RV Poseidon POS530

Cruise Report

„MineMoni 2018“

Mine Monitoring in the German Baltic Sea 2018;
Environmental baseline study testing UDEMM Best Practices

01rst – 21rst October 2018,
Kiel (Germany) – Kiel (Germany)

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2018

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1 Cruise Summary

1.1 Summary

Poseidon cruise POS530 took place within the framework of the BMBF – funded UDEMM project (Environmental monitoring for the delaboration of munition in the sea). There are two overarching goals in this cruise: One is to test and verify the best practices developed in the UDEMM project during a large scale Baltic sampling and mapping cruise (-> blueprint for coming monitoring cruises). The second is to acquire the first scientifically acquired baseline data set of the contamination by munition contaminants (incl. TNT) in the vicinity of some of the munition dump sites in the Baltic Sea. Three main sites were chosen based on historic reconstruction work prior to the survey. The transits to and in between those sites were planned along former constraint routes during WWII. These routes were main target of the British Air Force and mines and bombs can be expected along these ways. During transits water samples were taken with CTD-rosette-mounted Niskin bottles in regular distances in order to get a dense cluster of TNT measurements across the German Baltic Sea. First action inside the research areas always was the high-resolution hydroacoustic mapping. Based on the findings, stations for the following program were planned. This included additional water sampling, the deployment of mussel bags for biomonitoring, AUV surveys with the GIRONA 500, Subbottom Profiler and ADCP profiles, underwater video surveys and sediment sampling. By the use of these methods the areas are surveyed and analyzed in terms of their munition content and distribution (as objects on the seafloor, but also dissolved inside the water), their sedimentary composition (subseafloor and surficial sediments) and their current regime.

1.2 Zusammenfassung

Die Poseidon Ausfahrt POS530 erfolgte im Rahmen des BMBF- geförderten UDEMM Projekts (Umweltmonitoring für die Delaboration von Munition im Meer). Dazu wurden zwei übergreifende Ziele definiert: Zum Einen sollen in UDEMM entwickelte Methoden in einer groß-skaligen Kartierungs- und Bepropungsausfahrt in der Ostsee getested und verifiziert werden um in Zukunft als Vorlage für breitangelegte Monitorings zu fungieren. Zum Anderen geht es darum die ersten wissenschaftlichen Ausgangsdaten zur Kontamination durch sprengstofftypische Verbindungen (u.a. TNT) in einigen belasteten Gebieten in der deutschen Ostsee zu generieren. Drei Hauptarbeitsgebiete wurden auf Basis von historischen Recherchearbeiten vor Beginn der Ausfahrt bestimmt. Die Transitstrecken zu und zwischen den Untersuchungsgebieten wurden entlang von ehemaligen Zwangswegen geplant. Diese Routen wurden im zweiten Weltkrieg verstärkt von der Britischen AirForce bombadiert, wodurch hier mit Bomben und Minen zu rechnen ist. Während der Transits wurden in regelmäßigen Abständen Wasserproben in Niskin Flaschen genommen, die auf einer CTD-Rosette angebracht sind. So soll ein dichtes Netz von TNT Messungen für die deutsche Ostsee entstehen. In den Untersuchungsgebieten begannen die Arbeiten jeweils mit einer hochaufgelösten hydroakustischen Kartierung. Basierend auf den Ergebnissen wurden dann die Stationen für weitere Wasserproben, Muschelstationen für Biomonitoring, AUV Tauchgänge mit dem GIRONA 500 AUV, Subbottom Profiler und ADCP Profile, unterwasser Video Profile, sowie Sedimentproben bestimmt und durchgeführt. Mithilfe der beschriebenen Methoden werden die einzelnen Gebiete untersucht und in Hinblick auf ihre Munitionsvorkommen und -Verteilung (als Objekte auf dem Meeresboden, sowie als Lösungen im Wasser), der sedimentologischen Zusammensetzung (im Untergund und an der Meeresbodenoberfläche), sowie ihres Strömungsregimes analysiert.

2 Participants

2.1 Principal Investigators

Name	Institution
Beck, Aaron J., Dr.	GEOMAR
Greinert, Jens, Prof.	GEOMAR
Kampmeier, Mareike, M.Sc.	GEOMAR
Maser, Edmund, Prof.	GEOMAR
Schlosser, Christian, Dr.	CAU Kiel
Strehse, Jennifer, M.Sc.	CAU Kiel

2.2 Scientific Party

Name	Discipline	Institution
Greinert, Jens	Marine Geology / Chief Scientist	GEOMAR
Kampmeier, Mareike	Marine Geology / Senior Scientist	GEOMAR
Gazis, Iason	Marine Geology	GEOMAR
Leimann, Ilmar	Marine Geology	GEOMAR
Michaelis, Patrick.	Marine Data Science	GEOMAR
Gonzalez Avalos, Everardo	Marine Data Science	GEOMAR
Beck, Aaron J.	Marine Geochemistry	GEOMAR
Schlosser, Christian	Marine Geochemistry	GEOMAR
Dietz, Alexandra	Marine Geochemistry	GEOMAR
Lösel, Christiane	Marine Geochemistry	GEOMAR
Hamisch, Stephan	Marine Geochemistry	GEOMAR
Diller, Nicolaj	AUV Team	GEOMAR
Schröder, Jens	AUV Team	GEOMAR
Kurbjuhn, Torge	AUV Team	GEOMAR
Barua, Ayushman	AUV Team	GEOMAR
Faber, Claas	Data Management	GEOMAR
Maser, Edmund, Prof.	Toxicology	CAU Kiel
Strehse, Jennifer	Toxicology	CAU Kiel
Appel, Daniel	Toxicology	CAU Kiel
Wichert, Uwe	Historic Analysis	MELUND
Sternheim, Jens	Historic Analysis	MELUND
Essen, Frido Yung Jin	Film Team	Radio Bremen
Rübing, Tobias	Film Team	Radio Bremen
Wangenheim, Lür	Film Team	Radio Bremen
Duda, Jan	Scientific Diver	CAU Kiel
Pagel, Tanja	Scientific Diver	CAU Kiel
Caskie, Benedikt	Scientific Diver	CAU Kiel
Weber, Florian	Scientific Diver	CAU Kiel

Ulrich, Jana	Scientific Diver	CAU Kiel
Jürgens, Fritz	Scientific Diver	CAU Kiel

2.3 Participating Institutions

GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
CAU Christian-Albrechts-Universität zu Kiel
MELUND Ministerium für Energiewende, Landwirtschaft, Umwelt, ländliche Räume und Digitalisierung Schleswig-Holstein

Figure 1: The scientific crew was frequently exchanged during the survey. According to special scientific needs, people were brought on board by support of the THW and German Navy.

2.4 Crew

Name	Rank
Günther, Matthias	Master
von Keller, Magnus	Chief Officer
Hannß, Robin	2nd Officer
Kröger, Kurre Klaas	Chief Engineer
Pieper, Carsten	2nd Engineer
Neitzel, Gerd	Electrician
Meiling, Ralf	Motorman
Mischker, Joachim	Bosun
Rauh, Bernd	SM
Heßelmann, Dirk	SM
Schrage, Frank	SM
Kuhn, Ronald	AB
Heyne, Roland	SM

Kosanke, Patrick	Cook
Gerischewksi, Bernd	Steward

3 Research Program

3.1 Aims of the Cruise

This ship proposal aims at testing new best practices for mapping munition contaminated areas, sample water and sediment and perform bio-indicator monitoring. Those practices have been recently developed in the BMBF funded project UDEMM (Environmental Monitoring for the Delaboration of Munition in the Sea; https://udemm.geomar.de/) that investigates the potential contamination (TNT, ADNT [amino dinitrotoluene], Pb, Hg) from dumped munition of the marine environment. At the same time, the cruise will be the first scientifically sound baseline study for the state of contamination in the water, the sediment and fauna within the German Baltic Sea.

3.2 Agenda of the Cruise

The cruise was set up for three weeks with four main areas (Gelting Bight, Fehmarn, Lübeck Bight and Rügen) and transits in between:

Area	Date	Program
Transit Kiel-Gelting Bight	01.-02.10.2018	CTD
		SVP
		MBES (calibration)
Gelting Bight Area 01	02.- 04.10.2018	SVP
		MBES
		CTD
		TV-CTD
		Grab
		ADCP
Gelting Bight Area 02	03.-04.10.2018	SVP
		MBES
		CTD
		TV-CTD
		Grab
		AUV
		Diver (Mussel bags)
		SBP
		ADCP
Transit Gelting Bight-Fehmarn	04.-05.10.2018	CTD
		GoFlo
Fehmarn Area 01	05.-05.10.2018	MBES
Fehmarn Area 02	05.-10.10.2018	SVP
		MBES
		CTD
		TV-CTD

		Grab
		AUV
		Diver (Mussel bags)
		SBP
		ADCP
Transit Fehmarn – Lübeck Bight	10.-11.10.2018	SVP
		MBES
		CTD
Lübeck Bight Area 01	11.-17.10.2018	SVP
		MBES
		CTD
		TV-CTD
		Grab
		AUV
		SBP
		ADCP
Lübeck Bight Area 02	13.-17.10.2018	SVP
		MBES
		CTD
		GoFlo
		TV-CTD
		Grab
		AUV
		Diver (Mussel bags)
		SBP
		ADCP
Transit Lübeck Bight - Rügen	17.-18.10.2018	CTD
		GoFlo
Rügen	18.-20.10.2018	SVP
		MBES
		CTD
		GoFlo
		TV-CTD
		SBP
		Grab
Transit Rügen - Kiel	20.-21.10.2018	CTD
		GoFlo

Due to the extensive work program and the limited space on board, several crew exchanges were required.

3.3 Methods and devices

3.3.1 Acoustic mapping by ship based multibeam

Most of the working areas have not been mapped in high resolution before and only single findings or information in historic documents exist. Working areas are generally deeper than 12m in order to operate RV POSEIDON. A RESON T50 system was used and installed in the moon pool. If available (close enough to land) we were able to use RTK correction for the GPS position. Motion compensation will be done with a SBG Apogee-U INS system (installed next to the moonpool on deck) and an OCTANS motion unit (inside the lab) as redundant system. Sound velocity profiles were acquired with a Valeport Swift SVP Profiler. GPS and RTK data was controlled via the Septentrio AsteRx-U Marine Full multi-frequency (GPS, GLONASS, Galileo, Beidou) GNSS receiver (Figure 2). The two Septentrio GNSS antennas were mounted on the Back parallel to the vessel with 2m separation. Offsets were measured from shore with a theodolite, using the SBG INS as zero point inside the coordinate system (Table 1).

