

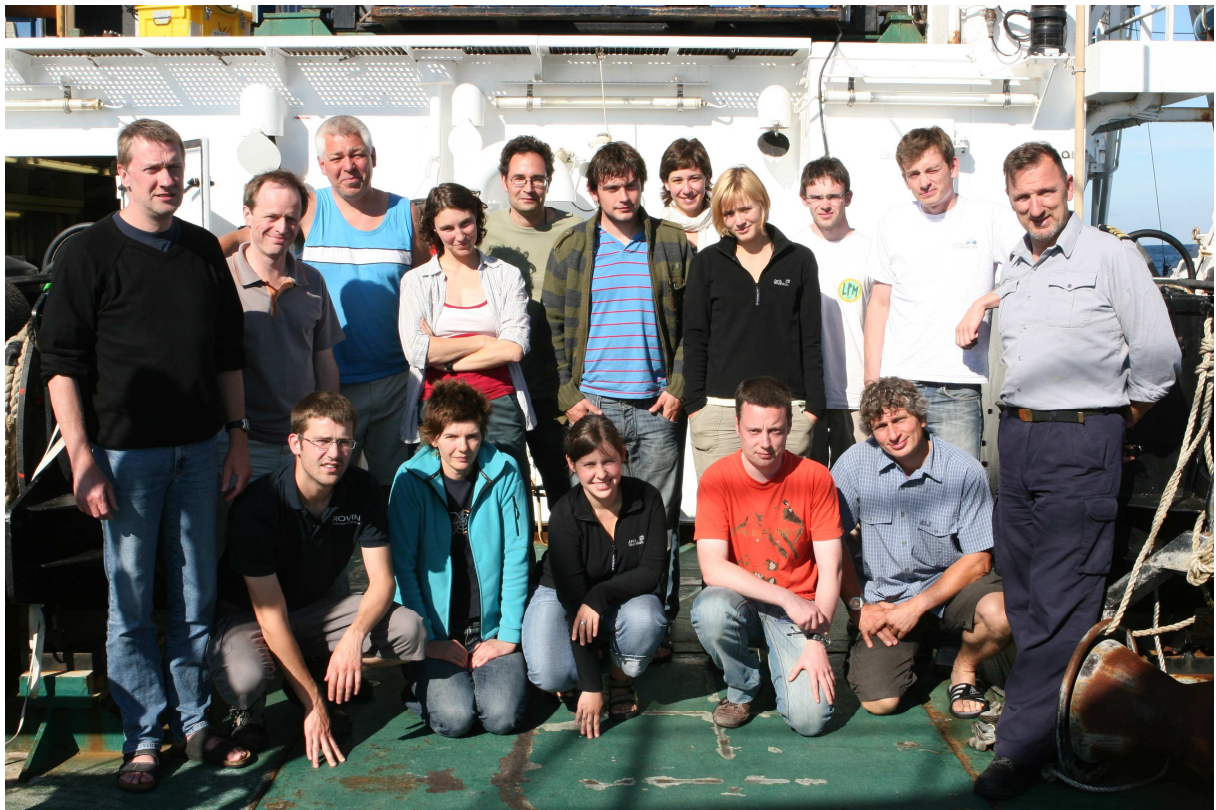
Cruise report

Belgica 2008/13b

8 – 17 June 2008

La Coruña – La Coruña - Zeebrugge

Galiciabank



1. CRUISE REFERENCE

Belgica 2008/13b

La Coruna (ES) – Zeebrugge (B)

09.06.2008 – 17.06.2008

2. SCIENTIFIC PERSONNEL

Prof. Dr. Ann Vanreusel	Chief scientist, Marine Biology Section, UGent
Ellen Pape	2 nd responsible; Marine Biology Section, UGent
Guy Desmet	Marine Biology Section, UGent
Bart Beuselinck	Marine Biology Section, UGent
Dr. Hendrik GHeerardyn	Marine Biology Section, UGent
Willem Versteeg	RCMG, UGent
Lies De Mol	RCMG, UGent
Arne Baeyens	RCMG, UGent
Dries Boone	RCMG, UGent
Dr. Kevin Ruddick	BELCOLOUR-2, MUMM
Griet Neukermans	BELCOLOUR-2, MUMM
Christoph Plum	Forschungsinstitut Senckenberg
Alix Francois Meier	TV production company Fernsehbüro
André Zschocke	TV production company Fernsehbüro
Maria Druet Vélez	Instituto Espanol de Oceanografia (IEO)
Siegrid Jans	MARIN, MUMM
Thierry Jauniaux	MARIN, MUMM

3. SHIPS OFFICERS AND CREW

Ron Joosen	Cmdr
Yves Philips	2Com
Gunther Claes	COX'N
Marc Dirick	HTD
Luc Servranckx	Boatswain
Davis De Clerck	Dek 1
Jo Debruyne	Dek 2
Thierry Dumoulin	DET
Michel Kenens	Chief Mec
Frank Van Lent	Chief Tel
Kurt Lauwers	Mec 1
Henri Leclercq	Chief Elec
Henri Eloy	Elec 1
Erwin Van Bosch	Chef
Laurent Didier	Steward

4. FRAMEWORK AND OBJECTIVES

This campaign took place in the framework of different international and national funded research projects:

The European Science Foundation (ESF)- EURODEEP project BIOFUN “Biodiversity and Ecosystem functioning in contrasting southern European deep-sea environments : from viruses to megafauna” aims at understanding the relationship between biodiversity of different benthic components (micro- to megabenthos and fish fauna) of the marine environment and the functioning of the ecosystems. The main study area of this project is the Mediterranean whereas the Galicia Bank (GB) and adjacent basin, offshore the Iberian Margin was chosen as a kind of reference site for comparison with the more oligotrophic Mediterranean. Additionally the influence of Mediterranean Outflow water on the summit of the Galicia bank and its importance in the distribution of species was investigated. The Marine Biology research group is partner in the BIOFUN project.

The FP6 Integrated project HERMES Hot spot ecosystem research on the margins of European seas aims at mapping and understanding the present biodiversity in different habitats along the European Margins. One of the work packages of this project focuses on the distribution and biodiversity of the fauna associated with cold water corals. Both RCMG and the Marine Biology research group of the UGent are partners in the HERMES project in order to map the habitat heterogeneity and the associated biodiversity of European margins and to understand the underlying processes.

The general objective of the BELSPO-funded BELCOLOUR-2 project is to improve the quality of existing optical remote sensing products for marine, coastal and inland waters based on new scientific knowledge and to develop new products (including partial pressure of CO₂ and primary production) for key applications such as aquaculture and air-sea CO₂ flux quantification. In addition to algorithm work and image processing BELCOLOUR-2 participates in seaborne cruises for the purposes of calibration of algorithms and for validation of the end products. MUMM’s contribution to the BELCOLOUR-2 measurements consists of reflectance, suspended matter and phytoplankton pigment measurements for use in satellite image validation (if cloud-free) and algorithm calibration and validation.

The specific objectives of this campaign were :

To investigate the stratigraphic framework and the sedimentary environment of the summit area of the Galicia bank. (RCMG)

To map the distribution of the cold water coral ecosystems on the Galicia Bank (RCMG and MarBiol)

To study the population genetics of selected sponge species associated with cold water corals along the European margin including the GB (MarBiol)

To investigate the biodiversity and distribution of the meiofauna at different depths of the summit area of the GB in comparison with similar water depths in the Mediterranean (for nematodes) (MarBiol) and with other Atlantic seamounts (for copepods) (Institute Senckenberg);

To investigate the trophic specificity and carbon flow within deep-sea meiofauna (MarBiol)

To make in-situ measurements simultaneous with satellite overpasses of MERIS (Medium Resolution Imaging Spectrometer) and MODIS (Moderate Resolution Imaging Spectrometer) (MUMM)

5. LOCALIZATION

From June 10 till June 13 the R/V Belgica operated on the Galicia Bank (located between 42°-44°N and 11°-13°W) at water depths between 700 m (summit of the seamount; Station 1) and 1600 m ("Seismic drift" area). All 3 stations where boxcorer deployments were carried out are indicated on Figure 1. Seismic survey areas are depicted on Figure 2. BELCOLOUR-2 (MUMM) measurements were made at specified times (Table 3) regardless of location. During transit from La Coruna to Zeebrugge (June 14 – June 17) BELCOLOUR-2 measurements were made passing through Spanish, France and UK waters. A complete overview of all BELCOLOUR-2 stations can be found in Table 3.

