HERMES 2008
CORALFISH2008
CRUISE REPORT

Cruise 64PE 291-292, Texel-Cork-Texel,
10 June - 16 July 2008

Belgica Mound Province
Hatton Bank

Biodiversity, ecosystem functioning and food web complexity of cold water coral reefs in the NE Atlantic, and the relation between fish and coldwater corals.
&
Testing the MOVE.

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INTRODUCTION

Reef-forming colonial coldwater or deep water corals have a patchy distribution along the whole European Atlantic margin from north Norway to Mauritania. Even in the Mediterranean with its high deep-sea temperature of 13 degrees Celsius these ‘coldwater' corals are present, although much rarer than in the Atlantic. The main species in the Atlantic are *Lophelia pertusa* and *Madrepora oculata*, often growing together and sometimes even growing on each other. At some places these corals form patchy thickets of a few meters wide and about 1 meter high (e.g. Galicia Bank) in a hydrodynamic area, in other areas they can cover a large area with a more or less closed blanket of corals (e.g. Rockall Bank). In the Rockall Bank area these corals have formed many sea mounds, some of them 200-300m high. In the northern areas the corals can form real reefs, comparable to tropical corals, of kilometers long and tens of meters high, with colonies looking like huge cauliflowers with a diameter of about 2 meters (e.g. Sula- and Røstreef, Norway). In the last decades our knowledge of the distribution, biodiversity and functioning of these coral communities has grown considerably in particular through projects funded by the European Commission, e.g. ACES, ECOMOUND, GEOMOUND and HERMES. However there are still many questions to solve and many areas to map.

Cold-water coral ecosystems are thought to be very rich in fauna, especially sponges, crustaceans, echinoderms and fishes. Therefore these ecosystems are classified as "hotspots for biodiversity". The HERMES project, financed by the EC, is set up primarily to investigate marine "hotspots of biodiversity" like cold-water coral reefs, to study how these ecosystems function, and to assess their importance for the oceanic environment. Apart from enlarging our scientific knowledge and understanding of the functioning of these reefs, it is also important that the new data can be used to set up rules for conservation or exploitation (e.g. fisheries, oil and gas exploration) for these vulnerable systems.

Within another project CORALFISH that is also funded by the EC and that started on 1 June 2008 the relation between fish and these coldwater coral communities is studied. Do these communities have an important role for certain fish populations as nurseries, as hiding and/or feeding places?

PROGRAM and GOALS for the HERMES/CORALFISH2008 EXPEDITION

During the past three years the department of Marine Ecology (MEE) of NIOZ has done research on Rockall Bank and Porcupine Bank (west of Ireland), Mingulay Reef (SE of the Outer Hebrides, Scotland) and on Tisler Reef (SW Sweden). For this expedition the targets were to study the coral communities of the Belgica Mound Province in the Porcupine Bight (first leg) and Hatton Bank (second leg).

BELGICA MOUNDS

The Belgica Mounds are situated on the eastern side of the Porcupine Bight. Several studies targeting these coral communities have been carried out. A summary of the

research done so far and extra information based on ROV video footage can been found in Foubert et al. (2005). In December 2006 the area was designated as a special protected area of Ireland, and a special permit from Ireland is needed to carry out scientific research. Through the kind help of Dr. Eamonn Kelly (*Wildlife Inspector*) this permit was received on short notice. Our goals for this area were to obtain some samples to study the biodiversity, biomass and density of macrobenthos, to study the foodweb by analyses of stable isotopes of selected benthic species, and to research the possible food resources. For Rockall Bank and Mingulay Reef we had found a clear correlation between the tidal currents, and temperature and fluorescence. From this we concluded that there is a regular lateral transport and downwelling of fresh material from the surface or the shallows to the coral community (Duineveld et al, 2007; Davies et al, submitted). For the Belgica Mounds we wanted to see if we could find any evidence that would also point to such a food transport mechanism.
For the CORALFISH project the fish population within the coral community will be studied by video surveys and by deploying a lander with baited HD Video camera. Further for the BIOFUN project funded by the European Science Foundation the MOVE, a deep-sea crawler, was tested outside the Belgica Mound Province. The MOVE will be used during the BIOFUN expedition to the Galicia Bank in September 2008.

HATTON BANK

Hatton Bank is a large bank situated in the mid NE Atlantic Ocean. Together with the equally large Rockall Bank from which it is separated by a relatively shallow depression with a maximum depth of 1200m, it forms the Rockall Plateau. The top of the Bank lies at about 500m depth. The bottom fauna of Hatton Bank is not very well studied, and Roberts (2008) gives a first detailed study of some stations at Hatton Bank on the basis of seabed photographs taken during a baseline habitat mapping exercise in Aug 2005. Although several of the 13 photographic stations showed evidence of coral framework, it is difficult to assess the extension and abundance of coldwater corals on Hatton Bank from these data. Another source of coldwater occurrences at Hatton Bank is the database of the group of A Freiwald (Erlangen University), which was kindly offered to us. It contained 14 records of live corals, discovered by dredge, and originally reported by Chesher (1987), Long et al, (1999), Spiro et al. (2000) and Freiwald et al. (2002).

Hatton Bank is also an important deep-sea fishing area especially for the Spanish fishing fleet. In 2005, ICES reviewed the current knowledge of *Lophelia pertusa* distribution on Hatton Bank (ICES, 2005) following the request made by NEAFC. On the basis of this report NEAFC made a decision to prohibit bottom trawling and fishing with static gear (including bottom gillnets and longlines) on part of the bank from 1 January 2007 (http://www.neafc.org/measures/measures-2007/docs/rec-9-2007_hatton-rockall-closures.pdf). In 2007, ICES updated and corrected the information on *Lophelia pertusa* on Hatton Bank (Durán Muñoz et al., 2007a). NEAFC reacted by deciding to extend the Hatton closure to include the southern section of the bank from 1 January 2008 (NEAFC Recommendation IX.2007 and IX.2008, EC Regulation No 40/2008) (http://www.neafc.org/measures/current_measures/docs/09-rec_corals.pdf). Durán Muñoz et al. (2008) then presented new information and suggested an extra area for closure to fisheries on Hatton bank.

The goal of our expedition within the framework of the European HERMES project was to study part of Hatton Bank quite intensively to discover how extensive and abundant cold-water corals on Hatton Bank really are. Further we wanted to obtain enough data of the coral community to be able to compare the abundance, biomass, biodiversity and foodweb with those of Rockall Bank. We also tried to find evidence for a food source for these rich communities, as we had found at Rockall Bank and Mingulay Reef. And finally, in the framework of the European project CoralFish, we wanted to learn more about the importance of these coral communities for fish.

RESEARCH AREA & METHODS

Research area

For the first leg of the cruise the Belgica Mounds were visited, while during the second leg a part of Hatton Bank was the research area (Fig. 1). A list of all activities with dates and positions is given in the appendix.

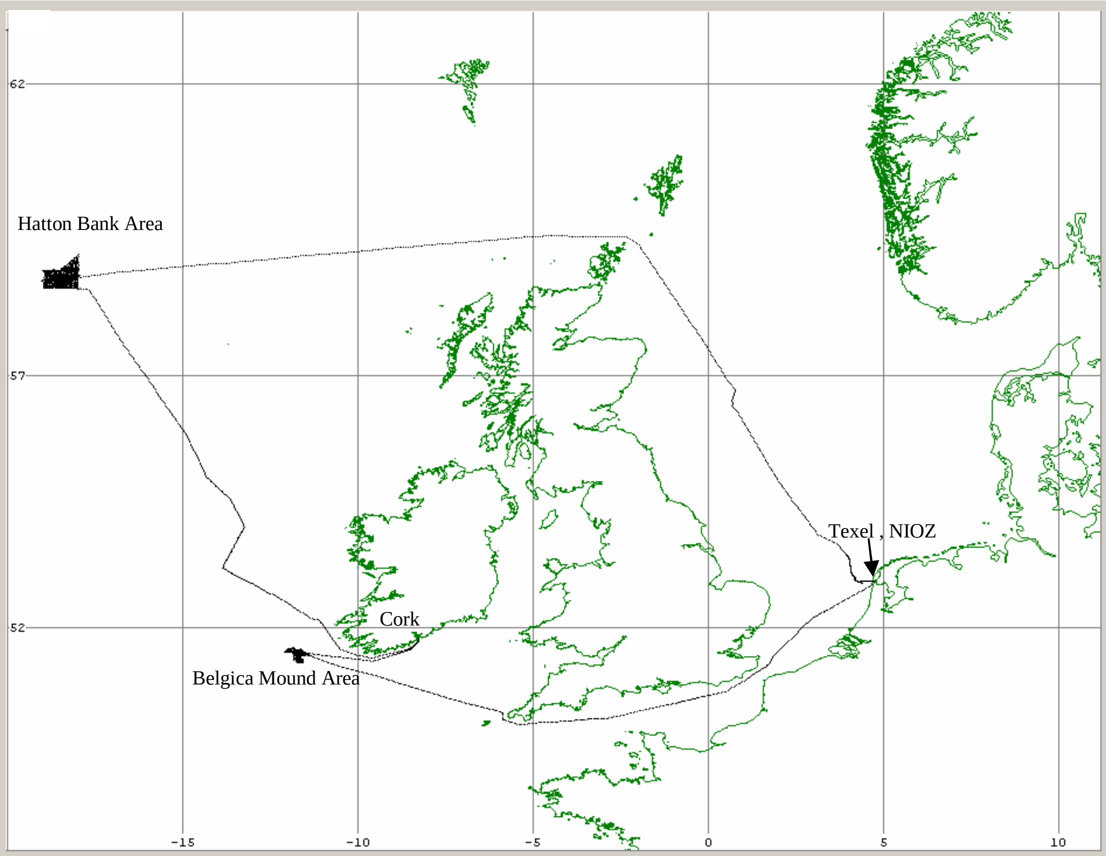


Fig. 1 The track of the RV Pelagia and the positions of the two main study sites, being the Belgica Mounds and part of Hatton Bank.

Multibeam

In 2006 Royal NIOZ acquired a new Kongsberg EM 300 multibeam echosounder for its research vessel Pelagia. The system is a 30 kHz echo sounder with a 1^{o} opening angle for the transmitter and a 2^{o} angle for the receiver. The transducers are mounted in a gondola attached along the port side of the hull. It uses 135 beams with a maximum coverage sector of 150^{o}. The transmit fan is split into a maximum of 9 individual sectors that can be steered independently to compensate for ships roll, pitch and yaw. This is in order to get the best fit of the ensonified line perpendicular to the ships track and thus a uniform coverage of the sea bed. The ships motion is registered by a Kongsberg MRU-5 reference unit, and its position and heading by two GPS antennas. Motion and position is combined in a Seapath 200 ships attitude processing unit and sent to the transmitter and receiver unit (TRU). The system is synchronized by means of a 1 pulse per second signal produced by the Seapath 200 which is sent to the TRU. Data from the receiver transducer and the ships attitude are combined in an acquisition computer (Kongsberg HWS 10). For data acquisition Kongsbergs' SIS

(Seafloor Information System) software is used. The sound velocity profile is calculated on the basis of a CTD profile obtained with a Seabird CTD system. The sound velocity near the transducers in the gondola is measured by a Reson SVP 70 sound velocity probe.

With the multibeam part of the Belgica Mounds and Hatton Bank were surveyed (Fig. 2). In principal every night was used to multibeam these areas and the surroundings. From the xyz data bathymetric maps were drawn with the software program Surfer 8. Results are shown in Fig. 3 and Fig. 4

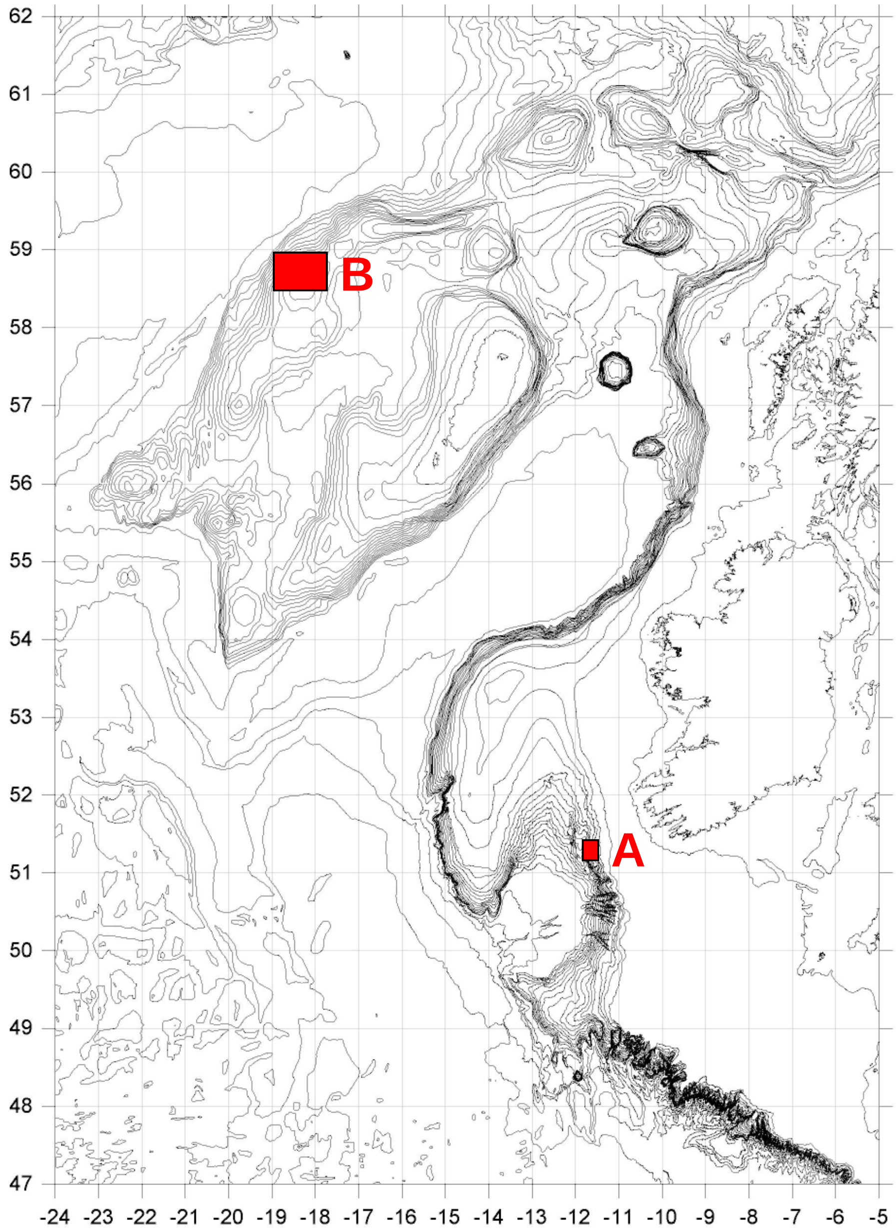


Fig. 2. Position of the two areas which were multibeamed and in which the research was focused. A. Belgica Mounds in the Porcupine Bight. B. Part of Hatton Bank.

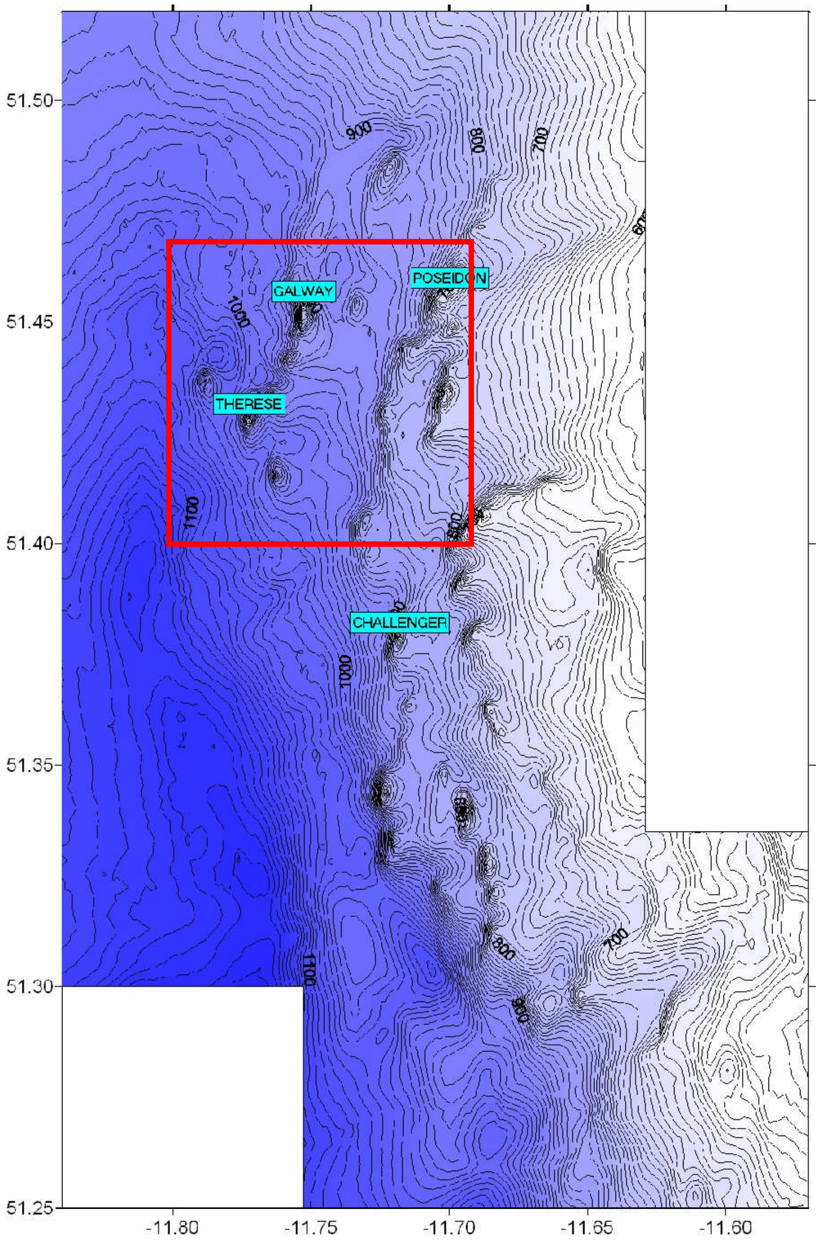


Fig. 3. Bathymetric map, a result from our multibeam surveys in the Porcupine Bight. See Fig. 2 for a positional overview (area A). Some of the mounds of the Belgica Mound Province are indicated. The red rectangle indicates the area where most of our research was done (see Fig. 5)

CTD

During the cruise the CTD-rosette sampler was equipped with 22 Noex bottles of 12 liter, a Seabird™ 911 CTD with auxiliary sensors for oxygen, turbidity (Seapoint) sensor and fluorescence (Chelsea Aqua 3). Data were acquired using the SeaBird SBEdata Processing –Win 32 software. The principal activities involving the CTD-rosette were Yoyo-series at the same spot for 13 hours in a row. Water was collected at regular intervals, and a maximum of 5 liter was filtered over preweighted GFF and CA filters for total particulate matter, C & N content and ratio, and for phytopigments.

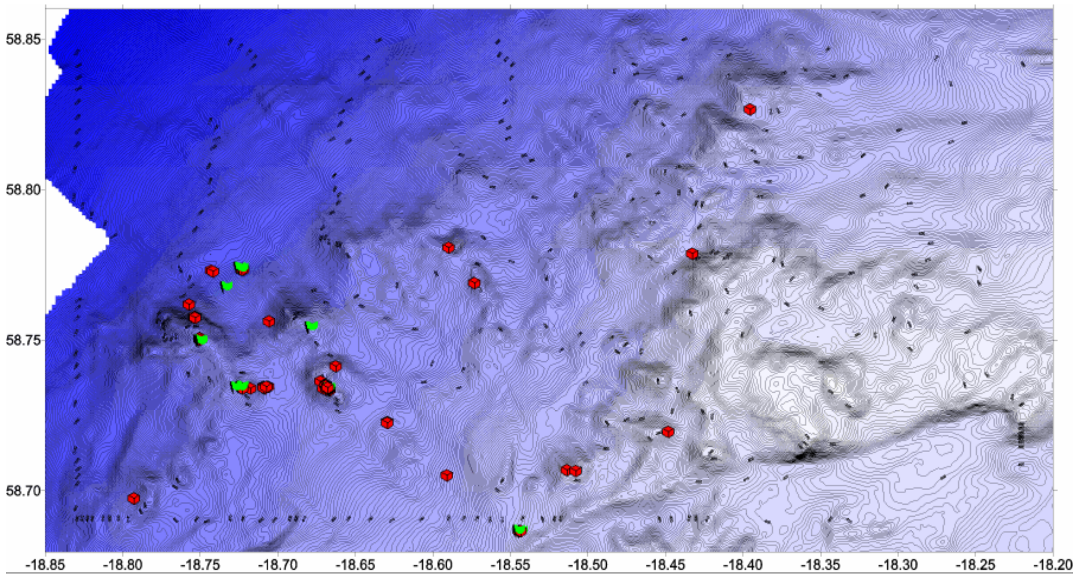


Fig. 4. Bathymetric map as a result from our multibeam surveys on Hatton Bank. See Fig. 2 for a positional overview (area B). The red boxes are the boxcore stations while the green flags indicate the ALBEX lander and Mooring positions.

Triangular Dredge & 3m Beamtrawl

To collect fish and larger invertebrates for food web analysis and taxonomy we used a triangular dredge. The dredge consists of a triangular iron frame holding a nylon net with mesh size of 2 cm. Weights (10 kg) are attached to two corners of the triangle to keep the dredge upright. The underside of the net is protected by a rubber mat. The dredge was only used twice, only in the hatton Bank area and only outside the coral area. Bottom contact was kept short (15 minutes), and ground fishing speed low (1-1.5 knots), and maximum cable length was 2 times the depth. Both attempts were successful.

Two attempts were carried on Hatton Bank to catch more fish with a 3m beamtrawl. It was used in a flat area with supposedly no main coral growth to avoid too much damage to the corals and to avoid loosing the net. The first attempt was very successful; the second only produce one (big) fish..

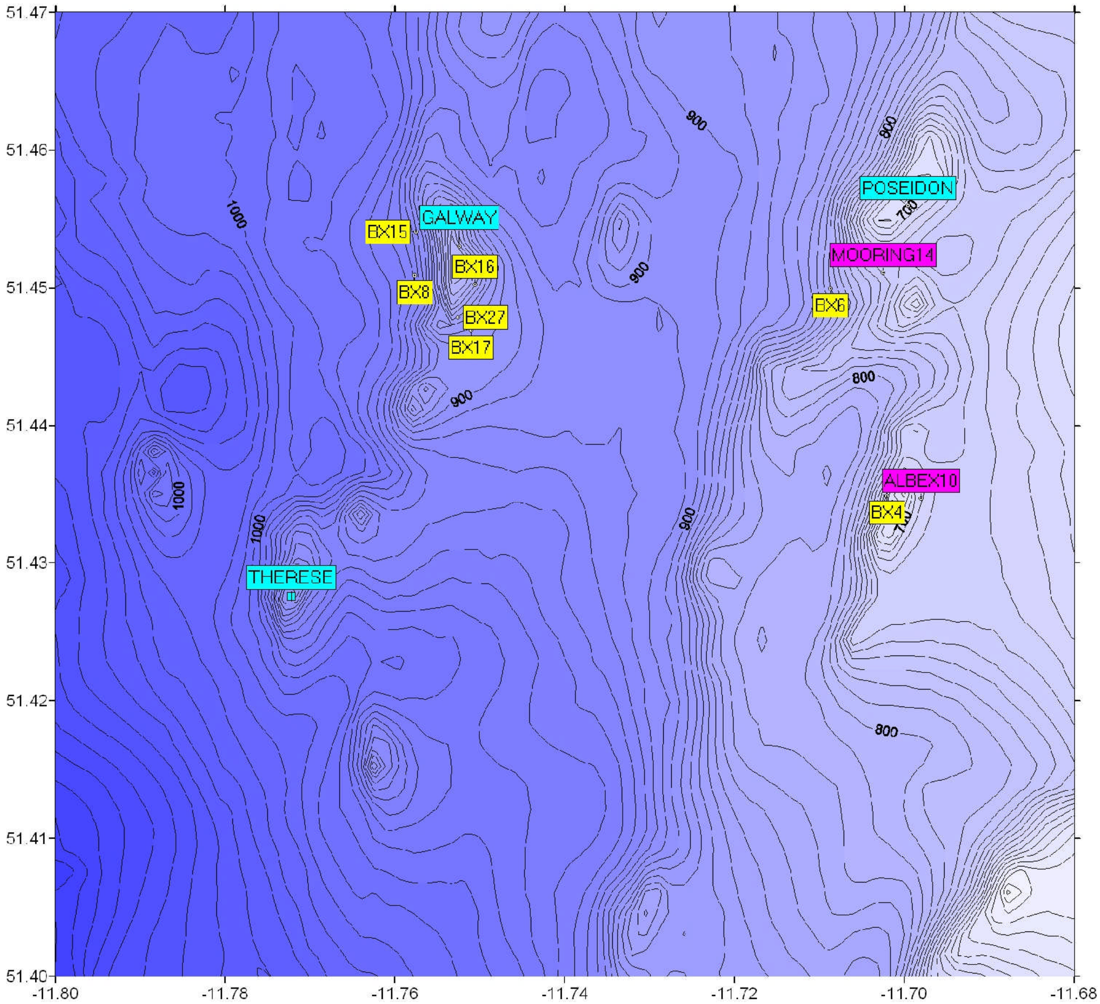


Fig. 5. The research area in the Belgica Mound Province. The main 3 mounds are indicated in blue. The positions of the ALBEX lander (pink), the Mooring deployment (pink) and the boxcore samples (yellow) are indicated. Two boxcore samples taken for the MOVE fall outside of this area.

Boxcorer

Boxcore samples were taken by the special NIOZ boxcorer (K18) equipped with a stainless steel cylindrical core of 50 cm in diameter and 55 cm height and a trip valve sealing the box. An online video system was installed on the boxcorer with two green lasers. In soft sediment the corer worked fine, but in harder sediment the samples were almost always disturbed. A few times the whole contents had been pushed upside down, meaning that the surface of the sediment with e.g. living corals was covered with a thick layer of sediment. We argued that this was due to the imbalance of the boxcorer caused by the heavy digital camera with frame attached to one side of the boxcorer. Therefore, as an alternative, the smaller boxcorer with a core diameter of 30cm was used to get undisturbed samples. This worked very well. The disturbed cores were not discarded but sieved for molluscan biodiversity purposes. The undisturbed samples were often subsampled for incubations and for organic chemistry. The top 10 cm of the rest of the boxcore sample was sieved through 0.5mm and stored on formaldehyde for macrofauna analysis. Larger animals were frozen separately for stable isotope analysis.

On and near the Belgica Mound Province a total of 9 attempts were made, 2 of which were outside the protected area (Fig. 4). All attempts except 1 were successful. At Hatton Bank a total of 53 boxcore samples were taken, 3 of which failed (sta. 71, 86, and 99). Almost all the surfaces of the boxcore samples were photographed (see Appendix 2).

Samples obtained for research of the macrofauna and the thanatocoenose.

The disturbed samples that could not be used for other purposes were sieved through 0.5mm and stored wet for analysis of the thanatocoenosis (mainly Mollusca). One sample only was collected in the Belgica Mound Province, and 13 samples were collected at Hatton Bank.

For biodiversity research 6 samples were taken within the Belgica Mound Province, 4 of which contained coral rubble or living coral at the surface. At Hatton Bank 40 boxcore samples were collected and sieved through 0.5mm. Of these 17 were also subsampled for deck incubations and geochemical research. Samples with a lot of epifauna (coral rubble) were separated into epifauna and infauna. In all cases only the upper 10cm of the boxcore was sieved for infauna. In most cases the sediment below 10cm consisted of a sticky clay difficult to sieve and without any obvious macrofauna. Therefore this deeper layer was discarded. All samples were stored in formalin (4%).

Samples obtained for Organic Chemistry

Samples were obtained for organic chemistry (pigments/stable isotopes/lipids) from boxcores. Samples were taken using cut-off syringes, five syringes were taken per boxcore and immediately frozen at -80˚C for processing and analysis at NIOZ.

Table 1. List of samples taken.for organic chemistry.

station	Latitude	Longitude	Depth (m)
33	58.73612	-18.67222	787
58	58.76863	-18.57323	751
63	58.6866	-18.54313	698
72	58.73373	-18.6703	782
79	58.77332	-18.72227	992
85	58.70495	-18.59105	760
89	58.75742	-18.7534	847
90	58.70678	-18.51355	640
91	58.71945	-18.4478	593
100	58.73412	-18.70867	850
105	58.74983	-18.75001	862
111	58.75748	-18.75352	918
115	58.77287	-18.7425	1010
123	58.72262	-18.62902	806
124	58.72228	-18.62943	803
135	58.77315	-18.72317	995
149	58.70628	-18.50752	640

Shipboard respiration measurements (Rachel Jeffreys & Gerard Duineveld)

A. Oxygen analysis by the Winkler Titration Method

Procedure

Oxygen samples were taken from two different sets of samples; CTD rosette water column samples and the oxygen uptake incubation experiments (see section B). Water samples were collected for oxygen analysis from the CTD rosette bottles immediately after each CTD cast. Only bottom water was measured from the CTD transects. Glass sample bottles with a pre-determined volume were filled to overflowing from the rosette bottles to ensure no air bubbles were in the sample. Samples were fixed as soon as they had been collected with 0.5 ml of manganese chloride solution followed by 0.5 ml of alkaline iodide solution (sodium hydroxide and sodium iodide). Each sample bottle is shaken vigorously to increase the efficiency of the oxidation of $Mn(OH)_2$. When all of the samples have been collected and fixed, they are stored submersed in cold water in dim light prior to analysis with a spectrophotometer.

The samples are analyzed after ~ 1 hour, to allow enough time for the oxidation of $Mn(OH)_2$. A volume of 0.5 ml of sulphuric acid was added to the sample and a stirrer bar was placed into the bottle. The bottle was then placed on a magnetic stirrer and stirred until all the flocculents from the precipitation of $Mn(OH)_2$ had disappeared (at the moment the amount of O_2 is the same as the amount of iodine which is detected by the spectrophotometer at 456nm). Prior to sample analysis the spectrophotometer was calibrated (set to zero) with Millipore water. Each sample was measured twice. After the addition of H_2SO_4 and subsequent stirring the sample was placed on the spectrophotometer magnetic stirrer and the red tube was placed in the sample: this draws the sample into a cell (via a pump) where its wavelength is measured, a reading then appears on the spectrophotometer. The system is now cleaned with Millipore water before the second reading is taken from the sample. After a second reading is obtained a few drops of saturated sulphide solution are added to the sample until the bottle turns clear, this solution is now run through the spectrophotometer and a reading is obtained. In this instance the iodine has precipitated to the bottom of the bottle and the turbidity of the water is measured. The concentration of oxygen in the sample is then calculated by the following equation:

$$[O_2] = \frac{(Esamp - Eturb))}{k * \frac{(Vb + Vs)}{(Vb - Vr)}} - 1.05 - cb$$

Where, *k* is a constant, *Vb* is the volume of the bottle, *Vs* is the volume of the acid added, *Vr* is the volume of $MnCl_2$ and NaOH/NaI solution. *Esamp* is the reading for the sample obtained from the spectrophotometer, *Eturb* is the reading obtained from the spectrophotometer after the addition of the saturated sulphide solution to the sample and *cb* is the chemical blank obtained from the Millipore water which is 0. Table 2 (below) shows the values obtained for bottom water samples on Hatton Bank. Depths given are from the multi-beam and samples were obtained approximately 5 to 10 m above the bottom depth given here.

