UNIVERSITY OF BERGEN
Department of Earth Science

REPORT: 100-04/06

Marine Geological Cruise Report

North Sea/Fladen area

R/V G.O. SARS

UoB Cruise No. GS-06-146

IMR Cruise No. 2005117

26. November - 2. December 2006

Department of Earth Science,
University of Bergen, Norway
December, 2006

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A. Nygård[1]
B.O. Hjelstuen[1]
S. Monsen[1]
J. Brendryen[1]
I. Mardal[1]
C. Clark[2]
A. Hughes[2]
R. Levine[2]

[1] University of Bergen, Department of Earth Science, Allegt. 41, N-5007 Bergen, Norway
[2] University of Sheffield, Department of Geography, Winter Street, Sheffield, S10 2TN, United Kingdom

1. INTRODUCTION

The marine geological survey to the North Sea (Figs. 1 and 2) is carried out by the Department of Earth Science, University of Bergen. The cruise is a scientific contribution to the NFR-funded research projects RAPID and GLACIPET (under the Petromaks programme); shortly described below. This report will give an overview of the scientific objectives, a description of the survey area and a general description of the cruise performance. Figure 1 shows the survey area with ship track lines, whereas a general survey log is provided in Table 1.

1.1. Project description and objectives

The cruise is part of two projects: **1)** "Punctuated disintegration of the NW European Ice Sheet and rapid climate change" (RAPID) and **2)** "Subsidence, uplift and tilting of traps – the influence on petroleum systems" (GLACIPET).

1.1.1. RAPID

The project "*Punctual disintegration of the NW European Ice Sheet and rapid climate change*" (RAPID) is a joint NFR/NERC scientific project. The marine geological objectives are to: **a)** Constrain the timing of Norwegian Channel Ice Stream (NCIS) events during the last glacial periods, **b)** Ascertain North Atlantic footprint of ice-rafted debris from the NCIS and assess correlations between NCIS events and known ocean and climate excursions, **c)** Reconstruct dimensions of the NCIS and estimate range of ice flux, **d)** Review evidence for major ice-dammed lakes, and compute their water volume and likely drainage routes, **e)** Compile geophysical and bathymetric data for the North Sea to develop the hypothesis of a grounded-ice break-up event and constrain its timing, and **f)** Estimate the ice volume involved, and likely melt water pathways to the North Atlantic.

The firm existence of glaciations over the North Sea (into the Fladen Ground Area), as well as the existence of an ice stream issuing through the Norwegian Channel has only recently been established. These two major parts of the Fennoscandian Ice Sheet, joining the continental ice to that of the British Isles, provide a potentially important source for melt water and ice bergs to have entered the North Atlantic in the past. In this project we aim to establish the area, volume and history of the ice sheet over the North Sea and the NCIS during the last glacial maximum. This will provide the basis for modeling experiments, employing a state-of-the-art ice berg

trajectory model, to examine the likely part of ice bergs from this region of Europe, and their potential impact on North Atlantic convection processes, and hence the global thermohaline circulation.

This research will benefit a number of scientific and policy areas. Reconstructing the evolution of the European Ice Sheet near the North Sea during the last glaciation will assist organization and policies that rely on recent geological history. A better reconstruction of past ice sheets also provides revised surface boundary conditions for climate models of the period, which are important verification tools for climate models of our global future. Understanding the past contribution of European Ice Sheets to the freshwater balance of the North Atlantic allows us to refine understanding of the ease with which the thermohaline circulation of the ocean can change, and its climatic consequences for western Europe. While there are currently no ice sheets in western Europe there is considerable debate about the sensitivity of the convection processes in the NE Atlantic to potential thermohaline collapse in the near future. This work will help define this debate.

1.1.2. GLACIPET

The main objective of this national Petromaks-project is to model the isostatic response of Cenozoic glaciations, sedimentation and erosion on the Norwegian continental shelf, and to constrain consequences for petroleum systems. This objective will be met by the following sub-goals, providing input to modelling: **1)** More complete knowledge on timing and extent of glaciations through the Plio-Pleistocene, **2)** Improved understanding and quantification of glacial depositional and erosional processes, **3)** Expanded knowledge on the interaction between the Fennoscandian, the Barents Sea, and the Kara Sea ice sheets, and their crustal influence through the last glacial cycle. Two contrasting areas is to be studied: the Barents Sea region, which is characterized by uplift through the late Cenozoic, and the northern North Sea, a region of late Cenozoic subsidence.

Since the development of the ice age theory, there has been a more or less continuous debate on the possible glaciations of the North Sea. Early interpretation of the extent of the Fennoscandian and Hiberno-British ice sheets into the North Sea basin were mainly based on inferences from sites bordering the North Sea, the general morphology (bathymetry) of the North Sea, and surface sediment distribution from depth soundings and dredges. Some global reconstructions (e.g. CLIMAP 1981) placed an ice mass between the Hiberno-British and

Fennoscandian ice sheets at the Last Glacial Maximum (LGM), while more recent ones have not. Observations of deep incisions on the North Sea seafloor, and the interpretation as subglacial/ice-proximal features have been taken as evidence for glaciations of the North Sea and their distribution has been used in constructing maps of extent of grounded ice. From the studies of core data and 2D seismic it has been suggested that the central North Sea has been glaciated. Recent work using 3D seismic investigation of tunnel valleys in the central North Sea concludes that they are subglacial meltwater channels, thus requiring an ice cover at their time of formation. Also, new research carried out along the continental margins, including recognition of end moraines and glacial fed debris flows strongly suggest that the NW European margin from Ireland to Svalbard was covered by glacial ice to the shelf edge during LGM. Detailed investigations of core and acoustic data suggests that the first occurrence of an ice stream following the Norwegian Channel took place at ~1.1 Ma and from Marine Isotope Stage (MIS) 12 (~0.460 Ma) the Norwegian Channel Ice Stream has apparently been active during each glacial stage. For the central North Sea, the first evidence of glaciations have been found within the Aberdeen Ground Bed and dated to ~0.900 Ma. The present project will compile new and previously published data from the northern North Sea in order to quantify erosion and deposition through the Pleistocene. An important element in this project will be to utilize 3D industrial data in order to determine genesis and geometry of the Pleistocene units in selected areas. This cruise, as the last years cruise GS140-05, will focus on collecting high resolution acoustic data, Topas and multibeam, in order to better link new and previously published core data with the seismic stratigraphy. From this work estimates of deposition (in the major depocenters in the region) and erosion for two time intervals will be done: **1)** From first glaciation of the North Sea (~1.1 Ma) to MIS 12 (~0.5 Ma) and **2)** the last 0.5 Ma.

1.2. Scientific Party

Atle Nygård	UoB	Research scientist/Cruise leader
Berit O. Hjelstuen	UoB	Associate Professor
Jo Brendryen	UoB	PhD student
Ivar Mardal	UoB	Master student
Stig Monsen	UoB	Technician
Asgeir Steinsland	IMR	Survey Engineer
Jarle Wangensten	IMR	Survey Engineer
Chris Clark	UoS	Professor
Anna Hughes	UoS	PhD student
Richard Levine	UoS	Post. Doc

UoB: University of Bergen, Dept. of Earth Science, Allegt. 41, 5007 Bergen, Norway
IMR: Institute of Marine Research, Nordnesgt. 50, P.O. Box 1870 Bergen, Norway
UoS: University of Sheffield, Department of Geography, Winter Street, Sheffield, S10 2TN, UK

2. METHODS

2.1. Research vessel

R/V G.O. SARS has a length of 77.4 m, beam of 16.4 m and a displacement of 4067 tonnes, and is owned by the Institute of Marine Research and the University of Bergen. R/V G.O. SARS is outfitted with diesel-electric propulsion plant and 2 Teco Westinghouse DC motors and has a top speed of 17.5 knots. Its engines are noise reduced; lowering the noise emission under water by 99% compared to conventional research vessels. The main duties are research operations within the areas of fishery, acoustic, environment and geology.

