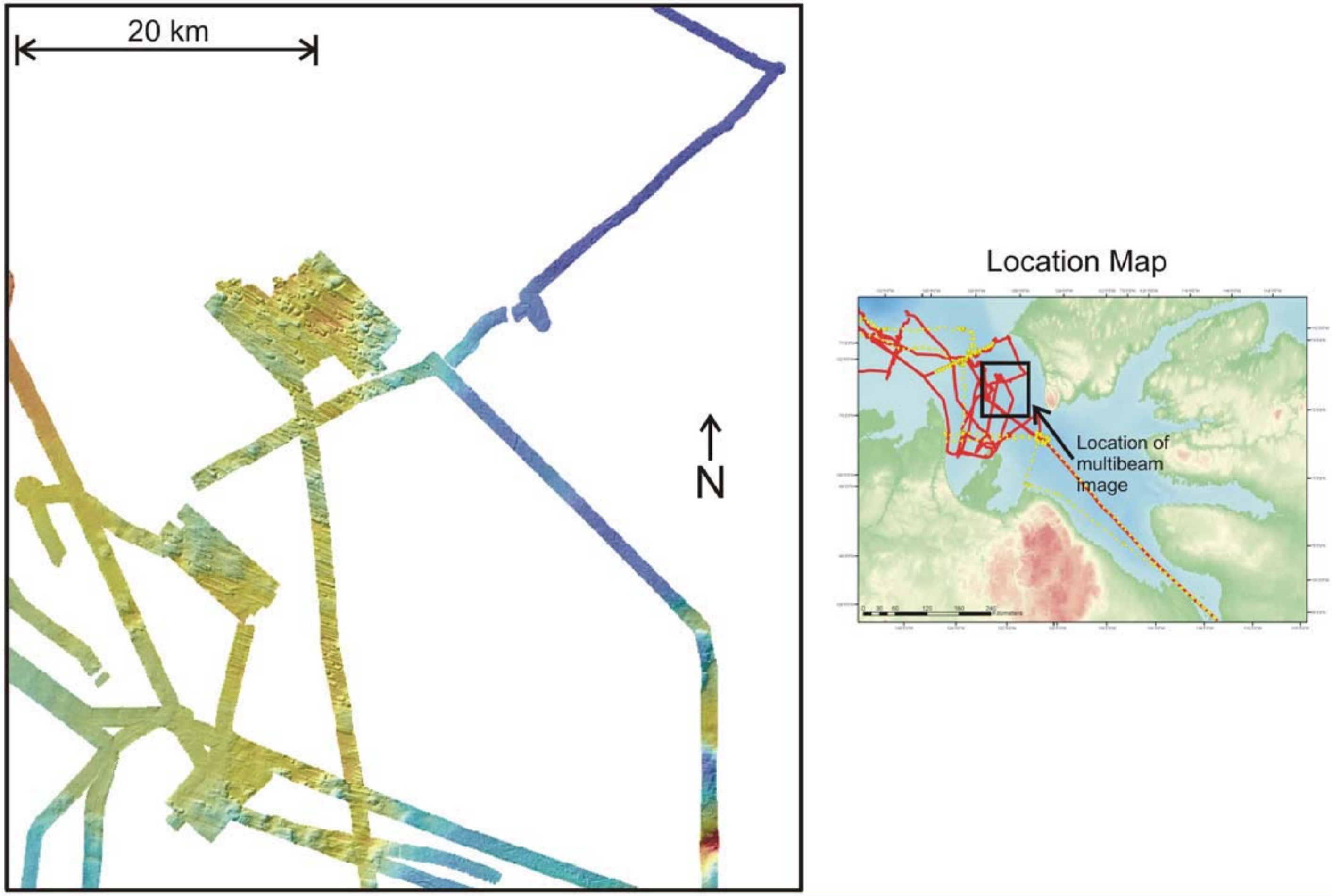

Figure 5.2: Multibeam echosounder image of glacial sole marks in the Amundsen Gulf.

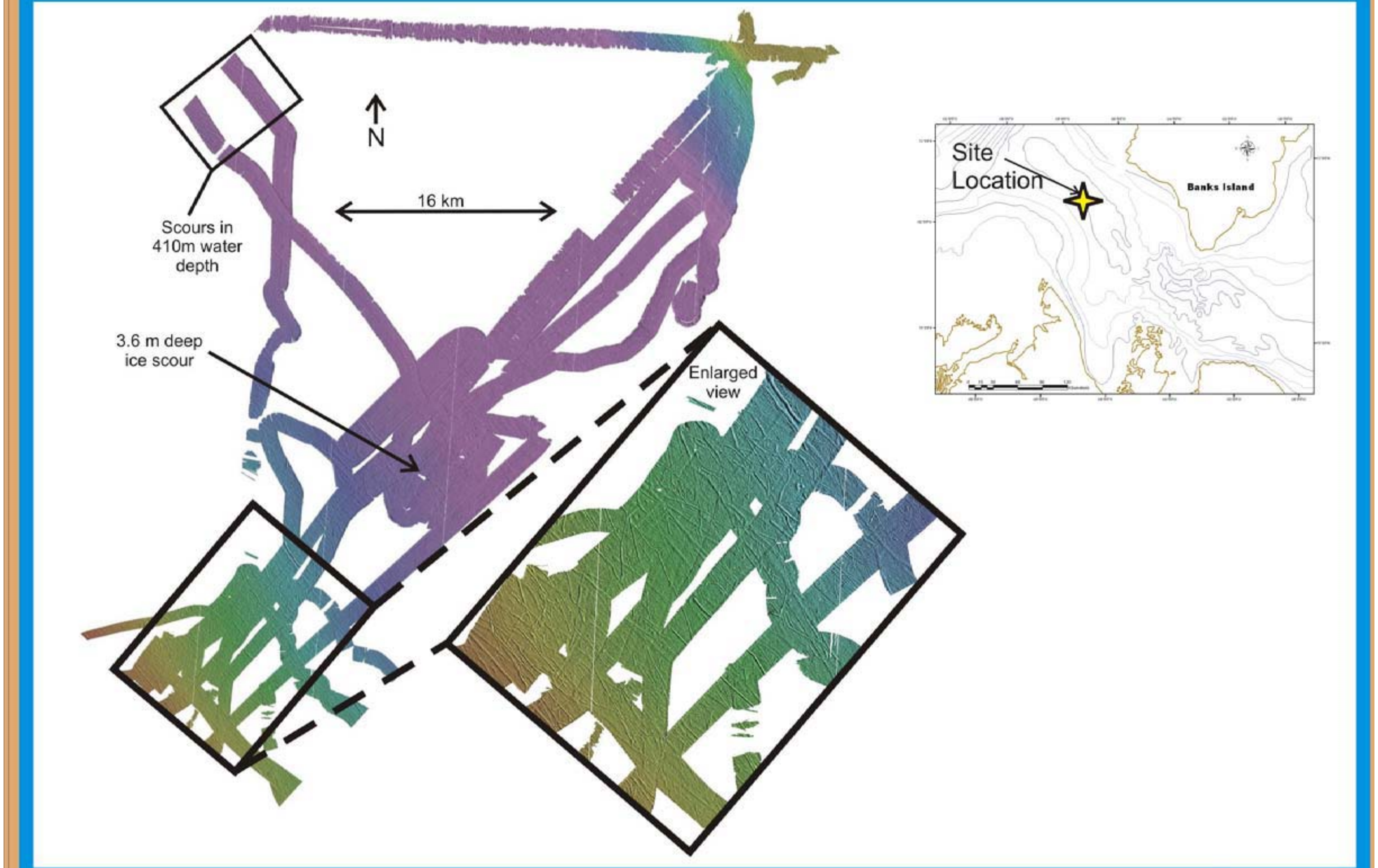

Figure 5.3: Multibeam echosounder image of an older ice scour regime at about 410 m water depth (Image courtesy Jason Bartlett, CHS)

The current interpretation of this data in Amundsen Gulf is that the glacial sole marks were formed underneath a glacial ice stream during the last glaciation and the deep water ice scours were formed by icebergs that calved from the glacier front. Further acquisition of multibeam data over both types of features will aim to delineate the extents of the features, and determine the marine limit of the Amundsen Gulf ice stream.

5.1.2 Barrow Strait Gas Vents / Pockmarks

Gas vents or pockmarks were discovered in Barrow Strait by multibeam echosounder during the 2005-804 cruise. There were 9 pockmark observed in a 14 x 13km survey grid conducted in about 300m water depth. The Barrow Strait pockmarks are ~200m wide, and approximately 10-25m deep (Figure 5.4). This figure also shows that one of these features appears to be actively venting gas. A 671cm long piston core (2005804-004 PC) and a box core (2005904-010 BC) were collected about 1km to the east of one of the larger pockmarks, however no hydrocarbon indicators were observed either core.

Most of these features appear to be oriented along a NW-SE corridor, suggesting that the hydrocarbons may be migrating from depth along a fault. The interpretation of a fault is based on the limited multibeam data available at the time of this report and should be re-examined when/if new data is acquired in this area.

Shallow gas research (i.e. pockmarks, mud volcanoes, etc.) is necessary because of the potential impact on pipelines, sub-seabed drilling, and the environment. Pockmarks could also be an indication of oil and gas resources at depth.

5.2 Deep Water Geotechnical and Geophysical Data

The use of the CCGS Amundsen for 2005-804 allowed for the collection of both geotechnical and geophysical data in much deeper water depths than are possible with other vessels in the Arctic Region. The Amundsen proved to be an excellent research platform, capable of working in rough weather and sea ice.

Piston cores and box cores were collected in various water depths in the Beaufort Sea, Amundsen Gulf, and the Northwest Passage ranging from 61m to 815m water depth. Geophysical data was collected in water depths as deep as 2516m on the Beaufort Slope. This deep water geophysical and geotechnical data compliments the extensive dataset collected in shallower water on the Beaufort Shelf onboard the CCGS Nahidik.

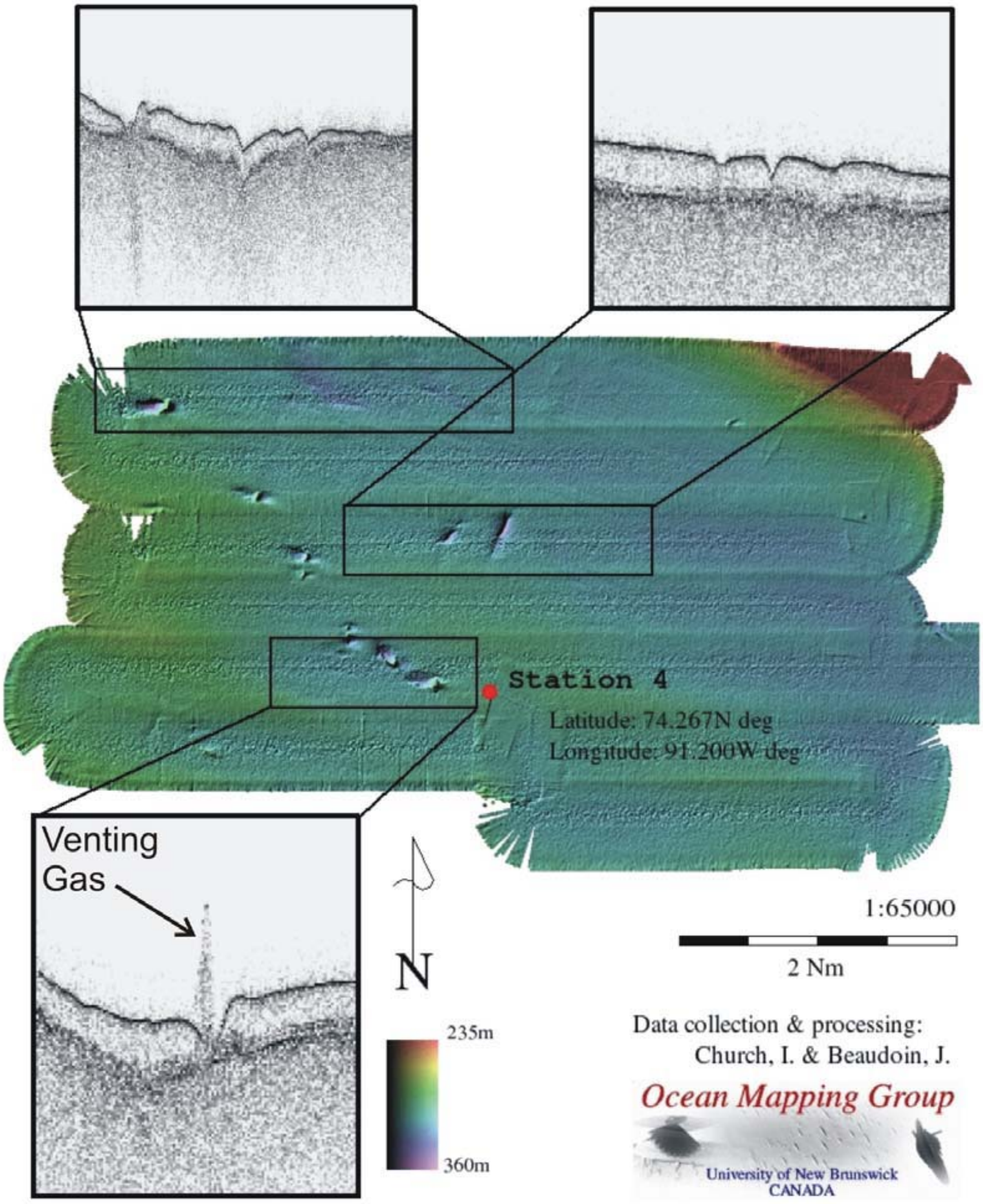

Figure 5.4: Gas vents observed in Barrow Strait

5.3 Evaluation of the Performance of Geophysical Equipment in Ice

As discussed in Section 4.2, sea ice adversely affected the quality of the geophysical data collected by the Amundsen. OMG personnel observed that the vessel's speed has a direct effect on how well the system can track the sea floor while moving through thin to moderate sea ice. A slower survey speed decreases the amount of noise generated as the ship's hull strikes sea ice. OMG has also observed that keeping tight tracking gates and narrowing the angular coverage sector will slightly improve the bottom tracking as well. The Knudsen 320R sub-bottom profiler proved to be a bit more robust that the EM 300 as it was able to collect usable data in most ice conditions.

Very thick sea ice causes the vessel to ride up onto the ice in order to break it, which brings the EM 300 and Knudsen 320R transducers to come in contact with the ice and/or highly aerated water. This situation led to unusable geophysical data from both the sub-bottom profiler and the multibeam echosounder. It is not an option to decrease the speed of the vessel in these ice conditions as the ship requires momentum to break the ice.

6.0 RECOMMENDATIONS

- Acquire more multibeam data in the Amundsen Gulf to determine the extent of ice sheet related features
- Acquire sediment cores from the slope failure feature imaged during 2004-804. Also acquire additional multibeam and sub-bottom profiler data in order to identify the failure mechanism and the age of the feature
- Complete multibeam and sub-bottom profiler coverage over piston core sites
- Complete multibeam and sub-bottom profiler coverage over seabed features imaged during 2005-804

Tables 6.1 and 6.2 summarize the data that was collected over seabed features and core sites during 2005-804. These tables are to assist the planning of future field work.

Table 6.1 - Multibeam / Sub-bottom and Core Data at Seabed Features

Feature	Multibeam/SBP	Box Core	Piston Core	Comments
Streamlined Drumlins	Yes	Yes (2004804-021BC and 022BC)	No	Additional MBE and SBP required
Ice Scours (410m)	Yes	Yes (2004804-027BC)	No	Additional MBE and SBP required
Barrow Strait Gas Vents	Yes	Yes (2005804-010BC)	Yes (2005804-004PC	Additional MBE and SBP required
Lancaster Sound Rep. Mapping Site	Yes	No	No	1978 'Byam Martin' Site

Table 6.2 - Multibeam / Sub-bottom Data at Piston Core Sites

Piston Core	Multibeam/SBP Survey Block	Comments
003PC / 3	No	Regional Line over site
004PC / 4	Yes	Complete Survey (gas vents)
005PC / 6	No	Regional Line over site
006PC / 7	Yes	Complete Survey
008PC / 12	Yes	Complete Survey

7.0 REFERENCES

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Sharpe, D.R., 1992. Glacial Sediments and Landforms, Southern Victoria Island, N.W.T., Canada. Ph.D. Thesis, University of Ottawa.

APPENDIX 1 - 2005-804 NARRATIVE

2005-804 NARRATIVE

ArcticNet 2005

Robbie Bennett- GSC Coring Technician onboard August 5th to September 15th, 2005

All times Mountain Daylight Time (MDT) unless otherwise noted

August 3, 2005
-depart Halifax @ 7:30 (ADT), flight delayed 1 hour and therefore missed connecting flight in Montreal. Arrive onboard Amundsen around midnight.

August 4, 2005
-Scheduling meeting 9:00 – 1:00 (EDT)
-located and unpacked equipment

August 5, 2005
-Amundsen departs Quebec City
-continued to locate and unpack equipment

August 6, 2005
-assemble MSCL

August 7, 2005
-clean rust from core head, barrels, couplers, and cutter and painted the corer parts

August 8, 2005
-apply second coat of paint to piston corer

August 9, 2005
-poor weather and sea state, no work due to dangerous conditions

August 10, 2005
-poor weather and sea state, no work due to dangerous conditions

August 11, 2005
-drill drainage holes (2) in piston core head

August 12, 2005
-initiation for crossing the Arctic Circle
-continue transit

August 13, 2005
-enter Clark Fjord and Gibb Fjord, conduct multibeam survey

-discussed deployment of piston corer with Rochon, Bosun, and 1st Officer
-found, cleaned, and prepared piston

August 14, 2005
-small crew change in Pond Inlet, mooring crew put ashore to calibrate mooring compasses away from the ship.
-locate and prepare piston core equipment
-spoke with engineers on modifications to the piston core head to eliminate problem of piston lodging in the core head after the triggering of the system.