Table 2.

Station Number	Depth (m)	Oxygen (μmol L^{-1})
125	803	206.63
126	782	204.96
127	850	205.69
128	918	212.15
129	1019	228.04
130	1134	229.31
142	1134	226.76
143	1020	229,54
144	918	218.80
144	850	203.97
145	850	215.06
146	782	209.32
147	804	208.88

Measurements from both the CTD oxygen sensor and the Winkler titration showed the presence of an oxygen minimum layer impinging on the slope at 850 m.

B. Incubation Experiments for Measurement of Oxygen Uptake Rates by the Sedimentary Community

Megacores were obtained from boxcores for incubation experiments (Fig. 6). The aim was to ascertain if there were differences in oxygen uptake rates between coral mounds and areas with no coral mounds, both over a depth gradient. A minimum of three cores were obtained for each site.

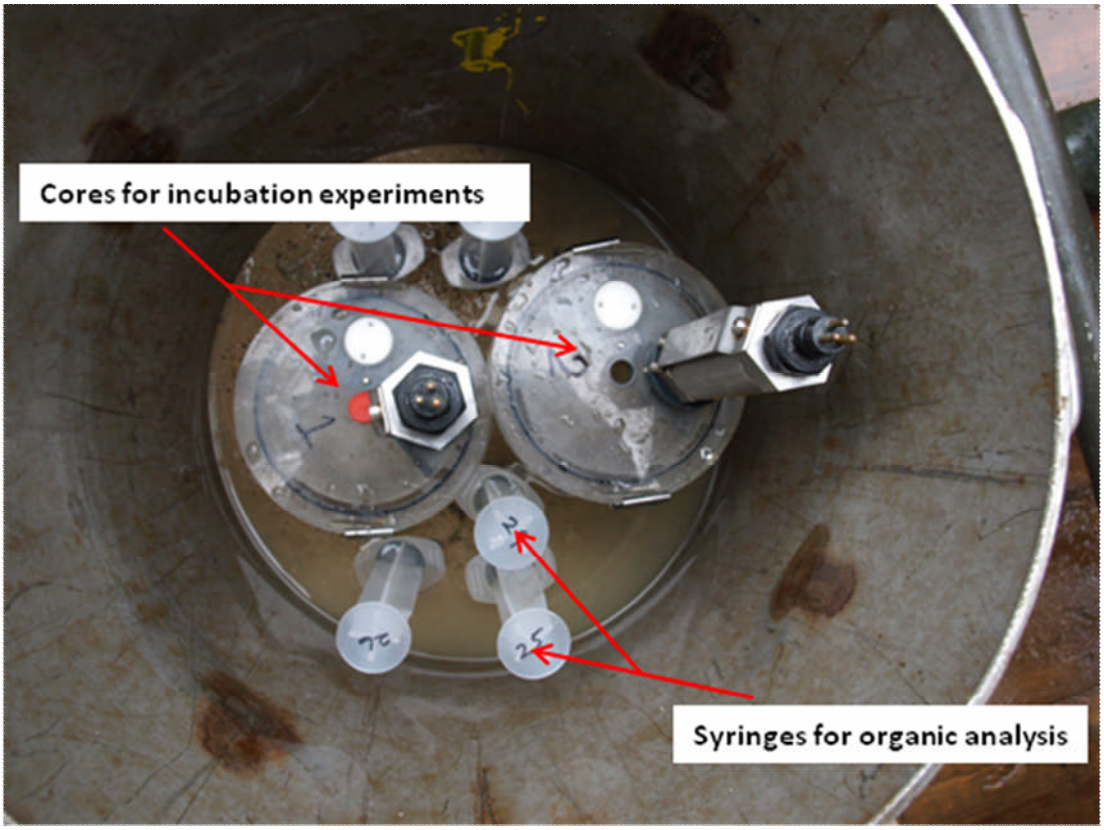


Figure 6: Sampling of a boxcore for organic analysis and incubation experiments, photograph Marc Lavaleye.

Cores were placed in a temperature controlled incubation tank (Fig. 7). The incubation system consisted of two tanks both filled with surface water. The temperature was controlled and maintained by a cooling system in the first tank. Cooled water was pumped from the first tank into the second tank where the incubated cores were held. Cores were placed into a core holder. The cores were sealed with a lid containing an o-ring. Each core lid contained a magnetic stirrer with a stirrer motor (stirring was continuous throughout the incubation) and a hole for insertion of the Presens optode and temperature probe sealed and held in place with bitumen sealant. Whilst the optode was not in place a rubber bung was used to seal the hole. One core from each incubation was continuously monitored and logged using the oxyview software; readings were logged every 10 seconds, typical output from the Presens optode is shown in figure 8. Cores that were incubated simultaneously were monitored and readings recorded manually every few hours with the optode. Start and end times and readings were noted for calculation of oxygen uptake rates by the sediment community. At the end of incubation, a water sample was obtained for validation of end point oxygen concentrations by Winkler titration and the volume of overlying water was calculated. The Presens optode was calibrated using 100% oxygen saturated water (bubbling air into Millipore water) and oxygen free water (addition of sodium sulphide), confirmed by Winkler titration of each water type.

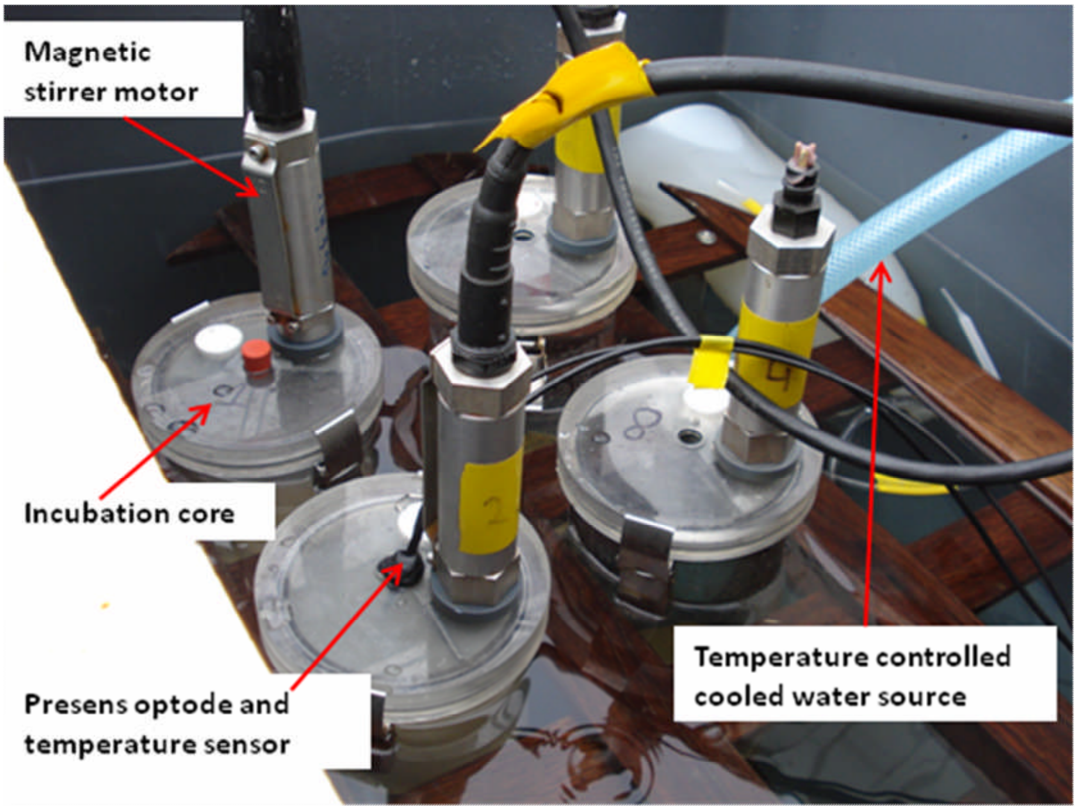


Figure 7: Temperature controlled incubation tank showing incubated cores and general set-up.

Oxygen uptake rates were calculated from the following equation:
$O_2 = DO_2 x V/T*(1/SA)$

Where: O_2 is oxygen uptake rate µmol m^{-2} h^{-1}; DO_2 is the difference in oxygen at the start and end of the incubation µmol L^{-1}; V is the volume of overlying surface water; T is the duration of the experiment in hours; SA is the surface area of the core in m^{-2}. The on-board results are shown in Table 3. There were significant differences (Anova) in uptake rates between area K and the Cape (on mound) and between K and the sandy plain. The Cape on mound had significantly higher uptake rates than the Cape off mound. These initial results imply that differences in oxygen uptake rates are a result of habitat type and are not depth related.

Table 3. The measured oxygen uptake rates of the sedimentary community grouped per area.

Core #	Area	On/Off Coral Mound	Depth (m)	Uptake Rate (O_2 µmol $m^{-2}h^{-1}$)	Mean uptake rate	SD
105	The Cape	On	862	203	**248.50**	**76.22**
107	The Cape	On	862	206		
111	The Cape	On	918	336.5		
115	The Cape	Off	1010	219	**151.75**	**45.37**
116	The Cape	Off	1004	123		
135	The Cape	Off	995	139		
135	The Cape	Off	995	126		
33	K	On	787	171	**100.33**	**61.40**
33	K	On	787	60		
72	K	On	782	70		
85	Sandy Plain	Off	760	301	**225.25**	**88.63**
85	Sandy Plain	Off	760	149		
123	Sandy Plain	Off	806	303		
124	Sandy Plain	Off	803	148		
90	Q	On	640	234	**177.20**	**55.19**
91	Q	On	593	112		
91	Q	On	593	161		
149	Q	On	640	144		
149	Q	On	640	235		

Coral Incubations

Two types of coral incubations were undertaken in larger incubation chambers (similar to incubation cores) in a controlled temperature laboratory at bottom water temperature (8.5˚C). The first from station 70 (area K on a coral mound). This core sample contained coral rubble and its associated epifauna (ophiuroids, squat lobsters, sponges, brisingids, asteroids). The uptake by this community was 44 µmol L^{-1} h^{-1}, the oxygen profile shown in figure 9 was not linear but this was not related to temperature.

The second incubation contained a live gorgonian from station 92 whose uptake rate was 378 µmol L^{-1} h^{-1} after blank correction. This oxygen profile (Fig. 10) was also not linear but not related to temperature.

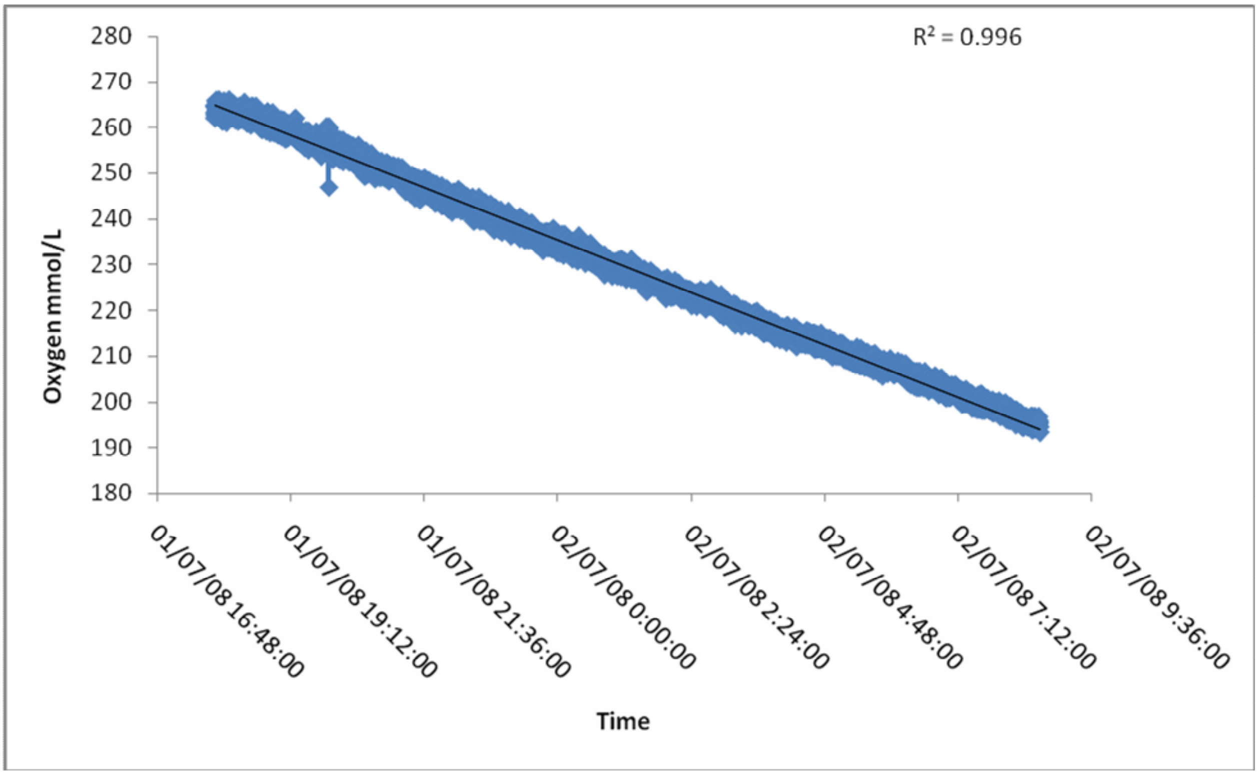


Figure 8. Typical output from the Presens optode, this data is from station 85.

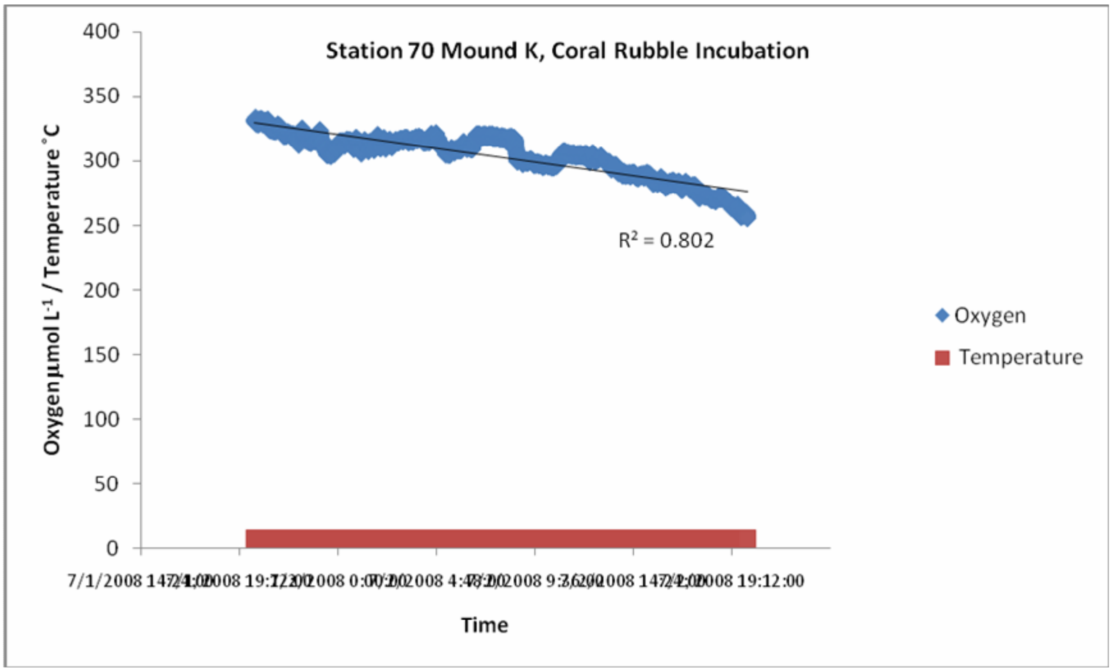


Figure 9. Oxygen uptake from a coral rubble community station 70.

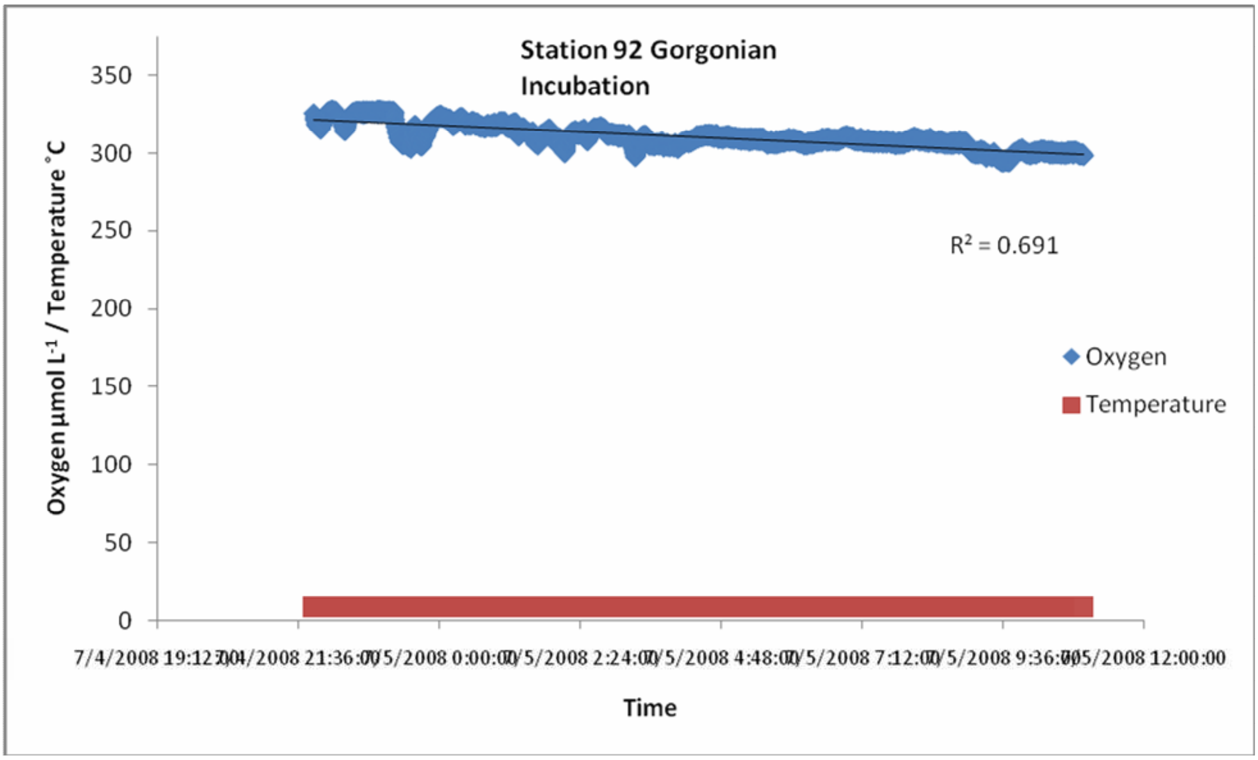


Figure 10. Oxygen uptake from a live gorgonian at station 92.

In situ Stand-Alone Pumping System (SAPS)

In order to obtain large volume filtered samples of the near-bottom water, we used a Challenger Oceanic™ Stand-Alone Pumping System (SAPS). The SAPS were loaded with 2 pre-combusted GF/F filters (293 mm diameter) on top of each other which were pressed down with a firm synthetic raster all to prevent tearing of the filters. The pumps were attached to the landers. In this way the inlet of the pumps is always very close to the bottom at a precise distance of 1.4m. The SAPS were programmed to pump for an hour. The pumping efficiency of the SAPS was 600-700 L h^{-1}. After recovery of the SAPS, the loaded GF/F filters were deep-frozen at -80°C.

Benthic lander and mooring deployments

The two benthic ALBEX landers were deployed for short periods during the cruise at various stations on tops of mounds, near the coral reefs or on areas without corals. Because of the bad weather the landers were not deployed in the way normally done by our group, which involves lowering it on a cable with an extra acoustic releaser to ca 1 m above the seafloor and than releasing it. Instead it was released immediately at the surface to let it freefall to the bottom. Video footage showed that it made a soft landing with a low impact on the bottom. As accurate positioning of the lander in this area was not really necessary we used this method during the whole expedition, which saved a lot of time. The ALBEX landers consist of an aluminum tripod equipped with 12-13 glass Benthos™ floats, two Benthos™ acoustic releasers and a single 260 kg ballast weight necessary for deployment and recovery. An Argos buoy, radio beacon, flash light and large orange flag are attached to locate it after surfacing.

The landers carried some of the following instruments: 1) OBS (Optical Back Scattering - Seapoint™) at 1 m above the seafloor for measuring particle density in the water column within a few centimeters of the instrument; 2) Fluorometer (Seapoint™) at 1 m ab for measuring fluorescent particles in the water column. The data of the fluorometer and OBS were stored by a NIOZ-built datalogger which also recorded temperature and tilt; 3) SAPS (Stand alone pump system) with a large filter of 29.8mm; 4) FSI current meter; 5) Digital time-lapse video cameras. The footage will be used to compare visible data with those of the NIOZ instruments for consistency and signs of transport or resuspension of particles close to the seafloor. 6) HD videocamera system; 7) Infrared light videocamera system build by Kongsberg and owned by SAMS; 8) Bait dispensor made out of a 12 vial carousel of Technicap. The bait used was sardines on vegetable oil; 9)Aanderaa current meter with 2 optodes (SAMS); 10) Transmissometer, fluorometer and OBS (SAMS); 11) Baited crab pots.

In addition to the landers, two NIOZ moorings were deployed several times to get extra information on currents, turbidity and fluorescence. The moorings were composed of a bottom weight (260kg), 2 acoustic releasers, 1 Aanderaa current meter (RCM9), and 1 OBS-Fluoro-and tiltmeter connected to a datalogger. Later the SAMS Aquadop Nortek currentmeter was also attached to one of the moorings. The mooring was held upright by 5 Benthos floats. The configurations of the landers and moorings were as follows. All times are in GMT.

ALBEX-2 deployments

The ALBEX-2 lander had 13 floats (glass spheres, 25 liter), two acoustic releases (519 & 708) and a ballast weight of 260kg. A flash, radiobeacon, flag and Argos buoy 1643 were attached to make it easier to locate when it had surfaced upon release of the ballast weight.

Station 41. Hatton Bank - station L (plain)
Deployment 26 June 12:22 - 29 June 16:03. The rising of the lander from bottom to seasurface took about 15 min, meaning that the rising velocity was about 50m/min.
SAPS98 - Program: 29 June 12:00-13:00, 1 hour of pumping over 2 old GFF filters. Inlet of water is about 1.30m above bottom. Result: filter is only somewhat colored, though it filtered 632 liter.
FSI currentmeter 1510. Intervaltime 1 minute. Ontime 20 sec. Position of measuring point 0.70m above bottom. Start: 26 June 11:00.
Datalogger B5 with OBS 1769 and Fluorometer 2385, both at 0.50m above bottom. Program: measuring every minute.
Magda's 2 digital videocameras with 2 lights aimed at a stick baited with 2 mackerels.
Aanderaa of SAMS with two optodes. The head of the Aanderaa sticks out above the lander. Position of optodes at 45 and 215 cm above bottom.

Station 74. Hatton Bank - station K (coral)
Deployment: 30 June 15:15 - 3 July 9:59
SAPS 98 - Program: 3 July 06:30-07:30, 1 hour of pumping over 2 new GFF filters. Result: filter is somewhat colored, though it filtered 733 liter.
FSI currentmeter (see station 41). Start: 30 June 13:00.
Datalogger B5 (see station 41). Start: 30 June 13:00.
Magda's 2 digital videocameras (see station 41)

Aanderaa of SAMS (see station 41)
Dave Walls acoustic pod for recording whale-clicks at 1.85 cm above seabed.

Station 103. Hatton Bank - station K (coral)
Deployment: 3 July ca. 19:19 - 7 July 9:40
SAPS 98 - Program: 7 July 06:30-07:30, 1 hour of pumping over 2 new GFF filters. Result: filter is somewhat colored, though it filtered 718 liter. Batteries only charged with 2Ah extra.
FSI currentmeter (see station 41). Start: 3 July 13:00
Datalogger B5 (see station 41). Start: 3 July 18:30
Magda's 2 digital videocameras (see station 41). Start: 3 July 19:10
Aanderaa of SAMS (see station 41)
Dave Walls acoustic pod for whales at 1.85cm above seabed.

Station 163. **Hatton Bank - station K (coral)**
Deployment: 8 July ca. 12:08 - 10 July 19:14
SAPS 98 - Program: 10 July 16:30-17:30, 1 hour of pumping over 2 new GFF filters. Result: filter is somewhat colored, though it filtered 661 liter.
FSI currentmeter 1510 (see station 41). Start: 8 July 11:00.
Datalogger B5 (see station 41). Start: 10 July 11:00.
Magda's 2 digital videocameras (see station 41). Start: 8 July.
Aanderaa of SAMS (see station 41)
Fishtraps. One large grey crate, 2 large perspex tubes, 2 small perspex tubes. All baited with mackerel packed in very fine nylon netting. All positioned at 0.5m above the bottom. Result: lots of amphipods.

ALBEX-3 deployments
The lander had 13 floats (glass spheres, 25 liter), two acoustic releases (531 & 557) and a ballast weight of 260kg. A flash, radiobeacon, flag and Argos buoy 2600 were attached to make it easier to locate it had surfaced upon release of the ballast weight.

Station 42. Hatton Bank - station K (coral)
Deployment: 26 June 17:38 - 29 June 16:03
SAPS 97 - Program: 29 June 12:00-13:00, 1 hour of pumping over 2 old GFF filters. Inlet of water is about 1.30m above bottom. Result: filter is somewhat colored with some spots, though it filtered 634 liter.
FSI currentmeter 1682. Intervaltime 1 minute. Ontime 20 sec. Position of measuring point 0.70m above bottom. Start: 26 June 10:00
Datalogger BE met OBS 1450 en Fluorometer 2248, both at 0.50m above bottom. Program: measuring every minute.
Magda's 2 digital videocameras with 2 lights aimed at the carousel and the bottom.
Sedimenttrap carousel Technicap at 40 cm above bottom within the lander frame. The vials in upright position, and filled with processed sardines on vegetable oil. Program: 26 June 20:00 first vial open; 28 June 20:00 second vial open and first vial closed; 29 June 12:00 second vial closed.
High definition video camera with one powerful ledlamp of 50Watt directed at the baited carousel. Connected to one batterysphere (MEE003). The camera was programmed as follows: 26 June 19:45-20:45 (1 hour)
21:45-22:00 (15 minutes)
23:00-23:15 (15 minutes)

	30x 1 minute with 1 hr pause between each shot
28 June	19:45-20:45(1 hour)
	21:45-22:00 (15 minutes)
	23:00-23:15 (15 minutes)
	13x 1 minute with 1 hr pause between each shot.

Andy's datalogger with OBS, Fluorimeter en Transmissometer at lowest bar of frame at 50cm above bottom. Dave's pod for whale clicks halfway horizontal.

Station 77. Hatton Bank - station L (plain)
Deployment: 30 June 20:05 - 3 July 8:42
SAPS 97 - Program: 3 July 6:30-7:30, 1 hour of pumping over 2 new GFF filters. Inlet of water is about 1.30m above bottom. Result: filter is somewhat colored with some spots, though it filtered 661 liter.
FSI currentmeter 1682 (see station 42). Start: 30 June 20:00
Datalogger BE (see station 42). Start: 30 June 17:00
Magda's 2 digital videocameras with 2 lights aimed at the carousel and the bottom.
Sedimenttrap carousel Technicap (see station 42). Program: 30 June 21:00 first vial open; 2 July 21:00 second vial open; 3 July 8:00 second vial closed.
HDVideo (see station 42).Program as follows:

30 June	20:45-21:45	(1 hour)
	21:45-1:30	(3x15 minutes with 1 hour pause in between each shot
		40x minutes with 1 hour pause in between each shot
02 July	20:45-21:45	(1 hour)
	21:45-1:30	(3x15 minutes with 1 hour pause in between each shot)
		6x 1 minutes with 1 hour pause in between each shot.

Andy's datalogger with OBS, Fluorimeter en Transmissometer (see station 42).

Station 112. Hatton Bank - top of Cape
Deployment: 4 July 16:29 -. 7 July 8:35.
SAPS 97 - Program: 7 July 6:30-7:30, 1 hour of pumping over 2 new GFF filters. Inlet of water is about 1.30m above bottom. Result: filter is somewhat colored with some spots, though it filtered 760 liter
FSI currentmeter 1682 (see station 42). Start: 4 July.
Datalogger BE (see station 42). Start: 4 July 15:00.
Magda's digi video has been taken off.
Sedimenttrap carousel Technicap (see sta. 42):
4 July 18:02 first vial open = sardines
5 July 6:02 second position open = empty
5 July 18:02 third vial open = sardines
6 July 6.02 fourth position open = empty
Result: a lot of amphipods in both vials.
HDVideo (see station 42).

Program:	5 July	16:30 (24 times 15min video, 15 min sleep)
	6 July	04:30 (88 times 1min video, 14 min sleep)

Andy's datalogger with OBS, Fluorimeter en Transmissometer (see station 42)
Andy's Infrared camera "Fat Boy"
Program: 4 July 16:30 (24 times 15min video, 15 min sleep).

Station 138. Hatton Bank - top of Cape
Deployment: 8 July 17:01 - 9 July 15:41

SAPS 97 - Program: 9 July 6:30-7:30, 1 hour of pumping over 2 new GFF filters. Inlet of water is about 1.30m above bottom. Result: there were problems in charging and programming the SAPS. At last we succeeded by resetting the SAPS, but the final result was negative, meaning that the filter was blank and that that the pump had not worked. The conclusion was that the batteries had not been charged enough.
FSI currentmeter 1682 (see station 42). Start: 8 July.
Datalogger BE (see station 42). Start: 8 July
Magda's digi video has been taken off.
Sedimenttrap carousel Technicap (see station 42):
8 July 19:02 first vial open = sardines
9 July 00:02 second position open = empty
9 July 05:02 third vial open = sardines
9 July 10.02 fourth position open =empty
HDVideo with 2 lamps (infrared and white) aimed at the carousel. The infrared light of SAMS thus is attached and programmed to and through the NIOZ HDvideo.
Program: 8 July 18:30-00:00 (15min infrared light, 15 min white light)
9 July 04:30-10:00 (15min infrared light, 15 min white light)
Andy's Infrared camera "Fat Boy". As this camera could be programmed as flexible as the NIOZ HDvideo camera, the infrared light was attached to the NIOZ camera (see above). Program of "fat boy": 8 July 18:30 (16 hours continuous video)
Andy's datalogger with OBS, but no Fluorimeter. The Fluorimeter did not work properly, besides then laser of the fluorimeter were so powerfull that they influenced the experiment with the infrared camera. The laser light was very clearly visible with the camera and lighted part of the background. Therefore the fluorimeter was uncoupled before deployment. See also station 42 for other details.