To accommodate these tasks the vessel is arranged with two sheltered hangars midships for environmental and geological research operations. These hangars have 6 winches all with 6000 m cable length (either with electrical or optical cording) for lowering scientific equipment to the deepest parts of the Norwegian Sea. The vessels heavy duty cranes and handling equipment are located in the main mid-ship hangar and on the aft deck. These include 6 cranes for lifting equipment from 2 tonnes up to 16 tonnes, and one CTD davit crane with a capacity of 2 tonnes. One Z-frame crane, with a capacity of 8 tonnes, is located on the stern. The operation centre is

arranged on the 5th deck, controlling all acoustic and hydrographical equipment. Furthermore, the vessel is arranged with 15 specialised laboratories. A number of sensitive transducers are located in two independent drop keels.

R/V G.O. SARS has room for 45 persons in 19 single berth cabins and 13 double berth cabins and it has a crew of 15.

2.2. Navigation

The shipboard navigation system is a Simrad Kongberg system. The GPS part is a dual antenna system for heading and position determination. This system is able to create position accuracy of 2m 2º (Differential GPS signal via satellite). No post-processing was carried out. The logged navigation has datum WGS84. ASCII files including positional fixes for every 10 sec survey time provided in a geographic co-ordinates (lat. and long.) format were made available for later plotting purposes. In addition, UTM co-ordinates (Zone 31, Central Meridian, WGS 84) were supplied.

2.3. Simrad Multibeam Echosounders

The Kongsberg Simrad Multibeam echo sounders EM300 and EM1002 are designed for seabed mapping at variable depths, and therefore have variable resolution capacities. Only EM1002 was used during the cruise. The echo sounders consist of three units:

a) Transducer arrays
b) Transceiver unit
c) Operator station

Transducer arrays

The transducer arrays are different in form for the different models, but are used for both transmitting and receiving pulses. Both arrays are positioned on the front of the drop keel hull.

Transceiver unit

The transceiver unit is a wall mounted cabinet with integrated shock and vibration absorbers. It contains transmission and reception electronics, the processors for beam formation, bottom detection and control of all parameters with respect to gain, ping rate and transmission angles.

Operator station

The operator station contains processors for beam-formation, bottom detection and parameter control as well as the operator interface.

It detects:

- depth and sounding positions
- raw ranges and beam pointing angles
- seabed imaging
- vessel position and attitude
- sound speed data
- system installation and set-up parameters

The system does not require operator intervention during normal operation, but tracks the bottom automatically while adjusting mode, gain and range dependant parameters as required. To improve bottom detection, leading to an improved data quality, the system is interfaced with the high frequency sonar.

Data Processing

There are three software packages that are commonly used during the processing process:

- The Neptun software, which is used for post-processing of bathymetric data (i.e. cleaning and filtering of raw data etc.).
- The Triton software, which is used for seabed sediment classification. This software extracts signal features from the seabed image data, and applies this data to a statistical classification procedure in order to obtain the best estimate for seabed sediment type as a function of position in the form of a map overlay.
- The Cfloor or the Fladermaus softwares are used for digital terrain modelling and plot generation. These terrain models can easily produce contour maps, 3D plots, combined bathymetry and acoustic imagery, depth profiles along specified routes, volume calculations etc.

2.3.1. EM 1002

The Kongsberg Simrad EM 1002 multibeam echo sounder is used for high resolution seabed mapping from water depths of 2 m to approximately 1002 m. The system has a maximum ping rate of more than 10 Hz, with 111 beams per ping. The beamwidth is 2*2°, which gives swath coverage of up to 7,5 times the distance from the transducer face to the bottom, or maximum

depth of about 1200 m. The EM 1002 system has a frequency of 95 kHz, which is robust for pollution and particles in the water and therefore results in good accuracy and resolution.

Three different pulse lengths are used for different depths; 0,2 ms for depths less than 200 m, 0,7 ms for intermediate depths and 2,0 ms for depths larger than 600 m. These pulses give depth resolutions of 2, 4 or 8 cm. On the cruise the normal procedure was however to switch to EM300 when reaching ca. 600-700 m water depth for achieving highest quality on the bathymetrical data.

The transducer is semicircular with a radius of 45 cm and 160° angular extent. The beam width is 2*2°, and its height, width and length is 398 mm, 887 mm, and 473 mm, respectively. Eight 20 m long underwater cables connect the transducer to the transceiver unit. Because of the curved shape, the accuracy is dependent upon variation in sound speed at the transducer depth. On R/V G.O. SARS the transducer and the receiver are located in a drop keel.

2.4. TOPAS (Parametric Sub-bottom Profiler System)

The TOPAS PS18 system is a single, narrow beam sub-bottom profiler system with electronic roll, pitch and heave stabilisator. The range resolution is normally less than 0.3 m, and penetration capability is normally more than 150 m. The TOPAS is designed around a parametric antenna utilizing the non-linear propagation characteristics of water to generate a low frequency acoustic pulse from a short, high frequency burst or from the inter-modulation of two high frequency signals. The received echoes are amplified, digitized, processed and displayed on-line, and can be printed out during the process. Raw, unprocessed data may be stored for later processing.

There are several types of pulses that can be used, depending on the different depth and different use that is needed. Generally, high frequency gives high resolution but low penetration, and for both the Ricker- and the Chirp pulse, maximum and minimum frequency is 6000 Hz and 500 Hz respectively. The Ricker pulse was applied on the whole cruise due to shallow water depth.

Ricker wavelet

The high resolution pulse is called the Ricker pulse, and gives detailed information about the top 5-10 m sediments in water depths less than 2000-3000 m. This mode gives short, single

pulses with power spectrum centered around 3,5 kHz. Ricker pulse is a wide-band wavelet and requires a high signal-to-noise ratio for optimal performance. Ping interval depends on wavelet type, water depth and operation mode. It range from 200-15000 ms, but default ping/shot interval for Ricker pulse is 300-500 ms in shallow areas.

3. FIELD OPERATIONS

A summary of ship-board operations is provided in Table 1.

3.1. Weather and sea state conditions

North Sea Plateau to Aberdeen, 26. - 30. November 2006

The sea state was generally rough during the entire period with waves usually 3-5 m, reaching a maximum of ca. 6-7 metres, and with wind speed maximum up to 55 kt (26 m/s). Calmer sea state and lower wind speed (14-17 kt or 7m/s) occurred periodically, inbetween the rough states. In spite of this the both TOPAS and multibeam were recorded during the entire survey.

During surveying of Line 22, towards Aberdeen, the wind speed exceeded 50 kt (25 m/s) throughout the night (Force 9-10) giving frequently loss of signal along the entire surveyed distance.

Aberdeen to Bergen, 1. - 2. December 2006

Calmer sea state, waves 1-2 metres, wind speed between 15 and 24 kt.

3.2. Equipment performance

3.2.1. TOPAS

The TOPAS parametric profiler was run with success during the entire survey. The TOPAS data have in overall a reasonable quality with reasonable penetration and high resolution along the survey lines. During periods of high sea state and strong wind loss in signal frequently occurred when surveying upwind. However, when downwind, signal quality was generally good.

Printing of TOPAS profiles to an analog printer functioned very well troughout the cruise.

The option given in the TOPAS program to change to a new file when a specified max-file-size was reached (in our case 100 MB) did not work, so this had to be done manually by stopping and starting the recording.

3.2.2. Multibeam system

The multibeam EM1002 system (drop keel mounted and heave compensated) performed well trouhgout the entire survey. At one occation the system had to be restarted.

3.2.3. Gravity coring

The gravity coring system functioned very well. Gravity coring (Fig. 2; Table II) was performed at locations on the flank of an incised valley (tunnel valley?) where the sediments were overcompacted.