August 15, 2005
-power up MSCL, PC will not function however all sensors seem to be working. Install Geotek software on laptop and connect to the instruments. Laptop functions well with system, will use MSCL this way until a new PC can be obtained.
-assisted Luc Michaud with mooring equipment.

August 16, 2005
-clean up swivel to be used with piston corer.
-made calibration standards to be used for the calibration of the MSCL.

August 17, 2005
-attempt box core 2005804-001 BC with brand new box corer, system not functioning well and no sample collected after 2 attempts, will need modifications to the box corer's trigger mechanism.

August 18, 2005
-assist engineers with modifications to box core and piston core

August 19, 2005
-prepared for box core
-box core delayed

August 20, 2005
-collect box core 2005804-002 BC

August 21, 2005
-prepared equipment for piston core

August 22, 2005
-assembled piston corer

August 23, 2005
-Lancaster Sound - collected piston core 2005804-003 PC and box core 2005804-003 BC, very rough conditions

-disassembled and cleaned equipment

August 24, 2005
-assembled piston corer

August 25, 2005
-Barrow Strait - collected piston core 2005804-004 PC and box core 2005804-004 BC
-disassembled and cleaned equipment

August 26, 2005
-prepared for the next piston core

August 27, 2005
-Victoria Strait - collected piston core 2005804-005 PC and box core 2005804-005 BC
-disassembled and cleaned equipment

August 28, 2005
-prepared MSCL, familiarized with MSCL software, conditions too rough to install radioactive source, will do so when clamps are obtained for securing the sensors
-located lumber for core rack

August 29, 2005
-logged cores with MSCL (005PC) however mag and resistivity values do not look good, will have to re-log

August 30, 2005
-Dease Strait - collected piston core 2005804-006 PC and box core 2005804-006 BC
-disassembled and cleaned equipment
-logged cores with MSCL (re-logged 005PC and 005TWC)

August 31, 2005
-logged cores with MSCL (006PC and 006TWC)

September 1, 2005
-logged cores with MSCL (004PC and 003PC)

September 2, 2005
-logged cores with MSCL (003TWC, 004TWC, 006BC 1&2, 005BC 1&2, 004BC 1&2, 003BC 1&2, 002BC 1&2)

September 3, 2005
-split/photograph/describe/spectrophotometer cores

September 4, 2005

-split/photograph/describe/spectrophotometer cores

September 5, 2005
-split/photograph/describe/spectrophotometer cores
-build rack for d-tubes

September 6, 2005
-split/photograph/describe/spectrophotometer cores
-subsample cores

September 7, 2005
-subsample cores

September 8, 2005
-subsample cores

September 9, 2005
-subsample cores

September 10, 2005
-subsample cores
-shorten trigger weight cable by 5' to 26'6"
-collect box core 2005804-007BC (surface samples only)

September 11, 2005
-cleaned refrigerated container

September 12, 2005
-clean lab
-prepare/assemble piston corer for the next core

September 13, 2005
-collected piston core 2005804-008 PC and box core 2005804-008 BC, piston core into very stiff glacial sediment which limited the penetration of the corer. Core cutter heavily damaged.
-logged cores with MSCL (008TWC, 008PC, 008BC)

September 14, 2005
-split/photograph/describe/spectrophotometer cores
-clean cabin and lab

September 15, 2005
-Crew Change, Bennett departs CCGS Amundsen in Kuglutuk, Nunavut

September 16, 2005
-Bennett arrives in Halifax around 5:00pm (ADT)

APPENDIX 2 - 2005-804 SAMPLE INFORMATION

2005-804 - ArcticNet 2005 Leg 1 (August 5th to September 15th)

Julian Date	Time UTC	Station No.	Core Number	Latitude	Longitude	Water Depth (m)	Sampling Device	Sample Type	Length (cm)	Apparent Penetration
229	6:57	108	2005804-001 BC	76°16.000' N	74°34.998' W	445	boxcore	Push core	0	no recovery
232	8:58	DNA11	2005804-002 BC (1)	77°49.750' N	74°37.971' W	703	boxcore	Push core	35	
"	"	"	2005804-002 BC (2)	"	"	"	"	"	38	
"	"	"		"	"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	"	Surface (Dinos)	0-0.5	
235	7:30	3	2005804-003 TWC	74°03.392' N	79°51.194' W	811	TWC	section 1	0-99	120
"	"	"	2005804-003 PC	"	"	"	Piston	section D-E	0-120	600
"	"	"	2005804-003 PC	"	"	"	"	section C-D	120-272	
"	"	"	2005804-003 PC	"	"	"	"	section B-C	272-424	
"	"	"	2005804-003 PC	"	"	"	"	section A-B	424-571	
237	2:38	4	2005804-004 TWC	74°16.155' N	91°05.048' W	350	TWC	section 1	0-104	130
"	"	"	2005804-004 PC	"	"	"	Piston	section E-F	0-63	610
"	"	"	2005804-004 PC	"	"	"	"	section D-E	63-217	
"	"	"	2005804-004 PC	"	"	"	"	section C-D	217-367	
"	"	"	2005804-004 PC	"	"	"	"	section B-C	367-521	
"	"	"	2005804-004 PC	"	"	"	"	section A-B	521-671	
239	19:02	6	2005804-005 TWC	69°09.956'N	100°41.847'W	61	TWC	section 1	0-119	130
"	"	"	2005804-005 PC	"	"	"	Piston	section D-E	1-116	920
"	"	"	2005804-005 PC	"	"	"	"	section C-D	116-268	
"	"	"	2005804-005 PC	"	"	"	"	section B-C	268-421	
"	"	"	2005804-005 PC	"	"	"	"	section A-B	421-571	
242	13:46	7	2005804-006 TWC	68°59.552'N	106°34.413'W	118	TWC	section 1	0-74	100
"	"	"	2005804-006 PC	"	"	"	Piston	section C-D	0-98	500
"	"	"	2005804-006 PC	"	"	"	"	section B-C	98-251	
"	"	"	2005804-006 PC	"	"	"	"	section A-B	251-402	

253	23:05	11	2005804-007 BC	70°19.465' N	126°23.472'W	253	boxcore	Surface (Forams)	0-1	
"	"	"	"	"	"	"	"	Surface (Dinos)	0-0.5	
256	13:41	12	2005804-008 TWC	69°54.436'N	122°58.296'W	174	TWC	section 1	76	120
"	"	"	2005804-008 PC	"	"	"	Piston	section A-B	0-128	400
235	10:45	3	2005804-009 BC (1)	74°02.419'N	79°55.954'W	811	boxcore	Push core	35	
"	"	"	2005804-009 BC (2)	"	"	"	"	"	32	
"	"	"		"	"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	"	Surface (Dinos)	0-0.5	
237	3:50	4	2005804-010 BC (1)	74°16.168'N	91°04.450'W	350	boxcore	Push core	35	
"	"	"	2005804-010 BC (2)	"	"	"	"	"	40	
"	"	"		"	"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	"	Surface (Dinos)	0-0.5	
239	18:07	6	2005804-011 BC (1)	69°09.967'N	100°41.719'W	61	boxcore	Push core	31	
"	"	"	2005804-011 BC (2)	"	"	"		"	30	
"	"	"		"	"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	"	Surface (Dinos)	0-0.5	
242	12:17	7	2005804-012 BC (1)	69°00.002'N	106°34.541'W	117	boxcore	Push core	39	
"	"	"	2005804-012 BC (2)	"	"	"	"	"	40	
"	"	"		"	"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	"	Surface (Dinos)	0-0.5	
256	10:41	12	2005804-013 BC (1)	69°54.813'N	122°57.957'W	219	boxcore	Push core	47	
"	"	"	2005804-013 BC (2)	"	"	"	"	"	46	
"	"	"		"	"	"	"	Surface (Forams)	0-1	
"	"	"		"	"	"	"	Surface (Dinos)	0-0.5	

APPENDIX 3 – 2005-804 SUB-BOTTOM PROFILES OVER PISTON CORE SITES

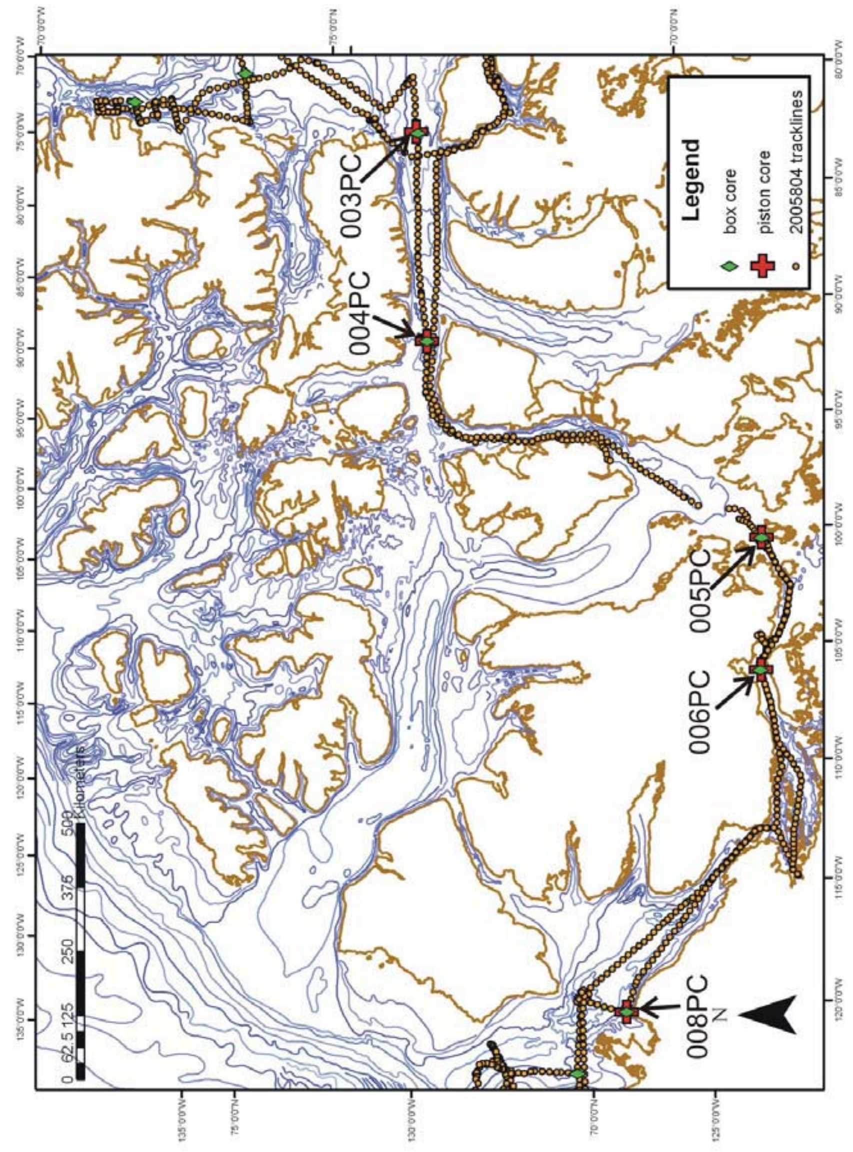
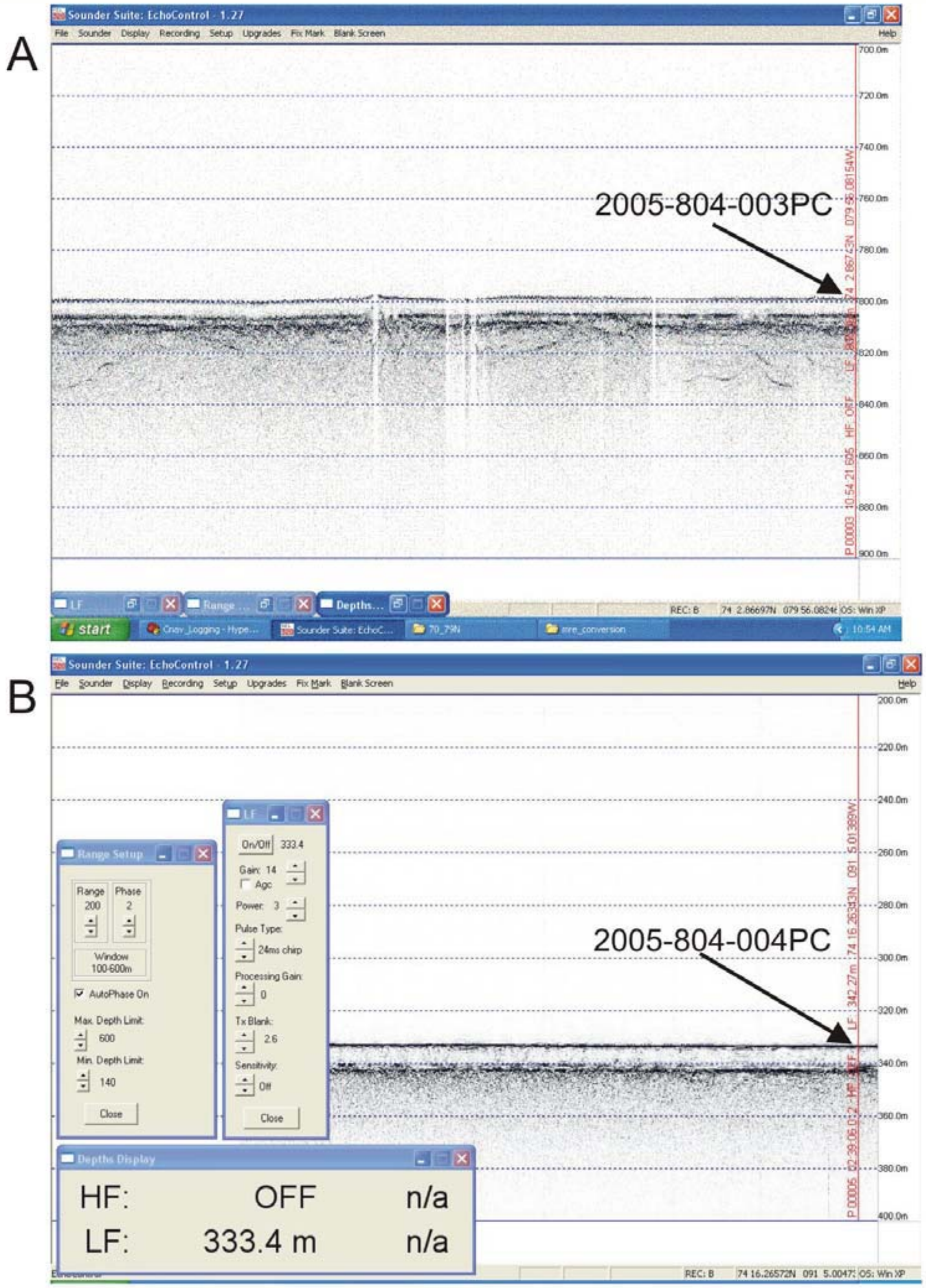


Figure A3.1: Geophysical and geotechnical data collected during 2005-804

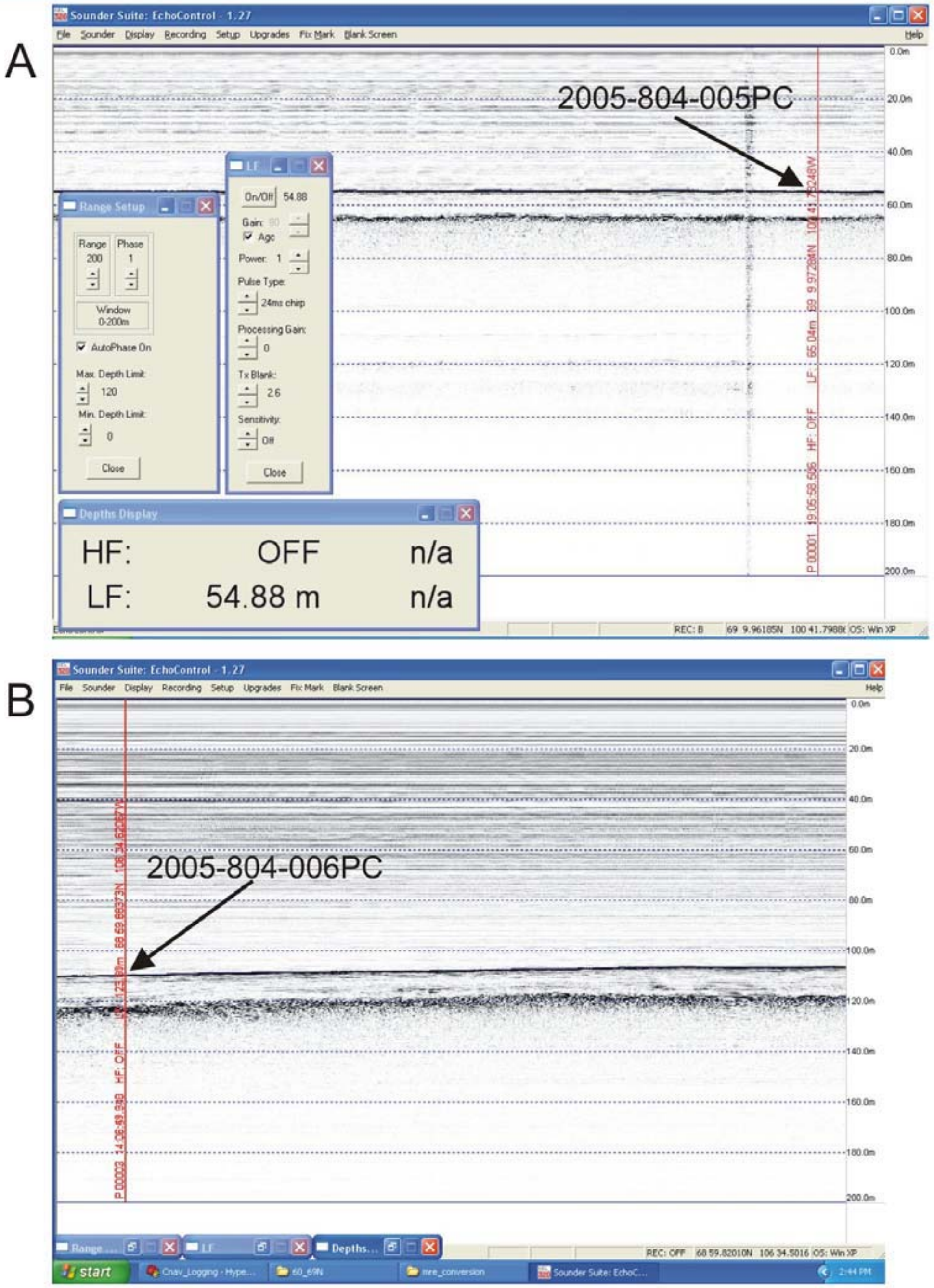


Range 200
Phase 2
Window 100-600m
☑ AutoPhase On
Max. Depth Limit: 600
Min. Depth Limit: 140

