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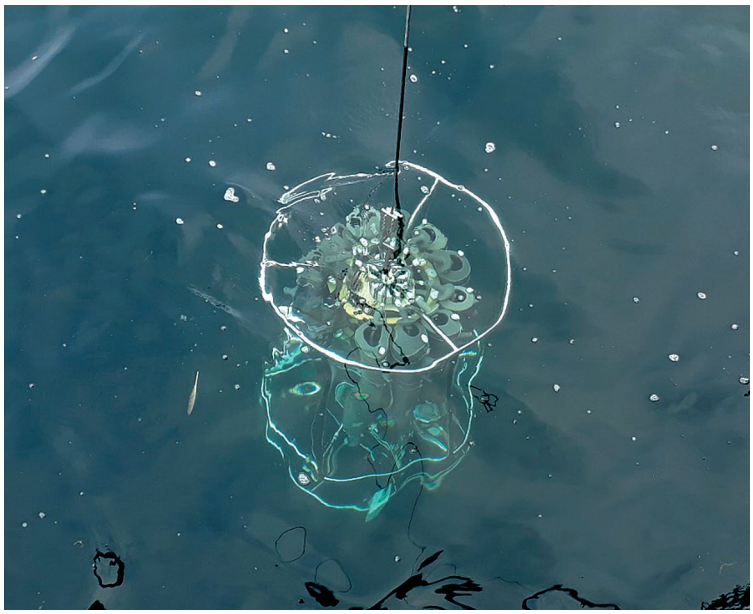
Helmholtz-Zentrum für Ozeanforschung Kiel

RV POSEIDON Fahrtbericht / Cruise Report POS527

Baseline Study for the Environmental Monitoring of Subseafloor CO_2 Storage Operations

Kiel – Kiel (Germany)
15.8. - 3.9.2018



Berichte aus dem GEOMAR
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Nr. 45 (N. Ser.)

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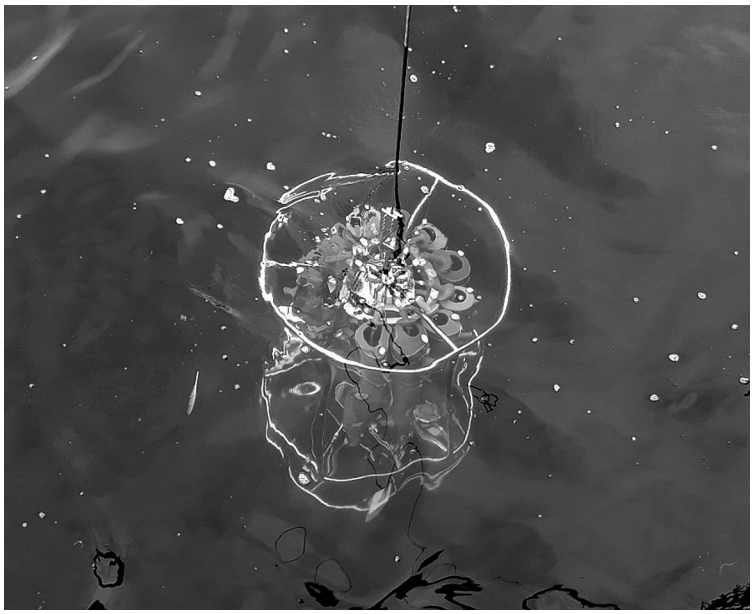

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Table of Contents

1. Summary 1
2. Research Programme / Objectives 2
3. Participant Lists 4
4. Cruise Narrative (Summary) 5
4.1. Sailing to Goldeneye area 5
4.2. Transfer of personnel and return to Goldeneye area 5
4.3. Acknowledgements 6
5. Methods 7
5.1. Water column sampling 7
5.1.1. SBE rosette frame and CTD sensors 7
5.1.2. Dissolved Oxygen for sensor calibration 8
5.1.3. Salinity for sensor calibration 8
5.1.4. Total Alkalinity and Dissolved Inorganic Carbon sampling 8
5.1.5. Dissolved organic carbon and dissolved organic nitrogen sampling 8
5.1.6. Inorganic Nutrients sampling 9
5.1.7. pH optode (TU Graz) deployment on CTD frame 9
5.2. Lab-on-chip Sensor technology 10
5.2.1. Nitrate + nitrite 10
5.2.2. Phosphate 10
5.2.3. pH 11
5.2.4. Total alkalinity (TA) 11
5.2.5. Dissolved Inorganic Carbon (DIC 11
5.3. Lander deployments 12
5.3.1. Develogic Lander 12
5.3.2. MPI Lander 13
5.4. Macrofauna community structure and biodiversity 16
5.4.1. Sample processing 16
5.5. Particle Size Analysis 18
5.5.1. Sample processing 18
5.6. Sediment geochemistry 19
5.6.1. Box cores sub-sampling 19
5.6.2. Gravity cores 20
5.7. Microbial activity in sediments 21
5.8. Multibeam survey activities 22

5.9. Picarro Atmospheric Gas Measurements 22
6. Preliminary Results 24
6.1. Water column chemistry 24
6.1.1. pH optode 29
6.2. Lab-on-chip deployments and measurements performed 30
6.2.1. LOC on MPI lander 30
6.2.2. Underway system 31
6.2.3. CTD casts 32
6.2.4. Grab samples from pore and benthic water 32
6.2.5. Direct sampling from sediment cores 33
6.3. Lander measurements 34
6.3.1. Develogic Lander 34
6.3.2. MPI lander 35
6.4. Macrofauna community structure 36
6.5. Sediment Geochemistry 36
6.5.1. Box cores 36
6.5.2. Gravity cores 38
6.6. Microbial activity in sediments 38
6.7. Multibeam survey activities 41
6.7.1. Bathymetric processing 42
7. References 43
8. Appendices 45
8.1. Ship´s log of all activities. Please note that the activity number of the ship does not correspond with the station number that we used on the cruise. 45
8.2. Sampling List for Box Core Activities on P527 74
8.3. Cruise Narrative (by day) 80

Table of Figures

Figure 1. Scientific participants of POS527 (after personnel transfer in Aberdeen) ... 4

Figure 2 Overview of cruise track POS527 starting in Kiel and ending in Kiel. Goldeneye area is marked**.** ... 6

Figure 3 Water sampler (12x10 L Niskin) rosette and CTD sensors ... 7

Figure 4. pH optode attached on the CTD frame ... 9

Figure 5. Set of NOC Lab-on-chip sensors connected to the ship underway water supply. ... 12

Figure 6. Surface hydro-acoustic modem for Develogic lander communication ... 13

Figure 7. *(A)* Oxygen minisensor and (B) pH-ISFET with added thermistor. The high precision and fast response times of these sensors makes them suitable for eddy covariance measurements of the turbulent fluctuations of solutes in the benthic boundary layer ... 15

Figure 8. Eddy covariance oxygen and pH sensors positioned just outside the measuring volume of the acoustic Doppler ... 15

Figure 9. The gradient profiler developed to determine dissolved oxygen and pH at 0.1 m and 1.1 m above the seafloor in the benthic boundary layer. ... 16

Figure 10. Box corer standing on deck of the Poseidon ... 17

Figure 11. Sub-coring of box core after water is drained. Cracks in the sediment surface are a product of the force of the box-coring ... 17

Figure 12. Sieving of elutriated macrofauna samples ... 18

Figure 13. Subsampling of box corer for particle size analysis (PSA). ... 19

Figure 14. Pore water extraction with Rhizons in subsample of box core ... 20

Figure 15. Left: Gravity core deployment; Right: cutting of the gravity core in 1 m sections ... 21

Figure 16. CTD stations during Poseidon 527 cruise ... 24

Figure 17. Vertical profiles of 19 CTD casts performed during Poseidon 527 cruise. ... 27

Figure 18. CTD depth profile (A) and oxygen Winkler profile (B) of CTD cast 3, station 10. ... 28

Figure 19. Preliminary pH values from pH optode deployment on the CTD frame ... 30

Figure 20. Four LOC sensors mounted on the MPI benthic boundary lander. 31

Figure 21. pH data from the last deployment of the MPI lander. Data was collected at approximately 10 minute per sample..... 31

Figure 22. Alkalinity sensor (left) mounted on the CTD frame. 32

Figure 23. Preliminary analysis of the pore water samples collected from box coring at station 2; the bottle numbers are roughly the same as the depth of the sample in cm. 33

Figure 24. Preliminary data of nitrate+nitrite and phosphate concentrations in µM at various depths in a sediment core sample from station 83..... 33

Figure 25. Develogic lander data pod popup found north of Norway. 34

Figure 26. (A) sediment resuspension caused by the impact of the lander on the seafloor, and (B) naturally occurring marine snow can interfere with eddy covariance measurements of pH. 35

Figure 27. (A) Water velocities at a height of 27 cm above the seafloor at station 90. (B) Oxygen concentrations determined with an eddy covariance minisensor. (C) Calculated oxygen fluxes overlaid with mean water velocity. 36

Figure 28. Fluxes (left) and volumetric rates (right) for the various sampling sites... 39

Figure 29. Sulfidic sediments with FeS bands (left), and gaseous sediments (middle), typical sediment from pockmark without gas or sulfide (right). 40

Figure 30. Small piece of calcite-rich stone. The stone was magnetic, hence Fe-rich as well. 40

Figure 31. Multibeam survey track during Poseidon 527..... 41

1. Summary

Eric Achterberg and Mario Esposito

Poseidon cruise 527 took place in the framework of the Horizon 2020 project STEMM-CCS of the European Union (EU). The project's main goal is to develop and test strategies and technologies for the monitoring of subseafloor CO_2 storage operations. In this context, a small research-scale CO_2 gas release experiment is planned for May 2019 in the vicinity of the Goldeneye platform located in the British EEZ (central North Sea).

The goal of cruise POS527 was to collect the necessary oceanographic and biogeochemical baseline data prior to this release experiment. The cruise focussed on the region in the direct vicinity of the Goldeneye platform in the North Sea (80 nm northeast of Aberdeen).

During the cruise, CTD casts were undertaken to study the water column chemistry in the study region. In addition, an MPI lander was deployed on a number of occasions for high-precision benthic flux measurements of O_2, CO_2 and pH in the bottom waters at Goldeneye. Push cores from box cores and also gravity cores were collected in the area for sediment biogeochemical analyses. Box coring was also conducted to obtain macrofauna samples for diversity investigations.

Multibeam surveys were conducted at times that no sampling activities were undertaken (mainly evenings and nights) in order to extend our bathymetric coverage of the Goldeneye region. We conducted continuous atmospheric measurements of CH_4, CO_2, and water partial pressures during the cruise. Benthic oxygen measurements were conducted in selected sediment cores using microelectrodes in order to assess variations in oxygen consumption rates in various contrasting sites in the Goldeneye region. Lab on chip sensors were deployed on CTD casts as well as on the MPI benthic lander.

It was envisaged to retrieve a Develogic benthic lander in the Goldeneye region, then service this lander and redeploy. This lander is equipped with a suite of sensors to monitor temperature, conductivity, pressure, current speed and direction, hydro-acoustic, pH, pCO_2, O_2 and nutrients over a period of about 10 months (since deployment in October 2017 during cruise POS518). Popup telemetry units for data transmission via IRIDIUM satellite telemetry were supposed to be released every 3 months. The pop-up buoys have not properly functioned so far, with only one recently found in a fjord in northern Norway. On our cruise we were not able to communicate with the lander, and could not retrieve and service it. We now plan to retrieve the lander in May 2019 with the help of a ROV.

2. Research Programme / Objectives

Eric Achterberg, Mario Esposito

Natural marine ecosystems of shelf seas such as the North Sea are in a constant flux as a consequence of daily/seasonal environmental drivers (e.g. ocean currents, tidal variations, freshwater inputs, water column stratification, phytoplankton blooms and organic matter sinking, nutrient supply variations (e.g. Richier et al., 2014; Rovelli et al., 2016; Thomas et al., 2009; Turrell, Henderson, Slesser, Payne, & Adams, 1992), and natural (e.g. cyclonic events; e.g. Fettweis, 2012) and anthropogenic stochastic disturbances (e.g. trawling, oil and gas production, sand extraction, or Carbon Capture and Storage (CCS)). These drivers strongly affect benthic ecological habitats, and biogeochemical exchange processes (fluxes) at the seafloor, within the water column, and at the sea surface (Wakelin et al., 2012) Moreover, the response of the natural system to even one single driver can be highly variable (Artioli et al., 2014). This can be demonstrated e.g. by the variability of the natural fluxes of CO_2 across the sediment-seawater interface. Variations in benthic degradation of organic matter can result in fluxes ranging by several orders of magnitude (~ 1-1000 g CO_2 m^{-2} yr^{-1}; Luff & Moll, 2004).

Consequently, strong efforts are needed to determine an effective biological and environmental baseline in order to provide the data needed to discriminate the potential direct signals of unintended CCS emissions from those caused by other natural or man-made drivers (e.g. Blackford et al., 2015; Wallmann et al., 2015). The proposed research cruise will help us to investigate the natural variability of subsea ecological, biogeochemical and oceanographic variables in 2018, in order to pre-define measurement strategies for a controlled sub-seabed CO_2-release experiment, which is planned for May 2019 in the Goldeneye area (Figure 2).

The Goldeneye area, which has been earmarked to become a large-scale offshore CO_2-storage site and exhibits all kinds of “gas-related” structures (i.e. numerous pockmark features at the seafloor, shallow gas at below ~100 m sediment depths, abandoned wells; Shell pers. comm.), is the main target area during the proposed research campaign.

The Poseidon 527 cruise to the Goldeneye region in the North Sea forms an important component of the European Union Horizon2020 with the title “Strategies for Environmental Monitoring of Marine Carbon Capture and Storage” STEMM-CCS. This project commenced in March 2016, and more details of the project can be found on its website http://www.stemm-ccs.eu/.

The overall aim of STEMM-CCS is to deliver new insights, guidelines for best practice, and tools for all phases of the CO_2 storage cycle at offshore Carbon Capture and Storage (CCS) sites. The work is centred around the Goldeneye site in the North Sea, which is a depleted gas field, and earmarked as a CC Storage complex.

Contributions to the main objectives of STEMM-CCS supported by our cruise are:

(1) Pre-define and measure sensitive and robustly measurable environmental background variables which provide an indication for subsea CO_2 leakage, prior to offshore CO_2 storage operations.

(2) Provide water column measurements of trace gases, nutrients, and carbonate chemistry variables to assess baseline conditions in the study region. Collect under natural (baseline) conditions a set of geochemical porewater data to provide a quantitative, process-based interpretation of porewater and benthic fluxes with the use of a state-of-the-art numerical model. The baseline data is needed for comparison with data obtained during artificial CO_2-release experiments, which will be conducted in 2019 in the same area.

(3) Undertake benthic ecology baseline measurements, to compare against conditions with perturbations from artificial CO_2 release experiments.

(4) Test novel chemical sensors, and hydroacoustic detection systems for measuring benthic and pelagic carbon fluxes (i.e. by using lab-on-chip technology, optodes, eddy co-variance techniques for O_2 and pH.

(5) Undertake multibeam observations of the seafloor in the Goldeneye region, with an emphasis on obtaining position and size of pockmarks.

3. Participant Lists

Scientific Party		**Crew**	
Eric Achterberg	Chief Scientist, water column biogeochemistry	Helge Volland	Captain
Mario Esposito	Water column biogeochemistry and lander	Dirk Thürsam	1st Officer
Dominik Jasinski	Water column biogeochemistry and lander	Oliver Jakobs	2nd Officer
Anna Lichtschlag	Sediment biogeochemistry	Kurre Klaas Kröger	Chief Engineer
Allison Schaap	Sensor deployment	Carsten Pieper	2nd Engineer
Saskia Ruhl	Benthic macrofaunau	Michael Rusik	Electrician
Thomas Mesher	Benthic macrofauna	Ralf Meiling	Mechanic
Dirk de Beer	Benthic biogeochemistry	Dominik Riederer	Mechanic
Dirk Koopmans	Benthic flux measurements	Joachim Mischker	Bosun
Catherine Wardell[1]	Multibeam surveying	Frank Schrage	AB
Thomas Lehmann[1]	Lander servicing	Finn Lukas Peterson	AB
Martin Arundell[2]	Sensor deployment	Matthias Maas	Mechanic
Emily Davey[2]	Water chemistry	Dirk Heßelmann	Mechanic
		Bernd Gerischewski	Steward
		Patrick Kosanke	Cook

[1]Before and [2]after personnel transfer in Aberdeen on August 21, 2018.

Figure 1. Scientific participants of POS527 (after personnel transfer in Aberdeen)

4. Cruise Narrative (Summary)

Eric Achterberg

4.1. Sailing to Goldeneye area

Cruise POS 527 mobilised in Kiel on August 14, 2018. The participants travelled from Plymouth Marine Laboratory (UK), National Oceanography Centre Southampton (UK), MPI Marine Microbiology (Bremen Germany), Develogic GmbH (Hamburg, Germany) and GEOMAR (Kiel, Germany). We sailed in the morning of August 15 (0830 h UTC) with very calm weather in the Baltic Sea. In the Skagerrak and the North Sea, the wind and waves were a little more demanding for some of the cruise participants.

We arrived at the Goldeneye site at 0530 h (UTC) on August 18 and commenced with locating the NOC Develogic lander. The wind was ca. 6 Bf, with significant wave action, which made it challenging to operate. The poor weather conditions only allowed us to undertake a CTD cast (station 1) and no box corer work or lander deployment could be undertaken. In the period between dinner and breakfast the next day, we undertook multibeam surveys to improve and extend our bathymetric coverage. The multibeam surveying became a standard operation during the evenings and nights.

August 19 and 20 provided us with excellent weather and calm seas. We made great progress and conducted 3 CTD casts, deployed the MPI lander that measures sediment-water fluxes of oxygen and inorganic carbon. In addition, we handled a dozen box cores. The speed of the box core operations was impressive. The crew of the Poseidon has been facilitating all this with excellent support.

4.2. Transfer of personnel and return to Goldeneye area

On August 21 we sailed from Goldeneye (departure at midnight) to Aberdeen to transfer two technicians. Catherine Wardell and Thomas Lehmann went home, and Martin Arundell and Emily Davey joined the vessel. We also purchased a spare part for the box corer and departed for the Goldeneye site on the evening of Aug 21. August 22 and 23 were successful days with MPI lander deployment and retrievals, CTD casts and box coring activities, followed by multibeam surveying at night. The weather deteriorated on August 24, with only CTD casts and MPI lander deployment possible. August 24 and 25 did not allow us to undertake any work at all and we sheltered behind Peterhead. On August 26 the weather conditions were favourable for a full day of work, whilst August 27 did not allow us to do any work because of poor weather. August 28 allowed us to work until early afternoon, when wave height became too dangerous for operations other than multi beam surveys. Good weather returned and on August 29 and from then on we had excellent conditions to conduct our work. We conducted gravity core operations on August 29 and 30, and these were successful. Following the retrieval of the MPI lander in the morning of August 31 we departed for Kiel.

We arrived in Kiel in the morning of September 3 (0700 h UTC).

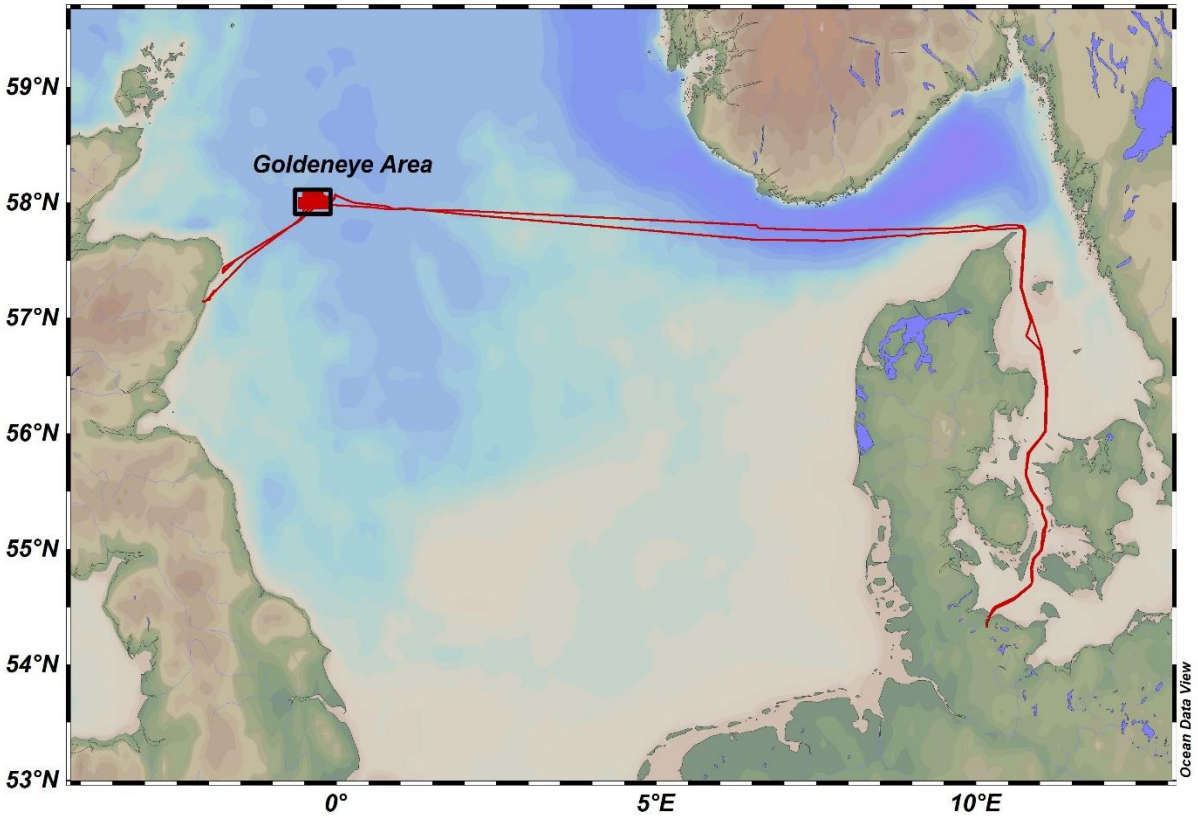


Figure 2 Overview of cruise track POS527 starting in Kiel and ending in Kiel. Goldeneye area is marked**.**

4.3. Acknowledgements

We would like to express our gratitude for the excellent support by Captain Günther and his crew which enabled us to obtain valuable data despite the various storms during this cruise.

The Technology and Logistics Centre (TLZ) at GEOMAR is acknowledged for the excellent logistic support. The cruise has received funding from GEOMAR and the STEMM-CCS project in the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654462.

5. Methods

5.1. Water column sampling

Mario Esposito, Dominik Jasinski, Eric Achterberg (GEOMAR, Kiel)

5.1.1. SBE rosette frame and CTD sensors

The SBE 9plus underwater unit on the 12 x 10 L Niskin bottles rosette frame was equipped with pressure sensors, 2 temperature sensors (SBE 3 Plus), 2 oxygen sensors (SBE 43) and 2 conductivity sensors (Figure 3). Furthermore, chlorophyll fluorescence (FLNTUR TD, Wetlabs) and altimeter (PSA-916, Teledyne Bentos) sensors are attached. The SBE underwater unit and Niskin bottle carousel motor were powered via the winch's coaxial-cable. CTD data recording and triggering Niskin bottles were controlled with SEASAVE software (version 7.21) on a computer linked to the SBE 11 Plus V2 Deck Unit. CTD data were recorded and stored on the computer. GPS position data was logged parallel to the CTD and Video data from NMEA-string of RV Poseidon (Furuno GPS).

Hydro-casts and hydrographic data from CTDs were processed by using SBE software SBE7.22.1. Usually data files of 1 minute bins and 1 meter bins were created from raw data files and exported to ASCII. CTD is combined with data sets from external sensors by correlating with their UTC time stamps.

Figure 3 Water sampler (12x10 L Niskin) rosette and CTD sensors

5.1.2. Dissolved Oxygen for sensor calibration

Samples for dissolved oxygen were drawn directly from the Niskin bottles into 100 ml borosilicate glass bottles. Bottles were rinsed at least three times with the sampling water before filling. While filling, the bottles were rotated to ensure no bubbles accumulate inside, overflowing was allowed. Immediately after sampling, 1 ml of alkaline sodium iodate and 1 ml of Manganese (II)-chloride-solutions were added to the sample. The samples were shaken vigorously for at least 30 seconds. After 30 minutes the samples were titrated. A magnetic bar and 1 ml of 50% sulphuric acid were added. The magnetic plate was turned on until the precipitate dissolved. Thiosulfate solution was added using a Metrohm titration stand until the point where the yellow colour disappeared. At this point 1 ml of zinc iodide starch solution was added and the titration continued until the solution was clear. The volume of the added thiosulfate solution was logged in the Excel oxygen calculation spreadsheet (Oxygen calculation POS527). Final oxygen concentrations (in µmol/l) were calculated by taking into account the bottle factor, thiosulfate factor and the added volume of titrant.

5.1.3. Salinity for sensor calibration

From each CTD cast, 3 to 4 Niskin bottles were sampled for salinity in order to calibrate the SBE conductivity sensor (SBE 9Plus). Salinity samples from differing salinities were chosen from the real time CTD upcast, and documented and stored in brown salinity bottles (Flensburg) for subsequent analysis at GEOMAR using a Guildline salinometer. This data will then be used to calibrate the conductivity sensor.

5.1.4. Total Alkalinity and Dissolved Inorganic Carbon sampling

Samples for Total Alkalinity and Dissolved Inorganic Carbon (TA/DIC) were drawn directly from the Niskin bottles into 250 ml Pyrex borosilicate glass bottles. Bottles were rinsed at least three times with the seawater before filling. While filling, the bottles were rotated to ensure no bubbles accumulate inside and to avoid the persistence of any minute bubbles, overflowing was allowed. After removing 2.5 ml of sampled seawater for headspace, samples were preserved by addition of 100 µl of 50% saturated $HgCl_2$ solution ((Dickson et al, 2007). A thin layer of silicone grease was applied around the glass stoppers and following appropriate labelling, the bottles were sealed and stored in the dark for later analysis at GEOMAR. Analysis will be performed using a conventional titration methods for TA measurements and coulometric titration for DIC measurements on a SOMMA (Marianda) analyser.

5.1.5. Dissolved organic carbon and dissolved organic nitrogen sampling

Samples for dissolved organic carbon (DOC) and dissolved organic nitrogen (DON) were collected directly from the Niskin bottles. One end of a silicone tubing was connected directly to the tap of the Niskin bottle while at the other end a stainless steel filter holder was attached. Ashed (combusted at 450 °C for 4 hours) 25 mm glass fiber (GF/F; Whatmann) filters with a nominal pore size 0.7 µm were placed in the filter holder for sampling. The filtered water was collected directly into pre-combusted 25 ml borosilicate glass vials. Samples were preserved by addition of 100 µl of 4M HCl to lower the pH of the solution to values less than 2. Vials were capped and following appropriate labelling, they were stored in the cold and dark for

subsequent analysis at GEOMAR. Analysis will be performed by high temperature combustion on a Shimadzu TOC V series analyser.

5.1.6. Inorganic Nutrients sampling

During Poseidon 527 cruise, CTD casts were sampled for inorganic nutrients (nitrate/nitrite, phosphate and silicic acid). Water samples were drawn directly from the Niskin bottles into acid washed (10% HCl) 60 ml Nalgene bottles. During sampling, latex gloves were worn in order to avoid contamination. Bottles and lids were rinsed at least 3 times with sampling water before filling. After appropriate labelling, the bottles were stored at -20 °C for later analysis. Samples will be analysed at GEOMAR using a Seal QuAAtro nutrient

5.1.7. pH optode (TU Graz) deployment on CTD frame

The TU Graz pH self-logger is an optical chemical sensors based on a fluorescent indicator dye immobilised on a polymer layer that changes its fluorescence properties based on seawater pH. An LED light excites the dye molecule in the membrane and the emitted light is guided by an optical fiber, captured and internally analysed by the device. The optode measures and records data autonomously with very low power consumption. As pH is strongly dependent on temperature, the device was calibrated at a controlled temperature of 22˚C. NaCl-Tris and NaCl-BisTris buffer solutions with an ionic strength of 0.7 µM and pH values of 8 and 7, respectively, were used for calibration. The optode was attached to the CTD frame (Figure 4) on several CTD casts.

Figure 4. pH optode attached on the CTD frame

5.2. Lab-on-chip Sensor technology

Martin Arundell & Allison Schaap (NOC, Southampton)

5.2.1. Nitrate + nitrite

The lab on chip nitrate+nitrite (Figure 5) is a submersible wet chemical analyser that performs colourimetric nitrate analysis using the Griess assay (N-(1-Naphthyl) ethylenediamine dihydrochloride) on a microfluidic chip. Nitrate is reduced to nitrite using a cadmium tube. A three-barrel syringe pump and multiple solenoid valves sample the local seawater and push the sample, analytical standards, reagents, and buffer through the chip. The system is controlled and data logged using an on-board electronics package. The sensor is housed in a pressure compensating housing rated to 6000 m depth.