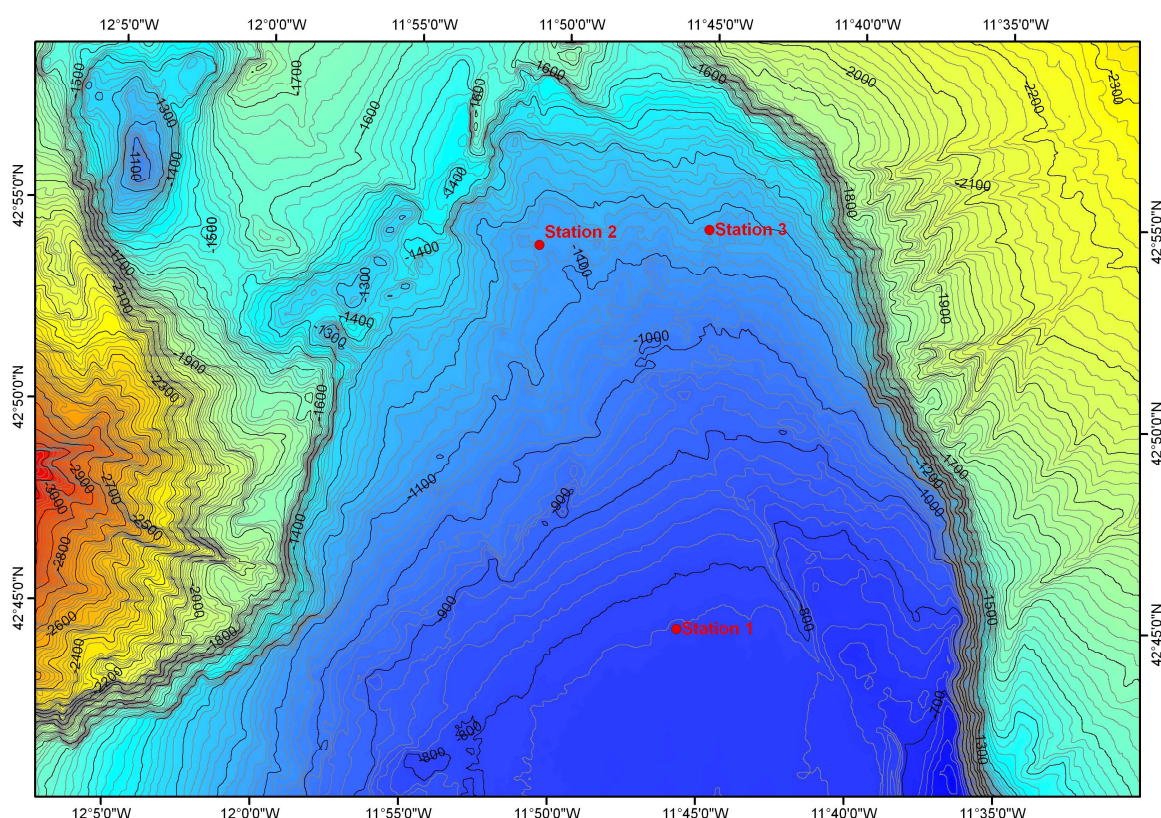


Figure 1: Location of the 3 stations at the Galicia Bank where the boxcorer was deployed. Background bathymetric map from ERGAP (CMIMA-CSIC, Barcelona, Spain).

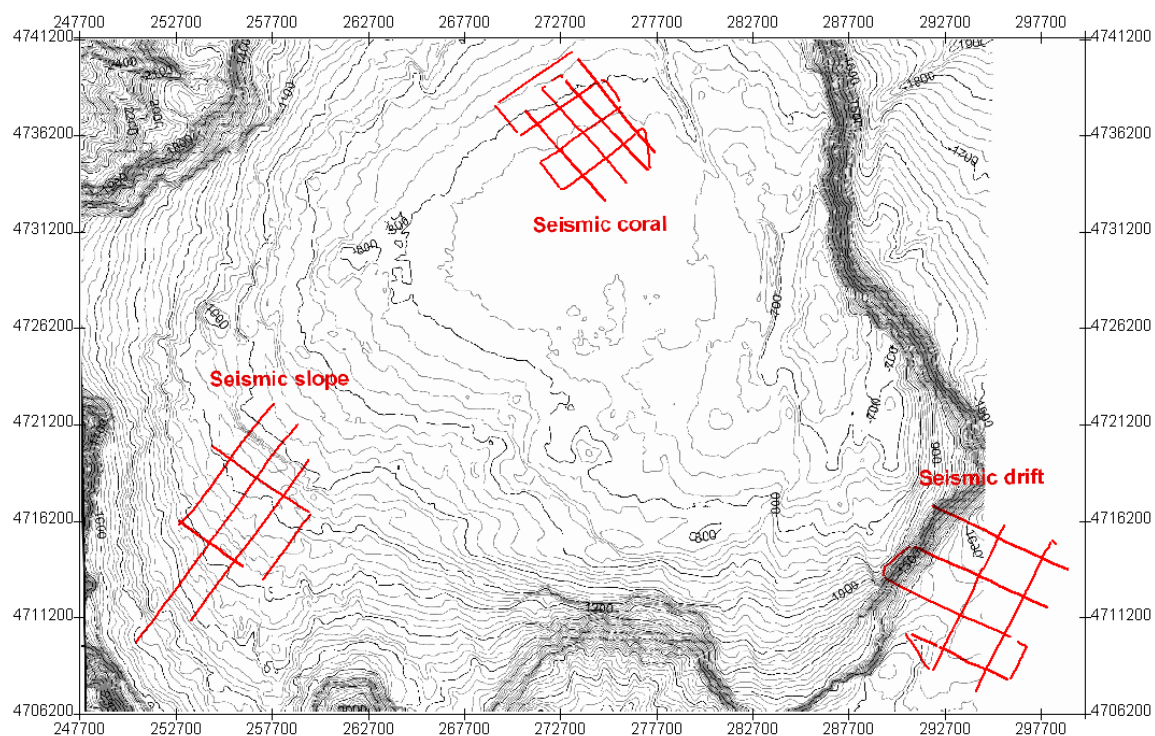


Figure 2: 2D seismic navigation (UTM 29/WGS84). Background bathymetric map from ERGAP (CMIMA-CSIC, Barcelona, Spain).

6. OPERATIONS

6.1. Biological sampling (Marbiol & Senckenberg)

6.1.1. Practical problems with the Midicorer (OSIL)

Based upon experiences from other research institutes and on our own experiences with the RV Belgica in 2006, conditions for optimal deployment of the Midicorer are well-known: *pay out velocity* is 40 m/min, *landing velocity* (last 50 m to the seabed) is 10 m/min, *haul velocity* is 50 m/min.

This deployment procedure was discussed in advance with the boatswain.

The Midicorer was deployed on June 11 at Station 2 at a water depth of 1200 m. Due to a technical problem with the winch, the cable length that was effectively paid out was much higher than what the control panel *readings* on the winch indicated! This resulted in a much higher drop velocity than required during deployment and a crash-landing of the corer. Again because of the faulty readings of the winch control panel, about 2400 m of cable were paid out for a sampling depth of only 1200 m, leaving the corer much longer on the seabed than necessary for the cores to penetrate the sediment (= 1 minute on average, depending on the sediment type). This extended

stay on the seabed, combined with the extra amount of cable paid out, probably caused the corer to be dragged on its side by the drift of the ship, bringing about substantial damage!

When the corer was hauled back on board, we could observe that several (mainly) moving parts of the Midicorer were damaged or broken:

- One **plastic core** was broken (Figure 3).

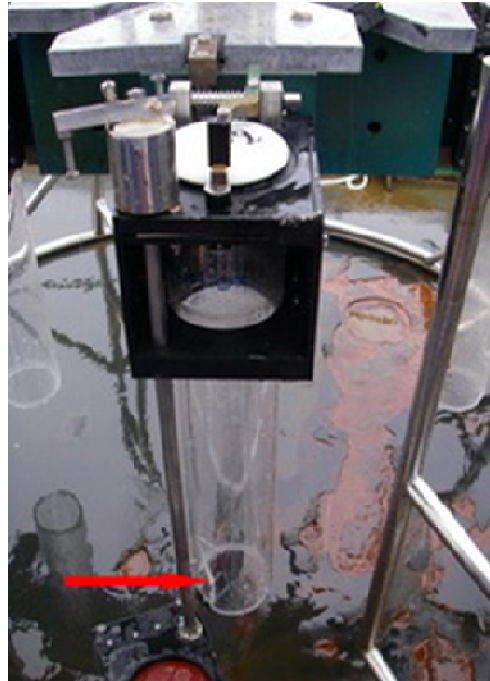


Figure 3: Broken plastic core of Midicorer.