3.3. General cruise performance

- The weather conditions were rough throughout the entire survey.
- The TOPAS profiling was generally successful.
- A total of 1900 km of TOPAS profiles was collected.
- 3 gravity cores were collected

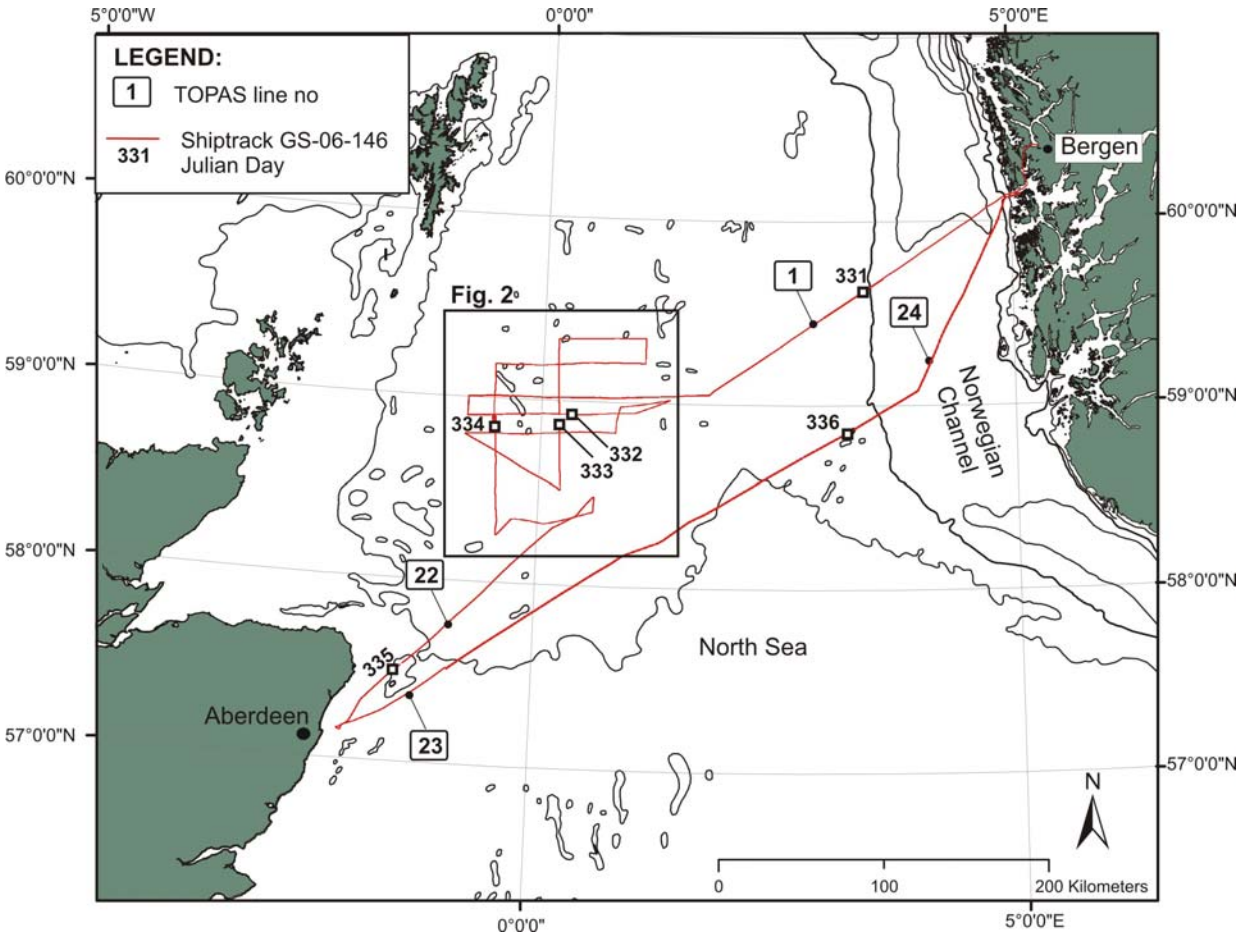


Figure 1. Survey location map. Bathymetric contours 100 m.

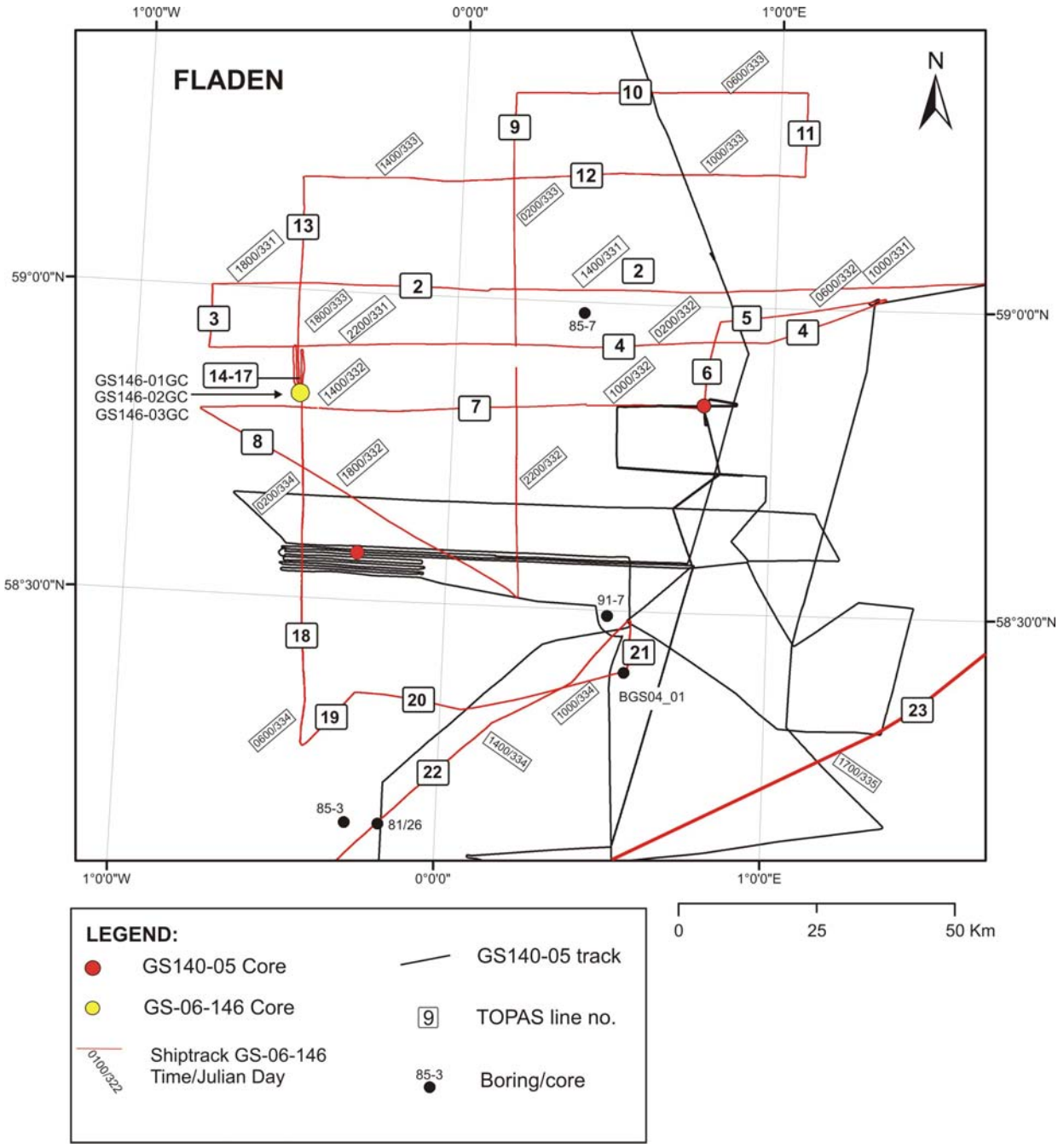


Figure 2. Detailed survey map of the Fladen area. Figure location in Fig. 1.