The core of the device is a microfluidic chip, which contains the fluid handling and optical measurement systems. The chip contains three sequential measurement cells of different lengths; each cell is equipped with an LED and photodiodes for absorbance detection. The lengths and approximate ranges are:

Long cell (98 mm): 0.025 – 10 µM
Medium cell (10 mm): up to 100 µM
Short cell (1 mm): up to 1000 µM

For a standard calibrated sample, the sensor automatically performs the following four steps:

1. Blank measurement
2. Sample measurement
3. Standard measurement
4. Delay

In fast sampling mode, the sensor instead performs a blank and standard measurement, followed by multiple sample measurements.

All nitrate + nitrite sensors on this cruise are version 3.3c.

5.2.2. Phosphate

The phosphate sensor (Figure 5) uses a modified version of the molybdenum blue absorbance method, which has been optimised for microfluidic flow manifolds. The chemical method involves the reaction between phosphate and acidified molybdate (reagent 1) to form a heteropoly acid, which is reacted with a reducing agent (reagent 2) to produce a blue coloured compound. The intensity of the blue colour is proportional to the concentration of phosphate present in the solution analysed and is measured by absorbance spectrophotometry at 700 nm.

The phosphate sensor relies on hardware and methods similar to that of the nitrate sensor. The optical absorbance cells and their respective ranges are:

a 98 mm measurement cell (~0-20 µM PO4)
a 10 mm measurement cell (~5-100 µM PO4)
a 1 mm measurement cell (> 100 µM PO4).

Similar to the nitrate sensor, the phosphate sensor can either do a calibrated measurement in the order blank – sample – standard 1 – standard 2 or a fast sampling mode with the blank and standards first and several subsequent measurements.

The phosphate sensors on this cruise are version 3.3e, with the exception of serial number 45 (which was at MPI before the cruise) which is version 3.3d.

5.2.3. pH

The pH sensor is based around a micro-fluidic chip which includes a serpentine mixer channel, a built in optical detector that includes a 2 wavelength LED/photo diode system and a temperature sensor. The micro-fluidic design results in a low sample (550 µL per measurement) and indicator (3 µL per measurement) consumption. Sample and indicator are pumped through the system via a stepper motor and controlled using miniature solenoid valves. The seawater sample and indicator solutions are pumped at a flow rate of 34 µL/min in order to obtain an enhanced dispersion and homogenous mixing along the channel. One custom made, twin-wavelength LED is used to transmit light at two wavelengths (434 nm and 598 nm) close to the absorption maxima of the two m-CP indicator forms (HI- and I2-). Changes in light intensity are recorded by the photodiode as a slug of indicator passes through the optical path. Data from the tail-end of the absorption signal are used to calculate the pH of the sample taking into account the pH perturbation of the indicator. The pH sensors on this cruise are version 3.3b.

5.2.4. Total alkalinity (TA)

The total alkalinity (TA) sensor (Figure 5) mixes seawater with a prepared titrant containing acid, pH sensitive dye, and salt to match the salinity of the seawater. The CO_2 created by acidifying the seawater is driven across a gas-permeable membrane with NaOH on the other side. The optical absorbance of the resulting solution is measured at two wavelengths (the two absorption peaks of the dye) from which the pH can be obtained. This single-point titration, along with accurate knowledge of the ratio of sample to titrant and of the titrant acidity, can be used to calculate the alkalinity of the original sample. The temperature of the mixed sample is measured directly in the channel with two thermistors, one immediately before and one immediately after the optical absorption cell.

To monitor the performance of the system and to provide an accurate measurement of the titrant acidity, the sensor also has a bag of certified reference material (CRM) from the Dickson Lab at Scripps Oceanography Centre; this CRM is periodically measured in place of seawater.

The TA sensors on this cruise are version 3.3b and are still considered experimental prototypes; this is the first time they have been deployed in the open ocean or at a depth exceeding 1 m.

5.2.5. Dissolved Inorganic Carbon (DIC

The DIC sensor is based around a micro-fluidic chip where a seawater sample is acidified and converted to CO_2 via a tube in a tube membrane (Gas Exchange Unit) where it is transferred into a 7mM NaOH acceptor solution at a flow rate of 100

µL/min. A modular contactless conductivity detector measures the change in conductivity, which is related to the DIC concentration in the sample. Temperature data of the NaOH and conductivity detector is recorded via thermistors.

The DIC sensors on this cruise are the first version thereof and are experimental prototypes.

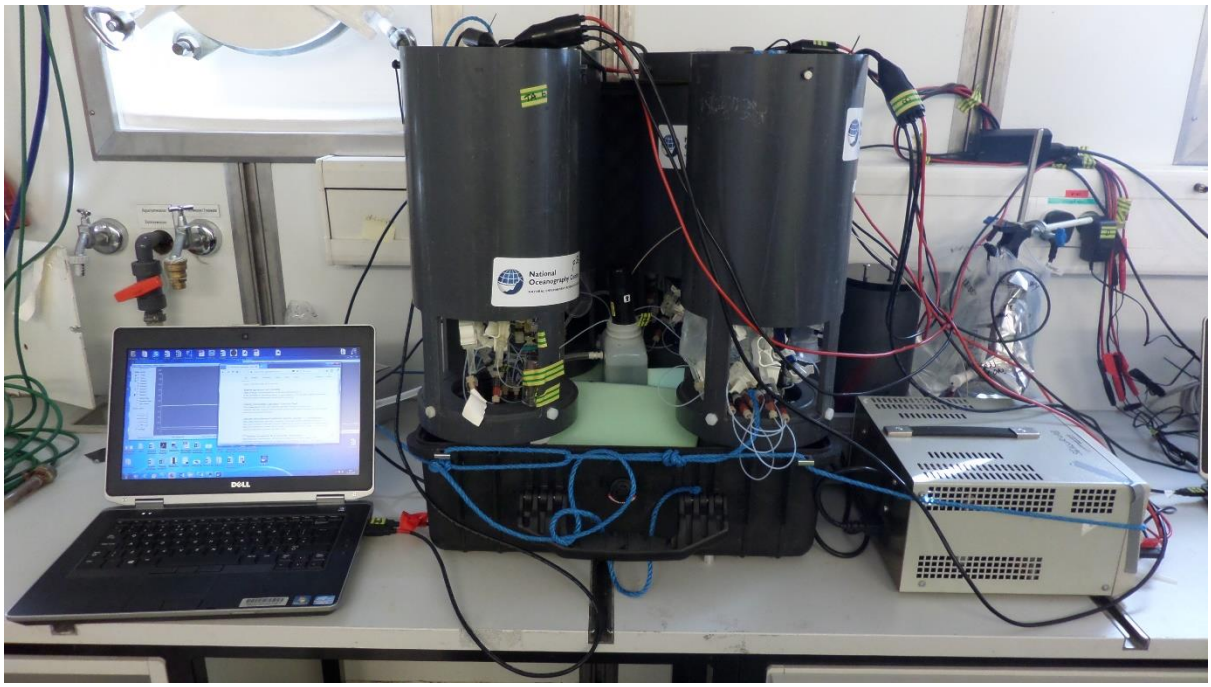


Figure 5. Set of NOC Lab-on-chip sensors connected to the ship underway water supply.

5.3. Lander deployments

5.3.1. Develogic Lander

Mario Esposito, (GEOMAR, Kiel)

The NOC lander is a submersible autonomous device manufactured by Develogic GmbH subsea systems. The lander was built according to our requirements in order to have continuous measurements of the environmental conditions of the Goldeneye area over a period of about 10 months. The system has an integrated acoustic modem HAM.Base VHF for communication and data logging, a satellite recovery beacon DW.SRB for transmission of GPS position via IRIDIUM satellite telemetry at surface, an integrated Sono.Vault II HF acoustic recorder, an integrated depth sensor Keller PA33Xc, a conductivity and temperature sensor Seabird SBE37-SM and a set of 6 ECB Popup Telemetry Units for data transmission via IRIDIUM satellite telemetry. The units contains an additional Port8 data logger fully integrated with a Seabird SeapHOx pH and O_2 sensor, 3 NOC Lab-on-Chip chemical sensors for inorganic nutrients (nitrate, phosphate) and pH and an Acoustic Doppler Current Profiler Nortek Signature 250. Three additional self-logging sensor devices for autonomous measurements of pH and pCO_2 were added. The loggers were provided by the Graz University of Technology.

The lander was deployed on October 16th 2017 from Poseidon 518 cruise and it was planned to be recovered, serviced and redeployed during the Poseidon 527 campaign. Daily visits to the lander site (57° 59.699' N, 00° 22.419' W) were undertaken during the Poseidon 527 in order to establish communication with the system. A surface hydro-acoustic modem with a 35 m rugged kevlar reinforced cable (Figure 6) was deployed on the port side of the ship in order to communicate with the lander in real-time.

Figure 6. Surface hydro-acoustic modem for Develogic lander communication

5.3.2. MPI Lander

Dirk Koopmans (MPI, Bremen)

Eddy covariance and gradient flux measurements

Our primary goal was to quantify dissolved inorganic carbon production in Goldeneye sediments under natural background conditions. To accomplish this, we determined benthic fluxes of dissolved oxygen and hydrogen ions using the eddy covariance technique (Berg et al., 2003). The flux of a solute, e.g., oxygen, is calculated from turbulent fluctuations in vertical water velocity and oxygen concentration as

$$\overline{J_{O2}} = \overline{v_z{}' O_2{}'}$$

where J_{O2} is the benthic oxygen flux, $v_z{}'$ is an instantaneous fluctuation in vertical velocity and $O_2{}'$ is the instantaneous fluctuation in oxygen concentration. Benthic inorganic carbon production can be quantified from these measurements by assuming a respiratory quotient of O_2:CO_2. This estimate can be constrained with eddy covariance measurements of hydrogen ion production. As inorganic carbon is produced, the pH of seawater is reduced. Thus, by quantifying the vertical flux of

hydrogen ions, one can also quantify benthic CO_2 production (Long et al., 2015). The carbonate chemistry must be determined for these calculations.

A secondary goal was to quantify gradients in dissolved oxygen and pH in the benthic boundary layer. The flux of a solute, e.g., oxygen, through water can be represented as a diffusive process

$$J_{O2} = D_T \frac{\Delta O_2}{\Delta z}$$

where D_T is the turbulent diffusivity (m^2 s^{-1}), and $\frac{\Delta O_2}{\Delta z}$ is the change in dissolved oxygen with distance above the bed. If oxygen flux is quantified by the eddy covariance technique, and the concentration gradient of dissolved oxygen is known, then D_T can be calculated. Once D_T is known, it can be used to calculate fluxes of other solutes for which the gradient can be resolved (Holtappels, et al., 2011). Dissolved inorganic carbon sensors have been developed by the National Oceanography Centre. During the release experiment, the gradient flux technique may allow us to quantify dissolved inorganic carbon release at the seafloor. Nevertheless, under natural background conditions, resolution of a gradient in dissolved oxygen or pH at the site will be a considerable challenge. Differences in dissolved oxygen are expected to be on the order of 50 nanomoles per liter. Differences in pH are expected to be on the order of 0.0001 pH unit.

Eddy covariance chemical sensors

Eddy covariance oxygen concentrations were determined with a 430 μm diameter optode minisensor (PyroScience Gmbh, Figure 7A). The light source and fluorescence detection were provided by an OEM module with a connector for underwater light transmission. Oxygen quenches optode fluorescence. Oxygen concentrations are determined by the phase shift in fluorescence.

Eddy covariance pH was determined with an ion sensitive field-effect transistor (ISFET; Microsens CH, Figure 7B). ISFETS have a high precision and fast response time, making them good candidates for eddy covariance applications. One drawback of these sensors is that they are light-sensitive. To exclude light, the sensor was mounted inside of an 8 mm-diameter opaque housing. Water was pumped from the measurement volume of the velocimeter through a thin intake tube and past the sensor and an adjacent reference electrode. To improve the reproducibility of pH fluxes, the ISFET signal was amplified, linearized, and also compensated for temperature changes.

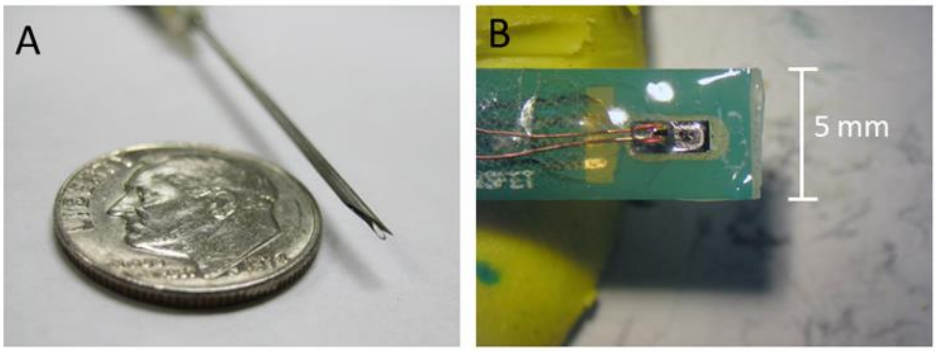


Figure 7. *(A)* Oxygen minisensor and (B) pH-ISFET with added thermistor. The high precision and fast response times of these sensors makes them suitable for eddy covariance measurements of the turbulent fluctuations of solutes in the benthic boundary layer

Eddy covariance logger

We previously measured benthic oxygen and hydrogen ion fluxes at the Goldeneye site in September of 2017 (POS 518-1). On POS 527 we aimed to quantify these fluxes over multiple hours to improve the precision of our measurements. To acquire these measurements an eddy covariance logger was developed that is capable of logging high-frequency oxygen and pH time series from multiple sensors. The primary advantage of the logger is that it allows the user to include two eddy covariance oxygen sensors and two eddy covariance pH sensors (Figure 8). High frequency measurements of oxygen and pH are susceptible to fouling by particles. With duplicate sensors, we aimed for replication that would increase the duration and precision of our eddy covariance measurements.

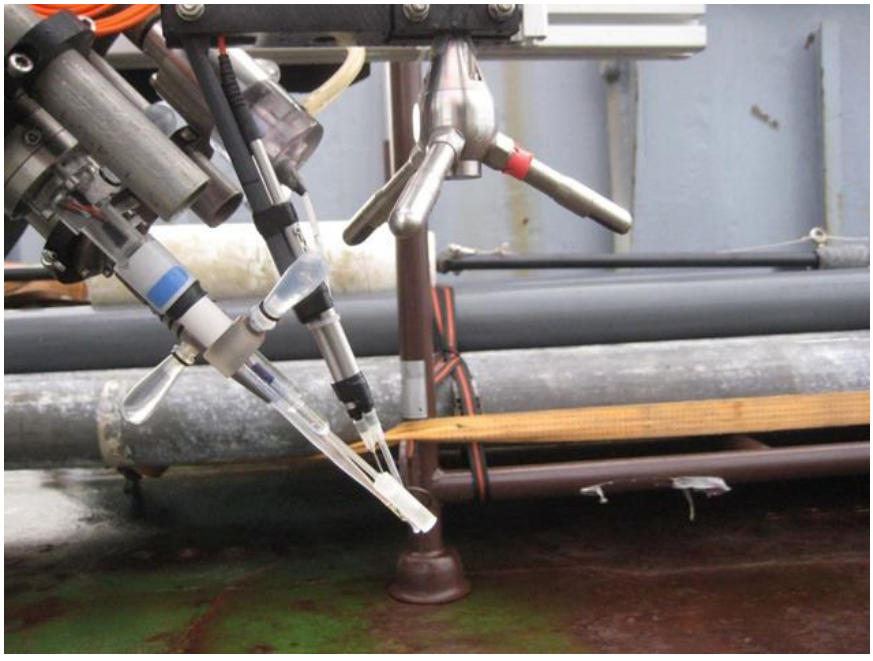


Figure 8. Eddy covariance oxygen and pH sensors positioned just outside the measuring volume of the acoustic Doppler

Gradient profiler

To determine concentration gradients of dissolved oxygen and pH in the benthic boundary layer, a pump-driven sampler was developed that collects water from heights of 0.1 m and 1.1 m above the sediment surface. Water is pumped from each of these heights past a suite of oxygen and pH sensors. Both the eddy covariance and gradient profiling instruments were mounted to the same lander (Figure 9).

Figure 9. The gradient profiler developed to determine dissolved oxygen and pH at 0.1 m and 1.1 m above the seafloor in the benthic boundary layer.

5.4. Macrofauna community structure and biodiversity

Saskia Ruhl and Thomas Mesher (Plymouth Marine Laboratory, Plymouth, UK)

5.4.1. Sample processing

Sampling of sediments for macrofauna community structure analyses were carried out by using a 50 x 50 cm box corer with a sampling surface area of 0.25 m^2 (Figure 10).

Figure 10. Box corer standing on deck of the Poseidon

The box corer was operated by the side winch of the Poseidon and it was lowered into the sediment with a rope speed of 0.8 m/s in all deployments, resulting in a controlled penetration into the generally soft surface sediment. At each station, after the retrieved box corer was on deck, any overlying water was drained off to reveal the sediment surface. As cores varied in depth and slope, each core was sub-sampled using a 30 cm diameter sub-corer to 30 cm depth (Figure 11).

Figure 11. Sub-coring of box core after water is drained. Cracks in the sediment surface are a product of the force of the box-coring

If the sediment available from the box core was less than 30 cm deep, the height difference was noted and will be taken into account during the subsequent data evaluation and analysis.

The 30 cm diameter core was then split into a series of buckets to facilitate processing. Macrofauna was suspended using sea water in 3 to 5 cycles of elutriation and sieved over a 1 mm mesh sieve (Figure 12).

Figure 12. Sieving of elutriated macrofauna samples

Residues were placed in pots and preserved with 10 % buffered formaldehyde solution. Upon return to Plymouth Marine Laboratory, all macrofauna will be extracted from the residue, identified and weighed.

5.5. Particle Size Analysis

Saskia Ruhl and Thomas Mesher (Plymouth Marine Laboratory, Plymouth, UK)

5.5.1. Sample processing

Sampling of sediments for particle size analyses were carried out by using a 50 x 50 cm box corer with a sampling surface area of 0.25 m^2 (Figure 10). Particle Size Analysis (PSA) sampling was undertaken in order to characterize the sediment type at the exact locations at which macrofauna samples were being taken.

At each of the macrofauna stations, the box core was sub-sampled for PSA after being drained from overlying water as described for macrofauna above. Three 50 ml syringe cores were taken from different areas in the box core and sub-divided into depths of 0-2 cm, 2-5 cm and 5-10 cm (Figure 13). The repetitions of each depth group were pooled in pots and sealed, then placed in a – 20 °C freezer. PSA samples will be returned to PML and analysed using a Beckman Coulter laser diffraction particle size analyser (LS 230).

Figure 13. Subsampling of box corer for particle size analysis (PSA).

5.6. Sediment geochemistry

Anna Lichtschlag, (NOC Southampton)

5.6.1. Box cores sub-sampling

Immediately after the box core arrived on deck of the Poseidon a subsample was taken with a plastic liner (diameter 8 cm; length ca 40 cm (Figure 14), stoppered at both ends and transported to the lab. The maximal length of the sediment in the core was about 25 cm. The upper 1-2 cm of the surface sediments were subsampled for organic carbon concentration analyses with a cut-off syringe and samples were immediately frozen at -20°C. In the wet lab, the porewater was extracted with Rhizons (Rhizon CSS: length 5 cm, pore diameter 0.2 µm; Rhizosphere Research Products, Wageningen, Netherland) that were inserted into the core liners through pre-drilled holes and connected to a syringe on which a small underpressure was applied. Sampling intervals were in 1 cm in the upper 10 cm and 2 cm below.

Aliquots of pore water were taken 1) for total alkalinity (2 mL), poisoned with $HgCL_2$ (5 µL) to prevent further microbial turnover and 2) for nutrients 0.5-2 mL, frozen at -20°C. Total alkalinity samples will be analysed at the National Oceanography Centre in Southampton via Gran titration, anion samples with an Ion Chromatograph and nutrients (PO_4, Si, NH_4, NO_x) will be analysed with an autoanalyzer after the method described in Grasshoff, et al, (1999) Some porewater samples were analysed on board for PO_4 and NO_x concentrations with the Lab-on-Chip sensors from NOC.

At the Develogic lander station and the pockmark station object 103 we also took 1) subsamples (ca 0.5 mL) for cations analyses which were acidified with 10 µL concentrated nitric acid (Suprapure), and subsamples for anion analyses (0.5 mL) which were stored in 0.5 mL ZnAc at 4°C. Cation samples will be analysed by Inductively Coupled Plasma- Optical Emission Spectrometry (ICP-OES) and anion samples will be analysed with an Ion Chromatograph. At both stations an additional

sediment core was cut in 1 cm in the upper 10 cm and 2 cm below and samples were frozen for organic and inorganic carbon analyses and stored at 4° for grain size and porosity analyses.

Figure 14. Pore water extraction with Rhizons in subsample of box core

5.6.2. Gravity cores

Sampling of sediments for geological and geochemical analysis were carried out with a gravity corer (GC) equipped with a weight of 1150 kg and a 6-m long core barrel (Figure 15). The GC was operated by the large movebar and it was lowered into the sediment with a rope speed of 0.8 m/s in all deployments, resulting in only minimal core overpenetration in the generally silty-to-clayey surface sediments. After the retrieved GC was on deck, the inner plastic liner (inner diameter of 110 mm) was pulled out and immediately cut in 1 m subsections, capped and labelled (Figure 15). One core of each site was chosen for porewater analyses and pore water was extracted with Rhizons (see above) at 20 cm intervals through holes drilled through the liners. Subsamples were taken for total alkalinity, nutrients, cations and anions. In addition, 4.5 mL pore water samples were stored in Exetainers and poisoned with $HgCl_2$ for oxygen and carbon isotopic analyses (Anita Flohr, University of Southampton). The remaining cores were stored and will be used for experiments at NOC Southampton; in addition, the solid phase geochemistry of the core used for pore water extraction will be determined with the XRF ITRAX cores scanner in the British Ocean Sediment Core Research Facility (BOSCORF) and the core will be subsampled for grain size analyses.

Figure 15. Left: Gravity core deployment; Right: cutting of the gravity core in 1 m sections

5.7. Microbial activity in sediments

Dirk de Beer (MPI, Bremen)

The oxygen rates were determined by microsensor measurements on retrieved cores. The sediments were collected using a box-corer and subsampled by clean subcores of about 25 cm. Microprofiles were determined at close to in situ temperature (8-9^{o}C), and from these the interfacial fluxes and volumetric rates were calculated. Sulfate reduction rates will be measured on sediment samples from these subcores that were taken at 0, 1, 2, 4, 8 and 16 cm depths. The samples are stored under nitrogen at 4^{o}C. Sulfate reduction rates will be measured at the MPI using the ^{35}S method. In short, $^{35}SO_4^{-2}$ will be injected, the sediments will then be left for 12 hours during which some of the label will be converted to sulfide by sulfate reduction. Then the amount of radioactive sulfide is determined and used as a measure for sulfate reduction rates.

Also samples were taken from gravity cores taken at the 3 sites. Samples were taken at 0, 25, 50, 75, 100, 125, 150, 200, 300, and 400 cm depths, stored under nitrogen at 4^{o}C.

5.8. Multibeam survey activities

Catherine Wardell (NOC, Southampton), Dirk de Beer (MPI, Bremen) and Anna Lichtschlag (NOC, Southampton)

Data acquisition

The RV Poseidon has a hull-mounted Wärtsilä ELAC Seabeam 3050 MKII multibeam system operating at 50kHz. During POS527 this system was used to acquire bathymetric data at 100-120 m water depth. Hydrostar control software was used to adjust the system settings and record .ssv and .xse files. The multi-ping mode was used, whereby two swathes are created quasi simultaneously, increasing the ping density on the seafloor. This survey was run at a ship's speed of 6 kt. The system has a maximum of 382 beams per ping and the equiangular mode was used, giving equally spaced angles between the beams. To begin, the maximum beam angle (140^{o}) was used to obtain maximum coverage. However, upon viewing the initial data, this was decreased to 120^{o} as the outermost data showed a low signal/noise ratio and a consistent depth offset from the main body of data. The source level and pulse length were set to auto for the system to determine the best settings for the water depth. Depth gates were applied at a centre depth of 120 m with a width of 30 m to prevent the system losing track of the seabed. Hypack/Hysweep survey was used for online data and coverage display and to record .RAW and .HSX data files.

The Coda Octopus GPS antennas and motion sensor sent the position, heading and motion data of the ship to the multibeam system. Data were recorded in WGS84. A hull-mounted sound velocity probe sent continuous sound velocity data to the multibeam and vertical sound velocity profiles were derived from CTD data and input into the Hysweep survey.

The bathymetric data were processed, gridded and displayed in CARIS HIPS and SIPS (version 9.1.8) on a remote laptop.

5.9. Picarro Atmospheric Gas Measurements

Tim Weiß (GEOMAR, Kiel)

The atmospheric CO_2 and CH4 concentrations were monitored during the cruise using a cavity ring down spectrometer (Picarro G2301-f) and GEOMARs 'Atmospheric Intake System' (AIS). The AIS pumps air from different air intakes into integrator volumes via aluminium tubing and then towards the Picarro analyzer. Three air intakes were installed on different elevation levels of RV POSEIDON to allow the calculation of concentration gradients for later sea-air gas flux assessments. Other parameters needed for such flux calculations, i.e. wind speed and water temperature were logged via the WERUM DVS data system throughout the cruise.

The long tubing between the AIS in the wet lab and the different air intakes caused time offsets between the air sampling and the actual gas measurement at the Picarro. Therefore each flow rate was adjusted according to the delay caused by the

tubing. These delays where measured, by timing the arrival of a CO_2 peak generated by the breath of a second person at each air-intake.

The Picarro measured the different air intake sequentially one after each other. However, after the initial delay measurement, the flow rates were tuned to adjust the delay of the different air intakes to make sure that the sequentially measured gas samples of the different air intakes originate from the same time point. Each intake was measured for one minute.

Air Intake No	Position	Elevation	Delay	Calc. flow rate
1	Bow	7.25 m	65 s @ 2.389 l/min	2.389 l/min
2	Top Deck	10 m	103s @2.13 l/min	1.7551 l/min
3	Mast	13.4 m	89s @ 2.323 l/min	1.176 l/min

The Picarro analyzer software was running on the Picarro hardware. The CH_4 and CO_2 concentrations could be monitored in real time, and were logged for post-processing. Additionally, OFOP (Ocean Floor Observation Protocol) software was running on a second computer. It was used to plot the gas concentrations onto a georeferenced map in real time.

6. Preliminary Results

6.1. Water column chemistry

Mario Esposito, Dominik Jasinski, Eric Achterberg (GEOMAR, Kiel)

During Poseidon 527 cruise, a total of 19 CTD casts (Table 1) was conducted in the Golden area and surroundings (Figure 16) for hydrographic data recording.

