

## RV BELGICA ST0703B - CRUISE REPORT



Subscriber: Dr. Vera Van Lancker (UG-RCMG)

Institute: UG - Renard Centre of Marine Geology

Responsibles: Dr. Vera Van Lancker

Telephone: +32 9 264 45 89

Fax: +32 9 264 49 67

E-mail: [Vera.Vanlancker@UGent.be](mailto:Vera.Vanlancker@UGent.be),

1. Belgica Cruise ST2007/03b
2. Participants
3. Program objectives
4. Measurements
5. Operations
6. Laboratory space
7. Infrastructure and instrumentation used
8. Analysis carried out on board
9. Automatic data acquisition
10. Remarks

**1. BELGICA CRUISE ST2007-03**

|    |                            |  |
|----|----------------------------|--|
| 1. | Cruise number              | 2007-03b   |
| 2. | Date / hour                | Zeebrugge TD: 15/02, 10h00<br>Zeebrugge TA: 16/02, 13h00 |
| 3. | Responsible scientist      | Dr. Vera VAN LANCKER (UG-RCMG)                           |
|    | Participating institutions | UG-RCMG, MUMM, WLH                                       |

**2. PARTICIPANTS**

|         |                  | 15-16-02-2007 |
|---------|------------------|---------------|
| UG-RCMG | Vera VAN LANCKER | X             |
|         | Isabelle DU FOUR | X             |
|         | Els VERFAILLIE   | X             |
|         | Bert DEZEURE     | X             |
|         | Sonia PAPILI     | X             |
| WLH     | Job JANSSENS     | X             |
| MUMM    | Fritz FRANCKEN   | X             |
|         | Michael FETTWEIS | X             |
| TOTAL   |                  | 8             |



### 3. PROGRAM OBJECTIVES

#### **QUEST4D: QUantification of Erosion/Sedimentation patterns to Trace the natural versus anthropogenic sediment dynamics (UG-RCMG, MUMM, WLH)**

QUEST4D, a Belspo funded project, focuses on the quantification of erosion and sedimentation processes along the Belgian shelf. As such, the sediment state and dynamics will be studied in the space, depth and time domain (4D). The research is timely as indications of a longer-term and broader-scale physical degradation of the seafloor exist and it is unclear whether this is solely due to the increasing anthropogenic influence or to a combination with the natural evolution of the seafloor itself, including the effect of climate change. The latter processes need to be disentangled as their impact needs to be balanced against the industry-related activities.

#### **MESH (Development of a framework for Mapping European Seabed Habitats) (RCMG)**

MESH is an EU Interreg IIIb-funded international marine habitat mapping programme aiming at the development of international standards and protocols for seabed mapping. Partnership: Joint Nature Conservation Committee (JNCC, coordination) (UK); Ghent University (B); Ifremer (FR); Marine Institute (IRL); Alterra-Texel (NL); TNO Environment, Energy and Process Innovation (NL); Centre for Environment, Fisheries and Aquaculture Science (CEFAS) (UK); Department for Agriculture and Rural Development, Northern Ireland (DARD) (UK); English Nature (UK); Envision Mapping Ltd (UK); National Museums and Galleries of Wales (NMGW) (UK); Natural Environment Research Council (British Geological Survey) (BGS) (UK)

### 4) MEASUREMENTS

1/ Boxcore sampling of the different mud environments

Boxcore samples were taken in different mud environments. Coordinates are given in annex and their location is shown in figure 1. In the shipping channel Pas van het Zand en Scheur recent deposited mud (freshly deposited to very soft consolidated) was sampled (fig. 2). In the swale north (SV01) and east (LG34a) of the dumping site B&W S1 sandy mud was sampled, which was rich in tubeworms (fig. 3). The Holocene mud, west of Pas van het Zand (MOW1) was covered with a muddy sand layer of 10 cm, as a result the Holocene mud couldn't be sampled very well (fig. 4). The cores will be used both for density measurements and bottom friction measurements.

