

RV BELGICA CRUISE 2016/11 – CRUISE REPORT

Subscribers	Dr. Michael Fettweis (MF), Dr. Sébastien Legrand, Dr. Koen Parmentier, Dr. Alain Norro (AN), Prof. Dr. Lei Chou (LC), Prof. Dr. Frank Dehairs (FD); Dr. Eric Stienen (ES)
Institutes	Operational Directorate Natural Environment (OD Nature) Université Libre de Bruxelles, Service de Biogéochimie et Modélisation du Système Terre, Océanographie Chimique et Géochimie des Eaux (ULB) Vrije Universiteit Brussel, Vakgroep Chemie, Onderzoeksgroep Analytische- en Milieuchemie (VUB) Research Institute for Nature and Forest (INBO)
Addresses	OD Nature-BRU: Gulledele 100, B-1200 Brussels (MF, AN) OD Nature-OST: 3de en 23ste Linieregimentsplein, B-8400 Ostend (KP, JH, FK) ULB : Campus de la Plaine, CP 208, Boulevard du Triomphe, B-1050 Brussels VUB : Pleinlaan 2, B-1050 Brussel INBO: Kliniekstraat 25, 1070 Brussel (ES)
Telephones	02 773 21 32 (MF), 059 55 22 41 (KP); 059/24 20 55 (JH); 02 525 03 04 (ES)
E-mails	mfettweis@naturalsciences.be ; slegrand@naturalsciences.be ; kparmentier@naturalsciences.be ; anorro@naturalsciences.be ; Lei.Chou@ulb.ac.be ; fdehairs@vub.ac.be ; eric.stienen@inbo.be

Education/Geology/Monitoring/Physical Oceanography: 14/03/2016 – 18/03/2016

-
1. Cruise details
 2. List of participants
 3. Scientific objectives
 4. Operational course
 5. Track plot
 6. Measurements and sampling
 7. Remarks
 8. Data storage

1. CRUISE DETAILS

1.	Cruise number	2016/11
2.	Date/time	Zeebrugge TD: 14/03/2016 at 13h00 Zeebrugge TA: 15/03/2016 at 08h30
3.	Chief Scientist	14-15/03/2016: Michael Fettweis 15-16/03/2016: Lei Chou 16-18/03/2016: Nicolas Vanermen
	Participating institutes	OD NATURE, ULB, VUB, INBO
4.	Area of interest	Belgian part of the North Sea, Scheldt estuary (NL+B)

2. LIST OF PARTICIPANTS

Institute	NAME	14-15/03	15/03	16/03	16-18/03
OD NATURE	Michael FETTWEIS	X			X
	Joan BACKERS	X			
	Wim VANHAVERBEKE	X			
	Gijs COULIER	X			
	Agiro ADAMOPOULOU	X			
	Sébastien LEGRAND				X
	Alain NORRO				X
	Daniel MARSHAM				X
INBO	Patrick HENDRICKS				X
	Nicolas VANERMEN				X
ULB-BGeoSys	Wouter COURTENS				X
	Lei CHOU		X	X	
	Xuefeng LI		X	X	
	Audrey PLANTE		X	X	
	Nathalie ROEVROS		X	X	
	Hailong ZHANG		X	X	
VUB-AMGC	Julien SCHNEIDER		X		
	Frank DEHAIRS		X	X	
	LEERMAKERS Martine		X	X	
	Florian DEMAN		X	X	
	Nolwenn LEMAÎTRE		X	X	
ULB students	Pierre-Jean SUPERVILLE	X			
	Samuel CUVELIER		X		
	Anouk DEBECQ		X		
	Antoine FONTAINE		X		
	Damien FRANÇOISE		X		
	Elise KAZMIERCZAK		X		
	Djenan RATKOVIC		X		
	Julien ROBIC		X		
	Ludovic STRAUS		X		
	Dimitri TCHERNIAEFF		X		
VUB-UGent students	Michel VAN HENTENRYCK		X		
	Ine CALLEBAUT			X	
	Yohannes Tefera DAMTEW			X	

Dylan DE BLOCK			X	
Adey Sileshi DELELEGN			X	
Bich DO THH NGOC			X	
Arnout LAUREYS			X	
Ronald MERCKX			X	
Sara MONSIEURS			X	
Thi Thu Ha NGUYEN			X	
Leendert PLAETINCK			X	
Alessandra RODRIGUES PESSÔA			X	
Christine UWIBAMBE			X	
Bertrand UWIMANA			X	
Preben VAN OVERMEIREN			X	
Samuel MOERIS	X			
Francis VANRYCKEGHEM	X			
	8	20	23	7