- One of the **adjuster bars** of the **closer weights** was completely bent; the picture below shows the closer weights had been in contact with the (whitish) sediment, clearly indicating that the Midicorer was dragged aside (Figure 4).

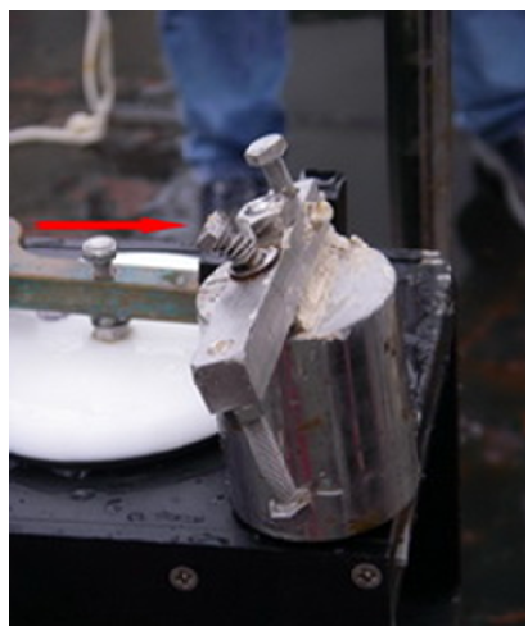


Figure 4: Completely bent adjuster bar of closer weight.

- One of the **carrier tubes** of the **bottom closer** was completely bent (Figure 5).

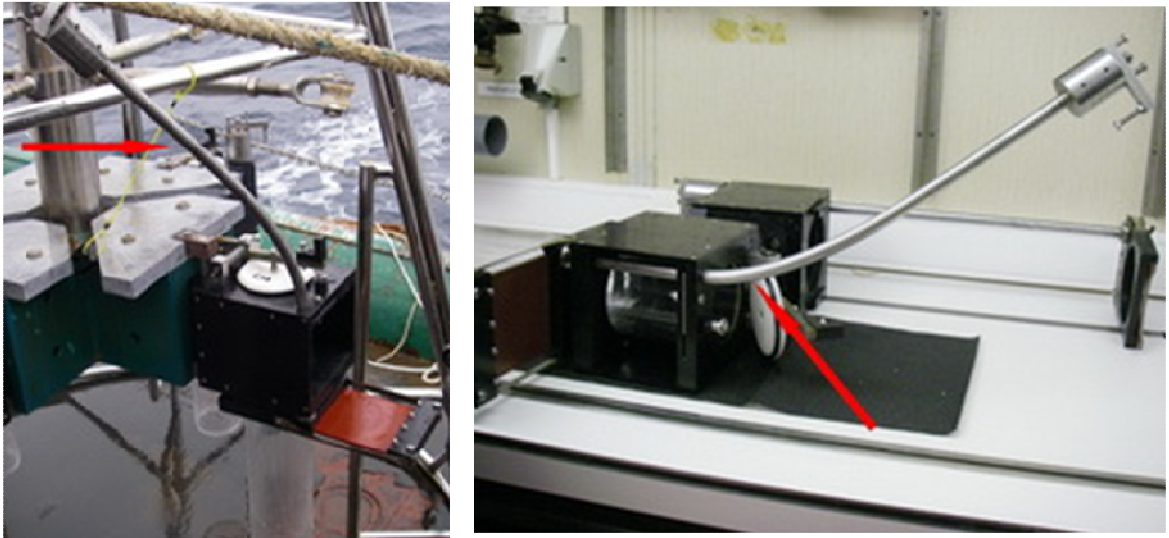


Figure 5: Bent carrier tube of bottom closer.

- Three of the four **bottom closers** were broken, indicating that the drop velocity was much too high (Figure 6).

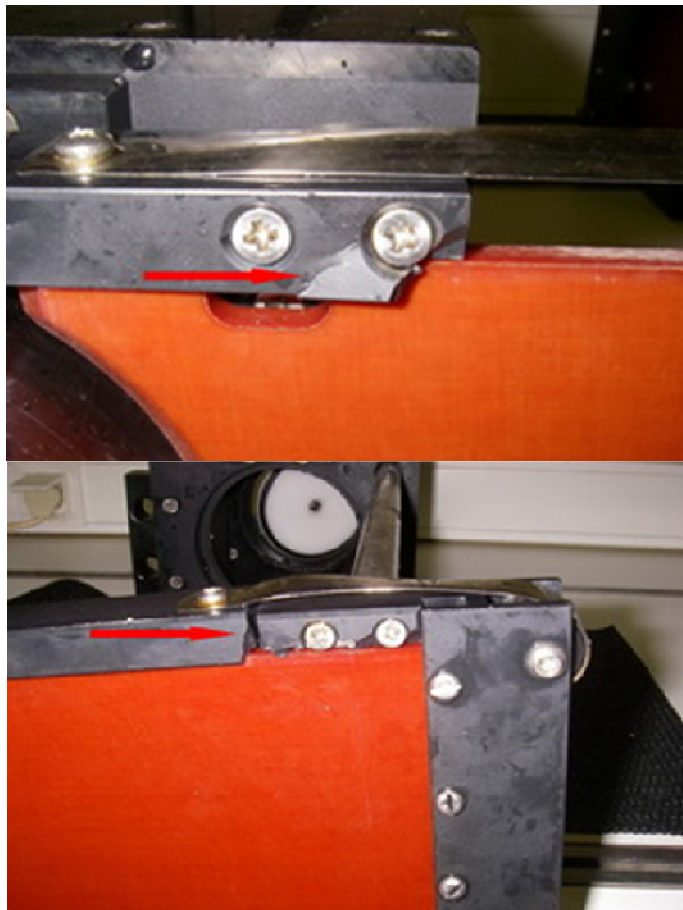


Figure 6: Broken bottom closers of Midicorer.

- We also suspect that the **stainless steel cylinder** and **piston** are slightly bent (see Figure 7) resulting in a hampered (down-) movement of the **head and damper** of the corer; this hydraulic damped down-movement is indispensable for a successful Midicorer deployment.

If this is the case, we expect a complete revision of the Midicorer will be necessary at the OSIL workshop (www.oceanscientific.com)

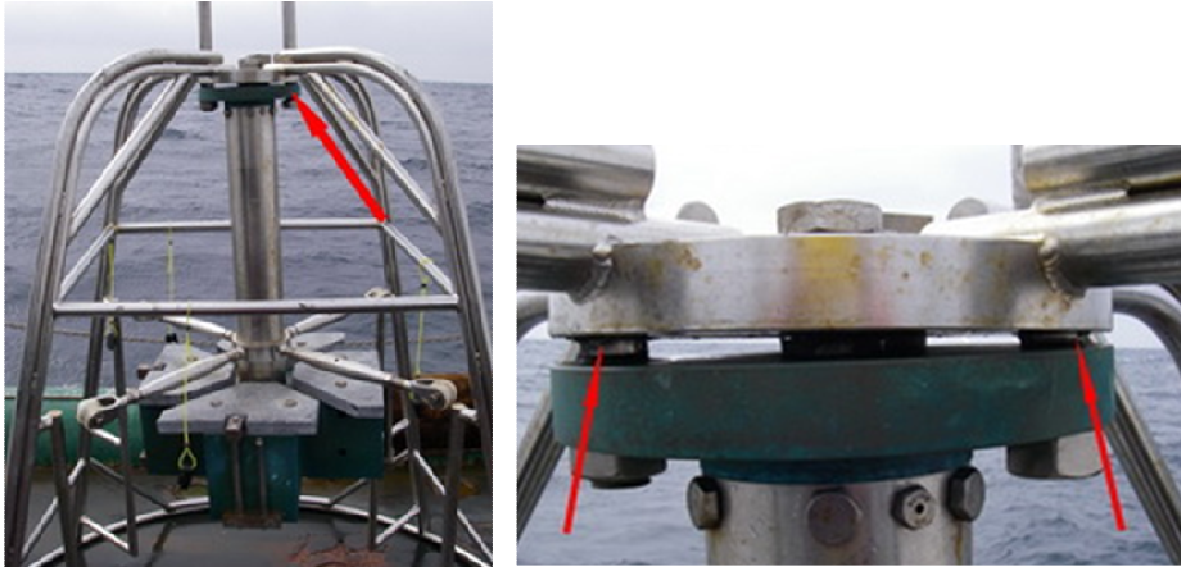


Figure 7: Slightly bent stainless steel cylinder and piston.