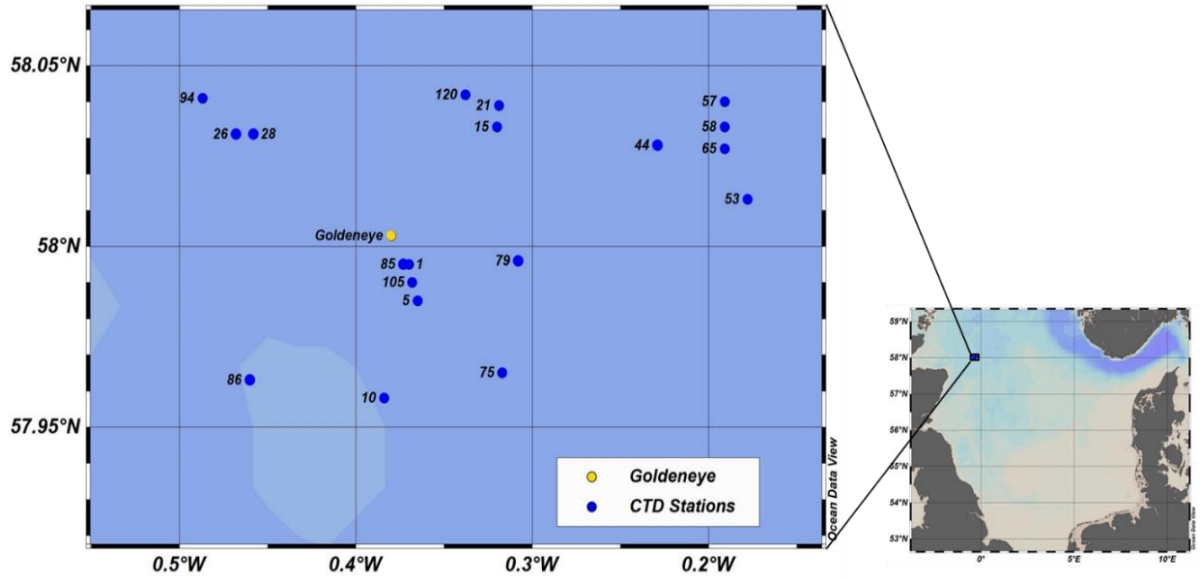
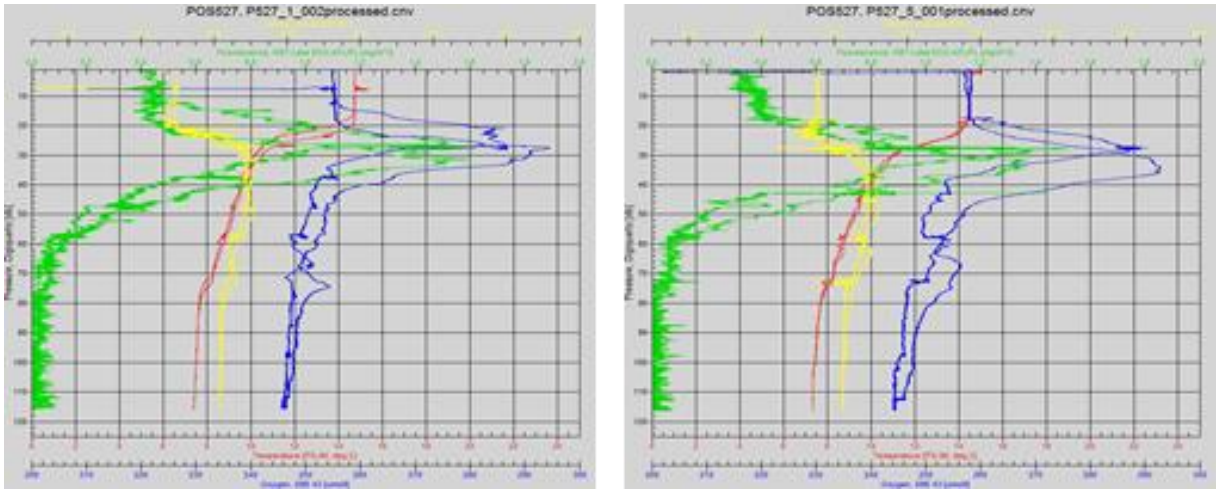
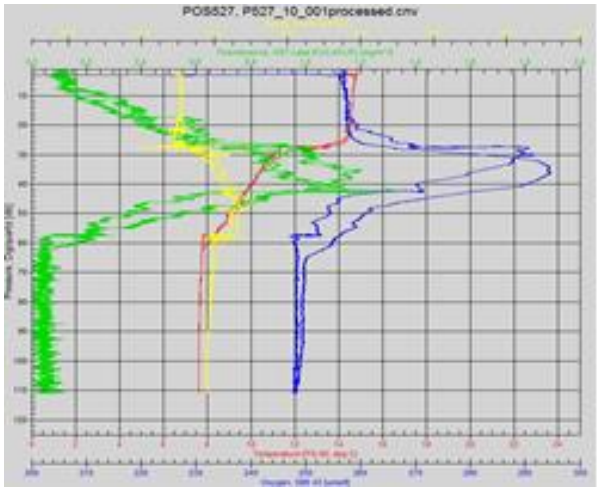


Figure 16. CTD stations during Poseidon 527 cruise

Recorded temperature, salinity, oxygen concentration and fluorescence from the 19 CTD casts are plotted versus water depth in Figure 17.

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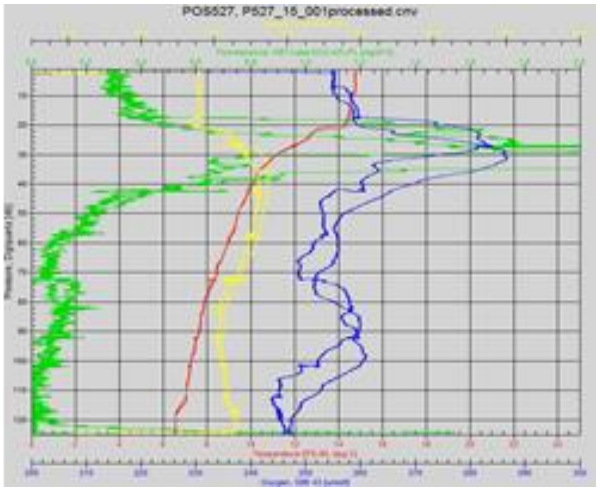
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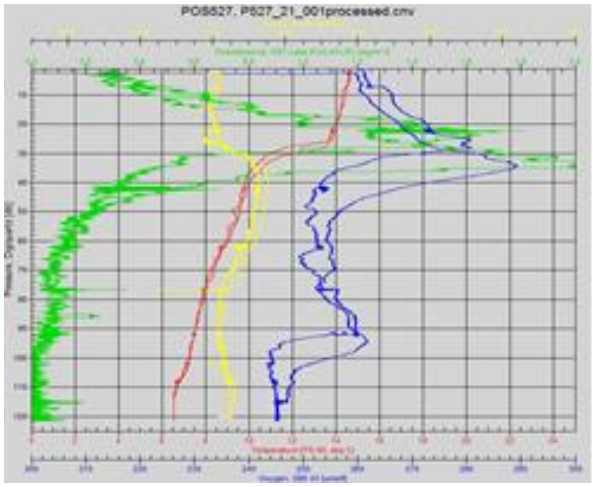
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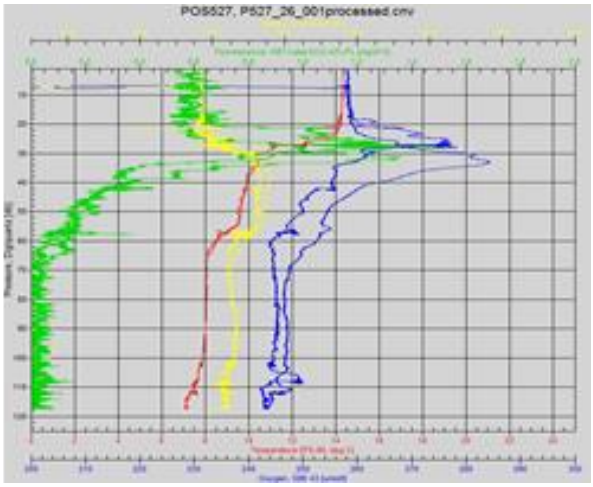
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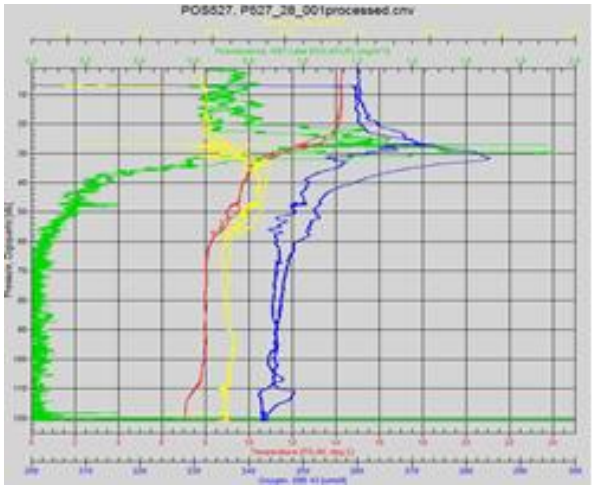
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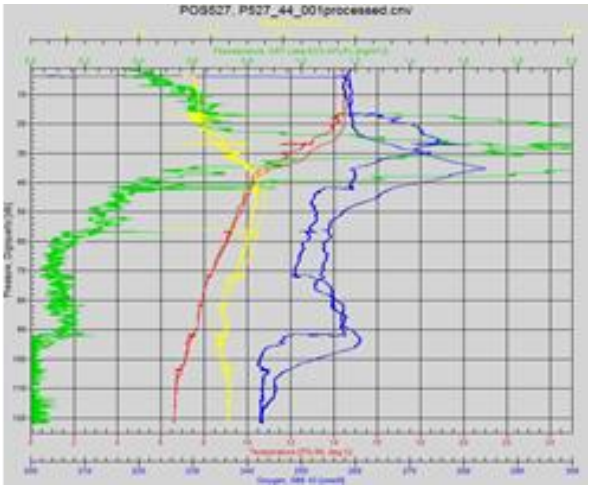
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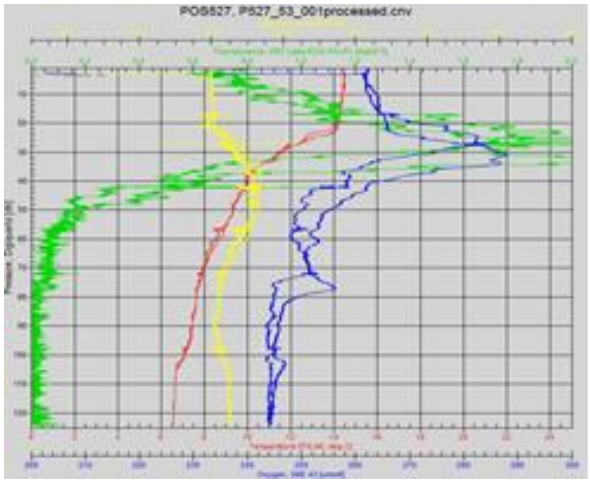
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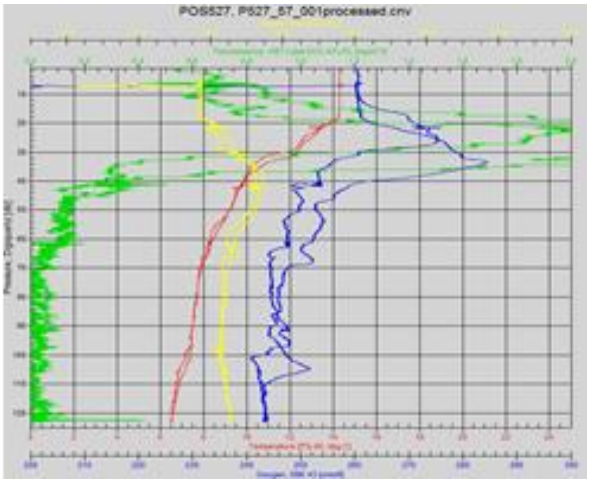
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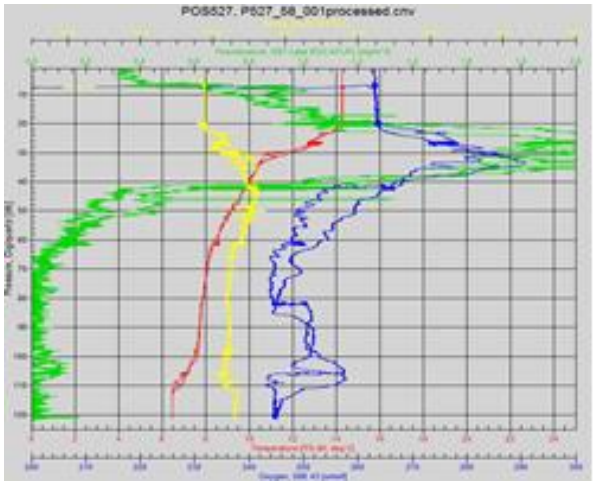
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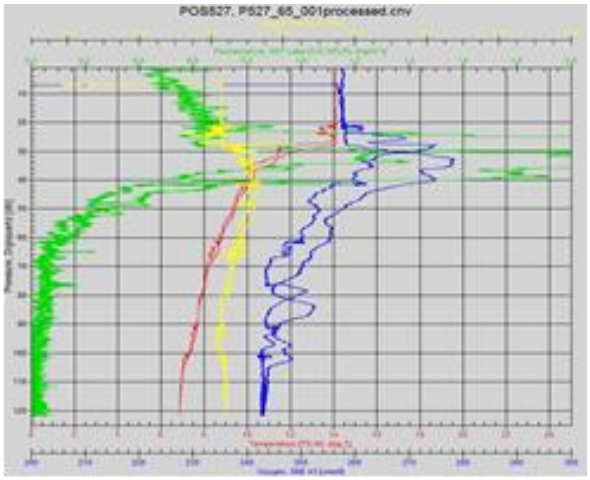
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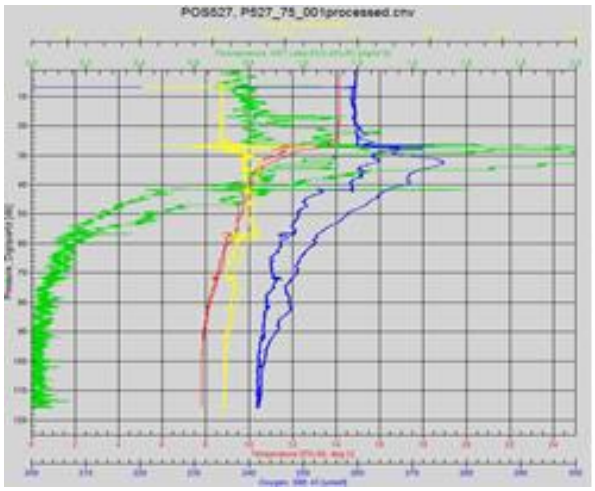
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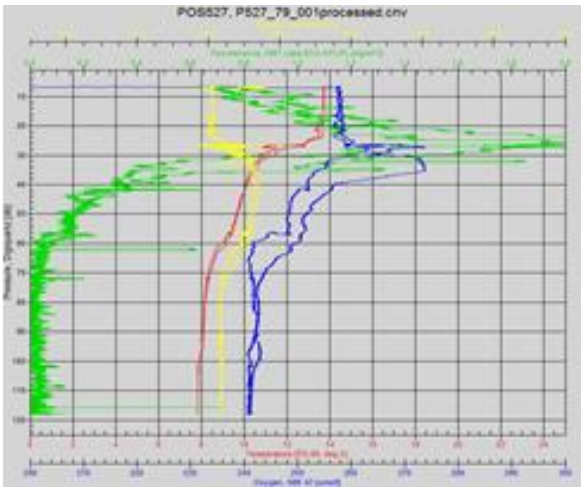
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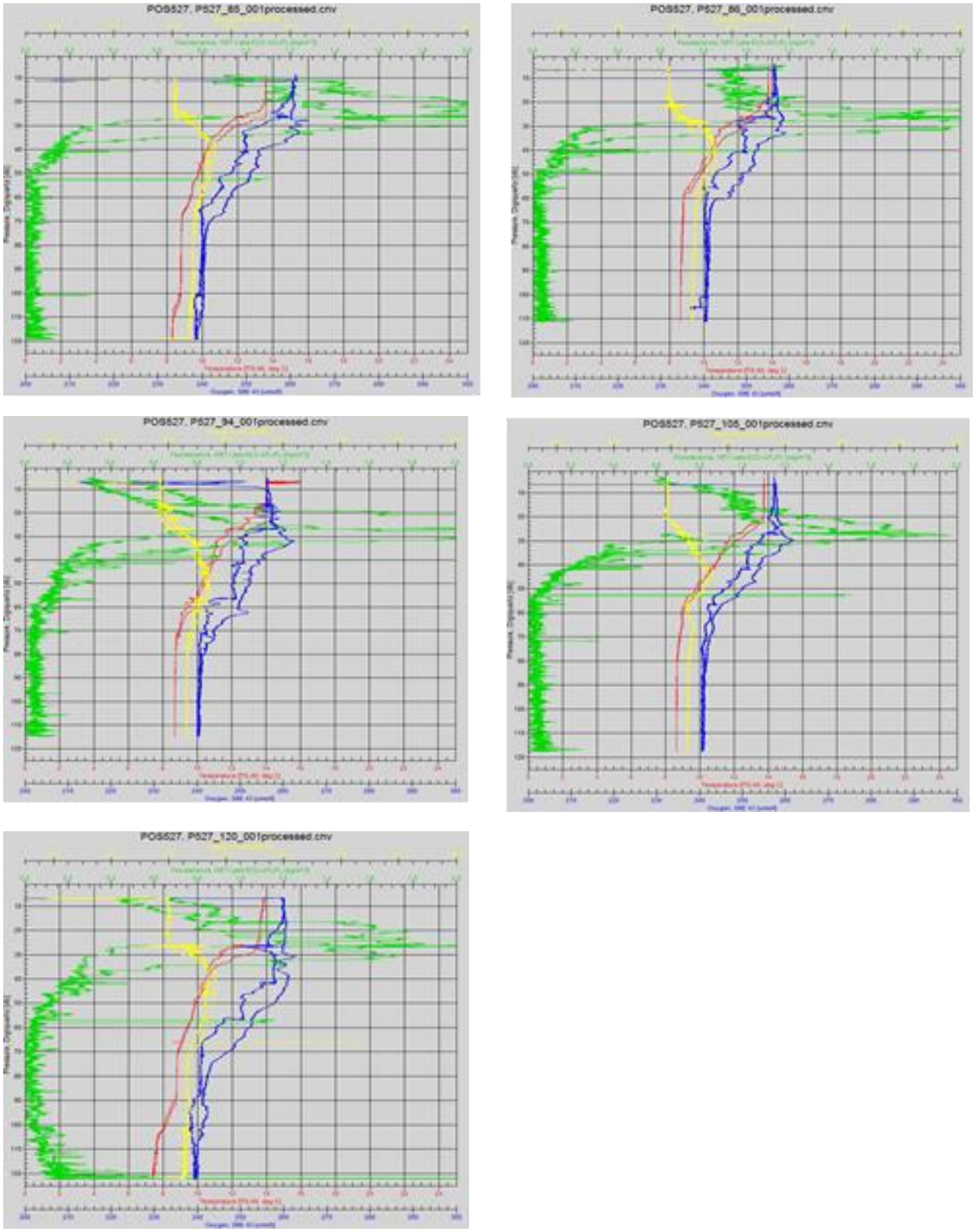

Figure 17. Vertical profiles of temperature (red), salinity (yellow), oxygen (blue) and fluorescence (green) for 19 CTD casts performed during Poseidon 527 cruise.

Depth profiles of the sampled stations indicate the water column was vertically stratified in both temperature and salinity with a strong thermo- and halocline at an approximate depth of 30 m. The water temperature of the surface layer ranged between 13.5 and 14.7 °C while salinity was between 34.85 and 34.95. Below the

thermocline, water temperatures were between 7.5 and 9.5 °C. The water mass of the interior layer was characterised by a higher salinity of about 35.10. Interestingly, the near bottom water mass of the stations north-east of the Goldeneye platform displayed slightly increased salinity and reduced temperatures down to 6.5 °C suggesting a possible inflow from the north of North Atlantic water. Vertical oxygen concentration profiles showed in general a similar trend as the fluorescence (chl a). Surface O_2 concentrations were about 270 µmol/l and in several occasions oversaturation peaks with concentrations up to 295 µmol/l were observed just below the thermocline. Bottom water concentrations were constant around 250 µmol/l.

The stainless steel CTD frame with 12 Niskin bottles was used for sampling of the water column. In order to calibrate the oxygen sensor on the CTD frame, duplicate discrete samples for dissolved oxygen were collected from a total of 18 CTD casts (Table 1) at a minimum of 3 water depths selected using the real-time data profiles obtained from the oxygen sensor (SeaBird Scientific SBE 43) attached on the CTD frame.

The standard deviation of duplicate samples was always better than 0.5 µmol/l. Winkler oxygen values were used to correct for the oxygen sensor offset (Figure 18).

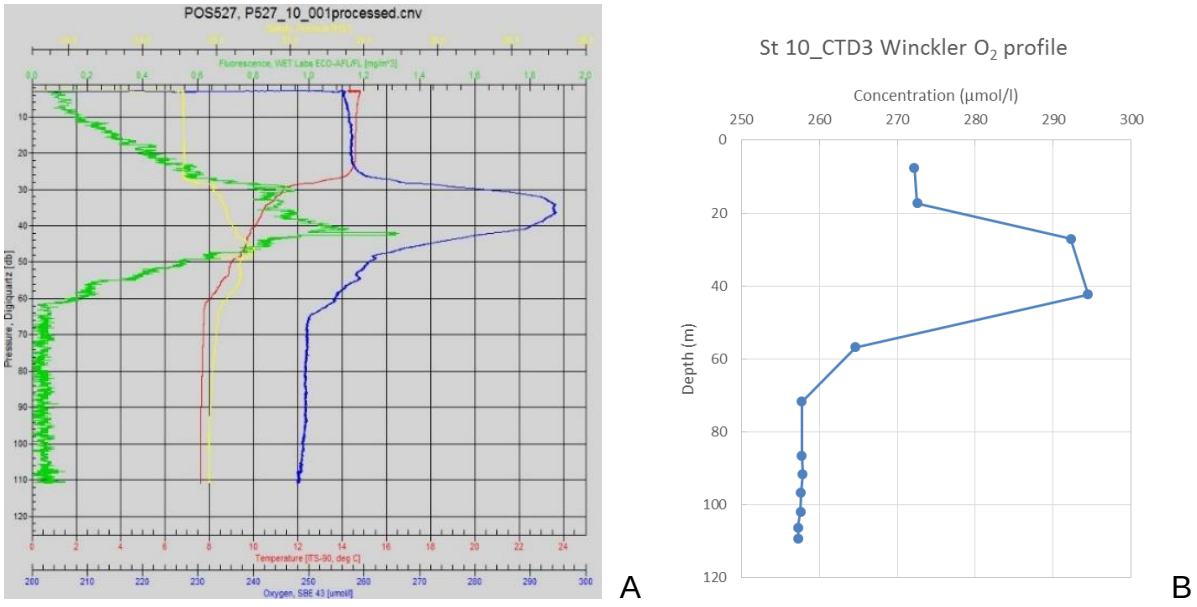

Figure 18. CTD depth profile (A) and oxygen Winkler profile (B) of CTD cast 3, station 10.

A number of 10 or 12 Niskin bottles were fired at selected water depths to collect TA/DIC, DOC/DON and nutrient samples from 18 and 19 CTD casts, respectively (Table 1).

POSEIDON 527 CTD casts									
						Parameter sampled			
Station Nr	Date	CTD Nr	Time (UTC)	Latitude (N)	Longitude (W)	O_2	TA / DIC	DOC / DON	Nut
1	18/08/2018	1	11:14	57° 59,670	0°22,205	x	x	x	x
5	19/08/2018	2	09:58	57° 59,099	0°21,88	x	x	x	x
10	19/08/2018	3	14:01	57°57,506	0°23,032	x	x	x	x
15	20/08/2018	4	07:08	58°01,950	0°19,215	x	x	x	x
21	20/08/2018	5	13:30	58°02,319	0°19,141	x	x	x	x
26	22/08/2018	6	06:18	58°01,859	0°28,073	x	x	x	x
28	22/08/2018	7	08:06	58°01,859	0°27,505		x	x	x
44	23/08/2018	8	08:44	58°01,686	0°13,723	x	x	x	x
53	23/08/2018	9	13:48	58°00,806	0°10,684	x	x	x	x
57	24/08/2018	10	09:09	58°02,042	0°11,486	x	x	x	x
58	24/08/2018	11	12:12	58°01,998	0°11,461				x
65	26/08/2018	12	09:59	58°01,646	0°11,472	x	x	x	x
75	26/08/2018	13	14:49	57°57,899	0°18,991	x	x	x	x
79	28/08/2018	14	08:16	57°59,745	0°18,451	x	x	x	x
85	28/08/2018	15	14:14	57°59,688	0°22,381	x	x	x	x
86	29/08/2018	16	06:01	57°57.804	0°27,608	x	x	x	x
94	29/08/2018	17	10:47	58°02,445	0°29,227	x	x	x	x
105	30/08/2018	18	06:48	57°59,374	0°22,089	x	x	x	x
120	30/08/2018	19	14:46	58°02,005	0°20,251	x	x	x	x

Table 1. List of CTD casts conducted during the Poseidon 527 cruise

6.1.1. pH optode

The deployment of the pH optode on Poseidon 527 was a first test to assess the logger capability to record data during relatively fast CTD vertical profiles. Several consecutive deployments were performed in order to check for potential drifts or photo-bleaching of the pH indicator dye. The device was set to sample every 2 seconds to assess the sensor response time. Preliminary pH results from CTD 11 deployment are plotted against temperature (Figure 19). The graph indicates a decrease in pH with depth, with enhanced pH values in the surface waters due to CO_2 uptake by phytoplankton, and an increase with depth below the pycnocline due to remineralisation of sinking organic matter.

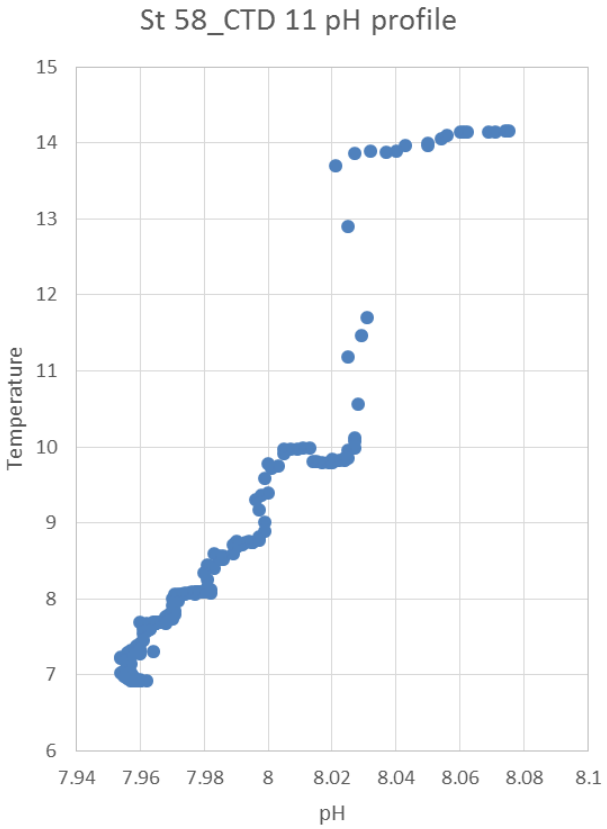

Figure 19. Preliminary pH values from pH optode deployment on the CTD frame

6.2. Lab-on-chip deployments and measurements performed

Martin Arundell & Allison Schaap (NOC, Southampton)

6.2.1. LOC on MPI lander

LOC sensors were deployed on the benthic boundary layer lander from the Max-Plank-Institute on four occasions (Table 2).

Start date	Station	Duration	Sensors deployed
23/08/2018	54	13 hrs	pH20
26/08/2018	75	40 hrs	pH33, DIC1, TA6, P45
29/08/2018	89	26 hrs	pH34, DIC1, TA6, P45
30/08/2018	120	15 hrs	pH34, DIC1, TA6, P45

Table 2. LOC deployments on MPI lander

The sensors were powered up while on deck and had a programmed delay before sampling began, typically 30-60 minutes. The sensors were held with four brackets in the middle of the lander, with their inlet tubes thus approximately 80 cm above the seafloor (Figure 20). Figure 21 shows sample data from the pH sensor during the last deployment.

Figure 20. Four LOC sensors mounted on the MPI benthic boundary lander.

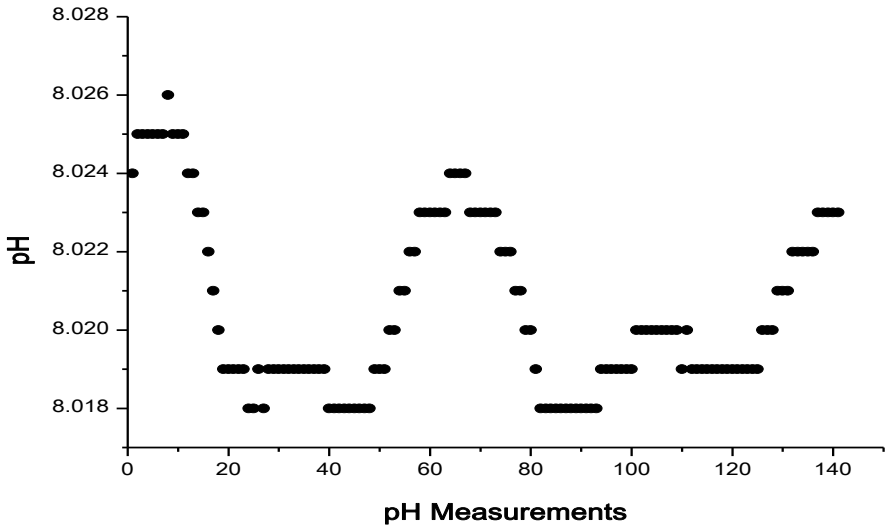

Figure 21. pH data from the last deployment of the MPI lander. Data was collected at approximately 10 minute per sample.

6.2.2. Underway system

The ship's underway system was used to periodically test the sensors during the voyage. A continuous sampling run with all five chemistries of sensor was done during the return trip back to Kiel, with bottle sampling for carbonate and nutrient analysis in parallel. The sensors were turned on while the ship was in the North Sea, on the evening of the 31st August, and left on until Sunday afternoon while transiting Kattegat. We took one carbonate and one nutrient bottle sample per two hours

starting at 07:00 UTC on the 1st Sept. while southwest of Norway and ending at 13:00 UTC on the 2nd of September.

6.2.3. CTD casts

One reagent housing had a Niskin bottle clip attached to it, allowing a sensor to be deployed on the CTD frame for water column measurements (Figure 22). TA6 had two successful runs on the CTD casts, one at station 28 (6 samples measured) and one at station 57 (4 samples measured). Phosphate (P58) was also deployed once on the CTD (6 samples, on station starting at 12:17 UTC on 24/08/2018) but due to an issue with the reagents the data may not be usable.