Table 1: Measured and calculated offsets of the MBES system.

Device	X Stbd +	Y Fwd +	Z down +
Apogee	0.000 m	0.000 m	0.000 m
AsteRx-U	0.930 m	7.680 m	1.669 m
SeaBat T50-P	7.371 m	5.371 m	-5.328 m
Device	**Pitch**	**Roll**	**Heading**
SeaBat T50-P	0.530°	-0.268°	-5.280°

Data acquisition occured with QPS QINSy (in UTM32/33) and processing was done with QPS Qimera and QPS FMGT to derive multibeam and backscatter information which is further processed with SAGA and ArcGIS for supervised and unsupervised object detection. We used the public available Baltic Sea bathymetric data set emodnet. The time needed to complete each survey is based on a 3.5kn survey speed; this will guarantee dense soundings in the along-track direction. Profile spacing had to be chosen as dense as possible, but also in a way that it could be navigated by the vessel crew. Therefore the spacing had to be 20 m minimum, which did not always give 50% overlap (depending on the water depth).

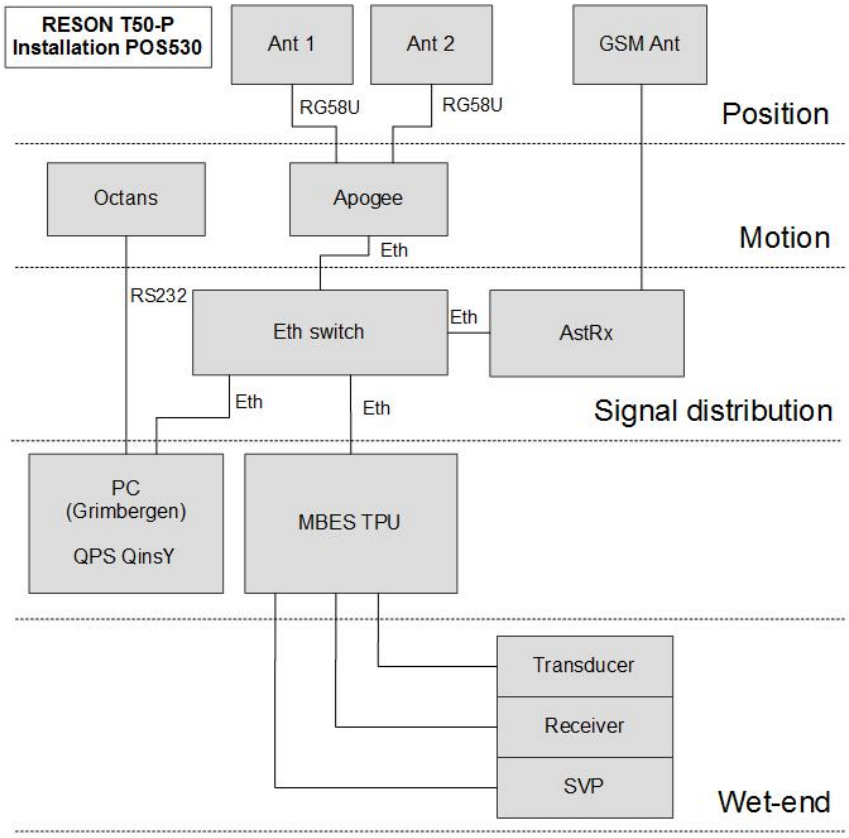


Figure 2: System overview of the RESON Seabat T50-P system.

3.3.2 Acoustic sub seafloor mapping with ship based subbottom profiler (SBP)

The Edgetech SBP is usually integrated into the GEOMAR AUV 'Abyss', but a special mounting frame enabled us to acquire ship based SBP data. The frame was attached to the sidepole and navigation came in from a mobile Hemisphere GPS antenna right above the pole (Figure 3). Settings were 4.0-24.0 kHz and 5 ms pulse length.

Figure 3: Side pole on the aft deck with the Subbottom Profiler attached.

3.3.3 Oceanographic determination of contaminants distribution via ADCP

The German Maritime and Hydrographic Agency (BSH) runs a 3D circulation model (BSHcmod) as an operational ocean prediction model for the Baltic Sea augmented with a multivariate data assimilation system. The BSH provides 72 hours forecast data via the GeoSeaPortal (https://www.geoseaportal.de). The knowledge of the oceanographic conditions during time of station work will allow us to adjust sampling strategies. We used a vessel-mounted ADCP during the cruise.

3.3.4 Optical observations by AUV

The new Autonomous Underwater Vehicle (AUV) Girona500 was recently bought from IQUA Robotics in Spain. This is the second test cruise of the vehicle after the delivery to Geomar.

The Girona500 is an AUV with a size of 1m x 1m x 1,5m. It consists of three main hulls that are connected with an aluminum structure. The total weight of up to 200 kg are packed with all necessary electronics and thrusters to maneuver in five degrees of freedom. It is capable of diving up to 500m deep and has a battery for a mission duration of up to 8 hours. The payload area with 35l of volume makes it valuable for scientists, as it can be packed with additional instruments for specialized tasks. The computer manages all interfaces to the sensors and has additional ports for the payload sensors.

For calculating its current position, the vehicle is equipped with a high precision inertial measurement system (INS). This sensor also uses additional information about its environment from other sensors and fuses them to a position: A Doppler velocity log (DVL) is giving the altitude and the relative velocity over ground, a pressure sensor contributes the depth of the AUV and on the surface GPS is also taken into account. Via an USBL transceiver on the ship and an USBL transponder on the AUV, it is possible to add absolute positioning measurements when the vehicle is submerged. In this case, the modems are also being used for sending basic information between the AUV and the control station or even simple commands. When on surface, the AUV can be controlled over a WIFI connection.

Furthermore, a CTD is permanently installed to measure pressure, salinity, temperature and conductivity.

The basic sensors include:

INS:	**IXblue Phins Combat C3** The internal navigation unit that processes sensor data and provides position information. The error of this INS is in range of 0,15° for heading and 0,05° for roll and pitch. This leads to a 0.3% DT position accuracy.
DVL:	**Teledyne RDI Explorer 600kHz** This device measures the velocity relative to the sea floor and its altitude.
CTD:	**Sea-Bird SBE 49 FastCAT** This measurement device acquires the conductivity, temperature and the pressure of the water and calculates the sound velocity.
Pressure sensor:	**Valeport ultraP** This sensor measures the pressure and converts it to water depth.
USBL:	**Evologics S2CR 18/34** The Evologics S2CR 18/34 modem combines underwater acoustics and positioning.
GPS:	**Quectel l86 GNSS module** The GPS is used to determine the absolute position at the surface.

Additional sensors for this cruise:

Four LED lights:	The lights are used to illuminate the sea floor. They will be turned on by the operator at the start of the mission.
Two Cameras:	**GoPro cameras** The two GoPro cameras were mounted and configured to take an image every 2 seconds
Multibeam	**Imagenex 837B DeltaT 4000** The optionally mounted multibeam sonar is used for mapping purposes.

The software is based on the widely used Robot Operating System (ROS) that suits the modular design perfectly. It offers efficient ways to integrate new software nodes into the system because every component works independently. The architecture is focused on defining interfaces that every component in the system can listen and broadcast to.
The AUV is operated with a Graphical User Interface (GUI) that is used for checking the system prior to a mission, mission planning, execution and mission monitoring. Therefore it needs a connection to the USBL modem, the GPS of the ship and the WIFI access point of the vehicle.
The main goal of this cruise for the AUV is to prove its value to the scientific community. This new technology needs to be explored and integrated into the workflows of the scientists as it offers a new approach with its hovering capability as well as its open architecture regarding hard- and software. Getting to know the vehicle, its limits and its possibilities is the main focus. Since the system is quite new, there will be some configuration and errors happening that have to be addressed by the operators. This experience will be gathered and put into a improved version for future cruises using this AUV.
The missions are described in more detail in the following section.
All data is recorded in a Rosbag-file. This is a standard format in that ROS records data. Each Rosbag-file consists of binary data and holds sequences of records. The specific format can be found at http://wiki.ros.org/Bags/Format.

3.3.5 Optical observations by towed camera

The Video-CTD was used to perform video-tows with real-time seafloor annotation using the OFOP software. All the information will be immediately incorporated into cruise GIS project for further planning. AUV operations will be during the day, Video-CTD tows will also happen during the night. Both systems will use USBL navigation (if needed at the same time). Video footage will be stored and backuped on board and later transferred to GEOMARs Media-Server ProxSys.

3.3.6 Water sampling and pre-concentrating of water for munition compound analyses

During WW II the constraint routes were main target of the British air force. Accordingly mines and aerial bombs can be expected along these ways. The transit routes were planned along those former constraint routes and water samples shall be taken every 10 km, in order to get a dense cluster of TNT measurement across the German Baltic Sea. Water samples will be collected using either CTD-rosette-mounted Niskin bottles or an ultraclean pump and tubing system. Dissolved munition compounds (TNT, Hg, Pb) will be extracted from seawater and preconcentrated onboard with an automated solid-phase extraction device. The resulting sample cartridges will be stored frozen until the end of the cruise, and transported to the laboratory at GEOMAR for further processing and analysis. Particulate samples from the water column will be collected on filters.

3.3.7 Sediment sampling with VanVeen grab

Sediment sampling stations were planned based on the backscatter of the certain area. The sediment is needed as groundtruth to correlate sediment properties (water content and grain size) to backscatter amplitudes. Therefore sediment was collected inside a plastic bag for grain size analysis and in small pre-weight container for water content analysis. A small volume of surface sediments (~200 mL) were collected in plastic bags and stored frozen for further geochemical processing and analysis.

3.3.8 Deployment of bio-monitoring stations

After identification of a larger munition contaminated area with exposed Schiesswolle mussel bags with 5 to 10 mussels will be placed very close to the explosives. Limiting water depth for the mussels is 20 m. Depending on the size of the investigated areas, 4 mussel bags per area should be deployed. The recovery is planned after a defined period of time, depending on the amount of open explosives discovered in the investigated area. In any case one part of the mussel bags will be recovered by divers during the cruise always at the end of the station work in the respective working area. The other part will stay in the area to be recovered at a later stage using FK LITTORINA from GEOMAR (3-4 months later). The analysis of the mussels using GC/MS-MS will be performed at the Institute of Toxicology and Pharmacology for Natural Scientists - University Medical School SH in Kiel after the cruise. The moorings were deployed by a dive team of scientific divers from the CAU Kiel. Their boat was stored on deck for the whole cruise and launched into the water when needed.