Station 155. Hatton Bank - top of Cape
Deployment: 10 July 15:59 - 11 July 19:12
SAPS 97 - Program: 11 July 16:00-17:00, 1 hour of pumping over 2 new GFF filters. Inlet of water is about 1.30m above bottom. Result: 353 liter. Conclusion: the problems of the last deployment were solved, although the charging of the batteries with 2.5 Ah was not sufficient to pump the maximum amount of about 700 liters.
FSI currentmeter 1682 (see station 42). Start: 10 July
Datalogger BE (see sta. 42). Start: 10 July 14:00
Magda's digi video has been taken off
Sedimenttrap carousel Technicap: 10 July 17:30 first vial open = sardines
10 July 21:55 second position open = empty
11 July 02:02 third vial open = sardines
11 July 04.58 fourth position open =empty
11 July 09:02 fifth vial open = sardines
11 July 11.58 sixth position open =empty
11 July 15:30 seventh vial open = sardines
11 July 17.58 eight position open =empty
HDVideo with 2 lamps (infrared and white) aimed at the carousel. The infrared light of SAMS is attached to and programmed through the NIOZ HDvideo.
Program: 10 July 18:00-22:00 (2 times 1 hour infrared light, 1 hour white light)
11 July02:00-05:00 (3 hours video with white light)
11 July09:00-12:00 (3 hours video with infrared light)
11 July 16:00-18:00 (2 times: half an hour white light, half an hour infrared light)

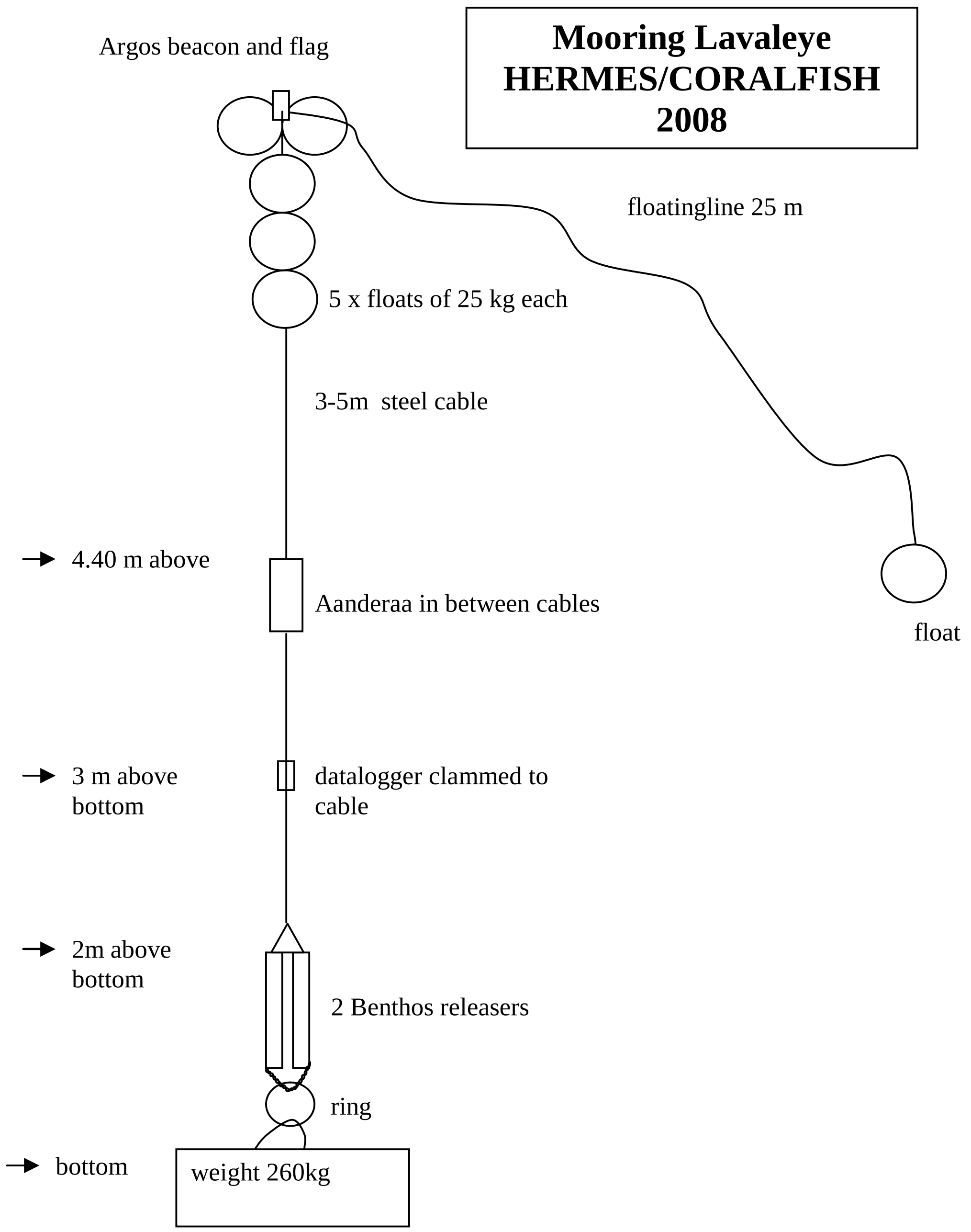
Andy's datalogger with OBS, no Fluorimeter at lowest bar of frame (see station 139).
Andy's Infrared camera "Fat Boy". Program: 10 July 18:00 (continuous).
Dave Walls acoustic pod to record whale clicks.

Moorings.

Two mooring were used during the expedition. Basically they had the same configuration. The total length did not exceed 25 m (see fig.), without the floating to ease the pickup. The ballast that exists of square ironbars had a weight of 260kg. The 5 floats are Benthos glass spheres of 25 liter each protected by ribbed plastic caps. The top two floats are firmly attached to each other together with an Argos satellite beacon (cylinder) and flag. A synthetic float of 25 kg on a long floating line functions as pickup buoy.

Station 38. Hatton Bank deep 1200m
Mooring 1. Deployment: 25 June 9:41 - 30 June 17:57
Acoustic Releasers (1002 and 1199). The head of the releaser is about 1.5 m above the bottom.
Aanderaa currentmeter (RCM11) of Magda. Position at 4.70 above bottom. Start at: 25 June, Intervaltime 1 minute, 4 channels. Result: the current worked only at the beginning and end of the deployment. After testing we concluded that the internal clock did not function well anymore. It seems that the sealed DSU memory block also holds a small battery that feeds the clock. After 7 years of use the battery has probably expired. The battery can only be changed by cutting or sawing the housing open! We found this a serious flaw in the design of the Aanderaa current meter, and we are glad we did not experience this in a long-term deployment!
Datalogger BF with OBS 1547 and Fluorometer 2696. Position 3.30 m above bottom. Program: measuring every minute for 1 minute. Start: 25 June 2008 10:00. In spite of some collisions with the ships hull during deployment the logger worked fine.

Station 39. Hatton Bank "Rober2"
Mooring 2. Deployment: 25 June 18:01 – 29 June 19:45.
Same general configuration as Mooring 1.
Floats: 5x (is more than enough as it sinks quite slowly) + 1 yellow float for pick-up. The top two floats are parallel to each other to allow a cylindrical ARGOS tube (satellite tracking devise) and a flag to be attached. Ballast weight: 260kg (iron bars).
Acoustic Releasers (532 and 1200). The head of the releaser is about 1.5 m above the bottom.
Aanderaa currentmeter of Hillebrand.
Position at 4.70 above bottom. Start at: 25 June. Intervaltime 1 minute, 4 channels.
It worked fine, except the temperature, because the small knob was accidentally set on arctic instead of low.
Datalogger BD with OBS 1450 and Fluorometer 2248
Position 3.30 m above bottom. Start at 26 June 2008 17:45. Program: measuring every minute.
Despite the weather deployed without problems.



Station 75. Hatton Bank 1000m
Mooring 2, Deployment 30 June 16:25 – 3 July 13:39
Same configuration and instruments as Station 39.
Aanderaa currentmeter Hillebrand. Position at 4.70 above bottom. Start at: 30 June ca. 16:00. Intervaltime 1 minute, 4 channels. Temperature is now set at low (instead of arctic).
Datalogger BD with OBS 1450 and Fluorometer 2248. Position 3.30 m above bottom. Start at 30 June 2008 15:30. Gain 4. Program: measuring every minute.

Station 83. Hatton Bank N-East Mound
Mooring 1. Deployed: 1 July 14:00 – 10 July 13:36.
Same configuration and instruments as station 38, but an extra current meter is added.
Argos beacon (V05-101).

Aquadop (Andy) with fintail and temperature/salinity logger at 4.70m above bottom
Aanderaa currentmeter Magda. Position at 15 m above bottom. Intervaltime 1 minute, 4 channels. Start 1 July.
Datalogger BF with OBS 1547 and Fluorometer 2696. Position 3.30 m above bottom. Start at 1 Juli 2008 13:30. Gain 4. Program: measuring every minute.

Station 109. Hatton Bank 1000m
Mooring 2. Deployed: 4 July 13:30 – 10 July 14:39
Same configuration and instruments as station 39.
Aanderaa currentmeter Hillebrand. Position at 4.70 above bottom. Start at: 4 July. Intervaltime 1 minute, 4 channels. Temperature is now set at low (instead of arctic).
Datalogger BD with OBS 1450 and Fluorometer 2248. Position 3.30 m above bottom. Start at 30 June 2008 15:30. Gain 4. Program: measuring every minute, 20 days.

Literature:

Chesher, J.A., 1987. Cruise report of Magnus Heinason. 17th September–14th October NE Atlantic. British Geological Survey Report 87/43, Edinburgh, 62pp.

Davies, A.J., Duineveld, G., Lavaleye, M., Bergman, M., van Haren, H., Roberts, J. M., 2009. Downwelling and deep-water bottom currents as food supply mechanisms to the cold-water coral Lophelia pertusa (Scleractinia) at the Mingulay Reef Complex. Limnology & Oceanography 54: 620-629.

Duineveld, G.C.A., M.S.S. Lavaleye, M.J.N. Bergman, H. de Stigter & F. Mienis, 2007. Trophic structure of a cold water coral mound community (Rockall Bank, NE Atlantic) in relation to the near bottom particle supply and current regime. Bull. Mar. Sci. 81(3): 449-467.

Durán Muñoz, P, F. J. Murillo, M. Sacau, and T. Patrocinio. 2007a. Some Notes about Information on the Occurrence of Cold‚water Corals on the Hatton Bank, summarised in year 2005 by the ICES Working Group on Deep‚water Ecology: “Table 3.1 Positions where Lophelia pertusa has been recorded on the Hatton Bank” (ICES‚WGDEC Report 2005). Working Document presented to the Working Group on Deep‚Water Ecology. Plymouth. 26–28 February 2007.

Durán Muñoz, D., F.J. Murillo, A. Serrano, M. Sayago-Gil, S. Parra, V. Díaz del Río, M. Sacau, T. Patrocinio & J. Cristobo, 2008. A Case Study of available methodology for the identification of Vulnerable Ecosystems/Habitats in bottom deep-sea fisheries: Possibilities to apply this method in the NAFO Regulatory Area in order to select Marine Protected Areas. SC WG ON THE ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT, Instituto Español de Oceanografía, Serial No. N5491 NAFO SCR Doc. 08/6

Foubert, A., T. Beck, A.J. Wheeler, J. Opderbecke, A. Grehan, M. Klages, J. Thiede, H-P. Henriet & Polarstern ARK-XIX/3a shipboard party, 2005. New view of the Belgica Mounds, Porcupine Seabight, NE Atlantic: preliminary results from the Polarstern ARK-XIX/3a ROV cruise. pp. 403-415. In: Freiwald, A. & J. Murray Roberts (eds), 2005. Cold-water corals and ecosystems. pp. i-xxxii, 1-1243. _ Springer: Berlin.

ICES. 2008. Report of the ICES‚NAFO Joint Working Group on Deep Water Ecology (WGDEC), 10–14 March 2008, Copenhagen, Denmark. ICES CM 2008/ACOM:45. 122 pp.

Long, D., Roberts, J.M., Gillespie, E.J., 1999. Occurrences of *Lophelia pertusa* on the Atlantic margin. British Geological Survey Report WB/99/24, Edinburgh, 23pp and appendices.

Roberts, J.M., L-A. Henry, D. Long & J. P. Hartley, 2006. Cold-water coral reef frameworks, megafaunal communities and evidence for coral carbonate mounds on the Hatton Bank, north east Atlantic. Facies DOI 10.1007/s10347-008-0140-x 123

Spiro, B., Roberts, M., Gage, J., Chenery, S., 2000. 18O/16O and 13C/12C in an ahermatypic deep-water coral Lophelia pertusa from the North Atlantic: a case of disequilibrium isotope fractionation. Rapid Commun. Mass Spectrom. 14, 1332–1336.

Crew and participants of the expedition.

List of participants

No	Name	Institute and profession	Texel-Cork 10-20 June	Cork-Texel 20-16 July
1	**Marc Lavaleye**	Chief scientist, NIOZ biologist	1	1
2	**Gerard Duineveld**	NIOZ -biologist		1
3	**Magda Bergman**	NIOZ -biologist		1
4	**Leon Wuis**	NIOZ-technician	1	1
5	**Jan Willem Schmelling**	NIOZ-electrotechnician	1	1
6	**Andy Davies**	SAMS-biologist, Scotland		1
7	**Rachel Jeffreys**	NIOZ-biologist		1
8	**Inge van den Beld**	student RUG		1
9	**Lucy Buck**	student Roosevelt Academy	1	1
10	**Thalia Whatmough**	SAMS-student, Scotland		1
11	**Dave Wall**	cetacean observer, Ireland	1	1
12	**Maarten Weerenbeck**	student VU	1	
13	**Johan van Heerwaarden**	NIOZ technician	1	
14	**Erica Koning**	NIOZ geochemist	1	
15	**John Cluderay**	NIOZ-electrotechnician	1	
16	**Marck Smit**	NIOZ - head technical dep.	1	
17	**Martin Laan**	NIOZ electrotechnician	1	
18	**Jenske Schuring**	NIOZ student	1	
		Total	12	11

List of the crew

No	Name	Rank	Texel-Cork 10-20 June	Cork-Texel 20-16 July
1	**Cees de Graaff**	Captain	1	1
2	**Ron van Oerle**	First officer	1	
3	**Floris Visser**	First officer		1
4	**David Verheyen**	Second officer	1	1
5	**Jaap Seepma**	Chief engineer	1	1
6	**Marcel de Kleine**	Second engineer	1	
7	**Hans List**	Second engineer		1
8	**Roel van der Heide**	Ships technician	1	
9	**Sjaak Maas**	Ships technician	1	1
10	**Ger Vermeulen**	Able bodied	1	1
11	**Jose Israel Vitoria**	Able bodied	1	1
12	**Eric Bronda**	Able bodied		1
13	**Garl Mik**	Cook	1	
14	**Hans van der Linde**	Cook		1
15	**Freddie Hiemstra**	Assistant cook	1	1
		Total	11	11

Cruise diary

10 June Tuesday

With beautiful weather and a calm sea we leave the harbor of Royal NIOZ, Texel with destination: the Atlantic Ocean. Each of the 12 participants of the expedition and the 11 crew members were present at 10 am. But some technical problems with the ship still had to be solved, so we leave after lunch, a bit later than planned. We have a long trip ahead of us. The goal for this first of two legs is the Belgica Mound Province in the Porcupine Bight, south of Ireland. This is an area were coldwater coral communities occur. In the framework of 2 large international projects, both funded by the European Commission, we will carry on with our coral research of the past years. On former cruises we have already investigated the coldwater coral reefs of Galicia Bank, Rockall Bank, Porcupine Bank, and near the Outer Hebrides and SW Sweden. The two projects are HERMES and CORALFISH. Within the HERMES project (Hotspot Ecosystem Research of the Margins of European Seas) we are trying (among other things) to find out why these rich coral communities are present and can survive at these relatively great depths (500-800m). What do these corals eat and what is the source of their food? The CORALFISH project is about the assessment of the interaction between corals, fish and fisheries, in order to develop monitoring and predictive modeling tools for ecosystem based management in the deep waters of Europe and beyond. In other words are coldwater coral communities important for fish, in for example the sense of a nursery, a hiding place or as a place to feed? We try to solve all of theses questions by using a lot of different deep-sea tools to measure and record all kinds of information in and around these reefs. An important bi-product of our research will be the provision of the information needed by politicians and nature-conservationist to be able to protect at least part of these vulnerable ecosystems, which are mainly threatened by deepwater fisheries. Another goal during this expedition is to test the MOVE in the deep water. The MOVE (mobile vehicle) is a large complicated vehicle that can travel slowly over the sea bottom. It was designed at NIOZ. To manage this vehicle we have a number of additional skilled technicians on board to make sure that the test will give positive results.
After sailing only a few hours, offshore Scheveningen, we encounter a serious problem. The Pelagia suddenly slows down, the main engine is dead. The problem looks really serious at first, and it is possible that we have to go back. But first we anchor on the North Sea and the two engineers are trying to find how serious the problem is. After a while they come back with the good news that a relatively small electromotor (only 130 kg) is broken beyond repair, but they have a spare. After 2 hours of hard work they have replaced the faulty motor, and we can proceed towards our destination. With the modern techniques we can watch the European Football Championship on television sent to us via satellite.


The captain on the bridge.

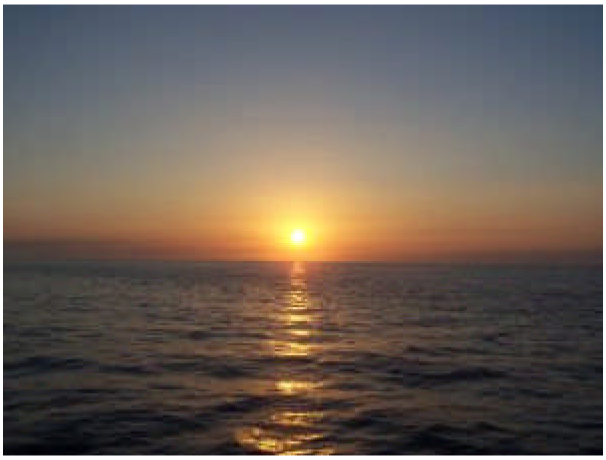
11 June Wednesday

The weather is still fine. The less wind, waves and swell the better. It makes life much easier on the ship. So nobody is seasick, and only during the hot meal at lunch time when we get some more waves, a few people leave the table early, leaving the dessert for us. On deck and in the labs we are busy building up and testing equipment. We pass the white cliffs of Dover. Now and then the ship gains a speed of 12 knots, which is due to the fact that the ship's hull was recently cleaned of fouling organisms in the dry-dock. As we intend to do research in Irish EEZ waters, we need an official permission from Ireland to do so. We requested it more than 6 months ago through the ministry of Foreign Affairs. But so far we haven't heard anything. Luckily, an email reaches us in the afternoon that permission is granted. However, there is still a problem, as we want to do research in the coral area of the Belgica Mounds. This area is, since 2006, designated by Ireland as a "Special area of Conservation". To do research here you must have extra special permission. As we are only informed of this fact at the last minute, it is impossible to get this in time through the normal procedure. The authorities realize that too, and allow us to contact the "Department of the Environment, Heritage & Local Government" of Ireland directly. I immediately send an email with our research plan, and just hope that this will work out quick.


The cliffs of Dover

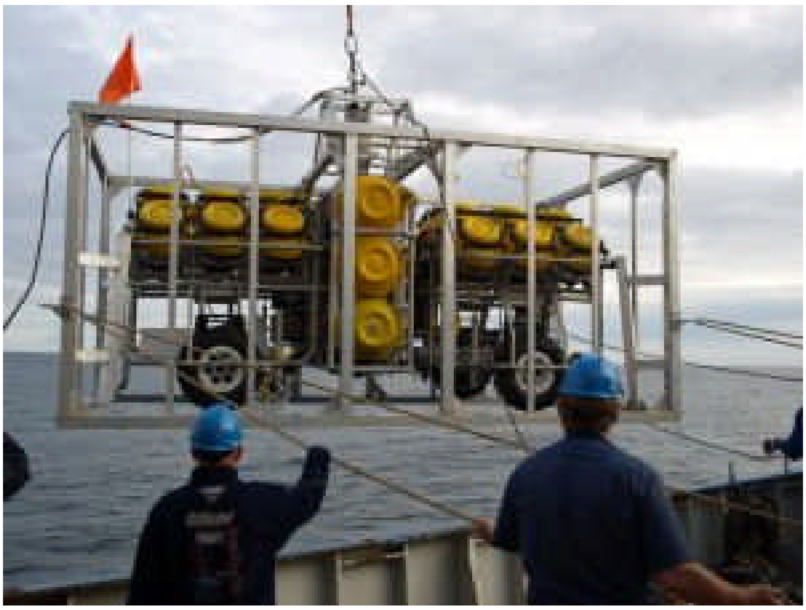
12 June Tuesday

Because the weather stays fine we make very good progress, and we hope to arrive in the research area tomorrow already. So we have to hurry to make everything ready. Maarten is busy to fasten equipment to the lander, while Jenske and Lucy help to test the dataloggers. In the afternoon I phone Ireland to enquire if they got my message about the special permission, and if and when we will get it. They assure me that they are busy with it, and that I will get it as soon as possible.


Beautiful weather at sea.

13 June Friday

Today we have set the time two hours behind. This is convenient for us as most equipment and the ship log work with Greenwich Mean Time (GMT), and by setting the clock 2 hours back we have the daily routine like mealtimes etc. at GMT. The usual mistakes by calculating the local time into GMT are now avoided. For us it means that we can sleep-out in the morning for 2 more hours, but have to work 2 hours longer in the evening. And nobody seems to have problems with it, and as daylight stretches from early in the morning till late at night, it does not feel strange at all. We arrived today at our destination, the Belgica Mound Province, which is situated in the Porcupine Bight, south of Ireland. We immediately started to multibeam the area to map the seafloor. We are permitted to do that as exactly when we sailed into the area we received an email from the Irish authorities that we had official permission to do our research in this special area. This area is protected because it has a concentration of seamounts which are covered with the vulnerable (especially to fishing) cold-water corals. After a zigzag course to quickly map a large area, we look for a shallow and flat area without corals and stones to drop and test the MOVE on. Everybody is working extra hard to get the MOVE, our large Mobile Vehicle into the water in time, as tonight the Dutch play against France in the European Football Championship, and of course that cannot be missed. Stuff on deck has to be moved away as we need space to deploy the enormous MOVE easily from deck into the sea. Everybody has their safety boots on and helmet on their head, which is an obligation when cranes or A-frames are in use. Marck Smit has his birthday today, so we also make some time to eat the birthday cake, home-made by our cook. With help of the multibeam we picked a spot that seems suitable for the MOVE. To be extra sure we check the bottom with our online video equipment. The seafloor at 300m depth looks flat and sandy with now and than a small stone. We also take a sediment sample with the boxcorer. This shows that the bottom is quite hard, which is good, and with many tiny shells and small solitary corals (not so good for the oxygen electrodes, which can easily break on a shell when they penetrate the sediment). But for a test this area is very suitable. Although we work hard to get everything ready, the MOVE is such a complicated thing to program, that to the distress of some fanatical football fans, we only manage to start with the deployment action after dinner. To land the MOVE very gently on the bottom, for its lonely trip over the seafloor, cost us less time than we anticipated, and so we can still see the second half of the football match which proved to be very rich in goals in favor of the Netherlands. Lucy & Marc


The deployment of the lander.

14 June Saturday

Early this morning at 8:00 we triggered the acoustic releasers of the MOVE by sending a special sound signal to the seafloor. The MOVE there upon dropped its heavy weight and is now on the ascent to the surface, because of the many glass floats. We are watching the sea surface around us and wonder when and where the MOVE will appear. An airplane of the coastguard is checking us out. The MOVE finally pops up and we pick it up and set it safely on deck. Erica and technicians check out immediately if all the equipment has worked, and they find that there are still problems to be solved, but that the new installed equipment worked very well and that MOVE did drive for 1 hour over the sea bottom. Later that day we lowered the CTD to 950 meter with our 4 dataloggers with 4 OBS and 4 Fluorometers for calibration with the CTD measurements. For that purpose we keep it for 10 minutes at 4 depths (being 950m, 77m, 49m and 22m) to get enough data for these depths with different turbidity/fluorescence. We also take watersamples at these depths to get samples which will be analyzed for particles and pigments. With our online video boxcorer we survey one of the seamounds. But after a while the winch gets stuck, and we can not haul in the boxcorer. After more than one hour the problem is solved and we can continue. The boxcore sample containes only 2 coral pieces, but it is better than nothing. Yesterday we had a boxcore with lots of polychaete tubes and some empty shell and coral skeleton fragments, but no living coral. All in all it was a good working day, with the sea like mirror, which is rare.

Jenske Schuring & Marc.

Maarten, Lucy and Jenske processing the boxcore sample.

Sunday 15 June

Lots of sun today, so it is a real "Sun"day. We notice it at breakfast too, as we get a croissant and fruit loaf. We have a day program with a lot of variety, we will do 3 videosurveys, the deployment of the fish-observatory lander and a second test deployment of the MOVE. At coffee time special almond pastries are served as we have another birthday now of our first officer Ron. With the video boxcorer we first have a look at the test area for the MOVE, than a survey over Galway Mount and at the end we take a sediment sample. The grab succeeds very well and indeed we catch some living coral again. Than the fish-observatory lander with the new high-definition (HD) camera and a programmable food dispenser made from a sedimenttrap carousel. We have filled the vials of the dispenser with sardines in oil. We hope that this bait is attractive for fish and scavengers as it is for most of us. It will be the first deployment for this NIOZ built prototype camera. For the MOVE-team it will also be another exciting day. The first test in relatively shallow water at first seemed to be not as successful as we had hoped, while the dry tests on deck all worked well. The disappointment ebbed away a bit as, in the end, we managed to get some data out of the instruments. Of course, it is a very complicated vehicle. It has to move over the seafloor and stop at places to take samples and do lots of measurements to give us an insight into the variation in the processes that take place in and near the bottom. So it is quite a hassle to test and program all the different instruments on deck from our blue transport container, which is our primitive MOVE office. After lots of discussion between me and the technicians we decided on a good test program for the 950 m deep station. And at 20:30 the MOVE started its new trip on the seafloor. Tomorrow we will expect it back, and will see if it performed better than the first test. Fingers crossed.
Erica

Jenske and Lucy fill up the bait-vials of the food-dispenser with sardines in oil.

Martin busy programming in the MOVE container.

16 June Monday

This time a report as the birds around the ship would have recorded it. A Gannet flew over the quiet sea in a good mood. He spotted a fishing vessel in the distance with lots of other birds, so this is a clear sign that there must be easy food there. Coming closer he noticed that it was no ordinary fishing vessel, as people were standing on the deck trying to spot something on the water. Gannet took a closer look and almost bumped its head against a large yellow thing that popped up out of the sea. The people on the ship seemed to have waited for this thing, and the ship was now heading towards it. Gannet landed on the water close-by to see what was going to happen. The thing [which in fact was the MOVE] was quickly taken out of the water with such a speed that they must have done this more often. Gannet's attention was attracted to something else, as the ship started to lower a kind of barrel in a frame [boxcorer] on a long cable. Maybe this would provide some food? After a long while the barrel came to the surface again, but it only contained some unpalatable corals. Gannet did not understand the humans, as they seemed quite enthusiastic about the catch. Then another thing happened. They dropped a number of larger yellow floats in the water with an orange flag, which suddenly disappeared underwater [deployment of a mooring]. A stupid action, according to Gannet, that would not provide any food. After checking with the other birds he learned that some of them already waited for several days here, but did not see fish. So time to leave and find another easier source for food. And Gannet disappeared, still hungry, over the horizon.

Maarten Weerenbeck

A sample with coral taken with the boxcorer.

17 June, Tuesday

Today we have planned a CTD-yoyo that will take the whole day. Exactly above a seamount with corals we will measure the whole overstanding watercolumn and the changes over time. Depth is about 800m. We will measure the watercolumn with a CTD. CTD stands for **C**onductivity (which can give you the salinity), **T**emperature and **D**epth. This instrument, that also measures turbidity and fluorescence, is lowered on a cable to a few meters above the bottom, and then back again to the surface. This procedure is repeated as often as we can, that is why we call it a yo-yo. All the information gathered by the instruments is directly sent to the ship through the copperwire in the core of the cable. In the CTD-lab we can see that e.g. the temperature drops from 15^0C at the surface to 9^0C near the bottom. During the day we hope to see the influence of the tides, as ebb and flood is not just a phenomenon that is confined to the beach. Even in the deep-sea at more than 5000m depth you can still notice that currents reverse with the tides. Or perhaps we will find evidence of internal waves. At other coldwater coralreefs we measured a 2 degree difference in temperature at the bottom during the tidal cycle. The water with the highest temperature also had the highest concentrations of pigments, which points to algae, a possible food for corals. This can be the reason that corals abound at these deep-sea places. We are lucky to have planned the yo-yo today, as the weather has turned quite bad. Showers pass by, and the wind is coming up and increases up to windforce 8. The sea immediately reacts by showing big waves with foam. We now have to secure everything on deck, in the labs and in the cabins. The people without any previous experience on the ship now realize that we were very fortunate with the weather and the sea conditions. The movements of the ship caused by the waves make it dangerous to do any sampling or deployments. So we have to postpone the third test deployment of the MOVE. But the CTD is one of the few things that can still be used in this weather without problems. As we are all adapted to the seamotions over the past days, nobody gets seasick, and work goes on. As we also collect near-bottom water during the yo-yo with the Rosette sampler that is attached to the CTD, there is plenty of work. The water has to be filtered on board as quickly as possible, which is a tedious job as it only slowly passes through our fine meshed filters.

Lucy tapping water from the CTD-Rosette sampler in the rain.

These filters are stored in the -80 freezer, and will be analyzed later at NIOZ for carbon, nitrogen, stable isotopes and pigments. At the end of the day we have done a total of 16 yo-yo a very good result.


Large waves passing by.

18 June, Wednesday

The weather has improved considerably, but not as much as we had hoped for from the promising forecasts. The sea is still agitated, and the ship makes some bad jerks now and then. As our time is limited, we decide to go on with the planned deployment of the MOVE anyway. It will be our last chance as tomorrow we have to head to the harbor of Cork. With all the man power we have and with the help of ropes we try to keep the MOVE as steady as we can when it is lifted in the air to get it over the railing and into the sea. It all seems to go fine, till suddenly the crane doesn't react anymore to the steering commands by Sjaak. A slight panic creeps in, when the heavy and large MOVE hangs a few meters above the deck and starts to rock more and more. Sjaak starts sweating, but after a quick reset of the cranes dashboard, the crane works fine again, and the MOVE is dropped into the water without damage. Once it touches the bottom after a while, it is freed from its protective frame and can start its trip over the seafloor at 1000 m depth. We steam to the position of the lander that is standing on a coral-mound, and trigger the acoustic releasers. The weight is dropped and the lander floats to the surface. And indeed after 20 minutes the yellow floats and the orange flag pop up on the surface. We drag it in, and have it safe on deck before lunchtime. The new HD video seems to have worked well, although there is a bit of water in it. And indeed it produced some nice shots of the oil escaping from the vial with sardines when the food dispenser opens. We notice that fish and some large long-legged crabs are attracted to the bait. The so-called "carrier crabs" have the two hind legs bent upwards. At the end they have a kind of simple claw with which they can hold a large piece of sponge or coral above their carapace. They probably do this as a protection against sharks. In time the number of small animals swimming and sitting on the frame near the bait is increasing. These are small (1 cm) crustaceans of the group Amphipoda, the real scavengers of the deep-sea. Because of their large numbers they can clean a dead fish in less than a day, leaving only a nice clean white skeleton. We retrieve the mooring too, which is also going well. In the afternoon the waves have flattened enough to try another video-survey. The last two surveys we did on 16 June showed beautiful pictures, but because of an internal malfunction the recorded images were unfortunately lost. So we try again, and it is a nice survey with lots of corals and relatively high number of fish, among which is a monkfish. After catching some plankton to get our foodweb samples complete, we get the MOVE back after dinner. Although it bumped a bit against the ship, the damage is minor, and our last scientific action in this area is successfully completed. The ship is heading for Cork.