Table I

General survey log

UoB cruise no. GS-06-146 (IMR cruise no. 2006117)

Date	Time/Julian Day UTC	Subject
26.11.2006	15:00/330	Departure Bergen
26.11.2006	17:14/330	At Marstein Fyr
26.11.2006	17:20/330	Start logging EM1002
26.11.2006	17:27/330	Start TOPAS Line 01 (20061126172724.raw)
27.11.2006	08:34/331	End TOPAS Line 01 (200611270823131.raw)
27.11.2006	08:34/331	Start TOPAS Line 02 (20061127083402.raw)
27.11.2006	15:22/321	Did a turn to avoid fish boat
27.11.2006	18:50/331	End TOPAS Line 02 (20061127183526.raw)
27.11.2006	18:51/331	Start TOPAS Line 03 (2006112715101.raw) Surveying against the wind
27.11.2006	19:51/331	End TOPAS Line 03 (2006112715101.raw)
27.11.2006	19:51/331	Start TOPAS Line 04 (20061127195138.raw)
28.11.2006	01:26/332	Ink out, changed cadridge (black), however it was the colour cadridge that was emty
28.11.2006	01:53/332	Starting printer again, changed setting in printer setup to "black" (was on colour)
28.11.2006	02:11/332	Stop printing on paper - bad quality on print out
28.11.2006	02:18/332	Start printing again, after change in setting and "cleaning"
28.11.2006	05:05/332	End TOPAS Line 04 (20061128044722.raw)
28.11.2006	05:28/332	Start TOPAS Line 05 (20061128052714.raw)
28.11.2006	07:35/332	End TOPAS Line 05 (20061128070704.raw)
28.11.2006	07:35/332	Start TOPAS Line 06 (20061128073557.raw), Surveying against the wind
28.11.2006	08:54/332	End TOPAS Line 06 (20061128073557.raw)
28.11.2006	08:54/332	Start TOPAS Line 07 (20061128085425.raw)
28.11.2006	12.03/332	Change gain to 8dB because of dark printout
28.11.2006	16:04/332	Turn. End TOPAS Line 07 (20061128145148.raw)
28.11.2006	16:04/332	Stop logging EM1002
28.11.2006	16:07/332	Start TOPAS Line 08 (20061128160731.raw)
28.11.2006	16:07/332	Start logging EM1002
28.11.2006	20:57/332	End TOPAS Line 08 (20061128195841.raw)
28.11.2006	20:57/332	Start TOPAS Line 09 (20061128205731.raw)
29.11.2006	03:42/333	Turn. End TOPAS Line 09 (20061129031713.raw)
29.11.2006	03:42/333	Stop logging EM1002
29.11.2006	03:43/333	Start TOPAS Line 10 (2006112903454.raw)
29.11.2006	03:43/333	Start logging EM1002
29.11.2006	07:36/333	End TOPAS Line 10 (20061129061300.raw)
29.11.2006	07:36/333	Start TOPAS Line 11 (20061129073600.raw), Surveying against the wind

Table I

General survey log
UoB cruise no. GS-06-146 (IMR cruise no. 2006117)

Date	Time/Julian Day UTC	Subject
29.11.2006	07:37/333	Stop logging EM1002
29.11.2006	07:37/333	Start logging EM1002
29.11.2006	08:43/333	End TOPAS Line 11 (20061129073600.raw)
29.11.2006	08:43/333	Start TOPAS Line 12 (20061129084318.raw)
29.11.2006	11:21/333	Problem with EM1002. Stop logging EM1002
29.11.2006	11:45/333	Start logging EM1002 after restart
29.11.2006	16:04/333	Turn. End TOPAS Line 12 (20061129151640.raw)
29.11.2006	16:04/333	Stop logging EM1002
29.11.2006	16:06/333	Start TOPAS Line 13 (20061129160614.raw)
29.11.2006	16:06/333	Start logging EM1002
29.11.2006	18:57/333	Start 75kHz ADCP bottom track bin size 8m / 2006117
29.11.2006	19:29/333	End TOPAS Line 13 (20061129183459.raw)
29.11.2006	19:29/333	Stop logging EM1002
29.11.2006	19:31/333	Start logging EM1002
29.11.2006	19:31/333	Start TOPAS Line 14 (20061129193148.raw)
29.11.2006	20:06/334	Stop logging EM1002
29.11.2006	20:06/333	End TOPAS Line 14 (20061129193148.raw)
29.11.2006	20:08/333	Start TOPAS Line 15 (20061129200813.raw)
29.11.2006	20:11/333	Start logging EM1002
29.11.2006	21:09/333	Stop logging EM1002
29.11.2006	21:11/333	End TOPAS Line 15 (20061129200813.raw)
29.11.2006	21:11/333	Start TOPAS Line 16 (20061129211157.raw)
29.11.2006	21:15/333	Start logging EM1002
29.11.2006	21:46/333	End TOPAS Line 16 (20061129211157.raw)
29.11.2006	21:46/333	Start TOPAS Line 17 (20061129214609.raw)
29.11.2006	22:22/333	Stop logging EM1002
29.11.2006	22:29/333	Stop TOPAS Line 17 (20061129214609.raw)
29.11.2006	22:46/333	At station GS-06-146-01GC
29.11.2006	22:54/333	Gracity corer off deck
29.11.2006	23:12/333	Gracity corer on deck
29.11.2006	23:34/333	At new station
29.11.2006	23:34/333	Gravity corer off deck
29.11.2006	23:44/333	Gravity corer on deck
29.11.2006	23:44/333	Core empty
29.11.2006	23:59/333	At station GS-06-146-02GC
29.11.2006	23:59/333	Gravity corer off deck
30.11.2006	00:07/334	Gravity corer on deck
30.11.2006	00:23/334	At station GS-06-146-03GC
30.11.2006	00:23/334	Gravity corer off deck
30.11.2006	00:38/334	Gravity corer on deck

Table I

General survey log
UoB cruise no. GS-06-146 (IMR cruise no. 2006117)

Date	Time/Julian Day UTC	Subject
30.11.2006	00:45/334	Start TOPAS Line 18 (20061130004608.raw)
30.11.2006	00:45/334	Start logging EM1002
30.11.2006	06:39/334	Stop TOPAS Line 18 (20061130004608.raw)
30.11.2006	06:39/334	Stop logging EM1002
30.11.2006	06:40/334	Start TOPAS Line 19 (20061130064100.raw)
30.11.2006	06:44/334	Start logging EM1002
30.11.2006	07:37/334	Stop TOPAS Line 19 (20061130064100.raw)
30.11.2006	07:37/334	Stop logging EM1002
30.11.2006	07:37/334	Start TOPAS Line 20 (20061130073747.raw)
30.11.2006	07:38/334	Start logging EM1002
30.11.2006	10:26/334	End logging EM1002
30.11.2006	10:26/334	End TOPAS Line 20 (20061130101153.raw)
30.11.2006	10:26/334	Start TOPAS Line 21 (20061130102632.raw)
30.11.2006	10:27/334	Start logging EM1002
30.11.2006	11:05/334	Turn. Stop logging TOPAS Line 21
30.11.2006	11:05/334	Stop logging EM1002
30.11.2006	11:06/334	Start logging EM1002
30.11.2006	11:06/334	Start logging TOPAS Line 22
30.11.2006	11:06/334	Start transit to Aberdeen
30.11.2006	22:00/334	Stop logging EM1002
01.12.2006	05:06/335	"Outside" Aberdeen
01.12.2006	05:06/335	Stop logging TOPAS Line 22 (20061201033156.raw)
01.12.2006	07:22/335	Aberdeen harbour closed due to bad weather. Turn back towards Bergen.
01.12.2006	07:22/335	Start logging TOPAS Line 23 (20061201272254.raw)
01.12.2006	07:22/335	Start logging EM1002
02.12.2006	03:49/336	Turn. Stop logging TOPAS Line 23 (2006120203252.raw)
02.12.2006	03:50/336	Start logging TOPAS Line 24 (20061202035021.raw) change trace length to 150 ms
02.12.2006	09:24/336	End logging TOPAS Line 24 (20061202074007.raw), End of survey
02.12.2006	09:32/336	Stop logging EM1002, End of survey
02.12.2006	09:32/336	Transit to Begen
02.12.2006	12:00/336	In Bergen. End cruise

Table II

Core stations log
UoB Cruise no. GS-06-146 (IMR cruise no. 206117)

Date	Julian Day Time/	Subject	Water depth (m)	(WGS 84; Zone 31) Geographical coordinates		UTM coordinates (WGS 84; Zone 31)	
				Longitude Deg.	Latitude Deg.	Easting	Northing
29.11.2006	22:54/333	Gravity corer off deck at station 01 GC	145	58° 50.063' N	0° 28.707' E	6524353	354457
29.11.2006	23:12/333	Gravity corer on deck at station 01 GC					
29.11.2006	23:34/333	Gravity corer off deck at station 02 GC	146	58° 50.144' N	0° 28.657' E	6524500	354415
29.11.2006	23:44/333	Gravity corer on deck at station 02 GC					
30.11.2006	00:23/334	Gravity corer off deck at station 03 GC	143	58° 50.124' N	0° 28.677' E	6524466	354433
30.11.2006	00:38/334	Gravity corer on deck at station 03 GC					