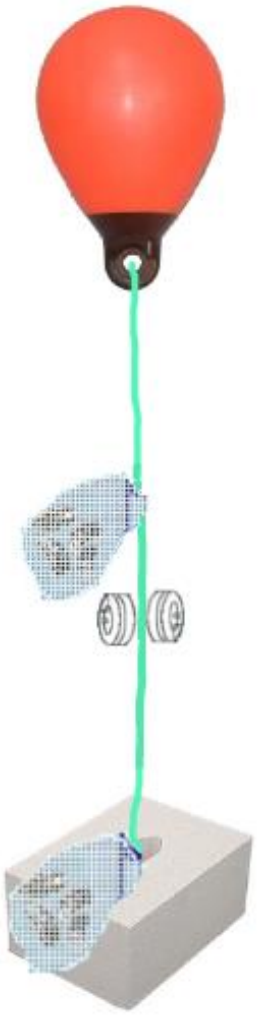


Figure 4: Scetch of a mussel mooring. A buoy is attached to a calcearous sandstone. One net is attached at the bottom, the other one in 1 m height above the seafloor. Two passive sampler are attached right below the upper mussel net.

3.4 Descriptions of the Working Areas

3.4.1 Gelting Bight

Water depth 13 – 22 m; the Gelting Bight is located at the end of the outer Flensburg Fjord.
The Gelting Bight is a very safe area for ships against bad weather conditions. Nearly the complete three sides, west-, south- and east leg are protected by coastline, only the northern part is open to Flensburg Fjord. In end of WW II, beginning in April 1945, the German Navy dislocated all units without battle order in the Flensburg Fjord, Gelting Bight and Fjord Schlei. The main reason for the dislocation was the lack of fuel (oil and coal). In beginning of May 1945, 39 submarines different types sunk themselves in the bight (Operation Regenbogen). All subs were full equipped. After 5th May, 2 flotillas with Fast Patrol Boats (FPB) and some Guard-ships anchored in Gelting Bight. On 10th May the FPB Support unit "CARL PETERS" was hit by an UK ground mine and sunk. The westside of Gelting Bight, directly connected with the Flensburg Fjord is the dumping area of 200 missiles V 1 from 03rd May 1945. The ship "MARIE LOUISE" loaded 200 of the missiles I Flensburg and dumped the complete cargo between Bokholm and the bight. Nearly 40 parts of the missiles, complete objects ort parts of the missiles were found in further time. The central Gelting Bight, "Jürgensflach" was the last place for two redumped ships with a cargo from more as 1600 to Green Ring III (Tabun) CW artillery shells. All shells were recovered, stored in containers and redumped in the North Atlantic.

3.4.2 Fehmarn Belt and Fehmarn Sound

Water depth 15 – 35 m; both straits have been important locations in WW II. The Fehmarn Sound and the approach areas were protected by the island Fehmarn and the continent against weather conditions and enemy attacks. The Fehmarn Belt, a "deep water way" was the route for bigger ships to the Baltic Sea. After beginning air mining by the Royal Air Force (RAF) on 13th /14th April 1940, the German Navy established constraint routes (Figure 5). These straits were secured by guard ships, marked with buoys, lighthouse ships and fixed guardships with Anti-aircraft weapons.

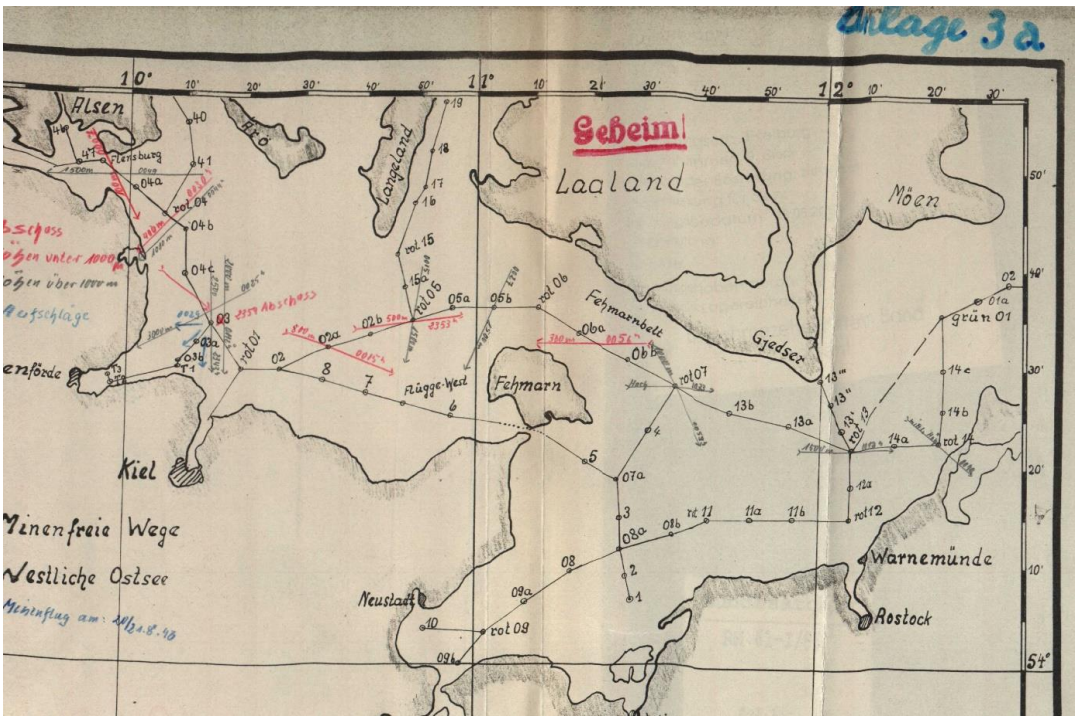


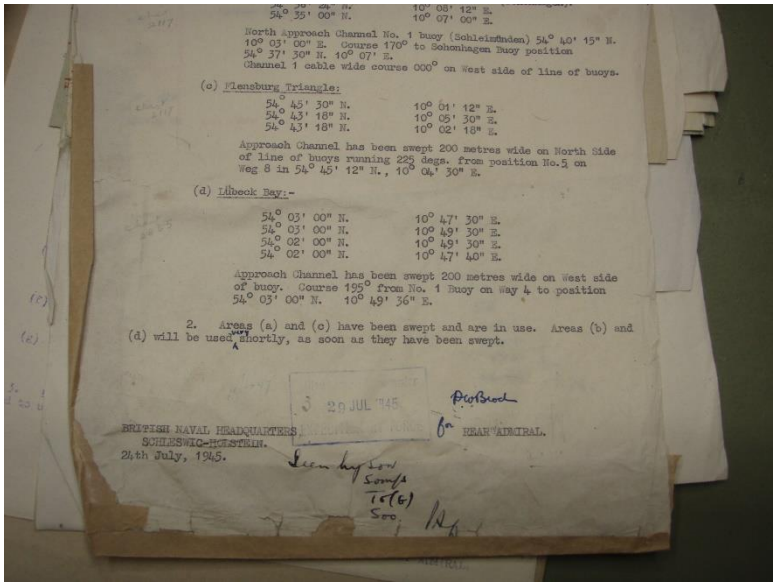
Figure 5: Historic map from the western German Baltic Sea with the constraint routes (BAMA Freiburg RM 45 I 181 Sperrkmdt w. Ostsee).

The constraint routes were numbered and divided in different parts. The route Fehmarn Belt was the way Nr. 1 and the parts were from red 5 on the westside to red 7 on the east side, the way in Fehmarn Sound was Nr. 5. For the Royal Navy as Planning Command and the RAF as Operating Command were both straits one target and was named garden “Radish”. In this target, the RAF dropped at all 450 ground mines. 11 ships sunk or were damaged.

On the other side, the German Navy swept continuously the constraint route and swept nearly 80 % of the dropped mines. In end of WW II, the area, the air attacks from the Fighter Command with fighter and intruder hit and destroyed a number of ships. On the East-cape of Fehmarn, Staberhuk, was the meeting point for nearly 25 ships and submarines, 5 ships sunk, the others were damaged.

3.4.3 Lübeck Bight

Water depth 13-23 m; for the Lübeck Bight, two dumping areas were established.



54° 35' 00" N. 10° 07' 00" E.

North Approach Channel No. 1 buoy (Schleimünden) 54° 40' 15" N. 10° 03' 00" E. Course 170° to Sohonhagen Buoy position 54° 37' 30" N. 10° 07' E.
Channel 1 cable wide course 000° on West side of line of buoys.

(c) Flensburg Triangle:-

54° 45' 30" N.	10° 01' 12" E.
54° 43' 18" N.	10° 05' 30" E.
54° 43' 18" N.	10° 02' 18" E.

Approach Channel has been swept 200 metres wide on North Side of line of buoys running 225 degs. from position No.5 on Weg 8 in 54° 45' 12" N., 10° 04' 30" E.

(d) Lübeck Bay:-

54° 03' 00" N.	10° 47' 30" E.
54° 03' 00" N.	10° 49' 30" E.
54° 02' 00" N.	10° 49' 30" E.
54° 02' 00" N.	10° 47' 40" E.

Approach Channel has been swept 200 metres wide on West side of buoy. Course 195° from No. 1 Buoy on Way 4 to position 54° 03' 00" N. 10° 49' 36" E.

2. Areas (a) and (c) have been swept and are in use. Areas (b) and (d) will be used shortly, as soon as they have been swept.

29 JUL 1945

for REAR ADMIRAL.

BRITISH NAVAL HEADQUARTERS,
SCHLESWIG-HOLSTEIN.
24th July, 1945.

Figure 6: Historic document, giving coordinates of sea dumping ground for munition after the WW II (National Archive Kew / UK).

A later German document from Civil-EOD descript the area and shows a complete number of dumped Ammunition with 60 000 tons, 50 000 tons in Pelzerhaken-area and 10 000 tons in Haffkrug-area (Figure 6). In time 1950-1960, a civil company recovered nearly 15 000 tons of different kinds Ammunition (mostly bombs and heavy artillery shells). But 45 000 tons ore more, are still at sea.
Beginning from 1rst December 1945, the ammunitions were transported by trains to Lübeck Schlutup, loaded from trains to Hubber-barges and were sent in the dumping areas. The sonar screens with a high density of contacts show us the dumping points from the barges with dump a cargo of more as 100 tons in every run.