Carrier crabs attracted to the sardine bait on the lander.

19 June, Thursday

We are still steaming towards Cork, Ireland, and the arrival time was set with the harbor authorities at 15:00. This gives us plenty of time, and the Pelagia does not have to steam at full power. The nice weather makes it easy to shuffle the MOVE back into its container. It will be picked up by the NIOZ truck to be transported back to Texel. The test has given the technicians enough information to prepare it for its next cruise in September. Than it will be deployed in really deep water (3 km deep) offshore NW Spain. The participants gather together on the front deck of the ship to watch the Irish coast coming near. We sail up the river Lee, and head directly towards the city Cobh, with its large cathedral amidst many small colorful houses. For Cork we still have to zigzag 20 minutes over the meandering river. At last it becomes very narrow, and finally a bright green painted bridge does not permit us to go any further. We are only a few 100m away from our hotel and the city centre. Everybody is glad about that, and when the customs clear the ship, many use the time to make a stroll through the centre, do some shopping or grab a drink on a terrace. In the evening I too have time to visit a pub together with the technicians Leon and Jan-Willem.

The Pelagia in the harbor of Cork near the centre.

20 June, Friday

We say goodbye to the people from the MOVE and to the students Maarten and Jenske. They fly back to Texel. The two students get a book about marine animals with the signatures of all the participants and crew as a souvenir for their first scientific expedition on the Atlantic Ocean. At lunch we see already five new faces, belonging to the biologist Magda, Rachel and Andy and the students Inge and Thalia. Andy and Thalia come from the Scottish Marine Institute in Oban, and for some reason their equipment has not yet arrived. But after some phone calls the lost stuff is found and brought in time to the Pelagia. We now only have to wait for Gerard. His plane has been delayed, but we expect him sometime in the evening. In the meantime the ship takes in stores, among which are lots of fresh vegetables. There is also a whole carton box full of mackerel, but that will be used as bait for our landers. With Jan-Willem I buy a new DVD recorder to store our deep-sea videos more easily. The truck of NIOZ also arrives to bring some stuff from NIOZ, and to take the MOVE back home again. It is getting later and later and we get worried about Gerard, but at 19:30 he is dropped off by a taxi. As it is high tide he has some difficulties to climb on board over the very steep gang-way. Not much later we leave with a pilot on board to reach the open sea again. Our destination is the corals of Hatton Bank.

Cobh with its cathedral and colorful houses.

21 June, Saturday

Hatton Bank is a large underwater bank or plateau which in cross section is about 50 miles wide, with the shallowest point being about 500m. From Cork it is about 600 miles steaming. The Pelagia will hopefully cover that in 2.5 days, weather permitting. And that doesn't work, as the weather quickly turns bad. The wind increases to a windforce 9 with lots of showers. After the nice sunny time in Cork the new participants have a hard time. Inge, one of the new students, keeps herself together and copes quite well with the circumstances. Lucy, who already has spent 10 days on the ship, has no problem at all, while Thalia looks a bit bleak, staring silently over the waves that get higher and higher. Of the more experienced people only Rachel seems to suffer. For her it is her first trip on the Pelagia. But anyway, it doesn't matter much if you are feeling bad or not for the work on board, as it is almost impossible to do something in the lab or on deck because of the rolling and rocking of the ship. The captain orders a safety drill to give us something to do, and we all have to assemble outside in front of the bridge with our lifejackets and survival suits. There it is checked if you are standing near the correct life-boat (50% chance as we have two of them), and if you are wearing your lifejacket the right way. In the afternoon we have a scientific meeting about what exactly we will do, and how we will organize the work at Hatton Bank. Our target will be the coldwater corals again. There are indications that there are indeed corals at Hatton Bank, but nobody has a clue how much this is. Are there extensive reefs or are there only a few scattered thickets? So it will be really a discovery expedition. The weather gets that bad that the captain has to alter course to make sure that we make some more speed although the traveling distance will be longer. A big advantage is that the ship is riding the waves better, so we are not tossed around so much anymore.

Safety drill

22 June Sunday

Luckily the wind has slacked down, and the ship can take a direct course again. We now can also work on our equipment. Magda is busy to position her digital camera onto one of the two landers. This camera is directed at a pole onto which we will attach a frozen mackerel as bait. We hope it will attract lots of scavengers, that will produce nice video footage, which will give us a clue about how many of these animals are living down there between the corals. Gerard is busy setting up two large seawater tanks and to attach them to our cooling machine in container 16. The machine can easily keep the 1000 liter tanks at bottom water temperature (about 9^{o}C). We will use the tanks to keep the bottom animals that we hope to catch alive. We want to know how active they are by measuring their oxygen consumption. Jan Willem replaces the boxcore camera with another one as it failed to record our nice video surveys. He also had time to look at our HD video footage and grabbed a nice picture of carrier-crabs out of it. So everybody is more or less busy. The ship makes good progress too, but because we lost time on the first day we will arrive a bit later, probably tomorrow late in the afternoon.

23 June Monday

A beautiful day with a calm sea. We gain some of the time we lost during the bad weather. At 15:00 we stop for an hour to test our dataloggers with OBS and Fluorometer. For that purpose we have attached them to the CTD so that we can calibrate them against the turbidity and fluorometer of the CTD. We keep the CTD for 15 minutes at 4 different depths, 975m, 75m, 50m and 27m. We have also attached the Scottish datalogger. It all worked out, and as we collect the data we learn that all equipment worked well, but that they also all give different data. We are now able to correct for this. We arrive at Hatton Bank at 17:00, and start with mapping this area unknown to us with our multibeam. The multibeam is an advanced echosounder that registers the depth of the seafloor over a wide band while the ship is traveling at about 6 knots. On the computer screen of the multibeam you can immediately see the results, a beautiful colorful map of the relief of the seafloor beneath us. Mounts, canyons, and plains become visible. During the night we discover a small seamount which seems promising for corals, and we will have a more detailed look tomorrow.


Inge and Lucy busy with attaching the dataloggers to the CTD.

24 June 2008 Tuesday

The weather again turned from very good to bad. But in spite of that we can do some work. We video-survey three of the seamounts we discovered last night with our multibeam, and find our first evidence of the presence of corals. Particularly at the first mount we try, the coral is quite abundant. Further we see many starfishes and fishes, and even a shark of 2 meters long. We also take a couple of sediment samples with our large boxcorer, and Lucy and I (Inge) are sieving the sediment through 0.5 mm for the macrofauna. The first boxcore produced a nice sample with corals, brittle stars, starfishes, bristle worms, shells and some stones. The other boxcores seemed superficially less interesting. Rachel, the BIOFUN postdoc, has taken subsamples of the bocore samples to be used for the oxygen consumption experiments. Although the high waves are very scenic and make some nice photographs, I hope that the weather will improve soon. But the weather forecasts are not very promising.
Inge van den Beld


A boxcore full of deep-sea sediment and overstanding water. Lucy, Inge, Rachel and Gerard standing around it.

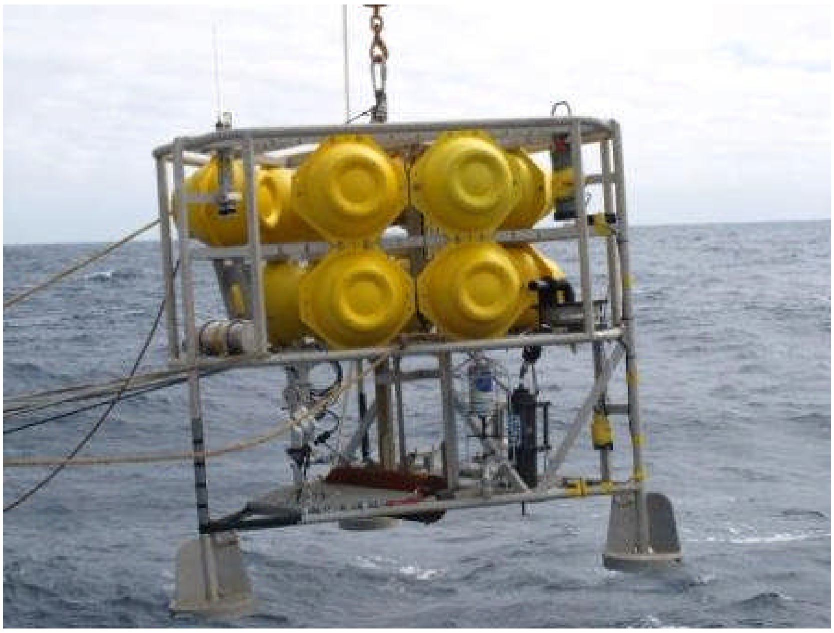
25 June Wednesday

The weather is still rough, but we manage to deploy both our moorings. We have decided that the first seamount that we surveyed is the most promising, and we will use it as the centre of our activities in the coming days. We plan to deploy 2 moorings deep (1200m) at the west and east side of our coral seamount at Hatton Bank, and we will deploy a third one at the shallowest point of the Bank. The mooring is in our case a steel cable of only 25 meters with floats on one end and a weight on the other to keep it straight and vertical in the water. Attached to the cable are a current, turbidity and fluoro-meter. As the mooring is very short compared to the mooring of oceanographers, the deployment is normally quite an easy procedure. But as the weather is quite bad, the job is tough, and inevitably the relatively fragile datalogger touches the ships hull a few times. But luckily without any damage, and when we uncouple (trigger) the cable from the ship, the whole mooring sinks rapidly to the bottom of the sea. Then we steam to the shallow point of the Bank. This will cost a few hours because of the weather. We will drop the SAMS mooring at that point, and Andy has already tested his acoustic releaser on a cable at 250m depth. Although he was worried about it, the acoustic releaser worked well. The releaser is the most crucial thing of the mooring, if it does not work it is very difficult to get your mooring with its expensive equipment back. Finally we are on station, and the SAMS mooring is ready for deployment and laid out on deck. Andy, however, wants to test the releaser another time, to be very sure. But now it doesn't react at all. We try it several times but that doesn't help. A decision has to be made, so I decide that we will deploy the other NIOZ mooring at this station to avoid loosing any time. In a quarter of an hour the second NIOZ mooring is ready for deployment, and after a successful action, we see the mooring with its yellow floats and orange flag disappearing under water. We are glad that both moorings have been deployed; they will measure the changes in the environmental parameters at the seabed at these two different places over the time of the expedition. Tomorrow we will deploy our two benthic landers near and on top of the coral mound. The SAMS-mooring will not be used, unless we can solve the problem with the releaser.

26 June Thursday

Today looked promising as the sun was shining…but the wind was blowing hard. In spite of this we had a successful day deploying two of our benthic landers.
A benthic lander is a large aluminum frame which sits on the seafloor. To this frame we can attach scientific instruments which give us information about conditions at the seafloor. We spent most of the morning preparing the landers for deployment. The first lander was deployed just before lunch in an area containing no cold water corals at a depth of 850m. On this lander we placed a baited camera, which consisted of some mackerel, to attract scavenging fish and crabs and a digital camera to record which animals visited the lander. In order to learn about the seafloor environment we attached the following instruments to the lander: oxygen probes to tell us how much dissolved oxygen is in the water, current meters to give information on the speed and direction of currents in the area, fluorescence meters which will tell us if there are any degraded phytoplankton (tiny marine plant cells) at the seafloor and an OBS to measure optical back scatter which will give information on the particles in the water.

Such particles and degraded phytoplankton are a food source for many of the animals that live at the seafloor.
The second lander was deployed at 700 m on a mound 50m high where cold water corals live. This lander contains sardine bait which is released at two intervals; first when the lander is at the seafloor and then again a day and a half later. There was also a high definition digital camera attached to record animals visiting the sardine bait. This lander also had the same instruments attached to it as the first lander and a transmissometer to detect particles. Our whale specialist David, also attached a hydrophone to the lander to record whale calls. Each lander also contains a data logger which stores all of the data collected by the instruments and a weight to help it sink to the bottom and keep it on the seafloor. The landers were lowered into the sea by the ships crane and then were released to fall to the seafloor under their own weight. Both deployments went very well. The landers will stay at the seafloor for three days. When we retrieve the landers we will compare the data from the area where cold water corals were present to the area where no corals were present. We might expect to see more scavenging fish and crabs in the area where corals are present. Rachel Jeffreys.


The top of the mooring with flag and ARGOS-beacon.

27 June Friday

The day began with some welcome visitors: a group of pilot whales were hanging out on the port side of the ship. They are the first on this cruise to have been spotted so close (within a few meters) for an extended time period, and all the cameras came out to greet them.
Over breakfast, the weather forecast map was dubiously passed around the tables...the large LOW sweeping in over the wee red dot which indicated our position stirred mumbles to the effect of “I wish we were in the Azores”. Meanwhile the cetacean congregation continued to grow in all directions. Dave from the Irish Whale and Dolphin Group (www.iwdg.ie) estimated 100 pilot whales and 10 white-sided dolphins. They leisurely passed by, occasionally lining up to surf a wave and with the odd breacher, until they gradually disappeared around lunchtime.

Given the strong winds and growing swell, the video and box-coring plans were put on hold. Instead, the small triangular dredge was deployed. Once its goods had been disgorged onto deck and the larger creatures picked out, Inge, Lucy and Marc began diligently sieving through several large barrels of coral rubble on the aft deck in the wind and rain, to extract the smaller and more elusive fauna. Meanwhile, the hard-working crew, Leon and Jan-Willem were kept busy conducting CTDs, and Magda and Andy spent many hours battling with the multi-beam mapping program.
By evening, captain C had ordered the clamping down of port-hole covers on the accommodation level. Despite the increasing winds and swell, Rachel decided to do some rowing after dinner. I joined her on a bike, smiling at the absurdity of cycling in the middle of the North Atlantic. Thalia Whatmough.


Pilot whales enjoying the waves.

28 June Saturday

It is windforce 8 outside and we expect that it will even increase to 9. This means that we cannot do anything outside. After coffee time, we notice that wind and swell play against each other, with the effect that the rolling of the ship decreases. Inge, Lucy and I decide that it is not too bad on deck and we start sorting the dredge material from yesterday more secure. Yesterday we had to stop half way as it was becoming too awkward to work on deck as it was difficult to stay on your feet because of the movements of the ship. The girls didn't mind as they were shivering in the cold wind in the middle of the summer. Now we finish the job by sieving all the dredge material through 3 large sieves. The 1 cm sieve retrieves dead coral skeletons and small stones, but also some live animals like many sponges and orange brittle stars and a few spider crabs, long worms with scraping jaws that live in symbiosis with the corals, 6 different species of seastars of which one has 6 instead of 5 legs, and many more animals. The spider crab comes in two species, one with very long and slender legs, and another with shorter stout legs and a large forked rostrum between the eyes. Inge finds a small furry ball, and when I explain that it is a fire-worm, she is shocked and drops it immediately.
But the small polychaete did not do any harm. However, in the Mediterranean in shallow water lives a large colorful species which you don't want to touch, as his glass-like bristles easily penetrate your skin, break off and give a lasting burning

sensation. But in general there are not a lot of dangerous animals in the deep-sea. In between al the dead coral we also find a few pieces of living coral. During lunch we are served a thick pea soup with hot pancakes as dessert, just to remind us that summer here looks more like a Dutch winter. After lunch we do a CTD yo-yo but now not at the same spot but from deep to shallow to make a cross-section of the watercolumn over the slope. It works out well, and we get a nice picture. It shows that at 800-900 meter there is an obvious turbid layer (nepheloid layer), but we have no clue yet where it comes from and if there is a connection with the corals. We hope to solve these questions during the expedition. At night we are multibeaming as usual, but the machine malfunctions. Magda, who is our multibeam expert on board, fixes the problem easily by resetting the computers. The result is that is produces again a nice bottom map.

The triangular dredge with a good catch.

29 June Sunday

It is Sunday and also really a sunny day. Even the sea is quite flat, probably a rarity in this area. With the multibeam we discovered several other little seamounts and will visit two of them today to see if they have any coral cover. Our video indeed shows that both of them have an extensive cover of corals. Most of it is dead, and only the tops that are sticking out above the dead coral carpet are alive. The difference is clearly visible, as the dead coral is brown-gray, while the living coral has an orange color. Frequently we see fishes lying between the coral; mostly it is ling (*Molva*) or a torsk (*Brosme brosme*). Other large animals that are easy to spot are orange anemones, big white sponges, sea-urchins with long spines (*Cidaris*). At the end of the video track we take a sediment sample with the boxcorer. The sediment sample is 'sandy'. There is no stone coral in it, but instead we caught two black corals, which are curled like the tail of a pig. They look like they are made out of thin black iron wire, with the difference that here there are tiny orange polyps sitting up the "wire". With cores we take some subsamples of the large sediment sample; some large cores (10 cm) for oxygen incubations, and small ones (prepared syringes) for pigment and lipid analyses. The pigment analyses are used to determine how much fresh food is available at the bottom. The pigments are coming from algae that live in the top 100m of the ocean as these "plants" need sunlight to grow. If these tiny unicellular algae die or are eaten, they sink after a while half digested to the seafloor, and there form the food for most of the deep-sea community, including coldwater corals. The second video survey runs over a much steeper hill, but it also has lots of corals. In getting the boxcorer on board again, it touches with the wrong side (with the video camera) the ship, and the video gets damaged. Jan Willem, our electrotechnician, has a look and is not very happy with the result. Luckily water did not penetrate the housings, and as we have a spare, he will be able to repair it. Leon will make a better protective frame around it, so that it cannot happen again. In the afternoon we recover both our landers without problems. Both flags are easily seen at the surface with this fine weather. If they are both on board, it proves that all equipment worked well and that we also have some nice HD-video footage. Our sardines (bait) have attracted Amphipoda, fishes and red crabs. As we are afraid that the weather will be bad again tomorrow we also recover our shallow (550m) mooring. We manage and we get it back intact. All in all a very busy day, and we have lots of data to download and to analyze this evening.

The large boxcorer with camera ready to be launched.

30 June Monday

Today we try to get some live coral for our incubation experiments. As our large boxcorer cannot be used yet, because of the damage to the video system yesterday, we use the spare but smaller boxcorer. It has a core of only 30cm in diameter instead of

50cm, but has the advantage that it often penetrates deeper into these hard coral sediments. The first trial is a disappointment. We collect a core full of clear bottom water, but surprisingly it contains a living crinoid (sea-lily) and a shrimp. The second trial gives a nice sediment sample, but it contains so much dead coral that Rachel fails to push a subcore in. So Lucy and Inge sieve this core as a whole to collect the macrofauna. The third core is quite colorful, as it contains orange anemones, orange brittle stars and orange starfishes. After lunch one of the landers is ready to be deployed again, and we position it on top of a coral mound. We also deploy our mooring that we recovered yesterday again, but now at 1000m. The deeper mooring is recovered, and we are standing on the bridge to see were the flag will surface. Always a bit of an exciting moment. But the minutes go by and we haven't seen it yet, and we are getting worried. Since yesterday indeed the weather has turned rough again, and the waves with foam make it difficult to detect a floating object. The ship is moved closer to the point were we expect it to surface, and suddenly the captain discovers it. It is quite close, but indeed difficult to see under these circumstances. We pick it up, and after downloading the data, we learn that the temperature at 1200m is only 4.5 degrees. A surprise is that there are still relatively high concentrations of algae and particles in the water at that depth. At 20:00 we have our other lander prepared for another deployment, and we drop it in the sea too. The deck is now quite empty with the moorings and both landers gone. The wind is quite strong, and this afternoon one of those freak waves suddenly crashed into the working deck and flooded our wetlab. Jaap, our engineer, who was sitting there to smoke a cigarette, couldn't escape in time and got totally wet, but to his luck his cigarette stayed dry.

A boxcore sample with lots of dead coral and orange anemones and brittle stars.

1 July Tuesday

For today I have planned an alternative bad weather program next to the normal one, as according to the weather forecast for today we can expect bad weather. But luckily for us, the meteorologists have it completely wrong and the day stays calm, so we can perform a boxcorer program in deep water (1000m). The bottom is quite sandy here, with little stones. If you look at this sand closer with a microscope, you can see that the so-called sandgrains are in fact the shells of unicellular organisms, Foraminifera.

These organisms live in enormous numbers in the oceans. Most of them live in the surface layer of the water column, and form part of the plankton. If they die, the "heavy" shell sinks to the seafloor. In millions of years all the dead shells together can form a thick layer at the seafloor. In a similar way coldwater coral reefs can form with the dead coral skeletons thick layers too. Deep borings through some seamounds has proven that they can form mounds of 200-300m tall in several million years. During the morning we collect several other sediment samples with the boxcorer. After lunch we prepare another mooring. Magda's current meter didn't work properly the last time, but luckily Andy has brought a new currentmeter, which we may use. Both the cuurentmeters are attached, so that we can compare them. Magda's meter is attached 10 m above that of Andy. After the deployment of the mooring, we dredge at 1000m for 15 minutes. We always dredge for a short time to diminish damage to bottom and net. Our catch easily fits into a 20 liter bucket. Most of it consists of stones, but we also caught a fish with our small shallow dredge. It is called a rattail, as it has a long tapering tail. In sorting and sieving the catch we discover spidercrabs, hermitcrabs, a seamouse (kind of strange worm), solitary corals and a sea urchin (Cidaris). But no trace of any reef forming coral, not even a piece of its skeleton. Probably at 1000m it is too cold for it here.

Rachel taking her cores out of the boxcore sample.

2 July Wednesday

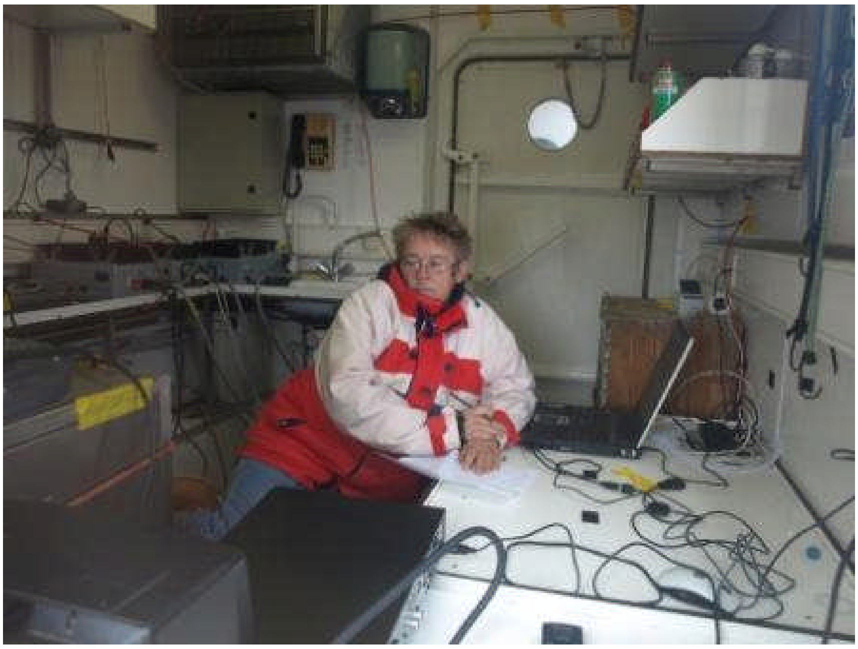
First again a talk about the weather. The forecast for today for this area is very bad: storm with windforce 9. But we do not experience this at all. At times there is even no wind at all. At first we are afraid that this is the well known silence before the storm, but nothing happens during the day, and we can work the whole day without problems. The videoboxcore is fixed, and we can have another online look at the seabottom. We survey a new discovered little seamount, which proves to be one of the richest places with coral up to now in this area, with also many fish and sea-urchins. In plotting the video survey on a map we notice that there is a difference between the original multibeam picture and the final bathymetric map of about 150 m! This is quite important as we need a high accuracy of the position as these coralmounds are not very big and you want to know exactly where the top is. The difference proves to be a mysterious error when the original data are interpolated into a bathymetric map. We often call the multibeam the "multidream" as it gives these wonderful colored pictures. But as it is a very complicated machine it is also can give a lot of problems. So far Magda is able with some difficulty to control it with some help of Andy. But there were moments that she called it the "multi-scream". The rest of the day is filled with more videosurveys. At the end of each track of about an hour we take a boxcore sample. One was quite beautiful, filled with dead coral that was covered with 100 orange brittle stars. The day ends beautiful with a large and complete rainbow.

Rainbow over Hatton Bank.

3 July Thursday

This morning we recovered the lander that we had deployed last Monday. We are anxious to see the data it has collected and the video footage it has shot. Luckily we see the lander with flag popping up after a quarter of an hour, the normal time necessary for the lander to travel from bottom to surface with about a speed of 50m/minute. It is routine now to get it on deck. All instruments seem to have worked well. This lander has a carousel with some vials filled with sardines in oil. These vials

were opened one by one at certain times, and we are curious what kind of animals were attracted by this bait at 700m. These first shots of video show the landing of the lander on the bottom. After the dust plumes have gone an uninteresting sandy bottom becomes visible. Apart from particles drifting by and the occasional shrimp and amphipod, nothing happens at first. No one seems to be interested in the bait. Almost a day after the landing a big crab tries to get some sardines out of the vials, but its claws are too big for the vial. Suddenly a black shadow passes by, it is a large ray. As time passes by the vials with bait more or less stay untouched, and it seems that there are not a lot of scavengers down there, or that they don't like our bait. We recover the other lander which is standing amidst corals in the afternoon. It also has a video camera, but here the bait is a frozen mackerel. The bait or this area gives a much better result. Almost immediately amphipods flock around the bait and after only 8 minutes we see a large crab trying to climb the lander to get to the bait. First it falls on its back in between the coral, but later it indeed manages to reach the dead fish and starts eating. A large fish approaches a few minutes later and tries to tear off the head of the mackerel, but at first without success. As the video cannot record continuously as the deployment lasts several days, it is time-lapsed. The disadvantage becomes clear as in the next shot we notice that the mackerel is gone completely, and we will never know who was responsible for it. But we will try again, and will deploy the lander with a new mackerel tomorrow.
Magda



Magda making notes while watching the lander video.

4 July Friday

The 4th of July, Independence Day in the USA, but also significant onboard the R/V Pelagia. Floating over the undiscovered country of Hatton Bank, we were set to embark upon an amazing adventure. I had brought an infra-red video system with me, part of a new lander developed by SAMS. The system uses a low-light ROV camera in conjunction with 2 powerful infra-red lights. Unfortunately, the system is rather bulky and heavy with the internally powered DVR weighing nearly 50 kg in air!

Lovingly christened the “Fat Boy” by my NIOZ colleagues, it closely resembles a bouncing bomb made famous by the Dambusters.
The ALBEX lander became the vessel for the voyage of discovery with the IR system. Gerard made some clamps for the system to rest upon in the corner of the lander, whilst Jan Willem acquired a variety of clamps for the camera and lamps. The system is particularly interesting as we hypothesize that light will have significant impact upon animal behavior in the lightless deep-sea. One recalls the example of hydrothermal vent animals with eye damage probably caused by the powerful lamps of submersibles and ROV’s. Any animal would be wise to avoid light sources in a usually dark place, only the bold, curious or hungry are likely to take the risk.
Still, attached was the “Fat Boy”, programmed to record a baited pot for 12 hours before the High Definition video camera of the NIOZ takes over, recording the same field of view at the same interval. With the usual professionalism of the crew, the lander was hoisted and dropped in free-fall to reach the bottom, lying at a depth of about 1000m it may provide insights into animal behavior not yet uncovered in the deep. On the other hand, it may not show us anything! We await the return of the “Fat Boy” to see what glimpses it provides of the dark deep.
Andrew Davies (Scottish Association for Marie Science)


Jan Willem and Andy checking if all the video cameras are attached well. The picture shows a corner of the lander full with equipment. The rusty ballast weight in the front. In between Jan Willem and Andy from left to right: infrared camera, HD-videocamera, "fat boy" or infrared camera system, current meter and filterdevice (SAPS).

5 July Saturday

Just out of bed the captain pops in with a serious face. Since 4 o'clock this morning we are drifting because of engine problems. It looks quite serious, but both engineers Jaap and Hans are still busy to find the real cause of the problem. It seems that there is something wrong with the main electronic switch board between the electro and diesel engines. As it works with high voltages (660V), everything has to be switched off to avoid serious accidents and to make repairs if at all possible. The disadvantage is that we then not only cannot steam with the ship, but we cannot do a scientific program as all winches and cranes are dead too. There is, however, still electricity for the basic facilities, like lights, cooking and computers, as the harbor engine is started. The morning passes by without extra news, and people are beginning to speculate what will happen if it cannot be repaired. The smaller engine is still functional, but it will give us a maximum speed of 3 knots in fine weather. As we are in between Iceland and Ireland it is a long back to land. Because of the dominating wind direction, Ireland (Galway) seems to be the better options, but that is still a week steaming with the one engine. That means the expedition is over. The afternoon also doesn't give positive nor negative news about the engine. In the mean time we check the videos we have made so far and note two different kinds of shark, rays, ling, red crabs and lots of amphipods. During dinner both engineers enter with a tired smile on their faces. They fixed it. The engine works again. For me a big relief, all the doom scenarios can be thrown away, and we can continue our scientific program. We start immediately with filling up the bathymetric map with new multibeam tracks. We have now almost filled in completely a nice rectangle that includes all our stations so far. Floris sets a record during his morning-watch (04:00-08:00) by counting 2 ships in this desolated area. One he discovered on the radar and the other was discovered through radio contact, but were too far off to be seen with binoculars. It shows in another way how far off we are from land and the normal shipping routes.

6 July Sunday

Yes it is Sunday again. If you are sitting in the middle of the ocean for a couple of weeks doing your work without a real break, you do not notice a weekend anymore. Therefore the cook serves fresh made raisin bread at breakfast, so that we are aware that it is really Sunday. After doing almost nothing yesterday because of the engine problems, we start today by taking a bottom sample with the small boxcorer. The rest of the day is filled with video surveys, but it does not work as well as during the past days. The video camera normally switches on when the whole frame is close to the bottom to save video time that is bound to a maximum. But now it doesn't switch on at all. Jan Willem tries several times to get contact with the camera through the thin copperwires in the very strong synthetic cable that connects the video boxcorer with the ship. But all in vain, so the only solution is to hoist it back on deck to see what is wrong. When this is done it becomes clear why it didn't work, as one of the electric cables was cut by accident by another wire. Jan Willem can repair it quickly, as by accident we find a spare cable in one of the many aluminum boxes. We could have repaired the cut cable too by soldering and vacuum packing the cut with bitumen, a kind of very sticky black chewing gum. But, alas, one of participants of the last expedition has taken almost all the bitumen back to Texel, and we have to search the ship to collect some tiny bits here and there. It shows how dependent you are here in the middle of the Atlantic Ocean on even some minor and inexpensive materials. So we hope we will not encounter more cable cuts. The three videosurveys after the repair work out well. They show that coral can reach up to 950m depth here. The knolls to the south are covered with corals although a bit more sparingly than seen earlier. At least we have discovered that at Hatton Bank there is far more coral than we initially thought. The nicest of the recordings today is a squid on the video, and the saddest a disheveled bird (a Wheatear, which normally lives on land, especially in the dunes) that reached the ship with his last powers, but will never see his land of origin again. The hundreds of Northern Fulmars sitting in the water around the ship seem to have no problem at all with living in the middle of the ocean.