Table III

Topas data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Line no.	File name	RAW file			SEG-Y file	Remarks
		size, Kb	date	time	size, Kb	
1	GS-06-146_01a_20061126172724	14407	26.11.2006	17:27:24		
1	GS-06-146_01b_20061126173740	105464	26.11.2006	17:37:40		
1	GS-06-146_01c_20061126183518	113681	26.11.2006	18:35:18		
1	GS-06-146_01d_20061126193901	100251	26.11.2006	19:39:01		
1	GS-06-146_01e_20061126203512	100156	26.11.2006	20:35:12		
1	GS-06-146_01f_20061126213131	104466	26.11.2006	21:31:31		
1	GS-06-146_01g_20061126223032	100132	26.11.2006	22:30:32		
1	GS-06-146_01h_20061126232803	100323	27.11.2006	23:28:03		
1	GS-06-146_01i_20061127002417	100156	27.11.2006	00:24:17		
1	GS-06-146_01j_20061127012214	100180	27.11.2006	01:22:14		
1	GS-06-146_01k_20061127021826	100084	27.11.2006	02:18:26		
1	GS-06-146_01l_20061127031433	102204	27.11.2006	03:14.33		
1	GS-06-146_01m_20061127041150	171491	27.11.2006	04:11:50		
1	GS-06-146_01n_20061127055421	100053	27.11.2006	05:54:21		
1	GS-06-146_01o_20061127070843	100287	27.11.2006	07:08:43		
1	GS-06-146_01p_20061127082313	14112	27.11.2006	08:23:13		
2	GS-06-146_02a_20061127083402	100089	27.11.2006	08:34:02		
2	GS-06-146_02b_20061127094824	100394	27.11.2006	09:48:24		
2	GS-06-146_02c_20061127110300	100143	27.11.2006	11:03:00		
2	GS-06-146_02d_20061127121800	100107	27.11.2006	12:18:00		
2	GS-06-146_02e_20061127133223	100143	27.11.2006	13:32:23		
2	GS-06-146_02f_20061127144656	100179	27.11.2006	14:46:56		
2	GS-06-146_02g_20061127160125	107217	27.11.2006	16:01:25		
2	GS-06-146_02h_20061127172106	100107	27.11.2006	17:21:06		
2	GS-06-146_02i_20061127183526	20575	27.11.2006	18:35:26		
3	GS-06-146_03a_20061127185101	80646	27.11.2006	18:51:01		
4	GS-06-146_04a_20061127195138	103913	27.11.2006	19:51:38		
4	GS-06-146_04b_20061127210853	101023	27.11.2006	21:08:53		
4	GS-06-146_04c_20061127222358	105421	27.11.2006	22:23:58		
4	GS-06-146_04d_20061127234220	100161	27.11.2006	23:42:20		
4	GS-06-146_04e_20061128005652	100107	28.11.2006	00:56:52		
4	GS-06-146_04f_20061128021119	106804	28.11.2006	02:11:19		
4	GS-06-146_04g_20061128033041	103195	28.11.2006	03:30:41		
4	GS-06-146_04h_20061128044722	53124	28.11.2006	04:47:22		
5	GS-06-146_05a_20061128052714	134290	28.11.2006	05:27:14		
5	GS-06-146_05b_20061128070704	38366	28.11.2006	07:07:04		

Table III

Topas data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Line no.	File name	RAW file			SEG-Y file	Remarks
		size, Kb	date	time	size, Kb	
6	GS-06-146_06_20061128073557	105260	28.11.2006	07:35:57		
7	GS-06-146_07a_20061128085425	100682	28.11.2006	08:54:23		
7	GS-06-146_07b_20061128100914	52819	28.11.2006	10:09:14		
7	GS-06-146_07c_20061128104838	100323	28.11.2006	10:48:38		
7	GS-06-146_07d_20061128120314	100735	28.11.2006	12:03:14		
7	GS-06-146_07e_20061128131807	126067	28.11.2006	13:18:07		
7	GS-06-146_07f_20061128145148	98491	28.11.2006	14:51:48		
8	GS-06-146_08a_20061128160731	110682	28.11.2006	16:07:31		
8	GS-06-146_08b_20061128172947	100143	28.11.2006	17:29:47		
8	GS-06-146_08c_20061128184415	100179	28.11.2006	18:44:15		
8	GS-06-146_08d_20061128195841	78922	28.11.2006	19:58:41		
9	GS-06-146_09a_20061128205731	100143	28.11.2006	20:57:31		
9	GS-06-146_09b_20061128221205	102890	28.11.2006	22:12:05		
9	GS-06-146_09c_20061128232835	105152	28.11.2006	23:28:35		
9	GS-06-146_09d_20061129004645	100179	29.11.2006	00:46:45		
9	GS-06-146_09e_20061129020115	102190	29.11.2006	02:01:15		
9	GS-06-146_09f_20061129031713	34542	29.11.2006	03:17:13		
10	GS-06-146_10a_20061129034354	100466	29.11.2006	03:43:54		
10	GS-06-146_10b_20061129045836	100107	29.11.2006	04:58:36		
10	GS-06-146_10c_20061129061300	111382	29.11.2006	6:13:00		
11	GS-06-146_11a_20061129073600	90484	29.11.2006	07:36:00		
12	GS-06-146_12a_20061129084318	105816	29.11.2006	08:43:18		
12	GS-06-146_12b_20061129100157	121346	29.11.2006	10:01:57		
12	GS-06-146_12c_20061129113210	100089	29.11.2006	11:32:10		
12	GS-06-146_12d_20061129124634	100215	29.11.2006	12:46:34		
12	GS-06-146_12e_20061129140106	101651	29.11.2006	14:01:06		
12	GS-06-146_12f_20061129151640	64757	29.11.2006	15:16:40		
13	GS-06-146_13a_20061129160614	100053	29.11.2006	16:06:14		
13	GS-06-146_13b_20061129172035	100125	29.11.2006	17:20:35		
13	GS-06-146_13c_20061129183459	73213	29.11.2006	18:34:59		
14	GS-06-146_14a_20061129193148	45835	29.11.2006	19:31:48		

Table III

Topas data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Line no.	File name	RAW file			SEG-Y file	Remarks
		size, Kb	date	time	size, Kb	
15	GS-06-146_15a_20061129200813	85511	29.11.2006	20:08:13		
16	GS-06-146_16a_20061129211157	45727	29.11.2006	21:11:57		
17	GS-06-146_17a_20061129214609	58312	29.11.2006	21:46:09		
18	GS-06-146_18a_20061130004608	112908	30.11.2006	00:46:08		
18	GS-06-146_18b_20061130021009	100484	30.11.2006	02:10:09		
18	GS-06-146_18c_20061130032450	112225	30.11.2006	03:24:50		
18	GS-06-146_18d_20061130044815	100107	30.11.2006	04:48:15		
18	GS-06-146_18e_20061130060240	51454	30.11.2006	06:02:40		
19	GS-06-146_19a_20061130064100	76265	30.11.2006	06:41:00		
20	GS-06-146_20a_20061130073747	107199	30.11.2006	07:37:47		
20	GS-06-146_20b_20061130085725	100215	30.11.2006	08:57:25		
20	GS-06-146_20c_20061130101153	19174	30.11.2006	10:11:53		
21	GS-06-146_21_20061130102632	52100	30.11.2006	10:26:32		
22	GS-06-146_22a_20061130110853	102728	30.11.2006	11:08:53		
22	GS-06-146_22b_20061130122533	24309	30.11.2006	12:25:33		
22	GS-06-146_22c_20061130124349	100287	30.11.2006	12:43:49		
22	GS-06-146_22d_20061130135825	100143	30.11.2006	13:58:25		
22	GS-06-146_22e_20061130151250	100197	30.11.2006	15:12:50		
22	GS-06-146_22f_20061130162722	102980	30.11.2006	16:27:22		
22	GS-06-146_22g_20061130174355	184595	30.11.2006	17:43:55		
22	GS-06-146_22h_20061130200103	100089	30.11.2006	20:01:03		
22	GS-06-146_22i_20061130211526	100305	30.11.2006	21:15:26		
22	GS-06-146_22j_20061130223001	105421	30.11.2006	22:30:01		
22	GS-06-146_22k_20061130234827	100089	30.11.2006	23:48:27		
22	GS-06-146_22l_20061201010252	100251	01.12.2006	01:02:52		
22	GS-06-146_22m_20061201021731	100107	01.12.2006	02:17:31		
22	GS-06-146_22n_20061201033156	128671	01.12.2006	03:31:56		
23	GS-06-146_23a_20061201072254	138311	01.12.2006	07:22:54		
23	GS-06-146_23b_20061201090548	101543	01.12.2006	09:05:48		
23	GS-06-146_23c_20061201102118	100843	01.12.2006	10:21:18		
23	GS-06-146_23d_20061201113617	100538	01.12.2006	11:36:17		
23	GS-06-146_23e_20061201125102	100592	01.12.2006	12:51:02		
23	GS-06-146_23f_20061201140553	102064	01.12.2006	14:05:53		
23	GS-06-146_23g_20061201152143	100197	01.12.2006	15:21:43		
23	GS-06-146_23h_20061201163609	104559	01.12.2006	16:36:09		
23	GS-06-146_23i_20061201175350	100161	01.12.2006	17:53:50		
23	GS-06-146_23j_20061201190816	105888	01.12.2006	19:08:16		
23	GS-06-146_23k_20061201202752	28869	01.12.2006	20:27:52		
23	GS-06-146-23l_20061201204933	52766	01.12.2006	20:49:33		