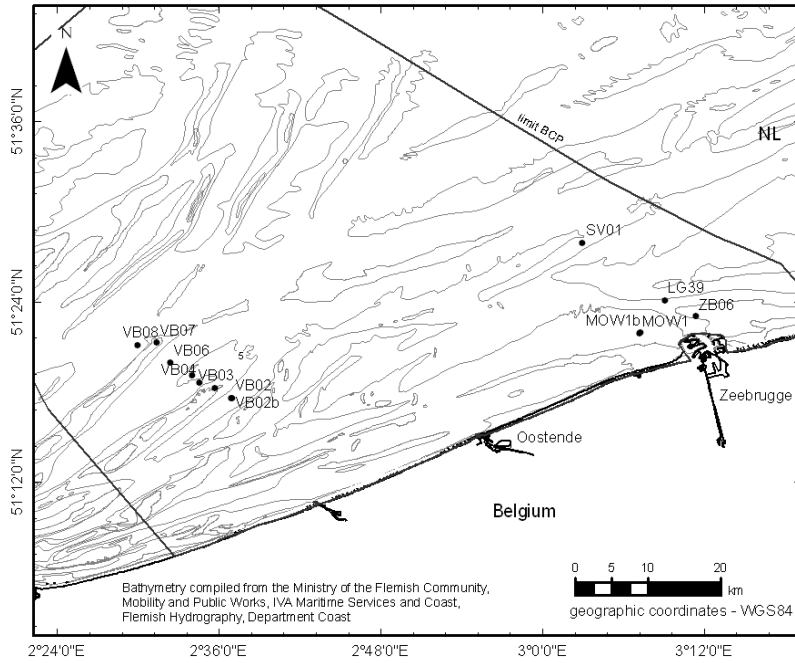


Figure 1: Boxcore of freshly deposited mud, layered due to tide deposition in the Scheur (LG39) and Pas van het Zand (ZB06)



Figure 2: Boxcore of freshly deposited mud, layered due to tide deposition in the Scheur (LG39) and Pas van het Zand (ZB06)



Figure 3: Boxcore of muddy sand sampled in the swale north (SV01, left and middle) and east (LG34a) of the dumping place B&W S1 (SV1). A lot of tubeworms were encountered in SV01.



Figure 4: Boxcore of Holocene mud with on top a layer of sand, mud and muddy sand (MOW1 and MOW1bis).

## 2/ Flemish Banks

Due to low water, 7 instead of 9 boxcores were taken along a track covering the Flemish Banks. Coordinates are given in annex. In the swales between the Oostdijk and the Buiten Ratel (VB06) and the Buiten Ratel and the Kwintebank, gravels/shells were found (VB02b) (Fig. 5). On the sandbanks, sandy sediments were encountered (VB03, 04, 05, 07 & 08) (Fig. 6). During the night multibeam measurements along Decca transects were sailed (the De Moor profiles). They were stopped earlier than planned because of low tide.



Figure 5: Boxcore of gravels, taken in the swale between the Oostdijk and the Buiten Ratel (VB06). Boxcore of shell debris, shells and gravels, sampled in the swale between the Buiten Ratel and the Kwintebank (VB02b).



Figure 6: Boxcore of fine to medium sand, taken on the Oostdijk (VB03, 04, 05, 07, 08)

## 2/ Region north of the Vlakte van de Raan

The program of Friday morning was changed due to the early finishing of the multibeam measurements covering the Flemish Banks. Instead, multibeam measurements in the region north of the Vlakte van de Raan were performed. A box, which was already covered during campaign ST0624, was redone because of the bad quality of the previous data. The coordinates of the box are shown in table 1. The multibeam measurements were done in the framework of the mapping of the bioherm structures made by tubeworms.