3.4.4 Rügen

Water depth 35-45 m; along the coastline from Kiel to Kaliningrad (former Königsberg) the main traffic strait was the “Zwangsweg 1” Two “gardens”, “Sweet Pea” with the Kadet-Rinne and “Willow” the area of Rügen and Sassnitz were established by Royal Navy and mined by RAF. 671 mines were dropped in “Sweet Pea” and 341 mines in “Willow” 75 ships were damaged or sunk in these minefields. Nearly the complete area alongside the coastline were used for military activities as exercise and live firing area for anti-aircraft artillery, coastal artillery, and the Airforce. North of Rügen, the Navy needed the area for exercises for all kind of ships, include live firing for Naval guns. On the 20th November 1944 in a gunnery-exercise, the German “Elbing-destroyer” (Torpedoboat) T 34 sunk after hitting a ground mine.

4 Narrative of the Cruise

1st – 7th October 2019

We finalized loading and installing on Monday 1st October at the GEOMAR pier and started the cruise at 16:00 in the afternoon. About 5 minutes later we had the first station at the entrance to the Schwentine River the first water sampling station of many to come. During the night of 1st to 2nd October, we sampled 13 CTD profiles between the Schwentine and Gelting Bight in the north. Areas of potential munition dumps, more specifically the dumping of 167 V1 rockets, were partly mapped by multibeam in the Geltinger Bight; two suspicious objects were identified to be later observed visually. Unfortunately the visibility at the respective water depth was very bad, hindering any clear view of the objects. Instead we performed a number of other visual tows, aiming at habitat studies and ground truth for multibeam based backscatter analyses. Backscatter here means the intensity of the hydro-acoustic signal of the multibeam which has been used for seafloor classification and habitat mapping in coastal and deeper areas. Ground truth data were acquired with a number of VanVeen grabs, and 9 additional CTD profiles were taken further inside the Flensburg Fjord.

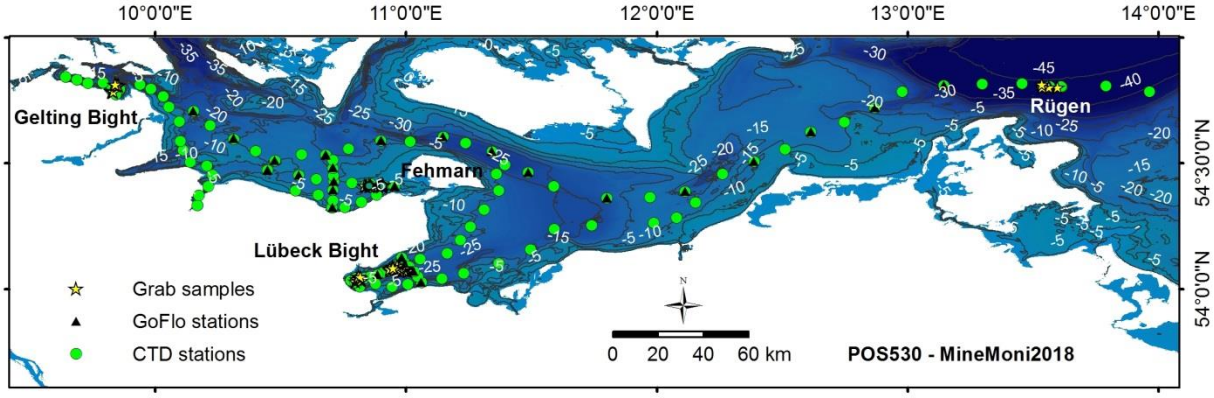


Figure 7: Water samples were taken via CTD and GoFlo along the German Baltic coastline, following the constraint routes from the WW II. In total 249 stations (CTD, GoFlo, Grab samples, MBES, AUV, SBP, divers, ADCP) were accomplished.

The first exchange of personal happened 4th October at 8am. Three people from Radio Bremen and four divers were transported by the THW from Kappeln towards POSEIDON. The weather was brilliant and the sea totally calm. The divers deployed two moorings with small bags of mussels next to one of the suspicious objects, and interviews were given to the film crew. In the evening of the 4th CTD sampling continued on the way towards Fehmarn. After the last CTD station, multibeam mapping started within the Fehmarn Belt and later on in the Fehmarn Sound. Bathymetric data from the latter location showed a handful of objects on the seafloor resembling long, cylindrical artificial bodies, which may be ground mines.

It is virtually impossible to observe a small object on the seafloor using a ship towed camera system as wind and waves make it very difficult to manoeuvre the vessel with 1m accuracy. Thus AUV ANTON could prove that AUVs in such cases are much better suited to such fine scale tasks. Two photo transects with 1m line spacing and a photo interval of 2 sec and 1 sec acquired good data that will be used to generate a complete photo mosaic of the two areas (approx. 30m x 30m each). Both surveys successfully confirmed the existence of strongly overgrown cylindrical objects on the seafloor. By the 7th October at 1:40 pm, gaps inside the MBES data were filled and work continued with grab sampling, followed by another night of CTD and GoFlo casts. The research site is actually partly located inside a firing range of the German Navy in Todendorf. During the day we were not allowed to enter the area,

due to ongoing shooting tests. But during the night of the 7th and also the 10th October we took the chance and took N-S and E-W – transects of CTD water sampling- and GoFlo stations. As this is an active testing site, higher concentrations of explosive compounds within this area are expected

8th – 14th October 2019

After mapping the Fehmarn Sound area, we arranged the field program according to our findings from the multibeam data. To be able to create a habitat classification it is essential to acquire a good set of ground truth data. Therefore we did visual ground truthing with the AUV and TV-CTD, as well as grab samples in different backscatter regimes. After sampling the dark and smelly mud in Geltinger Bight, it was a relief to sample the sandy area of Fehmarn Sound. The sediment here is mainly composed of fine to medium sand with worm tubes on the surface (Figure 2). Formed by currents going through the Fehmarn Sound, we observed fields of sediment ripples in the high-resolution multibeam data. They reach a crest height of ca 15 cm and lengths of 120 cm. To show the influence of the ripple direction onto the sonar data, we ran several multibeam lines over the same ripple field from different directions. Only the ripple-parallel tracks could resolve the characteristic ripple structure, whereas the seafloor seemed to be homogeneous when driving parallel to the ripple's aspect.

Furthermore, we used the time for more detailed testing and to evaluate the best settings to gain high resolution images of mines on the seafloor. Therefore we gave the watch officers a hard time as we asked them to precisely steer the vessel following a star-like pattern over one mine (Figure 3). With a narrow swath, low pulse length and high ping rates the effort paid off and resulted in 10 cm resolution images of a ground mine. This allows us detailed morphological analysis of the mine's size and shape. On the 10th of October, scientific divers from CAU Kiel came back for the second time. The shuttle from Heiligenhafen was done by the THW Ratzeburg and turned out to be a nice boat ride in the sunrise from Neustadt to the 10 m water line where POSEIDON was waiting. Again we had best weather conditions for three dives in total. Two mussel moorings were set out and installed next to two suspicious objects in 13 m water depth. In the evening, the THW boat returned to pick up the divers and brought 3 more crew members and we left the area after six days. Two of new crew members, Jens Sternheim (MELUND) and Uwe Wichert (external consultant) work for the German expert panel 'Expertenkreis Munition im Meer' of the BLANO (Bund Länder Ausschuss Nordsee Ostsee) and can provide detailed historic knowledge about possible munition dumping areas within the Baltic Sea. According to their expertise, a spontaneous mapping session on the eastern side of Fehmarn Island was fit into the night schedule. The area from Staberhuk is a special historical point. At the end of April 1945, submarine school flotilla, auxiliary-ships and merchant ships anchored along the south-east side of the Island of Fehmarn. A massive air attack with fighters from the Royal Air Force hit the ships with guns, rockets and bombs. The ships were damaged or sunk, with a high number of seriously and fatally injured crewmembers. The wrecks were recovered after the war, but ammunition from the attack contaminated the waters around the fighting area. Misfired ammunition and contaminated areas are both of interest within this research operation. By the evening of October 14th we had mapped both dumpsites in Lübeck Bight. Directly on the first multibeam profile we crossed a 75 x 180 m large mound composed of suspicious elongated objects. A TV-CTD profile across this area revealed several grenades and ammunition boxes, but due to the poor visibility at 23 m water depth, the total amount could not be verified.

In addition to the main dump site, another one exists closer to shore. In this more southern site we were hoping for better water conditions and sent the AUV 'Anton' onto his next mission. The footage that was collected was immediately pre-analyzed by Uwe and also shows grenades, ammunition boxes and explosive charges. In short, we do not have problems to find good targets for the coming diver

missions and the deployment of our mussel bags. We collect water from the Niskin bottles at 3-10 depths at each station for measurement of dissolved explosives compounds. These include such chemicals as TNT (trinitrotoluene), and a number of other explosives and their degradation products. Because the Niskin bottles and CTD winch wire include some metal parts, they contaminate the water with metals, and cannot be used for trace element sampling. At a number of stations on this cruise, we instead used GoFlo bottles for ultraclean water sampling. These specialized bottles don't have metal components, and are deployed on a plastic-protected cable. In these samples, we will measure dissolved metals and metalloids including lead and mercury, which were used extensively in primary explosives and are likely to be present at the munitions dumping grounds.

14th – 21st October

During the night from the 14th to 15th October we ran Subbottom Profiler profiles across the area. The morning was filled with two more CTDs until the AUV was ready for its next two dives. The night was then again used for MBES profiling and the calm weather during the day was perfectly suited for more AUV dives. The rest of the day we took grab samples for ground truth and geochemical analyses. Brought by the German Navy, the scientific diver team came on board for the third time on the 17th of October. Again the weather was on our side, the sea was perfectly calm and the sun was shining. Two mussel mooring were installed next to the boxes full of grenades and detailed photos were taken by the divers. The day continued with more grab samples until the evening. Around 6 pm the THW boat came for the crew exchange and two students and one staff of the GEOMAR data management team arrived. With the divers, 6 more scientists left and we felt a little bit lonely, being only 7 people left. It didn't last long though, as we started to take CTDs and GoFlos over the night along the eastern shore line of Lübeck Bight until we reached the north of Ruegen on the evening of the next day. Arriving in our last working area we directly started with a 12 hours mapping session. After working in maximum water depths of 25 meters, the 44 meters here, do feel almost like the deep sea. The stations take longer and the multibeam resolution is slightly decreased. The area north of Rügen was chosen, because a Russian mine has been found here during offshore cable laying work. But except of two shipwrecks and many fishing trawl marks, the area is rather uniform with only a few suspicious objects. Due to the poor visibility close to the bottom, we unfortunately had no chance to identify them. One of the wrecks we also surveyed with the video CTD and got very nice footage of the 30 m long wooden ship. During the night of the 19th to 20th October the mapping went on and we closed our program in this area with a few sub bottom profiler lines and grab samples. Around 5 pm we were ready to head home. At least we headed in that direction. 10 more CTD and GoFlo stations had to be fulfilled and at 8 am in the morning it was finally done. The last station (#249) was taken on the 21st October at 6:20 am and we reached Kiel at noon.