On/Off 333.4
Gain: 14
☐ Agc
Power: 3
Pulse Type: 24ms chirp
Processing Gain: 0
Tx Blank: 2.6
Sensitivity: Off

HF: OFF n/a
LF: 333.4 m n/a

Figure A3.2: Sub-bottom profiler records of piston core sites:
A) site 003PC; B) site 004PC



Range Setup

Range 200
Phase 1
Window 0-200m
☑ AutoPhase On
Max. Depth Limit: 120
Min. Depth Limit: 0

LF

On/Off 54.88
Gain: 80
☑ Agc
Power: 1
Pulse Type: 24ms chirp
Processing Gain: 0
Tx Blank: 2.6
Sensitivity: Off

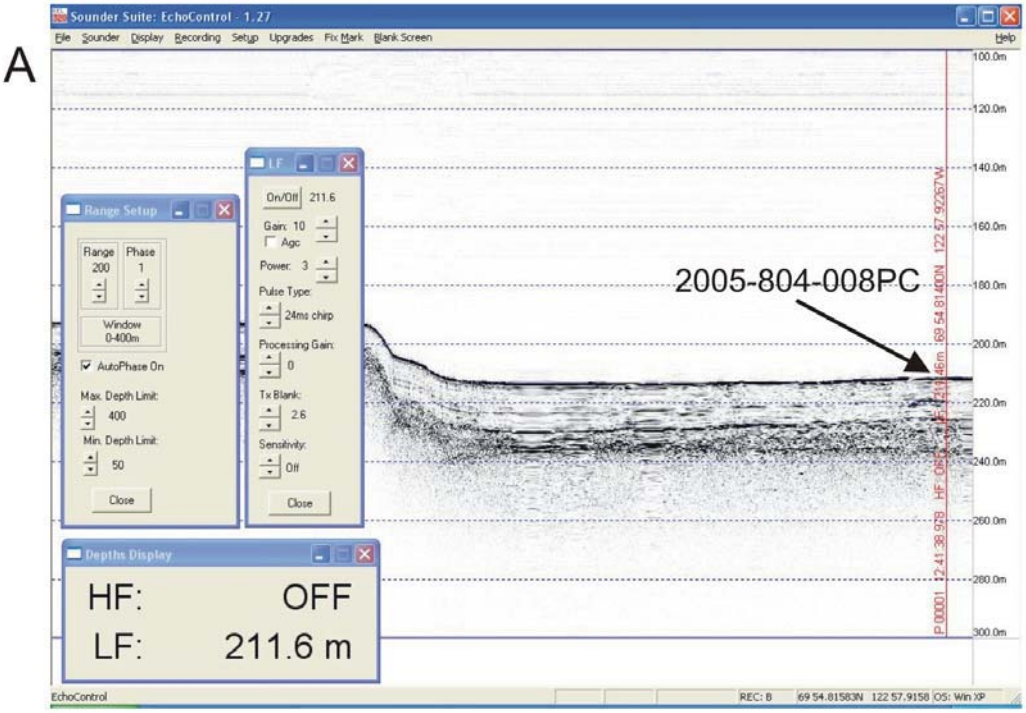
Depths Display

HF:	OFF	n/a
LF:	54.88 m	n/a

REC: B | 69 9.96185N 100 41.7988(| OS: Win XP

REC: OFF | 68 59.82010N 106 34.5016 | OS: Win XP

Figure A3.3: Sub-bottom profiler records of piston core sites: A) site 005PC; B) site 006PC



Range Setup

Range 200

Phase 1

Window 0-400m

☑ AutoPhase On

Max. Depth Limit: 400

Min. Depth Limit: 50

LF

On/Off 211.6

Gain: 10

☐ Agc

Power: 3

Pulse Type: 24ms chirp

Processing Gain: 0

Tx Blank: 2.6

Sensitivity: Off

Depths Display

HF: OFF

LF: 211.6 m

REC: B 69 54.81583N 122 57.9158 OS: Win XP

Figure A3.4: Sub-bottom profiler records of piston core site:
A) site 008PC

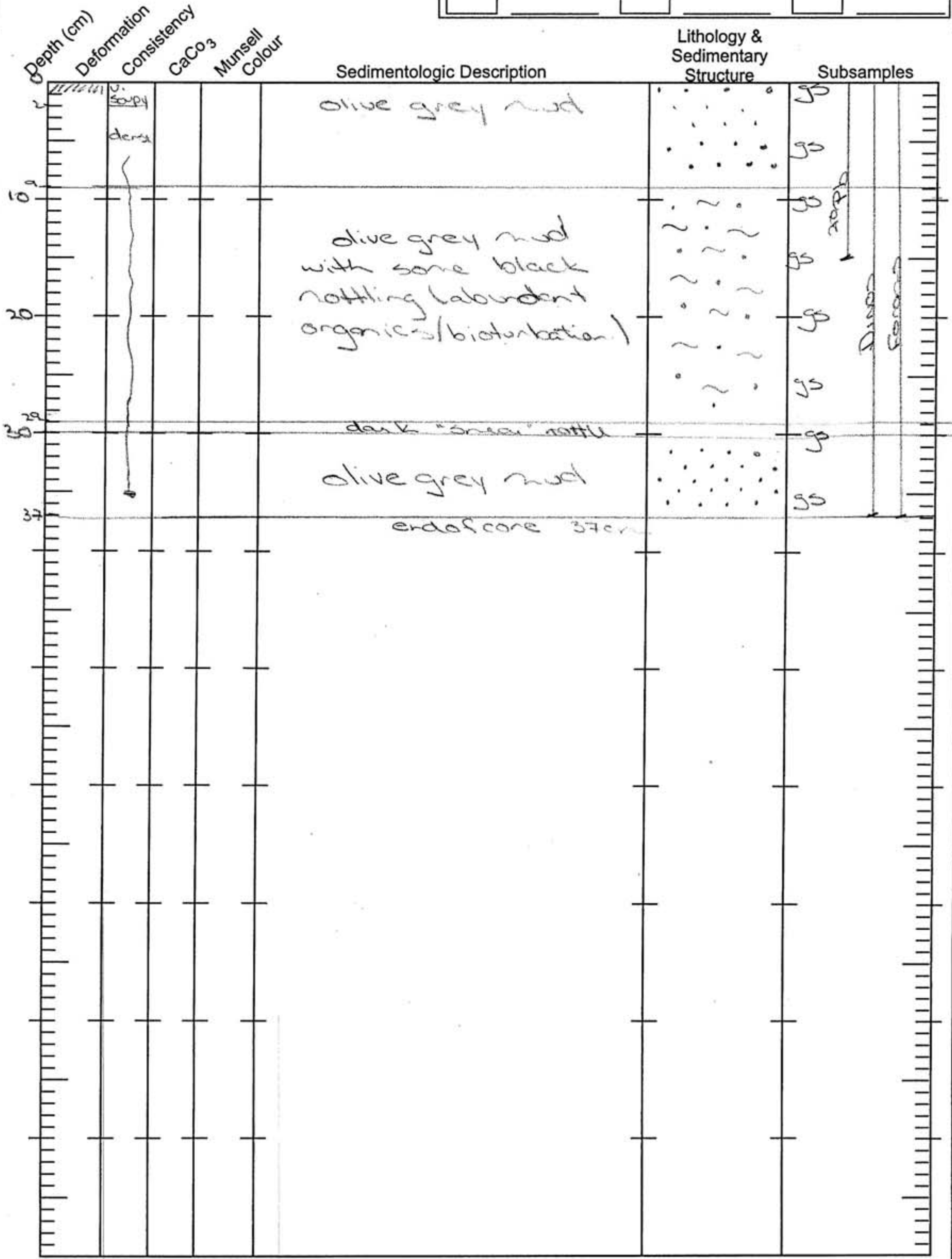
APPENDIX 4 – 2005-804 PISTON CORE DESCRIPTION SHEETS

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 002 BC
Geographic Location: Smith Sound/Nares Strait
Water Depth: 703 m
Total Length: 37 cm
Core Barrel Type: Pushcore ① from Boxcore
Date: 04 Sept. 2005
Project Number: X-30
Latitude: 77° 49.750
Longitude: 74° 39.971
Described by: A. Schell
Page 1 of 1

SYMBOL LEGEND

⁘	mud
S S S	mottles biotурb



olive grey mud

olive grey mud with some black mottling (abundant organics/bioturbation)

dark "swash" mottle

olive grey mud

end of core 37 cm

NOTES: Pushcore ① of 2005-804-002 BC.
Collected 20 August 2005; Split 04 Sept. 2005,
4°C cold storage.
210Pb every cm (0-15) 1cc; 1cc grainsize every 5cm
Dinos + Forams 1ccc every cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 003 twc

Geographic Location: Baffin Bay / Lancaster Sound

Water Depth: 811 m
Total Length: 98.5 cm

Core Barrel Type: Trigger Weight

Date: 07 Sept. 2005

Project Number: X-30

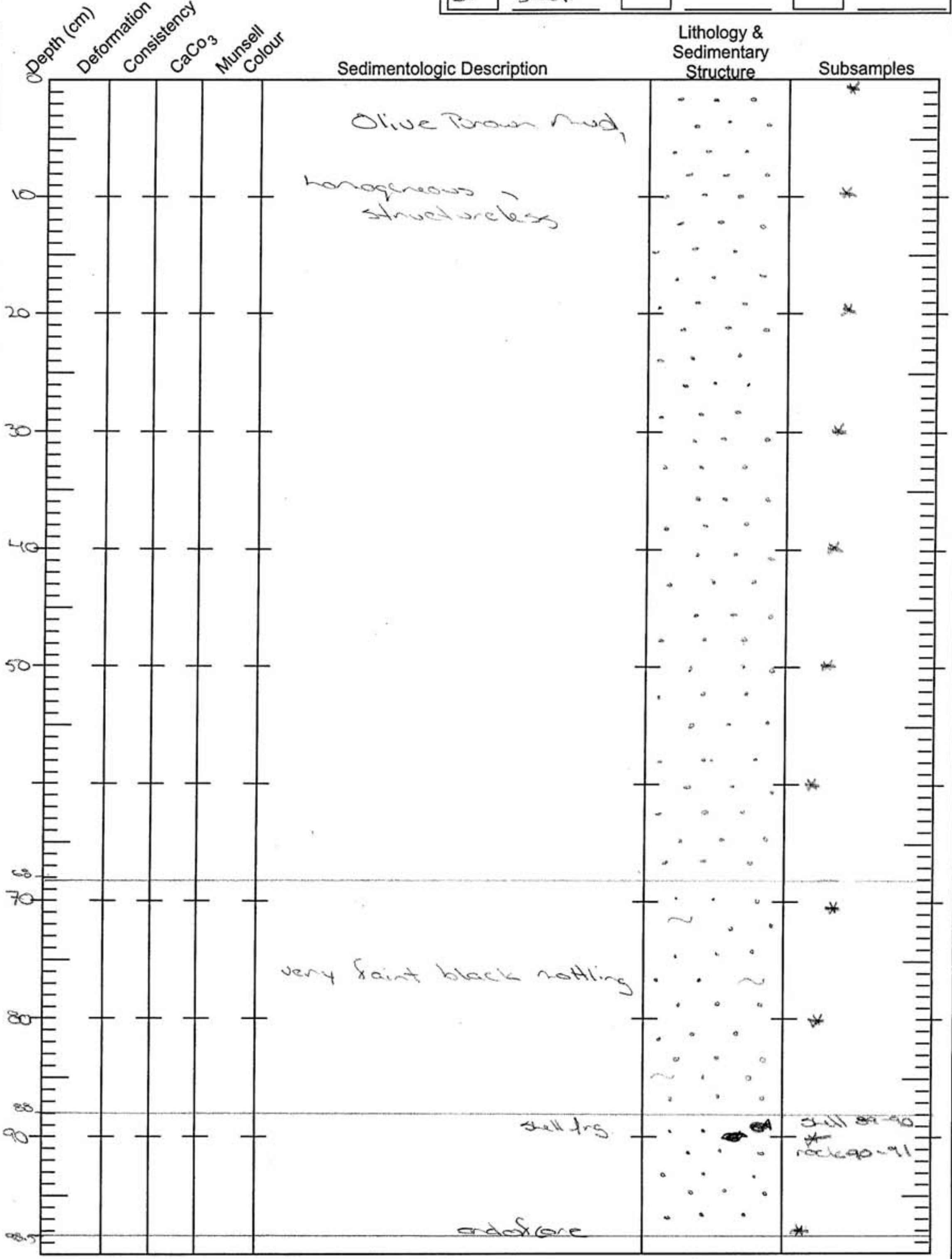
Latitude: 77° 49.750
Longitude: 74° 39.971

Described by: A. Schell

Page 1 of 1

SYMBOL LEGEND

∵	mud	☐		☐	
~	mottling	☐		*	subsample
●	shell	☐		☐	



Olive Brown mud, homogeneous - structureless

very faint black mottling

shell frg

end of core

shell 89-90

rock 90-91

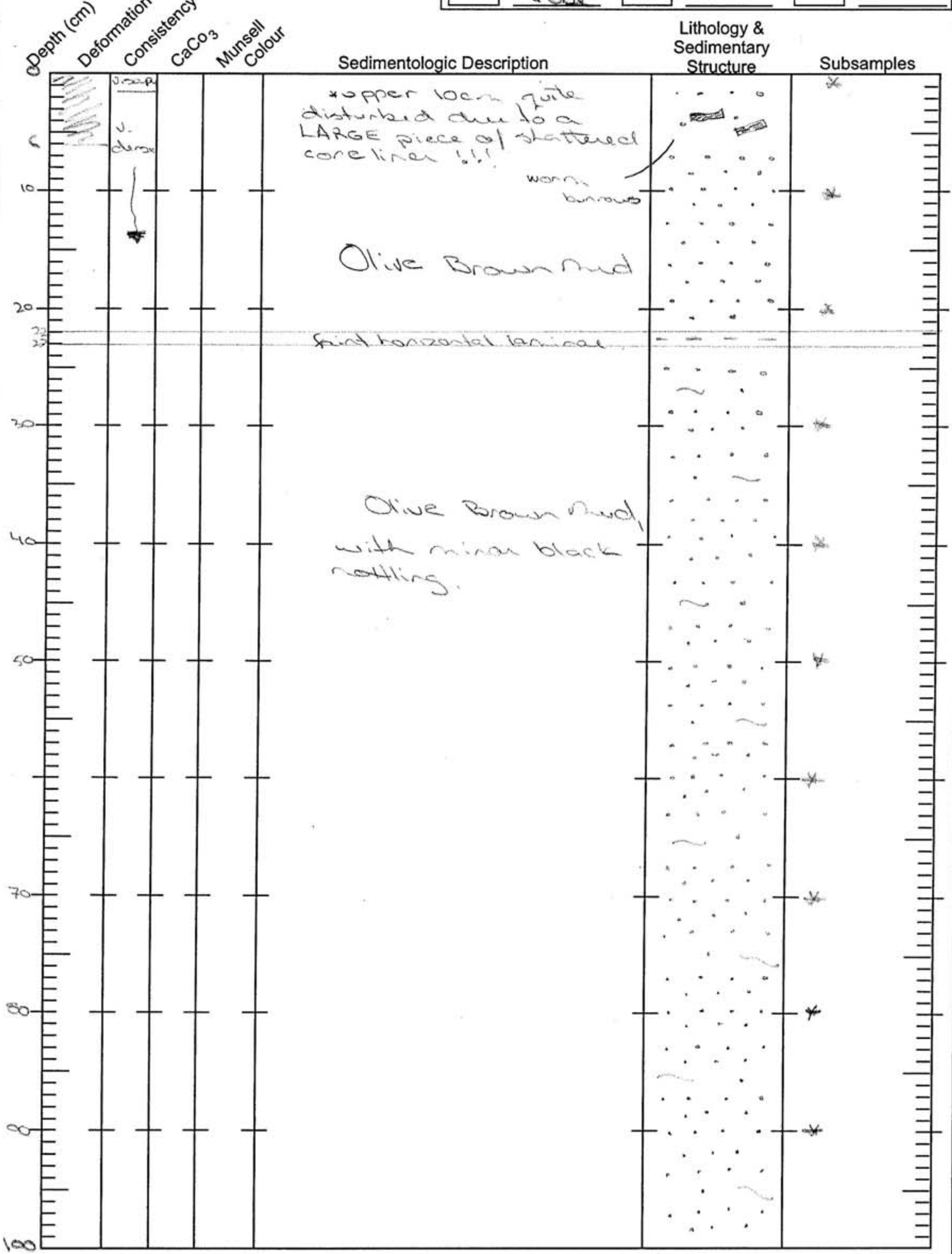
NOTES: Forams, Dinos (10cc), Diatoms (5cc), Grainsize O18, organic carbon (1cc) @ every 10cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 003 PC
Geographic Location: Lancaster Baffin Bay / Sound
Water Depth: 811 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 05 Sept 2005
Project Number: X-30
Latitude: 77° 49.750
Longitude: 74° 39.971
Described by: T. Schell
Page 1 of 6

SYMBOL LEGEND

∴	mud	∼	mottling	☐	
– –	laminae	☐		*	subsample
▬	worm tube	☐		☐	



*upper 10cm quite disturbed due to a LARGE piece of shattered coreliner !!!