Table 1: Coordinates of the box where multibeam measurements were performed

| Easting (wgs84) | Northing (wgs84) | NB (wgs84) | OL (wgs84) |
|-----------------|------------------|------------|------------|
| 507002          | 5704800          | 51 29.658  | 03 06.052  |
| 507800          | 5704043          | 51 29.249  | 03 06.740  |
| 510458          | 5706478          | 51 30.55   | 03 09.04   |
| 509602          | 5707348          | 51 31.03   | 03 08.30   |

## 5. OPERATIONS

All times are given in local time.

### Thursday, February 15<sup>th</sup>

09h00 Embarkation of UG-RCMG, WLH and MUMM personnel



09h45 Sail off from Zeebrugge  
10h00 – 13h15 Boxcoring of ZB02, ZB06, MOW1, LG39, LG34a and SV01

*Transit to the Flemish Bank region*

16h00 – 18h30 Boxcoring of VB02 till VB08  
19h00 – Roll Calibration and Multibeam measurements

### **Friday, February 16<sup>th</sup>**

– 05h45 Multibeam measurements

*Transit to the region north of the Vlakete van de Raan*

08h00 – 12h00 Multibeam measurements

*Transit to Zeebrugge*

13h00 Disembarkment of scientific personnel

- End of campaign ST0703b -

## **6. LABORATORY SPACE USED**

|                   |   |
|-------------------|---|
| BRIDGE:           | Multibeam operations  |
| WET LAB:          | Samplings   |
| MICROBIOLOGY LAB: | Storage of instruments (sampling equipment, sound velocity probe) |
| BIOCHEMISTRY LAB: | Storage of instruments  |
| FISHERIES LAB:    |   |

## **7. INFRASTRUCTURE USED**

Continuous measurements  
- Thermosalinograph SCTD-SBE21  
- Turner fluorometer  
- Sea water pump

Navigation / Meteorology / Bathymetry  
- Friedrichs meteo  
- DGPS Thales Aquarius  
- Atlas Deso 20  
- Tss 320B heave compensator  
- RoxAnn bottom discriminator  
- Kongsberg-Simrad EM1002S multibeam  
- Sound velocity probe (not working)

Sediment sampling

- Boxcore

## 8. ANALYSIS CARRIED OUT ON BOARD

## 9. AUTOMATIC DATA ACQUISITION

Parameters that were acquired:

| N°  | Parameters    | Acquisition rate<br>0.5 sec | Acquisition rate<br>10 sec |
|-----|---------------|-----------------------------|----------------------------|
| 13  | PT/ST SPEED   |                             | *                          |
| 14  | DEPTH SPEED   |                             | *                          |
| 15  | FO/AF SPEED   |                             | *                          |
| 16  | REL. WINDDIR  |                             | *                          |
| 17  | REL. WINDSPD  |                             | *                          |
| 19  | HUMIDITY_HR   |                             | *                          |
| 20  | ATM PRESSURE  |                             | *                          |
| 24  | SEATEMP_1     |                             | *                          |
| 30  | SOL-RAD       |                             | *                          |
| 34  | AIRTEMP.DRY   |                             | *                          |
| 35  | AIRTEMP.WET   |                             | *                          |
| 36  | SHIP HEADING  | *                           | *                          |
| 120 | IN-WIND DIR   |                             | *                          |
| 121 | IN-WINDSPD    |                             | *                          |
| 122 | IN-WINDSPD.BF |                             | *                          |
| 123 | CUMUL.DIST    | *                           | *                          |
| 182 | HUMIDITY_DW   |                             | *                          |
| 184 | TSS DEPTH-L   | *                           | *                          |
| 185 | TSS DEPTH-H   | *                           | *                          |
| 186 | TSS HEAVE     | *                           | *                          |
| 191 | SBE21 TEMP.   | *                           | *                          |
| 192 | SBE21 SALIN.  | *                           | *                          |
| 193 | SBE21 SIGTH.  | *                           | *                          |
| 195 | TURNER FLUO.  | *                           | *                          |
| 197 | DGPS LAT.N/S  | *                           | *                          |
| 198 | DGPS LONG.E/W | *                           | *                          |
| 199 | DGPS HG_MSL   | *                           | *                          |
| 200 | DGPS UTCTIME  | *                           | *                          |
| 201 | DGPS SPEED    | *                           | *                          |
| 202 | DGPS COURSE   | *                           | *                          |
| 203 | DGPS QUALITY  | *                           | *                          |
| 214 | MGN DGPS LAT  | *                           | *                          |
| 215 | MGN DGPS LON  | *                           | *                          |
| 219 | ROXANN DEPTH  | *                           | *                          |
| 220 | ROXANN ROUGH  | *                           | *                          |
| 221 | ROXAN HARD    | *                           | *                          |