5 Preliminary Results: Hydroacoustic and optical seafloor mapping

5.1 Gelting Bight

Table 2. Overview of the performed work inside the area.

	Area 01	Area 02
Mapped area:	0.75 km^2	4.60 km^2
Water depth:	12.5 – 25.0 m	10.0 – 25.0 m
Acquired data:	• MBES • 2 SVP	• MBES • 3 SVP

	• 2 TV-CTD • 5 Grab samples • 1 SBP	• 1 TV-CTD • 5 Grab samples • 2 CTD • 2 mussel moorings

From the coast the seafloor drops to a flat plain in 22 m water depth. The first area (Area 01) contains a natural ridge structure of ca 100 m lengths and ca 9 m height above the surrounding seafloor. Multibeam data show that on the ridge top occur rocks and boulders. Underwater water video footage reveals lumps of mussels, which characterize the ridge as a natural mussel reef. Suspicious objects were not detected.

The second area (Area 02) is located further to the shore. The flat seafloor is incised by a number of fishery trawl marks. In the south-east of the area the seafloor is shallower and is characterized by a more varying bathymetry (Figure 8). Towed TV-CTD missions showed very low visibility inside the water and rather muddy sediments, often accompanied with bacteria (Figure 11). Grab samples also show rather fine sediments with H_2S smell.

Four suspicious objects were found. Three objects are around 2.5 m long and are most likely ground mines. One, which is suspected to be part of a V1 rocket is around 4 m long (Figure 9 and Figure 10). Due to the poor visibility, none of the objects could be validated by underwater video or divers.

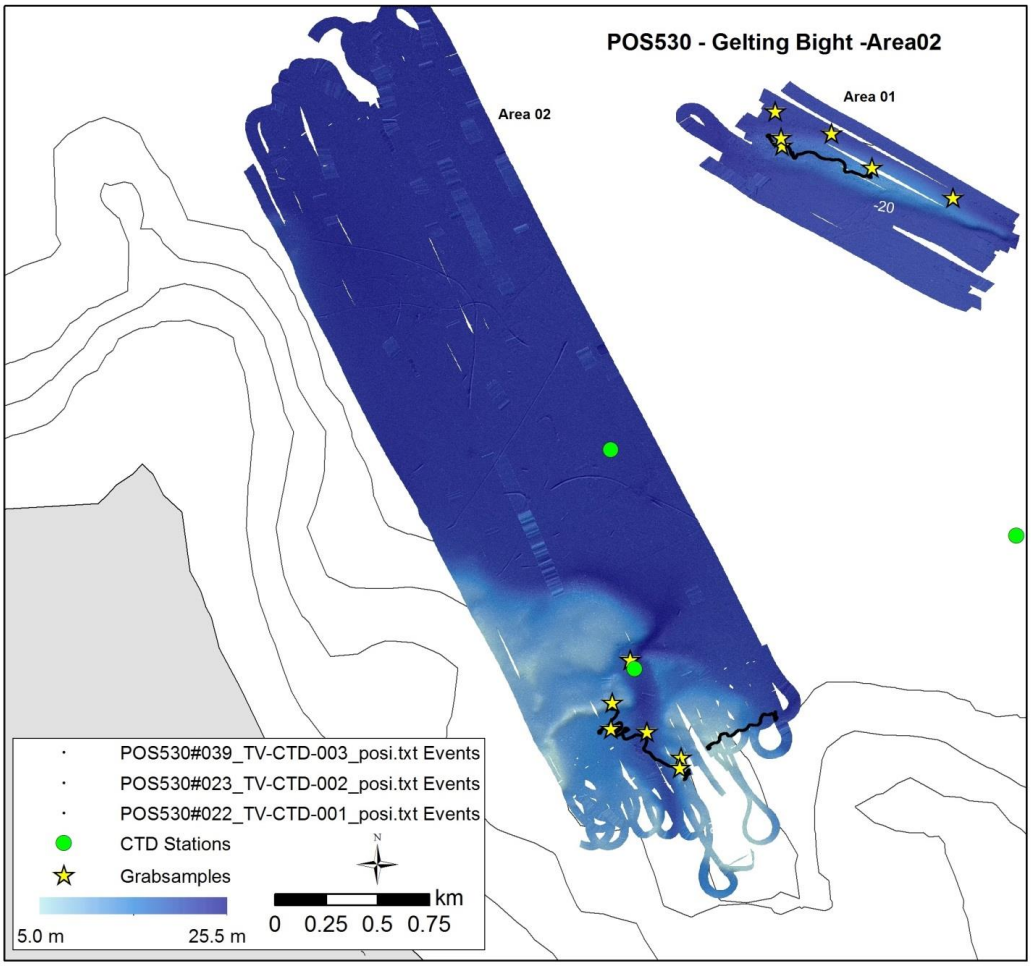


Figure 8: Inside the Gelting Bight two areas were surveyed. The water depth ranges from 12 to 25.5 m, whereby the seafloor is mainly flat. Green circles indicate CTD water sampling stations and the yellow stars mark grab sample locations. One video profile was acquired in area 01 and two in area 02.

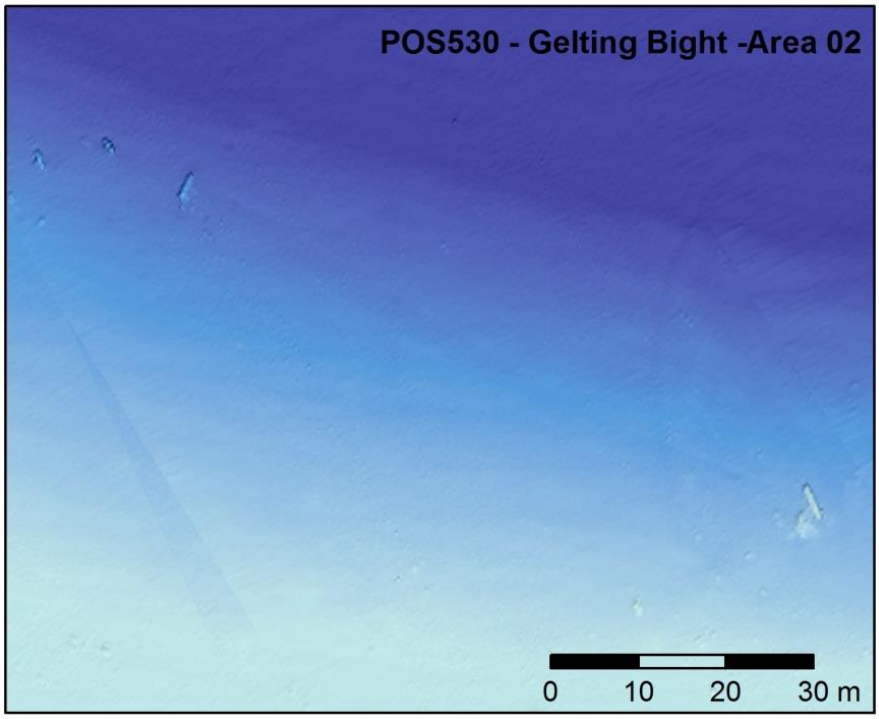


Figure 9: 4 suypicious objects (most likely one torpedo (on the right) and three ground mines werde detected in the MBES data. Their length ranges from 4 – 2 m.

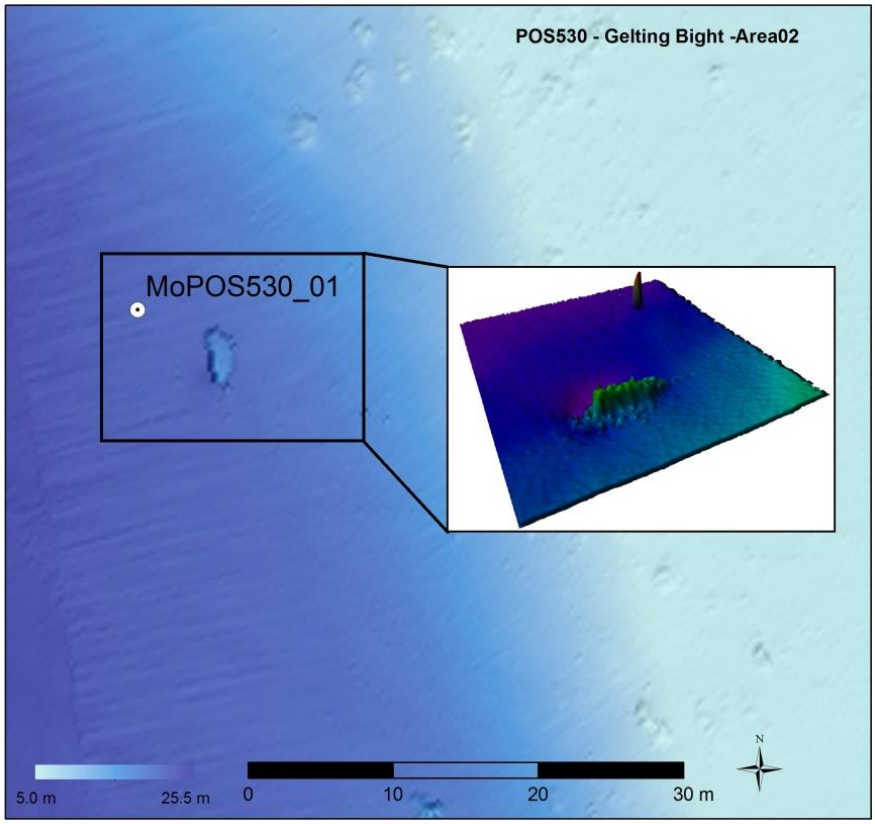


Figure 10: The object of 2.5 m length and 1.3 m width is not clearly identifiable, but could be a half buried V1 rocket. Due to the very low visibility, the finding could not be validated by divers. Next to the object one mussel mooring was installed (9 m distance).