No wind to fly.

7 July Monday

An exciting day especially for Andy, as we will recover the lander with his infrared camera. The acoustic releaser answers our sound signal almost immediately, and it drops its heavy iron weight of 260 kg. We check by regularly sending a sound signal to the lander if it really comes to the surface, but the distance to the ship stays exactly the same, and we are getting worried. After 5 minutes the distance becomes larger instead of smaller. We make contact with the bridge, and they confirm that we are still moving away from the area. We are relieved as this is the reason we couldn't see that the lander was coming up. And indeed after 20 minutes the lander with flag surfaces. We hoist it on deck and then it is getting busy around the lander. Cables are attached to the different instruments to read the data out. Other equipment has to be detached to be opened in the dry lab. This also happens with the infrared camera system (fat boy). We need a trolley to transport the heavy thing inside. There it is opened. The O-rings of the lid have closed it off adequately, and seawater hasn't penetrated the sensitive electronics. One drop of seawater can ruin the expensive camera. Andy is happy in all states, as his camera has done very well during its maiden voyage to the bottom of the sea. The black and white video shows that the infrared light penetrates far enough through the water to see the carousel with bait very well. In the first 5 hours after the bait has been released we see several ling and torsk. Both fish look a bit like an interbreed between a cod and an eel. It looks as if they are not disturbed at all by the infrared light. A few times they even touch the bait. The HD video which shot footage at the same time was also very good. During the bright white light periods we have the impression that we see less fish. Is this really true, and is this caused by the bright light or because the bait has become unattractive after a few hours? We try to answer these questions by doing more deployments with both cameras.

Andy in the lab with his “fat boy” infra red camera.

8 July Tuesday

Despite the varied scientific program (landers, moorings, CTD, videosurvey, boxcorer) it starts to become a kind of routine for most people after being almost a month without break at sea. And you need to do something about that. A good remedy for crew as well as scientists is fishing with our 3m beamtrawl. Of course, this trawling also has to have a scientific purpose. And it does. We want to know how the foodweb of the deepwater community in and around the corals is built up. For example, we want to know how many animals are directly dependent on the suspended food particles in the water (the filterfeeders), how many are feeding on the material that is lying on the bottom surface (deposit-feeders), and how many scavengers or carnivores there are. By looking carefully at the morphology of animals it is often possible to deduce what kind of food it probably eats. An animal with big teeth very probably will have these to catch other animals, and a worm with his guts full of sediment is probably a deposit feeder. But sometimes it is not very clear what an animal feeds on. By analyzing the stable isotope ratio of carbon as well as nitrogen it is possible to get an integrated picture of where animals fit in the foodweb pyramid. If it sits at the base of the pyramid it means that it feeds on the primary food source, which are fresh algae. If you are the top of the pyramid, you are a so-called top-predator. The name pyramid was chosen because you have much more animals that can live on the primary (algae) sources (the wide basis of the pyramid), than the few top predators. For example, there live many more zebras (grass-eaters) in Africa than lions (meat eaters). The animals from the base of the pyramid were already well represented in our boxcore samples, but top predators like fish are hard to catch with a boxcorer. The beamtrawl we are using is comparable but much smaller than that which the plaice and sole fishery in the North Sea are using. We have chosen an area at 800m depth where the bottom is flat and where we expect no corals. We only plan to fish for 15 minutes. Paying out and hoisting in the almost 2 km steel cable takes most of the time. When the net comes to the surface again, it is luckily not torn. On this bottom unfamiliar to us, it is easily possible to rip or lose your net because of some unknown rocks. As the cod-end is visible we already see that we have a good catch. When the catch is dropped onto the deck, fishes, crabs, sea-urchins and some corals show up. The fishes of course attract most of the attention of the people, especially the sharks and rays. The most common fish in the catch is a kind of cod. Because of the pressure difference between the deep-sea and the surface the swimbladder has expanded so much that the eyes have popped out a bit and the stomach is visible through the mouth. Remarkable are the red flat pancake sea-urchins. These sea-urchins do not have a strong skeleton, and when the body is lifted out of the water the water inside is drained and the animal collapses. A few of these sea-urchin species can have poisonous spines, so they leave it to me to take them out of the catch. The most beautiful animal is a so-called medusa-head, a large orange brittle star with branching arms. With a whole group of volunteers we sort the whole catch in the evening on deck. Bit by bit it is rinsed over the sieves so that nothing is lost.

The common cod-like fishes of the trawlcatch.


The cod-end with catch on deck.

9 July Wednesday

We are lucky with the weather these last days, of course it is all relatively speaking, but for Hatton Bank we call it nice weather. With temperatures of 13 degrees you cannot call it real summer weather, but the swell and wind have decreased that much that working and sleeping isn't problematic anymore. We start today with a CTD-session. It is a repeat of what we did a few days ago. Its purpose is to look for changes in the 1000m deep watercolumn. We are especially interested if the near bottom zone with a low-oxygen level, which we found last time, is still there. And indeed after we have analyzed the data in the afternoon this layer is visible again. What is the cause of it? Could it be caused by resuspension of material by internal waves? And is there a connection with the corals? Questions we cannot answer yet. We want to do another CTD yoyo for a day long to get more information which is planned for the last working day. Today there is only time to recover the lander with the infra-red and HD-videocamera. To discover if white and infra-red light influence the behavior of fishes, we have alternated the illumination (white or infra-red light) of the bait every 15 minutes. The bait (sardines again) has attracted a lot of scavenging amphipods. You can see them swimming against the current towards the bait. After they have stuffed themselves full of food, they lazily stay around clinging to the lander. They sit shoulder to shoulder. It is a pity we do not notice much fish during this time, and therefore it is difficult to draw conclusions about what light is better to use. For the long-term bait experiment (1 year) which is scheduled for next year we want to be sure of how much the light is influencing our experiment. We do this research in the frame work of the new European project CoralFISH, in which NIOZ is a partner. The project will investigate the relation between fish and coldwater coral reefs. We prepare the lander for another last experiment. The day is finished off by taking a boxcore sample at one of the stations where Rachel still needs another sample for oxygen consumption incubation. She starts to get a nice collection of data. Still two days to go, and we have to head back home. So we have a meeting about the priorities are for these last days.

10 July Thursday

Today we will do the last two video surveys of this expedition. Two knolls in the north of our area will be the target. The boxcorer with videocamera, lamp and 2 lasers is lowered to about 3 meters above the seafloor. The videopictures are condensed and then passed along the thin copperwires over a length of more than 5 km to the ship. Quite an achievement of the electronic department. And it works. On the monitor the two green parallel laser beams are clearly visible. Where they hit the floor 2 bright green dots light up. The man of the winch uses the relative distance between the dots (which is always absolutely 30 cm) as an estimate of the distance between video and seafloor. If the dots are coming too far apart, we are too close to the bottom and he has to winch some cable in to avoid crashing into the bottom. As a scientist we use the laser points on the video to get an exact measurement of e.g. animals (length of fishes) and of the surface covered by living coral. Both mounds have a coral cover. Then we recover both our moorings. One of them already measured for 10 days in a row, so we hope that it will give a nice long dataset of temperature, currents and suspended particles. And indeed it worked well, except for the Aanderaa current meter of Magda. After 5 days of correct readings it suddenly starts to make up data by itself. If these data were really true, then there has been an enormous storm with very high current speeds down there. We do not believe that, and we think the current meter needs a revision. For us it is not really a disaster as we have Andy's currentmeter as a back-up. That one shows a perfect picture in which the currents stay within the expected minimum and maximum values. On the basis of these measurements we also notice that there is a periodicity in the changes in time, especially in temperature. From the first short-term measurements of the landers we had the impression that there was no pattern in the changes in temperature. But now we are able to calculate that we have to start the CTD yo-yo very early in the morning (04:00) as we expect the most important changes within the first hours. After having discussed it with the captain we make set up shifts. Jan Willem and Ger drew the short straw and have the first shift tomorrow. In the meantime the lander with both video cameras and the sardines has been deployed for the last time. It takes a lot of time to

The large rattail of about 1 meter long.

prepare it, but deploying it is done in 5 minutes. We do another beamtrawl at 1000m, but this time we are not as lucky as last time and the net is almost empty. When the cod-end is emptied one big rattail fish is our catch. It is almost 1 meter long. At the end of the day the other lander with the frozen mackerel is recovered. The video shows that it quickly attracted 3 species of shark, which, together with a whole lot of amphipods, ate the bait in a very short time.

11 July Friday

The last working day at Hatton Bank will be filled with a CTD yo-yo at one point of 900m depth. As we are only interested at the layer near the bottom we lower the CTD to the bottom, and winch it in up to 400m above the seafloor, and than back again to the bottom. This is repeated multiple times during the day until 18:00 in the evening. At the end of the day we will then have 14 hours of data; that is the advantage of starting very early. After we have made graphs of the watercolumn data, we indeed see, as expected, changes near the bottom in the first few hours. Is this caused by tidal movements, or maybe by internal waves? And what is the relation with corals? Still questions to be solved in the future. After dinner we recover the lander with the video cameras, and this is also our final scientific action of the expedition. After the lander is safe and secured on deck, the ship heads in the direction of Texel. The back trip runs along the north of Scotland and the Orkney Islands into the North Sea. We are very lucky with the weather (no swell, hardly any wind and even some sun) and we make such good progress that we will arrive in the NIOZ harbor on Texel already on 15^{th} of July at 18:00. In the meantime we pack everything in boxes and crates which are stored in 20feet containers. It was a very successful expedition. We have discovered more coral on Hatton Bank than we expected. In comparison to the coral reefs of Rockall Bank and the Belgica Mounds the amount of living coral is smaller. Only the top of the coral framework is alive at Hatton Bank. We collected enough sediment samples with the boxcorer for macrofauna analyses. The water column has been measured thoroughly with the CTD, and we filtered a lot of water for the analysis of the suspended particles. With the multibeam we assembled a beautiful detailed bathymetric map of our research area. For the first time we made HD video images of crabs, sharks, rays and other fishes that were attracted by our bait. The combination of our HD camera with the infra-red camera of SAMS worked out very well. All these data will give us a better insight into why these corals are living here, where their food is coming from, how biodiverse the community is and how important they are for fishes. We also hope that our investigation will help to protect these unique and vulnerable coral communities from fisheries and other human threats.

Chief scientist, Marc Lavaleye (NIOZ)

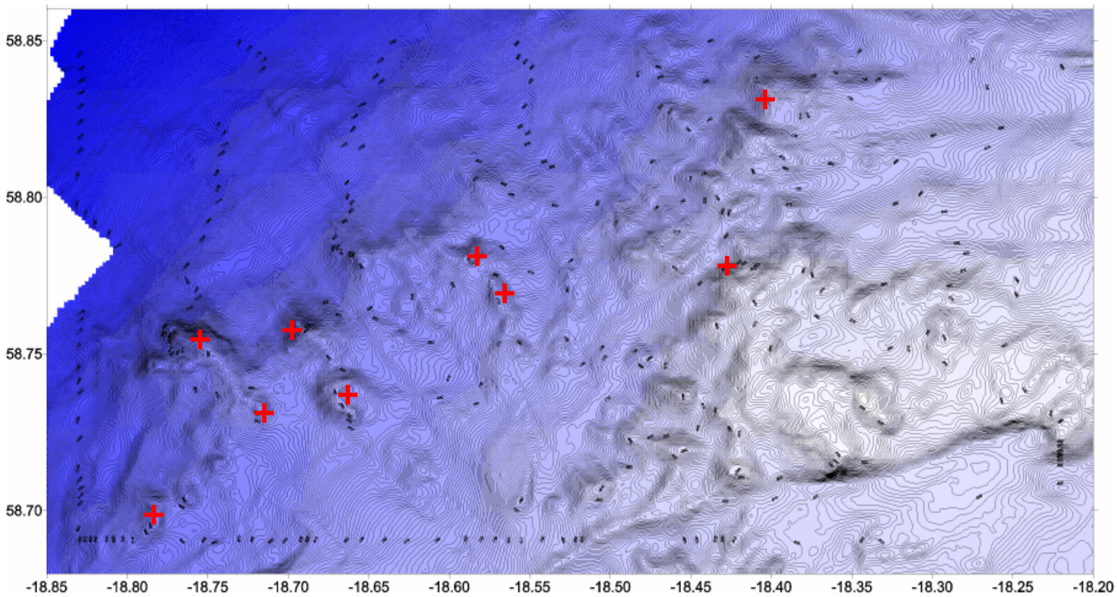
The crew and participants of the HERMES/CoralFISH 2008 cruise with RV Pelagia. From left to right at first row: Thalia (yellow jacket), Hans, Lucy, Marc, Ger and Eric. Second row standing: Cees, David, Magda, Leon, Andy, Sjaak, Inge, Dave, Rachel (small), Jan-Willem, Gerard, Floris, Jaap and Freddie. Jose and Hans List were too late for the photo.

Acknowledgements.

The scientists would like to thank the captain Cees de Graaff and crew of RV Pelagia who provided invaluable help and expertise to smoothly carry out the various scientific tasks during this cruise. Also, invaluable is the technical support and help prior, during and after the cruise by the NIOZ marine research facilities (MRT) and associated departments (MTC, MTM; MTE; AA and DMG). Funding for research was provided through the Dutch National Science Foundation (NWO/ALW) and by the European Community through the HERMES project (contract no EC-FP6, GOCE-CT-2005-511234-1) and the EU CORALFISH project (contract 213144 Call ENV-2007-O1)

APPENDIX

Apendix 1 (below). Positions were live coral was found by us on Hatton Bank.

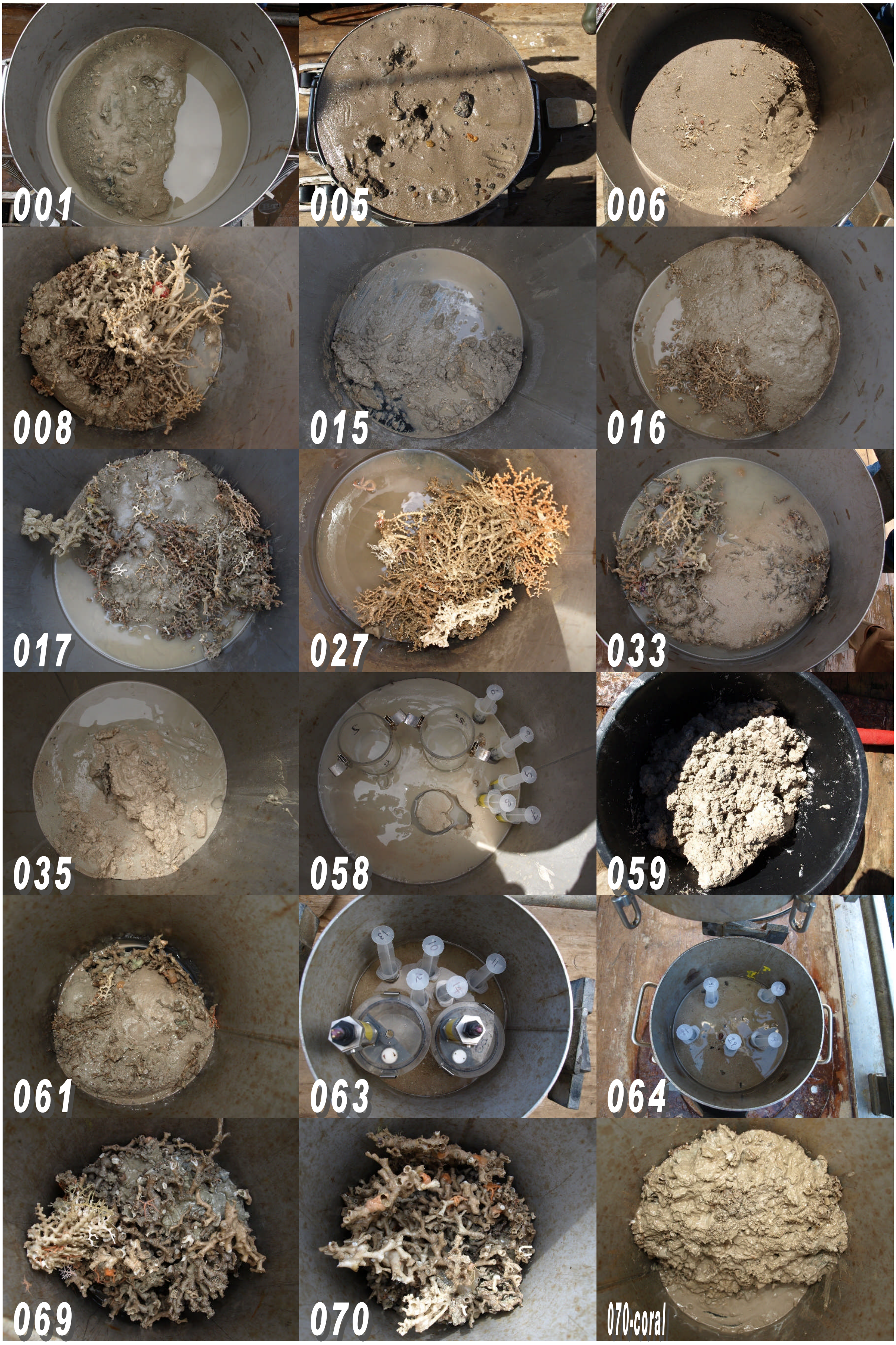


Appendix 2 (pp. 68-70). Photographs of the surface of boxcore samples. From the following stations a photograph is unavailable: 36, 68, 72, 80, 138. The boxcore stations 1- 27 were situated in or near the Belgica Mound Province, while stations 33 and higher were taken at Hatton Bank. Four boxcores are not shown for the following reasons: 4 (failed, 2 pieces of coral), 71 (failed), 86 (failed), 99 (failed)

Appendix 3 (pp. 71-72). Description of boxcores with indications of what material was preserved, how much, how it was preserved, how many subcores taken, and if there was any live coral.

Appendix 4 (pp. 73-76). List of collected animals.

Appendix 5 (pp. 77-90). Logbook with details of all sampled stations.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Appendix 3. Description of boxcores.

Station	Success	Remarks	Sieved 0.5mm	Result	Preservation	Subcores	Corals
Belgica Mounds							
1	good	for MOVE test	all	wet sample	wet	no	
4	bad	almost empty	no	2 coral pieces	formalin 4%	no	
5	good	no details	all	2x13L bucket	formalin 4%	no	
6	good	some leaking on one side, sandy up to 10 cm deep, than clay	only top 10cm	1x13L bucket	formalin 4%	no	
8	disturbed	about 10L disturbed sediment with dead corals, may be labelled as Sta.7	all	1x3L bucket	formalin 4%	no	
15	good	no details, but with chunk of coral	all	2x3L bucket	formalin 4%	no	
16	good	25 cm of sediment, top 10cm sandy, than clay.	only top 10cm	2x6L bucket	formalin 4%	no	Madrepora
17	good	only 5 cm sediment, but corals and Aphrocallista skeletons	all	2x6L bucket	formalin 4%	no	Madrepora (10 cm)
27	disturbed	large piece of Madrepora, but little sediment	all	1x3L bucket	formalin 4%	no	Madrepora
Hatton Bank							
33	good	34cm sediment, corals	0-10cm, >10cm, epifauna	2x13L bucket	formaline 4%	2x incubatie, 2 smallcores, 4 syringes 60ml	Lophelia
35	disturbed	4-7cm disturbed sediment	all	1x6L bucket	wet		
36	good	a bit disturbed, 22cm sediment, sandy	all	2x13L bucket	wet	brittle stars (2x)	
58	good	10cm sediment, sandy,Cidaris skeleton	all	1x6L bucket	formaline 4%	2 incubations, 5 syringes	
59	disturbed	8-11cm sediment	all	1x13L bucket	wet	no	
61	good	a bit disturbed, dead Lophelia	all	2x3L bucket	formaline 4%	no	
63	good	30cm sediment, sandy, little stones, clear water	all?	1x3L bucket	formaline 4%	2 incubations, 5 syringes	
64	good	34cm sediment, sandy, little stones, clear water	all?	1x3L bucket	formaline 4%	5 syringes	
68	bad	little bit disturbed sediment (1cm), crinoid, shrimp	all	1x1L bucket	wet	no	
69	good	a lot of dead coral	all	13 L + 6L	formaline 4%	no	
70	good	0-18cm, oblique surface, a bit disturbed, a lot of dead coral	all + epifauna	2x13L bucket	formaline 4%	no, but part of the dead coral for incubations	
71	no	not tripped					
72	bad	a little bit of sediment	all	1L bucket	wet	no	
73	good	14-19cm sediment,	all + epifauna	2x3L bucket	formaline 4%	no	Lophelia, Madrepora
79	good	21cm sediment, sandy with litle stones, clear water	all	1L bucket	formaline 4%	2 incubations, 5 syringes	
80	good	16-18cm, sediment, sandy with little stones; a bit disturbed	top 10cm	3L bucket	formaline 4%	no	
81	good	22-24cm, sediment, sandy with little stones	top 10cm	3L bucket	formaline 4%	no	
82	good	21-22cm, sediment, sandy with little stones	all	3L bucket	formaline 4%	no	
85	good	22cm sediment, water milky	all	6L bucket	formaline 4%	2 incubations, 5 syringes	
86	no	not tripped					

Station	Success	Remarks	Sieved 0.5mm	Result	Preservation	Subcores	Corals
88	good	13cm sediment, slightly disturbed, sandy	all	6L bucket	formaline 4%	no	
89	good	25cm sediment with coral rubble at surface, below 10cm clay	top 10cm, epifauna	2x13L bucket	formaline 4%	1 incubation, 3 syringes	
90	good	18-24cm sediment, milky water, slightly disturbed, sandy with a bit coral	top 10cm	1x6L bucket	formaline 4%	1 incubation, 5 syringes	
91	good	nice, 10-12cm, sandy, clear water	all	1x6L bucket	formaline 4%	2 incubations, 5 syringes	
92	disturbed	very disturbed, but >10cm sediment	all	1x6L bucket	wet	no	large Antipatharia
96	disturbed	10cm sediment, large cracks, no coral	all	1x6L bucket	wet	no	
97	disturbed	16-18cm, large cracks, no coral	all	1x6L bucket	wet	no	
99	no	not tripped					
100	good	>20cm, sandy with coral rubble	top 10cm	1x3L bucket	formaline 4%	2 incubations, 5 syringes	
101	good	23-25cm, sandy with coral rubble	top 10cm	1x3L bucket	formaline 4%	no	
102	good	>20cm, sandy with coral rubble	top 10cm	3L+6L bucket	formaline 4%	no	
105	good	14cm, some coral rubble	all	3L+1L	formaline 4%	1 incubation	
106	disturbed	0-14cm, dead corals	all	2x3L bucket	formaline 4%	no	
107	good	16-18cm, dead coral up to 7 cm high	all+epifauna	3l+1L	formaline 4%	1 incubation	Solitary
108	good	>10cm, coral rubble	all + epifauna	2x3L bucket	formaline 4%	no	Antipatharia
110	good	>10cm, coral rubble, Crinoidea, Ophiuroidea	all+epifauna	13L+6L+3L bucket	formaline 4%	no	
111	good	33cm, Lophelia dead, Cidaris, Ophiuroidea	all+epifauna	6L+3L bucket	formaline 4%	1 incubation	
113	good	18-23cm, coral rubble, empty sea-urchin,	all+epifauna	13L+6L bucket	formaline 4%	no	
115	good	18cm, clear water, green fluffy material at bottom surface,sandy, small stones	all	1L bucket	formaline 4%	1 incubation, 5 syringes	
116	good	13-16cm, sandy,big stone	all	1L bucket	formaline 4%	1 incubation	
117	disturbed	20cm, sediment upside down, heavily disturbed, sandy with bedrock	all	13L bucket	wet	no	
118	bad	heavily leaking because of stone, coral rubble and sediment	all	6L bucket	wet	no	
119	good	17-19cm, sandy, milky water	all	3L bucket	wet	no	
123	good	23cm, sandy with little stones, clear water	all	1L bucket	formaline 4%	1 incubation, 5 syringes	
124	good	23cm, sandy with little stones, clear water	all	3L bucket	formaline 4%	1 incubation, 5 syringes	
132	good	13cm, sandy with coral rubble	all	3L bucket	wet	no	
133	good	0-18cm, oblique surface, a bit disturbed, a lot of dead coral	all+epifauna	2x6L bucket	formaline 4%	no	
134	good	18-20cm, lots of dead coral	all+epifauna	13L+3L bucket	formaline 4%	1 incubation	
135	good	>10cm, sandy	all	3L bucket	formaline 4%	2 incubations, 5 syringes	
138	disturbed	leaking heavily	all	3L bucket	wet	no	
149	good	28cm, sandy	0-10cm	1L bucket	wet?	2 incubations, 5 syringes	
151	good	some coral rubble	all+epifauna	2x13L bucket	formaline 4%	no	
152	good	a lot of dead coral	all+epifauna	2x6L bucket	formaline 4%	no	

Appendix 4. List of collected animals.

Gear	Station	Species	Animal group	Number	Preserved
Belgica Mounds					
Boxcorer	5	Serpulidae	Polychaeta	1	-80
Boxcorer	5	Aphrocallista	Porifera	1	-80
Boxcorer	6	Sea-urchin	Echinoidea	1	-80
Boxcorer	8	Orange anemone	Anthozoa	2	-80
Boxcorer	8	Thelmatactis	Anthozoa	2	-80
Boxcorer	8	Gorgonaria (yellow-green)	Anthozoa	1	-80
Boxcorer	8	Anthomastus (big, red)	Anthozoa	1	-80
Boxcorer	8	Desmophyllum cristagalli	Anthozoa	1	-80
Boxcorer	8	Delectopecten	Bivalvia	2	-80
Boxcorer	8	Asperarca	Bivalvia	7	-80
Boxcorer	8	Dorhynchus thomsoni	Crustacea	1	-80
Boxcorer	8	Amphipoda orange	Crustacea	1	-80
Boxcorer	8	Architectonica (dead)	Gastropoda	1	dry
Boxcorer	8	Orange brittle star	Ophiuroidea	4	-80
Boxcorer	8	Hesionidae	Polychaeta	5	-80
Boxcorer	8	Eunice	Polychaeta	3	-80
Boxcorer	8	Madrepora	Scleractinia	1	-80
Boxcorer	8	Lophelia	Scleractinia	2	-80
Boxcorer	8	Ascidiacea	Tunicata	1	-80
Lander	10	Amphipoda	Crustacea	many	-80
Boxcorer	16	Soft coral white (Clavularia?)	Anthozoa	3	-80
Boxcorer	16	Actiniaria (white with special tentacles)	Anthozoa	1	-80
Boxcorer	16	Thelmatactis	Anthozoa	1	-80
Boxcorer	16	Asperarca	Bivalvia	2	-80
Boxcorer	16	Isopoda with long antennae	Crustacea	2	-80
Boxcorer	16	Amphissa	Gastropoda	3	-80
Boxcorer	16	Brittle stars 2 species	Ophiuroidea	2	-80
Boxcorer	16	Eunice	Polychaeta	1	-80
Boxcorer	16	Polyplacophora	Polyplacophora	1	-80
Boxcorer	16	Madrepora	Scleractinia	1	-80
Boxcorer	16	Sipunculida (large)	Sipunculida	1	-80
Boxcorer	17	Cerianthus (purple)	Anthozoa	1	-80
Boxcorer	17	Gorgonaria (red)	Anthozoa	10	-80
Boxcorer	17	Epizoanthus	Anthozoa	1	-80
Boxcorer	17	Asperarca	Bivalvia	?	-80
Boxcorer	17	Nemertesia	Hydrozoa	1	-80
Boxcorer	17	Brittle stars 2 species	Ophiuroidea	4	-80
Boxcorer	17	Hesionidae	Polychaeta	1	-80
Boxcorer	17	Harmothoe	Polychaeta	1	-80
Boxcorer	17	Eunice	Polychaeta	3	-80
Boxcorer	27	Soft coral white (Clavularia?)	Anthozoa	1	-80
Boxcorer	27	Madrepora	Anthozoa	1	-80
Boxcorer	27	Desmophyllum cristagalli	Anthozoa	1	-80
Boxcorer	27	Dorhynchus thomsoni	Crustacea	1	-80
Boxcorer	27	Brittle stars (orange)	Ophiuroidea	2	-80
Boxcorer	27	Eunice	Polychaeta	3	-80
Boxcorer	27	Chaetopterus	Polychaeta	1	-80
Boxcorer	27	Ampharetidae	Polychaeta	1	-80
Boxcorer	27	Hesionidae	Polychaeta	1	-80
Plankton	28	Copepoda	Crustacea	many	-80
Plankton	29	Copepoda	Crustacea	many	-80
Plankton	29	Syngnathidae	Pisces	2	-80
Hatton Bank					
Boxcorer	33	Lophelia	Anthozoa	1	-80
Boxcorer	33	Asperarca	Bivalvia	2	-80
Boxcorer	33	Crinoidea	Crinoidea	1	-80
Boxcorer	33	Echiurus	Echiura	1	-80
Boxcorer	33	Natica	Gastropoda	1	-80
Boxcorer	33	Psolus	Holothuroidea	1	-80
Boxcorer	33	Brittle star (orange)	Ophiuroidea	3	-80
Boxcorer	33	Brittle star (slimy)	Ophiuroidea	5	-80
Boxcorer	33	Harmothoe	Polychaeta	1	-80