Table III

Topas data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Line no.	File name	RAW file			SEG-Y file	Remarks
		size, Kb	date	time	size, Kb	
23	GS-06-146_23m_20061201215108	100209	01.12.2006	21:51:08		
23	GS-06-146_23n_20061201234139	100439	01.12.2006	23:41:39		
23	GS-06-146_23o_20061202013229	100052	02.12.2006	01:32:29		
23	GS-06-146_23p_20061202032252	24019	02.12.2006	03:22:52		
24	GS-06-146_24a_20061202035021	100448	02.12.2006	03:50:21		
24	GS-06-146_24b_20061202050505	100628	02.12.2006	05:05:05		
24	GS-06-146_24c_20061202061952	108024	02.12.2006	06:19:52		
24	GS-06-146_24d_20061202074007	140178	02.12.2006	07:40:07		

Table IV

Multibeam data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Project Nordsjoen1002_GS146-06

Filename	*Size (kb)*	*Instrument*
0000_20061126_172008_ShipName.all	15 770 440	EM1002
0001_20061126_175008_ShipName.all	19 485 584	EM1002
0002_20061126_182008_ShipName.all	18 626 262	EM1002
0003_20061126_185008_ShipName.all	18 192 694	EM1002
0004_20061126_192008_ShipName.all	19 319 372	EM1002
0005_20061126_195008_ShipName.all	18 712 060	EM1002
0006_20061126_202008_ShipName.all	19 060 970	EM1002
0007_20061126_205008_ShipName.all	18 984 348	EM1002
0008_20061126_212008_ShipName.all	19 002 074	EM1002
0009_20061126_215008_ShipName.all	19 150 374	EM1002
0010_20061126_222008_ShipName.all	19 498 528	EM1002
0011_20061126_225008_ShipName.all	19 704 396	EM1002
0012_20061126_232008_ShipName.all	20 179 646	EM1002
0013_20061126_235008_ShipName.all	20 717 904	EM1002
0014_20061127_002008_ShipName.all	21 333 532	EM1002
0015_20061127_005008_ShipName.all	22 927 564	EM1002
0016_20061127_012008_ShipName.all	25 040 080	EM1002
0017_20061127_015008_ShipName.all	27 454 750	EM1002
0018_20061127_022008_ShipName.all	28 366 990	EM1002
0019_20061127_025008_ShipName.all	28 914 920	EM1002
0020_20061127_032008_ShipName.all	29 563 212	EM1002
0021_20061127_035008_ShipName.all	28 991 604	EM1002
0022_20061127_042008_ShipName.all	28 222 644	EM1002
0023_20061127_045008_ShipName.all	27 975 974	EM1002
0024_20061127_052008_ShipName.all	27 790 126	EM1002
0025_20061127_055008_ShipName.all	28 105 478	EM1002
0026_20061127_062008_ShipName.all	28 477 158	EM1002
0027_20061127_065008_ShipName.all	28 610 168	EM1002
0028_20061127_072008_ShipName.all	28 771 284	EM1002
0029_20061127_075008_ShipName.all	28 885 806	EM1002
0030_20061127_082008_ShipName.all	28 894 390	EM1002
0031_20061127_085008_ShipName.all	28 692 592	EM1002
0032_20061127_092008_ShipName.all	28 416 780	EM1002
0033_20061127_095008_ShipName.all	28 253 394	EM1002
0034_20061127_102008_ShipName.all	27 967 780	EM1002
0035_20061127_105008_ShipName.all	27 743 946	EM1002
0036_20061127_112008_ShipName.all	27 766 702	EM1002
0037_20061127_115008_ShipName.all	27 859 118	EM1002
0038_20061127_122008_ShipName.all	27 454 996	EM1002
0039_20061127_125008_ShipName.all	27 636 436	EM1002
0040_20061127_132008_ShipName.all	26 276 378	EM1002
0041_20061127_135008_ShipName.all	26 714 432	EM1002
0042_20061127_142008_ShipName.all	26 435 054	EM1002
0043_20061127_145008_ShipName.all	26 832 716	EM1002
0044_20061127_152008_ShipName.all	27 006 444	EM1002

Table IV

Multibeam data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Project Nordsjoen1002_GS146-06

Filename	*Size (kb)*	*Instrument*
0045_20061127_155008_ShipName.all	27 351 342	EM1002
0046_20061127_162008_ShipName.all	27 630 874	EM1002
0047_20061127_165008_ShipName.all	25 285 738	EM1002
0048_20061127_172008_ShipName.all	27 100 048	EM1002
0049_20061127_175008_ShipName.all	26 670 644	EM1002
0050_20061127_182008_ShipName.all	27 137 944	EM1002
0051_20061127_185008_ShipName.all	22 827 814	EM1002
0052_20061127_192008_ShipName.all	21 712 042	EM1002
0053_20061127_195008_ShipName.all	24 491 564	EM1002
0054_20061127_202008_ShipName.all	26 748 976	EM1002
0055_20061127_205008_ShipName.all	26 248 552	EM1002
0056_20061127_212008_ShipName.all	26 574 666	EM1002
0057_20061127_215008_ShipName.all	27 188 424	EM1002
0058_20061127_222008_ShipName.all	29 061 766	EM1002
0059_20061127_225008_ShipName.all	28 104 366	EM1002
0060_20061127_232008_ShipName.all	27 079 200	EM1002
0061_20061127_235008_ShipName.all	26 585 732	EM1002
0062_20061128_002008_ShipName.all	26 331 630	EM1002
0063_20061128_005008_ShipName.all	26 014 294	EM1002
0064_20061128_012008_ShipName.all	26 230 328	EM1002
0065_20061128_015008_ShipName.all	26 575 074	EM1002
0066_20061128_022008_ShipName.all	27 321 618	EM1002
0067_20061128_025008_ShipName.all	27 424 154	EM1002
0068_20061128_032008_ShipName.all	27 389 114	EM1002
0069_20061128_035008_ShipName.all	27 540 962	EM1002
0070_20061128_042008_ShipName.all	27 823 636	EM1002
0071_20061128_045008_ShipName.all	27 630 782	EM1002
0072_20061128_052008_ShipName.all	27 775 152	EM1002
0073_20061128_055008_ShipName.all	27 564 154	EM1002
0074_20061128_062008_ShipName.all	27 384 384	EM1002
0075_20061128_065008_ShipName.all	27 729 754	EM1002
0076_20061128_072008_ShipName.all	27 157 094	EM1002
0077_20061128_075008_ShipName.all	26 073 570	EM1002
0078_20061128_082008_ShipName.all	25 378 086	EM1002
0079_20061128_085008_ShipName.all	26 521 612	EM1002
0080_20061128_092008_ShipName.all	26 241 508	EM1002
0081_20061128_095008_ShipName.all	26 370 224	EM1002
0082_20061128_102008_ShipName.all	26 974 026	EM1002
0083_20061128_105008_ShipName.all	26 897 214	EM1002
0084_20061128_112008_ShipName.all	27 263 786	EM1002
0085_20061128_115008_ShipName.all	27 440 474	EM1002
0086_20061128_122008_ShipName.all	26 963 350	EM1002
0087_20061128_125008_ShipName.all	27 333 298	EM1002
0088_20061128_132008_ShipName.all	28 722 600	EM1002
0089_20061128_135008_ShipName.all	26 893 606	EM1002