Figure 22. Alkalinity sensor (left) mounted on the CTD frame.

6.2.4. Grab samples from pore and benthic water

Sediment samples >20 cm deep were collected from the box corer and the pore water sampled by Anna Lichtschlag (NOC) using Rhizons; subsamples of some of the pore water were collected in vials and analysed directly on the LOC sensors for

nitrate+nitrite, phosphate, and, some cases, total alkalinity. Four stations were sampled (stations 2, 7, 24, and 29) in this fashion with subsamples from between 7 and 11 depths into the sediment for nitrate/phosphate and at 1-3 depths for TA. Sample data from one core is shown in Figure 23.

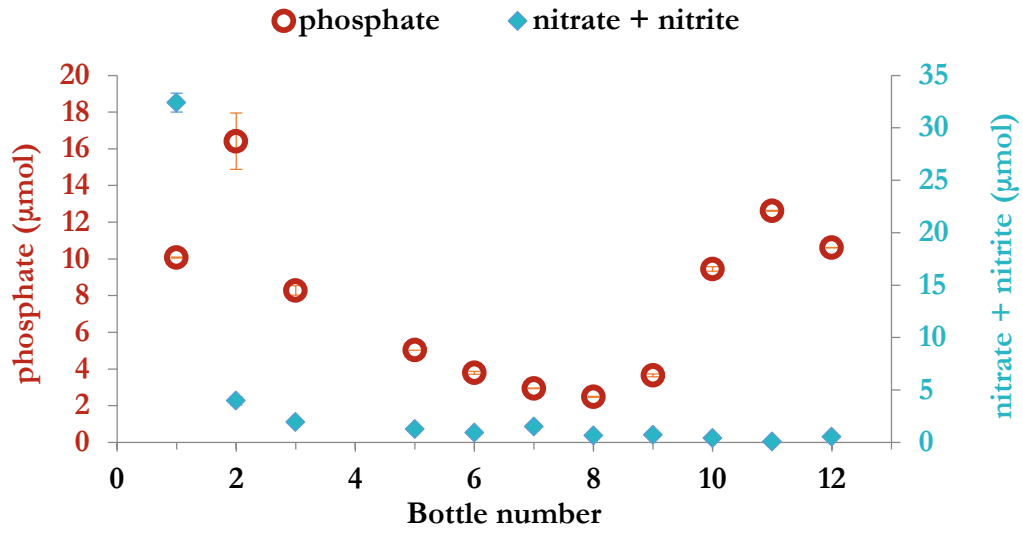

Figure 23. Preliminary analysis of the pore water samples collected from box coring at station 2; the bottle numbers are roughly the same as the depth of the sample in cm.

6.2.5. Direct sampling from sediment cores

As a proof-of-concept test, three sediment cores were directly sampled for nitrate and/or phosphate by connecting the sample inlet of the sensors directly to Rhizons inserted into the sediment cores. This analysis was performed on samples from stations 72 (P only), 83 (N&P, Figure 24), and 91 (N&P).

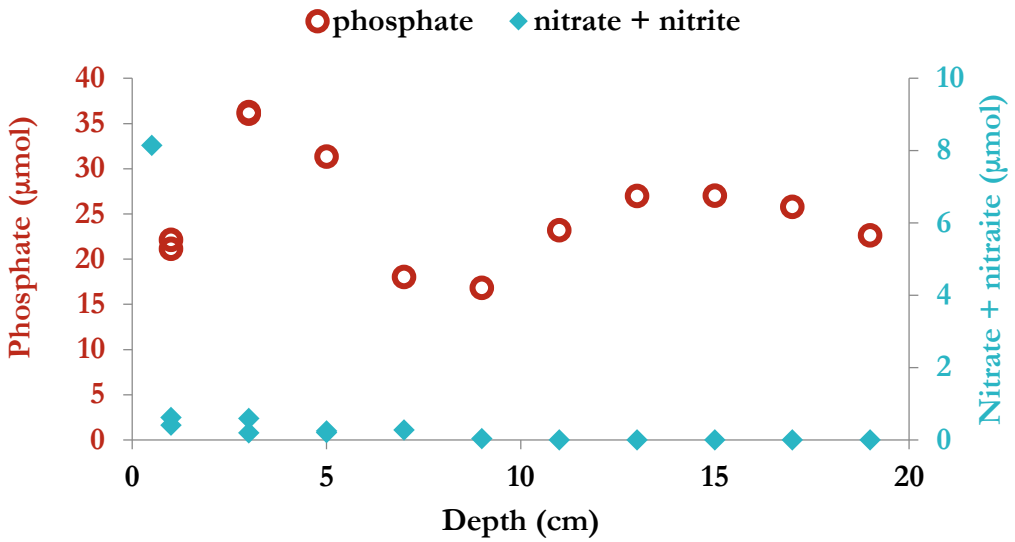

Figure 24. Preliminary data of nitrate+nitrite and phosphate concentrations in µM at various depths in a sediment core sample from station 83.

6.3. Lander measurements

6.3.1. Develogic Lander

Mario Esposito (GEOMAR, Kiel)

On the Poseidon 527 cruise, daily attempts to communicate with the NOC lander were undertaken. The first approach was to position the ship directly on the location where the lander was deployed to try to communicate via hydrophone. As no successful communication was established, we tried to interrogate the lander while the ship was slowly sailing, covering an area surrounding the lander position of about 1 km^2. This approach was not successful either. Following hydrophone deployments, on several occasions, specific multibeam surveys were conducted in order to locate the lander. Unfortunately, the multibeam resolution was not adequate to identify the lander. Goldeneye is categorized as a limited fishing activity area, however, on several occasions during the Poseidon 527 we observed fishing vessels in the vicinity. The most plausible reason for the failed localisation and recovery of the lander is that the system was possibly removed and/or turned over by fishing activities (trawling).

During the cruise, on August 20th we were informed that a data pod (popup) from the baseline lander was found in Vengsøy, a small island on the north of Norway (Figure 25). Three popups were programmed to be released from the lander but they resulted to be not suitable for data transmission while at sea. A yellow protection cap installed on top of the antenna glass dome is believed to be the cause of failed data transmission as the plastic absorbs seawater and attenuates or almost completely shields the signal from the antenna.

Figure 25. Develogic lander data pod popup found north of Norway.

6.3.2. MPI lander

Dirk Koopmans (MPI, Bremen)

During Poseidon 527 cruise, a total of 7 deployments of the benthic boundary layer lander from MPI (Table 3) were performed in order to get eddy covariance and gradient flux measurements.

Date	Time (UTC)	Station	Latitude	Longitude	Duration (h)	Depth (m)	Measurements
19 Aug.	07:55	3	57° 59.3863	0° 19.0955	30.0	131	logger failure
22 Aug.	07:08	27	58° 1.8837	0° 28.0705	23.1	126	logger failure
23 Aug.	06:39	55	58° 1.90375	0° 11.5160	15.2	129	Velocity, O2, pH
24 Aug.	14:09	59	58° 1.90375	0° 11.5605	40.1	125	Velocity, O2, pH
26 Aug.	15:16	76	57° 57.8877	0° 18.9834	40.0	119	Velocity, O2, pH
29 Aug.	07:21	90	57° 58.0481	0° 27.9497	27.0	114	Velocity, O2, pH
30 Aug.	15:13	121	58° 0.4111	0° 18.860	14.9	125	Velocity, O2, pH

Table 3. List of benthic boundary layer lander deployments during Poseidon 527 cruise.

Our acquisition of pH observations for eddy covariance was impeded by resuspension of fine particles caused by the lander impact on the sediment surface (Figure 26A) and also by particulate material in suspension in water (Figure 26B). Sufficient particles in suspension can block flow past the sensor. To diminish the effect of particle resuspension on eddy covariance sensor measurements, the lander was equipped with a fin to orient the instruments towards oncoming flow. Nevertheless, sediment disturbance by the lander was great enough to suspend a cloud of fine sediments into our sensors in spite of the prevailing currents.

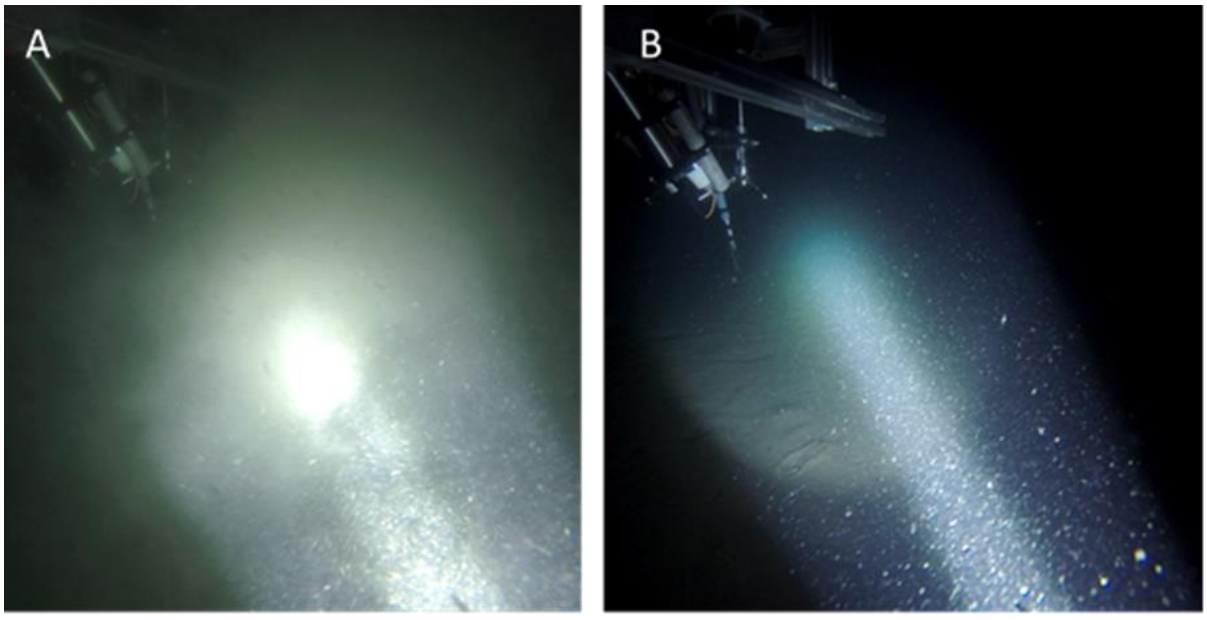

Figure 26. (A) sediment resuspension caused by the impact of the lander on the seafloor, and (B) naturally occurring marine snow can interfere with eddy covariance measurements of pH.

At Station 90 the average benthic oxygen uptake was 6.1 ± 2.4 mmol m^{-2} d^{-1} (s.e., n = 11 half-hour intervals, Figure 27). This rate matches the average oxygen consumption measured in 2017. Calculation of pH fluxes is ongoing.

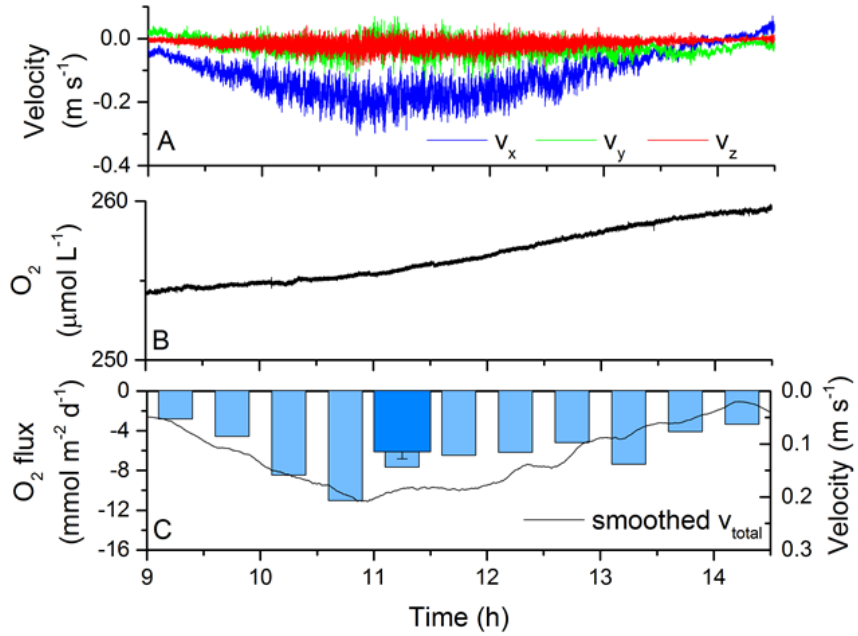

Figure 27. (A) Water velocities at a height of 27 cm above the seafloor at station 90. (B) Oxygen concentrations determined with an eddy covariance minisensor. (C) Calculated oxygen fluxes overlaid with mean water velocity.

6.4. Macrofauna community structure

Saskia Ruhl and Thomas Mesher (PML, Plymouth, UK)

Benthic organisms living on or in sediments can affect the sediment structure and biogeochemical processes locally as well as over larger areas (Montserrat et al., 2009; Van Hoey et al., 2008). In order to accurately characterize baseline environmental conditions at the Goldeneye experimental site, an understanding of its benthic biological community is therefore crucial. The sampling focused on benthic macrofauna, which is typically defined by body sizes over 0.5 mm. This group comprises of animals large enough to affect the sediment structure through the movement of particles and the construction of structures such as tubes.

6.5. Sediment Geochemistry

Anna Lichtschlag (NOC Southampton)

6.5.1. Box cores

The aim of the sampling of the upper sediment layer was to understand the heterogeneity of the surface geochemistry in relation to different benthic habitats and zones. This data is needed in order to establish a baseline characterization around the Goldeneye platform for the STEMM-CCS release experiment in May 2019. In particular, we want to test if external parameters, such as grain size and fishing activity, have an effect on the carbon cycle in the sediments. Hence samples were taken in areas with known differences in grain size and fishing activity, inside and

outside of pockmarks and in the vicinity of wells. In total 18 box cores were subsampled in different zones (Table 4). This was done in parallel to the biological sampling. In addition a box core was taken close to the Develogic lander position and subsampled for sediment geochemistry.

Station	object ID	Date	Lat	Long	UTC	depth (m)	Type	Effort	Strata
2	29	19/08/2018	57 59.39	0 21.990	06:33	115.2	Muddy sand	Medium	Well Muddy sand Medium VMS
7	17	19/08/2018	57 59.114	0 23.173	12:25	113.8	Muddy sand	Very_low	Muddy sand Very_low VMS
8	25	19/08/2018	57 59.485	0 23.202	13:02	114.5	Muddy sand	Medium	Well Muddy sand Medium VMS
16	149	20/08/2018	58 02.274	0 18.654	07:51	119.3	Sandy mud	Very_high	Sandy mud Very_high VMS
17	160	20/08/2018	58 01.707	0 19.512	08:23	118.9	Sandy mud	Very_high	Sandy mud Very_high VMS Pockmark
24	179	20/08/2018	58 01.547	0 17.459	15:15	119.0	Sandy mud	High	Sandy mud High VMS Pockmark
29	94	22/08/2018	58 01.871	0 27.483	08:56	117.0	Muddy sand	Very_low	Muddy sand Very_low VMS Pockmark
31	104	22/08/2018	58 0.865	0 26.442	04:48	122.2	Muddy sand	Medium	Muddy sand Medium VMS Pockmark
34	1	22/08/2018	57 58.757	0 27.973	12:43	123.2	Muddy sand	Very_low	Muddy sand Very_low VMS
36	3	22/08/2018	57 58.228	0 28.351	13:31	110.0	Muddy sand	Very_low	Muddy sand Very_low VMS
37	133	22/08/2018	58 0.012	0 21.754	14:26	117.0	Muddy sand	Medium	Muddy sand Medium VMS Pockmark
38	163	22/08/2018	58 0.300	0 20.800	14:51	119.0	Ectone	Very_high	Well Ecotone Very high VMS
45	189	23/08/2018	58 2.285	0 13.222	09:22	120.2	Sandy mud	High	Sandy mud High VMS
48	202	23/08/2018	58 0.984	0 11.003	11:54	115.5	Sandy mud	Medium	Sandy mud Medium VMS
50	210	23/08/2018	58 1.333	0 10.656	12:43	118.7	Sandy mud	Medium	Sandy mud Medium VMS Pockmark
72	35	26/08/2018	57 58.319	0 19.413	15:56	113.6	Muddy sand	Very_high	Muddy sand Very_high VMS
83	lander	28/08/2018	57 59.761	0 22.409	11:41	113.7	n.d.	n.d.	n.d.
91	103	28/08/2018	58 0.712	0 26.306	08:18	118.2	Muddy sand	Medium	Muddy sand Medium VMS Pockmark

Table 4. Box core stations sampled for sediment geochemistry during POS527 for particle. Latitude/Longitude/UTC are from box core at the seafloor.

6.5.2. Gravity cores

The aim of the gravity core sampling was to record the sediment geochemistry in the upper 3-5 m of the sediment prior to the STEMM-CCS CO_2 release experiment in May 2019. Gravity cores were taken with a 6-m long core barrel (rope speed 0.8 m s^{-1}) at the Develogic lander site (3 replicates), at a pockmark site (object 103, 3 replicates) and at a well site (2 replicates, Table 5). Retrieved cores were between 2 ½ and 4 ½ m in length.

Station no.	GC no.	object ID	Date	Lat bottom	Long bottom	UTC bottom	depth (m) bottom	depth (m) on deck	Comment
97	GC01	103	29-Aug	58.0692	0 26.252	12:26	122.3	123	Pore water extraction
98	GC02	103	29-Aug	58 0.678	0 26.267	12:51	120.2	120	
99	GC03	103	29-Aug	58 0.68	0 26.261	13:20	120.2	119.2	
100	GC04	Develogic lander	29-Aug	57 59.710	0 22.317	14:04	115.9	115.9	
101	GC05	Develogic lander	29-Aug	57 59.722	0 22.354	14:27	116.6	116	
102	GC06	Develogic lander	29-Aug	57 59.734	0 22.383	14:48	115.8	116	Pore water extraction
103	GC07	29	30-Aug	57 59.341	0 22.064	06:16	113.9	114	Pore water extraction
104	GC08	29	30-Aug	57 59.366	0 22.053	06:38	114	115	

Table 5. Gravity core stations during POS527

6.6. Microbial activity in sediments

Dirk de Beer (MPI, Bremen)

Sediments were compared from 3 areas: the Develogic lander site where the CO_2 injection experiment will be conducted, pockmarks and a site where disused wells are present (Table 6, Table 7). Microbial degradation of organic matter is mainly performed by respiration using oxygen and sulfate, each roughly 50/50. We expected that the pockmarks have a higher activity than the surrounding sediments, as a result of residual activity due to methane input and as these depressions may accumulate more marine snow. Also the well area may be more active due to methane leaks along the well pipes.

Date	Lat	Long	Station	Object	Site	O_2 flux (mol m^{-2} s^{-1})	R (mol m^{-3} s^{-1})
19/8/2018	57 59.39	0 21.990	2	29	Well, sulfidic	1.91e-7	1.9e-3
20/8/2018	58 01.707	0 19.512	17	160	Pockmark	1.49e-7 1.02e-7	1.04e-3 1.5e-3
22/8/2018	58 01.871	0 27.483	29	94	Pockmark, sulfidic, gas	1.19e-7 1.59e-7	1.1e-3 0.71e-3
22/8/2018	58 0.712	0 26.306	32	103	Pockmark, sulfidic	1.68e-7	1.73e-3
23/8/2018	58 2.285	0 13.222	45	189	flat	1.28e-7 0.6e-7	1.3e-3 0.6e-3
23/8/2018	58 1.333	0 10.656	50	210	flat	0.93e-7 0.86e-7	0.96e-3 0.84e-3
26/8/2018	57 58.319	0 19.413	72	35	pockmark	0.91e-7 0.82e-7	0.63e-3 0.63e-3
28/8/2018	57 59.761	0 22.409	83	-	Lander, flat	1.15e-7 0.88e-7	1.18e-3 0.87e-3
29/8/2018			90	32	pockmark	0.84e-7 1.1e-7	0.86e-3 1.03e-3

Table 6. Box cores stations sampled for microbial activity

There is no clear difference in activity between pockmarks and the flat areas. Both the oxygen fluxes and the volumetric rates were similar. However, the areas with sulfidic smelling sediment were about twice as active (

Figure 28). The sediments from the well area also showed suspicious gas bubbles. We sampled them for later analysis of methane.

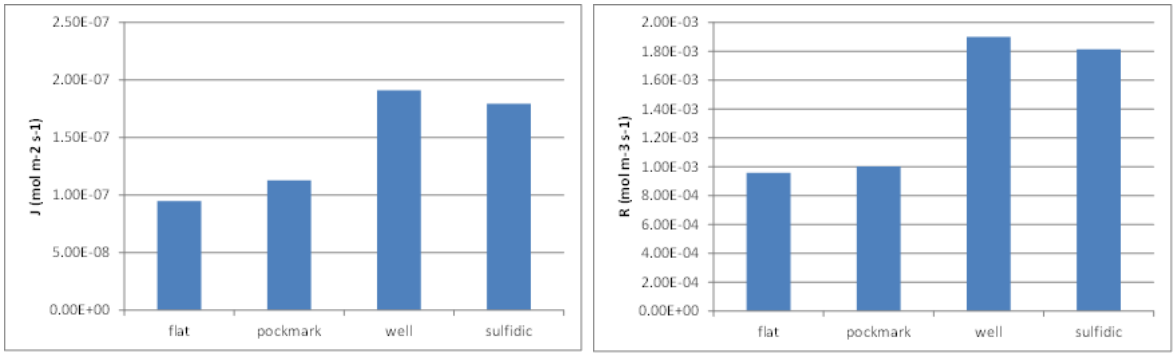

Figure 28. Fluxes (left) and volumetric rates (right) for the various sampling sites

The pockmarks are mostly no longer seeping methane, and do not collect more organic material from marine snow. Where we see signs of methane in the form of bubbles and black zones, the oxygen fluxes are higher (Figure 29). It is interesting that in a sulfidic box core some calcite rich stones were found. This was possibly formed during AOM (Figure 30).

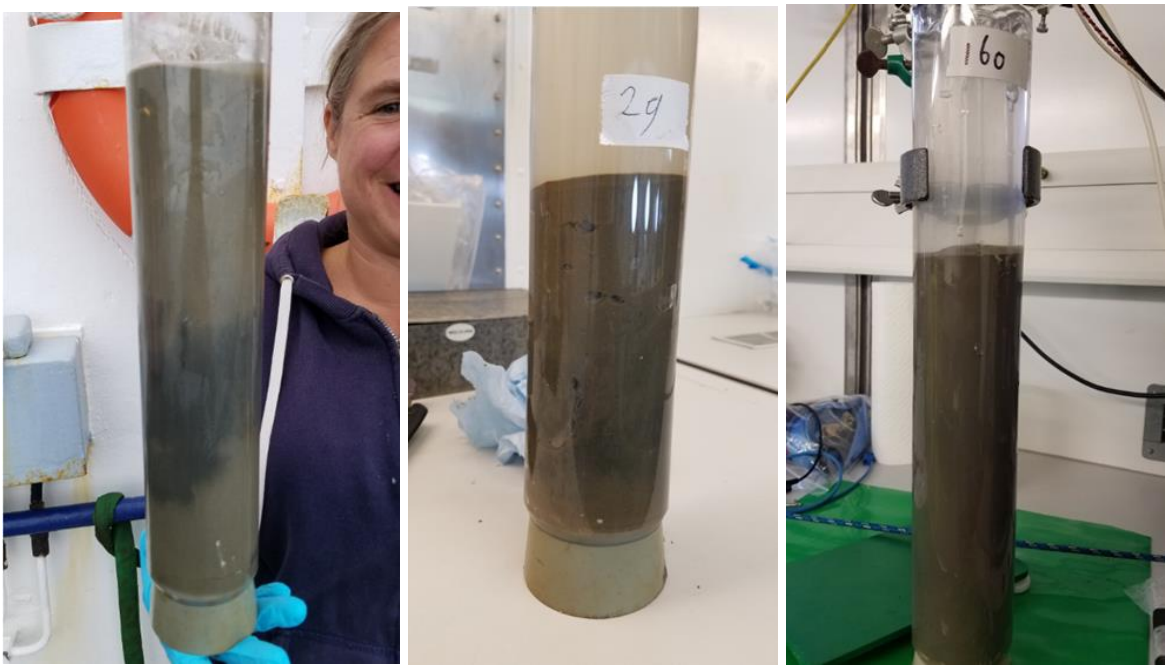

Figure 29. Sulfidic sediments with FeS bands (left), and gaseous sediments (middle), typical sediment from pockmark without gas or sulfide (right).

Figure 30. Small piece of calcite-rich stone. The stone was magnetic, hence Fe-rich as well.

Date	Lat	Long	Station	Object	GC nr	Site
29/8/2018	58.0.692	0 26.252	97	103	1	pockmark
29/8/2018	57 59.734	0 22.383	102		6	lander
30/8/2018	57 59.341	0 22.064	103	29	7	well

Table 7. Sample list of gravity cores for sulfate reduction measurements

6.7. Multibeam survey activities

Catherine Wardell (NOC, Southampton), Dirk de Beer (MPI, Bremen) and Anna Lichtschlag (NOC, Southampton)

During cruise POS527, August 2018, multibeam data were acquired to expand upon the existing bathymetric data surrounding the Golden Eye site. Figure 31 shows the data with the major noise removed but the daily sound velocity profiles and further cleaning are still required.

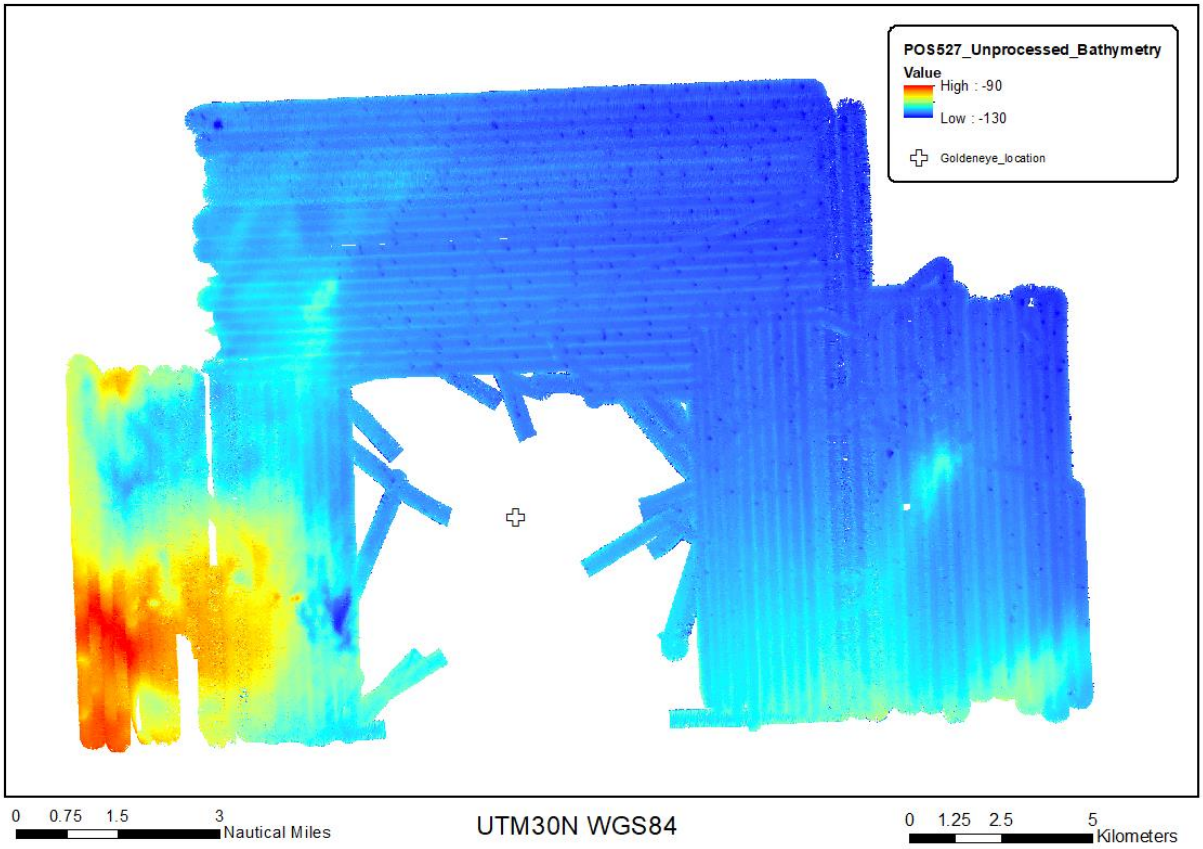

Figure 31. Multibeam survey during Poseidon 527

From this initial data it is possible to see that the pockmarks are more prevalent to the northeast of the Goldeneye platform. There are currently no evident pockmarks to the west but further data processing is required for this area. These preliminary results are consistent with existing bathymetric data from the Goldeneye area. From the figure, we can see that the depths to the northeast are fairly uniform but there is a shoaling to the west and evidence of possible shoaling to the southeast. Some of the data collected has been removed as the seafloor could not be distinguished from the noise, this could have been due to poor weather conditions or to the system losing track of the seabed. This new data will contribute to habitat mapping and general characterisation of the area as well as pock mark detection. POS527 focused on areas to the west, north and east of the Golden Eye Platform, extending already existing data. The extents are detailed in Table 8, coordinates are in WGS84 UTM zone 30N.