3. SCIENTIFIC OBJECTIVES

OD Nature-MOMO (MF)

The project is part of the general and permanent duties of monitoring and evaluation of the effects of all human activities on the marine ecosystem to which Belgium is committed following the OSPAR-convention (1992). The goal of the project is to study the cohesive sediments in the Belgian part of the North Sea using numerical models as well as by carrying out of measurements. Through this, data will be provided on the transport processes which are essential in order to answer questions on the composition, origin and residence of these sediments, the alterations of sediment characteristics due to dredging and dumping operations, the effects of the natural variability, the impact on the marine ecosystem, the estimation of the net input of hazardous substances and the possibilities to decrease its impact as well as the input.

OD Nature-surface drifters (SL)

OD Nature's Marine Forecasting Centre develops and operates drift and fate models for objects adrift (FLOAT), oil pollution (OSERIT) or chemical pollution (HNS-MS) of the marine system. In order to validate these models, 4 surface drifters (2 isphere, 1 code-davis and 1 oceania buoy) will be deployed. Thanks to their GPS, the drifters' trajectory will be recorded with a high spatio-temporal resolution suitable for model validation. Thanks to their Iridium transceiver, the position of the drifters is known in near real time (the maximal delay should be of 30 min).

INBO-ES

Based on the results of standardized ship-based seabird counts, the Research Institute for Nature and Forest (INBO) investigates the effects of offshore wind farms on the presence and distribution of seabirds. Following a BACI set-up, the INBO performs monthly surveys along a fixed monitoring route through the impact and control areas at the Blighbank (Belwind wind farm) & Thorntonbank (C-Power wind farm).

ULB-students (LC)

This campaign provides practical training of students enrolled in the course « GEOL-F-4001 Geochemistry of continental and marine waters ». GEOL-F-4001 is a course given at the University of Brussels in the framework of the MASTER program of ULB geology, biology, chemistry, bioengineering in chemistry and bioindustries, environmental sciences & management).

VUB-students (FD)

This campaign provides practical training in field sampling and analysis in the framework of Master Programs in Environmental Chemistry (VUB-UG) and Human Ecology (VUB).

ULB-BGeoSys

ULB will sample waters, suspended matter and sediments in the Scheldt estuary and the Belgian coastal zone for various analyses (nutrient speciation and trace metals, etc.).

VUB-AMGC

VUB will sample for the determination of dissolved and particulate metals in estuarine and coastal waters. The DGT technique for the speciation of metals will be applied to estuarine waters. This is also part of the practical training for the students.

OD Nature - MONWIN Underwater noise (AN)

Environmental research on offshore windfarm projects in the Belgian part of the North Sea (C- Power on the Thorntonbank, Belwind on the Blighbank and Northwind on the Lodewijkbank). Part: underwater noise.

OD Nature-NewSTHEPS (KP)

The NewSTHEPS project (“**New Strategies for monitoring and risk assessment of Hazardous chemicals in the marine Environment with Passive Samplers**”) aims to develop innovative approaches and novel practical techniques that address the current fundamental scientific and methodological issues related to the implementation of Good Environmental Status (GES) of the Marine Strategy Framework Directive in national and European waters.

In this research project, novel and integrated passive sampler (PS)-based approaches (modelling and measurements) will be developed for both chemical exposure (monitoring) and biological effect assessment (passive dosing).

OD Nature-LN (ICOS)

The AUMS (Autonomous Underway Measurement System) system is inspired by the success of similar systems deployed on various ships of opportunity in the framework of the European Union FerryBox project (www.ferrybox.org). The instrumentation will greatly enhance the continuous oceanographic measurements made by RV Belgica by taking advantage of the significant technological improvements since the design of the existing (salinity, temperature, fluorescence) systems (cfr. ICOS Standards). In particular, many new parameters can now be measured continuously including important ecosystem parameters such as nitrate, ammonia, silicate, dissolved oxygen and CO₂, turbidity, alkalinity and phytoplankton pigments. In addition, the new equipment allows automatic acquisition and preservation of water samples, rendering RV Belgica operations significantly more efficient by reducing onboard human resources. Data will be available in near real-time via OD Nature’s public website (<http://odnature.naturalsciences.be/belgica/en/odas>) and following quality control, from the Belgian Marine Data Centre. Since 2015, the AUMS data are also delivered to the EC ESFRI project ICOS.

ESA-MC (GNSS)

For the European Space Agency continuous GNSS (Global Navigation Satellite system) data is autonomously acquired in the maritime environment for performance evaluation under different conditions.

4. OPERATIONAL COURSE

All times are given in local time. All coordinates in WGS84.

Throughout the campaign, measurements are made with the AUMS system.

Monday 14/03/2016

09h00-10h30	Embarkation of instruments and personnel
10h00-12h00	Water and sediment sampling and deployment of passive sampling cages in 2 nd military dock
14h21	Deployment of tripod at MOW1 (51°N 21.609, 3°E 08.0806'), with passive sampling devices and sediment traps.
14h30	Anchoring near MOW1 (51°N 21.44', 3°E 7.40')
14h30-14h50	Water sampling with Niskin bottles and sea water pump.
15h10	Start of 13h cycle at MOW1
15h20	Van Veen sample
15h20, 15h40, 16h00	Niskin samples 1, 2, 3
15h30	Boc core sample
16h20, 17h00	Niskin samples 4, 6
17h00	Boc core sample
17h20, 17h40, 18h00	Niskin samples 7, 8, 9
18h20, 18h40, 19h00	Niskin samples 10, 11, 12
19h20, 19h40, 20h00	Niskin samples 13, 14, 15
20h20, 20h40, 21h00	Niskin samples 16, 17, 18
21h20, 21h40, 22h00	Niskin samples 19, 20, 21
22h20, 22h40, 23h00	Niskin samples 22, 23, 24
23h20, 23h40, 00h00	Niskin samples 25, 26, 27

Tuesday 15/03/2016

00h20, 01h00	Niskin samples 28, 30
01h20, 01h40, 02h00	Niskin samples 31, 32, 33
02h20, 02h40, 03h00	Niskin samples 34, 35, 36
03h20, 03h40, 04h00	Niskin samples 37, 38, 39
08h00	Recuperation of OBS5 and GPS logger on AW buoy
08h30-10h00	Disembarkation of teams, embarkation of ULB students

Wednesday 16/03/2016

Thursday 17/03/2016

Friday 18/03/2016

09h30	Arrival at Zeebrugge, disembarkation
-------	--------------------------------------

- End of campaign 2016/11 -

5. TRACK PLOT

Figure 1: Track plot of campaign 2016/11

6. MEASUREMENTS AND SAMPLING

6.1. OD Nature-MF (MOMO)

1) Deployment of tripod

A tripod was deployed on Monday 14/03/2016 13h21 (GMT) at MOW1 (51°N 21.609, 3°E 08.0806'), see photo 1 and table 1. On the tripod was also attached 2 passive sampling cages, the Nioz sediment trap and 2 OD Nature sediment traps. During deployment one of the OD Nature sediment traps was detached.

Table 1: Position of the deployed instruments.

Station		Lat/Lon WGS 84	Deployment (GMT)	Recuperation (GMT)
MOW1	Tripod	51°N 21.609°, 3°E 8.0806'	14/03/2016 13h21	planned half April (Zeetijger)

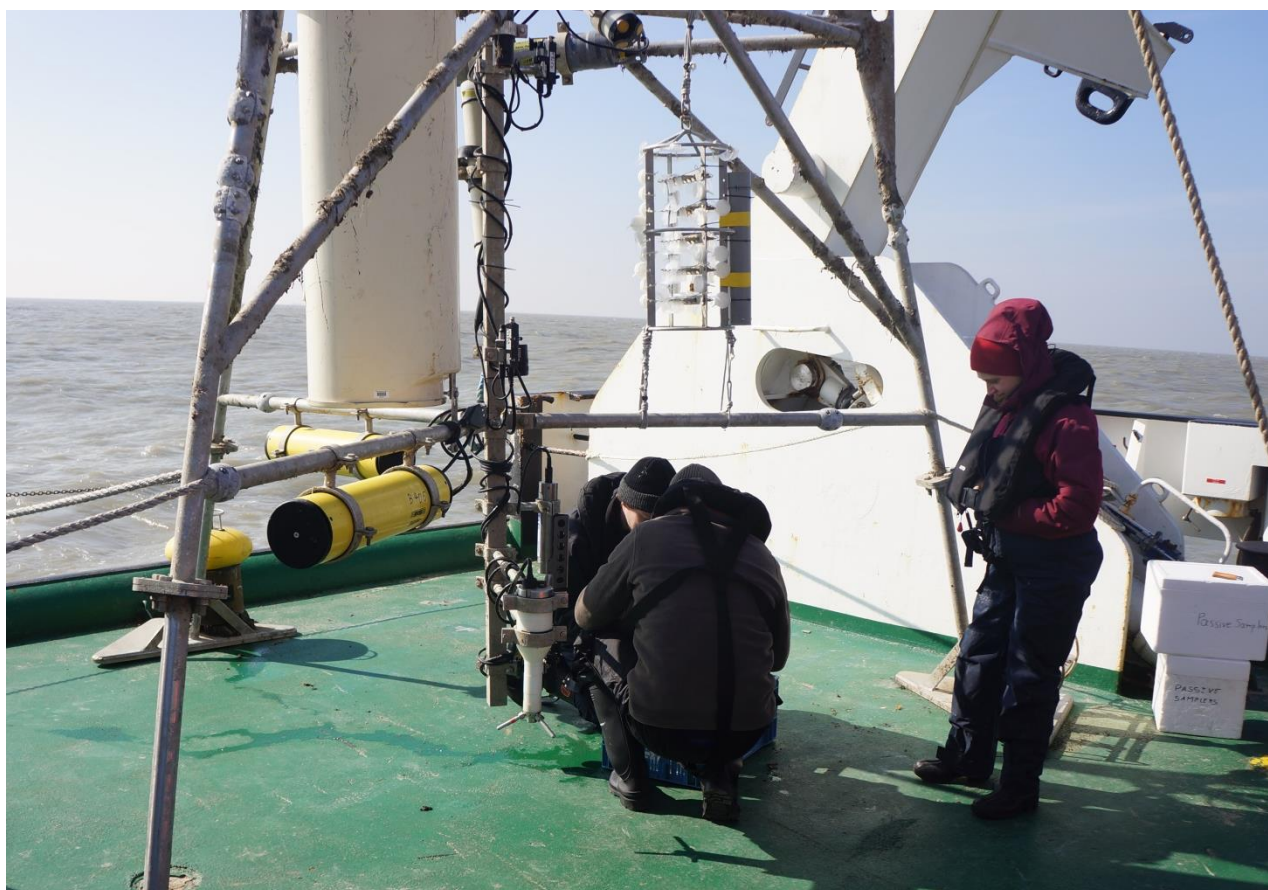


Photo 1: Tripod deployed at MOW1 on 14/03/2016.

2) Through tide measurement (13h) and bed sampling

A through tide cycle was carried out at MOW1 (14-15/03), see table 2, photo 2. The following OBS have been calibrated: ... The LISST 100 -X was not attached to the Rosette. Water samples were taken for turbidity measurements and filtrations of suspended particulate matter concentration each 20 min, and chlorophyll and

POC/PON concentration each hour; bottle samples were collected for later salinity measurements. A Van Veen grab was taken, see Table 3 and Photo3.

Table 2: Position of 13h measurements.

ID	Start (Date + time GMT)	End (Date + time GMT)	Lat_wgs84	Lon_wgs84
MOW1	14/03/2016 14h10	15/03/2016 03h00	51°N 21.439'	3°E 7.397'

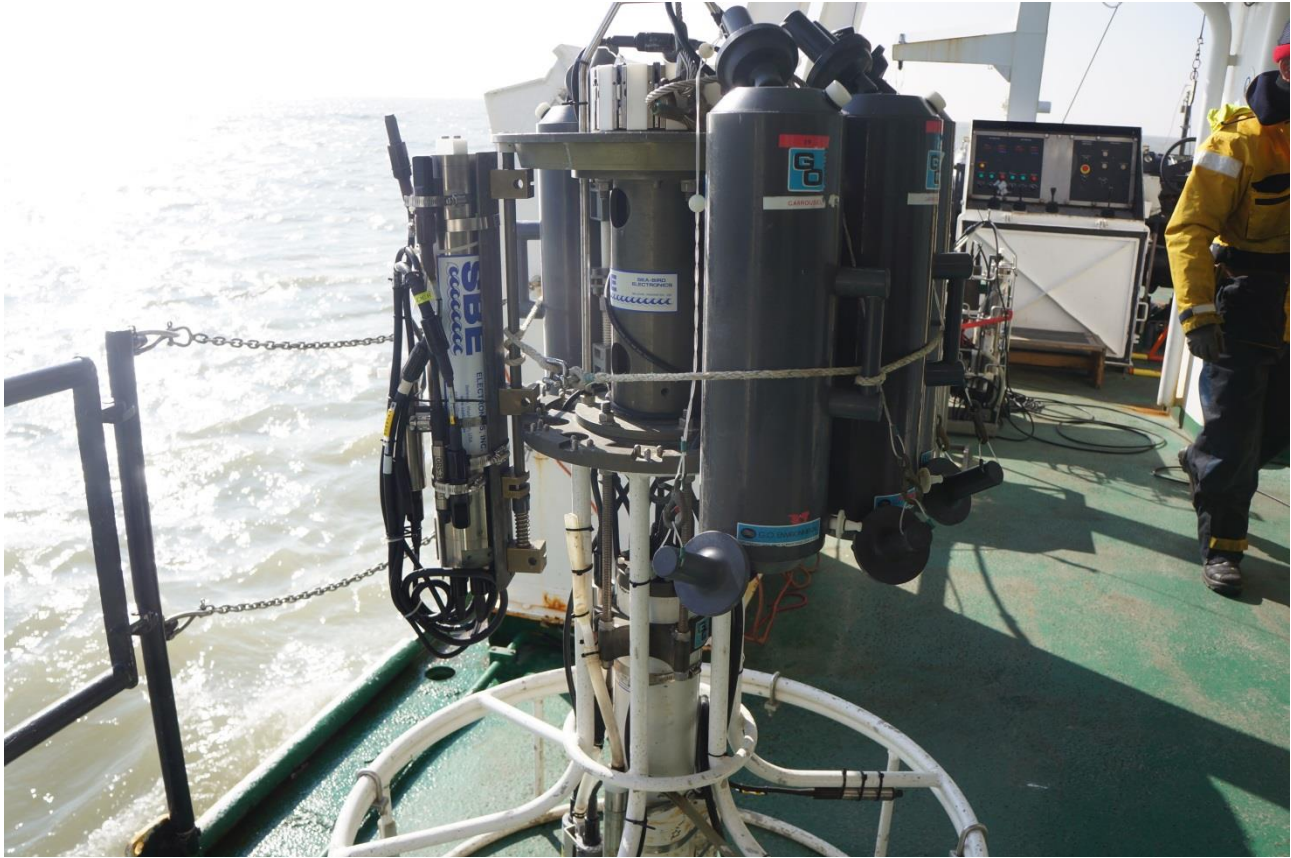


Photo 2: Rosette ready for the 13h cycle at MOW1.



Photo 3: Van Veen grab sample at MOW1.

Table 3: Position of the Van Veen grab sample.

ID	Lat/Lon WGS 84	Date (GMT)	Description
MOW1	51°N 21.439, 3°E 7.397'	14/03/2016 14h20	top: about 10cm fine sand with soft grey mud lenses; below: consolidated black

6.2. OD NATURE-KP

1) Deployment of tripod

A tripod was deployed on Monday 14/03/2016 13h21 (GMT) at MOW1 (51°N 21.609', 3°E 08.0806'). On the tripod two cages with two types of passive samplers were attached. Pre-extracted non-spiked silicone sheets (PDMS sheets) were attached to a cage for Ghent University. Pre-extracted and PRC-spiked silicone sheets were attached for OD Nature. A sediment trap (Technicap PPS 4/3) and two sediment traps (experimental design from OD Nature) were also deployed for further grain size analysis and chemical extraction. In addition divinylbenzene (DVB) based passive samplers were attached to the cage deployed with the tripod. After recovery, all passive samplers deployed for the NewSTHEPS project will be used for chemical analysis or bioassays. From the buoy above the tripod was also attached a second smaller buoy with a passive sampler cage (DGT) for trace metal sampling in the surface water.

2) Niskin Bottles - Box Corer

Water samples were taken for turbidity measurements, SPM concentration, chlorophyll, POC/PON concentration and salinity measurements in OD Nature. Furthermore Niskin bottles were used to take water samples at approximately 2 meters depth for chemical analysis for the NewSTHEPS project. The samples were filtered through 1.0 µm GF/B Whatmann glass fiber filters or Durapore 0.45 µm PVDF filter under vacuum before storage at 4°C. Filtered SPM were stored in deep freeze for carbon analysis or at 4°C for trace metal content. Also a Van Veen grab was taken for further extraction of the sediment and chemical analysis in OD Nature and from two Box-corers were retrieved three sediment cores of approximately 20 cm.

6.3. INBO-ES

6.5 OD Nature-AN

7. REMARKS

no remarks

8. DATA STORAGE

OD-Nature-MF: contact Joan Backers
OD-Nature-KP: contact Koen Parmentier
INBO: contact Erik Stienen