Table IV

Multibeam data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Project Nordsjoen1002_GS146-06

Filename	*Size (kb)*	*Instrument*
0090_20061128_142008_ShipName.all	26 853 200	EM1002
0091_20061128_145008_ShipName.all	27 248 658	EM1002
0092_20061128_152008_ShipName.all	27 443 204	EM1002
0093_20061128_155008_ShipName.all	13 958 352	EM1002
0094_20061128_160742_ShipName.all	27 280 374	EM1002
0095_20061128_163743_ShipName.all	26 892 980	EM1002
0096_20061128_170743_ShipName.all	27 176 084	EM1002
0097_20061128_173743_ShipName.all	26 987 292	EM1002
0098_20061128_180743_ShipName.all	26 520 332	EM1002
0099_20061128_183743_ShipName.all	26 072 302	EM1002
0100_20061128_190743_ShipName.all	25 839 814	EM1002
0101_20061128_193743_ShipName.all	25 407 202	EM1002
0102_20061128_200743_ShipName.all	25 873 906	EM1002
0103_20061128_203743_ShipName.all	25 708 588	EM1002
0104_20061128_210743_ShipName.all	26 301 376	EM1002
0105_20061128_213743_ShipName.all	26 242 116	EM1002
0106_20061128_220743_ShipName.all	26 313 964	EM1002
0107_20061128_223743_ShipName.all	27 003 470	EM1002
0108_20061128_230743_ShipName.all	27 167 708	EM1002
0109_20061128_233743_ShipName.all	26 646 210	EM1002
0110_20061129_000743_ShipName.all	26 691 624	EM1002
0111_20061129_003743_ShipName.all	26 727 878	EM1002
0112_20061129_010743_ShipName.all	27 659 390	EM1002
0113_20061129_013743_ShipName.all	27 738 604	EM1002
0114_20061129_020743_ShipName.all	27 210 346	EM1002
0115_20061129_023743_ShipName.all	27 661 188	EM1002
0116_20061129_030743_ShipName.all	26 989 570	EM1002
0117_20061129_033743_ShipName.all	4 723 764	EM1002
0118_20061129_034400_ShipName.all	26 846 430	EM1002
0119_20061129_041400_ShipName.all	26 894 518	EM1002
0120_20061129_044400_ShipName.all	27 228 630	EM1002
0121_20061129_051400_ShipName.all	26 792 610	EM1002
0122_20061129_054400_ShipName.all	27 480 022	EM1002
0123_20061129_061400_ShipName.all	27 756 072	EM1002
0124_20061129_064400_ShipName.all	28 424 644	EM1002
0125_20061129_071400_ShipName.all	23 262 374	EM1002
0126_20061129_073729_ShipName.all	28 911 238	EM1002
0127_20061129_080729_ShipName.all	28 809 550	EM1002
0128_20061129_083729_ShipName.all	28 800 666	EM1002
0129_20061129_090729_ShipName.all	28 973 254	EM1002
0130_20061129_093729_ShipName.all	27 925 342	EM1002
0131_20061129_100729_ShipName.all	27 431 818	EM1002
0132_20061129_103729_ShipName.all	26 388 440	EM1002
0133_20061129_110729_ShipName.all	13 204 926	EM1002
0134_20061129_114506_ShipName.all	26 800 022	EM1002

Table IV

Multibeam data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Project Nordsjoen1002_GS146-06

Filename	*Size (kb)*	*Instrument*
0135_20061129_121506_ShipName.all	26 610 416	EM1002
0136_20061129_124506_ShipName.all	27 501 812	EM1002
0137_20061129_131506_ShipName.all	26 278 192	EM1002
0138_20061129_134506_ShipName.all	26 692 626	EM1002
0139_20061129_141506_ShipName.all	26 693 694	EM1002
0140_20061129_144506_ShipName.all	26 406 386	EM1002
0141_20061129_151506_ShipName.all	26 482 794	EM1002
0142_20061129_154507_ShipName.all	17 352 128	EM1002
0143_20061129_160603_ShipName.all	24 026 998	EM1002
0144_20061129_163603_ShipName.all	24 445 610	EM1002
0145_20061129_170604_ShipName.all	25 416 210	EM1002
0146_20061129_173604_ShipName.all	26 070 396	EM1002
0147_20061129_180604_ShipName.all	25 270 614	EM1002
0148_20061129_183604_ShipName.all	23 092 118	EM1002
0149_20061129_190603_ShipName.all	19 394 212	EM1002
0150_20061129_193152_ShipName.all	24 621 758	EM1002
0151_20061129_200151_ShipName.all	2 992 582	EM1002
0152_20061129_201122_ShipName.all	24 108 646	EM1002
0153_20061129_204122_ShipName.all	23 355 110	EM1002
0154_20061129_211522_ShipName.all	24 957 792	EM1002
0155_20061129_214522_ShipName.all	23 945 634	EM1002
0156_20061129_221522_ShipName.all	5 078 378	EM1002
0157_20061130_004558_ShipName.all	25 139 158	EM1002
0158_20061130_011558_ShipName.all	24 694 170	EM1002
0159_20061130_014558_ShipName.all	26 360 702	EM1002
0160_20061130_021558_ShipName.all	18 226 944	EM1002
0161_20061130_024558_ShipName.all	24 873 378	EM1002
0162_20061130_031558_ShipName.all	24 116 384	EM1002
0163_20061130_034558_ShipName.all	16 625 704	EM1002
0164_20061130_041558_ShipName.all	23 577 098	EM1002
0165_20061130_044558_ShipName.all	25 575 606	EM1002
0166_20061130_051558_ShipName.all	23 892 562	EM1002
0167_20061130_054558_ShipName.all	24 856 184	EM1002
0168_20061130_061558_ShipName.all	20 169 564	EM1002
0169_20061130_064447_ShipName.all	27 678 862	EM1002
0170_20061130_071447_ShipName.all	20 800 364	EM1002
0171_20061130_073852_ShipName.all	27 502 236	EM1002
0172_20061130_080852_ShipName.all	26 841 242	EM1002
0173_20061130_083852_ShipName.all	26 582 984	EM1002
0174_20061130_090852_ShipName.all	26 265 694	EM1002
0175_20061130_093852_ShipName.all	26 273 468	EM1002
0176_20061130_100852_ShipName.all	14 859 886	EM1002
0177_20061130_102734_ShipName.all	26 084 422	EM1002
0178_20061130_105734_ShipName.all	7 502 944	EM1002
0179_20061130_110842_ShipName.all	25 070 860	EM1002

Table IV

Multibeam data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Project Nordsjoen1002_GS146-06