Area	North West Limit	North East Limit	South West Limit	South East Limit
West of Platform	58^{o} 02.4' N 000^{o} 35.2' W	58^{o} 02.4' N 000^{o} 27.3' W	57^{o} 57.0' N 000^{o} 35.2' W	57^{o} 56.9' N 000^{o} 27.3' W
North of Platform	58^{o} 06.3' N 000^{o} 30.7' W	58^{o} 06.3' N 000^{o} 14.0' W	58^{o} 02.4' N 000^{o} 30.7' W	58^{o} 02.4' N 000^{o} 14.0' W
East of Platform	58^{o} 02.3' N 000^{o} 17.8' W	58^{o} 02.3' N 000^{o} 07.4' W	57^{o} 57.2' N 000^{o} 17.8' W	57^{o} 57.2' N 000^{o} 07.4' W

Table 8. Data extent coordinates during Poseidon 527

6.7.1. Bathymetric processing

The .HSX files were imported into CARIS HIPS and SIPS where tidal corrections were applied and sound velocity was checked and amended if necessary. The noise was cleaned from the data manually and by the application of a filter removing the outer beams of lines where the beam angle was set to 140^{o}. The data was then gridded and displayed.

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8. Appendices

8.1. Ship´s log of all activities. Please note that the activity number supplied by the bridge of the ship does not correspond with the station number that we used on the cruise.

Activity – Device Operation	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Speed (kn)	Course	Latitude (deg)	Longitude (deg)	Wind Dir	Comment
POS527_139-1	31.08.2018 06:15	Lander	on deck	58° 01,974' N	0° 20,256' W	118.7	0	133	58.032.903	-0.3376	91	Lander
POS527_139-1	31.08.2018 06:08	Lander	on deck	58° 02,016' N	0° 20,285' W	119.2	0	59	58.033.592	-0.33809	80	floating buoy
POS527_138-1	31.08.2018 04:40	Multibeam	profile end	58° 00,080' N	0° 07,377' W	120.1	6	0.4	58.001.335	-0.122957	8	
POS527_138-1	31.08.2018 04:12	Multibeam	alter course	57° 57,224' N	0° 07,363' W	114.2	5	0.8	57.953.728	-0.122717	358	rwk = 360°
POS527_138-1	31.08.2018 03:14	Multibeam	alter course	58° 02,891' N	0° 07,667' W	122.7	6	178	58.048.188	-0.127775	304	rwk = 180°
POS527_138-1	31.08.2018 02:11	Multibeam	alter course	57° 57,087' N	0° 08,049' W	112.6	5	355	57.951.457	-0.134153	327	rwK = 360°
POS527_138-1	31.08.2018 01:12	Multibeam	information	58° 02,200' N	0° 08,358' W	121.3	5	181	58.036.668	-0.139303	308	Continue Multibeam operation
POS527_138-1	31.08.2018 00:07	Multibeam	information	58° 02,193' N	0° 08,345' W	121.3	4	178	58.036.555	-0.139078	305	Stop mullitbeam operation due to sesmic vessel "Sanco Swift"
POS527_138-1	30.08.2018 23:56	Multibeam	alter course	58° 03,071' N	0° 08,432' W	121.9	5	91	58.051.183	-0.140528	306	rwK = 180°
POS527_138-1	30.08.2018 22:48	Multibeam	alter course	57° 57,046' N	0° 09,021' W	107.2	5	141	57.950.773	-0.150358	306	rwK = 000°
POS527_138-1	30.08.2018 21:48	Multibeam	alter course	58° 02,927' N	0° 09,189' W	121	5	83	58.048.780	-0.153143	320	rwK = 180°
POS527_138-1	30.08.2018 20:50	Multibeam	alter course	57° 57,240' N	0° 09,530' W	107.5	5	92	57.954.002	-0.158827	343	rwK = 000°
POS527_138-1	30.08.2018 19:47	Multibeam	alter course	58° 02,929' N	0° 09,875' W	120.6	4	78	58.048.820	-0.164578	325	rwK = 180°
POS527_138-1	30.08.2018 18:48	Multibeam	alter course	57° 57,231' N	0° 10,190' W	108.5	5	90	57.953.852	-0.16983	344	rwk = 000°

POS527_138-1	30.08.2018 17:50	Multibeam	profile start	58° 02,889' N	0° 10,400' W	120.8	5	181	58.048.147	-0.173332	325	rwk = 180°
POS527_137-1	30.08.2018 15:23	Lander	in the water	58° 02,022' N	0° 20,232' W	118.9	0	350	58.033.703	-0.337198	327	floating buoy
POS527_137-1	30.08.2018 15:16	Lander	max depth/on ground	58° 02,007' N	0° 20,265' W	119	0	108	58.033.450	-0.337742	329	
POS527_137-1	30.08.2018 15:13	Lander	in the water	58° 02,011' N	0° 20,268' W	118.9	0	261	58.033.508	-0.337795	334	
POS527_136-1	30.08.2018 15:00	CTD	on deck	58° 02,009' N	0° 20,253' W	119	0	322	58.033.482	-0.337553	321	
POS527_136-1	30.08.2018 14:50	CTD	max depth/on ground	58° 02,007' N	0° 20,258' W	118.8	0	35	58.033.452	-0.337635	320	SL max = 121m
POS527_136-1	30.08.2018 14:46	CTD	in the water	58° 02,005' N	0° 20,253' W	118.9	0	249	58.033.413	-0.337552	322	
POS527_135-1	30.08.2018 14:38	Box Corer	on deck	58° 02,004' N	0° 20,216' W	118.7	0	280	58.033.393	-0.336927	310	
POS527_135-1	30.08.2018 14:34	Box Corer	max depth/on ground	58° 02,002' N	0° 20,205' W	118.9	0		58.033.365	-0.336747	316	SL max = 120m
POS527_135-1	30.08.2018 14:32	Box Corer	in the water	58° 01,997' N	0° 20,206' W	118.7	0		58.033.275	-0.336762	312	
POS527_134-1	30.08.2018 14:12	Box Corer	on deck	58° 02,066' N	0° 22,095' W	119.2	0	46	58.034.440	-0.368245	317	
POS527_134-1	30.08.2018 14:08	Box Corer	max depth/on ground	58° 02,065' N	0° 22,094' W	119.3	0	35	58.034.410	-0.368227	301	SL max = 119m
POS527_134-1	30.08.2018 14:06	Box Corer	in the water	58° 02,059' N	0° 22,101' W	120.2	0	24	58.034.322	-0.368357	297	
POS527_133-1	30.08.2018 13:46	Box Corer	on deck	58° 02,249' N	0° 23,065' W	121.6	0	295	58.037.482	-0.384413	311	
POS527_133-1	30.08.2018 13:41	Box Corer	max depth/on ground	58° 02,248' N	0° 23,055' W	119	0	94	58.037.460	-0.384248	304	SL max= 119m
POS527_133-1	30.08.2018 13:38	Box Corer	in the water	58° 02,247' N	0° 23,065' W	121.7	0	65	58.037.448	-0.384422	301	

POS527_132-1	30.08.2018 13:16	Box Corer	on deck	58° 01,208' N	0° 22,389' W	118	0	64	58.020.140	-0.373147	319	
POS527_132-1	30.08.2018 13:12	Box Corer	max depth/on ground	58° 01,208' N	0° 22,393' W	117.6	0	198	58.020.130	-0.37322	313	SL max= 119m
POS527_132-1	30.08.2018 13:08	Box Corer	in the water	58° 01,210' N	0° 22,394' W	117.8	0	87	58.020.175	-0.373227	314	
POS527_131-1	30.08.2018 12:36	Box Corer	on deck	58° 01,067' N	0° 21,891' W	146.3	0	17	58.017.785	-0.364855	294	
POS527_131-1	30.08.2018 12:32	Box Corer	max depth/on ground	58° 01,065' N	0° 21,887' W	118.6	0	13	58.017.742	-0.364782	302	SL max= 119m
POS527_131-1	30.08.2018 12:28	Box Corer	in the water	58° 01,058' N	0° 21,887' W	119.2	0	279	58.017.637	-0.364788	302	
POS527_130-1	30.08.2018 12:13	Box Corer	on deck	58° 00,841' N	0° 22,591' W	119.3	0	350	58.014.008	-0.376512	290	
POS527_130-1	30.08.2018 12:09	Box Corer	max depth/on ground	58° 00,840' N	0° 22,591' W	119.5	0	286	58.013.997	-0.376508	289	SL max= 120m
POS527_130-1	30.08.2018 12:05	Box Corer	in the water	58° 00,839' N	0° 22,583' W	119.8	0	43	58.013.988	-0.376383	302	
POS527_129-1	30.08.2018 11:11	Lander	on deck	57° 58,033' N	0° 27,744' W	106.8	0	103	57.967.210	-0.462397	297	Lander
POS527_129-1	30.08.2018 11:04	Lander	on deck	57° 58,018' N	0° 27,835' W	106.6	0	322	57.966.965	-0.463917	298	Floating Buoy
POS527_128-1	30.08.2018 09:23	Box Corer	on deck	57° 58,553' N	0° 13,583' W	111.6	0	302	57.975.880	-0.226375	291	
POS527_128-1	30.08.2018 09:19	Box Corer	max depth/on ground	57° 58,557' N	0° 13,578' W	111.6	0	161	57.975.958	-0.226295	300	SL max = 113m
POS527_128-1	30.08.2018 09:15	Box Corer	in the water	57° 58,566' N	0° 13,559' W	115.5	0	218	57.976.098	-0.22599	290	
POS527_127-1	30.08.2018 09:00	Box Corer	on deck	57° 59,046' N	0° 13,222' W	112.4	0	87	57.984.098	-0.220372	295	
POS527_127-1	30.08.2018 08:56	Box Corer	max depth/on ground	57° 59,049' N	0° 13,268' W	116	0	91	57.984.145	-0.221133	296	SL mx = ,114m

POS527_127-1	30.08.2018 08:53	Box Corer	in the water	57° 59,052' N	0° 13,250' W	112.6	0	304	57.984.207	-0.220837	293	
POS527_126-1	30.08.2018 08:40	Box Corer	on deck	57° 59,086' N	0° 13,386' W	144.9	0	300	57.984.768	-0.223102	299	
POS527_126-1	30.08.2018 08:35	Box Corer	max depth/on ground	57° 59,087' N	0° 13,379' W	113.1	0	168	57.984.782	-0.222977	300	SL max = 114m
POS527_126-1	30.08.2018 08:31	Box Corer	in the water	57° 59,088' N	0° 13,379' W	113.2	0	283	57.984.798	-0.222983	298	
POS527_125-1	30.08.2018 07:59	Box Corer	on deck	57° 59,652' N	0° 17,586' W	116.4	0	315	57.994.198	-0.293102	306	
POS527_125-1	30.08.2018 07:54	Box Corer	max depth/on ground	57° 59,644' N	0° 17,578' W	117.1	0	269	57.994.075	-0.292958	299	SL max = 117m
POS527_125-1	30.08.2018 07:51	Box Corer	in the water	57° 59,648' N	0° 17,555' W	116.1	0	333	57.994.130	-0.292592	302	
POS527_124-1	30.08.2018 07:07	CTD	on deck	57° 59,409' N	0° 22,081' W	113.7	0	289	57.990.147	-0.368018	302	
POS527_124-1	30.08.2018 06:55	CTD	max depth/on ground	57° 59,391' N	0° 22,088' W	114.1	0	10	57.989.855	-0.368128	309	SL max = 116m
POS527_124-1	30.08.2018 06:50	CTD	in the water	57° 59,383' N	0° 22,088' W	114	0	296	57.989.722	-0.368128	309	
POS527_123-1	30.08.2018 06:43	Gravity corer	on deck	57° 59,374' N	0° 22,072' W	114.1	0	312	57.989.565	-0.367872	297	
POS527_123-1	30.08.2018 06:39	Gravity corer	max depth/on ground	57° 59,367' N	0° 22,053' W	114.2	0	64	57.989.443	-0.36755	299	SL max = 119m
POS527_123-1	30.08.2018 06:36	Gravity corer	in the water	57° 59,364' N	0° 22,059' W	116.8	0	34	57.989.402	-0.367655	304	
POS527_122-1	30.08.2018 06:22	Gravity corer	on deck	57° 59,341' N	0° 22,063' W	114.2	0	107	57.989.012	-0.367717	309	
POS527_122-1	30.08.2018 06:16	Gravity corer	max depth/on ground	57° 59,341' N	0° 22,064' W	113.9	0	197	57.989.010	-0.36773	313	SL max = 120m
POS527_122-1	30.08.2018 06:13	Gravity corer	in the water	57° 59,346' N	0° 22,081' W	114.1	0	115	57.989.102	-0.368018	302	

POS527_121-1	30.08.2018 04:47	Multibeam	profile end	58° 03,520' N	0° 10,772' W	122.8	4	331	58.058.672	-0.179527	306	
POS527_121-1	30.08.2018 03:41	Multibeam	alter course	57° 57,178' N	0° 10,755' W	109.6	5	0	57.952.967	-0.179247	298	rwk = 360°
POS527_121-1	30.08.2018 02:37	Multibeam	alter course	58° 02,902' N	0° 11,033' W	121.4	5	156	58.048.373	-0.183882	281	rwK = 180°
POS527_121-1	30.08.2018 01:29	Multibeam	alter course	57° 57,192' N	0° 11,769' W	110.9	5	179	57.953.195	-0.196153	292	rwK = 000°
POS527_121-1	30.08.2018 00:28	Multibeam	alter course	58° 02,946' N	0° 12,083' W	121.1	5		58.049.092	-0.20138	285	rwK = 180°
POS527_121-1	29.08.2018 23:26	Multibeam	alter course	57° 57,087' N	0° 12,192' W	109.2	4	94	57.951.452	-0.203202	303	rwK = 000°
POS527_121-1	29.08.2018 22:23	Multibeam	alter course	58° 03,0' N	0° 12,531' W	120.4	5	90	58.049.997	-0.208855	304	rwK = 180°
POS527_121-1	29.08.2018 21:21	Multibeam	alter course	57° 57,193' N	0° 12,792' W	107.6	5	31	57.953.208	-0.213203	305	rwK = 000°
POS527_121-1	29.08.2018 21:10	Multibeam	alter course	57° 57,881' N	0° 14,336' W	110.6	6	148	57.964.685	-0.238927	291	rwK = 135°
POS527_121-1	29.08.2018 20:16	Multibeam	profile start	58° 02,952' N	0° 14,402' W	119.6	4	162	58.049.208	-0.240033	262	rwK = 180°
POS527_120-1	29.08.2018 19:21	Lander	on deck	57° 59,736' N	0° 22,438' W	114.9	0	178	57.995.602	-0.373958	271	Hydrophone, Lander not recovered
POS527_120-1	29.08.2018 15:21	Lander	in the water	57° 59,639' N	0° 22,680' W	116.3	0	228	57.993.977	-0.378003	277	Hydrophone
POS527_119-1	29.08.2018 14:51	Gravity corer	on deck	57° 59,739' N	0° 22,388' W	116	0	330	57.995.655	-0.373138	290	
POS527_119-1	29.08.2018 14:48	Gravity corer	max depth/on ground	57° 59,735' N	0° 22,383' W	116.3	0	304	57.995.575	-0.373052	281	SL max = 125m
POS527_119-1	29.08.2018 14:44	Gravity corer	in the water	57° 59,737' N	0° 22,377' W	116.3	0	159	57.995.615	-0.372955	282	
POS527_118-1	29.08.2018 14:31	Gravity corer	on deck	57° 59,729' N	0° 22,355' W	116.1	0	319	57.995.492	-0.37259	279	
POS527_118-1	29.08.2018 14:27	Gravity corer	max depth/on ground	57° 59,722' N	0° 22,353' W	128.9	0	85	57.995.368	-0.372553	277	SL max = 121m
POS527_118-1	29.08.2018 14:24	Gravity corer	in the water	57° 59,724' N	0° 22,367' W	116	0	272	57.995.393	-0.37279	283	

POS527_117-1	29.08.2018 14:07	Gravity corer	on deck	57° 59,712' N	0° 22,316' W	111	0	308	57.995.205	-0.371925	279	
POS527_117-1	29.08.2018 14:03	Gravity corer	max depth/on ground	57° 59,709' N	0° 22,317' W	116.2	0	304	57.995.153	-0.371943	282	SL max = 121m
POS527_117-1	29.08.2018 14:00	Gravity corer	in the water	57° 59,702' N	0° 22,305' W	116	0	330	57.995.038	-0.371757	284	
POS527_116-1	29.08.2018 13:25	Gravity corer	on deck	58° 00,680' N	0° 26,268' W	120.8	0	278	58.011.328	-0.437795	284	
POS527_116-1	29.08.2018 13:20	Gravity corer	max depth/on ground	58° 00,680' N	0° 26,261' W	124.1	0	207	58.011.337	-0.437683	286	SL max= 121m
POS527_116-1	29.08.2018 13:17	Gravity corer	in the water	58° 00,689' N	0° 26,248' W	2158.3	0	244	58.011.477	-0.43747	282	
POS527_115-1	29.08.2018 12:55	Gravity corer	on deck	58° 00,685' N	0° 26,243' W	119.9	0	58	58.011.413	-0.437388	273	
POS527_115-1	29.08.2018 12:51	Gravity corer	max depth/on ground	58° 00,679' N	0° 26,266' W	119.7	0	271	58.011.308	-0.43776	270	SL max= 120m
POS527_115-1	29.08.2018 12:48	Gravity corer	in the water	58° 00,678' N	0° 26,264' W	119.8	0	271	58.011.302	-0.437728	272	
POS527_114-1	29.08.2018 12:29	Gravity corer	on deck	58° 00,689' N	0° 26,261' W	123	0	246	58.011.482	-0.437682	269	
POS527_114-1	29.08.2018 12:25	Gravity corer	max depth/on ground	58° 00,693' N	0° 26,253' W	122.7	0	199	58.011.542	-0.437543	274	SL max= 124m
POS527_114-1	29.08.2018 12:20	Gravity corer	in the water	58° 00,696' N	0° 26,244' W	123.1	0	136	58.011.605	-0.437393	271	
POS527_113-1	29.08.2018 11:40	Box Corer	on deck	58° 02,602' N	0° 28,816' W	111.3	0	302	58.043.360	-0.480273	256	
POS527_113-1	29.08.2018 11:34	Box Corer	max depth/on ground	58° 02,607' N	0° 28,804' W	111.7	0	247	58.043.448	-0.480063	265	SL max= 113m
POS527_113-1	29.08.2018 11:32	Box Corer	in the water	58° 02,604' N	0° 28,801' W	111.1	0	47	58.043.405	-0.480022	253	
POS527_112-1	29.08.2018 11:15	Box Corer	on deck	58° 02,422' N	0° 29,247' W	111.1	0	234	58.040.375	-0.487445	253	

POS527_112-1	29.08.2018 11:10	Box Corer	max depth/on ground	58° 02,421' N	0° 29,239' W	111	0	231	58.040.345	-0.48732	257	SL max= 113m
POS527_112-1	29.08.2018 11:07	Box Corer	in the water	58° 02,423' N	0° 29,226' W	110.7	0	232	58.040.385	-0.487103	261	
POS527_111-1	29.08.2018 11:03	CTD	on deck	58° 02,431' N	0° 29,225' W	111	0	153	58.040.513	-0.487083	252	
POS527_111-1	29.08.2018 10:53	CTD	max depth/on ground	58° 02,424' N	0° 29,227' W	111	0	346	58.040.407	-0.487123	254	SL max= 113m
POS527_111-1	29.08.2018 10:48	CTD	in the water	58° 02,434' N	0° 29,219' W	110.6	0	136	58.040.560	-0.486988	248	
POS527_110-1	29.08.2018 09:10	Box Corer	on deck	58° 00,949' N	0° 26,020' W	116.6	0	177	58.015.817	-0.433672	248	
POS527_110-1	29.08.2018 09:06	Box Corer	max depth/on ground	58° 00,982' N	0° 26,039' W	121	0	105	58.016.370	-0.433982	245	SL max = 121m
POS527_110-1	29.08.2018 09:02	Box Corer	in the water	58° 00,979' N	0° 26,062' W	119.1	0	160	58.016.312	-0.43436	252	
POS527_109-1	29.08.2018 08:48	Box Corer	on deck	58° 01,057' N	0° 26,634' W	118.8	0	315	58.017.623	-0.4439	253	
POS527_109-1	29.08.2018 08:43	Box Corer	max depth/on ground	58° 01,059' N	0° 26,621' W	119.5	0	212	58.017.650	-0.44369	271	SL max = 124m
POS527_109-1	29.08.2018 08:39	Box Corer	in the water	58° 01,063' N	0° 26,614' W	121.2	0	310	58.017.720	-0.443562	263	
POS527_108-1	29.08.2018 08:22	Box Corer	on deck	58° 00,694' N	0° 26,316' W	117	0	196	58.011.558	-0.438602	274	
POS527_108-1	29.08.2018 08:18	Box Corer	max depth/on ground	58° 00,710' N	0° 26,308' W	117.9	0	249	58.011.825	-0.438475	289	SL max = 119m
POS527_108-1	29.08.2018 08:14	Box Corer	in the water	58° 00,715' N	0° 26,297' W	119.3	0	230	58.011.910	-0.438282	278	
POS527_107-1	29.08.2018 07:31	Lander	in the water	57° 57,980' N	0° 27,942' W	106.7	1	208	57.966.328	-0.465693	273	Floating Buoy
POS527_107-1	29.08.2018 07:20	Lander	in the water	57° 58,027' N	0° 27,898' W	106.7	0	64	57.967.108	-0.464968	282	MPI-Lander

POS527_106-1	29.08.2018 06:50	Box Corer	on deck	57° 58,082' N	0° 28,029' W	108.5	0	328	57.968.042	-0.46715	298	
POS527_106-1	29.08.2018 06:45	Box Corer	max depth/on ground	57° 58,057' N	0° 27,981' W	108.8	0	303	57.967.618	-0.466358	301	SL max = 109m
POS527_106-1	29.08.2018 06:42	Box Corer	in the water	57° 58,055' N	0° 27,955' W	108.1	0	303	57.967.587	-0.465922	303	
POS527_105-1	29.08.2018 06:31	Box Corer	on deck	57° 57,842' N	0° 27,621' W	108.1	0	285	57.964.033	-0.460348	302	
POS527_105-1	29.08.2018 06:26	Box Corer	max depth/on ground	57° 57,822' N	0° 27,628' W	108.2	0	352	57.963.707	-0.460458	302	SL max = 108m
POS527_105-1	29.08.2018 06:22	Box Corer	in the water	57° 57,802' N	0° 27,627' W	108.4	0	325	57.963.375	-0.460453	299	
POS527_104-1	29.08.2018 06:18	CTD	on deck	57° 57,790' N	0° 27,620' W	108.3	0	120	57.963.162	-0.46034	294	
POS527_104-1	29.08.2018 06:06	CTD	max depth/on ground	57° 57,818' N	0° 27,599' W	107.5	0	316	57.963.627	-0.459987	299	SL max = 106m
POS527_104-1	29.08.2018 06:01	CTD	in the water	57° 57,804' N	0° 27,607' W	108.1	0	247	57.963.403	-0.46012	293	
POS527_103-1	29.08.2018 04:53	Multibeam	profile end	58° 02,271' N	0° 34,972' W	103.2	6	0	58.037.850	-0.582862	240	
POS527_103-1	29.08.2018 04:03	Multibeam	alter course	57° 57,181' N	0° 34,963' W	89	5	0.6	57.953.010	-0.582715	219	rwk = 360°
POS527_103-1	29.08.2018 03:04	Multibeam	alter course	58° 02,372' N	0° 34,626' W	106.7	4	215	58.039.537	-0.577102	206	rwk = 180°
POS527_103-1	29.08.2018 02:11	Multibeam	alter course	57° 57,150' N	0° 34,280' W	87.8	5	353	57.952.498	-0.571333	193	rwK = 360°
POS527_103-1	29.08.2018 01:07	Multibeam	information	58° 02,422' N	0° 33,884' W	95.1	4	253	58.040.368	-0.56474	192	rwK = 180°
POS527_103-1	29.08.2018 00:07	Multibeam	alter course	57° 57,093' N	0° 33,509' W	99.5	4	286	57.951.547	-0.55848	186	rwK = 000°
POS527_103-1	28.08.2018 23:05	Multibeam	alter course	58° 02,366' N	0° 33,305' W	102.6	4	186	58.039.432	-0.555077	187	rwK = 180°
POS527_103-1	28.08.2018 22:07	Multibeam	alter course	57° 57,080' N	0° 32,904' W	96.6	5	282	57.951.330	-0.548392	187	rwK = 000°

POS527_103-1	28.08.2018 21:01	Multibeam	alter course	58° 02,372' N	0° 32,300' W	105.6	4	335	58.039.540	-0.538335	188	rwK = 180°
POS527_103-1	28.08.2018 20:03	Multibeam	alter course	57° 57,144' N	0° 31,965' W	211	4	191	57.952.397	-0.532742	186	rwK = 000°
POS527_103-1	28.08.2018 18:44	Multibeam	alter course	58° 02,394' N	0° 31,959' W	107.9	2	238	58.039.893	-0.532653	204	rwK = 180°
POS527_103-1	28.08.2018 17:45	Multibeam	alter course	57° 57,234' N	0° 31,285' W	101.6	5	181	57.953.903	-0.521412	214	rwK = 000°
POS527_103-1	28.08.2018 16:50	Multibeam	alter course	58° 02,400' N	0° 31,216' W	114	3	196	58.039.997	-0.520267	207	rwk = 180°
POS527_103-1	28.08.2018 15:52	Multibeam	profile start	57° 57,153' N	0° 30,972' W	103.8	4	354	57.952.553	-0.516193	192	rwk = 360°
POS527_102-1	28.08.2018 14:34	CTD	on deck	57° 59,692' N	0° 22,429' W	115.8	0	183	57.994.868	-0.37382	189	
POS527_102-1	28.08.2018 14:20	CTD	max depth/on ground	57° 59,697' N	0° 22,404' W	115.9	0	163	57.994.957	-0.373395	183	SL max = 118m
POS527_102-1	28.08.2018 14:16	CTD	in the water	57° 59,690' N	0° 22,388' W	116	0	297	57.994.828	-0.373128	185	
POS527_101-1	28.08.2018 12:42	Box Corer	on deck	58° 00,369' N	0° 15,856' W	117.7	0	75	58.006.155	-0.264267	197	
POS527_101-1	28.08.2018 12:38	Box Corer	max depth/on ground	58° 00,375' N	0° 15,857' W	117.2	0	86	58.006.250	-0.264282	196	SL max= 119m
POS527_101-1	28.08.2018 12:35	Box Corer	in the water	58° 00,373' N	0° 15,849' W	117.8	0	325	58.006.222	-0.264145	194	
POS527_100-1	28.08.2018 11:46	Box Corer	on deck	57° 59,784' N	0° 22,405' W	116.5	0	225	57.996.407	-0.373413	196	
POS527_100-1	28.08.2018 11:42	Box Corer	max depth/on ground	57° 59,758' N	0° 22,409' W	115.4	0	169	57.995.972	-0.373487	190	SL max= 116m
POS527_100-1	28.08.2018 11:38	Box Corer	in the water	57° 59,766' N	0° 22,410' W	115.8	0	161	57.996.095	-0.373503	191	
POS527_99-1	28.08.2018 11:06	Box Corer	on deck	57° 58,893' N	0° 19,053' W	116.8	0	332	57.981.553	-0.317545	188	
POS527_99-1	28.08.2018 11:02	Box Corer	max depth/on ground	57° 58,886' N	0° 19,054' W	123.2	0	115	57.981.440	-0.31756	187	SL max= 116m