Gear	Station	Species	Animal group	Number	Preserved
Boxcorer	33	Lanice	Polychaeta	1	-80
Boxcorer	33	Sponge (purple)	Porifera	1	-80
Boxcorer	35	Coral	Anthozoa	?	-80
Boxcorer	35	Brittle star	Ophiuroidea	?	-80
Boxcorer	35	Polychaeta	Polychaeta	?	-80
Boxcorer	36	Brittle star	Ophiuroidea	2	-80
Lander	42	Crinoidea	Crinoidea	1	-80
Lander	42	Amphipoda	Crustacea	many	-80
Dredge	45	Madrepora	Anthozoa	7	-80
Dredge	45	Solitary coral	Anthozoa	15	-80
Dredge	45	Gorgonaria	Anthozoa	4	-80
Dredge	45	Desmophyllum cristagalli	Anthozoa	1	-80
Dredge	45	Asteroidea (6 species)	Asteroidea	8	-80
Dredge	45	Chlamys	Bivalvia	30	-80
Dredge	45	Asperarca	Bivalvia	9	-80
Dredge	45	Astarte	Bivalvia	2	-80
Dredge	45	Brachiopoda	Brachiopoda	8	-80
Dredge	45	Spider crab (Rochinia carpenteri)	Crustacea	20	-80
Dredge	45	Dorhynchus thomsoni	Crustacea	50	-80
Dredge	45	Munida	Crustacea	12	-80
Dredge	45	Hermit crab	Crustacea		-80
Dredge	45	Shrimp	Crustacea	5	-80
Dredge	45	Cirolanidae (Isopoda)	Crustacea	2	-80
Dredge	45	Amphipoda	Crustacea	2	-80
Dredge	45	Echinidae	Echinoidea	4	-80
Dredge	45	Cidaris	Echinoidea	2	-80
Dredge	45	Gastropoda (Buccinidae,Mitridae,Naticidae)	Gastropoda	9	-80
Dredge	45	Psolus	Holothuroidea	2	-80
Dredge	45	Cucumaria	Holothuroidea	1	-80
Dredge	45	Pliobothrus (Stylasteridae)	Hydrozoa	7	-80
Dredge	45	Brittle stars (orange)	Ophiuroidea	100	-80
Dredge	45	Brittle star (slimy)	Ophiuroidea	40	-80
Dredge	45	Ophiuroidea	Ophiuroidea	5	-80
Dredge	45	Small fish	Pisces	1	-80
Dredge	45	Macrouridae	Pisces	1	-80
Dredge	45	Lepidion (Moridae)	Pisces	1	-80
Dredge	45	Sternoptychidae (pelagic)	Pisces	1	-80
Dredge	45	Sea mouse (Hermione)	Polychaeta	3	-80
Dredge	45	Eunice	Polychaeta	15	-80
Dredge	45	Harmothoe	Polychaeta	1	-80
Dredge	45	Amphinomidae	Polychaeta	2	-80
Dredge	45	Serpulidae	Polychaeta	2	-80
Dredge	45	Hesionidae	Polychaeta	7	-80
Dredge	45	Porifera (several species, some blue)	Porifera	50	-80
Dredge	45	Hexactinellida	Porifera	2	-80
Dredge	45	Scaphopoda	Scaphopoda	1	-80
Dredge	45	Sipunculida	Sipunculida	1	-80
Boxcorer	58	Antipatharia	Anthozoa	2	-80
Boxcorer	58	Brachiopoda	Brachiopoda	1	-80
Boxcorer	58	Amphipoda	Crustacea	1	-80
Boxcorer	58	Amphiura	Ophiuroidea	1	-80
Boxcorer	61	Solitary coral (Dianthus)	Anthozoa	3	-80
Boxcorer	61	Brittle stars (orange)	Ophiuroidea	3	-80
Boxcorer	61	Chaetopterus	Polychaeta	1	-80
Boxcorer	61	Hesionidae	Polychaeta	1	-80
Boxcorer	68	Henricia (part)	Asteroidea	1	-80
Boxcorer	68	Crinoidea (large)	Crinoidea	1	-80
Boxcorer	68	Shrimp	Crustacea	1	-80
Boxcorer	68	Hesionidae	Polychaeta	1	-80
Boxcorer	69	Coral	Anthozoa	1	-80
Boxcorer	70	Actiniaria (orange)	Anthozoa	2	-80
Boxcorer	70	Brisinga	Asteroidea	6	-80
Boxcorer	70	Ascidiacea (large)	Tunicata	1	-80
Boxcorer	73	Lophelia	Anthozoa	1	-80
Boxcorer	73	Madrepora	Anthozoa	1	-80

Gear	Station	Species	Animal group	Number	Preserved
Boxcorer	73	Solitary coral	Anthozoa	2	-80
Boxcorer	73	Brittle star	Ophiuroidea	2	-80
Boxcorer	73	Eunice	Polychaeta	1	-80
Dredge	84	Solitary coral	Anthozoa	few	-80
Dredge	84	Spider crab (Rochinia carpenteri)	Crustacea	4	-80
Dredge	84	Hermit crab	Crustacea	2	-80
Dredge	84	Cidaris	Echinoidea	1	-80
Dredge	84	Holothuroidea (small)	Holothuroidea	2	-80
Dredge	84	Hydrozoa	Hydrozoa	1	-80
Dredge	84	Brittle star	Ophiuroidea	1	-80
Dredge	84	Macrouridae	Pisces	1	-80
Dredge	84	Sea mouse (Hermione)	Polychaeta	1	-80
Dredge	84	Polyplacophora	Polyplacophora	1	-80
Boxcorer	89	Solitary coral (Dianthus)	Anthozoa	2	-80
Boxcorer	89	Crinoidea (brown)	Crinoidea	1	-80
Boxcorer	89	Munida	Crustacea	2	-80
Boxcorer	89	Dorhynchus thomsoni	Crustacea	1	-80
Boxcorer	89	Echinidae	Echinoidea	1	-80
Boxcorer	89	Brittle star (orange)	Ophiuroidea	30	-80
Boxcorer	89	Brittle star (slimy)	Ophiuroidea		-80
Boxcorer	89	Brittle star (brown)	Ophiuroidea	4	-80
Boxcorer	89	Porifera (several species)	Porifera	many	-80
Boxcorer	92	Thelmatactis	Anthozoa	1	-80
Boxcorer	92	Peachia	Anthozoa	1	-80
Boxcorer	92	Henricia	Asteroidea	1	-80
Boxcorer	92	Asperarca	Bivalvia	3	-80
Boxcorer	92	Bryozoa	Bryozoa	1	-80
Boxcorer	92	Munida (small)	Crustacea	1	-80
Boxcorer	92	Echiurus	Echiura	1	-80
Boxcorer	92	Brittle star (orange)	Ophiuroidea	3	-80
Boxcorer	92	Brittle star (slimy)	Ophiuroidea		-80
Boxcorer	92	Capitella	Polychaeta	1	-80
Boxcorer	92	Ascidiacea (transparent)	Tunicata		-80
Boxcorer	96	Actiniaria (orange)	Anthozoa	1	-80
Boxcorer	96	Actiniaria (vlees?)	Anthozoa	1	-80
Boxcorer	96	Thelmatactis	Anthozoa	1	-80
Boxcorer	96	Henricia	Asteroidea	1	-80
Boxcorer	96	Asperarca	Bivalvia	5	-80
Boxcorer	96	Sertellidae	Bryozoa	1	-80
Boxcorer	96	Dorhynchus thomsoni	Crustacea	1	-80
Boxcorer	96	Munida	Crustacea	1	-80
Boxcorer	96	Echiurus	Echiura	1	-80
Boxcorer	96	Psolus	Holothuroidea	1	-80
Boxcorer	96	Brittle star (slimy)	Ophiuroidea	1	-80
Boxcorer	96	Brittle star (brown)	Ophiuroidea	7	-80
Boxcorer	96	Capitellidae	Polychaeta	1	-80
Boxcorer	96	Porifera	Porifera	1	-80
Boxcorer	96	Scaphopoda	Scaphopoda	1	-80
Boxcorer	96	Ascidiacea (slimy)	Tunicata	1	-80
Boxcorer	96	Ascidiacea (leathery)	Tunicata	1	-80
Boxcorer	107	Solitary coral	Anthozoa	1	-80
Boxcorer	107	Crinoidea	Crinoidea	1	-80
Boxcorer	107	Brittle star (orange)	Ophiuroidea	1	-80
Boxcorer	108	Antipatharia	Anthozoa	1	-80
Boxcorer	110	Crinoidea	Crinoidea	2	-80
Boxcorer	110	Brittle star (orange)	Ophiuroidea	many	-80
Boxcorer	111	Cidaris	Echinoidea	1	-80
Boxcorer	111	Brittle star (orange)	Ophiuroidea	?	-80
Boxcorer	113	Solitary coral	Anthozoa	?	-80
Boxcorer	113	Brittle star (orange)	Ophiuroidea	?	-80
Boxcorer	113	Brittle star (slimy)	Ophiuroidea	?	-80
ALBEX2 trap	136	Amphipoda	Crustacea	many	-80
Beamtrawl	137	Anthomastus (big, red)	Anthozoa	1	-80
Beamtrawl	137	Madrepora (small pieces)	Anthozoa	20	-80
Beamtrawl	137	Thelmatactis	Anthozoa	2	-80

Gear	Station	Species	Animal group	Number	Preserved
Beamtrawl	137	Desmophyllum	Anthozoa	5	-80
Beamtrawl	137	Solitary coral (dianthus)	Anthozoa	21	-80
Beamtrawl	137	Lophelia (pieces)	Anthozoa	3	-80
Beamtrawl	137	Gorgonaria (orange)	Anthozoa	2	-80
Beamtrawl	137	Actiniaria (orange)	Anthozoa	1	-80
Beamtrawl	137	Porania (starfish)	Asteroidea	1	-80
Beamtrawl	137	Starfish (goosefeet)	Asteroidea	3	-80
Beamtrawl	137	Astropecten	Asteroidea	7	-80
Beamtrawl	137	Henricia	Asteroidea	4	-80
Beamtrawl	137	Astropecten (short arms)	Asteroidea	1	-80
Beamtrawl	137	Chlamys	Bivalvia	20	-80
Beamtrawl	137	Delectopecten	Bivalvia	10	-80
Beamtrawl	137	Asperarca	Bivalvia	20	-80
Beamtrawl	137	Hiatella	Bivalvia	4	-80
Beamtrawl	137	Astarte	Bivalvia	2	-80
Beamtrawl	137	Cuspidaria	Bivalvia	1	alcohol
Beamtrawl	137	Brachiopoda	Brachiopoda	20	-80
Beamtrawl	137	Hermit crab	Crustacea	15	-80
Beamtrawl	137	Chirostylidae (squat lobster)	Crustacea	1	-80
Beamtrawl	137	Munidae (large)	Crustacea	5	-80
Beamtrawl	137	Munidae (small)	Crustacea	?	-80
Beamtrawl	137	Munidopsis	Crustacea	1	-80
Beamtrawl	137	Rochinia (spider crab)	Crustacea	10	-80
Beamtrawl	137	Dorhynchus thomsoni	Crustacea	10	-80
Beamtrawl	137	Isopoda	Crustacea	5	-80
Beamtrawl	137	Spirontocaris	Crustacea	8	-80
Beamtrawl	137	Shrimp (pelagic)	Crustacea	5	-80
Beamtrawl	137	Amphipoda	Crustacea	1	-80
Beamtrawl	137	Bathynectes (only claw)	Crustacea	1	-80
Beamtrawl	137	Echinus (large, broken)	Echinoidea	1	-80
Beamtrawl	137	Echinus (small)	Echinoidea	6	-80
Beamtrawl	137	Cidaris	Echinoidea	?	-80
Beamtrawl	137	Colus	Gastropoda	3	-80
Beamtrawl	137	Psolus	Holothuroidea	20	-80
Beamtrawl	137	Pliobothrus (Stylasteridae)	Hydrozoa	3	-80
Beamtrawl	137	Hydrozoa	Hydrozoa	1	-80
Beamtrawl	137	Nemertini	Nemertini	1	-80
Beamtrawl	137	brittle star (red, slimy)	Ophiuroidea	?	-80
Beamtrawl	137	Brittle star (orange)	Ophiuroidea	20	-80
Beamtrawl	137	Brittle star (brown)	Ophiuroidea	2	-80
Beamtrawl	137	Ophiura	Ophiuroidea	1	-80
Beamtrawl	137	Macrouridae	Pisces	2	-80
Beamtrawl	137	Moridae (juv.)	Pisces	1	-80
Beamtrawl	137	Eunice	Polychaeta	>10	-80
Beamtrawl	137	Serpulidae	Polychaeta	10	-80
Beamtrawl	137	Nephtys	Polychaeta	3	-80
Beamtrawl	137	Hesionidae	Polychaeta	20	-80
Beamtrawl	137	Amphinomidae	Polychaeta	1?	-80
Beamtrawl	137	Harmothoe	Polychaeta	4	-80
Beamtrawl	137	Polychaeta	Polychaeta	2	alcohol
Beamtrawl	137	Porifera	Porifera	>10	-80
Beamtrawl	137	Ascidiacea (jelly)	Tunicata	3	-80
Beamtrawl	137	Ascidiacea (leather)	Tunicata	1	-80
Plankton	140	Cerianthus larvae	Anthozoa		formaline
Plankton	140	Cymbulia	Gastropoda		formaline
Plankton	140	Salpae	Tunicata		-80
Plankton	140	Salpae	Tunicata		-80
Beamtrawl	156	Macrouridae	Pisces	1	-80

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
Belgica Mound Province							
1-1	Multibeam	Start	Jun 13 2008 09:09:38	51.39923	-11.36087	186	line cnt. 0013
1-1	Multibeam	End	Jun 13 2008 11:37:51	51.4501	-11.76755	52	line cnt. 0017
1-2	Multibeam	Start	Jun 13 2008 11:44:42	51.44613	-11.7714	52	line cnt. 0018
1-2	Multibeam	End	Jun 13 2008 12:52:58	51.53657	-11.6452	626	line cnt. 0021
1-3	Multibeam	Start	Jun 13 2008 13:03:53	51.53467	-11.6554	650	line cnt. 0021
1-3	Multibeam	End	Jun 13 2008 15:08:46	51.40245	-11.37183	239	line cnt. 0025
1-4	Videoboxcore	Start	Jun 13 2008 15:34:02	51.39925	-11.37282	239	
1-4	Videoboxcore	End	Jun 13 2008 15:57:02	51.39642	-11.37263	239	Thanatocoenose
1-5	Multibeam	Start	Jun 13 2008 16:40:49	51.4111	-11.39122	247	line cnt. 0026
1-5	Multibeam	End	Jun 13 2008 17:30:09	51.42942	-11.51877	363	line cnt. 0027
1-6	Multibeam	Start	Jun 13 2008 17:38:06	51.43958	-11.51932	363	line cnt. 0028
1-6	Multibeam	End	Jun 13 2008 18:16:19	51.41982	-11.42408	271	line cnt. 0029
1-7	MOVE	Deployment	Jun 13 2008 19:04:55	51.39993	-11.37155	236	Time and Pos. at releasing
1-8	Multibeam	Start	Jun 13 2008 19:59:29	51.42962	-11.51112	352	line cnt. 0030
1-8	Multibeam	End	Jun 13 2008 22:50:34	51.50627	-11.976	952	line cnt. 0036
1-9	Multibeam	Start	Jun 13 2008 23:09:14	51.48168	-11.98907	981	line cnt. 0036
1-9	Multibeam	End	Jun 14 2008 00:27:00	51.44468	-11.76813	1000	line cnt. 0038
1-10	Multibeam	Start	Jun 14 2008 00:33:54	51.44685	-11.77177	994	line cnt. 0039
1-10	Multibeam	End	Jun 14 2008 01:02:18	51.40788	-11.82147	1126	line cnt. 0040
1-11	Multibeam	Start	Jun 14 2008 01:23:05	51.39798	-11.78002	1060	line cnt. 0040
1-11	Multibeam	End	Jun 14 2008 02:27:16	51.48657	-11.66017	671	line cnt. 0043
1-12	Multibeam	Start	Jun 14 2008 02:41:08	51.4856	-11.67347	728	line cnt. 0043
1-12	Multibeam	End	Jun 14 2008 03:08:47	51.52202	-11.62263	568	line cnt. 0043
1-13	Multibeam	Start	Jun 14 2008 03:21:41	51.50867	-11.60183	528	line cnt. 0044
1-13	Multibeam	End	Jun 14 2008 04:40:05	51.392	-11.73127	892	line cnt. 0047
1-14	Multibeam	Start	Jun 14 2008 04:55:40	51.38042	-11.68602	715	line cnt. 0047
1-14	Multibeam	End	Jun 14 2008 05:30:12	51.43442	-11.6568	642	line cnt. 0049
1-15	Multibeam	Start	Jun 14 2008 05:49:49	51.45022	-11.63957	592	line cnt. 0049
1-15	Multibeam	End	Jun 14 2008 06:21:37	51.49427	-11.58785	494	line cnt. 0050
1-16	MOVE	Recovery	Jun 14 2008 08:18:05	51.40387	-11.37948	242	Picking in
2-1	CTD	Start	Jun 14 2008 10:11:48	51.42	-11.74333	955	Test CTD with 4 dataloggers
2-1	CTD	Bottom	Jun 14 2008 10:29:04	51.42012	-11.74322	955	
2-1	CTD	End	Jun 14 2008 11:31:33	51.42013	-11.74322	955	
3-1	Multibeam	Start	Jun 14 2008 12:01:56	51.39107	-11.81013	1163	line cnt. 0051
3-1	Multibeam	End	Jun 14 2008 12:45:03	51.39427	-11.68745	718	line cnt. 0053
4-1	Videoboxcore	Start	Jun 14 2008 14:13:16	51.43492	-11.69923	686	Bottom, Belgica Mounds, label st. 3!
4-1	Videoboxcore	End	Jun 14 2008 14:47:56	51.43493	-11.70215	686	failed, only 2 coral pieces
4-2	Multibeam	Start	Jun 14 2008 18:51:50	51.44222	-11.83352	1042	line cnt. 0053
4-2	Multibeam	End	Jun 14 2008 20:06:46	51.31272	-11.83322	1123	line cnt. 0055
4-3	Multibeam	Start	Jun 14 2008 20:25:03	51.32552	-11.84222	1107	line cnt. 0056
4-3	Multibeam	End	Jun 14 2008 21:14:34	51.32558	-11.6961	865	line cnt. 0057
4-4	Multibeam	Start	Jun 14 2008 21:30:52	51.30762	-11.67758	792	line cnt. 0058
4-4	Multibeam	End	Jun 14 2008 22:12:26	51.3833	-11.67758	702	line cnt. 0059
4-5	Multibeam	Start	Jun 14 2008 22:26:00	51.38272	-11.70558	834	line cnt. 0060
4-5	Multibeam	End	Jun 14 2008 22:54:13	51.33365	-11.70292	850	line.cnt. 0060
4-6	Multibeam	Start	Jun 14 2008 23:08:35	51.3387	-11.73633	1044	line.cnt. 0061
4-6	Multibeam	End	Jun 14 2008 23:29:36	51.37602	-11.73525	981	line cnt. 0061
4-7	Multibeam	Start	Jun 14 2008 23:44:35	51.37745	-11.77913	1089	line cnt. 0062
4-7	Multibeam	End	Jun 15 2008 00:04:19	51.34118	-11.7834	1184	line cnt. 0062
4-8	Multibeam	Start	Jun 15 2008 00:26:37	51.30363	-11.75737	1168	line cnt. 0063

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
4-8	Multibeam	End	Jun 15 2008 01:02:11	51.3025	-11.6561	815	line cnt. 0065
4-9	Multibeam	Start	Jun 15 2008 01:13:45	51.28578	-11.65655	876	line cnt. 0065
4-9	Multibeam	End	Jun 15 2008 01:49:29	51.28527	-11.76032	1136	line cnt. 0066
4-10	Multibeam	Start	Jun 15 2008 02:03:21	51.26233	-11.76377	1157	line cnt. 0067
4-10	Multibeam	End	Jun 15 2008 02:41:27	51.26202	-11.65582	905	line cnt. 0069
4-11	Multibeam	Start	Jun 15 2008 02:57:42	51.2442	-11.65338	913	line cnt. 0069
4-11	Multibeam	End	Jun 15 2008 04:48:31	51.43887	-11.65525	631	line cnt. 0073
4-12	Multibeam	Start	Jun 15 2008 05:23:40	51.49357	-11.7226	900	line cnt. 0073
4-12	Multibeam	End	Jun 15 2008 05:59:51	51.49317	-11.84418	965	line cnt. 0075
4-13	Multibeam	Start	Jun 15 2008 06:13:58	51.51027	-11.83217	947	line cnt. 0075
4-13	Multibeam	End	Jun 15 2008 07:08:30	51.51288	-11.97263	944	line cnt. 0077
5-1	Videoboxcore	Start	Jun 15 2008 08:33:39	51.46648	-11.8837	942	Bottom Sampling for MOVE
5-1	Videoboxcore	End	Jun 15 2008 09:06:37	51.46685	-11.88273	942	Boxcore taken
6-1	Videoboxcore	Start	Jun 15 2008 11:33:49	51.45007	-11.70048	750	Galway Mounds
6-1	Videoboxcore	End	Jun 15 2008 12:15:22	51.44998	-11.70875	805	Boxcore taken
7-1	Multibeam	Start	Jun 15 2008 12:45:15	51.44835	-11.71215	857	line cnt. 0000 (New Start of Mapping)
7-1	Multibeam	End	Jun 15 2008 12:47:29	51.44837	-11.70707	810	line cnt. 0000
7-2	Multibeam	Start	Jun 15 2008 12:51:53	51.45202	-11.70727	755	line cnt. 0001
7-2	Multibeam	End	Jun 15 2008 13:18:56	51.452	-11.78508	1026	line cnt. 0002
8-1	Videoboxcore	Start	Jun 15 2008 14:00:36	51.45132	-11.74793	900	Galway Mounds, labelled as sta.7
8-1	Videoboxcore	End	Jun 15 2008 14:51:43	51.45088	-11.75773	900	Boxcore taken
9-1	Multibeam	Start	Jun 15 2008 15:15:04	51.44243	-11.75922	900	line cnt. 0002
9-1	Multibeam	End	Jun 15 2008 15:20:55	51.43478	-11.74625	934	line cnt. 0002
9-2	Multibeam	Start	Jun 15 2008 15:23:34	51.4335	-11.73977	934	line cnt. 0003
9-2	Multibeam	End	Jun 15 2008 16:02:29	51.4315	0	560	line cnt. 0004
9-3	Multibeam	Start	Jun 15 2008 16:15:32	51.41267	0	578	line cnt. 0005
9-3	Multibeam	End	Jun 15 2008 17:15:29	51.4115	0	1092	line cnt. 0007
9-4	Multibeam	Start	Jun 15 2008 17:30:23	51.43033	0	1015	line cnt. 0007
9-4	Multibeam	End	Jun 15 2008 17:33:37	51.43017	0	1021	line cnt.0007
10-1	Albex 3 lander	Deployment	Jun 15 2008 18:21:14	51.43467	-11.69803	694	Time and Pos. at Releasing
11-1	MOVE	Deployment	Jun 15 2008 20:18:49	51.46623	-11.88359	942	Time and Pos. at Releasing
12-1	Multibeam	Start	Jun 15 2008 21:33:22	51.49018	-11.79167	989	line cnt. 0008
12-1	Multibeam	End	Jun 15 2008 22:30:51	51.4934	-11.62728	589	line.cnt.0009
12-2	Multibeam	Start	Jun 15 2008 22:42:05	51.48535	-11.64327	623	line cnt. 0010
12-2	Multibeam	End	Jun 16 2008 00:05:21	51.3317	-11.64497	657	line cnt. 0013
12-3	Multibeam	Start	Jun 16 2008 00:22:05	51.33813	-11.65808	694	line cnt. 0013
12-3	Multibeam	End	Jun 16 2008 01:09:54	51.33845	-11.79285	1168	line cnt. 0014
12-4	Multibeam	Start	Jun 16 2008 01:21:24	51.33588	-11.77702	1186	line cnt. 0015
12-4	Multibeam	End	Jun 16 2008 01:58:36	51.39813	-11.77587	1050	line cnt. 0016
12-5	Multibeam	Start	Jun 16 2008 02:11:58	51.42702	-11.76237	971	line cnt. 0017
12-5	Multibeam	End	Jun 16 2008 02:22:17	51.44405	-11.75085	897	line cnt. 0018
12-6	Multibeam	Start	Jun 16 2008 02:44:26	51.46968	-11.80403	1036	line cnt. 0018
12-6	Multibeam	End	Jun 16 2008 03:33:49	51.47043	-11.65657	700	line cnt. 0019
12-7	Multibeam	Start	Jun 16 2008 03:48:40	51.4474	-11.65563	628	line cnt. 0020
12-7	Multibeam	End	Jun 16 2008 04:08:27	51.44982	-11.70842	800	line cnt. 0020
12-8	Multibeam	Start	Jun 16 2008 04:35:49	51.39313	-11.75133	1013	line cnt. 0021
12-8	Multibeam	End	Jun 16 2008 05:08:57	51.39005	-11.6576	650	line cnt. 0023
12-9	Multibeam	Start	Jun 16 2008 05:20:28	51.36775	-11.65938	657	line cnt. 0023
12-9	Multibeam	End	Jun 16 2008 05:57:28	51.37222	-11.75915	1042	line cnt. 0025
12-10	Multibeam	Start	Jun 16 2008 06:05:12	51.36037	-11.75697	1078	line cnt. 0025
12-10	Multibeam	End	Jun 16 2008 06:45:29	51.35595	-11.64062	605	line cnt. 0027