6.1.2. Boxcorer

As the Midicorer was clearly damaged (see § 6.1.1.), biological sampling was performed using a boxcorer (Figure 8) for the remainder of the campaign. All 3 boxcorer deployments at station 2 failed (only ± 5 cm of sediment was recovered in the boxcorer; Figure 9), probably due to the hardness of the seabed. From the 2 last failed boxcores, a qualitative sample was taken and frozen immediately at -20°C . Because of the inadequate boxcore samples, it was decided to navigate towards another station at 1200 m water depth (Station 3). Here, all boxcore deployments turned out to be successful. Boxcores were subsampled by means of 4 Plexiglass core tubes (internal diameter=100 mm; length=600 mm), which were actually part of the equipment of the Midicorer. A detailed overview of all boxcorer deployments intended for community and natural biomarker analyses (details on boxcorer deployments for enrichment experiment excluded!) can be found in the table below (Table 1).

Table 1: Details of boxcorer deployments for meiofaunal community and natural biomarker analyses. Core samples for Forschungsinstitut Senckenberg are indicated as such.

Date	St.	Depth	Lat (N)	Long (W)	Depl.	N° of core tubes	Purpose
11/06	2	1130 m	42°54,1376'	11°50,7356'	(1)	0	/
11/06	2	1136 m	42°54,1580'	11°50,8165'	(2)	0	Qualitative sample
11/06	2	1136 m	42°54,1810'	11°50,8440'	(3)	0	Qualitative sample
11/06	3	1200 m	42°54,7090'	11°45,1423'	1 (4)*	4	1 – Environmental variables 2 – Fatty acid profile of nematodes 3 – Meiofaunal/nematode community analyses 4 – Copepod community analyses (Senckenberg)
11/06	3	1200 m	42°54,7180'	11°45,1548'	2 (5)	4	1 – Environmental variables 2 – Fatty acid profile of nematodes 3 – Meiofaunal/nematode community analyses 4 – Copepod community analyses (Senckenberg)
11/06	3	1200 m	42°54,7230'	11°45,1320'	3 (6)	4	1 – Environmental variables 2 – Fatty acid profile of nematodes 3 – Meiofaunal/nematode community analyses 4 – Copepod community analyses (Senckenberg)
11/06	3	1200 m	42°54,7480'	11°45,1866'	4 (7)	4	Entire boxcore for copepod community analyses (Senckenberg)
12/06	1	780 m	42°44,7940'	11°45,7810'	5 (8)	4	1 – Environmental variables 2 – Fatty acid profile of nematodes 3 – Meiofaunal/nematode community analyses 4 – Copepod community analyses (Senckenberg)
12/06	1	780 m	42°44,7870'	11°45,8018'	(9)	0	/
12/06	1	700 m	42°44,8160'	11°45,7661'	6 (10)	4	1 – Environmental variables 2 – Fatty acid profile of nematodes 3 – Meiofaunal/nematode community analyses 4 – Copepod community analyses (Senckenberg)
12/06	1	700 m	42°44,8360'	11°45,8154'	7 (11)	4	1 – Environmental variables 2 – Fatty acid profile of nematodes 3 – Meiofaunal/nematode community analyses 4 – Copepod community analyses (Senckenberg)
12/06	1	700 m	42°44,8060'	11°45,8055'	8 (12)	4	Entire boxcore for copepod community analyses (Senckenberg)

* x(y) x = number of successful boxcorer deployment
y = actual number of boxcorer deployment



Figure 8: Boxcorer.



Figure 9: Failed Boxcore.

6.1.3. Processing of core samples

At station 1 (700 m) and station 3 (1200 m) 4 boxcorer deployments were performed for the purpose of biodiversity and natural biomarker analysis of the meiofaunal (copepods - Senckenberg and nematodes - Marbiol) community at the Galicia Bank. Each boxcore was subsampled by 4 Plexiglass core tubes (part of Midicorer equipment). The first 3 boxcores at the 2 stations were sampled as follows:

- Core 1 was intended for the analysis of *environmental variables* (pigment concentration, organic matter content, grain size, fatty acid composition, C/N). This core was extruded, sliced (0-1, 1-2, 2-3, 3-4, 4-5, 5-10 and 10-15 cm when available) and subsampled by means of syringes for the different environmental variables. Samples taken for the determination of organic matter content and grain size were dried aboard the ship in an oven (chemistry lab) at 60°C. The remainder of the samples was stored at -20°C. Analyses will be conducted at the Marine Biology lab of Ghent University.
- Core 2 will be analyzed for *fatty acid profiles of deep-sea nematodes*. These sediment samples were frozen immediately at -20°C. Fatty acid analyses will be conducted in cooperation with the Centre for Estuarine and Marine Ecology of the Netherlands Institute of Ecology (NIOO-CEME).
- *Meiofaunal/nematode community analyses* will be conducted on core 3. The overlying bottom water in the core tube was sampled by means of a syringe and washed over a 32 µm mesh-sieve. The fraction retained on the sieve was then fixed in seawater-buffered 4 % formalin. In order to investigate community variability with sediment depth, this core was sliced (0-1, 1-2, 2-3, 3-4, 4-5, 5-10 and 10-15 cm when available) and fixed with seawater-buffered 4% formalin. At the home lab in Ghent these samples will be rinsed over 1000 and 32 µm mesh-sieves to retain the meiofaunal size-class (32-1000 µm). Following a standard

protocol, the samples are then resuspended and centrifuged with the colloidal silica gel LUDOX HS 40% to separate the meiofaunal organisms from the surrounding sediment. After staining with Rose Bengal, all metazoan meiobenthic organisms will be classified at higher taxon level and counted under a stereoscopic microscope using Higgins & Thiel (1988) and reference material. Nematodes will be hand-picked and transferred over an alcohol-glycerine solution to glycerine on glass slides. Afterwards, nematodes will be identified up to genus/species level using relevant taxonomic literature.

- Core 4 was sampled by Christoph Plum of Forschungsinstitut Senckenberg for the purpose of *copepod community analyses*. The upper 5 cm of this core were fixed as a whole in seawater-buffered 4% formalin. The analyses of the copepod community will be carried out in the laboratories of the Forschungsinstitut Senckenberg, Wilhelmshaven, Dep. DZMB (German Centre of Marine Biodiversity Research). Main interests are focused on species diversity of the copepod community, its species composition and similarity to other communities of previously sampled seamounts. These data will help to gain more insight into the relevance of seamounts for the dispersal of marine benthic copepods.

The 4th boxcorer deployment was subsampled only by Christoph Plum of Forschungsinstitut Senckenberg and was processed in the same way as the 4th core of the previous deployments.

6.1.4. Sampling of coral-associated sponges (Marbiol)

We planned to collect coral-associated sponges at Station 1 using a boxcorer and/or the ROV Genesis. However, during campaign 08/13b no coral-associated sponges were sampled. On June 13 an attempt was made to deploy the ROV, but unfortunately the camera failed (no more up/down movement). The boxcores taken at Station 1 contained no traces of corals.

6.2. Biological experiments (Marbiol)

6.2.1. Colonization experiment

It was intended (on June 10) to conduct an *in situ* colonization experiment at station 2 (1200 m water depth) using the ROV Genesis. For this purpose, an experimental tray was supposed to be put on the seabed for a period of 4 days. However, due to bad weather conditions the ROV could not be deployed and as such the experiment was not conducted.

6.2.2. Enrichment experiment

On June 11, 3 successful boxcorers (n°9 – n°11, see operational report, n°8 failed) were deployed at station 3 (1200 m water depth) in order to retrieve 10 Plexiglass core tubes filled with deep-sea sediment (and associated fauna) for an enrichment experiment. Geographical coordinates of the locations of all 4 deployments are (Table 2):

Table 2: Geographical coordinates of boxcorer deployments for the enrichment experiment at station 3.