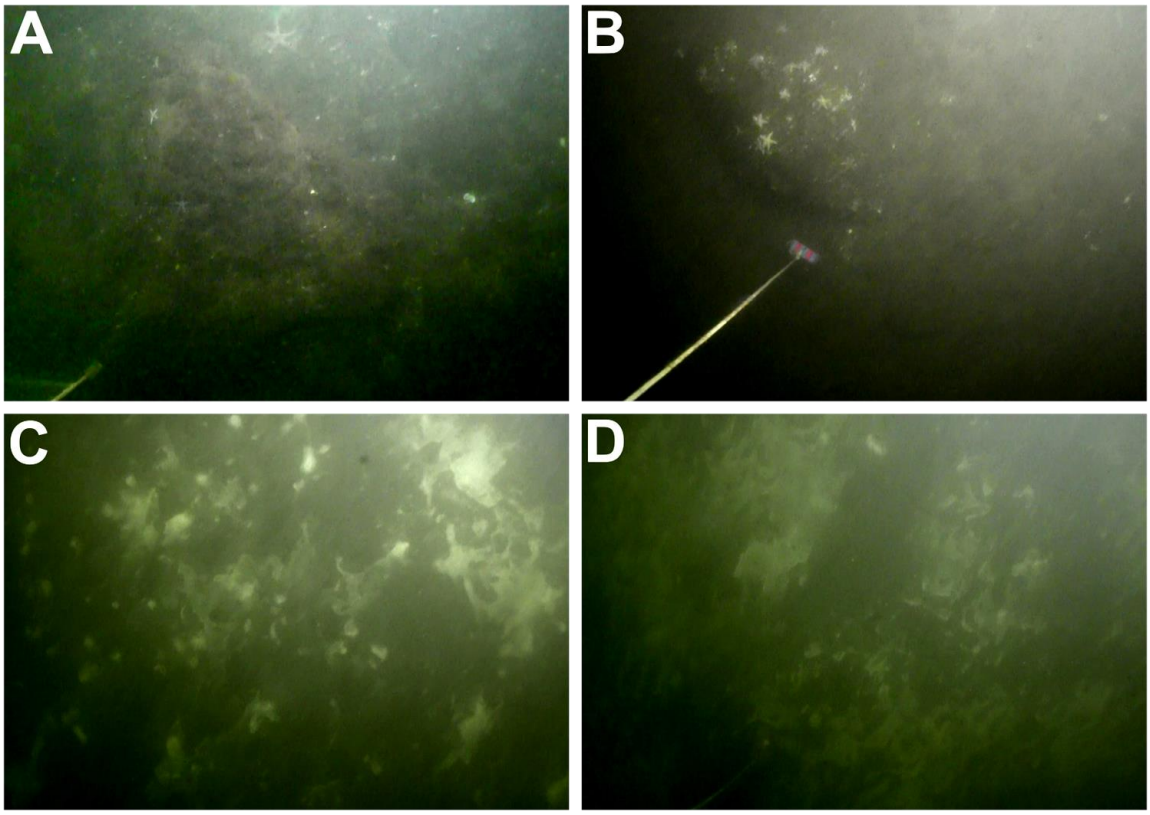


Figure 11: Screenshots from towed underwater video of the TV-CTD. A: Lumps of mussels on the top of the ridge. B: A rock overgrown by mussels and covered with starfisch in Area 01 in Gelting Bight. C: Soft sediment with white bacteria mats in area 02 in Gelting Bight. D: Low visibility and muddy sediments with bacteria in area 02.

5.2 Fehmarn

Table 3. Overview of the performed work inside the area.

	Area 01	Area 02
Mapped area:	3.1 km^2	8.5 km^2
Water depth:	14 – 23 m	10 – 16 m
Acquired data:	• MBES • 1 SVP • 2 CTD • 1 GoFlo	• MBES • 3 SVP • 3 AUV dives • 3 TV-CTD • 20 Grab samples • ADCP • 5 CTD • 2 mussel moorings

Inside the Area 01 in the Fehmarn Belt were no mines found. Mega sand ripples occur on the eastern edge of the mapped area (Figure 14) and indicate a very active seafloor with sediment redistribution. The ripples reach heights of 1 m and show a westerly shallow and easterly steep incident angle. This indicates a formation caused by westerly currents.

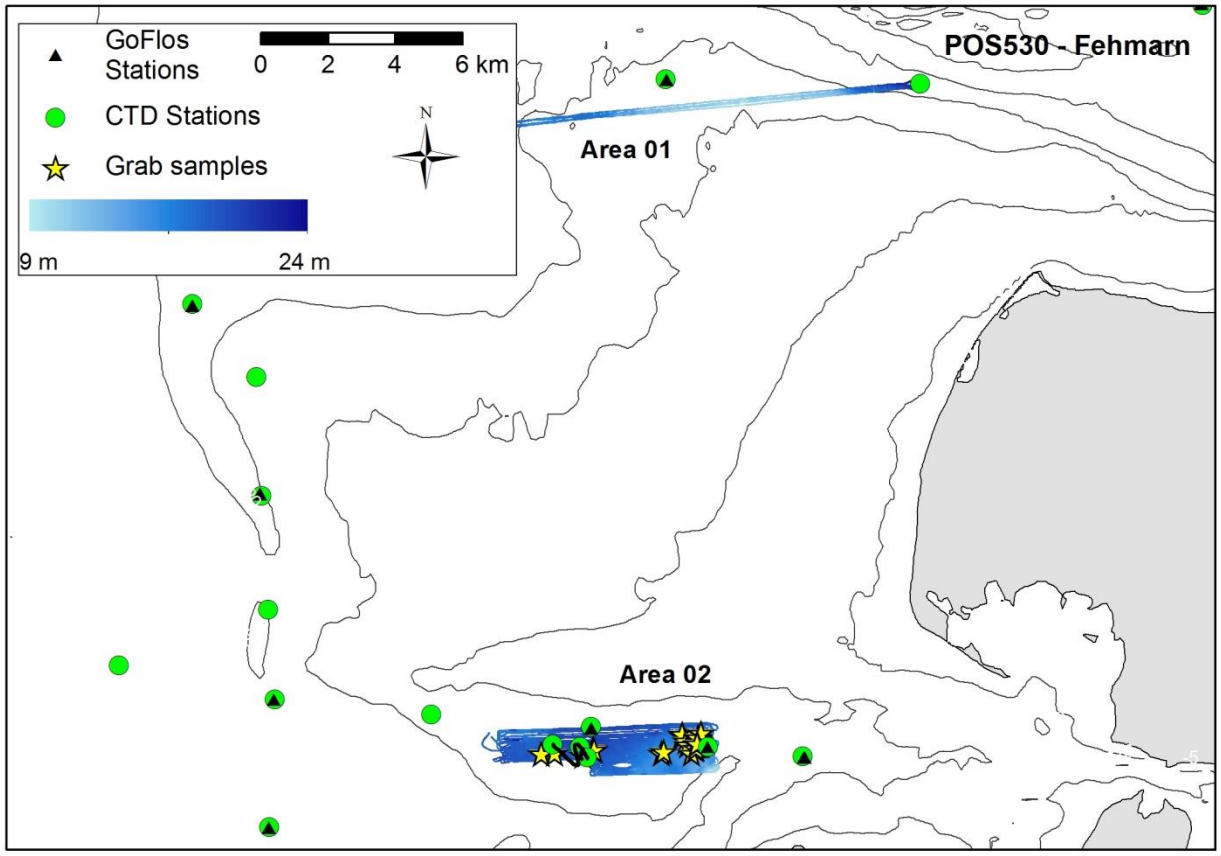


Figure 12: Two areas were surveyed: Area 01 inside Fehmarn Belt and Area 02 inside Fehmarn Sound. The water depth ranges from 10 to 23 m. Green circles indicate CTD water sampling stations and the yellow stars mark grab sample locations.

The second area (inside Fehmarn Sound) is sandy with some outcropping rocky areas. It seems quite active, as it also shows sediment ripples. However those ripples are much smaller than those in the Fehmarn Belt. Four possible mine contacts were identified based on the MBES data. One contact was validated by TV-CTD and divers as ground mine (Figure 13). Around the mine a scour has formed. The visibility underwater was much better compared to Gelting Bight and the AUV took a photo survey

Figure 13: Underwater targets for the scientific divers: measuring the height and length of sediment ripples and installing a mussel mooring next to a ground mine.

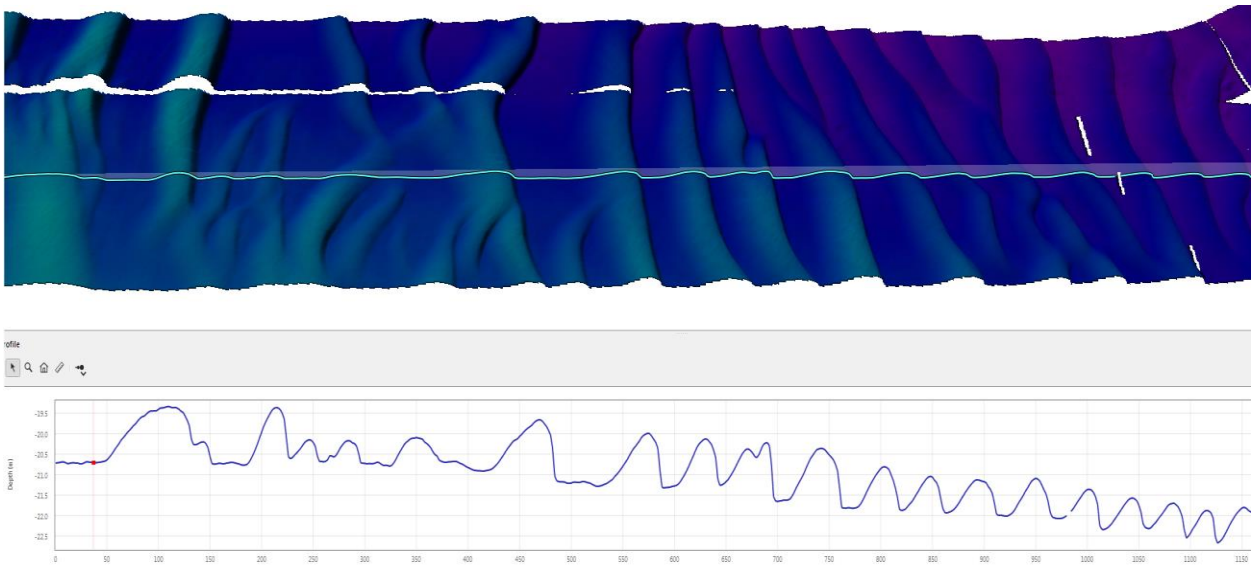


Figure 14: Mega sand ripples in the Fehmarn Belt. Crest height is up to 1 m and ripple length varies from 30 to 60 m.

AUV Dive Anton026 / Fehmarn Sound Area 02

Date:	6th October 2018		
Launch:	12:30 UTC	Survey Time:	0:52 hours
Recovery:	13:22 UTC	Distance Traveled:	980 m

This was the first test with the new camera housing. Unfortunately the new camera was not completely finished. But the new lights for the camera were mounted. The lights were turned on continuously to illuminate the pictures that were taken with GoPro cameras.