Olive Brown Mud

faint horizontal laminae

Olive Brown Mud, with minor black mottling.

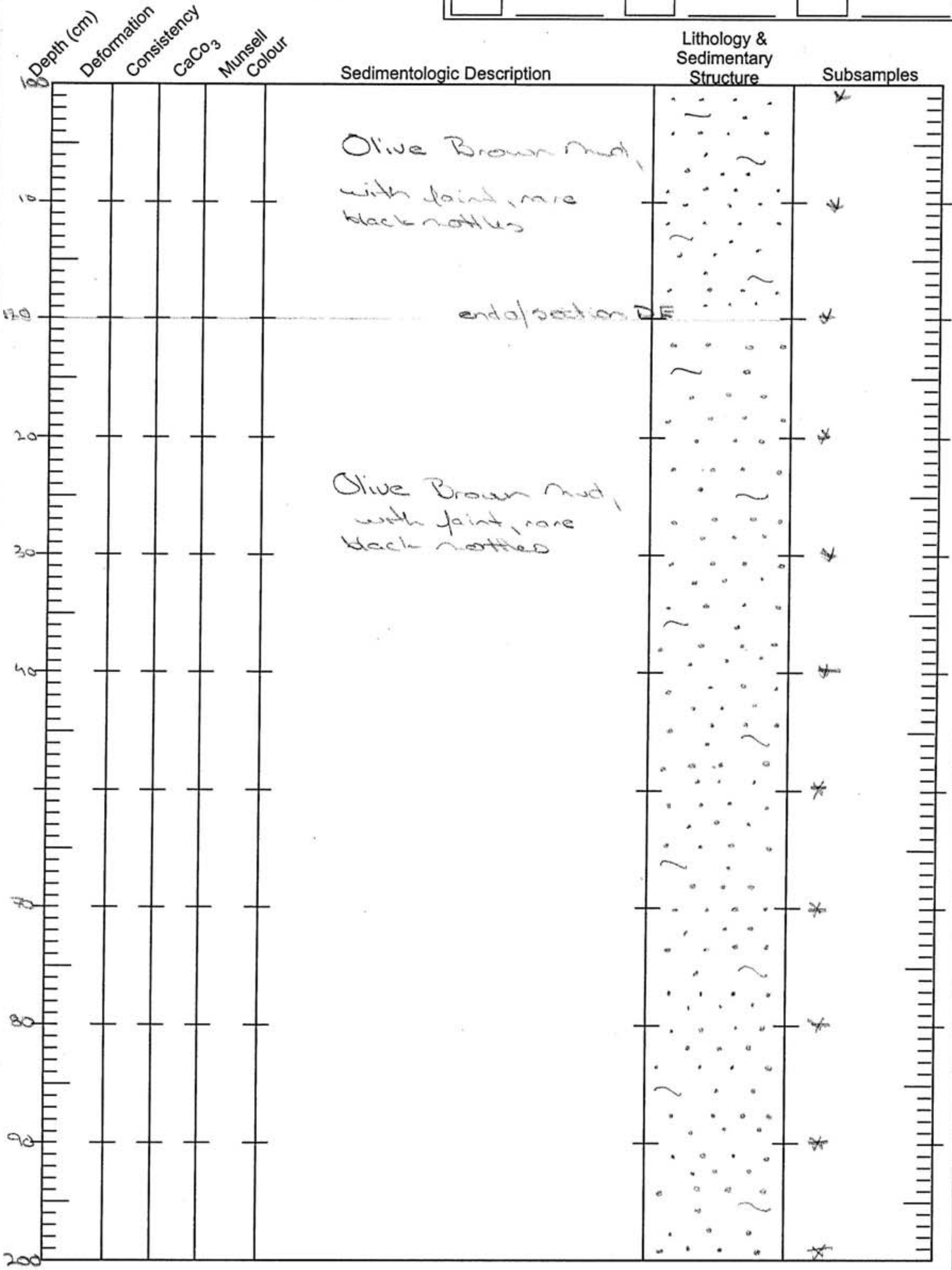
NOTES: Forams, Dinos 10cc, Diatoms 8cc, Grainsize, O^{18}, organic carbon (1cc)

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 003PC
Geographic Location: Lancaster Baffin Bay/ Sound
Water Depth: 811 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 05 Sept. 2005
Project Number: X-30
Latitude: 77° 49.750
Longitude: 74° 39.971
Described by: A. Schell
Page 2 of 6

SYMBOL LEGEND

∵	mud	☐		☐	
~	mottles	☐		✕	subsample
☐		☐		☐	



Olive Brown mud, with faint, rare black mottles

end of section D

Olive Brown mud, with faint, rare black mottles

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 003PC
Geographic Location: Lancaster Baffin Bay / Sound
Water Depth: 811 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 05 Sept. 2005
Project Number: X-30
Latitude: 77° 49.750
Longitude: 74° 39.971
Described by: T. Schell
Page 3 of 6

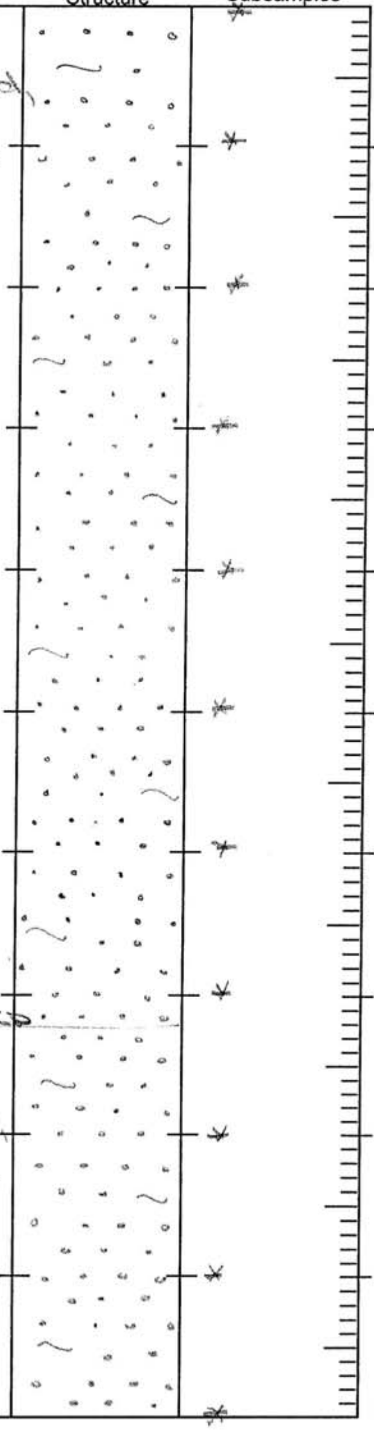
SYMBOL LEGEND

∴	mud				
~	mottles			*	subsampl

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description
200					Olive Brown mud, with very faint, rare black mottles
10					
20					
30					
40					
50					
70					
272					end of section CD
80					Olive Brown mud, with very few black mottles
90					
300					

Lithology & Sedimentary Structure

Subsamples



NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804 Sample Number: 003PC	Geographic Location: Lancaster Baffin Bay/ Sound	Water Depth: 811 m Total Length: 571 cm
Core Barrel Type: Piston Core	Date: 06 Sept. 2005	Project Number: X-30

Latitude: 77° 49.750
Longitude: 74° 39.971

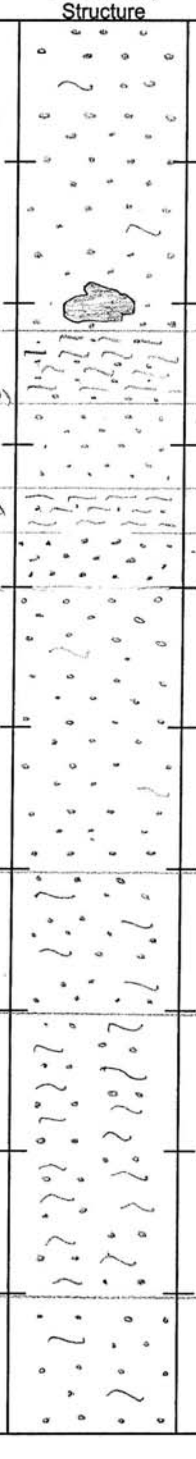
Described by: A. Schell

Page 4 of 6

SYMBOL LEGEND

∴	mud	☐		✳	subsample
~	mottles	☐		☐	
▨	rock	☐		☐	

Depth (cm)	Deformation	Consistency	CaCO3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
300					Olive Brown Mud, with few mottles		✳
10							✳
320					Rock		✳
322					horizontal burrowing mottles		
327							
330							✳
333					abundant black horizontal burrows/mottles		
336							
340					Very faint black mottles		✳
50							✳
					increasing amounts of burrows/ black mottles		✳
70					Abundant black mottles/burrows		✳
80							✳
90					Olive Brown Mud, lesser amounts of black mottles/ burrowing		✳
400							✳



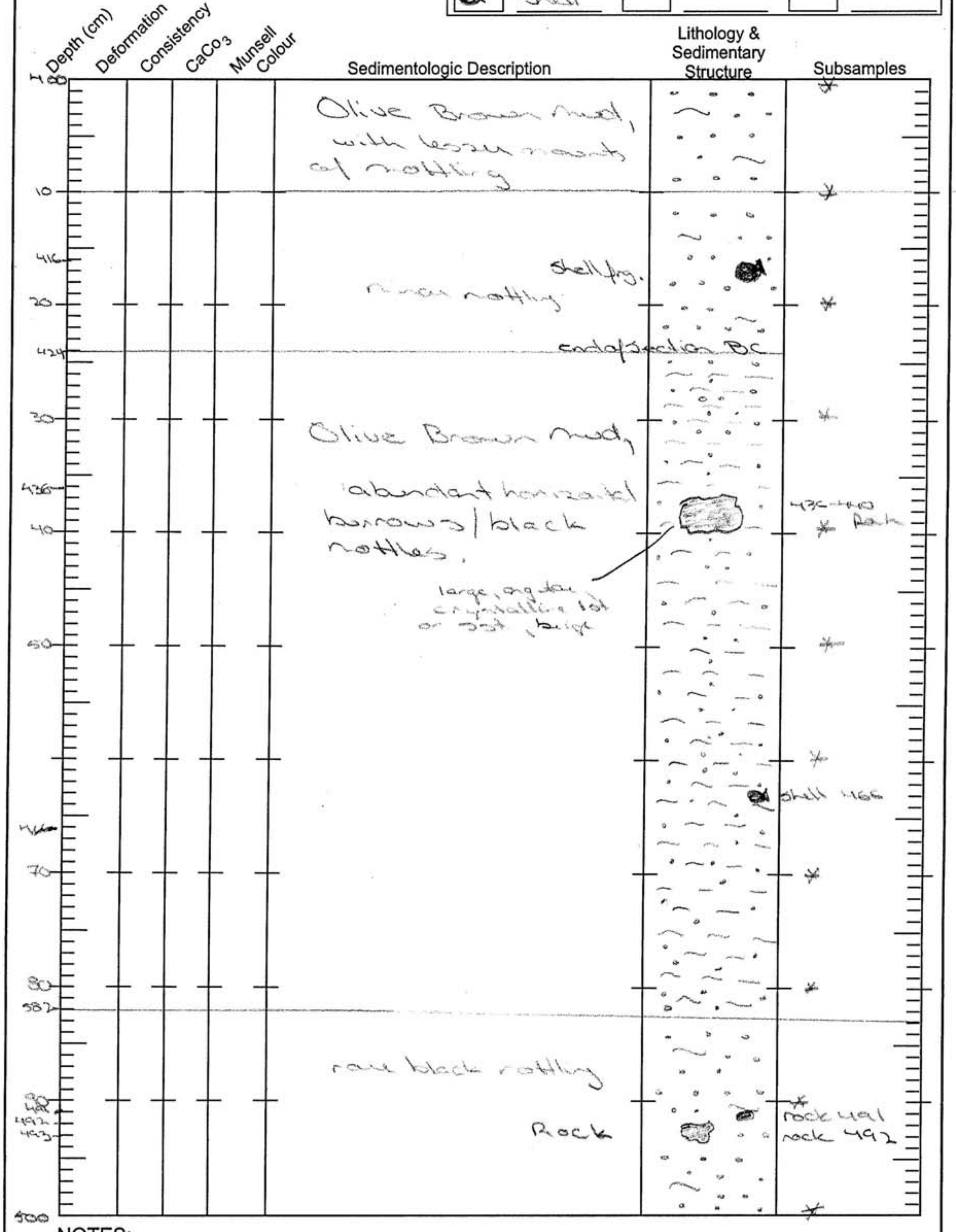
NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 003PC
Geographic Location: Lancaster Sound / Baffin Bay
Water Depth: 811 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 06 Sept 2005
Project Number: X-30
Latitude: 77° 49.750
Longitude: 74° 39.971
Described by: K. Schell
Page 5 of 6

SYMBOL LEGEND

∵	mud	▨	Rock	☐	
~	mottles	☐		*	subsample
●	shell	☐		☐	



Olive Brown mud, with lesser amounts of mottling

Shell frg.

minor mottling

end of section BC

Olive Brown mud, abundant horizontal burrows / black mottles.

large, angular crystalline rck or sst, beige

436-440 Rock

shell 466

rare black mottling

Rock

rock 491
rock 492

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 - 804
Sample Number: 003 PC

Geographic Location: Baffin Bay / Lancaster Sound

Water Depth: 811 m
Total Length: 571 cm

Core Barrel Type: Piston Core

Date: 06 Sept 2005

Project Number: X-30

Latitude: 77° 49.750
Longitude: 74° 39.971

Described by: T. Schell

Page 6 of 6

SYMBOL LEGEND

∴	mud	▲	Rock	☐	
~	mottles	☰	laminae	*	subsample
▲	shell	≋	deformed laminae	☐	

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Subsamples
500					Olive Brown mud, rare black mottles shell frag	*
505						
10						* rock 510
20					Brown - beige mud, with faint lamination	*
30						*
536 537					Beige mud shell frag.	
40					Dark Brown mud, with faint laminations	*
548					smooth beige chert pebble	Rock
50						*
553					Brownish- beige mud, laminated	
560					Reddish/pink brown - beige mud laminated	* rock 560
568					deformed laminae	
70						*
571					end of section AB core	
80						
90						
600						

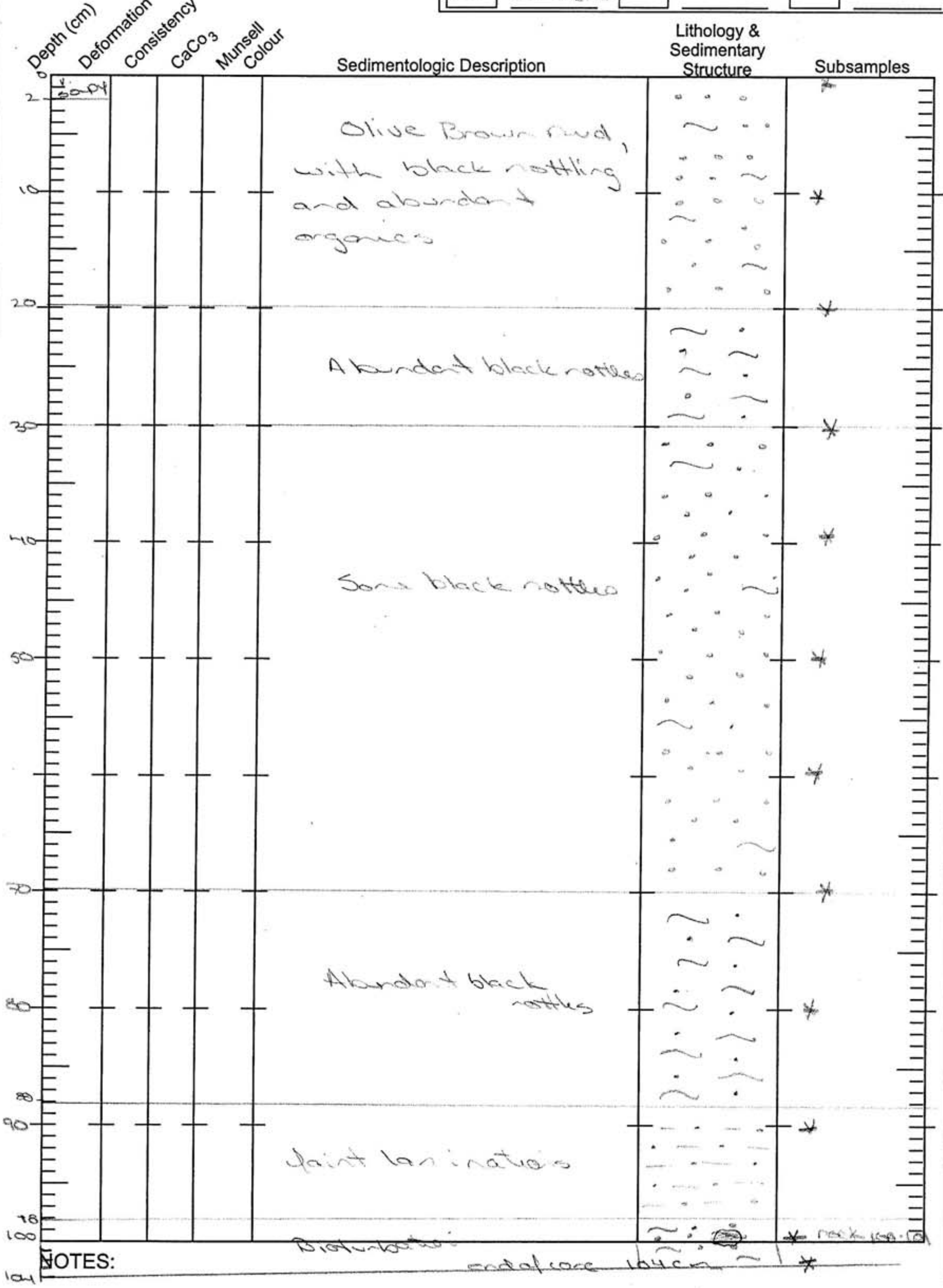
NOTES: end of core - 571 cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 004 twc
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 104 cm
Core Barrel Type: Trigger weight
Date: 07 Sept. 2005
Project Number: X.30
Latitude: 74° 16.155
Longitude: 91° 05.048
Described by: T. Schell
Page 1 of 1