	Lat (N)	Long (W)	Remark
Boxcorer n°8	/	/	unsuccessful
Boxcorer n°9	42°54,7280'	11°45,1476'	successful
Boxcorer n°10	42°54,7340'	11°45,1510'	successful
Boxcorer n° 11	42°54,7690'	11°45,1844'	successful

These cores were placed in 2 big experimental buckets which were located inside the fridge of the fish lab (Figure 10). The buckets were filled with water in order to minimize possible temperature fluctuations. The temperature of the fridge was kept at 10°C, which is the *in situ* bottom water temperature (pers. obs.). Each core was aerated by means of oxygen pumps. After an acclimatization period of ± 20 h, the cores - except for the control core (core T0), which was sampled - were injected with a ^{13}C -glucose solution (Figure 10). Glucose is a substrate for heterotrophic bacteria, so by injecting ^{13}C -glucose we hoped to label the bacteria present in the sediment inside the cores with the ^{13}C isotope. Elevated levels (compared to the isotope signal of nematodes in the control core) of ^{13}C in the nematodes originating from the experimental cores, suggests feeding upon the bacteria. During injection of the cores, it became apparent the volume of the ^{13}C glucose solution in the eppendorf vial was not sufficient to inject all 9 cores! This was due to a misinterpretation of the calculation of the required volume. Instead, 3 cores were injected with the bacterial substrate.



Figure 10: Enrichment experiment. Left: Cores in experimental buckets inside the fridge of the fish lab. Middle and Right: injecting bacterial substrate solution.

The purpose of the experiment is to follow-up bacterial uptake by the nematodes over a time period of 14 days. Cores were sampled after 1, 7 or 14 days. Each core was sliced (0-1, 1-2, 2-3, 3-4, 4-5, 5-10 cm) and stored at -20°C until further (stable isotope) analysis. Five days after the start of the experiment (T5) the R/V Belgica arrived in the port of Zeebrugge and the experimental buckets were transported to the Marine Biology Lab in Ghent (duration of transport = max. 2.5 h), where the experiment was continued in a cold room. During transport, cores were not aerated. When sampling core T7 and T14, a control core (not injected with a solution of bacterial substrate) was sampled simultaneously to check if nematodes were still alive. This was done in order to make sure that the absence of an elevated nematode ¹³C signal in the experimental cores was not due to the death of the nematodes.

6.3. Seismic surveys (RCMG + IEO)

About 155 km of seismic data were collected (30 2D lines) in the study area. Most of the seismic profiles are single channel surface sparker lines, acquired with a SIG sparker source (120 electrodes). The sparker was triggered every 2 s on 'seismic coral' and 3 s on 'seismic drift' and 'seismic slope', reaching 500 J energy. The sampling frequency was set at 8 kHz and a record length of 1800 ms TWT for 'seismic coral' and 2800 ms TWT for 'seismic drift' and 'seismic slope' was used. The velocity of the ship during seismic work was about 3-3.5 knots. During this work, R/V Belgica operated on electrical engines for noise reduction.

6.4. ROV deployment

All planned ROV deployments were cancelled partly because of the bad weather conditions (day 1). The last day, the RIB broke down and could not be repaired which did not allow any further gear deployment.

6.5. BELCOLOUR-2 measurements (MUMM)

The standard BELCOLOUR-2 sampling at each station consisted of the following set of observations (approximately 15 minutes):

- Orientation of the ship with the sun at 135° according to the bow of the ship (see figure ???)
- Above-water light measurements from TriOS-RAMSES spectroradiometers (MUMM)
- Niskin/bucket water sample at -0.5 m for: suspended particulate matter, chlorophyll-a and phaeopigments (MUMM) during the light measurements, with the ship still oriented at 135° according to the sun. If not possible with the Niskin, the water sample was taken with buckets.
- ODAS printout (MUMM)
- Subjective description of sea/sky state (wave height, foam fraction coverage, cloud fraction, sun visibility, etc.) and sea/sky photos
- SeaCAT profile (SCTD+OBS+PAR) (MUMM) – this measurement was not made when Ugent was using the side A-frame for measurements.
- ODAS printout (MUMM)
- Secchi depth (MUMM)

For the above-water light measurements with the RAMSES spectroradiometers viewing direction was at an azimuthal angle of 135° to the sun and the ship was oriented to avoid ship shadow and reflection on the water being targeted.

The following minor problems were encountered during the campaign:

1. CTD connection to the PC room not working
2. OURS software malfunction:
 - campaign administration form did not accept new cruise
 - not communicating with ODAS properly
3. Fluorescence showing negative values
4. RAMSES TriOS irradiance sensor had no inclinometer

Additionally, at station 2 (1200 m water depth) a CTD deployment was performed to provide data on salinity, depth and temperature.

6.6. TV documentary about seamounts (*Fernsehbüro*)

From June 9 till June 14 two employees of a TV production company from Berlin, Germany, which produces scientific documentaries for the broadcast station Arte, joined the R/V Belgica. The purpose was to make a documentary about seamounts. The main focus was on the research of Christoph Plum (Forschungsinstitut Senckenberg).

6.7. Operational report

The time mentioned in this cruise report and on the seismic survey sheets is the Belgian summer time (BRAVO TIME = UTC + 2 hours)

Monday 09/06/08

08:30	Start transit from La Coruna to the Galicia Bank	
14:55	Start BELCOLOUR-2 measurements	[MUMM]
15:15	End BELCOLOUR-2 measurements	[MUMM]
16:25	Start BELCOLOUR-2 measurements	[MUMM]
16:45	End BELCOLOUR-2 measurements	[MUMM]
24:00	Arrival at the summit of the Galicia Bank (Station 1)	

Tuesday 10/06/08

00:49	Start seismic survey of the coral site ("Seismic coral")	[RCMG + IEO]
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00:51	End seismic survey of the coral site ("Seismic coral") due to weather conditions	[RCMG + IEO]
01:00	Transit to station 2 (1200 m water depth)	[MUMM]
09:55	Transit to coast (finistere) due to weather conditions	
13:21	Start BELCOLOUR-2 measurements	[MUMM]
13:41	End BELCOLOUR-2 measurements	[MUMM]
15:35	Start BELCOLOUR-2 measurements	[MUMM]
15:55	End BELCOLOUR-2 measurements	[MUMM]
16:00	Evaluation of sea state. As the sea state had improved the ROV was moved away from the A-frame on the after deck, whilst the Midicorer was placed under the A-frame.	
16:50	Transit to the Galicia Bank	
20:30	Arrival at the "Seismic drift" area at the Galicia Bank	
20:46	Start of line GB080601, heading 195° (av. speed 4.5 knots).	[RCMG + IEO]
21:47	End of line GB080601.	[RCMG + IEO]
21:49	Start of line GB080602	[RCMG + IEO]
21:52	Stop seismic due to no speed (<1 knot). Switch from electric propulsion to diesel propulsion.	[RCMG + IEO]
22:00	Streamer out of the water. Too much noise on diesel propulsion.	[RCMG + IEO]

Wednesday 11/06/08

05:30	Transit to Station 2 (1200 m water depth)	
08:15	Start deployment of the Midicorer	
09:20	Midicorer on deck. Midicorer appeared to be severely damaged.	
10:15	Deployment CTD to a depth of 1100 m	[MUMM]
11:25	Deployment boxcorer n°1 at station 2	
11:40	Boxcorer n°1 on seabed	
11:58	Boxcorer n°1 on deck (failed)	
12:50	Start BELCOLOUR-2 measurements	[MUMM]
13:10	End BELCOLOUR-2 measurements	[MUMM]
13:25	Deployment boxcorer n°2 at station 2	
13:45	Boxcorer n°2 on seabed	
14:00	Boxcorer n°2 on deck (failed)	
14:05	Deployment boxcorer n°3 at station 2	
14:24	Boxcorer n°3 on seabed	
14:43	Boxcorer n°3 on deck (failed)	
14:45	Transit to station 3 (1200 m) due to inadequate boxcore samples	
15:30	Deployment boxcorer n°4 at station 3	
15:48	Boxcorer n°4 on seabed	
16:05	Boxcorer n°4 on deck (successful)	[Marbiol + Senckenberg]
16:17	Start BELCOLOUR-2 measurements	[MUMM]