## 10. REMARKS ON THE MEASUREMENTS, INSTRUMENTS AND ON THE OPERATIONAL COURSE OF THE CAMPAIGN

-Problems were encountered with the sound velocity probe and these have been reported to Joan Backers.

-The OURS programme was used to facilitate the sampling procedure, but was abandoned because of uncertainties. Detailed remarks have been sent to Angelino Meirhaeghe.

-The officers and crew of RV Belgica are acknowledged for their help and skilful handling of the operations.

## ANNEX: coordinates of boxcore sampling stations

All samples were taken on Tuesday 15/02/2007.

| ID_short | UTC Time | NB (wgs84) | OL (wgs84) | descrip  |
|----------|----------|------------|------------|--|
| ZB06     | 9:08:30  | 51 23.11   | 3 11.40    | total: 45 cm, 5cm soft mud, 40 cm more consolidated soft mud (black), rest: sandy mud with shells            |
| MOW1     | 9:45:31  | 51 21.78   | 3 7.21     | total: 10 cm, 5 cm soft mud, rest: fine sand with shells   |
| MOW1b    | 10:01:45 | 51 21.82   | 3 7.24     | total: 15 cm, 0.5 cm fine sand, 2 cm grey-green mud, 8 cm muddy sand with shells, rest holocene (?) mud with |
| LG39     | 10:33:10 | 51 24.24   | 3 9.11     | total: 50 cm, soft black mud, layered due to tide deposition   |
| LG34a    |          |            |            | total: 15 cm, a lot of benthos (anemone, tubeworms), 1 cm sand, 2 cm soft mud, rest muddy fine sand          |
| SV01     | 12:13:25 | 51 28.50   | 3 2.98     | total: 32 cm, 7cm fine sand with a lot of benthos (tubeworms, seeapple), 25 cm of sandy mud                  |
| VB08     | 14:59:10 | 51 20.94   | 2 29.98    | total: 30-40 cm, homogenous fine to medium sand with shelldebris   |
| VB07     | 15:20:37 | 51 21.10   | 2 31.40    | total: 25-30 cm, homogenous medium sand with shelldebris   |
| VB06     | 15:46:07 | 51 19.60   | 2 32.40    | not succeeded because of stones  |
| VB05     | 16:09:11 | 51 18.68   | 2 34.03    | total: 28 cm, 1 mm mudlayer, 8 cm sand with mud & shells, 20cm fine sand with zones with more mud            |
| VB04     | 16:26:45 | 51 18.21   | 2 34.56    | total: 30 cm, medium sand with a lot of shelldebris  |
| VB03     | 16:47:19 | 51 17.79   | 2 35.71    | total: 20 cm, fine sand with not a lot of shelldebris  |
| VB02     | 17:11:13 | 51 17.01   | 2 36.99    | mislukt  |
| VB02b    | 17:15:45 | 51 17.00   | 2 37.00    | total: 10 cm, 2 mm mud layer, 7 cm fine sand with shells and shelldebris, 3 cm shells, shelldebris & gravel  |

Remark: The timestamp of sample LG34a still needs to be defined, based on the ODAS files.