SYMBOL LEGEND

⁚⁚	mud	☐		☐	
~	mottles	☐		✗	subsample
═	lamination	☐		☐	



Olive Brown mud, with black mottling and abundant organics

Abundant black mottles

Some black mottles

Abundant black mottles

faint laminations

Bioturbation

end of core 104 cm

NOTES:

Forams, Dinos (10cc), Diatoms (5cc), Grainsize, O18, organic carbon (1cc)

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

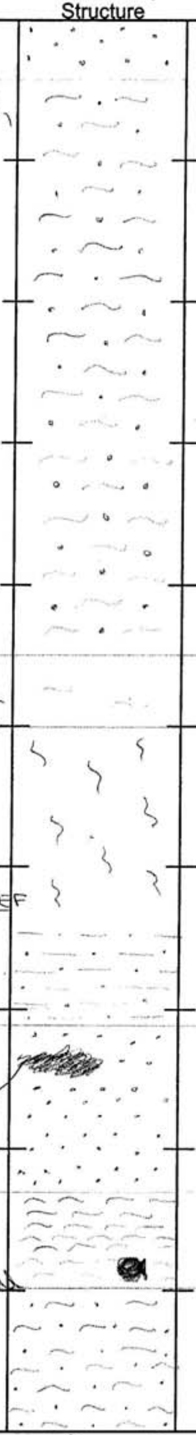
Cruise Number: 2005 -804
Sample Number: 004 PC
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 670.5 cm
Core Barrel Type: Piston Core
Date: 05 Sept. 2005
Project Number: X-30
Latitude: 74° 16. 155
Longitude: 91° 05. 048
Described by: K. Schell
Page 1 of 7

SYMBOL LEGEND

∴	mud	-∴-	mud, faintly laminated		
~	horizontal mottling	≡	high organics	*	subsample
}	vertical burrows	●	shell		

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Subsamples
		v. soupy			[illegible]	*
10					[illegible] Olive grey mud, with black horizontal mottling.	*
20						*
30						*
40					Olive grey mud	*
45					45 - 50cm very little black mottling	
50					Bioturbation, Vertical burrows	*
						*
63					end of section EF	
					Dark Olive grey mud, grey faintly laminated	
70						*
71					Olive Brown mud Large black mottle	
80						*
83					Very Abundant organics + massively bioturbated! 89 - 90 - shell	
90					Abundant mottling	*
100						*

Lithology & Sedimentary Structure



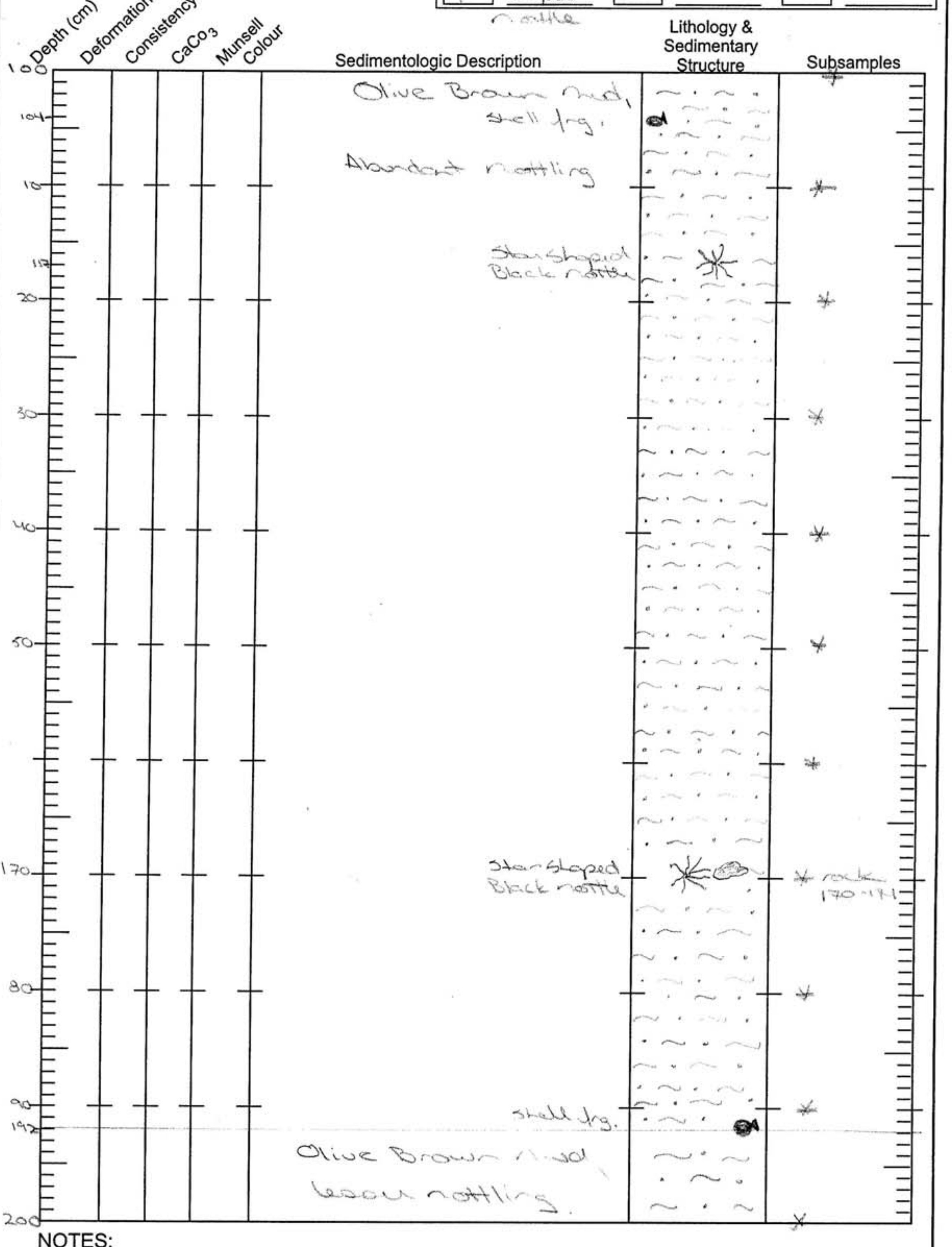
NOTES: Forams, Dinos (10cc), Diatoms (5cc), Grainsize, O^{18}, Organic Carbon (1cc)

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 - 804
Sample Number: 004 PC
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 670.5 cm
Core Barrel Type: Piston Core
Date: 05 Sept. 2005
Project Number: X-30
Latitude: 74° 16.155
Longitude: 91° 05. 048
Described by: T. Schell
Page 2 of 7

SYMBOL LEGEND

∴	mud	●	shell	☐	
~	black mottling	☐		✱	subsample
✳	star shaped mottle	☐		☐	



Olive Brown mud, shell frg.

Abundant mottling

Star shaped Black mottle

Star shaped Black mottle

rock 170-171

shell frg.

Olive Brown mud lesser mottling.

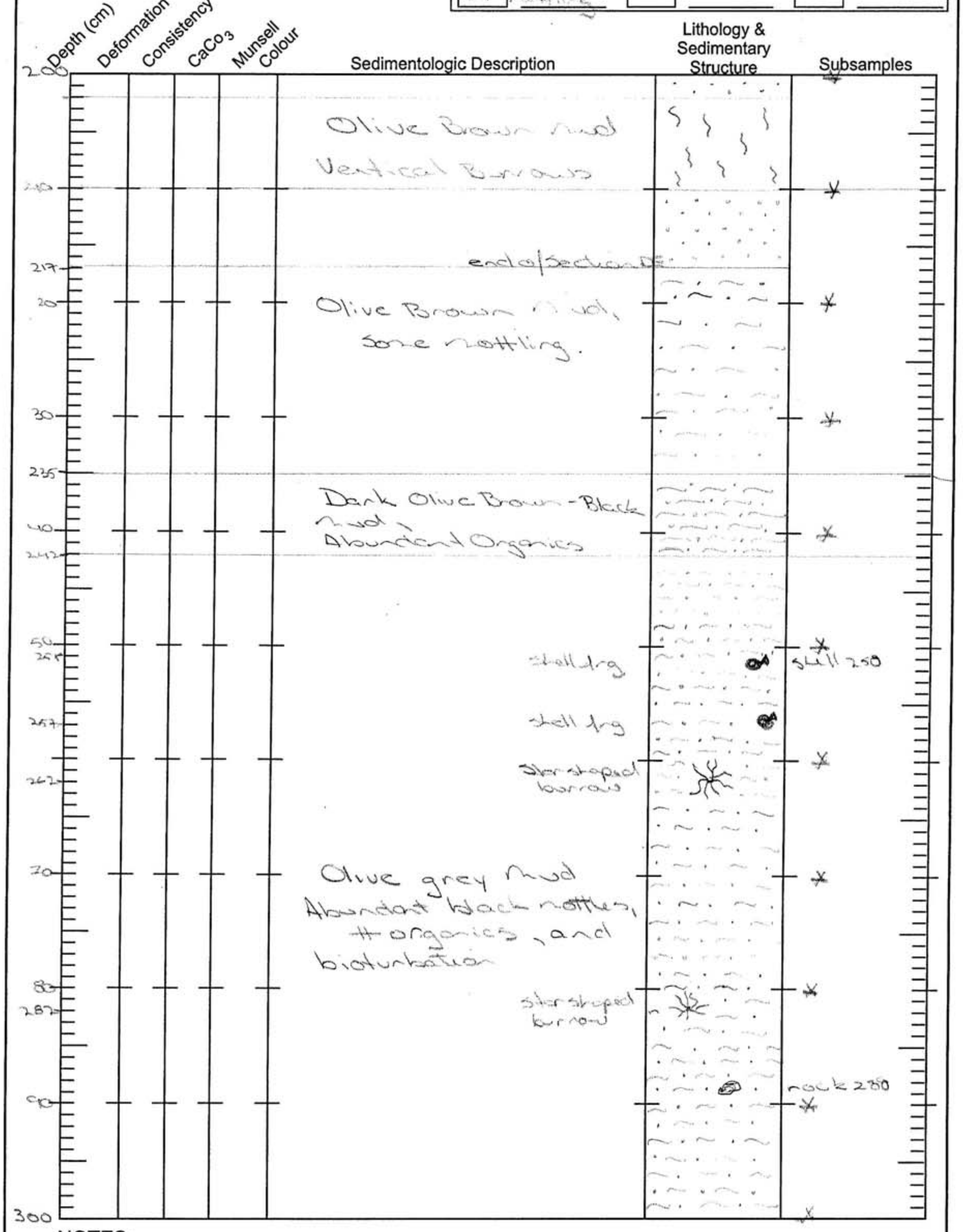
NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 004 PC
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 670.5 cm
Core Barrel Type: Piston Core
Date: 05 Sept. 2005
Project Number: X-30
Latitude: 74° 16.155
Longitude: 91° 05.048
Described by: A. Schell
Page 3 of 7

SYMBOL LEGEND

∴	mud	●	shell	☐	
⸾	vertical burrows	☐		✳	subsample
≈	horizontal mottling	☐		☐	



Olive Brown mud
Vertical Burrows

Olive Brown mud, some mottling.

Dark Olive Brown - Black mud, Abundant Organics

Olive grey mud
Abundant black mottles, # organics, and bioturbation

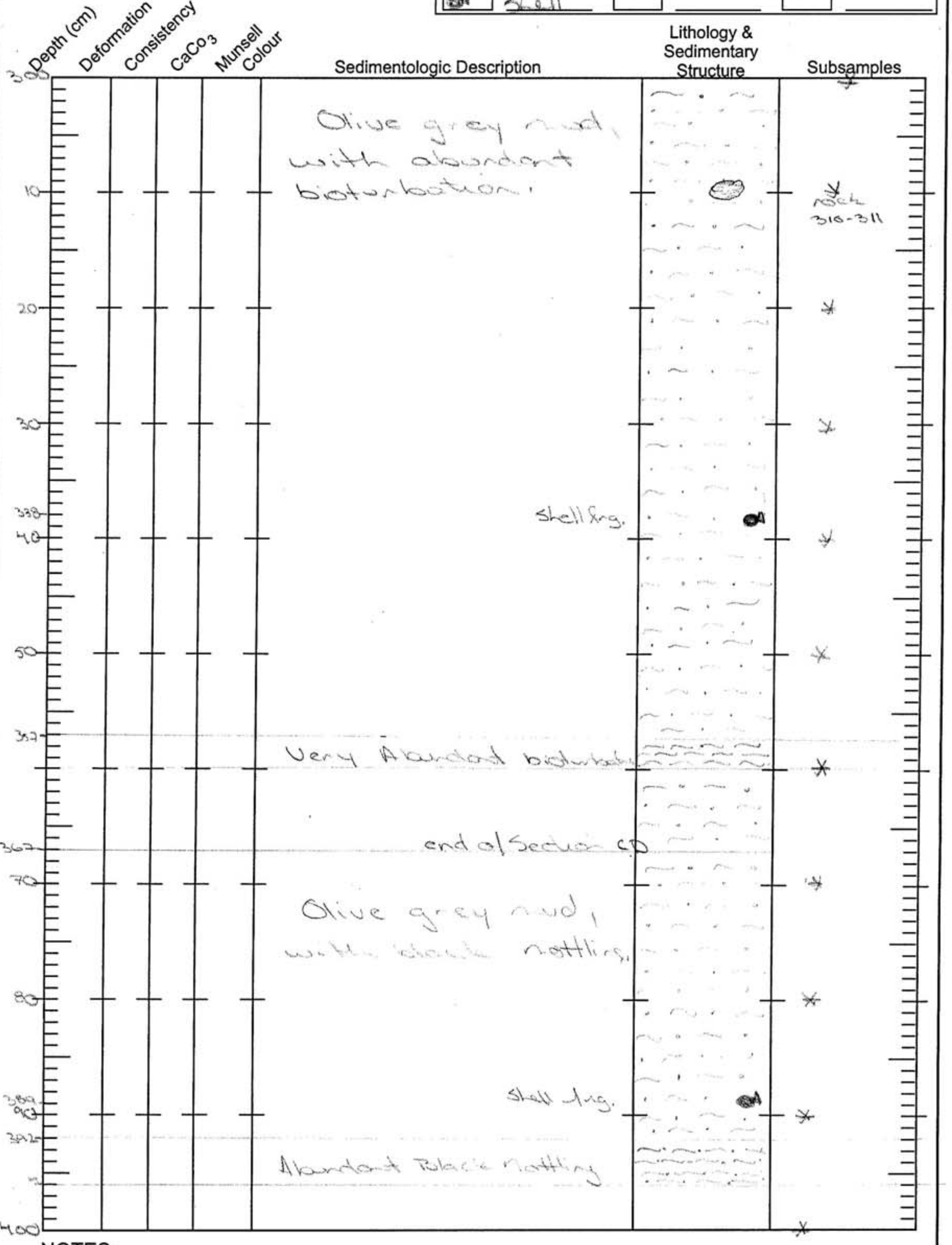
NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 - 804
Sample Number: 004 PC
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 670.5 cm
Core Barrel Type: Piston Core
Date: 05 Sept 2005
Project Number: X-30
Latitude: 74° 16.155
Longitude: 91° 05.048
Described by: X Schell
Page 4 of 7

SYMBOL LEGEND

∴	mud	≋	abundant mottling	☐	
~	horizontal mottling	☐		*	subsampl
●	shell	☐		☐	



Olive grey mud, with abundant bioturbation.

Shell frag.

Very Abundant bioturbati

end of Section CD

Olive grey mud, with black mottling.

Shell frag.