Figure 15: Anton equipped with 4 new LEDs.

The mission was a success. Many images were taken and a quick reconstruction shows that a long object was found. The object is about 2m long and 40cm wide.

Figure 16: First mine found with Anton.

The parameters for the AUV were adjusted according to the lessons learned from the cruise POS 526. This basically means that timeouts were increased, so that the mission could be executed safely. The modem timeout and mission timeout were set to the total time of the mission. The other timeouts for WiFi or DVL were set according to the experiences form the last cruise. These parameter adjustments were used for all missions.

AUV Dive Anton027 / Fehmarn Sound Area 02

Date:	6th October 2018		
Mission Start:	14:32 UTC	Survey Time:	0:26 hours
Mission End:	14:58 UTC	Distance Traveled:	580 m

This mission was kept quite short. The location of the mine was very well known after a multibeam survey, so we could target it directly with a photography mission.

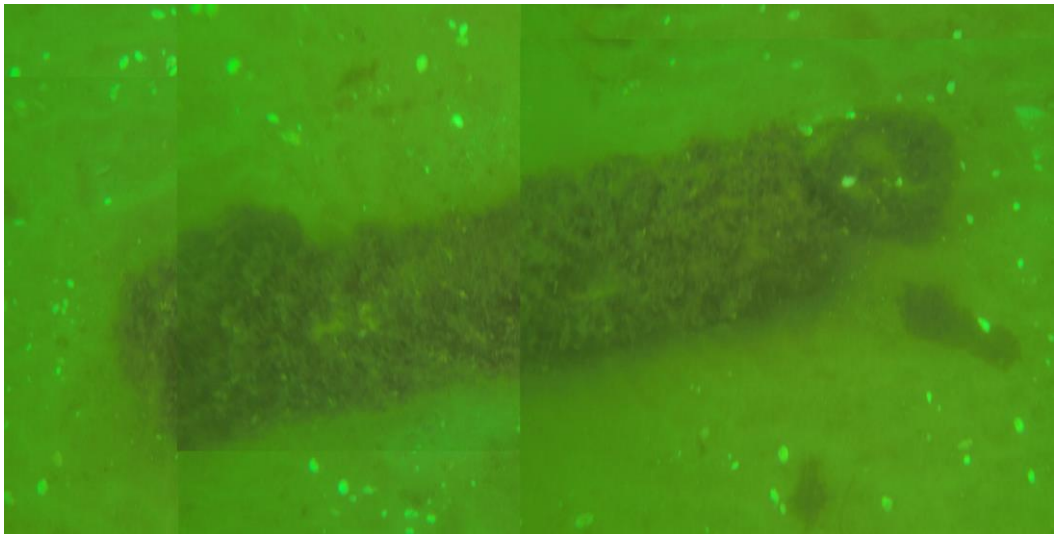


Figure 17: Photomosaik of Mine.

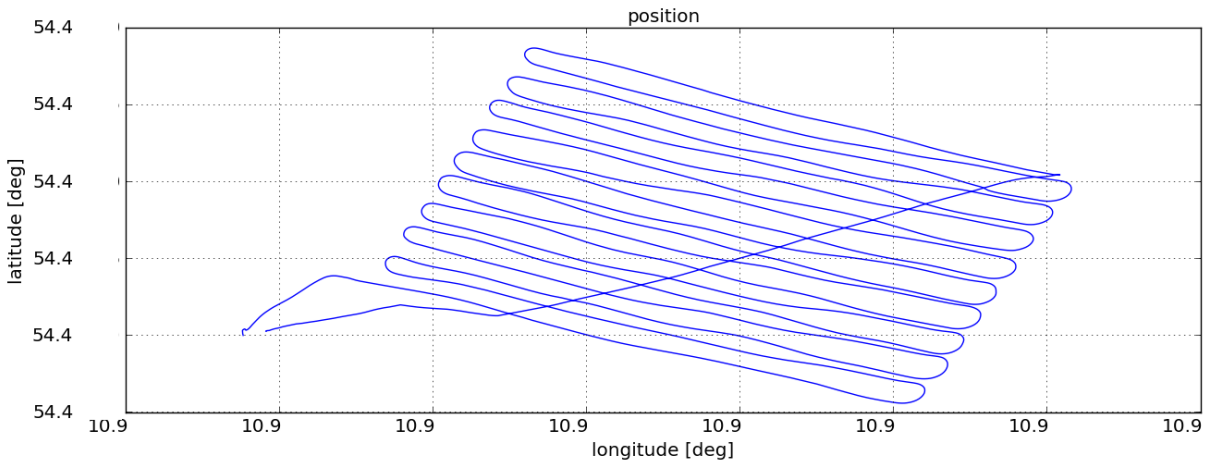


Figure 18: Track of AUV on mission Anton 027.

AUV Dive Anton028 / Fehmarn Sound Area 02

Date:	8th October 2018		
Mission Start:	07:39 UTC	Survey Time:	0:57 hours
Mission End:	08:36 UTC	Distance Traveled:	860 m

This mission was a first test for a combined mine search mission. The track was planned to combine two nearby search areas in one mission. Unfortunately the USBL communication is still not good enough to track the AUV position. But the received messages also hold the current goal waypoint so that the rough position and state can be determined. The plot of the USBL locations is still of no use.

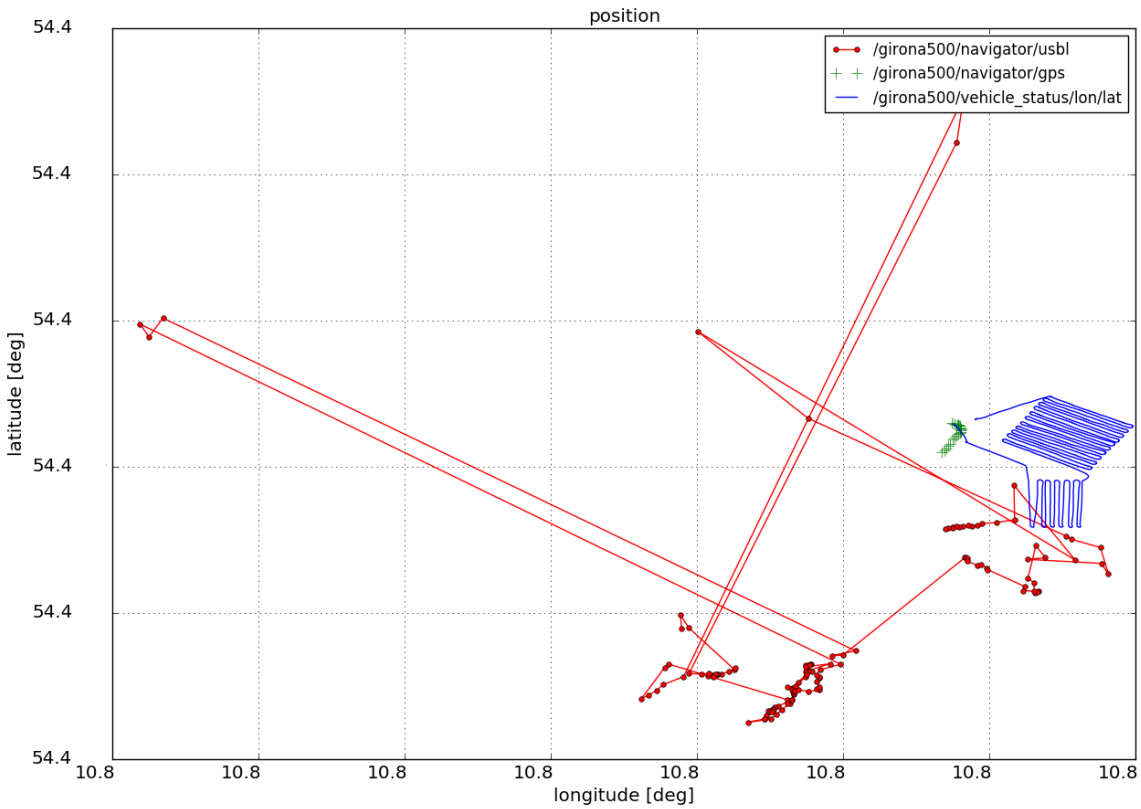


Figure 19: position of Anton during mission 028, USBL is not working correctly.

The photos of this mission showed only a stone where a mine was assumed to be. Also the second part of the mission was not executed in altitude mode, so that the camera was too far away to make good images.

Figure 20: Assumed mine object turned out to be a stone on mission Anton028.

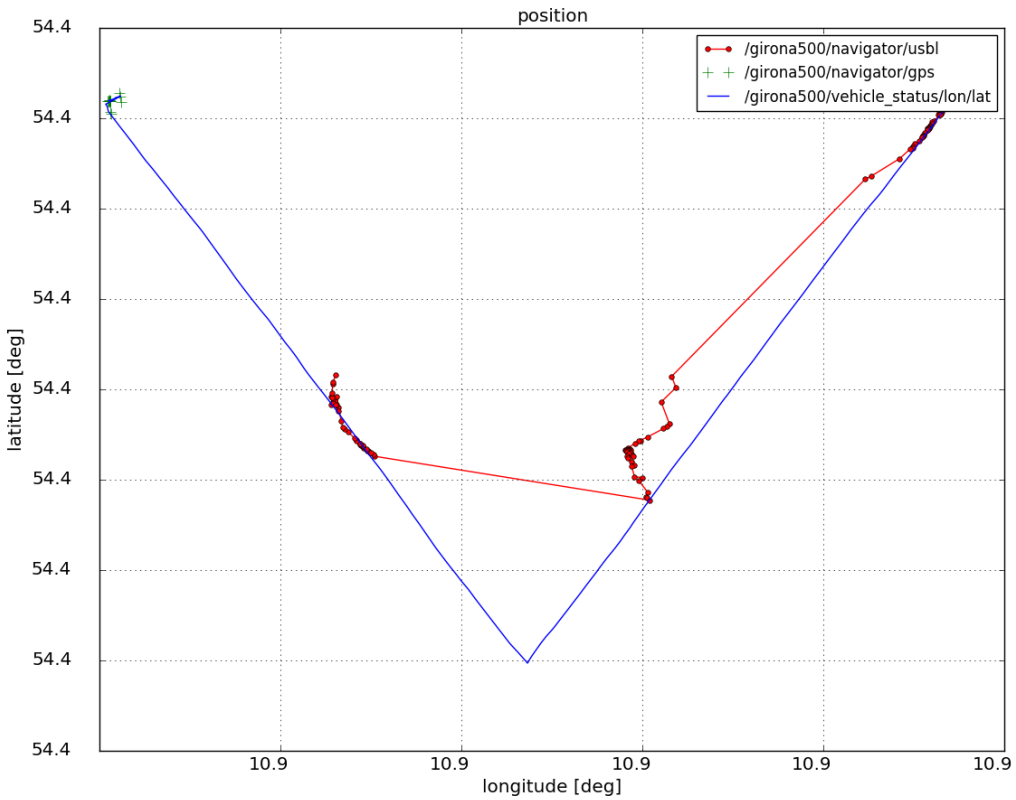


Figure 21: Track of the mission Anton 032 with GPS and USBL positions.