16:30	End BELCOLOUR-2 measurements	[MUMM]
16:42	Deployment boxcorer n°5 at station 3	
16:58	Boxcorer n°5 on seabed	
17:15	Boxcorer n°5 on deck (successful)	[Marbiol + Senckenberg]
17:21	Deployment boxcorer n°6 at station 3	
17:41	Boxcorer n°6 on seabed	
17:57	Boxcorer n°6 on deck (successful)	
18:02	Deployment boxcorer n°7 at station 3	
18:20	Boxcorer n°7 on seabed	
18:39	Boxcorer n°7 on deck (successful)	[Senckenberg]
18:45	Deployment boxcorer n°8 at station 3	
19:00	Boxcorer n°8 on seabed	
19:18	Boxcorer n°8 on deck (failed)	
19:22	Deployment boxcorer n°9 at station 3	
19:41	Boxcorer n°9 on seabed	
19:58	Boxcorer n°9 on deck (successful) – enrichment experiment	[Marbiol]
20:02	Deployment boxcorer n°10 at station 3	
20:21	Boxcorer n°10 on seabed	
20:38	Boxcorer n°10 on deck (successful) – enrichment experiment	[Marbiol]
20:45	Deployment boxcorer n°11 at station 3	
21:01	Boxcorer n°11 on seabed	
21:17	Boxcorer n°11 on deck (successful) – enrichment experiment	[Marbiol]
21:20	Transit to “Seismic coral” area (Station 1)	
22:43	Start seismic survey at the coral site (“Seismic coral”). Start of line GB080603, heading 135° (av. speed 3.5 knots)	[RCMG + IEO]
23:42	End of line GB080603.	[RCMG + IEO]

Thursday 12/06/08

00:08	Start of line GB080604, heading 315° (av. speed 3.7 knots).	[RCMG + IEO]
01:05	End of line GB080604.	[RCMG + IEO]
01:13	Start of line GB080605, heading 136° (av. speed 2.8 knots)	[RCMG + IEO]
01:21	End of line GB080605.	[RCMG + IEO]
01:24	Start of line GB080606, heading 136° (av. speed 3.5 knots).	[RCMG + IEO]
02:20	End of line GB080606.	[RCMG + IEO]
02:25	Start of line GB080607, heading 350° (av. speed 2.6 knots).	[RCMG + IEO]
02:50	End of line GB080607.	[RCMG + IEO]
02:52	Start of line GB080608, heading 228° (av. speed 4.5 knots).	[RCMG + IEO]
03:24	End of line GB080608.	[RCMG + IEO]
03:26	Start of line GB080609, heading 320° (av. speed 3.0 knots).	[RCMG + IEO]
03:40	End of line GB080609.	[RCMG + IEO]
03:42	Start of line GB080610, heading 55° (av. speed 2.5 knots).	[RCMG + IEO]
04:43	End of line GB080610.	[RCMG + IEO]
04:47	Start of line GB080611, heading 340° (av. speed 3.3 knots).	[RCMG + IEO]

05:02	End of line GB080611.	[RCMG + IEO]
05:04	Start of line GB080612, heading 235° (av. speed 3.5 knots).	[RCMG + IEO]
05:45	End of line GB080612.	[RCMG + IEO]
05:48	Start of line GB080613, heading 330° (av. speed 3.1 knots)	[RCMG + IEO]
06:05	End of line GB080613	[RCMG + IEO]
06:08	Start of line GB080614, heading 53° (av. speed 2.8 knots).	[RCMG + IEO]
07:00	End of line GB080614.	[RCMG + IEO]
07:02	Start of line GB080615, heading 140° (av. speed 3.8 knots).	[RCMG + IEO]
07:58	End of line GB080615.	[RCMG + IEO]
08:43	Deployment boxcorer n°12 at station 3	
08:55	Boxcorer n°12 on seabed	
09:05	Boxcorer n°12 on deck (successful)	[Marbiol + Senckenberg]
09:13	Deployment boxcorer n°13 at station 3	
09:21	Boxcorer n°13 on seabed	
09:35	Boxcorer n°13 on deck (successful)	[Marbiol + Senckenberg]
09:45	Deployment boxcorer n°14 at station 3	
09:56	Boxcorer n°14 on seabed	
10:05	Boxcorer n°14 on deck (successful)	[Marbiol + Senckenberg]
10:14	Deployment boxcorer n°15 at station 3	
10:24	Boxcorer n°15 on seabed	
10:35	Boxcorer n°15 on deck (successful)	[Marbiol + Senckenberg]
10:45	Deployment boxcorer n°16 at station 3	
10:55	Boxcorer n°16 on seabed	
11:04	Boxcorer n°16 on deck (successful)	[Marbiol + Senckenberg]
13:42	Start BELCOLOUR-2 measurements	[MUMM]
14:02	End BELCOLOUR-2 measurements	[MUMM]
14:07	Zodiac was attempted to be put in the water, but due to the impact of the ship it got damaged.	
15:22	Start BELCOLOUR-2 measurements	[MUMM]
15:42	End BELCOLOUR-2 measurements	[MUMM]
18:30	Arrival at the "seismic drift" area	
18:43	Start of line GB080616, heading 116° (av. speed 3.4 knots).	[RCMG + IEO]
19:56	End of line GB080616.	[RCMG + IEO]
20:15	Start of line GB080617, heading 292° (av. speed 3.5 knots).	[RCMG + IEO]
20:39	End of line GB080617.	[RCMG + IEO]
20:41	Start of line GB080618, heading 206° (av. speed 4.3 knots).	[RCMG + IEO]
21:43	End of line GB080618	[RCMG + IEO]
21:47	Start of line GB080619, heading 325° (av. speed 3.0 knots).	[RCMG + IEO]
22:12	End of line GB080619.	[RCMG + IEO]
22:15	Start of line GB080620, heading 110° (av. speed 2.6 knots).	[RCMG + IEO]
22:33	End of line GB080620.	[RCMG + IEO]
22:51	Start of line GB080620a, heading 115° (av. speed 2.8 knots).	[RCMG + IEO]
23:37	End of line GB080620a.	[RCMG + IEO]
23:40	Start of line GB080621, heading 28° (av. speed 2.0 knots).	[RCMG + IEO]

Friday 13/06/08

00:15	End of line GB080621.	[RCMG + IEO]
00:17	Start of line GB080622, heading 295° (av. speed 4.5 knots).	[RCMG + IEO]
01:09	End of line GB080622.	[RCMG + IEO]
01:11	Start of line GB080623, heading 50° (av. speed 1.8 knots).	[RCMG + IEO]
01:51	End of line GB080623.	[RCMG + IEO]
01:55	Start of line GB080624, heading 115° (av. speed 2.2 knots).	[RCMG + IEO]
03:44	End of line GB080624.	[RCMG + IEO]
04:00	Start transit to the 'seismic slope' area.	[RCMG + IEO]
06:00	Start of line GB080625, heading 215° (av. speed 4.2 knots).	[RCMG + IEO]
07:57	End of line GB080625.	[RCMG + IEO]
08:16	Start of line GB080626, heading 34° (av. speed 3.0 knots).	[RCMG + IEO]
10:47	End of line GB080626.	[RCMG + IEO]
11:02	Start of line GB080627, heading 220° (av. speed 4.2 knots).	[RCMG + IEO]
12:04	End of line GB080627.	[RCMG + IEO]
12:10	Start of line GB080628, heading 120° (av. speed 3.7 knots).	[RCMG + IEO]
12:58	End of line GB080628.	[RCMG + IEO]
13:05	Streamer out of the water due to the BELCOLOUR-2 measurement.	[RCMG + IEO]
13:27	Start BELCOLOUR-2 measurements	[MUMM]
13:47	End BELCOLOUR-2 measurements	[MUMM]
14:03	Start of line GB080629, heading 30° (av. speed 3.6 knots).	[RCMG + IEO]
14:41	End of line GB080629.	[RCMG + IEO]
14:43	Start of line GB080630, heading 300° (av. speed 4.5 knots).	[RCMG + IEO]
15:29	End of line GB080630.	[RCMG + IEO]
16:05	Start BELCOLOUR-2 measurements	[MUMM]
16:25	End BELCOLOUR-2 measurements.	[MUMM]
16:30	Transit to La Coruna	

7. PRELIMINARY RESULTS

7.1. Biological sampling (Marbiol & Senckenberg)

No results are available yet as time-consuming extraction procedures are required. The sediment retrieved at station 2 from the second boxcorer deployment was subsampled and examined under a stereoscopic microscope. It consisted mainly of dead Foraminifera.