POS527_99-1	28.08.2018 10:58	Box Corer	in the water	57° 58,884' N	0° 19,046' W	117.8	0	106	57.981.393	-0.317427	188	
POS527_98-1	28.08.2018 09:29	Box Corer	on deck	57° 59,476' N	0° 18,946' W	115.1	0	216	57.991.260	-0.315773	188	
POS527_98-1	28.08.2018 09:21	Box Corer	max depth/on ground	57° 59,488' N	0° 18,936' W	114.8	0	73	57.991.470	-0.3156	187	SL max = 116m
POS527_98-1	28.08.2018 09:18	Box Corer	in the water	57° 59,485' N	0° 18,962' W	118.4	0	60	57.991.413	-0.316027	183	
POS527_97-1	28.08.2018 09:03	Box Corer	on deck	57° 59,454' N	0° 19,526' W	118.5	0	76	57.990.902	-0.325428	180	
POS527_97-1	28.08.2018 08:59	Box Corer	max depth/on ground	57° 59,448' N	0° 19,531' W	117.4	0	70	57.990.805	-0.325523	176	SL max = 118m
POS527_97-1	28.08.2018 08:55	Box Corer	in the water	57° 59,443' N	0° 19,528' W	116.6	0	283	57.990.720	-0.32546	184	
POS527_96-1	28.08.2018 08:37	CTD	on deck	57° 59,747' N	0° 18,413' W	115.1	0	175	57.995.788	-0.306885	182	
POS527_96-1	28.08.2018 08:26	CTD	max depth/on ground	57° 59,763' N	0° 18,417' W	115.8	0	274	57.996.058	-0.306948	183	SL max = 116m
POS527_96-1	28.08.2018 08:21	CTD	in the water	57° 59,749' N	0° 18,436' W	115.5	0	54	57.995.825	-0.307268	184	
POS527_95-1	28.08.2018 08:13	Box Corer	on deck	57° 59,752' N	0° 18,456' W	115.5	0	146	57.995.862	-0.307593	181	
POS527_95-1	28.08.2018 08:09	Box Corer	max depth/on ground	57° 59,763' N	0° 18,454' W	117.3	0	259	57.996.050	-0.307572	179	SL max = 117m
POS527_95-1	28.08.2018 08:05	Box Corer	in the water	57° 59,761' N	0° 18,444' W	116.7	0	182	57.996.020	-0.307398	180	
POS527_94-1	28.08.2018 07:35	Lander	on deck	57° 58,152' N	0° 19,087' W	112.2	1	355	57.969.200	-0.318112	167	
POS527_94-1	28.08.2018 07:15	Lander	on deck	57° 58,010' N	0° 19,009' W	111.9	0	339	57.966.835	-0.316808	165	floating buoy
POS527_93-1	28.08.2018 05:02	Multibeam	profile end	58° 06,213' N	0° 14,370' W	121.8	5	90	58.103.543	-0.2395	184	
POS527_93-1	28.08.2018 03:36	Multibeam	alter course	58° 06,184' N	0° 31,109' W	118.1	5	73	58.103.063	-0.51849	178	rwk = 090°

POS527_93-1	28.08.2018 02:07	Multibeam	alter course	58° 06,024' N	0° 14,276' W	122.5	5	268	58.100.393	-0.237925	234	rwK = 270°
POS527_93-1	28.08.2018 00:32	Multibeam	alter course	58° 05,846' N	0° 30,864' W	120	5	80	58.097.427	-0.514403	241	rwK = 090°
POS527_93-1	27.08.2018 22:56	Multibeam	alter course	58° 05,640' N	0° 14,293' W	122.5	3	271	58.094.003	-0.238217	313	rwK = 270°
POS527_93-1	27.08.2018 21:21	Multibeam	alter course	58° 05,416' N	0° 30,888' W	114.2	5	0.8	58.090.273	-0.514808	315	rwK = 090°
POS527_93-1	27.08.2018 19:43	Multibeam	alter course	58° 05,145' N	0° 14,397' W	120.6	5	64	58.085.753	-0.239945	323	rwK = 270°
POS527_93-1	27.08.2018 18:11	Multibeam	alter course	58° 04,995' N	0° 30,936' W	114.3	4	325	58.083.255	-0.515607	319	rwk = 090°
POS527_93-1	27.08.2018 16:40	Multibeam	alter course	58° 04,967' N	0° 14,233' W	122.1	4	264	58.082.785	-0.237223	321	rwk = 270°
POS527_93-1	27.08.2018 15:08	Multibeam	profile start	58° 04,735' N	0° 30,873' W	115.8	5	81	58.078.913	-0.514555	311	rwK = 090°
POS527_92-1	27.08.2018 11:12	Multibeam	profile end	58° 04,273' N	0° 14,352' W	121.6	5	89	58.071.213	-0.239192	298	
POS527_92-1	27.08.2018 10:28	Multibeam	alter course	58° 04,344' N	0° 22,290' W	118.4	5	181	58.072.407	-0.371507	308	rwK = 090°
POS527_92-1	27.08.2018 09:39	Multibeam	alter course	58° 04,510' N	0° 14,198' W	121.8	5	189	58.075.162	-0.236635	298	rwK = 270°
POS527_92-1	27.08.2018 07:49	Multibeam	profile start	57° 57,149' N	0° 14,468' W	108.9	5	86	57.952.483	-0.241132	305	rwK = 000°
POS527_91-1	27.08.2018 06:29	Box Corer	on deck	58° 01,984' N	0° 19,987' W	117.4	0	125	58.033.070	-0.333113	290	Umgekippt
POS527_91-1	27.08.2018 06:19	Box Corer	max depth/on ground	58° 01,973' N	0° 20,171' W	117.6	0	108	58.032.880	-0.336182	292	SL max = 118m
POS527_91-1	27.08.2018 06:15	Box Corer	in the water	58° 01,994' N	0° 20,207' W	117.8	0	78	58.033.235	-0.336792	295	
POS527_90-1	27.08.2018 04:58	Multibeam	profile end	57° 57,184' N	0° 13,040' W	107.3	5	179	57.953.063	-0.217328	282	
POS527_90-1	27.08.2018 03:17	Multibeam	alter course	58° 05,768' N	0° 13,033' W	126	4	186	58.096.133	-0.217222	256	rwK = 180°
POS527_90-1	27.08.2018 01:44	Multibeam	alter course	57° 57,146' N	0° 13,361' W	108.5	4	355	57.952.440	-0.222677	254	rwK = 000°

POS527_90-1	27.08.2018 00:03	Multibeam	alter course	58° 05,723' N	0° 13,719' W	122.8	6	180	58.095.392	-0.228643	164	rwK = 180°
POS527_90-1	26.08.2018 22:27	Multibeam	profile start	57° 57,232' N	0° 14,012' W	109.5	5	357	57.953.865	-0.233527	145	rwK = 000°
POS527_90-1	26.08.2018 21:21	Multibeam	profile end	57° 57,095' N	0° 30,579' W	107	4	134	57.951.582	-0.509647	157	
POS527_90-1	26.08.2018 20:17	Multibeam	alter course	58° 02,396' N	0° 30,283' W	111.7	5	339	58.039.938	-0.50471	158	rwK = 180°
POS527_90-1	26.08.2018 19:18	Multibeam	alter course	57° 57,294' N	0° 29,955' W	104.8	5	180	57.954.900	-0.499247	171	rwK = 000°
POS527_90-1	26.08.2018 18:15	Multibeam	profile start	58° 02,286' N	0° 29,979' W	110.9	4	174	58.038.097	-0.499647	178	rwK = 180°
POS527_89-1	26.08.2018 17:24	Lander	on deck	57° 59,707' N	0° 22,412' W	115	0	18	57.995.108	-0.37354	179	Hydrophone, Lander not recovered
POS527_89-1	26.08.2018 16:14	Lander	in the water	57° 59,688' N	0° 22,409' W	115	0	335	57.994.795	-0.373483	159	Hydrophone
POS527_88-1	26.08.2018 15:26	Lander	in the water	57° 57,894' N	0° 19,091' W	113.1	0	253	57.964.898	-0.318187	155	floating buoy
POS527_88-1	26.08.2018 15:21	Lander	max depth/on ground	57° 57,890' N	0° 18,998' W	112.6	0	308	57.964.825	-0.316632	156	
POS527_88-1	26.08.2018 15:17	Lander	in the water	57° 57,888' N	0° 18,987' W	120.6	0	275	57.964.795	-0.316445	159	
POS527_87-1	26.08.2018 15:01	CTD	on deck	57° 57,894' N	0° 18,996' W	112.9	0	282	57.964.897	-0.316593	163	
POS527_87-1	26.08.2018 14:52	CTD	max depth/on ground	57° 57,893' N	0° 19,006' W	113.1	0	215	57.964.878	-0.316763	167	SL max = 114m
POS527_87-1	26.08.2018 14:48	CTD	in the water	57° 57,899' N	0° 18,991' W	113.1	0	300	57.964.988	-0.316513	164	
POS527_86-1	26.08.2018 14:43	Box Corer	on deck	57° 57,897' N	0° 18,991' W	113.1	0	85	57.964.945	-0.31651	164	
POS527_86-1	26.08.2018 14:39	Box Corer	max depth/on ground	57° 57,897' N	0° 19,009' W	113.2	0	197	57.964.957	-0.316823	164	SL max = 114 m
POS527_86-1	26.08.2018 14:37	Box Corer	in the water	57° 57,904' N	0° 19,001' W	113	0	224	57.965.070	-0.316678	163	

POS527_85-1	26.08.2018 14:21	Box Corer	on deck	57° 58,529' N	0° 18,670' W	114	0	348	57.975.485	-0.311162	193	
POS527_85-1	26.08.2018 14:17	Box Corer	max depth/on ground	57° 58,522' N	0° 18,662' W	113.8	0	230	57.975.358	-0.311025	197	SL max = 114m
POS527_85-1	26.08.2018 14:15	Box Corer	in the water	57° 58,522' N	0° 18,646' W	113.9	0	265	57.975.362	-0.310767	204	
POS527_84-1	26.08.2018 13:59	Box Corer	on deck	57° 58,308' N	0° 19,384' W	115	0	214	57.971.805	-0.323063	207	
POS527_84-1	26.08.2018 13:56	Box Corer	max depth/on ground	57° 58,317' N	0° 19,413' W	114	0	154	57.971.957	-0.323548	194	SL max= 114m
POS527_84-1	26.08.2018 13:52	Box Corer	in the water	57° 58,332' N	0° 19,425' W	113.8	0	252	57.972.197	-0.323745	198	
POS527_83-1	26.08.2018 13:36	Box Corer	on deck	57° 58,454' N	0° 20,257' W	114.3	0	302	57.974.237	-0.337612	185	
POS527_83-1	26.08.2018 13:32	Box Corer	max depth/on ground	57° 58,457' N	0° 20,231' W	114.4	0	223	57.974.288	-0.337183	188	SL max= 114m
POS527_83-1	26.08.2018 13:29	Box Corer	in the water	57° 58,460' N	0° 20,208' W	114	0	291	57.974.337	-0.336808	192	
POS527_82-1	26.08.2018 12:43	Box Corer	on deck	58° 01,887' N	0° 19,587' W	119.1	0	61	58.031.458	-0.326442	177	
POS527_82-1	26.08.2018 12:39	Box Corer	max depth/on ground	58° 01,895' N	0° 19,619' W	119	0	153	58.031.580	-0.326978	179	SL max= 119m
POS527_82-1	26.08.2018 12:35	Box Corer	in the water	58° 01,911' N	0° 19,598' W	118.7	0	309	58.031.842	-0.326638	178	
POS527_81-1	26.08.2018 12:02	Box Corer	on deck	58° 00,770' N	0° 17,295' W	118.6	0	322	58.012.840	-0.288245	181	
POS527_81-1	26.08.2018 11:54	Box Corer	max depth/on ground	58° 00,741' N	0° 17,199' W	118.3	0	289	58.012.357	-0.286645	182	SL mmax= 120m
POS527_81-1	26.08.2018 11:51	Box Corer	in the water	58° 00,720' N	0° 17,195' W	118.4	0	15	58.012.005	-0.286588	184	
POS527_80-1	26.08.2018 11:35	Box Corer	on deck	58° 01,244' N	0° 16,770' W	120.2	0	272	58.020.740	-0.279507	176	

POS527_80-1	26.08.2018 11:31	Box Corer	max depth/on ground	58° 01,237' N	0° 16,726' W	120.8	0	257	58.020.620	-0.27877	182	SL max= 120m
POS527_80-1	26.08.2018 11:27	Box Corer	in the water	58° 01,238' N	0° 16,691' W	119.2	0	274	58.020.628	-0.278178	174	
POS527_79-1	26.08.2018 11:12	Box Corer	on deck	58° 01,400' N	0° 17,127' W	119.4	0	132	58.023.328	-0.285448	183	
POS527_79-1	26.08.2018 11:08	Box Corer	max depth/on ground	58° 01,403' N	0° 17,105' W	119.5	0	277	58.023.388	-0.285087	178	SL max= 120m
POS527_79-1	26.08.2018 11:04	Box Corer	in the water	58° 01,402' N	0° 17,074' W	119.1	0	214	58.023.358	-0.284567	181	
POS527_78-1	26.08.2018 09:49	Box Corer	on deck	58° 01,649' N	0° 14,375' W	119.1	0	13	58.027.475	-0.239587	161	
POS527_78-1	26.08.2018 09:45	Box Corer	max depth/on ground	58° 01,617' N	0° 14,382' W	119.3	0	249	58.026.948	-0.239703	161	SL max = 120m
POS527_78-1	26.08.2018 09:40	Box Corer	in the water	58° 01,623' N	0° 14,348' W	119.2	0	182	58.027.050	-0.239138	154	
POS527_77-1	26.08.2018 09:15	CTD	on deck	58° 01,659' N	0° 11,459' W	119.5	0	315	58.027.650	-0.190975	161	
POS527_77-1	26.08.2018 09:04	CTD	max depth/on ground	58° 01,643' N	0° 11,492' W	119.2	0	185	58.027.378	-0.19154	167	SL max = 117m
POS527_77-1	26.08.2018 08:59	CTD	in the water	58° 01,643' N	0° 11,463' W	119	0	285	58.027.380	-0.191048	168	
POS527_76-1	26.08.2018 08:48	Box Corer	on deck	58° 01,644' N	0° 11,444' W	118.8	0		58.027.400	-0.190733	174	
POS527_76-1	26.08.2018 08:44	Box Corer	max depth/on ground	58° 01,658' N	0° 11,464' W	119.5	0	346	58.027.625	-0.19107	170	SL max = 121m
POS527_76-1	26.08.2018 08:40	Box Corer	in the water	58° 01,651' N	0° 11,459' W	118.9	0	273	58.027.520	-0.190983	172	
POS527_75-1	26.08.2018 08:25	Box Corer	on deck	58° 01,576' N	0° 10,533' W	118.4	0	132	58.026.263	-0.175553	172	
POS527_75-1	26.08.2018 08:21	Box Corer	max depth/on ground	58° 01,565' N	0° 10,565' W	118.7	0	35	58.026.083	-0.17608	163	SL max = 119m

POS527_75-1	26.08.2018 08:17	Box Corer	in the water	58° 01,570' N	0° 10,569' W	118.3	0	261	58.026.160	-0.176148	167	
POS527_74-1	26.08.2018 08:02	Box Corer	on deck	58° 01,809' N	0° 11,120' W	118.4	0	260	58.030.158	-0.185328	173	
POS527_74-1	26.08.2018 07:58	Box Corer	max depth/on ground	58° 01,811' N	0° 11,093' W	118.2	0	46	58.030.178	-0.184882	171	SL max = 120m
POS527_74-1	26.08.2018 07:53	Box Corer	in the water	58° 01,813' N	0° 11,112' W	118.6	0	167	58.030.208	-0.1852	172	
POS527_73-1	26.08.2018 06:57	Box Corer	on deck	58° 02,026' N	0° 11,510' W	122.7	0	138	58.033.767	-0.191832	175	
POS527_73-1	26.08.2018 06:52	Box Corer	max depth/on ground	58° 02,042' N	0° 11,553' W	122	0	87	58.034.033	-0.192558	170	SL max = 122m
POS527_73-1	26.08.2018 06:49	Box Corer	in the water	58° 02,046' N	0° 11,556' W	121.7	0	264	58.034.100	-0.192603	170	
POS527_72-1	26.08.2018 06:28	Lander	on deck	58° 02,219' N	0° 11,571' W	120.2	0	335	58.036.992	-0.192852	179	Lander
POS527_72-1	26.08.2018 06:16	Lander	on deck	58° 02,071' N	0° 11,509' W	121	0	291	58.034.522	-0.191823	173	floating buoy
POS527_71-1	25.08.2018 05:22	Multibeam	profile end	57° 59,828' N	0° 14,058' W	1264.1	2	357	57.997.130	-0.234307	312	
POS527_71-1	25.08.2018 04:20	Multibeam	alter course	57° 57,083' N	0° 14,086' W	1141.3	4	21	57.951.382	-0.234772	327	rwk = 360°
POS527_71-1	25.08.2018 02:38	Multibeam	profile start	58° 05,666' N	0° 14,348' W	1096.9	5	181	58.094.430	-0.239137	311	rwk = 180°
POS527_70-1	25.08.2018 01:13	Multibeam	profile end	58° 02,294' N	0° 30,610' W	244.5	3	359	58.038.242	-0.51016	334	
POS527_70-1	24.08.2018 23:47	Multibeam	alter course	57° 57,035' N	0° 30,321' W	222.2	4	204	57.950.580	-0.505357	300	rwK = 000°
POS527_70-1	24.08.2018 22:50	Multibeam	alter course	58° 02,399' N	0° 29,941' W	254.3	4	357	58.039.988	-0.49901	301	rwK = 180°
POS527_70-1	24.08.2018 21:45	Multibeam	alter course	57° 57,085' N	0° 29,670' W	108.7	4	223	57.951.418	-0.494505	299	rwK = 000°
POS527_70-1	24.08.2018 20:46	Multibeam	alter course	58° 02,420' N	0° 29,321' W	111.4	3	310	58.040.335	-0.488688	311	rwK = 180°
POS527_70-1	24.08.2018 19:47	Multibeam	profile start	57° 57,217' N	0° 29,276' W	109.4	5		57.953.622	-0.487942	291	rwK = 000°

POS527_69-1	24.08.2018 18:43	Lander	on deck	57° 59,775' N	0° 22,192' W	115.7	0	69	57.996.248	-0.36986	304	Hydrophon, Lander not recovered
POS527_69-1	24.08.2018 17:01	Lander	in the water	57° 59,665' N	0° 22,433' W	114.8	0	327	57.994.420	-0.37389	287	Hydrophone
POS527_68-1	24.08.2018 14:18	Lander	in the water	58° 02,055' N	0° 11,469' W	119.7	0	310	58.034.248	-0.191147	305	floating buoy
POS527_68-1	24.08.2018 14:13	Lander	max depth/on ground	58° 02,030' N	0° 11,487' W	123.9	0	33	58.033.828	-0.191447	307	
POS527_68-1	24.08.2018 14:09	Lander	in the water	58° 02,028' N	0° 11,498' W	122.9	0	335	58.033.802	-0.191642	313	
POS527_67-1	24.08.2018 12:59	CTD	on deck	58° 01,996' N	0° 11,430' W	119.8	0	188	58.033.273	-0.190503	314	
POS527_67-1	24.08.2018 12:24	CTD	max depth/on ground	58° 02,001' N	0° 11,460' W	121	0	301	58.033.355	-0.191007	335	SL max= 119m
POS527_67-1	24.08.2018 12:19	CTD	in the water	58° 01,998' N	0° 11,468' W	121.7	0	292	58.033.303	-0.19113	330	
POS527_66-1	24.08.2018 09:37	CTD	on deck	58° 02,044' N	0° 11,421' W	120.1	0	76	58.034.072	-0.190348	280	
POS527_66-1	24.08.2018 09:11	CTD	max depth/on ground	58° 02,039' N	0° 11,480' W	120.6	0	193	58.033.980	-0.191335	286	SL max = 120m
POS527_66-1	24.08.2018 09:07	CTD	in the water	58° 02,043' N	0° 11,492' W	122	0	117	58.034.045	-0.191535	283	
POS527_65-1	24.08.2018 06:32	Lander	on deck	58° 01,877' N	0° 11,366' W	119.2	0	128	58.031.288	-0.189427	276	Lander
POS527_65-1	24.08.2018 06:22	Lander	on deck	58° 01,955' N	0° 11,523' W	120.3	0	179	58.032.587	-0.192047	274	floating buoy
POS527_64-1	24.08.2018 03:52	Multibeam	profile end	57° 57,183' N	0° 28,944' W	109.1	5	180	57.953.048	-0.482397	267	
POS527_64-1	24.08.2018 02:55	Multibeam	alter course	58° 02,411' N	0° 28,617' W	110.4	6	356	58.040.188	-0.476952	259	rwK = 180°
POS527_64-1	24.08.2018 01:58	Multibeam	alter course	57° 57,074' N	0° 28,282' W	112.4	4	198	57.951.233	-0.47137	264	rwK = 000°
POS527_64-1	24.08.2018 01:00	Multibeam	alter course	58° 02,402' N	0° 27,947' W	112.7	4	348	58.040.035	-0.46578	298	rwK = 180°

POS527_64-1	23.08.2018 23:58	Multibeam	alter course	57° 57,108' N	0° 27,596' W	112.2	5	181	57.951.795	-0.459942	265	rwK = 000°
POS527_64-1	23.08.2018 23:04	Multibeam	profile start	58° 02,282' N	0° 27,554' W	114.8	5	185	58.038.038	-0.459242	253	rwK = 180°
POS527_64-1	23.08.2018 21:47	Multibeam	profile end	58° 04,625' N	0° 14,471' W	122.1	6	89	58.077.088	-0.241188	240	
POS527_64-1	23.08.2018 20:15	Multibeam	alter course	58° 04,453' N	0° 31,177' W	116	5	278	58.074.212	-0.519623	199	rwK = 090°
POS527_64-1	23.08.2018 19:33	Multibeam	profile start	58° 04,472' N	0° 23,564' W	118.1	5	285	58.074.528	-0.392725	279	rwK = 270°
POS527_63-1	23.08.2018 18:06	Lander	on deck	57° 59,752' N	0° 22,338' W	116	0	231	57.995.867	-0.372303	234	Hydrophon, Lander not recovered
POS527_63-1	23.08.2018 17:32	Lander	in the water	57° 59,746' N	0° 22,370' W	116.5	0	324	57.995.762	-0.37283	210	Hydrophone
POS527_63-1	23.08.2018 17:18	Lander	on deck	57° 59,696' N	0° 22,424' W	116	0	230	57.994.927	-0.373742	212	Hydrophone
POS527_63-1	23.08.2018 16:26	Lander	in the water	57° 59,710' N	0° 22,415' W	115.2	0	201	57.995.163	-0.373578	238	Hydrophone
POS527_62-1	23.08.2018 15:18	Lander	in the water	58° 01,940' N	0° 11,614' W	120.6	0	295	58.032.337	-0.19356	280	Bouy
POS527_62-1	23.08.2018 15:11	Lander	max depth/on ground	58° 01,906' N	0° 11,566' W	120.5	0	183	58.031.768	-0.192772	277	
POS527_62-1	23.08.2018 15:07	Lander	in the water	58° 01,913' N	0° 11,571' W	121.1	0	309	58.031.887	-0.19285	276	
POS527_61-1	23.08.2018 14:27	Box Corer	on deck	58° 01,901' N	0° 11,560' W	120.2	0	296	58.031.692	-0.192667	262	
POS527_61-1	23.08.2018 14:23	Box Corer	max depth/on ground	58° 01,908' N	0° 11,564' W	121.4	0	108	58.031.795	-0.19274	268	SL max = 123m
POS527_61-1	23.08.2018 14:20	Box Corer	in the water	58° 01,913' N	0° 11,575' W	121.2	0	185	58.031.885	-0.192908	272	
POS527_60-1	23.08.2018 14:04	CTD	on deck	58° 01,802' N	0° 10,651' W	120.3	0	249	58.030.025	-0.17752	276	
POS527_60-1	23.08.2018 13:54	CTD	max depth/on ground	58° 01,800' N	0° 10,668' W	122.2	0	112	58.030.007	-0.177805	263	SL max= 122m

POS527_60-1	23.08.2018 13:48	CTD	in the water	58° 01,805' N	0° 10,684' W	121.9	0	154	58.030.090	-0.178067	261	
POS527_59-1	23.08.2018 13:39	Box Corer	on deck	58° 01,811' N	0° 10,678' W	122.9	0	136	58.030.178	-0.177972	250	
POS527_59-1	23.08.2018 13:35	Box Corer	max depth/on ground	58° 01,811' N	0° 10,685' W	122.4	0	33	58.030.182	-0.17809	249	SL max= 123m
POS527_59-1	23.08.2018 13:32	Box Corer	in the water	58° 01,804' N	0° 10,690' W	121.7	0		58.030.063	-0.178172	245	
POS527_58-1	23.08.2018 13:09	Box Corer	on deck	58° 01,385' N	0° 11,447' W	118.7	0	258	58.023.092	-0.190777	242	
POS527_58-1	23.08.2018 13:06	Box Corer	max depth/on ground	58° 01,391' N	0° 11,434' W	118.2	0	311	58.023.188	-0.190575	237	SL max= 119m
POS527_58-1	23.08.2018 13:03	Box Corer	in the water	58° 01,381' N	0° 11,443' W	118.6	0	42	58.023.013	-0.190708	241	
POS527_57-1	23.08.2018 12:48	Box Corer	on deck	58° 01,348' N	0° 10,669' W	118.4	0	269	58.022.462	-0.177815	237	
POS527_57-1	23.08.2018 12:44	Box Corer	max depth/on ground	58° 01,334' N	0° 10,656' W	118.5	0	0.4	58.022.242	-0.177597	240	SL max= 119m
POS527_57-1	23.08.2018 12:39	Box Corer	in the water	58° 01,323' N	0° 10,643' W	118.6	0	332	58.022.055	-0.177375	228	
POS527_56-1	23.08.2018 12:25	Box Corer	on deck	58° 00,999' N	0° 10,504' W	117.1	0	34	58.016.642	-0.175068	225	
POS527_56-1	23.08.2018 12:21	Box Corer	max depth/on ground	58° 00,985' N	0° 10,495' W	117.2	0	308	58.016.423	-0.174917	234	SL max= 119m
POS527_56-1	23.08.2018 12:17	Box Corer	in the water	58° 00,979' N	0° 10,484' W	117.3	0	355	58.016.308	-0.174735	229	
POS527_55-1	23.08.2018 11:59	Box Corer	on deck	58° 00,987' N	0° 11,002' W	115.5	0	30	58.016.445	-0.183373	230	
POS527_55-1	23.08.2018 11:54	Box Corer	max depth/on ground	58° 00,984' N	0° 11,003' W	115.3	0	356	58.016.395	-0.183382	223	SL max= 117m
POS527_55-1	23.08.2018 11:51	Box Corer	in the water	58° 00,980' N	0° 10,996' W	115.3	0	354	58.016.335	-0.183263	224	

POS527_54-1	23.08.2018 11:30	Box Corer	on deck	58° 01,295' N	0° 12,877' W	119.1	0	308	58.021.580	-0.214608	221	
POS527_54-1	23.08.2018 11:26	Box Corer	max depth/on ground	58° 01,298' N	0° 12,862' W	119.3	0	167	58.021.628	-0.21437	219	SL max= 121m
POS527_54-1	23.08.2018 11:22	Box Corer	in the water	58° 01,296' N	0° 12,844' W	119.2	0	284	58.021.595	-0.214072	226	
POS527_53-1	23.08.2018 11:00	Box Corer	on deck	58° 01,830' N	0° 13,305' W	119.9	0	23	58.030.500	-0.221755	243	
POS527_53-1	23.08.2018 10:56	Box Corer	max depth/on ground	58° 01,822' N	0° 13,312' W	120	0	230	58.030.370	-0.22186	233	SL max= 121m
POS527_53-1	23.08.2018 10:53	Box Corer	in the water	58° 01,824' N	0° 13,314' W	120	0	230	58.030.400	-0.221893	243	
POS527_52-1	23.08.2018 09:28	Box Corer	on deck	58° 02,282' N	0° 13,221' W	120	0	255	58.038.028	-0.220345	261	
POS527_52-1	23.08.2018 09:22	Box Corer	max depth/on ground	58° 02,285' N	0° 13,222' W	120.1	0	255	58.038.087	-0.220362	265	BOKO 122m
POS527_52-1	23.08.2018 09:18	Box Corer	in the water	58° 02,297' N	0° 13,198' W	120.2	0	196	58.038.292	-0.219972	258	
POS527_51-1	23.08.2018 08:58	CTD	on deck	58° 01,561' N	0° 13,744' W	120.2	0	223	58.026.018	-0.229068	229	
POS527_51-1	23.08.2018 08:48	CTD	max depth/on ground	58° 01,573' N	0° 13,762' W	119.9	0	249	58.026.223	-0.229373	215	SL max = 120m
POS527_51-1	23.08.2018 08:43	CTD	in the water	58° 01,584' N	0° 13,720' W	119.6	0	65	58.026.405	-0.228675	209	
POS527_50-1	23.08.2018 08:40	Box Corer	on deck	58° 01,575' N	0° 13,735' W	120.2	0	33	58.026.250	-0.228912	210	
POS527_50-1	23.08.2018 08:36	Box Corer	max depth/on ground	58° 01,566' N	0° 13,748' W	119.5	0		58.026.098	-0.229135	209	BOKO 121m
POS527_50-1	23.08.2018 08:33	Box Corer	in the water	58° 01,561' N	0° 13,744' W	119.5	0	295	58.026.017	-0.22906	206	
POS527_49-1	23.08.2018 08:02	Box Corer	on deck	58° 01,152' N	0° 17,372' W	119.3	0	336	58.019.205	-0.289537	205	