Abundant Black Mottling

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 004PC

Geographic Location: Barrow Strait

Water Depth: 350 m
Total Length: 670.5 cm

Core Barrel Type: Piston Core

Date: 05 Sept 2005

Project Number: X-30

Latitude: 74° 16.155
Longitude: 91° 05.048

Described by: T. Schell

Page 5 of 7

SYMBOL LEGEND

∵	mud	☐		☐	
~	horizontal mottling	☐		*	subsample
●	shell	☐		☐	

Depth (cm)	Deformation	Consistency	CaCo₃	Munsell Colour	Sedimentologic Description	Subsamples
400					Olive grey mud with abundant black mottling, lots of organics, # Bioturbation	
10						*
20						*
30						*
40						*
442					Lesser amounts of Black mottling	
50						*
60						*
461					Shell frag.	
70						*
474					shell frag	
476					shell frag.	
80					Olive Brown mud	*
90						*
500						*

Lithology & Sedimentary Structure

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 004PC
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 610.5 cm
Core Barrel Type: Piston Core
Date: 05 Sept 2005
Project Number: X30
Latitude: 74° 16.155
Longitude: 91° 05.048
Described by: A. Schell
Page 6 of 7

SYMBOL LEGEND

∴	mud
~	horizontal mottling
●	shell
*	subsample

Depth (cm) | Deformation | Consistency | CaCo3 | Munsell Colour | Sedimentologic Description | Lithology & Sedimentary Structure | Subsamples

500 — Olive Brown mud, with some black mottling. — *
10 — *
20 — *
521 — end of section BC
Olive Brown mud
530 — worm tube — *
538 — shell frg..
40 — *
shell 548
550 — *
553
554
555
556 — minute shell frg. — shell 556
Abundant horizontal bioturbation mottling & organics — *
70 — * shell 571.5
80 — *
582 — shell frg.
shell 589.5
90 — *
591 — shell frg. — shell 592
600 — * shell 600

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 004 PC
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 670.5 cm
Core Barrel Type: Piston Core
Date: 05 Sept. 2005
Project Number: X-30
Latitude: 74° 16.155
Longitude: 91° 05.048
Described by: A Schell
Page 7 of 7

SYMBOL LEGEND

⁘	MUD	☐		☐	
∼	horizontal mottling	☐		*	subsample
●	shell	☐		☐	

Depth (cm)	Deformation	Consistency	CaCo₃	Munsell Colour	Sedimentologic Description	Subsamples
600					Olive Brown mud abundant bioturbation (horizontal)	*
10						*
620					abundant shell frags 620 630	*
630					Olive Brown - Beige mud, lenses to ~~[illegible]~~ black mottles	*
40 641					minor amounts of mottling, bioturbation beige mud clast (silt)	*
650						*
655					Olive Brown mud minor to odd bioturbation	*
670 670.5					end of section AD	*

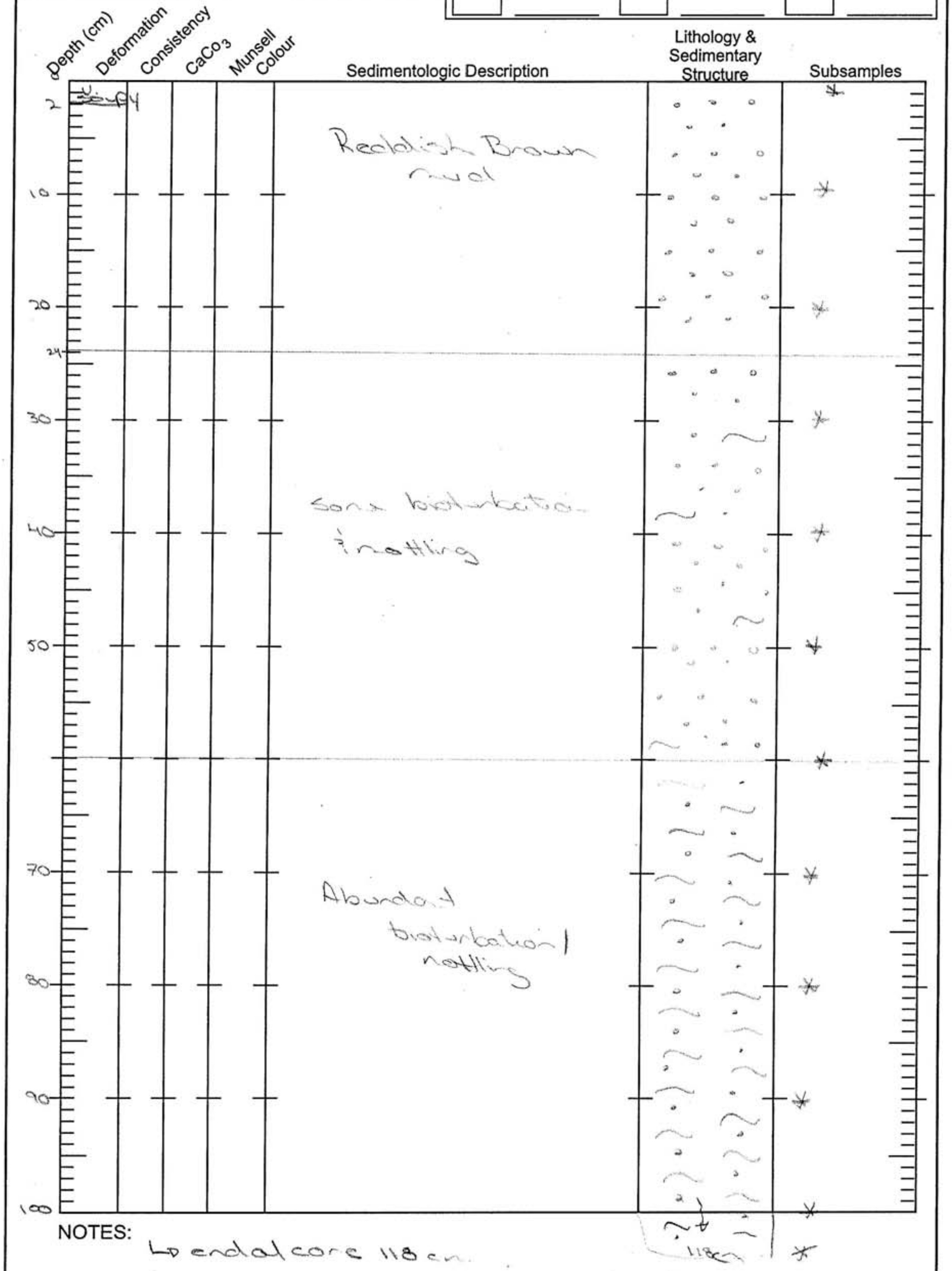
NOTES: end of core 670.5 cm
(+18 cm for c-c')

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 005 twc
Geographic Location: Victoria Strait
Water Depth: 61 m
Total Length: 118 cm
Core Barrel Type: Trigger weight
Date: 07 Sept 2005
Project Number: X-30
Latitude: 69° 09.956
Longitude: 100° 41.847
Described by: T. Schell
Page 1 of 1

SYMBOL LEGEND

∵	mud	☐		☐	
~	mottles	☐		*	subsample
☐		☐		☐	



Reddish Brown mud

Some bioturbation & mottling

Abundant bioturbation / mottling

NOTES: Lo end of core 118 cm.

Forams, Dinos (10cc) Diatoms (5cc), Grainsize, O18, organic carbon (10cc).

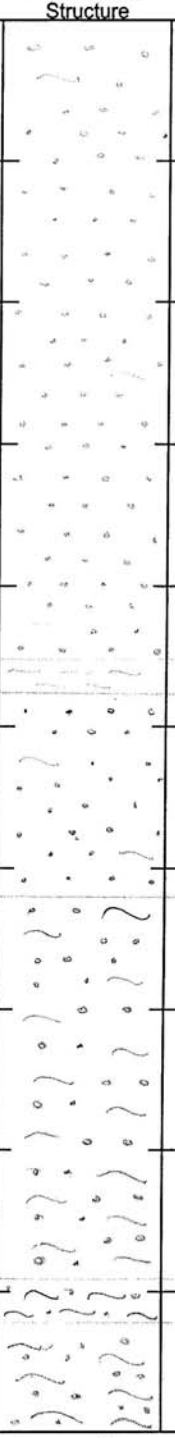
GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 005 PC
Geographic Location: Victoria Strait
Water Depth: 61 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 06 Sept 2005
Project Number: X-30
Latitude: 69° 09.956
Longitude: 100° 41.847
Described by: T. Schell
Page 1 of 6

SYMBOL LEGEND
∴ mud
~ mottles
* subsample

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Subsamples
0–5	≋				very soupy	*
5–45					Reddish Brown Mud, with very rare black mottles	* (10), * (20), * (30), * (40)
45–47					horizontal black mottles	
47–62					very rare black mottles	* (50), * (60)
62–89					Abundant black mottles	* (70), * (80)
89–92					very abundant black mottles	* (90)
92–100					Abundant black mottles	* (100)

Lithology & Sedimentary Structure



NOTES: Forams, Dinos (10cc) Diatoms (5cc),
Grainsize, O18, organic C. (1cc)

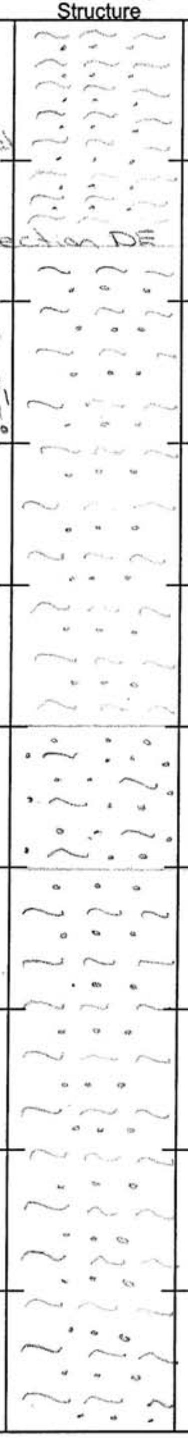
GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 005PC
Geographic Location: Victoria Strait
Water Depth: 61 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 06 Sept 2005
Project Number: X-30
Latitude: 69° 09.956
Longitude: 100° 41.847
Described by: A. Schell
Page 2 of 6

SYMBOL LEGEND

⁖	mud	☐		☐	
~	mottling	☐		✳	subsample
☐		☐		☐	

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
100							✳
10					Reddish Brown mud, with abundant horizontal black mottles		✳
16					end of section DE		
20					Reddish Brown mud, intensely bioturbated, diverse burrow styles!!		✳
30							✳
40							✳
150					lesser amounts of burrowing		✳
160							✳
70					Intensely bioturbated.		✳
80							✳
90							✳
200							✳



NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 - 804
Sample Number: 005 PC
Geographic Location: Victoria Strait
Water Depth: 61 m
Total Length: 571 cm
Core Barrel Type: Piston Core
Date: 06 Sept 2005
Project Number: X-30
Latitude: 69° 09.956
'.ongitude: 100° 41.847
Described by: T. Schell
Page 3 of 6

SYMBOL LEGEND

∴	mud	☐		☐	
~	mottling, bioturbation	☐		*	subsample
☐		☐		☐	

Depth (cm) | Deformation | Consistency | CaCo₃ | Munsell Colour | Sedimentologic Description | Lithology & Sedimentary Structure | Subsamples

200

Lesser amounts of bioturbation

208

10

Reddish Brown Mud

intensely bioturbated

20

30

40

50

end of Section CD

268

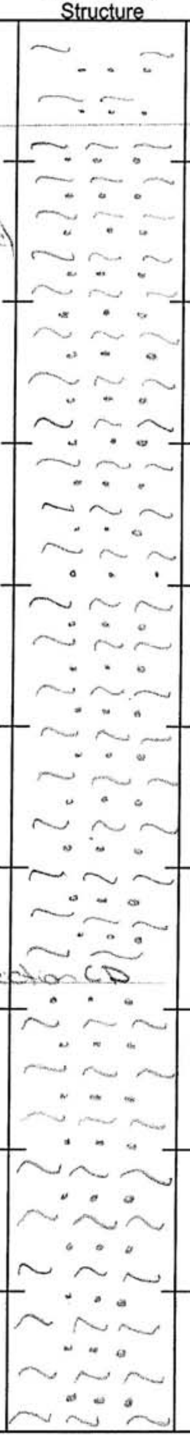
70

Reddish Brown Mud, abundantly & intensely bioturbated !!

80

90

300



NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804 Sample Number: 005 PC	Geographic Location: Victoria Strait	Water Depth: 61 m Total Length: 571 cm
Core Barrel Type: Piston Core	Date: 06 Sept 2005	Project Number: X-30

Latitude: 69° 09.956
Longitude: 100° 41.847

Described by: T. Schell

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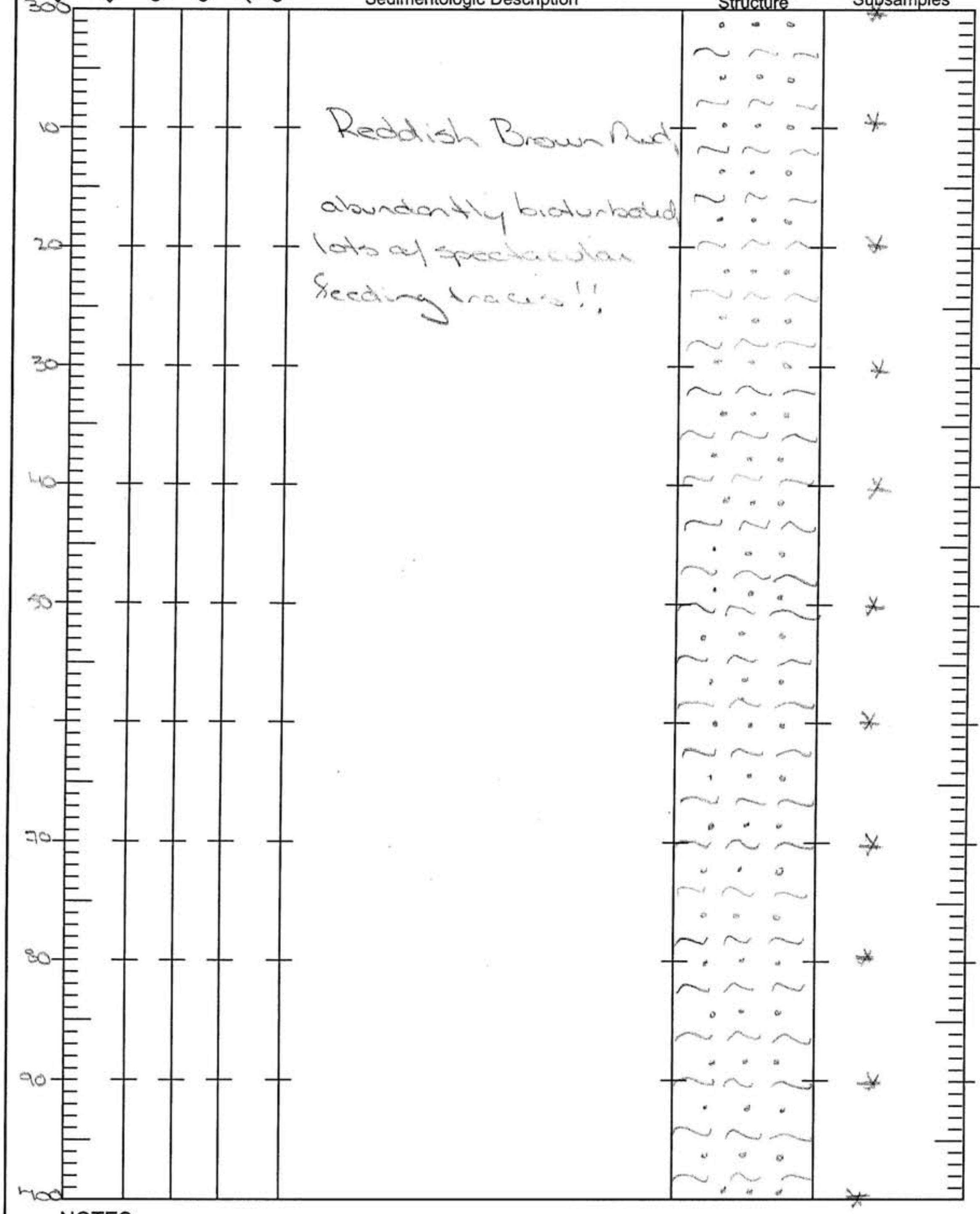
SYMBOL LEGEND

∵	mud	☐		☐	
~	mottles, bioturbated	☐		*	subsample
☐		☐		☐	

Depth (cm) | Deformation | Consistency | CaCo3 | Munsell Colour | Sedimentologic Description | Lithology & Sedimentary Structure | Subsamples



Reddish Brown Mud,

abundantly bioturbated,
lots of spectacular
feeding traces!!