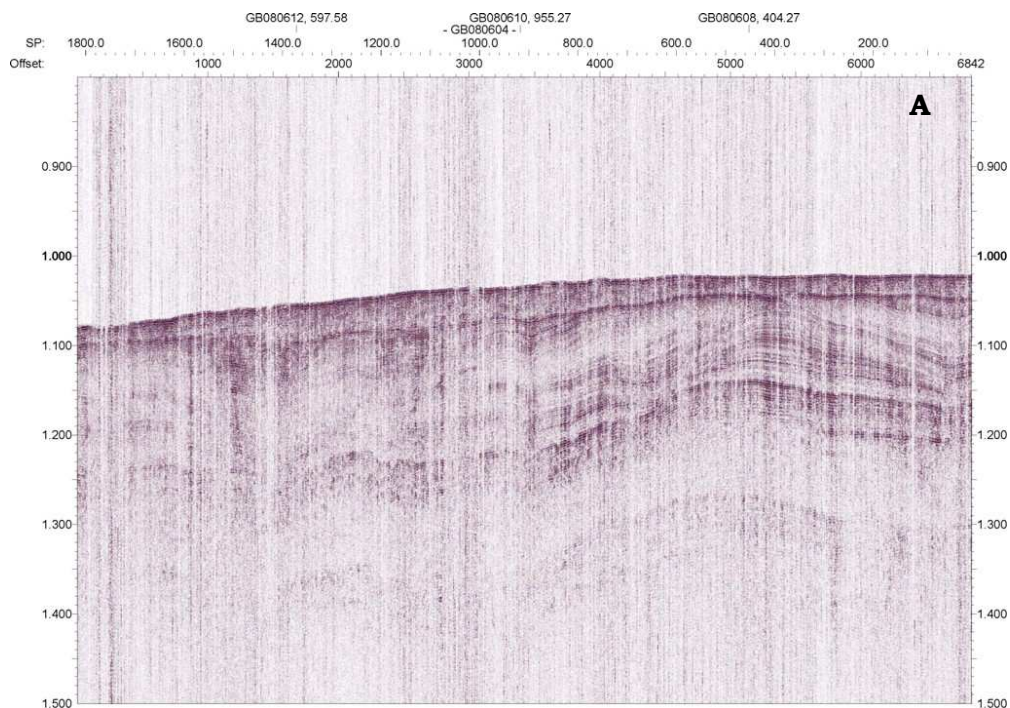
7.2. Biological experiments (Marbiol)

7.2.1. Enrichment experiment

As mentioned before, control cores were sampled at the Marine Biology lab of Ghent University after 7 and 14 days to check if the deep-sea nematodes were still alive. This was done for sediment slices 0-1, 1-2, 2-3, 3-4, 4-5 and 5-10 cm. For cores T7 and T14, living nematodes were observed throughout all sediment slices except for 5-10 cm in core T14. However, it has to be kept in mind that nematode numbers from a sediment depth below 5 cm are really low and that the high amount of detrital particles could have hampered the localization of the (unstained) nematodes. As we have some spare control cores, we are planning to investigate how long the nematodes are viable for (up to 5 weeks past sampling).

7.3. Seismic surveys (RCMG + IEO)

Seismic coral



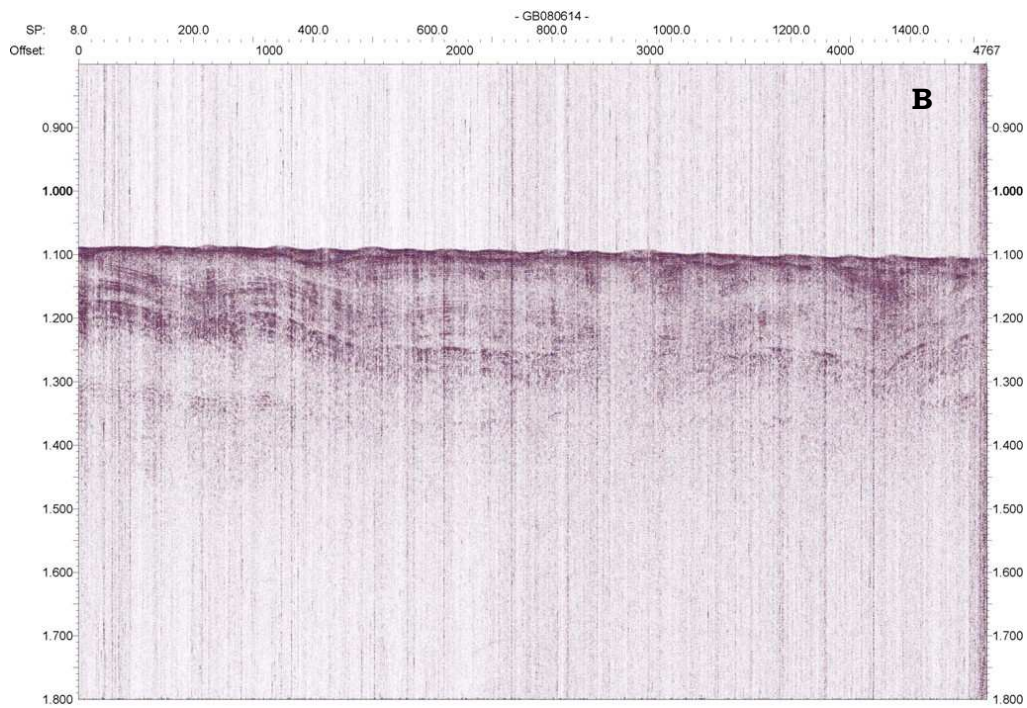
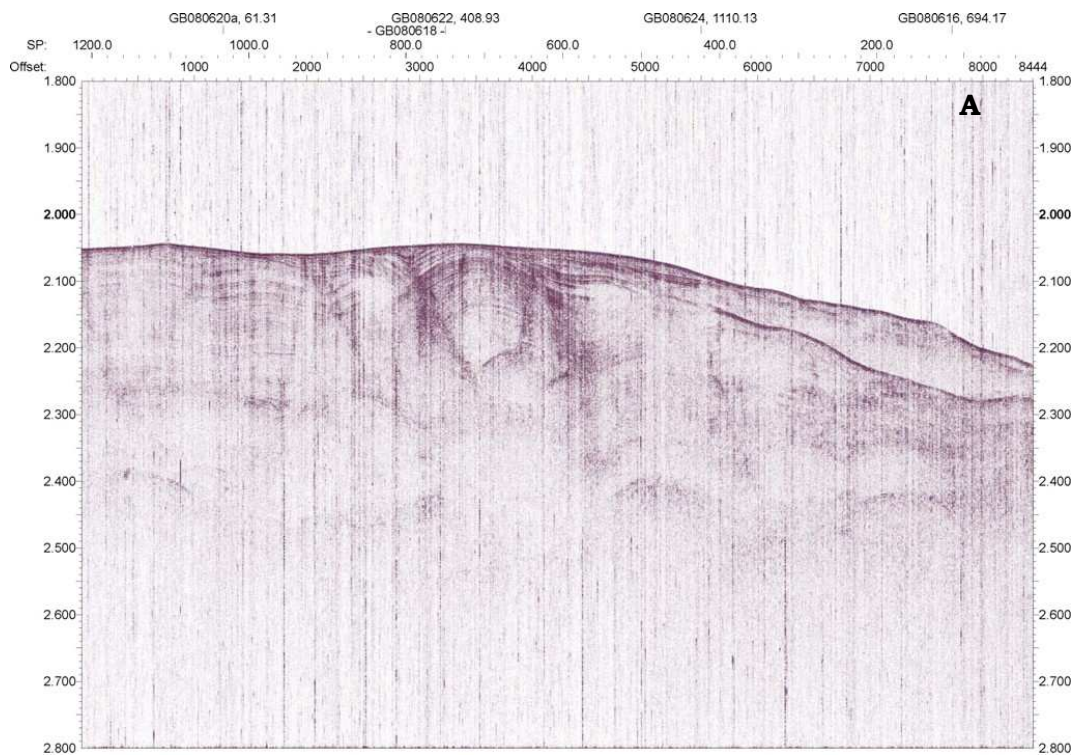


Figure 11: Example of two seismic profiles in the 'seismic coral' area on the northern flank of Galicia Bank: **A.** GB080604 along the slope and **B.** GB080614 across the slope (SP = shotpoint, Offset = distance in meters, vertical scale in seconds TWT).