Filename	*Size (kb)*	*Instrument*
0180_20061130_113842_ShipName.all	25 412 168	EM1002
0181_20061130_120842_ShipName.all	25 806 394	EM1002
0182_20061130_123842_ShipName.all	26 220 632	EM1002
0183_20061130_130842_ShipName.all	26 080 936	EM1002
0184_20061130_133842_ShipName.all	25 837 862	EM1002
0185_20061130_140842_ShipName.all	25 738 260	EM1002
0186_20061130_143842_ShipName.all	24 942 202	EM1002
0187_20061130_150842_ShipName.all	23 538 764	EM1002
0188_20061130_153842_ShipName.all	26 054 268	EM1002
0189_20061130_160842_ShipName.all	26 575 900	EM1002
0190_20061130_163842_ShipName.all	23 198 144	EM1002
0191_20061130_170842_ShipName.all	26 802 314	EM1002
0192_20061130_173842_ShipName.all	27 014 828	EM1002
0193_20061130_180842_ShipName.all	27 559 780	EM1002
0194_20061130_183842_ShipName.all	28 441 650	EM1002
0195_20061130_190842_ShipName.all	27 231 516	EM1002
0196_20061130_193842_ShipName.all	6 354 512	EM1002
0197_20061201_081101_ShipName.all	31 841 270	EM1002
0198_20061201_084101_ShipName.all	30 337 356	EM1002
0199_20061201_091101_ShipName.all	31 598 988	EM1002
0200_20061201_094101_ShipName.all	34 185 702	EM1002
0201_20061201_101101_ShipName.all	33 369 326	EM1002
0202_20061201_104101_ShipName.all	32 505 878	EM1002
0203_20061201_111101_ShipName.all	30 278 154	EM1002
0204_20061201_114101_ShipName.all	29 069 246	EM1002
0205_20061201_121101_ShipName.all	29 498 178	EM1002
0206_20061201_124101_ShipName.all	30 069 332	EM1002
0207_20061201_131101_ShipName.all	31 175 982	EM1002
0208_20061201_134101_ShipName.all	29 396 138	EM1002
0209_20061201_141101_ShipName.all	28 764 186	EM1002
0210_20061201_144101_ShipName.all	27 529 986	EM1002
0211_20061201_151101_ShipName.all	26 773 554	EM1002
0212_20061201_154101_ShipName.all	26 314 340	EM1002
0213_20061201_161101_ShipName.all	26 099 782	EM1002
0214_20061201_164101_ShipName.all	26 043 038	EM1002
0215_20061201_171101_ShipName.all	26 056 136	EM1002
0216_20061201_174101_ShipName.all	26 351 316	EM1002
0217_20061201_181101_ShipName.all	26 950 054	EM1002
0218_20061201_184101_ShipName.all	28 042 600	EM1002
0219_20061201_191101_ShipName.all	28 683 106	EM1002
0220_20061201_194101_ShipName.all	29 226 742	EM1002
0221_20061201_201101_ShipName.all	30 071 678	EM1002
0222_20061201_204101_ShipName.all	31 947 918	EM1002
0223_20061201_211101_ShipName.all	32 306 230	EM1002
0224_20061201_214101_ShipName.all	31 279 902	EM1002

Table IV

Multibeam data files
UoB Cruise no. GS-06-146 (IMR Cruise no. 2006117)

Project Nordsjoen1002_GS146-06

Filename	*Size (kb)*	*Instrument*
0225_20061201_221101_ShipName.all	30 663 862	EM1002
0226_20061201_224101_ShipName.all	30 071 002	EM1002
0227_20061201_231101_ShipName.all	29 331 858	EM1002
0228_20061201_234101_ShipName.all	28 631 396	EM1002
0229_20061202_001101_ShipName.all	28 783 744	EM1002
0230_20061202_004101_ShipName.all	29 367 508	EM1002
0231_20061202_011101_ShipName.all	27 723 056	EM1002
0232_20061202_014101_ShipName.all	24 853 996	EM1002
0233_20061202_021101_ShipName.all	22 754 908	EM1002
0234_20061202_024101_ShipName.all	22 083 630	EM1002
0235_20061202_031101_ShipName.all	21 857 292	EM1002
0236_20061202_034101_ShipName.all	21 744 988	EM1002
0237_20061202_041101_ShipName.all	21 811 174	EM1002
0238_20061202_044101_ShipName.all	21 939 626	EM1002
0239_20061202_051101_ShipName.all	22 069 768	EM1002
0240_20061202_054101_ShipName.all	22 130 458	EM1002
0241_20061202_061101_ShipName.all	22 138 920	EM1002
0242_20061202_064101_ShipName.all	21 951 430	EM1002
0243_20061202_071101_ShipName.all	22 141 806	EM1002
0244_20061202_074101_ShipName.all	22 972 240	EM1002
0245_20061202_081101_ShipName.all	22 284 016	EM1002
0246_20061202_084101_ShipName.all	21 946 086	EM1002
0247_20061202_091101_ShipName.all	15 389 334	EM1002

APPENDIX I

Cores Station Log Sheets

STATION	**01_GC**	GS-06-146

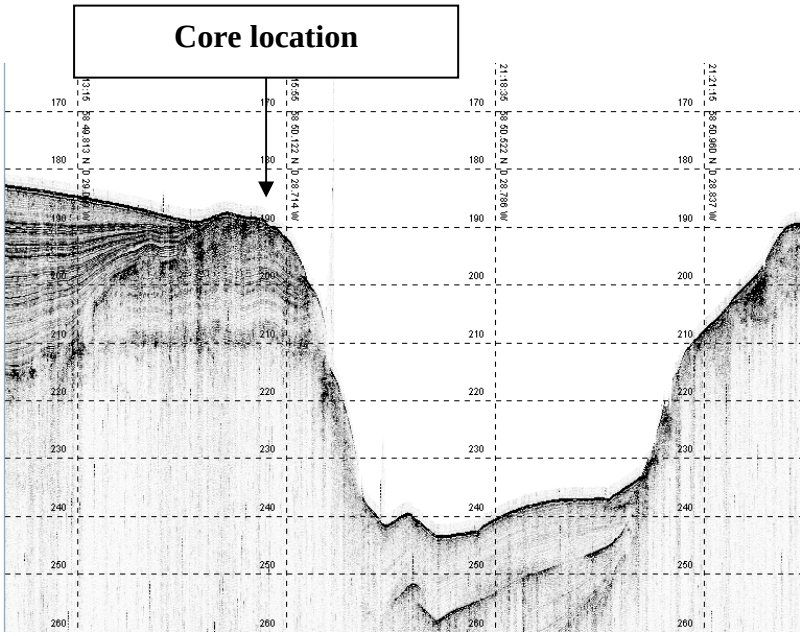
Date:	29.11.2006	UTC time:	22:54
Latitude:	58° 50.063'N	Longitude:	0° 28.707' W
Water depth:	145.1 m	Location:	North Sea

Core number:	GS-06-146-01GC	Core Barrel length:	2 m
		Apparent penetration:	
		Core length:	Ca 90 cm

Observations		
Core Information:		
Total No of section: 1		
Section No:	Labelling: GS-06-146-01GC	Length: ca 90 cm
Other information:		
Weather report:rough sea, wind speed 28 kt,		

Done on the boat with the core
GC:

Summary of sedimentological and physical observations



Core locations GS-06-146-01_02_03GC

STATION	**02_GC**	GS-06-146

Date:	29.11.2006	UTC time:	23:59
Latitude:	58^{o} 50.125'N	Longitude:	0^{o} 28.676' W
Water depth:	142,9 m	Location:	North Sea

Core number:	GS-06-146-02GC	Core Barrel length:	2 m
		Apparent penetration:	
		Core length:	Ca 20 cm

Observations		
Core Information:		
Total No of section: 1		
Section No:	Labelling: GS-06-146-02GC	Length: ca 20 cm
Other information: Core catcher still on barrel.		
Weather report:rough sea, windspeed 28 kt,		

Done on the boat with the core
GC:

Summary of sedimentological and physical observations

STATION	**03_GC**	GS-06-146

Date:	29.11.2006	UTC time:	00:23
Latitude:	58° 50.124'N	Longitude:	0° 28.677' W
Water depth:	142,9 m	Location:	North Sea

Core number:	GS-06-146-03GC	Core Barel length:	1,5 m
		Apparent penetration:	
		Core length:	Ca 30 cm

Observations		
Core Information:		
Total No of section: 2		
Section No: A B	Labelling: GS-06-146-03A-GC GS-06-146-03B-GC	Length: ca 20 cm Ca 10 cm
Other information: Section B is left in the core catcher. Packed in a zip-lock plastic bag. A shell was found in the section brake. The shell is divided between section A and B. Possibility of dating?		
Weather report:rough sea, windspeed 26 kt,		

Done on the boat with the core
GC:

Summary of sedimentological and physical observations

Bibliographic reference:
Nygård, A., Hjelstuen, B.O., Monsen, S., Brendryen, J., Mardal, I., Clark, C., Hughes, A., Levine, R., 2006. Marine Geological Cruise Report. North Sea/Fladen area. Report No. 100-04/06, Department of Earth Science, University of Bergen, Bergen, Norway, 29 pp.

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