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 005 PC

Geographic Location: Victoria Strait

Water Depth: 61 m
Total Length: 571 cm

Core Barrel Type: Piston Core

Date: 06 Sept 2005

Project Number: X-30

Latitude: 69° 09.956
Longitude: 100° 41.847

Described by: X. Schell

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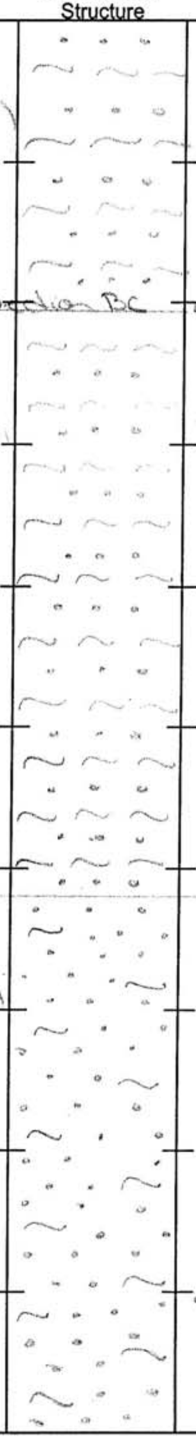
SYMBOL LEGEND

∵	mud	☐		☐	
~~	mottles bioturbation	☐		*	subsample
☐		☐		☐	

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
480					Reddish Brown Mud, abundantly bioturbated.		*
10							*
420					end of Section BC		420.5 *
					Reddish Brown Mud, abundantly bioturbated		
30							*
40							*
50							*
							*
462					Reddish Brown Mud, rare bioturbation / black mottles		
70							*
80							*
90							*
500							*



NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 005 PC

Geographic Location: Victoria Strait

Water Depth: 61 m
Total Length: 571 cm

Core Barrel Type: Piston Core

Date: 06 Sept 2005

Project Number: X-30

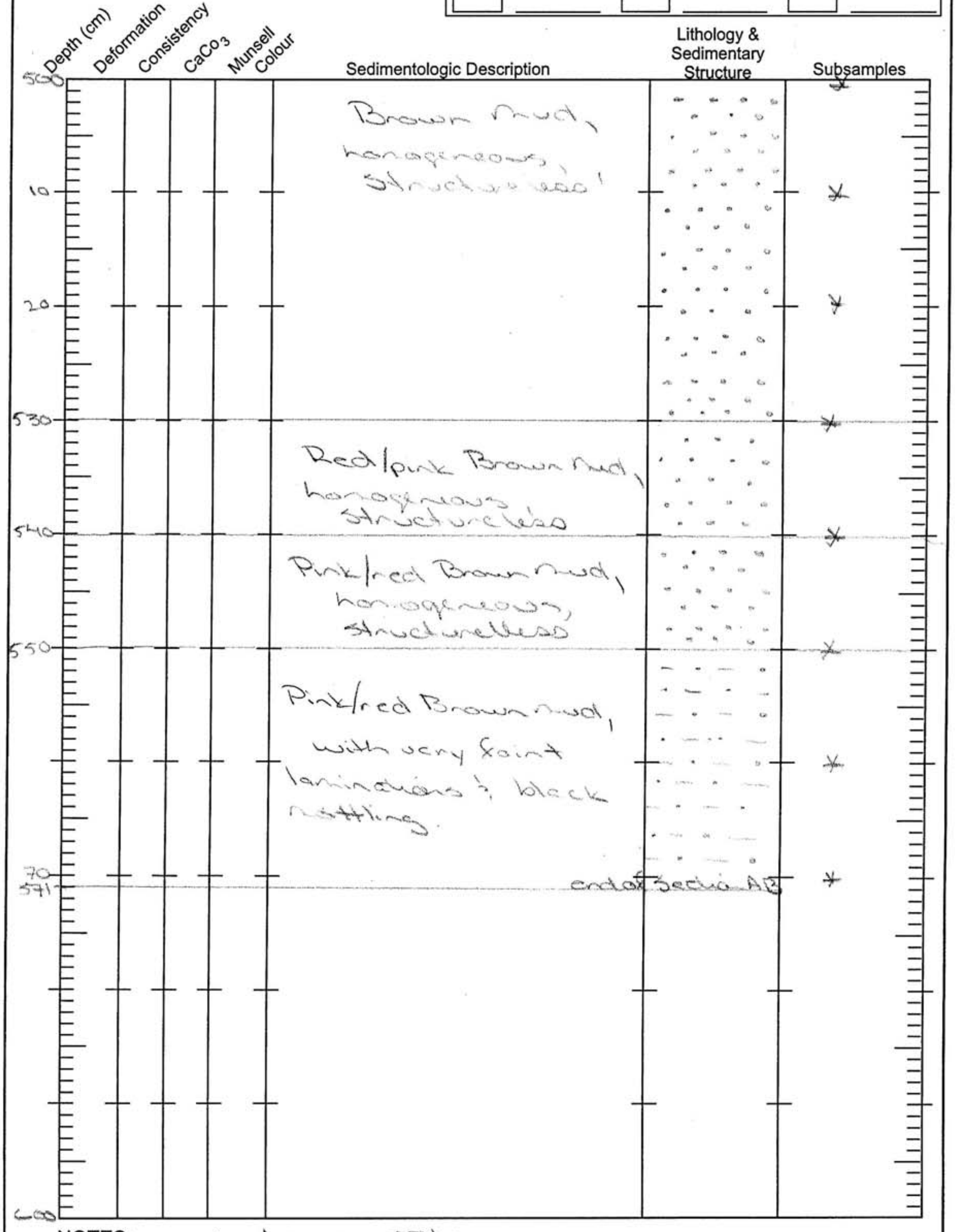
Latitude: 69° 09.956
Longitude: 100° 41.847

Described by: A. Schell

Page 6 of 6

SYMBOL LEGEND

⁘	mud	☐		☐	
⚋	laminae	☐		*	subsample
☐		☐		☐	



Brown mud, homogeneous, structureless!

Red/pink Brown mud, homogeneous structureless

Pink/red Brown mud, homogeneous, structureless

Pink/red Brown mud, with very faint laminations?, black mottling.

end of Section A3

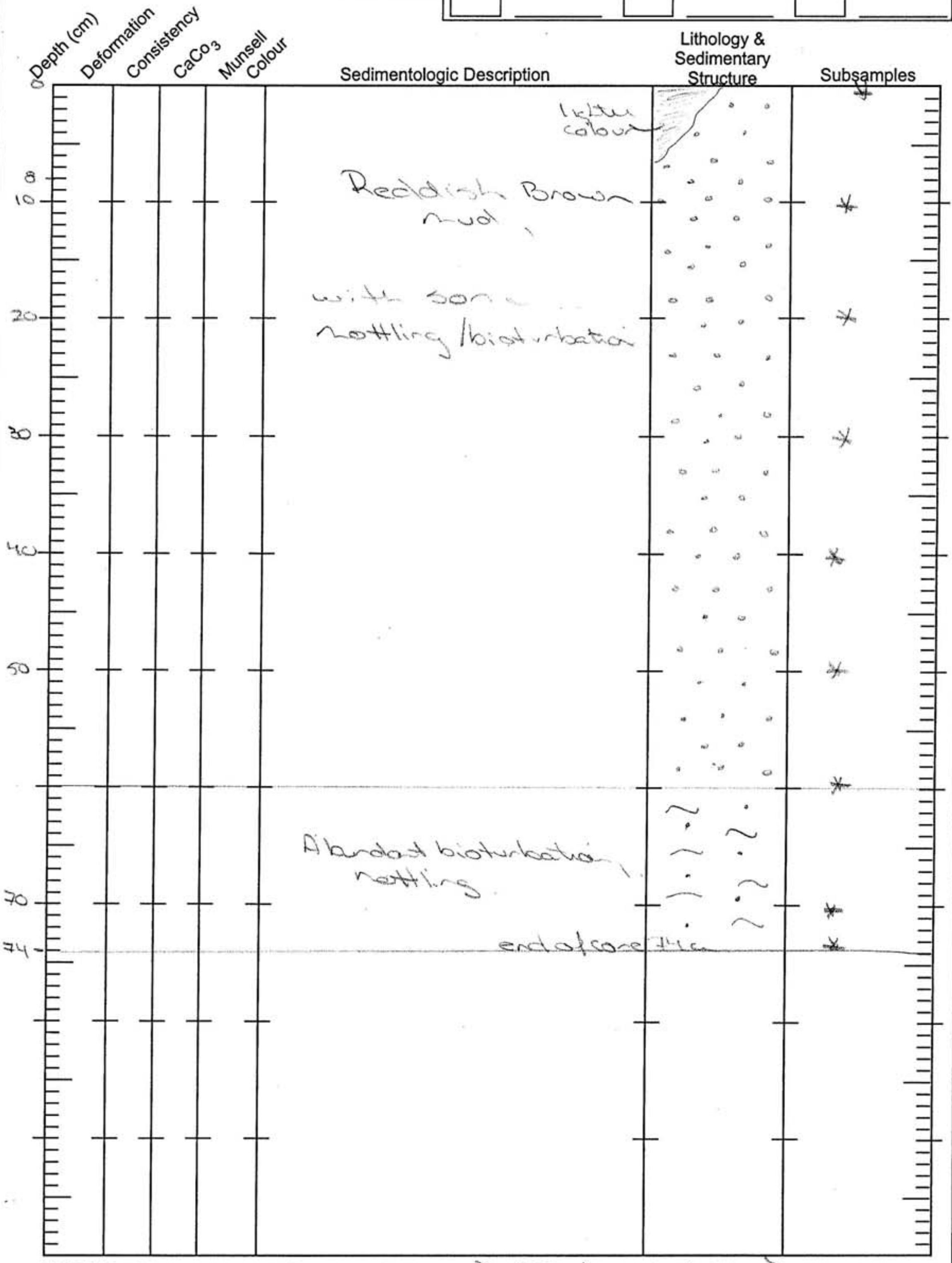
NOTES: end of core 571 cm

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 - 804
Sample Number: 006twc
Geographic Location: Dease Strait
Water Depth: 118 m
Total Length: 74 cm
Core Barrel Type: Trigger Weight
Date: 07 Sept 2005
Project Number: X-30
Latitude: 68° 59'. 552
Longitude: 106 ° 34 . 413
Described by: T. Schell
Page 1 of 1

SYMBOL LEGEND

∵	mud	☐		☐	
~		☐		*	subsample
☐		☐		☐	



lighter colour

Reddish Brown mud,

with some mottling/bioturbation

Abundant bioturbation, mottling

end of core 74cm

NOTES: Forams, dinos (10cc) Diatoms (5cc), Grainsize, O18, Organic C (1cc)

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2004-804
Sample Number: 006 PC

Geographic Location: Pease Strait

Water Depth: 118 m
Total Length: 402 cm

Core Barrel Type: Piston Core

Date: 04 Sept. 2005

Project Number: X-30

Latitude: 68° 59.552
Longitude: 106° 34.413

Described by: K. Schell

Page 1 of 4

SYMBOL LEGEND

⁘	mud
~	mottles bioturbation
✱	subsample

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
0	////	v. soupy v. dense			Reddish Brown mud	⁘	✱
8					Reddish Brown mud with Black mottling (+ organics) + bioturbation	⁘ ~	✱ ✱ ✱ ✱
49					Intense Black mottling		✱
50					Reddish Brown mud with lesser amounts of Black mottling.	⁘ ~	✱ ✱ ✱
90					Reddish Brown mud with Intense mottling	~	✱
98					end of Section D-C 98cm	~	✱

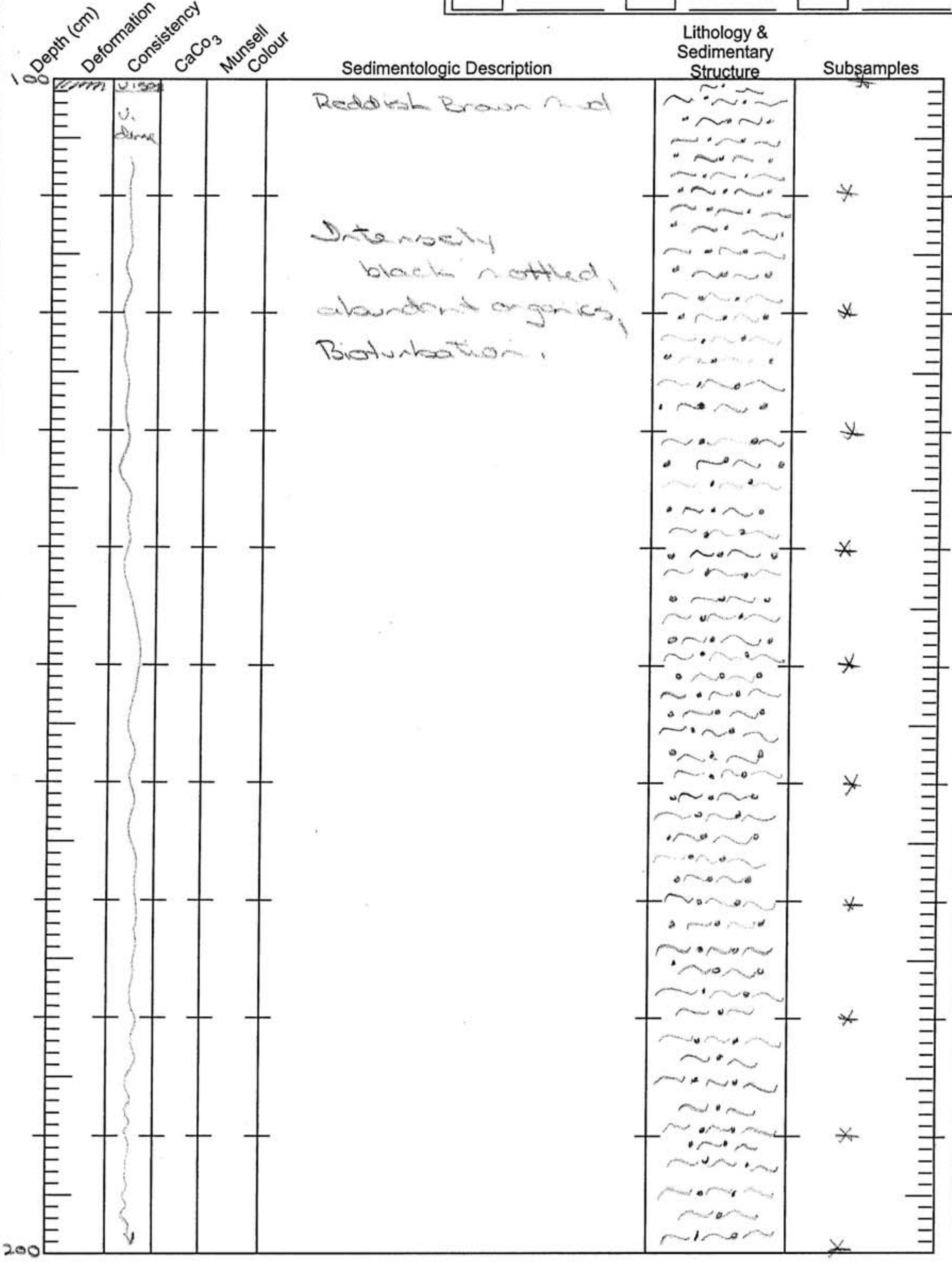
NOTES: Collected on 30 August 2005.
Split on 4 Sept 2005.
4°C cold storage
Forams, Dinos (10cc), Diatoms (5cc) grainsize, organic ((1cc)

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 -804
Sample Number: 006 PC
Geographic Location: Dease Strait
Water Depth: 118 m
Total Length: 402 cm
Core Barrel Type: Piston Core
Date: 04 Sept. 2005
Project Number: X-30
Latitude: 68° 59.552
Longitude: 106° 34.413
Described by: T. Schell
Page 2 of 4

SYMBOL LEGEND

∴	mud	☐		☐	
~	mottle bioturb.	☐		✳	subsample
☐		☐		☐	



Reddish Brown mud

Intensely black mottled, abundant organics, Bioturbation.

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 006 PC
Geographic Location: Dease Strait
Water Depth: 118 m
Total Length: 402 cm
Core Barrel Type: Piston Core
Date: 04 Sept 2005
Project Number: X-30
Latitude: 68° 59.552
Longitude: 106° 34.413
Described by: T. Schell
Page 3 of 4

SYMBOL LEGEND
- ∵ mud
- ∼ mottle bioturb
- ✱ subsample

Depth (cm)	Deformation	Consistency	CaCO3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
200		v. dense					
210					Reddish Brown mud Intensely mottled, +organics, Bioturbation		✱
220							✱
230							✱
240							✱
250					end of section B-C		✱
260							✱
270					olive grey mud Intensely mottled, +organics, bioturbation		✱
280							✱
290							✱
300							✱

NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 006 PC
Geographic Location: Dease Strait
Water Depth: 118 m
Total Length: 402 cm
Core Barrel Type: Piston Core
Date: 04 Sept 2005
Project Number: X-30
Latitude: 68° 59.552
Longitude: 106° 34.413
Described by: T. Schell
Page 4 of 4

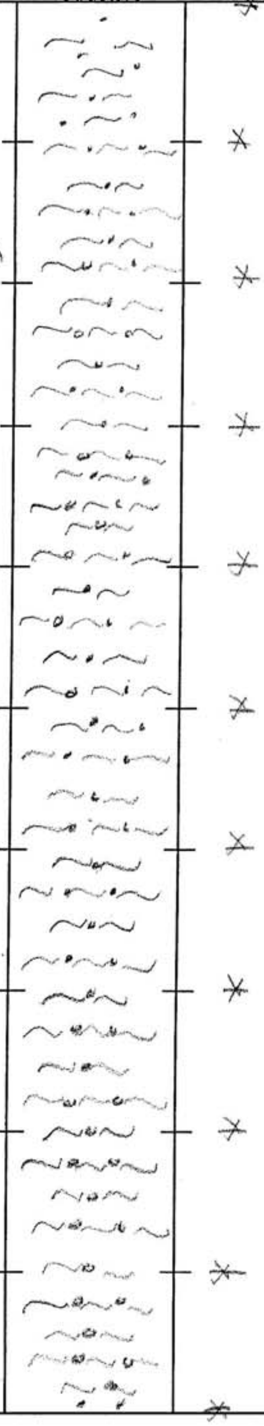
SYMBOL LEGEND
∴ mud
~ mottle bioturb
* subsample

Depth (cm) | Deformation | Consistency | CaCo3 | Munsell Colour | Sedimentologic Description | Lithology & Sedimentary Structure | Subsamples

300

v. dense

Olive gray mud, Intensely mottled, # organics, bioturbation



400
402

NOTES: end of Section A-B ~402cm
End of 2005-804-006 PC ~402cm

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2004 - 804
Sample Number: 008 twc

Geographic Location: Lyon's Point

Water Depth: 174 m
Total Length: 75.5 cm

Core Barrel Type: Trigger Weight core

Date: 14 Sept. 2005

Project Number: X-30

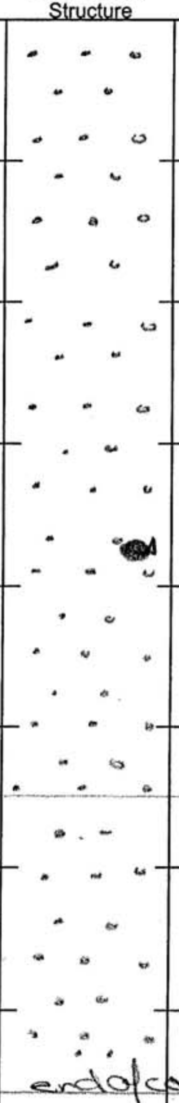
Latitude: 69° 54.436
Longitude: 122° 58.296

SYMBOL LEGEND

⁘	mud

Described by: T. Schell

Page 1 of 1



Depth (cm)	Deformation	Consistency	CaCo₃	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
0		v. soupy			Olive grey mud.		
37-38							shell 37-38
55					gradual colour change 55 - 75.5, → slightly reddish olive grey mud		
75.5						end of core	