Seismic drift



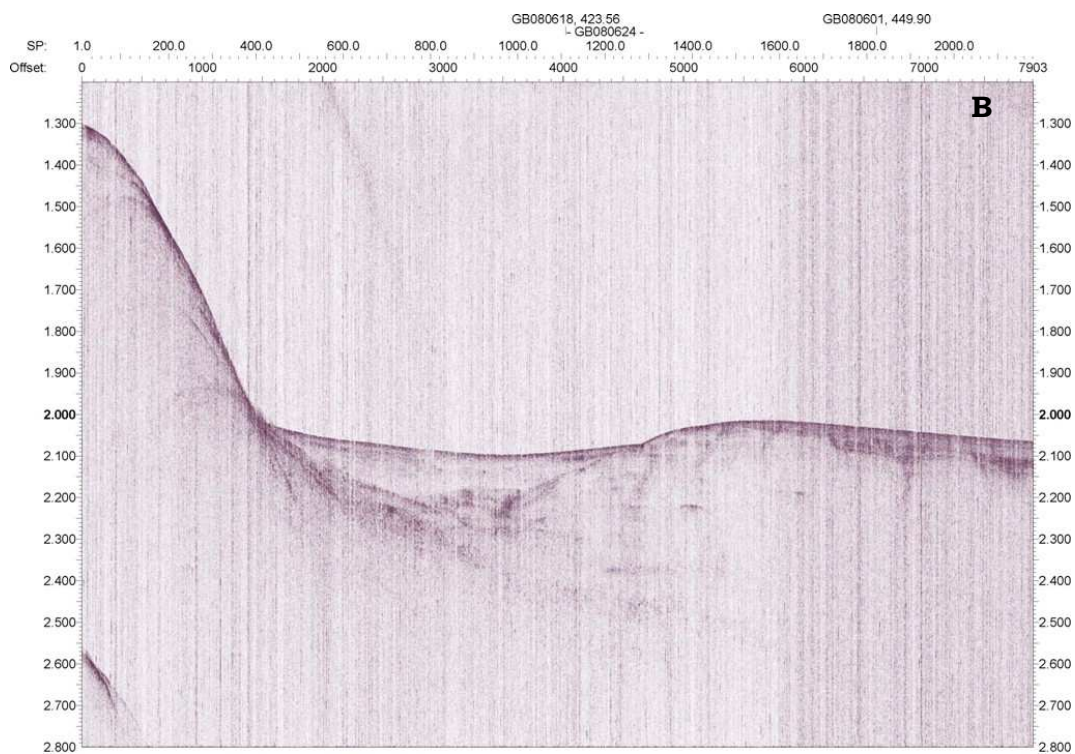


Figure 12: Example of two seismic profiles in the 'seismic drift' area (southeastern part of Galicia Bank: **A.** GB080618 and **B.** GB080624 (SP = shotpoint, Offset = distance in meters, vertical scale in seconds TWT).

Seismic slope

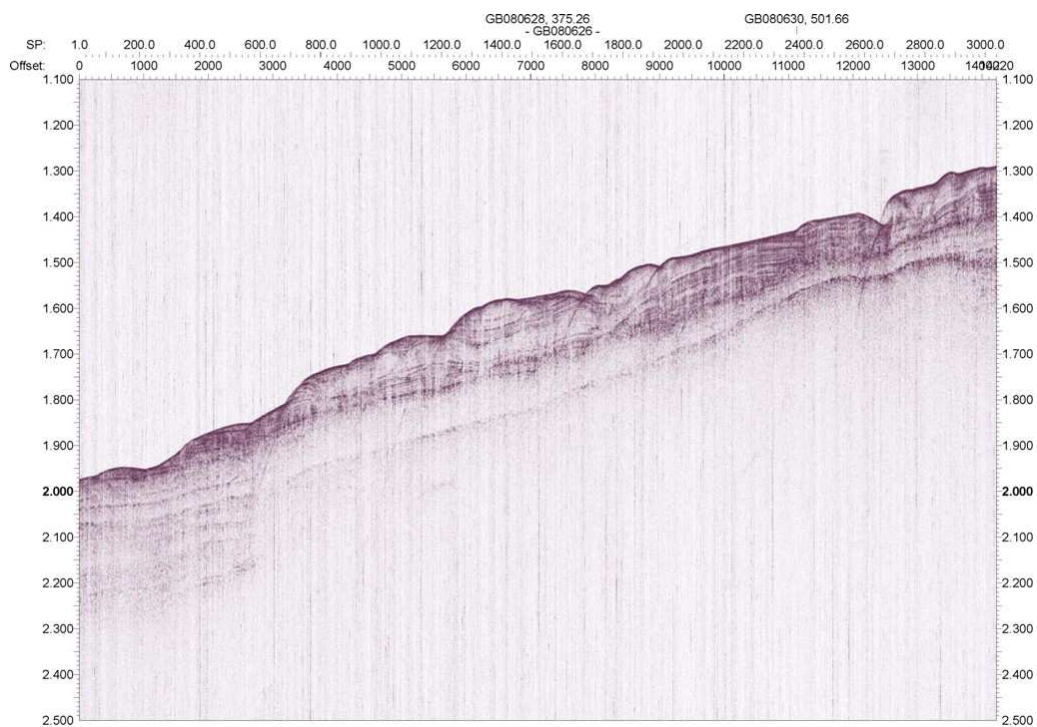


Figure 13: Example of a seismic profile in the 'seismic slope' area in the southwestern part of Galicia Bank: GB080626 (SP = shotpoint, Offset = distance in meters, vertical scale in seconds TWT).

7.4. BELCOLOUR-2 measurements (MUMM)

Campaign B08-13b has been successful: we have made in-situ measurements of Total Suspended Matter (TSM) and chlorophyll simultaneous with satellite overpasses. Seven out of 16 observations were match-ups (simultaneous satellite/in-situ measurements in relatively cloud free conditions), mostly with MODIS Aqua/Terra (none with MERIS), as shown in Table 3. An overview of the measurements done at all 16 stations is shown in Table 3 (TriOS=above water light measurements, SSS=subjective sea/sky state description, WS=water sample).

Table 3: Measurements done at various stations on campaign B08-13b (TriOS=above water light measurements, SSS=subjective sea/sky state description, WS=water sample). Match-ups are indicated.

Station	Date	Lat Degrees Lat Minutes	Lon Degrees Lon Minutes	Country	Time (UTC)	Satellite overpass	TriOS	SSS	WS	SeaCAT	Secchi	Match-up
LCZ1	09/06/2008	43 32.789	9 51.1224	E	12:52	MODIS Aqua	x	x	x	x	x	x
LCZ2	09/06/2008	43 31.096	10 6.559	E	14:30	MODIS Aqua	x	x	x	x	x	x
LCZ3	10/06/2008	42 53.034	10 6.559	E	11:21	MERIS	x	x	x	x	x	
LCZ4	10/06/2008	42 53.645	10 44.517	E	13:35	MODIS Aqua	x	x	x	x	x	
LCZ5	11/06/2008	42 54.276	11 50.929	E	10:50	MERIS	x	x	x	x	x	
LCZ6	11/06/2008	42 54.745	11 45.237	E	14:17	MODIS Aqua	x	x	x	x	x	
LCZ7	12/06/2008	42 44.875	11 45.959	E	11:42	MODIS Terra	x	x	x	x	x	x
LCZ8	12/06/2008	42 44.810	11 45.203	E	13:22	MODIS Aqua	x	x	x	x	x	x
LCZ9	13/06/2008	42 31.990	11 58.641	E	11:27	MERIS	x	x	x	x	x	
LCZ10	13/06/2008	42 36.048	11 56.439	E	14:05	MODIS Aqua	x	x	x	x	x	x
LCZ11	14/06/2008	43 36.283	8 23.291	E	10:56	MERIS	x	x	x	x	x	
LCZ12	14/06/2008	43 56.902	8 12.481	E	13:10	MODIS Aqua	x	x	x	x	x	
LCZ13	15/06/2008	47 43.275	6 12.347	F	10:22	MERIS		x				
LCZ14	15/06/2008	48 7.477	5 56.907	F	13:56	MODIS Aqua		x				
LCZ15	16/06/2008	50 9.100	0 54.452	UK	11:16	MODIS Terra	x	x	x	x	x	x
LCZ16	16/06/2008	50 12.371	0 32.918	UK	13:01	MODIS Aqua	x	x	x	x	x	x

8. ACKNOWLEDGEMENTS

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