POS527_49-1	23.08.2018 07:57	Box Corer	max depth/on ground	58° 01,148' N	0° 17,357' W	118.6	0	273	58.019.137	-0.289283	202	BOKO 120m
POS527_49-1	23.08.2018 07:54	Box Corer	in the water	58° 01,154' N	0° 17,349' W	118.5	0	189	58.019.227	-0.289157	181	
POS527_48-1	23.08.2018 07:04	Box Corer	on deck	58° 01,839' N	0° 28,015' W	114.1	2	151	58.030.652	-0.466917	178	
POS527_48-1	23.08.2018 06:57	Box Corer	max depth/on ground	58° 01,887' N	0° 28,020' W	113.9	0	295	58.031.455	-0.467002	171	BOKO 116m
POS527_48-1	23.08.2018 06:53	Box Corer	in the water	58° 01,886' N	0° 28,022' W	114.1	0	295	58.031.425	-0.467038	169	
POS527_47-1	23.08.2018 06:35	Lander	on deck	58° 01,817' N	0° 28,127' W	115.1	0	288	58.030.280	-0.468777	162	
POS527_47-1	23.08.2018 06:27	Lander	information	58° 01,817' N	0° 28,105' W	113.7	0	289	58.030.287	-0.468412	174	MPI-Lander, Schwimmleine
POS527_46-1	23.08.2018 03:19	Multibeam	profile end	58° 04,639' N	0° 14,444' W	120.9	6	90	58.077.310	-0.240733	201	
POS527_46-1	23.08.2018 01:46	Multibeam	alter course	58° 04,451' N	0° 31,211' W	115.4	5	273	58.074.177	-0.520187	220	rwK = 090°
POS527_46-1	23.08.2018 00:09	Multibeam	alter course	58° 04,282' N	0° 14,185' W	122.2	5	84	58.071.370	-0.23642	223	rwK = 270°
POS527_46-1	22.08.2018 22:32	Multibeam	alter course	58° 04,113' N	0° 31,264' W	115.7	4	291	58.068.552	-0.521065	205	rwK = 090°
POS527_46-1	22.08.2018 20:59	Multibeam	profile start	58° 04,117' N	0° 14,472' W	121.3	5	263	58.068.622	-0.241202	240	rwK = 270°
POS527_45-1	22.08.2018 15:24	Box Corer	on deck	58° 01,444' N	0° 22,082' W	120	0	293	58.024.075	-0.368033	299	
POS527_45-1	22.08.2018 15:20	Box Corer	max depth/on ground	58° 01,440' N	0° 22,072' W	120.2	0	113	58.024.007	-0.36787	297	SL max = 120m
POS527_45-1	22.08.2018 15:17	Box Corer	in the water	58° 01,446' N	0° 22,082' W	120.2	0	154	58.024.093	-0.368033	300	
POS527_44-1	22.08.2018 14:55	Box Corer	on deck	58° 00,303' N	0° 20,799' W	118.2	0	287	58.005.058	-0.346647	299	
POS527_44-1	22.08.2018 14:51	Box Corer	max depth/on ground	58° 00,300' N	0° 20,800' W	118.5	0	316	58.005.003	-0.346667	305	SL max = 117m

POS527_44-1	22.08.2018 14:49	Box Corer	in the water	58° 00,301' N	0° 20,797' W	117.7	0	125	58.005.013	-0.346625	308	
POS527_43-1	22.08.2018 14:30	Box Corer	on deck	58° 00,006' N	0° 21,767' W	117.5	0	245	58.000.103	-0.362787	315	
POS527_43-1	22.08.2018 14:25	Box Corer	max depth/on ground	58° 00,012' N	0° 21,754' W	117.2	0	143	58.000.202	-0.362568	313	SL max = 116m
POS527_43-1	22.08.2018 14:23	Box Corer	in the water	58° 00,013' N	0° 21,759' W	116.5	0	103	58.000.222	-0.362658	304	
POS527_42-1	22.08.2018 13:35	Box Corer	on deck	57° 58,234' N	0° 28,346' W	110.2	0	250	57.970.560	-0.47243	329	
POS527_42-1	22.08.2018 13:30	Box Corer	max depth/on ground	57° 58,230' N	0° 28,352' W	109.7	0	202	57.970.503	-0.472528	313	SL max= 108m
POS527_42-1	22.08.2018 13:28	Box Corer	in the water	57° 58,236' N	0° 28,346' W	110	0	64	57.970.593	-0.472427	318	
POS527_41-1	22.08.2018 13:12	Box Corer	on deck	57° 58,427' N	0° 27,610' W	118	0	298	57.973.777	-0.460172	312	
POS527_41-1	22.08.2018 13:08	Box Corer	max depth/on ground	57° 58,425' N	0° 27,605' W	118	0	182	57.973.753	-0.46009	314	SL max= 114m
POS527_41-1	22.08.2018 13:04	Box Corer	in the water	57° 58,424' N	0° 27,612' W	117.7	0	54	57.973.737	-0.460207	324	
POS527_40-1	22.08.2018 12:47	Box Corer	on deck	57° 58,761' N	0° 27,966' W	123.5	0	23	57.979.348	-0.466105	319	
POS527_40-1	22.08.2018 12:42	Box Corer	max depth/on ground	57° 58,756' N	0° 27,970' W	123.5	0	283	57.979.272	-0.46617	325	SL max= 122m
POS527_40-1	22.08.2018 12:39	Box Corer	in the water	57° 58,757' N	0° 27,968' W	122.5	0	150	57.979.277	-0.46613	325	
POS527_39-1	22.08.2018 11:58	Box Corer	on deck	58° 00,545' N	0° 26,353' W	118.5	0	43	58.009.080	-0.439217	346	
POS527_39-1	22.08.2018 11:54	Box Corer	max depth/on ground	58° 00,542' N	0° 26,386' W	125	0	96	58.009.030	-0.439767	330	SL max= 121m
POS527_39-1	22.08.2018 11:50	Box Corer	in the water	58° 00,541' N	0° 26,399' W	125.2	0	53	58.009.018	-0.43998	339	

POS527_38-1	22.08.2018 11:33	Box Corer	on deck	58° 00,702' N	0° 26,231' W	119.2	0	51	58.011.707	-0.437182	344	
POS527_38-1	22.08.2018 11:29	Box Corer	max depth/on ground	58° 00,700' N	0° 26,241' W	122.2	0	352	58.011.663	-0.43735	347	SL max= 122m
POS527_38-1	22.08.2018 11:25	Box Corer	in the water	58° 00,691' N	0° 26,250' W	124.7	0	58	58.011.518	-0.437502	337	
POS527_37-1	22.08.2018 11:02	Box Corer	on deck	58° 00,863' N	0° 26,442' W	122.2	0	186	58.014.383	-0.440693	339	
POS527_37-1	22.08.2018 10:58	Box Corer	max depth/on ground	58° 00,865' N	0° 26,442' W	122.2	0	308	58.014.413	-0.440702	340	SL max= 119m
POS527_37-1	22.08.2018 10:54	Box Corer	in the water	58° 00,861' N	0° 26,445' W	122.7	0	158	58.014.353	-0.440758	337	
POS527_36-1	22.08.2018 09:32	Box Corer	on deck	58° 01,620' N	0° 27,485' W	116.5	0		58.027.005	-0.458075	316	
POS527_36-1	22.08.2018 09:24	Box Corer	max depth/on ground	58° 01,616' N	0° 27,512' W	117	0	156	58.026.937	-0.45854	321	BOKO 116m
POS527_36-1	22.08.2018 09:21	Box Corer	in the water	58° 01,613' N	0° 27,526' W	116.7	0	44	58.026.882	-0.458767	313	
POS527_35-1	22.08.2018 09:00	Box Corer	on deck	58° 01,868' N	0° 27,481' W	117	0	32	58.031.127	-0.458022	304	
POS527_35-1	22.08.2018 08:55	Box Corer	max depth/on ground	58° 01,874' N	0° 27,486' W	117.2	0	32	58.031.242	-0.458097	302	BOKO 116m
POS527_35-1	22.08.2018 08:51	Box Corer	in the water	58° 01,872' N	0° 27,489' W	116.2	0	60	58.031.192	-0.458155	300	
POS527_34-1	22.08.2018 08:46	CTD	on deck	58° 01,862' N	0° 27,486' W	116.2	0	163	58.031.040	-0.458107	300	
POS527_34-1	22.08.2018 08:10	CTD	max depth/on ground	58° 01,866' N	0° 27,491' W	116.7	0	155	58.031.092	-0.45819	307	SL max = 114m
POS527_34-1	22.08.2018 08:06	CTD	in the water	58° 01,860' N	0° 27,505' W	117.5	0	97	58.030.992	-0.45842	306	
POS527_33-1	22.08.2018 07:28	Lander	in the water	58° 01,809' N	0° 28,261' W	114.5	1	255	58.030.150	-0.471018	318	Bake, Schwimmleine

POS527_33-1	22.08.2018 07:23	Lander	max depth/on ground	58° 01,806' N	0° 28,162' W	115	0	228	58.030.097	-0.469368	311	BOKO
POS527_33-1	22.08.2018 07:17	Lander	in the water	58° 01,802' N	0° 28,149' W	115	0	155	58.030.042	-0.469153	317	
POS527_33-1	22.08.2018 07:08	Lander	on deck	58° 01,813' N	0° 28,157' W	115	0	347	58.030.218	-0.46928	316	
POS527_33-1	22.08.2018 07:05	Lander	information	58° 01,808' N	0° 28,154' W	115	0	11	58.030.135	-0.469232	315	hieven, Seil läuft nicht frei
POS527_33-1	22.08.2018 06:54	Lander	in the water	58° 01,805' N	0° 28,162' W	115	0	98	58.030.085	-0.469372	320	MPI-Lander
POS527_32-1	22.08.2018 06:35	CTD	on deck	58° 01,807' N	0° 28,122' W	114.7	0	197	58.030.110	-0.468705	318	
POS527_32-1	22.08.2018 06:22	CTD	max depth/on ground	58° 01,850' N	0° 28,055' W	115.5	0	93	58.030.837	-0.467585	278	SL max = 115m
POS527_32-1	22.08.2018 06:20	CTD	in the water	58° 01,853' N	0° 28,070' W	115	0	121	58.030.883	-0.467835	276	
POS527_31-1	20.08.2018 21:47	Multibeam	profile end	58° 03,926' N	0° 14,441' W	121	5	90	58.065.437	-0.240678	316	
POS527_31-1	20.08.2018 20:18	Multibeam	alter course	58° 03,780' N	0° 30,967' W	116.7	4	327	58.062.992	-0.51612	231	rwK = 090°
POS527_31-1	20.08.2018 18:45	Multibeam	alter course	58° 03,762' N	0° 14,160' W	121.2	3	337	58.062.705	-0.236007	353	rwK = 270°
POS527_31-1	20.08.2018 18:26	Multibeam	alter course	58° 02,736' N	0° 16,994' W	119.7	5	1	58.045.602	-0.283233	337	rwK = 055°
POS527_31-1	20.08.2018 17:30	Multibeam	alter course	57° 57,131' N	0° 16,985' W	111.5	5	353	57.952.180	-0.28308	345	
POS527_31-1	20.08.2018 16:51	Multibeam	profile start	58° 00,380' N	0° 16,479' W	117.4	5	181	58.006.335	-0.274643	319	
POS527_30-1	20.08.2018 15:18	Box Corer	on deck	58° 01,542' N	0° 17,455' W	119	0	127	58.025.698	-0.29091	303	
POS527_30-1	20.08.2018 15:14	Box Corer	max depth/on ground	58° 01,548' N	0° 17,457' W	119	0	219	58.025.797	-0.290958	314	SL max = 119m
POS527_30-1	20.08.2018 15:12	Box Corer	in the water	58° 01,553' N	0° 17,459' W	119	0	263	58.025.877	-0.290987	316	

POS527_29-1	20.08.2018 14:50	Box Corer	on deck	58° 02,117' N	0° 19,591' W	119.3	0	129	58.035.280	-0.326515	298	
POS527_29-1	20.08.2018 14:45	Box Corer	max depth/on ground	58° 02,124' N	0° 19,588' W	120.5	0	175	58.035.402	-0.326462	301	SL max = 120m
POS527_29-1	20.08.2018 14:42	Box Corer	in the water	58° 02,127' N	0° 19,588' W	120.5	0	24	58.035.442	-0.326465	308	
POS527_28-1	20.08.2018 14:25	Box Corer	on deck	58° 02,197' N	0° 20,121' W	118.2	0	125	58.036.610	-0.335352	295	
POS527_28-1	20.08.2018 14:20	Box Corer	max depth/on ground	58° 02,198' N	0° 20,131' W	120.6	0	11	58.036.627	-0.335518	310	SL max = 120m
POS527_28-1	20.08.2018 14:18	Box Corer	in the water	58° 02,194' N	0° 20,126' W	118.8	0	236	58.036.567	-0.335435	300	
POS527_27-1	20.08.2018 13:59	CTD	on deck	58° 02,311' N	0° 19,125' W	118.3	0	144	58.038.525	-0.318755	296	
POS527_27-1	20.08.2018 13:38	CTD	max depth/on ground	58° 02,317' N	0° 19,149' W	118.3	0	219	58.038.617	-0.319158	301	SL max= 119m
POS527_27-1	20.08.2018 13:30	CTD	in the water	58° 02,323' N	0° 19,137' W	118.1	0	127	58.038.708	-0.318958	296	
POS527_26-1	20.08.2018 13:24	Box Corer	on deck	58° 02,336' N	0° 19,180' W	118.7	0	62	58.038.938	-0.31967	307	
POS527_26-1	20.08.2018 13:19	Box Corer	max depth/on ground	58° 02,329' N	0° 19,212' W	119.1	0	13	58.038.808	-0.320193	313	SL max= 116m
POS527_26-1	20.08.2018 13:16	Box Corer	in the water	58° 02,322' N	0° 19,223' W	119.5	0	359	58.038.698	-0.32038	302	
POS527_25-1	20.08.2018 12:09	Lander	on deck	57° 59,384' N	0° 22,062' W	115.7	0	153	57.989.728	-0.367707	308	MPI-Lander Recovery
POS527_24-1	20.08.2018 08:55	Box Corer	on deck	58° 02,060' N	0° 18,999' W	121.4	0	44	58.034.338	-0.316655	298	
POS527_24-1	20.08.2018 08:50	Box Corer	max depth/on ground	58° 02,052' N	0° 18,981' W	120.3	0	256	58.034.193	-0.316353	288	SL max = 120m
POS527_24-1	20.08.2018 08:46	Box Corer	in the water	58° 02,050' N	0° 18,981' W	119.9	0	46	58.034.175	-0.316352	296	

POS527_23-1	20.08.2018 08:27	Box Corer	on deck	58° 01,706' N	0° 19,496' W	118.9	0	95	58.028.433	-0.324928	288	
POS527_23-1	20.08.2018 08:21	Box Corer	max depth/on ground	58° 01,703' N	0° 19,510' W	118.7	0	310	58.028.380	-0.325167	288	SL max = 120m
POS527_23-1	20.08.2018 08:16	Box Corer	in the water	58° 01,701' N	0° 19,503' W	118.4	0	229	58.028.350	-0.325055	300	
POS527_22-1	20.08.2018 07:57	Box Corer	on deck	58° 02,276' N	0° 18,662' W	119.1	0	266	58.037.930	-0.311025	288	
POS527_22-1	20.08.2018 07:51	Box Corer	max depth/on ground	58° 02,274' N	0° 18,654' W	119.2	0	84	58.037.895	-0.310892	284	SL max = 120m
POS527_22-1	20.08.2018 07:48	Box Corer	in the water	58° 02,276' N	0° 18,661' W	119.4	0	176	58.037.937	-0.311017	284	
POS527_21-1	20.08.2018 07:26	CTD	max depth/on ground	58° 01,966' N	0° 19,188' W	118.9	0	264	58.032.770	-0.319803	289	
POS527_21-1	20.08.2018 07:15	CTD	max depth/on ground	58° 01,959' N	0° 19,205' W	118.9	0	335	58.032.658	-0.320087	295	SL max = 118m
POS527_21-1	20.08.2018 07:10	CTD	in the water	58° 01,953' N	0° 19,209' W	118.9	0	73	58.032.548	-0.320148	301	
POS527_20-1	20.08.2018 07:03	Box Corer	on deck	58° 01,958' N	0° 19,218' W	119	0	228	58.032.638	-0.320303	296	
POS527_20-1	20.08.2018 06:57	Box Corer	max depth/on ground	58° 01,950' N	0° 19,163' W	118.8	0	263	58.032.500	-0.31938	289	SL max = 119m
POS527_20-1	20.08.2018 06:55	Box Corer	in the water	58° 01,952' N	0° 19,151' W	118.7	0	189	58.032.527	-0.319175	281	
POS527_19-1	20.08.2018 06:33	Box Corer	on deck	58° 01,991' N	0° 19,727' W	119	0	297	58.033.192	-0.32878	295	
POS527_19-1	20.08.2018 06:27	Box Corer	max depth/on ground	58° 01,990' N	0° 19,730' W	118.7	0	143	58.033.167	-0.328825	293	SL max = 119m
POS527_19-1	20.08.2018 06:22	Box Corer	in the water	58° 01,997' N	0° 19,736' W	118.8	0	357	58.033.285	-0.328933	298	
POS527_18-1	20.08.2018 05:56	Multibeam	profile end	58° 01,921' N	0° 17,789' W	119.3	6	89	58.032.025	-0.296487	307	

POS527_18-1	20.08.2018 05:40	Multibeam	alter course	58° 01,969' N	0° 20,886' W	118.5	5	135	58.032.815	-0.348092	292	
POS527_18-1	20.08.2018 05:18	Multibeam	alter course	58° 02,130' N	0° 17,111' W	119.8	5	260	58.035.497	-0.285185	292	
POS527_18-1	20.08.2018 03:09	Multibeam	alter course	58° 03,581' N	0° 30,926' W	112.6	5	88	58.059.683	-0.515437	315	rwk= 090°
POS527_18-1	20.08.2018 01:30	Multibeam	alter course	58° 03,228' N	0° 14,067' W	120.1	5	79	58.053.798	-0.234443	316	rwk= 270°
POS527_18-1	19.08.2018 23:56	Multibeam	alter course	58° 03,048' N	0° 31,042' W	110.1	5	279	58.050.803	-0.517368	313	rwk= 090°
POS527_18-1	19.08.2018 22:24	Multibeam	alter course	58° 02,938' N	0° 14,035' W	120.3	4		58.048.972	-0.233923	339	rwK = 270°
POS527_18-1	19.08.2018 20:50	Multibeam	alter course	58° 02,884' N	0° 30,864' W	113	4	86	58.048.070	-0.514398	336	rwK = 090°
POS527_18-1	19.08.2018 19:32	Multibeam	alter course	58° 02,542' N	0° 17,575' W	119.8	3	21	58.042.367	-0.292908	352	rwK = 270°
POS527_18-1	19.08.2018 18:19	Multibeam	alter course	58° 02,343' N	0° 30,771' W	113.6	3	325	58.039.047	-0.512857	355	rwK = 090°
POS527_18-1	19.08.2018 17:10	Multibeam	alter course	58° 02,329' N	0° 17,659' W	119.4	5	276	58.038.822	-0.29431	339	
POS527_18-1	19.08.2018 16:13	Multibeam	profile start	57° 57,269' N	0° 17,481' W	111.3	5	0.9	57.954.480	-0.291348	358	
POS527_17-1	19.08.2018 15:30	Box Corer	on deck	57° 58,943' N	0° 20,267' W	114.3	0	244	57.982.385	-0.337792	8	
POS527_17-1	19.08.2018 15:25	Box Corer	max depth/on ground	57° 58,938' N	0° 20,255' W	114.2	0	16	57.982.307	-0.337578	360	SL max = 115m
POS527_17-1	19.08.2018 15:22	Box Corer	in the water	57° 58,935' N	0° 20,252' W	114	0	328	57.982.255	-0.337537	2	
POS527_16-1	19.08.2018 14:45	Box Corer	on deck	57° 57,513' N	0° 21,926' W	111.6	0	340	57.958.557	-0.365427	3	
POS527_16-1	19.08.2018 14:39	Box Corer	max depth/on ground	57° 57,515' N	0° 21,906' W	111.7	0	181	57.958.575	-0.365095	2	SL max = 113m
POS527_16-1	19.08.2018 14:37	Box Corer	in the water	57° 57,518' N	0° 21,906' W	111.7	0	149	57.958.633	-0.365107	359	
POS527_15-1	19.08.2018 14:19	CTD	on deck	57° 57,502' N	0° 23,018' W	110.4	0	112	57.958.360	-0.383637	5	

POS527_15-1	19.08.2018 14:09	CTD	max depth/on ground	57° 57,509' N	0° 23,023' W	110.2	0	126	57.958.485	-0.383718	2	SL max = 108m
POS527_15-1	19.08.2018 14:04	CTD	in the water	57° 57,509' N	0° 23,036' W	110.5	0	213	57.958.487	-0.383937	8	
POS527_14-1	19.08.2018 13:45	Box Corer	on deck	57° 57,515' N	0° 23,111' W	110.3	0	236	57.958.590	-0.38519	360	
POS527_14-1	19.08.2018 13:40	Box Corer	max depth/on ground	57° 57,523' N	0° 23,069' W	110.3	0	274	57.958.715	-0.384485	5	SL max= 111
POS527_14-1	19.08.2018 13:39	Box Corer	in the water	57° 57,524' N	0° 23,061' W	110.3	0	251	57.958.735	-0.384353	6	
POS527_13-1	19.08.2018 13:08	Box Corer	on deck	57° 59,473' N	0° 23,253' W	114.5	0	264	57.991.208	-0.38755	360	
POS527_13-1	19.08.2018 13:03	Box Corer	max depth/on ground	57° 59,485' N	0° 23,200' W	114.5	0	276	57.991.422	-0.386662	4	SL max= 116m
POS527_13-1	19.08.2018 13:01	Box Corer	in the water	57° 59,481' N	0° 23,187' W	114.4	0	321	57.991.347	-0.386447	1	
POS527_12-1	19.08.2018 12:30	Box Corer	on deck	57° 59,115' N	0° 23,169' W	113.6	0	87	57.985.253	-0.386152	6	
POS527_12-1	19.08.2018 12:25	Box Corer	max depth/on ground	57° 59,113' N	0° 23,172' W	113.6	0	100	57.985.220	-0.3862	21	SL max= 114m
POS527_12-1	19.08.2018 12:22	Box Corer	in the water	57° 59,116' N	0° 23,177' W	113.4	0	230	57.985.267	-0.386282	22	
POS527_11-1	19.08.2018 13:13	Box Corer	information	57° 59,405' N	0° 23,308' W	114.2	3	180	57.990.077	-0.388475	1	
POS527_11-1	19.08.2018 11:44	Box Corer	on deck	57° 58,721' N	0° 22,653' W	112.7	0	275	57.978.677	-0.377552	16	
POS527_11-1	19.08.2018 11:38	Box Corer	max depth/on ground	57° 58,724' N	0° 22,644' W	112.7	0	329	57.978.732	-0.377403	14	SL max = 113m
POS527_11-1	19.08.2018 11:36	Box Corer	in the water	57° 58,720' N	0° 22,641' W	112.7	0	297	57.978.667	-0.377347	17	
POS527_10-1	19.08.2018 10:58	Lander	information	57° 59,789' N	0° 22,354' W	115.4	1	290	57.996.483	-0.37256	16	Hydrophon an Deck

POS527_10-1	19.08.2018 10:15	Lander	information	57° 59,692' N	0° 22,390' W	115.4	0	243	57.994.870	-0.373172	12	Hydrophon zu Wasser
POS527_9-1	19.08.2018 09:16	CTD	on deck	57° 59,103' N	0° 21,851' W	113.9	0	95	57.985.043	-0.364185	18	
POS527_9-1	19.08.2018 09:04	CTD	max depth/on ground	57° 59,098' N	0° 21,853' W	114.1	0	83	57.984.970	-0.364217	13	SL max = 113m
POS527_9-1	19.08.2018 08:59	CTD	in the water	57° 59,095' N	0° 21,870' W	113.9	0	19	57.984.912	-0.364502	14	
POS527_8-1	19.08.2018 08:45	Box Corer	on deck	57° 59,053' N	0° 21,924' W	113.5	0	329	57.984.212	-0.365392	21	
POS527_8-1	19.08.2018 08:39	Box Corer	max depth/on ground	57° 59,035' N	0° 21,920' W	113.9	0	13	57.983.917	-0.365333	12	Boko, SL max = 116m
POS527_8-1	19.08.2018 08:38	Box Corer	in the water	57° 59,030' N	0° 21,920' W	113.6	0	302	57.983.838	-0.365338	354	
POS527_7-1	19.08.2018 08:11	Lander	information	57° 59,437' N	0° 22,012' W	115	1	11	57.990.620	-0.36687	17	Auftriebskörper zu Wasser
POS527_7-1	19.08.2018 08:01	Lander	max depth/on ground	57° 59,406' N	0° 21,998' W	114.8	0	230	57.990.098	-0.36663	352	Boko
POS527_7-1	19.08.2018 07:54	Lander	in the water	57° 59,385' N	0° 21,988' W	115.1	0	257	57.989.755	-0.366468	3	
POS527_6-1	19.08.2018 06:42	Box Corer	on deck	57° 59,410' N	0° 22,003' W	115.2	0	329	57.990.163	-0.366715	328	
POS527_6-1	19.08.2018 06:31	Box Corer	max depth/on ground	57° 59,384' N	0° 21,986' W	115	0	283	57.989.735	-0.366438	327	SL max = 118m
POS527_6-1	19.08.2018 06:24	Box Corer	in the water	57° 59,377' N	0° 21,981' W	115.1	0	311	57.989.620	-0.366343	284	
POS527_5-1	19.08.2018 05:25	Multibeam	profile end	58° 02,912' N	0° 14,797' W	120.8	5	359	58.048.532	-0.24661	313	
POS527_5-1	19.08.2018 04:24	Multibeam	alter course	57° 57,019' N	0° 15,103' W	109.5	5	144	57.950.323	-0.25172	268	
POS527_5-1	19.08.2018 03:24	Multibeam	alter course	58° 02,975' N	0° 15,134' W	120.3	5	182	58.049.588	-0.252237	265	
POS527_5-1	19.08.2018 02:21	Multibeam	alter course	57° 57,259' N	0° 15,435' W	109.9	5	353	57.954.310	-0.257257	280	rwk= 0

POS527_5-1	19.08.2018 01:15	Multibeam	alter course	58° 03,018' N	0° 15,889' W	119.6	2	124	58.050.307	-0.264815	281	rwk= 180
POS527_5-1	19.08.2018 00:12	Multibeam	alter course	57° 57,154' N	0° 16,237' W	110.5	6	21	57.952.572	-0.270612	291	rwk= 000
POS527_5-1	18.08.2018 23:07	Multibeam	alter course	58° 03,030' N	0° 16,489' W	120.8	5	182	58.050.500	-0.274825	257	rwk= 180
POS527_5-1	18.08.2018 22:03	Multibeam	alter course	57° 57,263' N	0° 16,900' W	111.5	6	76	57.954.378	-0.28167	276	rwK = 000
POS527_5-1	18.08.2018 20:57	Multibeam	alter course	58° 03,106' N	0° 17,507' W	119.5	5	79	58.051.758	-0.291782	282	rwK = 180°
POS527_5-1	18.08.2018 19:57	Multibeam	alter course	57° 57,250' N	0° 17,647' W	112.4	4	356	57.954.168	-0.294113	286	rwK = 000°
POS527_5-1	18.08.2018 16:42	Multibeam	profile start	57° 59,686' N	0° 22,040' W	115.9	4	278	57.994.765	-0.367335	270	
POS527_4-1	18.08.2018 11:26	CTD	on deck	57° 59,670' N	0° 22,188' W	115.5	0	158	57.994.507	-0.369803	237	
POS527_4-1	18.08.2018 11:14	CTD	max depth/on ground	57° 59,674' N	0° 22,206' W	116.2	0	314	57.994.573	-0.370108	233	113m max
POS527_4-1	18.08.2018 11:06	CTD	in the water	57° 59,682' N	0° 22,186' W	116.2	0	198	57.994.707	-0.36976	236	
POS527_3-1	18.08.2018 11:06	Lander	on deck	57° 59,683' N	0° 22,185' W	114.5	0	127	57.994.710	-0.36975	236	Hydrophon
POS527_3-1	18.08.2018 08:54	Lander	information	57° 59,823' N	0° 21,808' W	120	0	288	57.997.057	-0.36346	233	Hydrophon zu Wasser
POS527_2-1	18.08.2018 08:43	Multibeam	profile end	57° 59,512' N	0° 22,298' W	116.9	2	98	57.991.860	-0.371627	245	
POS527_2-1	18.08.2018 07:43	Multibeam	profile start	57° 59,870' N	0° 21,952' W	118.5	0	330	57.997.833	-0.365868	219	
POS527_1-1	18.08.2018 06:14	Lander	information	57° 59,903' N	0° 21,620' W	117.7	0	287	57.998.382	-0.360332	209	Releaser an Deck, Keine Antwort vom Lander
POS527_1-1	18.08.2018 06:13	Lander	in the water	57° 59,902' N	0° 21,617' W	118.2	0	282	57.998.373	-0.360278	209	Hydrophon