NOTES: Shell removed for dating 37-38 cm

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 008PC

Geographic Location: Lyon's Point

Water Depth: 174 m
Total Length: 128 cm

Core Barrel Type: Piston Core

Date: 14 Sept 2005

Project Number: X-30

Latitude: 69° 54.436
Longitude: 122° 58.296

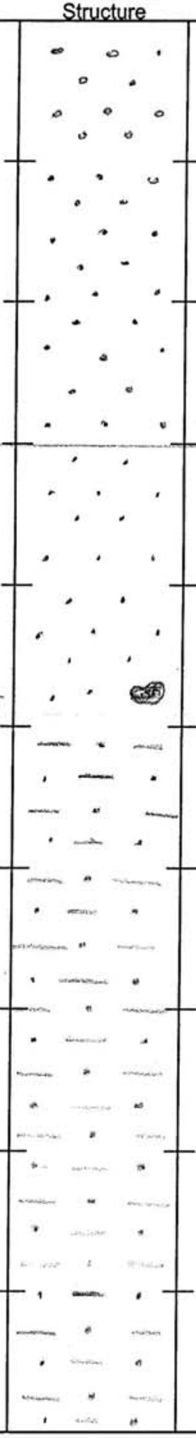
Described by: A Schell

Page 1 of 2

SYMBOL LEGEND

⁚⁚	mud
⁚–⁚	laminae

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
0							
10					Olive grey mud		
20							
30					Reddish brown mud		
40							
47					rock		
49							
50					Reddish brown mud with beige mud & black mud laminae		
70							
80							
90							
100							



NOTES:

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 0087C
Geographic Location: Lyon's Point
Water Depth: 174 m
Total Length: 128 cm
Core Barrel Type: Piston Core
Date: 14 Sept 2005
Project Number: X-30
Latitude: 69° 54.436
Longitude: 122° 58.296
Described by: K Schell
Page 2 of 2

SYMBOL LEGEND
▨ mud with laminae

Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
100							
110					Reddish brown mud with beige mud + black mud laminae		
120							
130						end of core	

NOTES:

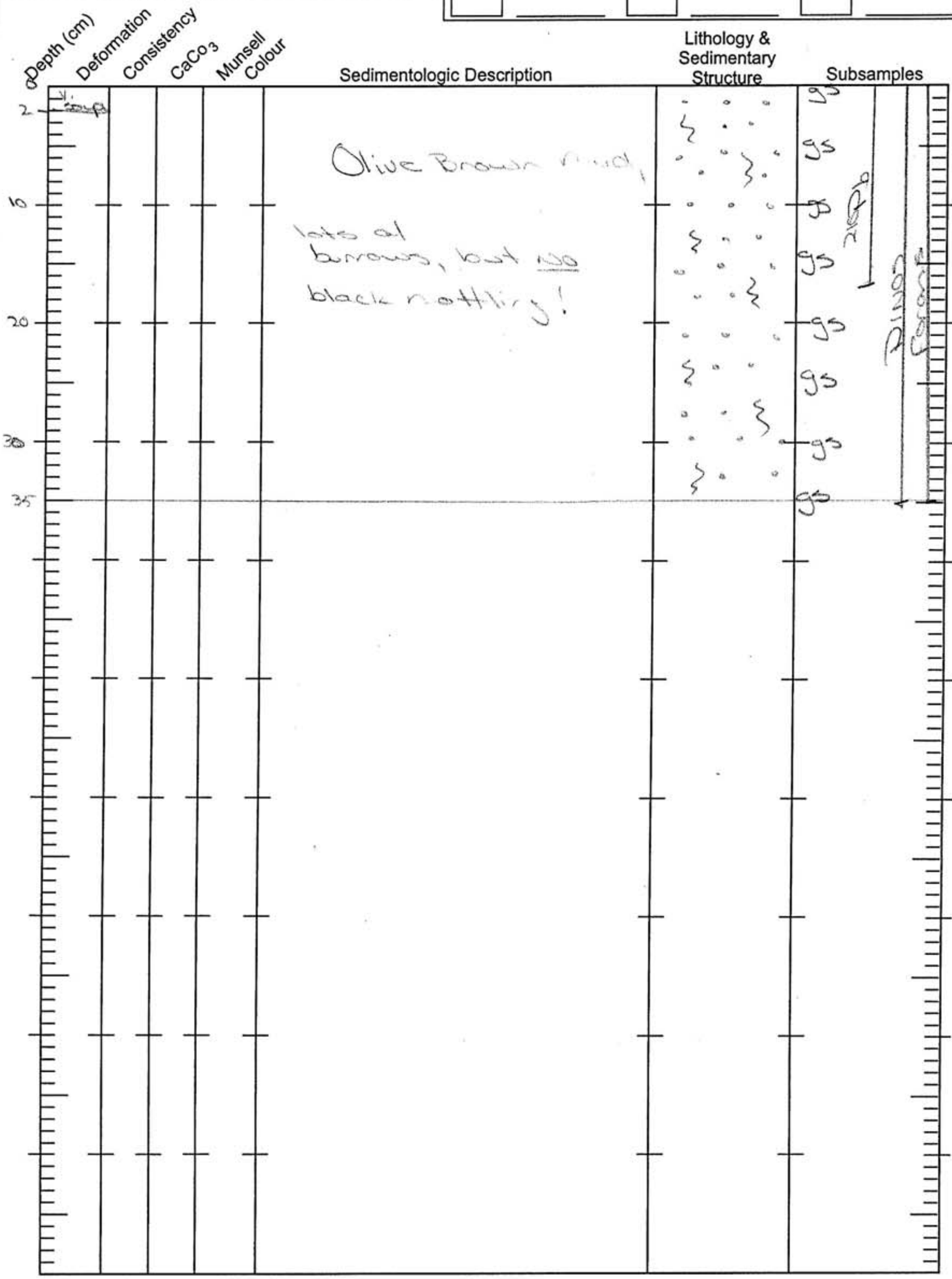
GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 009 bc[illegible]
Geographic Location: Baffin Bay / Lancaster Sound
Water Depth: 815 m
Total Length: 35 cm
Core Barrel Type: Boxcore · pushcore
Date: 07 Sept. 2005
Project Number: X-30
Latitude: 74° 02.419
Longitude: 79° 55.954
Described by: T. Schell
Page 1 of 1

SYMBOL LEGEND

⁘ mud

≀ burrows



Olive Brown mud,

lots of burrows, but NO black mottling!

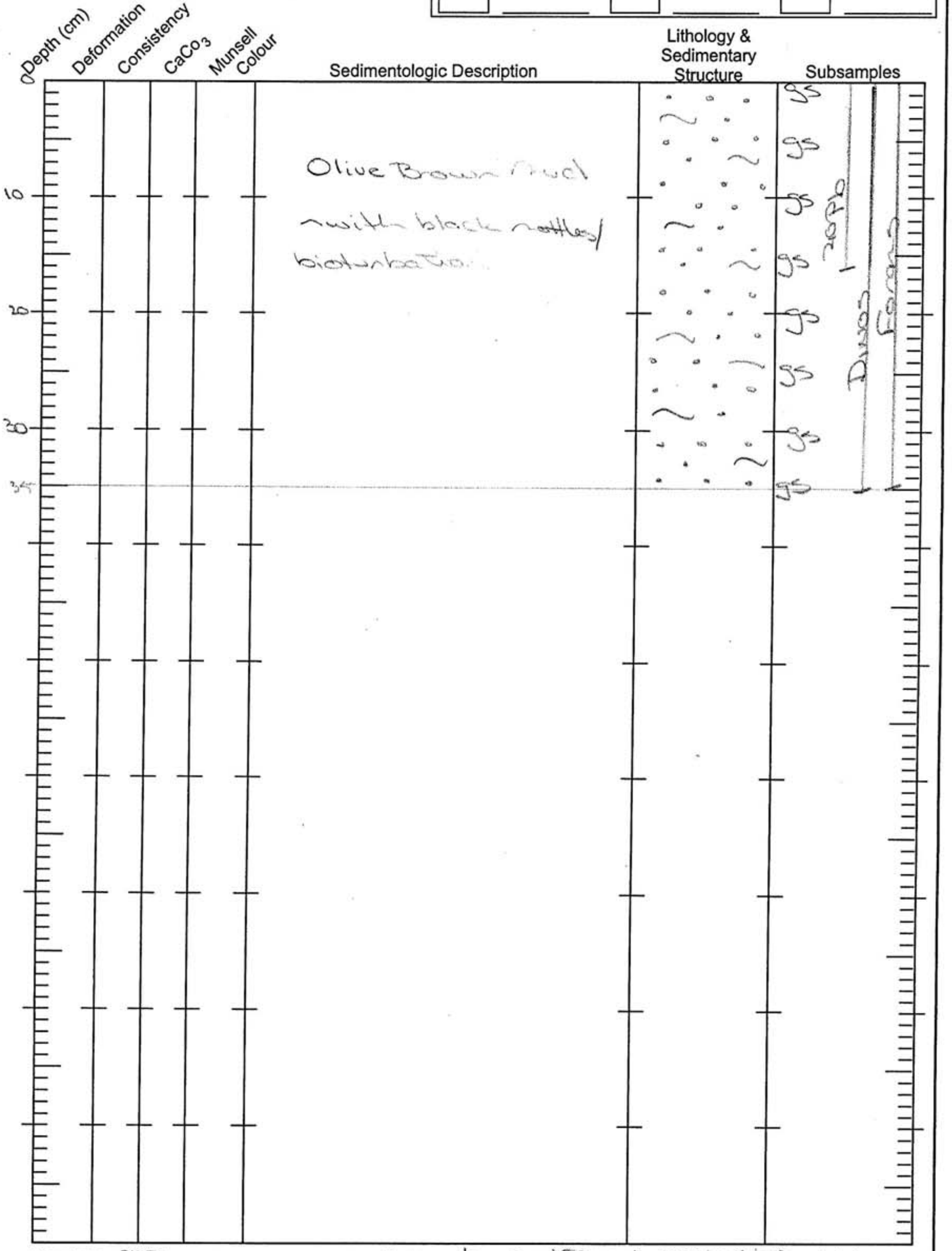
NOTES: 210Pb 1cc every cm for 0-15cm; grainsize 1cc every 5cm; Dinos + Forams every cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005 - 804
Sample Number: 010 bc
Geographic Location: Barrow Strait
Water Depth: 350 m
Total Length: 35 cm
Core Barrel Type: Boxcore - Pushcore
Date: 07 Sept. 2005
Project Number: X-30
Latitude: 74° 16.168
Longitude: 91° 04.45
Described by: T. Schell
Page 1 of 1

SYMBOL LEGEND

∴	mud	☐		☐	
~	mottles	☐		☐	
☐		☐		☐	



Olive Brown Mud with black mottles/bioturbation

NOTES: ^{210}Pb 1cc every cm for 0-15cm"; grainsize 1cc every 5cm"; Forams + Dinos every cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804 Sample Number: 011 BC	Geographic Location: Victoria Strait	Water Depth: 61 m Total Length: 31 cm
Core Barrel Type: boxcore - pushcore ①	Date: 07 Sept 2005	Project Number: X-30

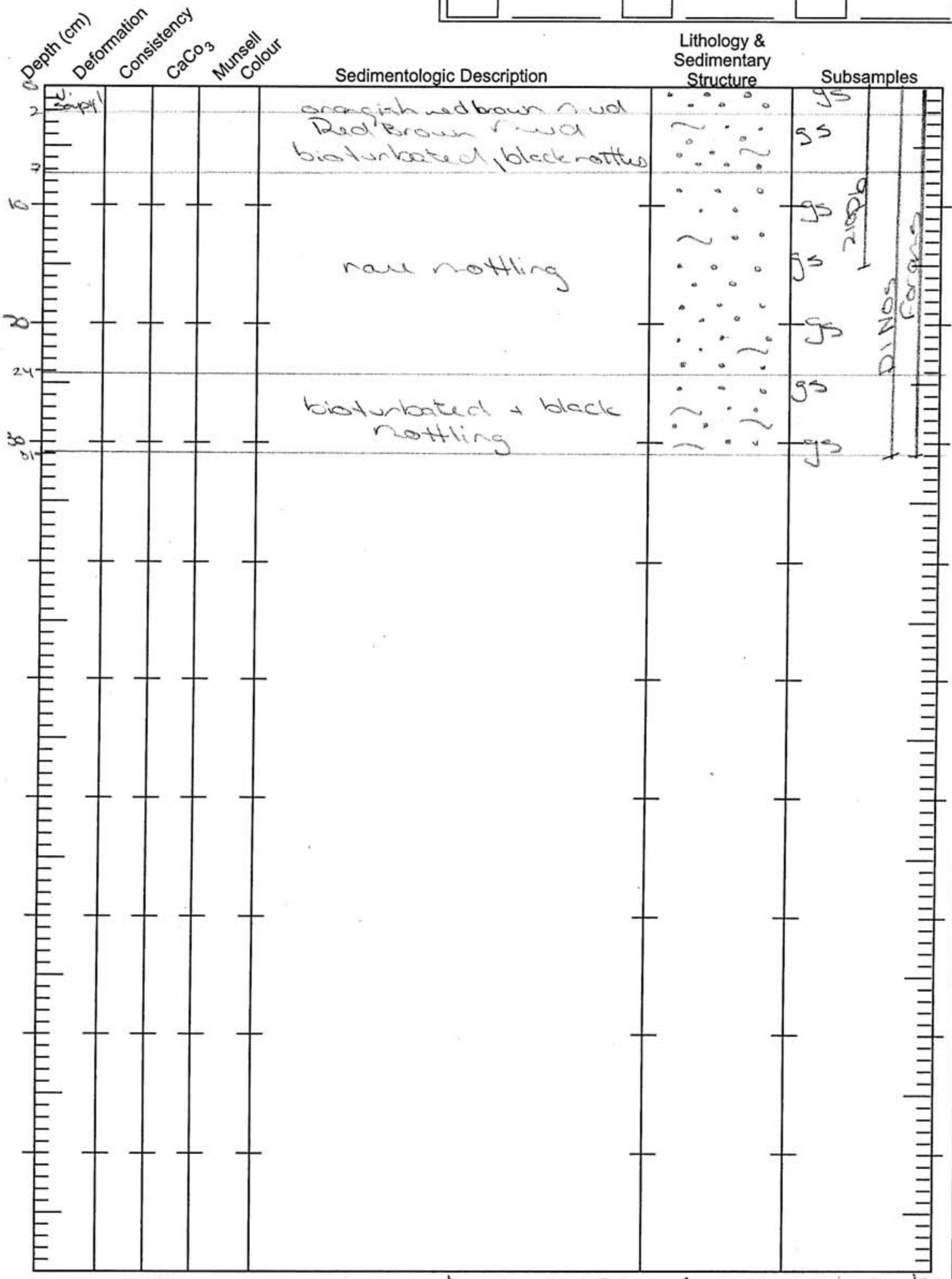
Latitude: 69° 09.967
Longitude: 100° 41.719

Described by: A Schell

Page 1 of 1

SYMBOL LEGEND

∴	mud
~	mottles



Depth (cm)	Sedimentologic Description
0–2	orangish red brown mud
2–7	Red Brown mud bioturbated, black mottles
7–24	rare mottling
24–31	bioturbated + black mottling

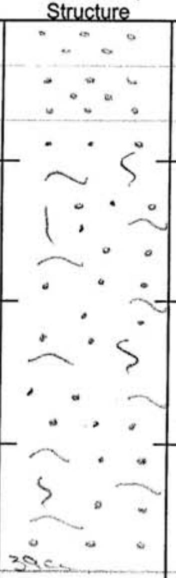
NOTES: 210Pb 1cc every cm from 0-15cm; grainsize 1cc every 5cm; DINOS + Forams 1cc every cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 012bc
Geographic Location: Dease Strait
Water Depth: 118 m
Total Length: 39 cm
Core Barrel Type: boxcore - pushcore ①
Date: 07 Sept 2005
Project Number: X.30
Latitude: 68° 00.002
Longitude: 106° 34.541
Described by: A Schell
Page 1 of 1

SYMBOL LEGEND

∴	mud
~	mottles



Depth (cm)	Deformation	Consistency	CaCo3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
0 U. soupy					orange brown mud		210Pb Dinos Forams
3 soupy					beige brown mud		
7					Brown - reddish brown mud, with burrows ?, bioturbated, lots of black mottles		
39					end of core 39cm		

NOTES: 210Pb 1cc every cm for 0-15cm; grainsize 1cc every 5cm; Dinos + Forams 10cc every cm.

GEOLOGICAL SURVEY OF CANADA (Atlantic) CORE DESCRIPTION

Cruise Number: 2005-804
Sample Number: 013 BC
Geographic Location: Cape Lyon
Water Depth: 29 m
Total Length: 47 cm
Core Barrel Type: Boxcore
Date: 14 Sept. 2005
Project Number: X-30
Latitude: 69° 54.813
Longitude: 122° 57.957
Described by: T. Schell
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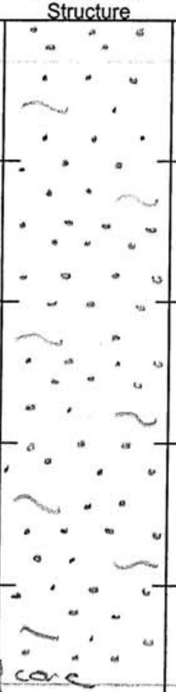
SYMBOL LEGEND

∴	mud	☐		☐	
~	mottles	☐		☐	
☐		☐		☐	

Depth (cm)	Deformation	Consistency	CaCO3	Munsell Colour	Sedimentologic Description	Lithology & Sedimentary Structure	Subsamples
0		V. soft			orangish-red mud		
10		V. soft			Olive grey mud, with black mottling (poorly split)		
20							
30							
40							
47					end of core		



NOTES: