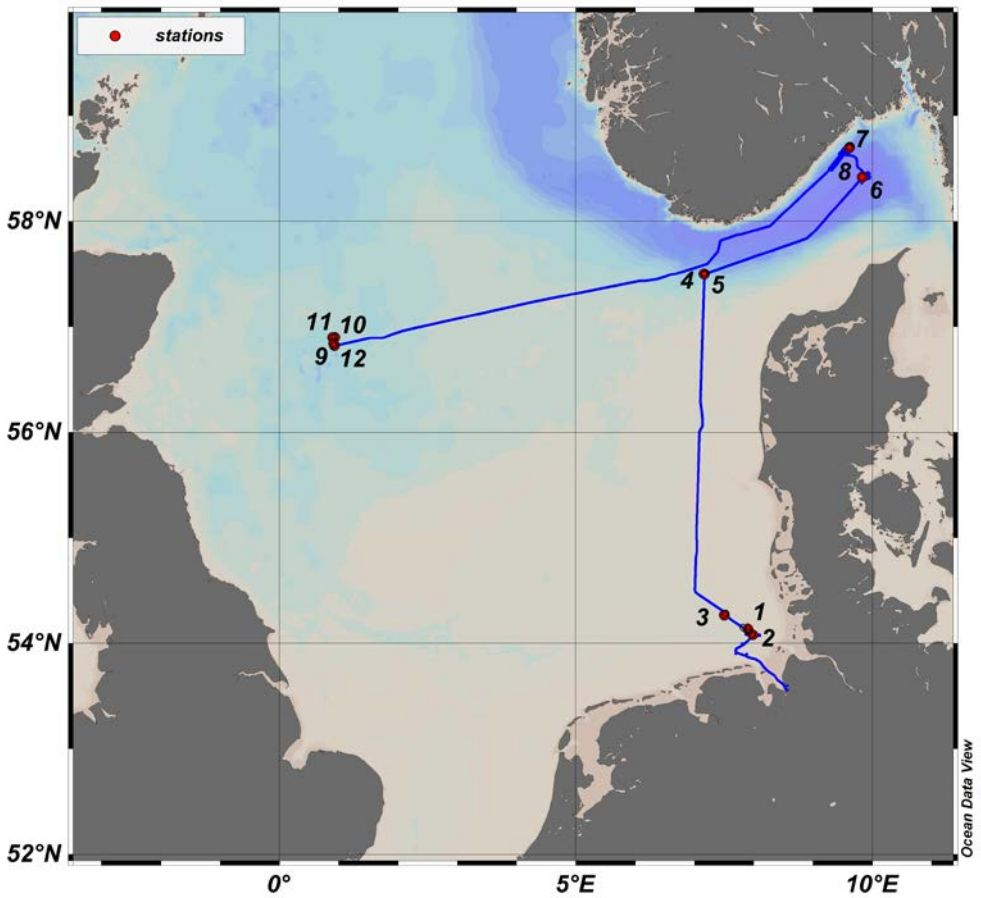
Institute for Chemistry and Biology of the Marine Environment (ICBM)
Carl von Ossietzky University of Oldenburg
Carl-von-Ossietzky-Str. 9-11
D-26129 Oldenburg
Germany

Phone: +49-(0)441-798-3518
Fax: +49-(0)4421-77 858-23
email: oliver.zielinski@uni-oldenburg.de

Short Cruise Report
RV SONNE (DBBE) – SO-P4

Bremerhaven - Aberdeen
23.09.2014 – 01.10.2014
Chief Scientist: Prof. Dr. Oliver Zielinski
Captain: Lutz Mallon



Objectives

The purpose of the cruise was the evaluation of the new vessel and its scientific equipment under scientific and technical aspects with a focus on the CTD-water sampler and the different integrated underway sensors. A secondary objective is the realistic scientific operation of geophysical and bio-optical instruments on board as training for future scientific expeditions. On board systems for deployment of geophysical instrumentations (e.g. winches, etc.) were evaluated. The scientific objectives are (a) the bio-optical characterisation of water bodies from the North-West European Shelf and the North-East Atlantic and (b) the investigation and comparison of water mass composition.

The following methods/activities were done:

(a) Sampling and testing of different underway systems utilizing a ferry-box system, a remote sensing reflectance setup and various laboratory validations.

(b) Bio-optical stations with CTD profiles, bio-optical sensor assembly profiles, radiometer-profiler operations and Secchi disk recording.

(c) Deployment and testing of geophysical instruments (CSEM systems, magnetics, gravimeter)

Narrative

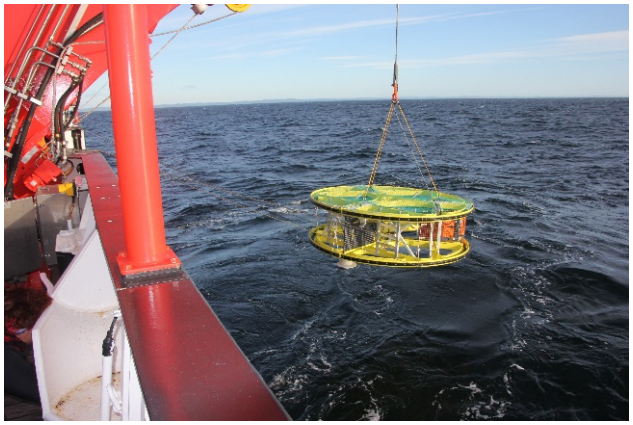
The RV SONNE departed Bremerhaven harbor at 10.00 on the 23.09.14 under favorable weather and sea conditions. All groups and participants arrived a day before to intensively use the time in Bremerhaven to install and prepare various systems on the ship (e.g. remote sensing, active electromagnetics systems, gravimetric system). The ship proceeded directly to the first observation area starting at station 1 (54° 8, 01'N, 7° 54, 08'E) south of Helgoland in the German Bight where several hours were required for trouble-shooting the operation and deployment of equipment. Within this region the seafloor was mapped with multibeam sonar and sound velocity was determined within the water column with a CTD, also testing its deployment via the ship winch. All Underway measuring systems were started (e.g. remote sensing, flow-through seawater system, gravimetric system). During the whole cruise track the on board flow-through system was validated via various laboratory analyses. Determined parameters include particulate organic matter, colored dissolved organic matter and chlorophyll. Water sampling was done at stations via CTD/Rosette also for reference analysis for remote sensing. In the evening the Golden Eye CSEM system was deployed for the first time at the ships stern side A-frame, continuing the evaluation successfully until the next day. Beside that installation at the moon pools of the ship were done. The use of the towed CSEM system HYDRA had to be canceled due to technical problems and weather conditions. With increasing wind and sea conditions the excellent properties of the vessel were markedly enabling a smooth and quiet operation even in rough seas.

The SONNE SO-P4 cruise departed from this area heading north towards the Norwegian trench/Skagerrak (2nd observation area, station 4-8). Here, besides the already mentioned CTD with water samples a free falling light profiler (Satlantic Profiler II) was tested before a towed magnetic sensor array (850 m cable lengths equipped with 2 sensors) was deployed within a literature revised area to detect magnetic anomalies below the seafloor. Due to the weather conditions the planned investigated area was shifted more closely to the coast where observations were repeated. By deployment of the Golden Eye the sea movement compensation of the ships main winch system was tested.

The towed magnetic sensor array was again deployed and the ship headed towards its last area of observation "Devil's Hole" which was reached at night (29.09.2014, 02.00). The validation of CTD, multibeam sonar and positioning system were tested to investigate the relatively narrow and long channels in this region. Supported by good sea conditions the test deployment of the fast rescue boat was possible. In this last observation area the

Golden Eye CSEM in various configurations was successfully deployed, supported by a Parasound system. The objective was to detect different sediment layers within the cross section of the channels. Last action in the evening was the successful deployment of the CSEM HYDRA. It was planned to tow the instrument overnight across a north-south transect. The system can detect changes in the conductivity of the seabed indicating evidence of gas inclusions or deposit. Unfortunately, due to technical problems in the transmission unit prevented the data generation for online access the ship remained on its position overnight. After finishing the HYDRA deployment and a last CTD action (30.09.2014) scientific equipment was de-installed and packed while the ship proceeded for Aberdeen harbor where the SONNE SO-P4 cruise ended on the 01.10.2014. The scientific crew was picked up by transport boats and brought to the harbor. Due to the fact that the ship could not enter the harbor a reference measurement on land of the gravimetric system which was installed in the on board gravimetric room in the center of the ship was not possible.

In summary, the cruise resulted in no time lost or equipment failure/lost. The scientists accomplished the technical and scientific objectives and gained important insights in the scientific and technical operation of geophysical and bio-optical instruments on the new research vessel SONNE.



Deployment of Golden Eye CSEM on RV SONNE.

Evaluated flow-through system (Underway system) on board RV SONNE.

KSS32-M gravimetric sea system in the on board gravimetric room of RV SONNE

Acknowledgements

The cruise of RV SONNE for the evaluation of the new vessel and its scientific equipment under scientific and technical aspects was funded by the Federal Ministry of Education and Research (BMBF).

Teilnehmerliste/ Participants

1.	Zielinski, Oliver	Fahrtleiter / *Chief Scientist*	ICBM
2.	Winkler, Holger	CTD, Data Management	ICBM
3.	Henkel, Rohan	CTD, Bio-Optic	ICBM
4.	Voß, Daniela	Bio-Optic, Underway systems	ICBM
5.	Wollschläger, Jochen	Bio-Optic, Underway systems	HZG
6.	Miranda Montenegro, Mario Luis	Bio-Optic, Underway systems	ICBM
7.	Garaba, Shungu Pascal	Bio-Optic, Remote sensing	ICBM
8.	Rüssmeier, Nick	Remote Sensing	ICBM
9.	Schwalenberg, Katrin	CSEM HYDRA	BGR
10.	Barckhausen, Udo	Magnetics, Gravimetry	BGR
11.	Bargeloh, Hans-Otto	Magnetics, Gravimetry	BGR
12.	Deppe, Joachim	CSEM HYDRA	BGR
13.	Heyde, Ingo	Magnetics, Gravimetry	BGR
14.	Rippe, Dennis	CSEM HYDRA	BGR
15.	Carmen, Schimpf	CSEM HYDRA, Documentation	BGR
16.	Müller, Hendrik	CSEM Golden Eye	UHB
17.	Hilgenfeldt, Christian	CSEM Golden Eye	UHB
18.	Konstantin Reeck	CSEM Golden Eye	UHB

ICBM	Institute for Chemistry and Biology of the Marine Environment, Oldenburg
HZG	Helmholz-Zentrum Geesthacht, Geesthacht
BGR	Federal Institute for Geosciences and Natural Resources, Hannover
UHB	University of Bremen, Bremen

Stationsliste / Stationlist

Station ID	Date	Time	Position Lat	Position Lon
1	23.09.2014	16:32:00	54° 8,01' N	7° 54,08' E
2	24.09.2014	07:21:00	54° 4,88' N	7° 59,04' E
3	24.09.2014	12:06:00	54° 15,99' N	7° 30,00' E
4	25.09.2014	12:22:00	57° 29,98' N	7° 10,05' E
5	25.09.2014	14:40:00	57° 30,03' N	7° 9,69' E
6	26.09.2014	07:09:00	58° 24,99' N	9° 50,12' E
7	27.09.2014	07:01:00	58° 41,99' N	9° 37,07' E
8	27.09.2014	11:43:00	58° 41,75' N	9° 36,57' E
9	29.09.2014	00:10:00	56° 49,21' N	0° 55,69' E
10	29.09.2014	08:41:00	56° 53,85' N	0° 56,04' E
11	29.09.2014	12:12:00	56° 53,85' N	0° 53,71' E
12	30.09.2014	09:08:00	56° 50,38' N	0° 54,82' E