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
13-1	MOVE	Recovery	Jun 16 2008 08:53:36	51.46317	-11.88047	950	Picking in
14-1	Mooring	Deployment	Jun 16 2008 10:36:02	51.4511	-11.7025	744	Galway Mounds (Free Fall)
15-1	Videoboxcore	Start	Jun 16 2008 11:19:46	51.45408	-11.75118	782	Galway Mounds 1
15-1	Videoboxcore	End	Jun 16 2008 12:13:14	51.45403	-11.75755	915	Boxcore taken
16-1	Videoboxcore	Start	Jun 16 2008 14:04:20	51.45607	-11.7538	1097	Galway Mounds 2
16-1	Videoboxcore	End	Jun 16 2008 14:53:29	51.45022	-11.75058	1097	Boxcore taken
17-1	Videoboxcore	Start	Jun 16 2008 15:53:59	51.45208	-11.7565	886	Galway Mounds 3 (redo)
17-1	Videoboxcore	End	Jun 16 2008 16:45:52	51.44688	-11.75098	889	Boxcore taken
17-2	Multibeam	Start	Jun 16 2008 17:49:37	51.51682	-11.63233	592	line cnt. 0027
17-2	Multibeam	End	Jun 16 2008 19:06:01	51.51487	-11.83738	939	line cnt. 0029
17-3	Multibeam	Start	Jun 16 2008 19:12:42	51.51708	-11.83285	936	line cnt. 0030
17-3	Multibeam	End	Jun 16 2008 21:02:57	51.32067	-11.81418	1142	line cnt. 0033
17-4	Multibeam	Start	Jun 16 2008 21:24:10	51.31118	-11.84145	1115	line cnt. 0034
17-4	Multibeam	End	Jun 16 2008 22:37:45	51.31082	-11.62315	647	line cnt. 0036
18-1	Multibeam	Start	Jun 16 2008 22:59:30	51.28818	-11.62522	678	line cnt. 0037
18-1	Multibeam	End	Jun 16 2008 23:50:44	51.28177	-11.77175	1218	line cnt. 0038
18-2	Multibeam	Start	Jun 17 2008 00:14:44	51.25635	-11.73327	1081	line cnt. 0039
18-2	Multibeam	End	Jun 17 2008 01:09:51	51.25705	-11.57935	615	line cnt. 0041
18-3	Multibeam	Start	Jun 17 2008 01:42:22	51.27495	-11.58373	576	line cnt. 0041
18-3	Multibeam	End	Jun 17 2008 02:17:48	51.27423	-11.68217	992	line cnt. 0042
18-4	Multibeam	Start	Jun 17 2008 02:47:22	51.30062	-11.62643	731	line cnt. 0043
18-4	Multibeam	End	Jun 17 2008 03:02:25	51.29822	-11.58228	581	line cnt. 0043
18-5	Multibeam	Start	Jun 17 2008 03:23:07	51.2847	-11.5923	584	line cnt. 0044
18-5	Multibeam	End	Jun 17 2008 03:37:09	51.28887	-11.62372	673	line cnt. 0044
18-6	Multibeam	Start	Jun 17 2008 03:49:18	51.28538	-11.59047	578	line cnt. 0045
18-6	Multibeam	End	Jun 17 2008 03:52:30	51.28527	-11.5821	576	line cnt. 0046
18-7	Multibeam	Start	Jun 17 2008 04:08:34	51.3175	-11.57953	592	line cnt. 0047
18-7	Multibeam	End	Jun 17 2008 04:27:08	51.31793	-11.62612	650	line cnt. 0048
19-1	Multibeam	Start	Jun 17 2008 04:57:14	51.32978	-11.65863	723	line cnt. 0048
19-1	Multibeam	End	Jun 17 2008 05:25:55	51.32793	-11.57905	584	line cnt. 0049
20-1	Multibeam	Start	Jun 17 2008 06:44:03	51.39855	-11.79588	1094	line cnt. 0049
20-1	Multibeam	End	Jun 17 2008 07:16:50	51.4575	-11.79113	1028	line cnt. 0051
21-1	CTD-jojo	Start	Jun 17 2008 08:21:58	51.45238	-11.75115	981	Mutibeam depth: 798 m
21-1	CTD-jojo	Bottom	Jun 17 2008 08:34:47	51.45217	-11.75247	981	
21-1	CTD-jojo	End	Jun 17 2008 08:54:46	51.45203	-11.75262	981	
21-2	CTD-jojo	Start	Jun 17 2008 09:14:38	51.45237	-11.75278	981	
21-2	CTD-jojo	Bottom	Jun 17 2008 09:28:17	51.4523	-11.7526	981	
21-2	CTD-jojo	End	Jun 17 2008 09:44:01	51.4526	-11.75245	18	
21-3	CTD-jojo	Start	Jun 17 2008 09:46:04	51.45212	-11.75223	18	
21-3	CTD-jojo	Bottom	Jun 17 2008 09:59:36	51.45205	-11.75267	18	
21-3	CTD-jojo	End	Jun 17 2008 10:14:06	51.45248	-11.7526	15	
21-4	CTD-jojo	Start	Jun 17 2008 10:15:27	51.45258	-11.75228	15	
21-4	CTD-jojo	Bottom	Jun 17 2008 10:29:04	51.45282	-11.75193	15	
21-4	CTD-jojo	End	Jun 17 2008 10:47:00	51.45208	-11.75222	15	
21-5	CTD-jojo	Start	Jun 17 2008 10:55:37	51.45222	-11.75248	15	
21-5	CTD-jojo	Bottom	Jun 17 2008 11:11:12	51.45263	-11.75208	15	
21-5	CTD-jojo	End	Jun 17 2008 11:26:29	51.4522	-11.75238	15	
21-6	CTD-jojo	Start	Jun 17 2008 11:27:20	51.45218	-11.7522	15	
21-6	CTD-jojo	Bottom	Jun 17 2008 11:43:19	51.45218	-11.75242	15	
21-7	CTD-jojo	Start	Jun 17 2008 11:59:21	51.4523	-11.75322	15	
21-6	CTD-jojo	End	Jun 17 2008 11:59:31	51.4523	-11.75322	15	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
21-7	CTD-jojo	Bottom	Jun 17 2008 12:13:09	51.45213	-11.75113	15	
21-7	CTD-jojo	End	Jun 17 2008 12:31:38	51.45127	-11.75057	15	
21-8	CTD-jojo	Start	Jun 17 2008 12:32:47	51.45138	-11.75152	15	
21-8	CTD-jojo	Bottom	Jun 17 2008 12:46:09	51.45225	-11.75228	15	
21-8	CTD-jojo	End	Jun 17 2008 13:05:25	51.45277	-11.75242	15	
21-9	CTD-jojo	Start	Jun 17 2008 13:21:16	51.45135	-11.75267	15	
21-9	CTD-jojo	Bottom	Jun 17 2008 13:36:57	51.45195	-11.75185	15	
21-10	CTD-jojo	Start	Jun 17 2008 13:53:05	51.45155	-11.75285	15	
21-9	CTD-jojo	End	Jun 17 2008 13:53:56	51.45155	-11.75288	15	
21-10	CTD-jojo	Bottom	Jun 17 2008 14:09:53	51.45175	-11.75183	15	
21-10	CTD-jojo	End	Jun 17 2008 14:25:15	51.45257	-11.75262	15	
21-11	CTD-jojo	Start	Jun 17 2008 14:26:15	51.45205	-11.75213	15	
21-11	CTD-jojo	Bottom	Jun 17 2008 14:42:33	51.4519	-11.75238	15	
21-11	CTD-jojo	End	Jun 17 2008 15:02:44	51.45102	-11.75222	15	
21-12	CTD-jojo	Start	Jun 17 2008 15:14:00	51.4522	-11.75073	15	
21-12	CTD-jojo	Bottom	Jun 17 2008 15:28:38	51.45177	-11.75163	15	
21-13	CTD-jojo	Start	Jun 17 2008 15:45:03	51.4528	-11.75315	15	
21-12	CTD-jojo	End	Jun 17 2008 15:45:58	51.45253	-11.75308	15	
21-13	CTD-jojo	Bottom	Jun 17 2008 15:58:37	51.45227	-11.75155	15	
21-13	CTD-jojo	End	Jun 17 2008 16:52:15	51.45242	-11.75237	15	
22-1	CTD-jojo	Start	Jun 17 2008 16:59:41	51.45235	-11.75228	15	
22-1	CTD-jojo	Bottom	Jun 17 2008 17:14:29	51.45257	-11.75112	15	
22-1	CTD-jojo	End	Jun 17 2008 18:03:50	51.45222	-11.75202	15	
23-1	Multibeam	Start	Jun 17 2008 18:38:53	51.45538	-11.80017	15	line cnt. 0051
23-1	Multibeam	End	Jun 17 2008 19:08:31	51.50422	-11.80125	987	line cnt. 0051
24-1	MOVE	Deployment	Jun 18 2008 10:21:45	51.4775	-11.88457	924	Time and Position of Releasing
25-1	Albex 3 lander	Recovery	Jun 18 2008 11:57:47	51.43312	-11.69817	724	Actual moment of Picking in
26-1	Mooring	Recovery	Jun 18 2008 13:33:25	51.45065	-11.70283	758	Actual moment of Picking in
27-1	Videoboxcore	Start	Jun 18 2008 14:49:24	51.45217	-11.75712	908	Galway Mounds 3 (redo)
27-1	Videoboxcore	End	Jun 18 2008 15:32:05	51.44782	-11.75252	908	Boxcore taken
28-1	Planktonnet (vertical)	Start	Jun 18 2008 16:28:18	51.44913	-11.74032	918	to depth of 100m
28-1	Planktonnet (vertical)	End	Jun 18 2008 16:39:38	51.44797	-11.73575	908	
29-1	Planktonnet (vertical)	Start	Jun 18 2008 16:43:21	51.44735	-11.7341	908	to depth of 200m
29-1	Planktonnet (vertical)	End	Jun 18 2008 17:03:37	51.44368	-11.72498	905	
30-1	MOVE Recovery	Recovery	Jun 18 2008 19:28:39	51.47465	-11.88088	934	Actual moment of Picking in
Hatton Bank							
31-1	CTD	Start	Jun 23 2008 14:55:40	58.51887	-17.62773	1004	South of Hatton Bank
31-1	CTD	Bottom	Jun 23 2008 15:12:44	58.51893	-17.62775	1001	
31-1	CTD	End	Jun 23 2008 16:37:30	58.51872	-17.62793	1001	
32-1	Multibeam	Start	Jun 23 2008 19:27:17	58.637	-18.4475	-4	line cnt. 0052
32-1	Multibeam	End	Jun 23 2008 21:18:34	58.77432	-18.73405	15	line cnt. 0007
32-2	Multibeam	Start	Jun 23 2008 22:14:18	58.76905	-18.72163	15	line cnt. 0007
32-2	Multibeam	End	Jun 23 2008 23:03:12	58.83048	-18.84953	15	line cnt. 0008
32-3	Multibeam	Start	Jun 23 2008 23:22:11	58.85965	-18.83283	15	line cnt. 0009
32-3	Multibeam	End	Jun 24 2008 02:09:04	58.6477	-18.42618	16	line cnt. 0015
32-4	Multibeam	Start	Jun 24 2008 02:29:52	58.65767	-18.40877	16	line cnt. 0015
32-4	Multibeam	End	Jun 24 2008 05:07:51	58.87982	-18.75888	16	line cnt. 0019
32-5	Multibeam	Start	Jun 24 2008 05:35:42	58.90222	-18.72687	16	line cnt. 0021
32-5	Multibeam	End	Jun 24 2008 07:13:05	58.75437	-18.53982	765	line cnt. 0024
33-1	Videoboxcore	Start	Jun 24 2008 09:18:14	58.72993	-18.65802	793	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
33-1	Videoboxcore	End	Jun 24 2008 10:13:03	58.73612	-18.67222	787	Boxcore taken
34-1	Multibeam	Start	Jun 24 2008 10:52:05	58.73687	-18.7314	37	line cnt. 0025
34-1	Multibeam	End	Jun 24 2008 12:14:15	58.65213	-18.54455	685	line cnt. 0027
35-1	Videoboxcore	Start	Jun 24 2008 13:42:53	58.74327	-18.65325	833	
35-1	Videoboxcore	End	Jun 24 2008 14:40:47	58.74118	-18.66255	796	Boxcore taken
36-1	Videoboxcore	Start	Jun 24 2008 16:53:42	58.68118	-18.52555	688	
36-1	Videoboxcore	End	Jun 24 2008 17:41:47	58.68652	-18.54417	700	boxcore
37-1	Multibeam	Start	Jun 24 2008 20:28:49	58.76595	-18.54315	787	line cnt. 0028
37-1	Multibeam	End	Jun 24 2008 21:11:50	58.78453	-18.45385	697	line cnt. 0030 (stopped)
38-1	Mooring 1	Deployment	Jun 25 2008 09:41:00	58.73005	-18.99727	1200	Actual moment of Releasing
39-1	Multibeam	Start	Jun 25 2008 16:08:33	58.75	-18.09	550	line cnt. 0030
39-1	Multibeam	End	Jun 25 2008 16:15:44	58.74833	-18.07167	550	line cnt. 0030
39-2	Multibeam	Start	Jun 25 2008 16:26:32	58.75333	-18.08	550	line cnt. 0031
39-2	Multibeam	End	Jun 25 2008 16:32:34	58.745	-18.08	550	line cnt. 0031
39-3	Multibeam	Start	Jun 25 2008 16:48:38	58.74167	-18.1	550	line cnt. 0032
39-3	Multibeam	End	Jun 25 2008 17:05:33	58.76167	-18.10167	550	line cnt. 0032
39-4	Mooring 2	Deployment	Jun 25 2008 18:01:54	58.75533	-18.0895	550	Actual moment of releasing
40-1	Multibeam	Start	Jun 25 2008 21:32:46	58.81735	-17.9414	623	line cnt. 0033
40-1	Multibeam	End	Jun 26 2008 00:39:25	58.61585	-18.4409	623	line cnt. 0040
40-2	Multibeam	Start	Jun 26 2008 01:16:37	58.62308	-18.4668	604	line cnt. 0040
40-2	Multibeam	End	Jun 26 2008 06:59:19	58.77645	-18.10063	564	line cnt.0051
40-3	Multibeam	Start	Jun 26 2008 07:21:40	58.77103	-18.15508	564	line cnt. 0052
40-3	Multibeam	End	Jun 26 2008 08:11:56	58.73073	-18.26623	543	line cnt. 0054
41-1	Albex 2 lander	Deployment	Jun 26 2008 12:22:55	58.6864	-18.5428	697	free fall
42-1	Albex 3 lander	Deployment	Jun 26 2008 17:38:43	58.73327	-18.66643	790	free fall
43-1	Multibeam	Start	Jun 26 2008 20:13:21	58.7296	-18.26568	537	line cnt. 0054
43-1	Multibeam	End	Jun 26 2008 21:05:14	58.6728	-18.4114	586	line cnt. 0055
43-2	Multibeam	Start	Jun 26 2008 21:21:16	58.68328	-18.4456	641	line cnt. 0056
43-2	Multibeam	End	Jun 26 2008 23:15:48	58.77667	-18.2072	586	line cnt. 0060
44-1	Multibeam	Start	Jun 26 2008 23:40:14	58.77745	-18.25837	601	line cnt. 0060
44-1	Multibeam	End	Jun 27 2008 00:58:39	58.69397	-18.45827	654	line cnt. 0062
44-2	Multibeam	Start	Jun 27 2008 01:28:19	58.71205	-18.50102	669	line cnt. 0063
44-2	Multibeam	End	Jun 27 2008 01:36:32	58.71937	-18.48748	660	line cnt. 0064
44-3	Multibeam	Start	Jun 27 2008 01:52:20	58.70507	-18.47182	632	line cnt. 0064
44-3	Multibeam	End	Jun 27 2008 02:17:28	58.7283	-18.43283	589	line cnt. 0066 (Stopped due signal failure)
45-1	Triangular dredge	Start	Jun 27 2008 09:39:44	58.7861	-18.6258	867	
45-1	Triangular dredge	End	Jun 27 2008 09:54:57	58.79062	-18.63612	910	
46-1	CTD	Start	Jun 27 2008 13:36:44	58.80802	-18.83022	1194	
46-1	CTD	Bottom	Jun 27 2008 13:59:09	58.80875	-18.83455	1191	(Hatton Bank 3)
46-1	CTD	End	Jun 27 2008 14:23:48	58.80967	-18.8309	1462	
47-1	CTD	Start	Jun 27 2008 14:54:39	58.79402	-18.79202	1132	
47-1	CTD	Bottom	Jun 27 2008 15:18:11	58.79278	-18.79342	1132	
47-1	CTD	End	Jun 27 2008 15:41:09	58.79258	-18.79348	1129	
48-1	CTD	Start	Jun 27 2008 16:10:52	58.77717	-18.75583	1018	
48-1	CTD	Bottom	Jun 27 2008 16:32:15	58.7783	-18.75458	1021	
48-1	CTD	End	Jun 27 2008 16:49:36	58.77748	-18.7563	1021	
49-1	CTD	Start	Jun 27 2008 17:28:09	58.75687	-18.70792	918	
49-1	CTD	Bottom	Jun 27 2008 17:44:21	58.75643	-18.70695	914	
49-1	CTD	End	Jun 27 2008 18:01:11	58.75662	-18.70767	914	
50-1	CTD	Start	Jun 27 2008 18:40:39	58.74052	-18.66935	785	
50-1	CTD	Bottom	Jun 27 2008 18:54:49	58.74003	-18.66875	785	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
50-1	CTD	End	Jun 27 2008 19:09:05	58.74057	-18.66822	785	
51-1	Multibeam	Start	Jun 28 2008 01:18:30	58.78422	-18.29223	627	line cnt. 0067
51-1	Multibeam	End	Jun 28 2008 01:42:22	58.76492	-18.34417	566	line cnt. 0068 (Stopped due too grid fault)
52-1	CTD	Start	Jun 28 2008 14:09:13	58.6878	-18.55158	708	
52-1	CTD	Bottom	Jun 28 2008 14:22:11	58.68657	-18.55565	711	
52-1	CTD	End	Jun 28 2008 14:36:59	58.68813	-18.55417	714	
53-1	CTD	Start	Jun 28 2008 14:56:14	58.7049	-18.59048	760	
53-1	CTD	Bottom	Jun 28 2008 15:10:17	58.70495	-18.59005	760	
53-1	CTD	End	Jun 28 2008 15:26:21	58.70513	-18.5901	766	
54-1	CTD	Start	Jun 28 2008 15:52:29	58.72243	-18.62955	803	
54-1	CTD	Bottom	Jun 28 2008 16:06:30	58.7229	-18.6272	803	
54-1	CTD	End	Jun 28 2008 16:22:11	58.72285	-18.63047	806	
55-1	CTD	Start	Jun 28 2008 16:59:55	58.74732	-18.68803	847	
55-1	CTD	Bottom	Jun 28 2008 17:14:33	58.74825	-18.68867	850	
55-1	CTD	End	Jun 28 2008 17:31:02	58.74817	-18.68947	853	
56-1	CTD	Start	Jun 28 2008 18:35:38	58.76717	-18.7327	976	
56-1	CTD	Bottom	Jun 28 2008 18:54:10	58.7672	-18.73312	976	
56-1	CTD	End	Jun 28 2008 19:11:39	58.76752	-18.73257	976	
57-1	Multibeam	Start	Jun 28 2008 20:17:41	58.77495	-18.77532	1053	line cnt. 0069
57-1	Multibeam	End	Jun 28 2008 21:30:54	58.67493	-18.95975	1155	line cnt. 0071
57-2	Multibeam	Start	Jun 28 2008 21:49:23	58.65635	-18.92817	1097	line cnt. 0072
57-2	Multibeam	End	Jun 28 2008 23:22:07	58.75822	-18.74008	927	line cnt. 0076
57-3	Multibeam	Start	Jun 28 2008 23:54:00	58.73535	-18.72045	834	line cnt. 0076
57-3	Multibeam	End	Jun 29 2008 01:11:49	58.63655	-18.90127	1060	line cnt. 0078
57-4	Multibeam	Start	Jun 29 2008 01:37:24	58.61913	-18.86228	995	line cnt. 0079
57-4	Multibeam	End	Jun 29 2008 03:01:51	58.7118	-18.70873	865	line cnt. 0081
57-5	Multibeam	Start	Jun 29 2008 03:25:24	58.69663	-18.68115	819	line cnt. 0082
57-5	Multibeam	End	Jun 29 2008 04:34:28	58.60417	-18.83223	911	line cnt. 0084
57-6	Multibeam	Start	Jun 29 2008 04:55:42	58.58922	-18.79568	877	line cnt. 0085
57-6	Multibeam	End	Jun 29 2008 06:06:22	58.68542	-18.64453	776	line cnt. 0087
57-7	Multibeam	Start	Jun 29 2008 06:21:55	58.67075	-18.60955	735	line cnt. 0088
57-7	Multibeam	End	Jun 29 2008 06:45:10	58.63767	-18.65923	779	line cnt. 0088
58-1	Videoboxcore	Start	Jun 29 2008 08:46:46	58.77235	-18.56315	806	
58-1	Videoboxcore	End	Jun 29 2008 09:42:04	58.76863	-18.57323	751	Boxcore taken
59-1	Videoboxcore	Start	Jun 29 2008 10:51:12	58.78293	-18.57972	813	
59-1	Videoboxcore	End	Jun 29 2008 11:45:23	58.78065	-18.58983	788	Boxcore taken
60-1	Albex 3 lander	Recovery	Jun 29 2008 13:45:24	58.73672	-18.66178	800	Actual moment of Picking in
61-1	Boxcore (small)	Bottom	Jun 29 2008 14:29:24	58.73327	-18.66665	794	Boxcore of station 42 (Albex 3 lander)
62-1	Albex 2 lander	Recovery	Jun 29 2008 16:03:14	58.6869	-18.5433	698	Actual moment of picking in
63-1	Boxcore (small)	Bottom	Jun 29 2008 16:36:10	58.6866	-18.54313	698	Boxcore of station 41 (Albex 2 lander)
64-1	Boxcore (small)	Bottom	Jun 29 2008 17:22:57	58.68665	-18.5432	698	Boxcore 2 of station 41
65-1	Mooring 2	Recovery	Jun 29 2008 19:45:11	58.75522	-18.08937	507	Actual moment of picking
66-1	Multibeam	Start	Jun 29 2008 20:44:01	58.77435	-18.30435	600	line cnt. 0089
66-1	Multibeam	End	Jun 29 2008 21:46:15	58.70748	-18.47922	649	line cnt. 0091
66-2	Multibeam	Start	Jun 29 2008 21:57:35	58.7154	-18.5033	686	line cnt. 0092
66-2	Multibeam	End	Jun 29 2008 22:00:30	58.71922	-18.49778	686	line cnt. 0092
66-3	Multibeam	Start	Jun 29 2008 22:40:00	58.7128	-18.50928	677	line cnt. 0093
66-3	Multibeam	End	Jun 29 2008 23:16:15	58.75007	-18.40647	550	line cnt. 0094
67-1	Multibeam	Start	Jun 29 2008 23:42:04	58.77707	-18.33212	618	line cnt. 0000 (NEW SURVEY)
67-1	Multibeam	End	Jun 30 2008 01:04:00	58.77733	-18.04908	575	line cnt. 0002

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
67-2	Multibeam	Start	Jun 30 2008 01:17:42	58.79672	-18.05052	578	line cnt. 0003
67-2	Multibeam	End	Jun 30 2008 02:39:27	58.79748	-18.33837	671	line cnt. 0005
67-3	Multibeam	Start	Jun 30 2008 02:58:05	58.78347	-18.29948	630	line cnt. 0006
67-3	Multibeam	End	Jun 30 2008 04:10:21	58.7242	-18.5181	714	line cnt. 0008
67-4	Multibeam	Start	Jun 30 2008 04:17:35	58.72398	-18.51928	714	line cnt. 0009
67-4	Multibeam	End	Jun 30 2008 06:12:59	58.91005	-18.70887	1331	line cnt. 0012
67-5	Multibeam	Start	Jun 30 2008 06:29:00	58.9231	-18.67272	1331	line cnt. 0013
67-5	Multibeam	End	Jun 30 2008 06:39:46	58.90683	-18.65297	1254	line cnt. 0014
68-1	Boxcore (small)	Bottom	Jun 30 2008 08:34:33	58.73352	-18.66693	779	Boxcore off station 42
69-1	Boxcore (small)	Bottom	Jun 30 2008 09:38:32	58.73342	-18.66775	779	Boxcore off Sation 42
70-1	Boxcore (small)	Bottom	Jun 30 2008 10:29:56	58.73337	-18.66778	772	Boxcore off Station 42
71-1	Boxcore (small)	Bottom	Jun 30 2008 11:25:39	58.73345	-18.66775	779	Boxcore off Station 42 (failed)
72-1	Boxcore (small)	Bottom	Jun 30 2008 12:25:36	58.73373	-18.6703	782	Boxcore off Station 42
73-1	Boxcore (small)	Bottom	Jun 30 2008 14:16:23	58.73377	-18.6673	782	Boxcore off Station 42
74-1	Albex 2 lander	Deployment	Jun 30 2008 15:15:13	58.7336	-18.66685	782	free fall
75-1	Mooring 2	Deployment	Jun 30 2008 16:24:59	58.76718	-18.73328	976	free fall
76-1	Mooring 1	Recovery	Jun 30 2008 17:57:22	58.73422	-18.99518	1396	Actual moment of picking in
77-1	Albex 3 lander	Deployment	Jun 30 2008 20:05:58	58.68662	-18.54403	698	free fall
78-1	Multibeam	Start	Jun 30 2008 22:48:57	58.80495	-18.0666	563	line cnt. 0015
78-1	Multibeam	End	Jun 30 2008 23:59:19	58.92122	-18.06725	871	line.cnt. 0016
78-2	Multibeam	Start	Jul 01 2008 00:10:49	58.90833	-18.07166	10	line.cnt. 0017
78-2	Multibeam	End	Jul 01 2008 03:32:03	58.91	-18.735	10	line.cnt. 0024
78-3	Multibeam	Start	Jul 01 2008 04:49:27	58.89425	-18.64043	1217	line cnt. 0025
78-3	Multibeam	End	Jul 01 2008 06:27:29	58.74315	-18.48942	705	line cnt. 0028
79-1	Boxcore (small)	Bottom	Jul 01 2008 08:30:56	58.77332	-18.72227	992	
80-1	Boxcore (small)	Bottom	Jul 01 2008 09:46:25	58.7736	-18.72223	995	
81-1	Boxcore (small)	Bottom	Jul 01 2008 10:53:44	58.77322	-18.72215	992	
82-1	Boxcore (small)	Bottom	Jul 01 2008 11:48:53	58.77317	-18.72203	992	
83-1	Mooring 1	Deployment	Jul 01 2008 14:00:44	58.75393	-18.67802	813	free fall
84-1	Triangular dredge	Start	Jul 01 2008 15:14:15	58.77115	-18.72362	985	
84-1	Triangular dredge	End	Jul 01 2008 15:29:43	58.76885	-18.72412	976	
85-1	Boxcore (small)	Bottom	Jul 01 2008 17:10:15	58.70495	-18.59105	760	
86-1	Boxcore (small)	Bottom	Jul 01 2008 18:43:40	58.70498	-18.59058	760	Failed
87-1	Multibeam	Start	Jul 01 2008 19:58:36	58.75387	-18.47812	711	line cnt. 0029
87-1	Multibeam	End	Jul 01 2008 20:49:28	58.80107	-18.32347	671	line cnt. 0030
87-2	Multibeam	Start	Jul 01 2008 20:58:53	58.81577	-18.30042	683	line cnt. 0031
87-2	Multibeam	End	Jul 01 2008 22:02:19	58.81323	-18.0819	578	line cnt. 0033
87-3	Multibeam	Start	Jul 01 2008 22:12:38	58.82375	-18.09557	590	line cnt. 0034
87-3	Multibeam	End	Jul 01 2008 22:56:23	58.90013	-18.1008	785	line cnt. 0036
87-4	Multibeam	Start	Jul 01 2008 23:06:52	58.88592	-18.11582	748	line cnt. 0036
87-4	Multibeam	End	Jul 02 2008 01:45:42	58.88342	-18.65303	1192	line cnt. 0042
87-5	Multibeam	Start	Jul 02 2008 02:10:45	58.85018	-18.57447	1019	line cnt. 0042
87-5	Multibeam	End	Jul 02 2008 04:23:16	58.8596	-18.11785	612	line cnt. 0046
87-6	Multibeam	Start	Jul 02 2008 04:44:39	58.83988	-18.11473	603	line cnt. 0047
87-6	Multibeam	End	Jul 02 2008 06:52:44	58.82497	-18.54908	927	line cnt. 0050
88-1	Videoboxcore (1 hour)	Start	Jul 02 2008 09:07:59	58.73392	-18.72268	828	
88-1	Videoboxcore (1 hour)	End	Jul 02 2008 10:00:26	58.73385	-18.70807	847	Boxcore Taken
89-1	Videoboxcore (1 hour)	Start	Jul 02 2008 11:09:44	58.74995	-18.74963	862	
89-1	Videoboxcore (1 hour)	End	Jul 02 2008 12:06:36	58.75742	-18.7534	880	Boxcore Taken
90-1	Videoboxcore (1 hour)	Start	Jul 02 2008 13:51:35	58.7064	-18.50763	640	
90-1	Videoboxcore (1 hour)	End	Jul 02 2008 14:43:46	58.70678	-18.51355	640	Boxcore Taken

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
91-1	Videoboxcore (1 hour)	Start	Jul 02 2008 15:51:42	58.72012	-18.46343	597	
91-1	Videoboxcore (1 hour)	End	Jul 02 2008 16:48:42	58.71945	-18.4478	593	End hopperline, boxcore taken
92-1	Videoboxcore (short)	Bottom	Jul 02 2008 18:57:55	58.73367	-18.71752	822	
93-1	Multibeam	Start	Jul 02 2008 20:46:48	58.70495	-18.4892	646	line cnt. 0052
93-1	Multibeam	End	Jul 02 2008 21:13:07	58.73097	-18.40868	556	line cnt. 0052
93-2	Multibeam	Start	Jul 02 2008 21:52:24	58.77448	-18.49877	748	line cnt. 0053
93-2	Multibeam	End	Jul 02 2008 22:52:31	58.8135	-18.295	683	line cnt. 0055
93-3	Multibeam	Start	Jul 02 2008 23:14:14	58.828	-18.2016	658	line cnt. 0056
93-3	Multibeam	End	Jul 02 2008 23:37:08	58.8295	-18.1166	603	line cnt. 0056
93-4	Multibeam	Start	Jul 03 2008 00:20:18	58.76687	-18.034	575	line cnt. 0057
93-4	Multibeam	End	Jul 03 2008 01:47:28	58.9216	-18.03603	902	line cnt. 0060
93-5	Multibeam	Start	Jul 03 2008 02:05:21	58.92023	-18.00075	887	line cnt. 0060
93-5	Multibeam	End	Jul 03 2008 03:30:50	58.76667	-17.99875	569	line cnt. 0062
93-6	Multibeam	Start	Jul 03 2008 04:30:28	58.82727	-18.19005	655	line cnt. 0063
93-6	Multibeam	End	Jul 03 2008 04:37:29	58.82833	-18.21458	668	line cnt. 0063
93-7	Multibeam	Start	Jul 03 2008 05:09:32	58.82258	-18.32978	708	line cnt. 0064
93-7	Multibeam	End	Jul 03 2008 06:12:45	58.79877	-18.53412	850	line cnt. 0066
94-1	Albex 3 lander	Recovery	Jul 03 2008 08:42:32	58.68768	-18.54528	701	Actual moment of picking in
95-1	Albex 2 lander	Recovery	Jul 03 2008 09:59:31	58.73538	-18.6643	791	Actual moment of picking in
96-1	Videoboxcore (short)	Bottom	Jul 03 2008 10:42:19	58.73493	-18.66862	791	
97-1	Videoboxcore (short)	Bottom	Jul 03 2008 11:38:35	58.73467	-18.66865	779	
98-1	Mooring 2	Recovery	Jul 03 2008 13:39:19	58.77032	-18.73028	985	Actual moment of picking in
99-1	Boxcore (small)	Bottom	Jul 03 2008 14:29:55	58.7342	-18.7091	847	Failed
100-1	Boxcore (small)	Bottom	Jul 03 2008 15:30:08	58.73412	-18.70867	850	
101-1	Boxcore (small)	Bottom	Jul 03 2008 16:31:35	58.7342	-18.70628	850	
102-1	Boxcore (small)	Bottom	Jul 03 2008 17:31:15	58.7343	-18.70713	853	
103-1	Albex 2 lander	Deployment	Jul 03 2008 19:19:47	58.73388	-18.66695	782	
104-1	Multibeam	Start	Jul 03 2008 20:37:30	58.69645	-18.61432	772	line cnt. 0000 (NEW SURVEY)
104-1	Multibeam	End	Jul 03 2008 21:56:53	58.58815	-18.77435	868	line cnt. 0002
104-2	Multibeam	Start	Jul 03 2008 22:06:09	58.59313	-18.78348	871	line cnt. 0003
104-2	Multibeam	End	Jul 04 2008 01:56:24	58.5921	-17.97787	680	line cnt. 0011
104-3	Multibeam	Start	Jul 04 2008 02:15:17	58.58013	-18.00157	680	line cnt. 0011
104-3	Multibeam	End	Jul 04 2008 04:10:46	58.79222	-18.00013	606	line cnt. 0014
104-4	Multibeam	Start	Jul 04 2008 04:23:49	58.793	-17.99987	597	line cnt. 0015
104-4	Multibeam	End	Jul 04 2008 06:02:44	58.68785	-18.24898	618	line cnt. 0018
105-1	Boxcore (small)	Bottom	Jul 04 2008 08:33:55	58.74983	-18.75001	862	
106-1	Boxcore (small)	Bottom	Jul 04 2008 09:15:46	58.75052	-18.75027	865	
107-1	Boxcore (small)	Bottom	Jul 04 2008 10:40:37	58.74985	-18.75003	862	
108-1	Boxcore (small)	Bottom	Jul 04 2008 11:31:45	58.75008	-18.74995	862	
109-1	Mooring 2	Deployment	Jul 04 2008 13:53:18	58.74957	-18.75047	862	free fall
110-1	Boxcore (small)	Bottom	Jul 04 2008 14:26:52	58.7575	-18.75333	914	
111-1	Boxcore (small)	Bottom	Jul 04 2008 15:39:08	58.75748	-18.75352	918	
112-1	Albex 3 lander	Deployment	Jul 04 2008 16:29:56	58.7342	-18.72282	828	free fall
113-1	Boxcore (small)	Bottom	Jul 04 2008 17:11:07	58.75732	-18.75318	918	
114-1	Multibeam	Start	Jul 04 2008 18:54:09	58.7005	-18.63087	785	line cnt. 0019
114-1	Multibeam	End	Jul 04 2008 19:58:47	58.63785	-18.45256	587	line cnt. 0022
114-2	Multibeam	Start	Jul 04 2008 20:23:19	58.6379	-18.45253	587	line cnt. 0022
114-2	Multibeam	End	Jul 04 2008 20:42:06	58.62133	-18.4062	615	
114-3	Multibeam	Start	Jul 04 2008 20:49:32	58.61967	-18.4109	609	line cnt. 0023
114-3	Multibeam	End	Jul 04 2008 21:49:27	58.68917	-18.24195	621	line cnt. 0024
114-4	Multibeam	Start	Jul 04 2008 22:02:58	58.68037	-18.207	630	line cnt. 0025