8.2. Sampling List for Box Core Activities on P527

Station	Date	object ID	Lat in	Long in	UTC in	depth in (m)	Lat bottom	Long bottom	Comment	Type_	Effort	Strata
2	19-08-18	29	57 59.38	0 21.9800	6:28: AM	115.0	57 59.39	0 21.9900	AL,ddb-SRR	Muddy sand	Medium	Well Muddy sand Medium VMS
4	19-08-18	18	57 59.03	0 21.9200	8:37: AM	113.6	57 59.035	0 21.9200		Muddy sand	Medium	Muddy sand Medium VMS
6	19-08-18	19	57 58.719	0 22.6330	11:35: AM	112.9	57 58.723	0 22.6430		Muddy sand	Medium	Muddy sand Medium VMS
7	19-08-18	17	57 59.115	0 23.1760	12:23: PM	113.5	57 59.114	0 23.1730	AL	Muddy sand	Very_low	Muddy sand Very_low VMS
8	19-08-18	25	57 59.480	0 23.1790	1:00: PM	114.9	57 59.485	0 23.2020	AL	Muddy sand	Medium	Well Muddy sand Medium VMS
9	19-08-18	20	Missed	missed	missed	missed	59 57.523	0 23.0710		Muddy sand	Medium	Muddy sand Medium VMS
11	19-08-18	21	57 57.519	0 21.9080	2:39: PM	112.0	57 57.513	0 21.9080		Muddy sand	Medium	Muddy sand Medium VMS
12	19-08-18	33	57 58.933	0 20.2510	3:22: PM	114.0	57 58.94	0 20.2570		Muddy sand	Very_high	Muddy sand Very_high VMS
13	20-08-18	148	58 01.997	0 19.7370	6:23: AM	119.0	58 01.989	0 19.7250		Sandy mud	Very_high	Sandy mud Very_high VMS
14	20-08-18	147	58 01.958	0 19.1600	6:53: AM	119.0	58 01.951	0 19.1650		Sandy mud	Very_high	Sandy mud Very_high VMS
16	20-08-18	149	58 02.279	0 18.6630	7:47: AM	118.8	58 02.274	0 18.6540	AL	Sandy mud	Very_high	Sandy mud Very_high VMS
17	20-08-18	160	58 01.695	0 19.5140	8:19: AM	118.3	58 01.707	0 19.5120	AL DDB, O2+SRR	Sandy mud	Very_high	Sandy mud Very_high VMS Pockmark
18	20-08-18	161	58 02.049	0 18.9800	8:46: AM	119.6	58 02.052	0 18.9860		Sandy mud	Very_high	Sandy mud Very_high VMS Pockmark

20	20-08-18	162	58 02.325	0 19.2190	1:17: PM	119.4	58 02.328	0 19.2150		Sandy mud	Very_high	Sandy mud Very_high VMS Pockmark
22	20-08-18	158	58 02.194	0 20.1260	2:18: PM	118.4	58 02.198	0 20.1310		Sandy mud	Very_high	Sandy mud Very_high VMS Pockmark
23	20-08-18	159	58 02.122	0 19.5810	2:40: PM	118.9	58.02.123	0 19.5860		Sandy mud	Very_high	Sandy mud Very_high VMS Pockmark
24	20-08-18	179	58 01.553	0 17.4560	3:11: PM	119.0	58 01.547	0 17.4590	AL	Sandy mud	High	Sandy mud High VMS Pockmark
29	22-08-18	94	58 01.873	0 27.4880	8:51: AM	117.0	58 01.871	0 27.4830	AL, DDB , O2	Muddy sand	Very_low	Muddy sand Very_low VMS Pockmark
30	22-08-18	93	58 01.612	0 27.5270	9:21: AM	116.5	58 01.616	0 27.5120		Muddy sand	Very_low	Muddy sand Very_low VMS Pockmark
31	22-08-18	104	58 0.862	0 26.4460	10:54: AM	122.0	58 0.865	0 26.4420	AL	Muddy sand	Medium	Muddy sand Medium VMS Pockmark
32	22-08-18	103	58 0.690	0 26.2500	11:25: AM	125.7	58 0.700	0 26.2410	DDB	Muddy sand	Medium	Muddy sand Medium VMS Pockmark
33	22-08-18	102	58 0.541	0 26.3980	11:50: AM	125.2	58 0.541	0 26.3810		Muddy sand	Medium	Muddy sand Medium VMS Pockmark
34	22-08-18	1	57 58.756	0 27.9700	12:39: PM	123.2	57 58.757	0 27.9730	AL	Muddy sand	Very_low	Muddy sand Very_low VMS
35	22-08-18	2	57 58.424	0 27.6110	1:05: PM	117.7	57 58.426	0 27.6050		Muddy sand	Very_low	Muddy sand Very_low VMS
36	22-08-18	3	57 58.234	0 28.3500	1:27:	110.0	57 58.228	0 28.3510	AL	Muddy	Very_low	Muddy sand

					PM					sand		Very_low VMS
37	22-08-18	133	58 0.017	0 21.7600	2:21: PM	117.7	58 0.012	0 21.7540	AL	Muddy sand	Medium	Muddy sand Medium VMS Pockmark
38	22-08-18	163	58 0.302	0 20.8000	2:48: PM	118.0	58 0.300	0 20.8000	AL	Ectone	Very_high	Well Ecotone Very high VMS
39	22-08-18	137	58 1.451	0 22.0840	5:58: AM	120.0	58 1.44	0 22.0720		Ecotone	Medium	Well Ecotone Medium VMS
41	23-08-18	95	nd	nd	nd	nd	58 01.888	0 28.02		Muddy sand	Very_low	Muddy sand Very_low VMS Pockmark
42	23-08-18	181	58 1.157	0 17.3470	7:53: AM	119.2	58 1.148	0 17.3660		Sandy mud	High	Sandy mud High VMS Pockmark
43	23-08-18	187	58 01.56	0 13.7370	8:32: AM	119.5	58 01.566	0 13.7480		Sandy mud	High	Sandy mud High VMS
45	23-08-18	189	58 2.3	0 13.1970	9:17: AM	119.9	58 2.285	0 13.2220	AL, DDB , O2	Sandy mud	High	Sandy mud High VMS
46	23-08-18	188	58 1.826	0 13.3120	10:52: AM	120.0	58 1.822	0 13.3120		Sandy mud	High	Sandy mud High VMS
47	23-08-18	191	58 1.295	0 12.8350	11:21: AM	119.7	58 1.300	0 12.8630		Sandy mud	Medium	Sandy mud Medium VMS
48	23-08-18	202	58 0.979	0 10.9550	11:51: AM	116.5	58 0.984	0 11.0030	AL	Sandy mud	Medium	Sandy mud Medium VMS
49	23-08-18	203	58 0.977	0 10.4830	12:17: PM	117.3	58 0.985	0 10.4950		Sandy mud	Medium	Sandy mud Medium VMS
50	23-08-18	210	58 1.32	0 10.6440	12:38: PM	118.6	58 1.333	0 10.6560	AL, DDB , O2	Sandy mud	Medium	Sandy mud Medium VMS Pockmark
51	23-08-18	204	58 1.378	0 11.4440	1:01: PM	118.6	58 01.391	0 11.4360		Sandy mud	Medium	Sandy mud Medium VMS
52	23-08-18	209	58 01.801	0 10.6900	1:32 PM	121.9	58 01.811	0		Sandy	Medium	Sandy mud

								16:26:24		mud		Medium VMS Pockmark
54	23-08-18	211	58 01.919	0 11.5750	2:18: PM	121.5	58 01.907	0 11.5620		Sandy mud	Medium	Sandy mud Medium VMS Pockmark
61	26-08-18	212	58 2.046	0 11.5590	6:49: AM	122.0	58 2.042	0 11.5530		Sandy mud	Medium	Sandy mud Medium VMS Pockmark
62	26-08-18	206	58 01.805	0 11.1060	7:55: AM	118.8	58 01.810	0 11.0940		Sandy mud	Medium	Sandy mud Medium VMS
63	26-08-18	205	58 01.57	0 10.5710	8:18: AM	118.3	58 01.566	0 10.5630		Sandy mud	Medium	Sandy mud Medium VMS
64	26-08-18	213	58 01.651	0 11.4630	8:41: AM	119.2	58 01.658	0 11.4650		Sandy mud	Medium	Sandy mud Medium VMS Pockmark
66	26-08-18	190	58 01.623	0 14.3480	9:40: AM	119.2	58 01.623	0 14.3820		Sandy mud	High	Sandy mud High VMS
67	26-08-18	180	58 01.402	0 17.0730	11:04: AM	120.0	58 01.403	0 17.1020				
68	26-08-18	183	58 01.239	0 16.7210	11:30: AM	121.7	58 01.237	0 16.7310		Sandy mud	High	Sandy mud High VMS Pockmark
69	26-08-18	182	58 0.718	0 17.1960	11:51: AM	119.2	58 0.741	0 17.1980		Sandy mud	High	Sandy mud High VMS Pockmark
70	26-08-18	151	58 01.907	0 19.5960	12:34: PM	120.0	58 01.896	0 19.6190		Sandy mud	Very_high	Sandy mud Very_high VMS
71	26-08-18	34	57 58.457	0 20.2000	1:28: PM	114.0	57 58.457	0 20.2350		Muddy sand	Very_high	Muddy sand Very_high VMS
72	26-08-18	35	57 58.332	0 19.4250	1:52: PM	113.7	57 58.319	0 19.4130	DDB	Muddy sand	Very_high	Muddy sand Very_high VMS
73	26-08-18	36	57 58.522	0 18.6400	2:14: PM	114.0	57 58.522	0 18.6610		Muddy sand	Very_high	Muddy sand Very_high VMS

74	26-08-18	37	57 57.913	0 18.9130	2:36: PM	115.0	57 57.898	0 19.90		Muddy sand	Very_high	Muddy sand Very_high VMS
78	28-08-18	55	57 59.761	0 18.4450	8:06: AM	116.6	57 59.763	0 18.4550		Ectone	Very_high	Ectone Very_high VMS Pockmark
80	28-08-18	54	57 59.443	0 19.5280	8:55: AM	117.2	57 59.447	0 19.5320		Ectone	Very_high	Ectone Very_high VMS Pockmark
81	28-08-18	53	57 59.484	0 18.9660	9:17: AM	117.5	57.59.488	0 18.9360		Ectone	Very_high	Ectone Very_high VMS Pockmark
82	28-08-18	52	57 58.883	0 19.0450	10:58: AM	118.5	57 58.887	0 19.0540		Ectone	Very_high	Ectone Very_high VMS Pockmark
83	28-08-18	lander	57 58.767	0 22.4100	11:38: AM	116.9	57 59.761	0 22.4090				
84	27-08-18	177	58 0.372	0 15.8480	12:34: PM	117.9	missed	missed		Muddy sand	Very_low	Muddy sand Very_low VMS
87	28-08-18	4	57 57.802	0 27.6270	6:22: AM	108.7	57 57.822	0 27.6270		Muddy sand	Very_low	Muddy sand Very_low VMS
88	28-08-18	5	57 58.056	0 27.9570	6:42: AM	108.2	57 58.056	0 27.9750		Muddy sand	Very_low	Muddy sand Very_low VMS
91	28-08-18	103	58 0.716	0 26.2960	8:14: AM	119.3	58 0.712	0 26.3060		Muddy sand	Medium	Muddy sand Medium VMS Pockmark
92	28-08-18	105	58 0.1.063	0 26.6130	8:39: AM	121.7	58 01.06	0 26.6210		Muddy sand	Medium	Muddy sand Medium VMS Pockmark
93	28-08-18	106	58 0.978	0 26.0590	9:03: AM	119.6	58 0.982	0 26.0390		Muddy sand	Medium	Muddy sand Medium VMS Pockmark
95	28-08-18	98	58 02.423	0 29.2270	11:07: AM	110.9	58 02.422	0 29.2390		Muddy sand	Very_low	Muddy sand Very_low VMS Pockmark
96	28-08-18	97	58 02.602	0 28.8030	11:31:	111.0	58 02.607	0 28.8030		Muddy	Very_low	Muddy sand

					AM					sand		Very_low VMS Pockmark
106	30-08-18	66	57 59.647	0 17.5560	7:51: AM	116.6	57 59.645	0 17.5770		Muddy sand	High	Muddy sand High VMS Pockmark
107	30-08-18	80	57 59.088	0 13.3850	8:32: AM	113.3	57 59.087	0 13.3780		Muddy sand	High	Muddy sand High VMS Pockmark
108	30-08-18	81	57 59.053	0 13.2590	8:54: AM	114.9	57 59.049	0 13.2680		Muddy sand	High	Muddy sand High VMS Pockmark
109	30-08-18	75	57 58.563	0 13.5690	9:16: AM	111.5	57 58.558	0 13.5780		Muddy sand	High	Muddy sand High VMS Pockmark
113	30-08-18	130	58 0.839	0 22.5780	12:06: PM	120.0	58 0.84	0 22.5890		Muddy sand	High	Muddy sand High VMS Pockmark
114	30-08-18	132	58 01.058	0 21.8880	12:28: PM	118.4	58 01.064	0 21.8870		Ectone	Medium	Ectone Medium VMS Pockmark
115	30-08-18	129	58 01.211	0 22.3940	1:09: PM	118.0	58 01.208	0 22.3930		Ectone	Medium	Ectone Medium VMS Pockmark
116	30-08-18	128	58 02.247	0 23.0640	1:38: PM	119.7	58 02.247	0 23.0540		Ectone	Medium	Ectone Medium VMS Pockmark
117	30-08-18	131	58 02.064	0 22.0950	2:09: PM	119.7	58 02.066	0 22.0930		Ectone	Medium	Ectone Medium VMS Pockmark
118	30-08-18	150	58 01.995	0 20.2050	2:31: PM	118.9	58 02.001	0 20.2050		Sandy mud	Very_high	Sandy mud Very_high VMS

8.3. Cruise Narrative (by day)

Poseidon cruise POS527 August 14 – September 3, 2018

All the dates and times are in UTC.

The Station positions in the narrative are the planned positions. Please check the tables for CTD Deployments, Box Core Deployments, and also in the ship´s log for the actual positions, as they will be slightly different.

August 14 and 15, 2018

Mobilisation and departure

Cruise POS 527 mobilised in Kiel on August 14, 2018. We sailed in the morning of August 15 with very calm weather in the Baltic Sea. In the Skagerrak and the North Sea the wind and waves were a little more demanding for some of the cruise participants.

August 18, 2018

We arrived at the Goldeneye site at 0530 h (UTC) and commenced with finding and recovering the NOC Develogic lander. The wind was ca. 6 Bf, with significant wave action. We did not manage to communicate with the lander. We have tried several different positions in order to have a successful data transfer between the hydrophone and the lander, but so far no luck. We are now conducting multibeam surveys in order to locate the lander on the seafloor. We have had no luck with this approach, and it is not clear whether the lander is actually not present at the position it was placed, or the noise in the multibeam signal did not allow us to recognise the lander.

The poor weather conditions only allowed us to undertake a CTD cast (station 1) and no box corer work or MPI lander deployment could be undertaken.

We will continue tomorrow with attempts to communicate with the lander.

Station 1 Goldeneye Lander site; water depth ca. 115 m

1100 h CTD deployment at 57°59,670 N and 0°22,205 W

August 19, 2018

Station 2

0628 h Box core deployment (obj 29) 57°59.3863 N and 0°21.9858 W

Station 3

0754 h Deployment of MPI lander 57°59.3863 N and 0°21.9858 W

Station 4

0837 h Box core deployment (obj 18) 57°59.0222 N and 0°21.8698 W

Station 5

0859 h CTD deployment 57°59.0222 N and 0°21.8698 W

0945 h Communicate with Develogic Lander and recover. This was not successful

Station 6

1300 h Box core deployment (obj 19) 57°58.7160 N and 0°22.6288 W

Station 7

1223 h Box core deployment (obj 17) 57°59.1056 N and 0°23.1421 W

Station 8

1300 h Box core deployment (obj 25) 57°59.4990 N and 0°23.1635 W

Station 9

1339 h Box core deployment (obj 20) 57°57.5179 N and 0°23.0752 W

Station 10

1404 h CTD deployment 57°57.5179 N and 0°23.0752 W

Station 11

1439 h Box core deployment (obj 21) 57°57.4939 N and 0°21.9176 W

Station 12

1522 h Box core deployment (obj 33) 57°58.9415 N and 0°20.2620 W

We had excellent weather and wave conditions for our activities. Overall, a very successful day and the activities were undertaken smooth and efficiently. The Develogic lander could not be located, and we were not able to communicate with the lander.

August 20, 2018

Station 13

0622 h Box core deployment (obj 148) 58°2.0226 N and 0°19.8135 W

Station 14

0653 h Box core deployment (obj 147) 58°1.9642 N and 0°19.1873 W

Station 15

0710 h CTD deployment 58°1.9642 N and 0°19.1873 W

Station 16

0747 h Box core deployment (obj 149) 58°2.2877 N and 0°18.6688 W

Station 17

0819 h Box core deployment (obj 160) 58°1.7029 N and 0°19.5506 W

Station 18

0846 h Box core deployment (obj 161) 58°2.0653 N and 0°18.9835 W

1000 h Communicate with Develogic Lander and recover. Not successful.

Station 19

1209 h Recover MPI lander 57°59.3863 N and 0°21.9858 W

Station 20

1316 h Box core deployment (obj 162) 58°2.3016 N and 0°19.1904 W

Station 21

1330 h CTD deployment 58°2.3016 N and 0°19.1904 W

Station 22

1418 h Box core deployment (obj 158) 58°2.1925 N and 0°20.1367 W

Station 23

1442 h Box core deployment (obj 159) 58°2.1204 N and 0°19.5947 W

Station 24

1512 h Box core deployment (obj 179) 58°1.5445 N and 0°17.4634 W

Again, excellent weather conditions, and low wave actions. The activities for the day were all successfully undertaken. Multibeam work was undertaken between end of station work and the departure for Aberdeen at 2200 h.

August 21, 2018

Scientist change in Aberdeen Arrival ca. 0700 h and departure at 1700 h. Also cable replaced on Box Corer.

August 22, 2018

Station 26

0620 h CTD deployment 58°1.883687 N and 0°28.070470 W

Station 27

0654 h Deployment of MPI lander 58°1.883687 N and 0°28.070470 W

Station 28

0806 h CTD deployment 58°1.862062 N and 0°27.477699 W focussed on sensor deployment

Station 29

0851 h Box core deployment (obj 94) 58°1.862062 N and 0°27.477699 W

Station 30

0921 h Box core deployment (obj 93) 58°1.618796 N and 0°27.511103 W

Station 31

1054 h Box core deployment (obj 104) 58°0.865337 N and 0°26.440486 W

Station 32

1125 h Box core deployment (obj 103) 58°0.701765 N and 0°26.251663 W

Station 33

1150 h Box core deployment (obj 102) 58°0.549354 N and 0°26.390491 W

Station 34

1239 h Box core deployment (obj 1) 57°58.732614 N and 0°27.929904 W

Station 35

1305 h Box core deployment (obj 2) 57°58.410333 N and 0°27.590230 W

Station 36

1327 h Box core deployment (obj 3) 57°58.225097 N and 0°28.357706 W

Station 37

1421 h Box core deployment (obj 133) 58°0.007393 N and 0°21.769847 W

Station 38

1448 h Box core deployment (obj 163) 58°0.297382 N and 0°20.786484 W

Station 39

1520 h Box core deployment (obj 137) 58°1.436274 N and 0°22.073752 W

1830 h Communicate with Develogic Lander. This was not successful.

Multibeam work through the night.

This was a very successful day, with many smooth operations and good weather conditions.

August 23, 2018

Station 40

0627 h Retrieval of MPI lander 58°1.883687 N and 0°28.070470 W

Station 41

0658 h Box core deployment (obj 95) 58°1.883687 N and 0°28.070470 W

Station 42

0757 h Box core deployment (obj 181) 58°1.1519 N and 0°17.3864 W

Station 43

0836 h Box core deployment (obj 187) 58°1.553524 N and 0°13.792217 W

Station 44

0843 h CTD deployment 58°1.553524 N and 0°13.792217 W

Station 45

0922 h Box core deployment (obj 189) 58°2.328452 N and 0°13.215757 W

Station 46

1056 h Box core deployment (obj 188) 58°1.827596 N and 0°13.276164 W

Station 47

1125 h Box core deployment (obj 191) 58°1.286513 N and 0°12.801917 W

Station 48

1154 h Box core deployment (obj 202) 58°0.972868 N and 0°10.998249 W

Station 49

1221 h Box core deployment (obj 203) 58°0.973071 N and 0°10.492822 W

Station 50

1243 h Box core deployment (obj 210) 58°1.338659 N and 0°10.651572 W

Station 51

1306 h Box core deployment (obj 204) 58°1.377100 N and 0°11.471959 W

Station 52

1335 h Box core deployment (obj 209) 58°1.806414 N and 0°10.675207 W

Station 53

1348 h CTD deployment 58°1.806414 N and 0°10.675207 W

Station 54

1420 h Box core deployment (obj 211) 58°1.903753 N and 0°11.560453 W

Station 55

1507 h Deployment of MPI lander 58°1.903753 N and 0°11.560453 W

1615 h Communicate with Develogic Lander. This was not successful.

Multibeam work through the night.

August 24, 2018

Station 56

0622 h Retrieval of MPI lander 58°1.903753 N and 0°11.560453 W

Station 57

0907 h CTD deployment 58°1.903753 N and 0°11.560453 W (TA sensor placed on CTD)

Station 58

1219 h CTD deployment 58°1.903753 N and 0°11.560453 W (phosphate sensor placed on CTD, and only discrete samples for nutrients were collected).

Station 59

1409 h Deployment of MPI lander 58°1.903753 N and 0°11.560453 W

1615 h Communicate with Develogic Lander. This was not successful.

Multibeam work through the night.

The weather was such that on August 24 no boxcoring activities could be undertaken. The wave height made it dangerous to deploy and retrieve the boxcorer.

On August 25, we did no work at all, and sheltered behind Peterhead. The weather for August 26 looks fine, and therefore we will return to the study site during the night.

August 26, 2018

Station 60

0616 h Retrieve MPI lander 58°1.903753 N and 0°11.560453 W

Station 61

0652 h Box core deployment (obj 212) 58°2.024750 N and 0°11.515997 W

Station 62

0758 h Box core deployment (obj 206) 58°1.814324 N and 0°11.114927 W

Station 63

0821 h Box core deployment (obj 205) 58°1.562212 N and 0°10.553903 W

Station 64

0844 h Box core deployment (obj 213) 58°1.654524 N and 0°11.450914 W

Station 65

0859 h CTD deployment 58°1.654524 N and 0°11.450914 W

Station 66

0945 h Box core deployment (obj 190) 58°1.622633 N and 0°14.346206 W

Station 67

1108 h Box core deployment (obj 180) 58°1.427636 N and 0°17.120603 W

Station 68

1131 h Box core deployment (obj 183) 58°1.232673 N and 0°16.702520 W

Station 69

1155 h Box core deployment (obj 182) 58°0.694495 N and 0°17.262215 W

Station 70

1244 h Box core deployment (obj 151) 58°1.897615 N and 0°19.619054 W

Station 71

1332 h Box core deployment (obj 34) 57°58.477176 N and 0°20.194874 W

Station 72

1356 h Box core deployment (obj 35) 57°58.317182 N and 0°19.417392 W

Station 73

1417 h Box core deployment (obj 36) 57°58.505990 N and 0°18.629989 W

Station 74

1440 h Box core deployment (obj 37) 57°57.887720 N and 0°18.983368 W

Station 75

1448 h CTD deployment 57°57.887720 N and 0°18.983368 W

Station 76

1517 h Deployment of MPI lander 57°57.887720 N and 0°18.983368 W

1615 h Communicate with Develogic Lander. This was not successful.

Multibeam work after end of lander search.

All activities were successful today. The wind and waves were considerable, but we were able to conduct a full programme of activities and did not lose any time due to poor weather conditions.

August 27, 2018

No station work at all today due to poor weather conditions. We have attempted one box core station, which failed because of swell. We also attempted to recover the MPI lander, which failed because of the strong winds pushing the vessel away from

the lander surface buoys. The only activity we have successfully conducted today was multibeam surveying.

August 28, 2018

Station 77

0715 h Retrieve MPI lander 57°57.887720 N and 0°18.983368 W

Station 78

0809 h Box core deployment (obj 55) 57°59.764247 N and 0°18.439676 W

Station 79

0821 h CTD deployment 57°59.764247 N and 0°18.439676 W

Station 80

0858 h Box core deployment (obj 54) 57°59.448841 N and 0°19.501354 W

Station 81

0921 h Box core deployment (obj 53) 57°59.484435 N and 0°18.970024 W

Station 82

1102 h Box core deployment (obj 52) 57°58.878001 N and 0°19.058370 W

Station 83

1141 h Box core deployment (obj Develogic lander) 57°59.699 N and 0°22.419 W

Station 84

1235 h Box core deployment (obj 177) 58°0.382336 N and 0°15.877410 W

Station 85

1416 h CTD deployment 57°59.699 N and 0°22.419 W

1630 h Multibeam surveying for the night

This was a quite successful day. The retrieval of the PI lander in the morning was successful, but took more time as expected due to challenging current conditions. The subsequent programme was smooth, but weather conditions deteriorated and station 84 had to be the last box core stations. Following a last CTD station, we continued with multibeam surveying.

August 29, 2018

Station 86

0601 h CTD deployment 57°57.799447 N and 0°27.614649 W

Station 87

0626 h Box core deployment (obj 4) 57°57.799447 N and 0°27.614649 W

Station 88

0645 h Box core deployment (obj 5) 57°58.048096 N and 0°27.949725 W

Station 89

0710 h Box core deployment (obj 3) 57°58.225097 N and 0°28.357706 W not conducted, but station number was maintained

Station 90

0720 h Deploy MPI lander 57°58.048096 N and 0°27.949725 W

Station 91

0818 h Box core deployment (obj 103) 58°0.701765 N and 0°26.251663 W

Station 92

0843 h Box core deployment (obj 105) 58°1.055290 N and 0°26.593548 W

Station 93

0906 h Box core deployment (obj 106) 58°0.975543 N and 0°26.033662 W

Station 94

1048 h CTD deployment 58°2.619824 N and 0°28.855030 W

Station 95

1111 h Box core deployment (obj 98) 58°2.435054 N and 0°29.2500 W

Station 96

1134 h Box core deployment (obj 97) 58°2.619824 N and 0°28.855030 W

Station 97

1220 h Gravity core deployment (obj 103) 58°0.701765 N and 0°26.251663 W

Station 98

1248 h Gravity core deployment (obj 103) 58°0.701765 N and 0°26.251663 W

Station 99

1317 h Gravity core deployment (obj 103) 58°0.701765 N and 0°26.251663 W

Station 100

1400 h Gravity core deployment (obj Develogic lander) 57°59.699 N and 0°22.419 W

Station 101

1424 h Gravity core deployment (obj Develogic lander) 57°59.699 N and 0°22.419 W

Station 102

1444 h Gravity core deployment (obj Develogic lander) 57°59.699 N and 0°22.419 W

1630 h Multibeam surveying for the night

All activities were successful today. The wind and waves conditions were good for working and we were able to conduct a full programme of activities.

August 30, 2018

Station 103

0613 h Gravity core deployment (obj 29) 57°59.346658 N and 0°22.080441 W

Station 104

0622 h Gravity core deployment (obj 29) 57°59.346658 N and 0°22.080441 W

Station 105

0650 h CTD deployment 57°59.346658 N and 0°22.080441 W

Station 106

0751 h Box core deployment (obj 66) 57°59.624362 N and 0°17.544770 W

Station 107

0835 h Box core deployment (obj 80) 57°59.081962 N and 0°13.400211 W

Station 108

0857 h Box core deployment (obj 81) 57°59.042604 N and 0°13.253027 W

Station 109

0919 h Box core deployment (obj 75) 57°58.563911 N and 0°13.58800 W

Station 112

1104 h Retrieval MPI lander 57°58.048096 N and 0°27.949725 W

Station 113

1209 h Box core deployment (obj 130) 58°0.838020 N and 0°22.556887 W

Station 114

1232 h Box core deployment (obj 132) 58°1.091366 N and 0°21.838678 W

Station 115

1313 h Box core deployment (obj 129) 58°1.221211 N and 0°22.459893 W

Station 116

1341 h Box core deployment (obj 128) 58°2.253415 N and 0°23.067864 W

Station 117

1411 h Box core deployment (obj 131) 58°2.066807 N and 0°22.113186 W

Station 118

1434 h Box core deployment (obj 150) 58°2.011423 N and 0°20.252681 W

Station 120

1446 h CTD deployment 58°2.011423 N and 0°20.252681 W

Station 121

1513 h Deployment of MPI lander 58°2.011423 N and 0°20.252681 W

1630 h Multibeam work for the night.

All activities were successful today. The wind and waves conditions were excellent for working and we were able to conduct a full programme of activities.

August 31, 2018

Station 122

0608 h Retrieval of MPI lander 58°2.011423 N and 0°20.252681 W

Departure for Kiel after lander retrieval. We arrived in Kiel on September 3, 2018 at 0700 h (UTC).

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