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
114-4	Multibeam	End	Jul 04 2008 23:12:48	58.76605	-18.0123	575	line cnt. 0027
114-5	Multibeam	Start	Jul 04 2008 23:27:08	58.74387	-18.00508	572	line cnt. 0028
114-5	Multibeam	End	Jul 05 2008 00:23:05	58.67607	-18.16742	615	line cnt. 0029
114-6	Multibeam	Start	Jul 05 2008 00:36:39	58.6723	-18.12708	618	line cnt. 0030
114-6	Multibeam	End	Jul 05 2008 01:16:41	58.72202	-18.00655	597	line cnt. 0031
114-7	Multibeam	Start	Jul 05 2008 01:31:38	58.69807	-18.0136	609	line cnt. 0031
114-7	Multibeam	End	Jul 05 2008 01:51:27	58.6725	-18.07202	618	line cnt. 0033
114-8	Multibeam	Start	Jul 05 2008 02:12:11	58.67152	-18.017	624	line cnt. 0033
114-8	Multibeam	End	Jul 05 2008 03:12:38	58.68303	-18.24702	624	line cnt. 0035
114-9	Multibeam	Start	Jul 05 2008 03:25:44	58.66773	-18.22827	637	line cnt. 0036
114-9	Multibeam	End	Jul 05 2008 03:31:08	58.66337	-18.24655	637	line cnt. 0036
114-10	Multibeam	Start	Jul 05 2008 03:50:36	58.67198	-18.19945	630	line cnt. 0037
114-10	Multibeam	End	Jul 05 2008 04:06:55	58.66252	-18.24972	637	line cnt. 0038 (Ceased, Techn. Problems)
114-11	Multibeam	Start	Jul 05 2008 18:48:05	58.65998	-18.30003	627	line cnt. 0038
114-11	Multibeam	End	Jul 05 2008 18:50:06	58.65998	-18.29267	630	line cnt. 0039 (Ceased, Techn. Problems)
114-12	Multibeam	Start	Jul 05 2008 19:20:51	58.65913	-18.30947	627	line cnt. 0039
114-12	Multibeam	End	Jul 05 2008 20:39:01	58.65255	-18.01867	640	line cnt. 0041
114-13	Multibeam	Start	Jul 05 2008 20:51:40	58.63328	-18.01867	649	line cnt. 0042
114-13	Multibeam	End	Jul 05 2008 22:21:00	58.64245	-18.3485	606	line cnt. 0044
114-14	Multibeam	Start	Jul 05 2008 22:34:42	58.6247	-18.37717	612	line cnt. 0045
114-14	Multibeam	End	Jul 06 2008 00:10:05	58.60997	-18.0118	664	line cnt. 0049
114-15	Multibeam	Start	Jul 06 2008 00:30:32	58.601	-18.0572	661	line cnt. 0049
114-15	Multibeam	End	Jul 06 2008 01:15:03	58.60438	-18.21868	612	line cnt. 0051
114-16	Multibeam	Start	Jul 06 2008 01:28:22	58.6068	-18.20015	615	line cnt. 0051
114-16	Multibeam	End	Jul 06 2008 03:52:15	58.61043	-18.72835	843	line cnt. 0056
114-17	Multibeam	Start	Jul 06 2008 04:09:54	58.62013	-18.6924	819	line cnt. 0056
114-17	Multibeam	End	Jul 06 2008 05:33:52	58.62313	-18.43642	621	line cnt. 0058
114-18	Multibeam	Start	Jul 06 2008 05:41:27	58.63078	-18.49478	766	line cnt. 0059
114-18	Multibeam	End	Jul 06 2008 06:46:38	58.65008	-18.66988	766	line cnt. 0060
114-19	Multibeam	Start	Jul 06 2008 07:21:36	58.65328	-18.55935	655	line cnt. 0060
114-19	Multibeam	End	Jul 06 2008 07:24:25	58.6571	-18.56202	692	line cnt. 0061
114-20	Multibeam	Start	Jul 06 2008 07:25:22	58.65833	-18.56407	711	line cnt. 0062
114-20	Multibeam	End	Jul 06 2008 07:41:49	58.67343	-18.6178	751	line cnt. 0062 (SURVEY Hatton Bank 2 completed
115-1	Videoboxcore (1 hour)	Bottom	Jul 06 2008 09:02:12	58.77287	-18.7425	1010	
116-1	Videoboxcore (1 hour)	Bottom	Jul 06 2008 13:37:01	58.77265	-18.74153	1004	
117-1	Videoboxcore (1 hour)	Start	Jul 06 2008 15:03:40	58.75765	-18.75322	871	
117-1	Videoboxcore (1 hour)	End	Jul 06 2008 16:02:12	58.76183	-18.75705	958	Boxcore Taken
118-1	Videoboxcore (1 hour)	Start	Jul 06 2008 17:16:06	58.75625	-18.68812	816	
118-1	Videoboxcore (1 hour)	End	Jul 06 2008 17:53:27	58.75597	-18.70573	908	Boxcore taken
119-1	Videoboxcore (1 hour)	Start	Jul 06 2008 19:23:39	58.69705	-18.77807	877	
119-1	Videoboxcore (1 hour)	End	Jul 06 2008 19:56:45	58.69735	-18.79292	908	Boxcore taken
120-1	Multibeam	Start	Jul 06 2008 21:09:16	58.59168	-18.76583	862	Multibeam - line cnt. 0000 (NEW SURVEY- Hatton Bank-4)
120-1	Multibeam	End	Jul 06 2008 22:05:14	58.59122	-18.97438	1087	Multibeam - line cnt. 0001
120-2	Multibeam	Start	Jul 06 2008 22:19:51	58.5998	-18.9495	1072	Multibeam - line cnt. 0002
120-2	Multibeam	End	Jul 07 2008 00:57:46	58.89088	-18.94987	1513	Multibeam - line cnt. 0008
120-3	Multibeam	Start	Jul 07 2008 01:24:28	58.88185	-18.95	1492	Multibeam - line cnt. 0009
120-3	Multibeam	End	Jul 07 2008 01:31:56	58.89458	-18.9507	1526	Multibeam - line cnt. 0010
120-4	Multibeam	Start	Jul 07 2008 02:30:56	58.9007	-18.91382	1495	Multibeam - line cnt. 0010
120-4	Multibeam	End	Jul 07 2008 03:35:10	58.90525	-18.69772	1297	Multibeam - line cnt. 0013

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
120-5	Multibeam	Start	Jul 07 2008 03:46:02	58.90715	-18.70938	1322	Multibeam - line cnt. 0013
120-5	Multibeam	End	Jul 07 2008 04:51:37	58.81432	-18.86623	1245	Multibeam - line cnt. 0015
120-6	Multibeam	Start	Jul 07 2008 05:02:36	58.8167	-18.86962	1254	Multibeam - line cnt. 0016
120-6	Multibeam	End	Jul 07 2008 05:31:26	58.78137	-18.79468	1118	Multibeam - line cnt. 0016
120-7	Multibeam	Start	Jul 07 2008 05:43:48	58.78455	-18.79593	1121	Multibeam - line cnt. 0017
120-7	Multibeam	End	Jul 07 2008 06:40:41	58.7052	-18.94142	1171	Multibeam - line cnt. 0019
121-1	Albex 3 lander	Recovery	Jul 07 2008 08:35:38	58.73502	-18.72412	834	Actual moment of Picking-in
122-1	Albex 2 lander	Recovery	Jul 07 2008 09:40:35	58.73443	-18.67065	785	Actual moment of Picking-in
123-1	Boxcore (small)	Bottom	Jul 07 2008 10:24:11	58.72262	-18.62902	806	plain, east of K
124-1	Boxcore (small)	Bottom	Jul 07 2008 11:03:12	58.72228	-18.62943	803	plain, east of K
125-1	CTD	Start	Jul 07 2008 11:49:09	58.72258	-18.6289	806	
125-1	CTD	Bottom	Jul 07 2008 12:03:23	58.72248	-18.62913	803	
125-1	CTD	End	Jul 07 2008 12:23:14	58.7205	-18.62558	800	
126-1	CTD	Start	Jul 07 2008 13:21:54	58.73922	-18.66688	782	
126-1	CTD	Bottom	Jul 07 2008 13:36:28	58.74002	-18.66733	782	
126-1	CTD	End	Jul 07 2008 13:52:06	58.74005	-18.66777	782	
127-1	CTD	Start	Jul 07 2008 14:25:02	58.74688	-18.69038	847	
127-1	CTD	Bottom	Jul 07 2008 14:41:04	58.74768	-18.68843	850	
127-1	CTD	End	Jul 07 2008 15:02:11	58.74766	-18.68848	856	
128-1	CTD	Start	Jul 07 2008 15:18:10	58.75677	-18.70807	918	
128-1	CTD	Bottom	Jul 07 2008 15:35:12	58.75683	-18.70863	918	
128-1	CTD	End	Jul 07 2008 15:52:53	58.7569	-18.70785	914	
129-1	CTD	Start	Jul 07 2008 16:22:47	58.77752	-18.75572	1019	
129-1	CTD	Bottom	Jul 07 2008 16:39:02	58.77743	-18.75627	1019	
129-1	CTD	End	Jul 07 2008 16:55:14	58.77762	-18.75568	1019	
130-1	CTD	Start	Jul 07 2008 17:20:11	58.79283	-18.79383	1134	
130-1	CTD	Bottom	Jul 07 2008 17:37:00	58.79283	-18.79453	1134	
130-1	CTD	End	Jul 07 2008 17:55:11	58.79282	-18.79402	1134	
131-1	Multibeam	Start	Jul 07 2008 20:44:13	58.6846	-18.95812	1174	Multibeam - line cnt. 0019
131-1	Multibeam	End	Jul 07 2008 21:51:45	58.59378	-18.78615	874	Multibeam - line cnt. 0022
131-2	Multibeam	Start	Jul 07 2008 22:09:57	58.59978	-18.85105	914	Multibeam - line cnt. 0022
131-2	Multibeam	End	Jul 07 2008 22:46:21	58.64363	-18.93543	1087	Multibeam - line cnt. 0023
131-3	Multibeam	Start	Jul 07 2008 23:31:02	58.7365	-18.90308	1146	Multibeam - line cnt. 0024
131-3	Multibeam	End	Jul 08 2008 01:10:27	58.90298	-18.90667	1492	Multibeam - line cnt. 0027
131-4	Multibeam	Start	Jul 08 2008 01:21:57	58.90168	-18.91632	1499	Multibeam - line cnt. 0028
131-4	Multibeam	End	Jul 08 2008 01:39:28	58.90165	-18.9846	1597	Multibeam - line cnt. 0029
131-5	Multibeam	Start	Jul 08 2008 01:42:25	58.90008	-18.98223	1591	Multibeam - line cnt. 0029
131-5	Multibeam	End	Jul 08 2008 02:17:06	58.89545	-18.87477	1440	Multibeam - line cnt. 0031
131-6	Multibeam	Start	Jul 08 2008 02:28:05	58.8828	-18.88738	1418	Multibeam - line cnt. 0031
131-6	Multibeam	End	Jul 08 2008 03:06:46	58.88282	-18.78133	1316	Multibeam - line cnt. 0032
131-7	Multibeam	Start	Jul 08 2008 03:28:22	58.85698	-18.80072	1267	Multibeam - line cnt. 0033
131-7	Multibeam	End	Jul 08 2008 03:55:00	58.85908	-18.89178	1372	Multibeam - line cnt. 0034
131-8	Multibeam	Start	Jul 08 2008 04:10:31	58.85217	-18.87362	1332	Multibeam - line cnt. 0034
131-8	Multibeam	End	Jul 08 2008 05:05:35	58.75478	-18.86545	1144	Multibeam - line cnt. 0035
132-1	Boxcore (small)	Bottom	Jul 08 2008 08:34:15	58.73357	-18.66843	782	disturbed
133-1	Boxcore (small)	Bottom	Jul 08 2008 09:18:58	58.73365	-18.6678	782	epi- and infauna
134-1	Boxcore (small)	Bottom	Jul 08 2008 10:02:37	58.73397	-18.66778	782	epi- and infauna
135-1	Boxcore (small)	Bottom	Jul 08 2008 11:15:02	58.77315	-18.72317	995	
136-1	Albex 2 lander	Deployment	Jul 08 2008 12:08:25	58.77348	-18.72292	995	Free fall
137-1	3 m beamtrawl	Start	Jul 08 2008 13:37:46	58.72177	-18.63127	801	
137-1	4 m beamtrawl	End	Jul 08 2008 14:24:32	58.73475	-18.60783	801	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
138-1	Boxcore (small)	Bottom	Jul 08 2008 16:02:17	58.73385	-18.72258	832	top of Cape
139-1	Albex 3 lander	Deployment	Jul 08 2008 17:01:01	58.73418	-18.72298	838	
140-1	Planktonnet (vertical)	Start	Jul 08 2008 17:08:42	58.7346	-18.72242	829	tot 100m
140-1	Planktonnet (vertical)	End	Jul 08 2008 17:16:30	58.73437	-18.72368	829	
140-2	Planktonnet (vertical)	Start	Jul 08 2008 17:22:29	58.73367	-18.72293	832	tot 200m
140-2	Planktonnet (vertical)	End	Jul 08 2008 17:40:53	58.73485	-18.72267	838	
141-1	Multibeam	Start	Jul 08 2008 20:24:08	58.91303	-18.48173	1150	Multibeam - line cnt. 0000 (NEW SURVEY-Hatton bank2008_5)
141-1	Multibeam	End	Jul 09 2008 00:34:38	59.1791	-17.98255	1286	Multibeam - line cnt. 0008
141-2	Multibeam	Start	Jul 09 2008 00:40:10	59.17833	-17.98383	1286	Multibeam - line cnt. 0009
141-2	Multibeam	End	Jul 09 2008 03:07:20	58.916	-17.98315	866	Multibeam - line cnt. 0014
141-3	Multibeam	Start	Jul 09 2008 03:16:07	58.91655	-17.98307	866	Multibeam - line cnt. 0014
141-3	Multibeam	End	Jul 09 2008 05:48:54	58.91632	-18.47553	1140	Multibeam - line cnt. 0020
142-1	CTD	Start	Jul 09 2008 08:24:08	58.79263	-18.79463	1134	
142-1	CTD	Bottom	Jul 09 2008 08:44:43	58.79275	-18.79387	1134	
142-1	CTD	End	Jul 09 2008 09:09:32	58.7925	-18.79512	1134	
143-1	CTD	Start	Jul 09 2008 09:30:50	58.7776	-18.75715	1023	
143-1	CTD	Bottom	Jul 09 2008 09:46:36	58.77773	-18.75623	1020	
143-1	CTD	End	Jul 09 2008 10:06:21	58.77787	-18.75575	1023	
144-1	CTD	Start	Jul 09 2008 10:30:59	58.7566	-18.70815	918	
144-1	CTD	Bottom	Jul 09 2008 10:45:16	58.75677	-18.70862	918	
144-1	CTD	End	Jul 09 2008 11:05:28	58.75715	-18.70813	921	
145-1	CTD	Start	Jul 09 2008 11:25:13	58.74775	-18.68898	850	
145-1	CTD	Bottom	Jul 09 2008 11:39:59	58.74817	-18.68918	850	
145-1	CTD	End	Jul 09 2008 11:58:08	58.74768	-18.68937	850	
146-1	CTD	Start	Jul 09 2008 13:17:46	58.74062	-18.66813	782	
146-1	CTD	Bottom	Jul 09 2008 13:31:20	58.7404	-18.66707	782	
146-1	CTD	End	Jul 09 2008 13:47:08	58.74018	-18.6685	782	
147-1	CTD	Start	Jul 09 2008 14:08:49	58.72217	-18.6288	804	
147-1	CTD	Bottom	Jul 09 2008 14:21:28	58.7225	-18.62782	804	
147-1	CTD	End	Jul 09 2008 14:35:43	58.72275	-18.6283	804	
148-1	Albex 3 lander	Recovery	Jul 09 2008 15:41:06	58.73452	-18.72692	841	Actual moment of Picking-in
149-1	Boxcore (small)	Bottom	Jul 09 2008 17:17:19	58.70628	-18.50752	640	at Q
150-1	Multibeam	Start	Jul 09 2008 19:51:05	58.94285	-18.437	1178	Multibeam - line cnt. 0020
150-1	Multibeam	End	Jul 09 2008 21:48:39	58.94132	-18.00555	1060	Multibeam - line cnt. 0023
150-2	Multibeam	Start	Jul 09 2008 21:59:06	58.94922	-18.0275	1060	Multibeam - line cnt. 0024
150-2	Multibeam	End	Jul 09 2008 23:38:59	59.14453	-18.03233	1440	Multibeam - line cnt. 0028
150-3	Multibeam	Start	Jul 09 2008 23:57:52	59.11838	-18.09272	1440	Multibeam - line cnt. 0028
150-3	Multibeam	End	Jul 10 2008 00:51:38	59.01788	-18.09743	1264	Multibeam - line cnt. 0029
150-4	Multibeam	Start	Jul 10 2008 01:07:34	59.02368	-18.06613	1261	Multibeam - line cnt. 0030
150-4	Multibeam	End	Jul 10 2008 01:38:33	59.08133	-18.06852	1390	Multibeam - line cnt. 0031
150-5	Multibeam	Start	Jul 10 2008 02:02:16	59.02942	-18.07843	1292	Multibeam - line cnt. 0032
150-5	Multibeam	End	Jul 10 2008 02:42:44	58.94605	-18.0798	1147	Multibeam - line cnt. 0033
150-6	Multibeam	Start	Jul 10 2008 02:56:55	58.94503	-18.1268	1029	Multibeam - line cnt. 0034
150-6	Multibeam	End	Jul 10 2008 04:20:03	59.08763	-18.15137	1378	Multibeam - line cnt. 0036
150-7	Multibeam	Start	Jul 10 2008 04:36:04	59.06075	-18.18745	1403	Multibeam - line cnt. 0037
150-7	Multibeam	End	Jul 10 2008 05:42:36	58.94587	-18.17068	1076	Multibeam - line cnt. 0039
150-8	Multibeam	Start	Jul 10 2008 05:59:13	58.96278	-18.18665	1119	Multibeam - line cnt. 0040
150-8	Multibeam	End	Jul 10 2008 06:55:23	58.96065	-18.38108	1236	Multibeam - line cnt. 0041
151-1	Videoboxcore (1 hour)	Start	Jul 10 2008 08:44:45	58.82635	-18.39537	715	
151-1	Videoboxcore (1 hour)	End	Jul 10 2008 09:41:25	58.83255	-18.4005	727	Boxcore taken
152-1	Videoboxcore (1 hour)	Start	Jul 10 2008 10:44:56	58.77838	-18.43238	665	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
152-1	Videoboxcore (1 hour)	End	Jul 10 2008 11:40:17	58.77012	-18.41993	585	Boxcore taken
153-1	Mooring 1	Recovery	Jul 10 2008 13:36:49	58.75408	-18.67878	807	Actual moment of Picking-in
154-1	Mooring 2	Recovery	Jul 10 2008 14:39:47	58.74948	-18.74917	863	Actual moment of Picking-in
155-1	Albex 3 lander	Deployment	Jul 10 2008 15:59:16	58.73413	-18.72318	838	Free fall
156-1	3m beamtrawl	Start	Jul 10 2008 17:14:39	58.77222	-18.71505	977	
156-1	3m beamtrawl	End	Jul 10 2008 17:29:40	58.7763	-18.70668	974	
157-1	Albex 2 lander	Recovery	Jul 10 2008 19:14:17	58.77372	-18.72432	995	Actual moment of picking in
158-1	Multibeam	Start	Jul 10 2008 21:02:00	58.90377	-18.50322	1128	Multibeam - line cnt. 0042
158-1	Multibeam	End	Jul 10 2008 21:11:44	58.91447	-18.47957	1144	Multibeam - line cnt. 0042
158-2	Multibeam	Start	Jul 10 2008 22:05:06	58.972	-18.29457	1202	Multibeam - line cnt. 0043
158-2	Multibeam	End	Jul 10 2008 22:42:29	59.02618	-18.2074	1295	Multibeam - line cnt. 0044
158-3	Multibeam	Start	Jul 10 2008 22:59:53	58.99955	-18.1942	1245	Multibeam - line cnt. 0045
158-3	Multibeam	End	Jul 10 2008 23:25:32	58.96682	-18.25217	1187	Multibeam - line cnt. 0046
158-4	Multibeam	Start	Jul 11 2008 00:37:02	58.91655	-18.00895	875	Multibeam - line cnt. 0046
158-4	Multibeam	End	Jul 11 2008 00:52:05	58.91665	-17.95362	875	Multibeam - line cnt. 0046
159-1	CTD-jojo	Start	Jul 11 2008 04:06:07	58.76298	-18.69955	903	1
159-1	CTD-jojo	Bottom	Jul 11 2008 04:23:07	58.76317	-18.6997	906	
159-1	CTD-jojo	End	Jul 11 2008 04:33:18	58.76327	-18.69928	906	
159-2	CTD-jojo	Start	Jul 11 2008 04:33:56	58.76328	-18.69938	906	2
159-2	CTD-jojo	Bottom	Jul 11 2008 04:43:10	58.76312	-18.70003	909	
159-2	CTD-jojo	End	Jul 11 2008 04:52:49	58.76323	-18.70043	909	
159-3	CTD-jojo	Start	Jul 11 2008 04:53:33	58.76333	-18.70067	912	
159-3	CTD-jojo	Bottom	Jul 11 2008 05:02:51	58.76317	-18.70103	912	
159-3	CTD-jojo	End	Jul 11 2008 05:12:22	58.7633	-18.70113	912	
159-4	CTD-jojo	Start	Jul 11 2008 05:13:01	58.76338	-18.70125	912	
159-4	CTD-jojo	Bottom	Jul 11 2008 05:22:37	58.76353	-18.70015	909	
159-4	CTD-jojo	End	Jul 11 2008 05:32:25	58.76332	-18.70023	909	
159-5	CTD-jojo	Start	Jul 11 2008 05:33:05	58.76337	-18.70023	909	
159-5	CTD-jojo	Bottom	Jul 11 2008 05:42:10	58.76312	-18.70053	909	
159-5	CTD-jojo	End	Jul 11 2008 05:51:56	58.76332	-18.69993	909	
159-6	CTD-jojo	Start	Jul 11 2008 05:52:36	58.76328	-18.69993	909	
159-6	CTD-jojo	Bottom	Jul 11 2008 06:02:04	58.76312	-18.7002	909	
159-6	CTD-jojo	End	Jul 11 2008 06:12:45	58.76292	-18.7006	909	
159-7	CTD-jojo	Start	Jul 11 2008 06:13:27	58.76285	-18.7005	909	
159-7	CTD-jojo	Bottom	Jul 11 2008 06:22:37	58.76278	-18.70048	909	
159-7	CTD-jojo	End	Jul 11 2008 06:32:26	58.76308	-18.69995	906	
159-8	CTD-jojo	Start	Jul 11 2008 06:33:09	58.76312	-18.70005	909	
159-8	CTD-jojo	Bottom	Jul 11 2008 06:43:05	58.7631	-18.69988	909	
159-8	CTD-jojo	End	Jul 11 2008 06:53:17	58.76302	-18.69958	906	
159-9	CTD-jojo	Start	Jul 11 2008 06:53:59	58.76302	-18.6995	906	
159-9	CTD-jojo	Bottom	Jul 11 2008 07:03:46	58.76305	-18.69982	906	
159-9	CTD-jojo	End	Jul 11 2008 07:14:05	58.76335	-18.70008	909	
159-10	CTD-jojo	Start	Jul 11 2008 07:14:51	58.76337	-18.70007	909	
159-10	CTD-jojo	Bottom	Jul 11 2008 07:23:55	58.76338	-18.69982	906	
159-10	CTD-jojo	End	Jul 11 2008 07:32:56	58.76358	-18.6994	906	
159-11	CTD-jojo	Start	Jul 11 2008 07:33:31	58.7635	-18.69943	906	
159-11	CTD-jojo	Bottom	Jul 11 2008 07:43:07	58.76325	-18.70048	909	
159-11	CTD-jojo	End	Jul 11 2008 07:53:20	58.763	-18.70023	909	
159-12	CTD-jojo	Start	Jul 11 2008 07:54:06	58.763	-18.70022	906	
159-12	CTD-jojo	Bottom	Jul 11 2008 08:03:41	58.76342	-18.70053	912	
159-12	CTD-jojo	End	Jul 11 2008 08:13:52	58.76288	-18.69813	897	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
159-13	CTD-jojo	Start	Jul 11 2008 08:15:00	58.76312	-18.69807	897	
159-13	CTD-jojo	Bottom	Jul 11 2008 08:24:42	58.76308	-18.69903	903	
159-13	CTD-jojo	End	Jul 11 2008 08:34:29	58.76208	-18.69802	887	
159-14	CTD-jojo	Start	Jul 11 2008 08:35:06	58.76213	-18.69783	887	
159-14	CTD-jojo	Bottom	Jul 11 2008 08:44:30	58.76227	-18.6983	890	
159-14	CTD-jojo	End	Jul 11 2008 08:53:32	58.76272	-18.69953	890	
159-15	CTD-jojo	Start	Jul 11 2008 08:54:33	58.7627	-18.7	906	
159-15	CTD-jojo	Bottom	Jul 11 2008 09:04:46	58.76178	-18.69868	890	
159-15	CTD-jojo	End	Jul 11 2008 09:13:54	58.76277	-18.69865	897	
159-16	CTD-jojo	Start	Jul 11 2008 09:15:01	58.76257	-18.6992	900	
159-16	CTD-jojo	Bottom	Jul 11 2008 09:24:36	58.76277	-18.69847	897	
159-16	CTD-jojo	End	Jul 11 2008 09:34:09	58.76205	-18.6986	890	
159-17	CTD-jojo	Start	Jul 11 2008 09:34:52	58.76217	-18.69893	890	
159-17	CTD-jojo	Bottom	Jul 11 2008 09:44:52	58.7631	-18.6962	894	
159-17	CTD-jojo	End	Jul 11 2008 09:54:00	58.76217	-18.70025	906	
159-18	CTD-jojo	Start	Jul 11 2008 09:54:54	58.76208	-18.70012	903	
159-18	CTD-jojo	Bottom	Jul 11 2008 10:04:27	58.76238	-18.70083	909	
159-18	CTD-jojo	End	Jul 11 2008 10:16:16	58.76307	-18.69952	906	
159-19	CTD-jojo	Start	Jul 11 2008 10:19:31	58.76287	-18.70157	912	
159-19	CTD-jojo	Bottom	Jul 11 2008 10:26:17	58.76268	-18.7014	912	
159-19	CTD-jojo	End	Jul 11 2008 10:36:34	58.76288	-18.6994	903	
159-20	CTD-jojo	Start	Jul 11 2008 10:37:39	58.76293	-18.69918	903	
159-20	CTD-jojo	Bottom	Jul 11 2008 10:46:26	58.76263	-18.69973	903	
159-20	CTD-jojo	End	Jul 11 2008 10:56:02	58.76333	-18.70012	909	
159-21	CTD-jojo	Start	Jul 11 2008 10:56:57	58.7634	-18.70022	909	
159-21	CTD-jojo	Bottom	Jul 11 2008 11:05:52	58.76325	-18.69848	903	
159-21	CTD-jojo	End	Jul 11 2008 11:15:53	58.76298	-18.70018	909	
159-22	CTD-jojo	Start	Jul 11 2008 11:16:44	58.76302	-18.70025	909	
159-22	CTD-jojo	Bottom	Jul 11 2008 11:25:12	58.76325	-18.69818	900	
159-22	CTD-jojo	End	Jul 11 2008 11:35:48	58.763	-18.70032	909	
159-23	CTD-jojo	Start	Jul 11 2008 11:36:19	58.76305	-18.70022	909	
159-23	CTD-jojo	Bottom	Jul 11 2008 11:45:25	58.76313	-18.70032	909	
159-23	CTD-jojo	End	Jul 11 2008 11:54:59	58.76283	-18.69955	906	
159-24	CTD-jojo	Start	Jul 11 2008 11:55:50	58.7627	-18.69955	903	
159-24	CTD-jojo	Bottom	Jul 11 2008 12:04:55	58.76322	-18.69927	906	
159-24	CTD-jojo	End	Jul 11 2008 12:15:00	58.7636	-18.69923	906	
159-25	CTD-jojo	Start	Jul 11 2008 12:15:07	58.76362	-18.69925	906	
159-25	CTD-jojo	Bottom	Jul 11 2008 12:24:55	58.76327	-18.69907	906	
159-25	CTD-jojo	End	Jul 11 2008 12:34:21	58.76325	-18.69962	903	
159-26	CTD-jojo	Start	Jul 11 2008 12:35:12	58.76335	-18.70012	909	
159-26	CTD-jojo	Bottom	Jul 11 2008 12:44:58	58.76325	-18.70118	912	
159-26	CTD-jojo	End	Jul 11 2008 12:54:54	58.76368	-18.69987	909	
159-27	CTD-jojo	Start	Jul 11 2008 12:55:33	58.7636	-18.69977	909	
159-27	CTD-jojo	Bottom	Jul 11 2008 13:04:58	58.76333	-18.69925	906	
159-27	CTD-jojo	End	Jul 11 2008 13:14:27	58.7636	-18.6998	909	
159-28	CTD-jojo	Start	Jul 11 2008 13:15:17	58.76365	-18.69957	909	
159-28	CTD-jojo	Bottom	Jul 11 2008 13:25:02	58.7636	-18.69985	909	
159-28	CTD-jojo	End	Jul 11 2008 13:34:53	58.7636	-18.70025	912	
159-29	CTD-jojo	Start	Jul 11 2008 13:35:45	58.76355	-18.70037	912	
159-29	CTD-jojo	Bottom	Jul 11 2008 13:45:20	58.76322	-18.6998	906	
159-29	CTD-jojo	End	Jul 11 2008 13:54:52	58.7632	-18.69975	906	

Station	Type	Event	Date/ Time	Lat N	Long W	Depth	Remark
159-30	CTD-jojo	Start	Jul 11 2008 13:55:41	58.76343	-18.69972	909	
159-30	CTD-jojo	Bottom	Jul 11 2008 14:05:14	58.76277	-18.69977	903	
159-30	CTD-jojo	End	Jul 11 2008 14:15:05	58.76362	-18.6997	909	
159-31	CTD-jojo	Start	Jul 11 2008 14:15:46	58.76373	-18.69955	909	
159-31	CTD-jojo	Bottom	Jul 11 2008 14:25:28	58.7632	-18.69907	903	
159-31	CTD-jojo	End	Jul 11 2008 14:35:07	58.7628	-18.70013	906	
159-32	CTD-jojo	Start	Jul 11 2008 14:36:14	58.76285	-18.70097	909	
159-32	CTD-jojo	Bottom	Jul 11 2008 14:46:16	58.76303	-18.69972	906	
159-32	CTD-jojo	End	Jul 11 2008 14:56:10	58.76302	-18.69903	909	
159-33	CTD-jojo	Start	Jul 11 2008 14:57:07	58.76285	-18.6996	903	
159-33	CTD-jojo	Bottom	Jul 11 2008 15:07:23	58.763	-18.70032	909	
159-33	CTD-jojo	End	Jul 11 2008 15:17:29	58.76395	-18.69887	906	
159-34	CTD-jojo	Start	Jul 11 2008 15:18:11	58.76383	-18.69895	906	
159-34	CTD-jojo	Bottom	Jul 11 2008 15:28:09	58.76292	-18.69957	906	
159-34	CTD-jojo	End	Jul 11 2008 15:38:35	58.76383	-18.70018	909	
159-35	CTD-jojo	Start	Jul 11 2008 15:39:19	58.76388	-18.70008	909	
159-35	CTD-jojo	Bottom	Jul 11 2008 15:49:57	58.76343	-18.70058	912	
159-35	CTD-jojo	End	Jul 11 2008 15:59:42	58.7633	-18.69947	909	
159-36	CTD-jojo	Start	Jul 11 2008 16:00:30	58.76328	-18.69928	906	
159-36	CTD-jojo	Bottom	Jul 11 2008 16:10:17	58.76357	-18.69902	906	
159-36	CTD-jojo	End	Jul 11 2008 16:19:58	58.76268	-18.6992	900	
159-37	CTD-jojo	Start	Jul 11 2008 16:20:38	58.76273	-18.69933	900	
159-37	CTD-jojo	Bottom	Jul 11 2008 16:30:36	58.76233	-18.70018	906	
159-37	CTD-jojo	End	Jul 11 2008 16:40:02	58.76342	-18.70033	909	
159-38	CTD-jojo	Start	Jul 11 2008 16:40:48	58.76337	-18.70015	909	
159-38	CTD-jojo	Bottom	Jul 11 2008 16:50:49	58.76288	-18.70043	909	
159-38	CTD-jojo	End	Jul 11 2008 17:00:19	58.76285	-18.70002	906	
159-39	CTD-jojo	Start	Jul 11 2008 17:01:04	58.76308	-18.70028	909	
159-39	CTD-jojo	Bottom	Jul 11 2008 17:09:46	58.76292	-18.70002	906	
159-39	CTD-jojo	End	Jul 11 2008 17:20:30	58.76282	-18.70033	906	
159-40	CTD-jojo	Start	Jul 11 2008 17:20:38	58.76285	-18.70035	906	
159-40	CTD-jojo	Bottom	Jul 11 2008 17:29:18	58.76292	-18.70052	909	
159-40	CTD-jojo	End	Jul 11 2008 17:45:55	58.76287	-18.70067	909	
160-1	Albex 3 lander	Recovery	Jul 11 2008 19:12:49	58.73413	-18.72665	838	Picking in