AUV Dive Anton029 / Fehmarn Sound Area 02

Date:	8th October 2018		
Mission Start:	13:33 UTC	Survey Time:	1:27 hours
Mission End:	15:00 UTC	Distance Traveled:	1,48 km

The lessons learned in the last mission were valuable and used for the afternoon mission. Allthough the USBL positioning was not improved, the signal was reliable. Many pings were received so that the progress could be monitored.

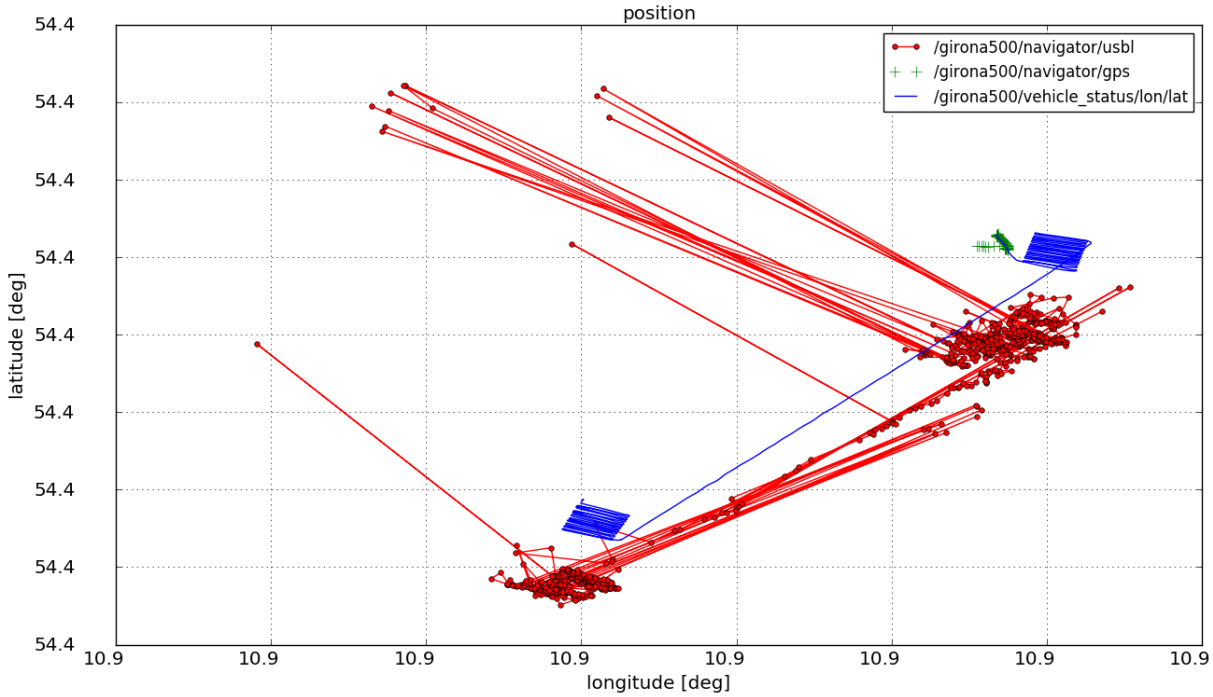


Figure 22: position of Anton during mission 028, USBL is not working correctly

The first evaluation of the images revealed good results. Anton found a ground-mine shaped object and a big wooden box.

Figure 23: Found objects on mission 029, (top - first object: mine, bottom - second object - wooden box)

AUV Dive Anton030 / Fehmarn Sound Area 02

Date:	9th October 2018		
Mission Start:	06:18 UTC	Survey Time:	1:37 hour
Mission End:	07:55 UTC	Distance Traveled:	1,36 km

This mission targeted a field with a lot of small stones. The goal was to see if maybe there were some other objects inbetween these stones. Unfortunately it turned out to be all stones.

The track-spacing of the mission is quite close. So naturally the current depth of the vehicle added with the current altitude will give the current depth of the seafloor. This was added to the basic export script to show this information to the operator. It can be very useful for designing future missions on the same area. The graph clearly shows the area with stones and a slight slope in general.

This mission also tested lower waypoint tolerance values. The tolerances are used to determine if the AUV has reached the goal and can pursue to the next waypoint. The tolerances were set to 1x1m and 0.5m in z orientation. These settings worked quite well, but the AUV did take a little longer for the full mission. This is obvious, since it has to make more adjustments. But this is only useful if a camera mission is planned, because of the small linespacing settings used with cameras.

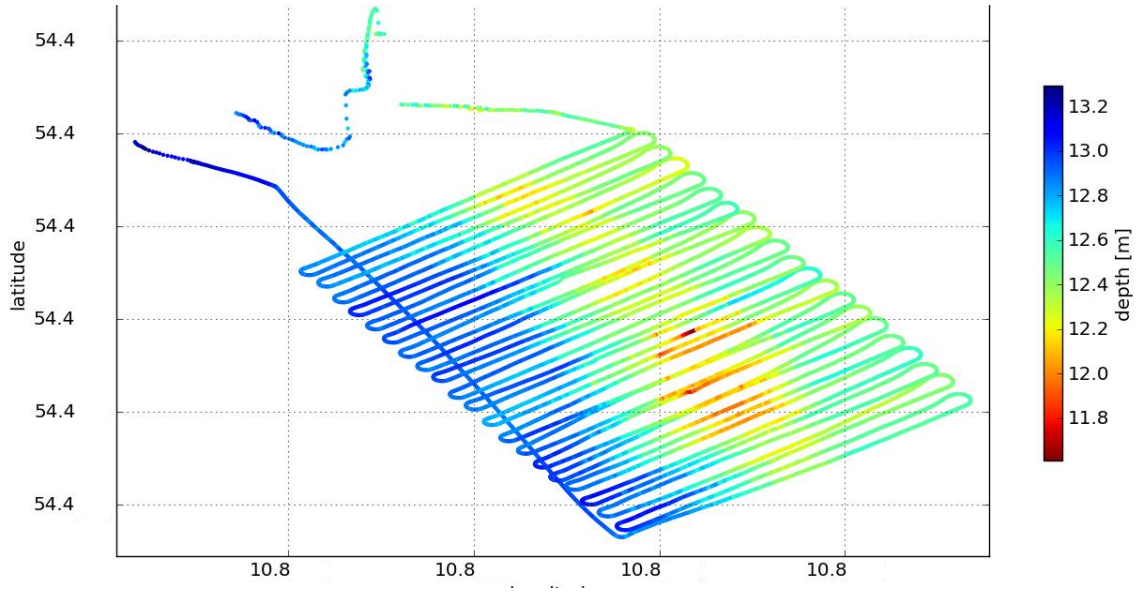


Figure 24: Bathymetry of mission Anton 030

AUV Dive Anton031 / Fehmarn Sound Area 02

Date:	9th October 2018		
Mission Start:	08:41 UTC	Survey Time:	1:17 hours
Mission End:	09:58 UTC	Distance Traveled:	1,88 km

The covered area with stones was also part of a multibeam mission. This was done, in order to improve to overall map from the area. The mission went as planned. The processing pipeline for the multibeam data is still not finished, so that it will take some time to have a detailed look into the recorded data.

But with the new export funcionalities for rosbags (which is the fileformat being used to save all of the parameters), the data can now be imported and plotted with qgis which enables everyone to visualize the data. Here we have first noticed, that Anton actually slows down before reaching a waypoint.

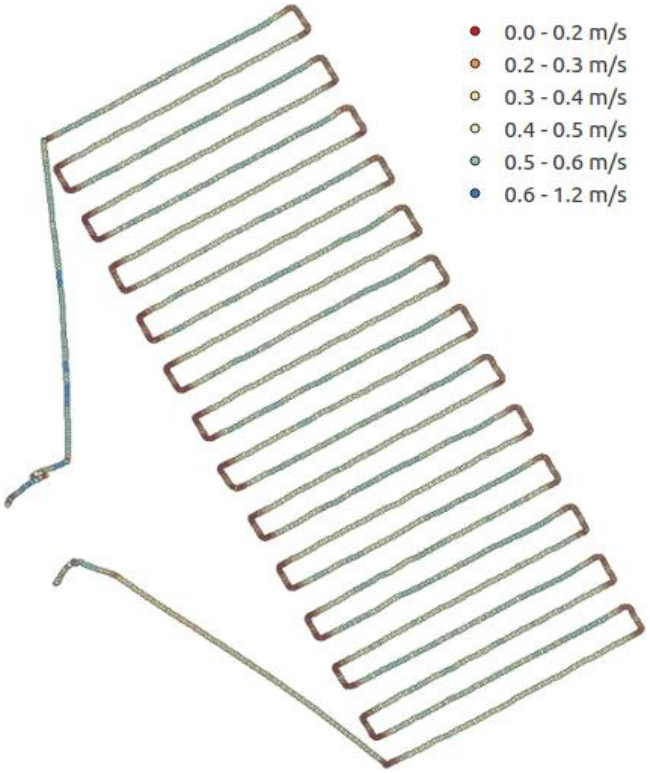


Figure 25: Anton031, plotted speed over position.

The multibeam was configured with the following settings:

Table 4: Multibeam settings Anton031

Profile point filter: Bottom Following	Averaging: 9	Number of beams: 480
Automatic sound speed: true	Beam width: 2	Sector size: 90°
Record formats: 837, 83P	Gain: 4	Range: 10m

AUV Dive Anton032 / Fehmarn Sound Area 02

Date:	9th October 2018		
Mission Start:	13:28 UTC	Survey Time:	1:32 hours
Mission End:	15:00 UTC	Distance Traveled:	1,55 km

The last mission in the working area near Heiligenhafen was a basic V-shaped track across the whole area that was searched for mines. This shape is supposed to give ground truth information for the multibeam survey.

This was the first time that such a large area was covered with the AUV. The AUV was a little bit faster than expected and did exactly what was intended. The communication with USBL was not good, allthough the ship tried to stay alongside the track.

5.3 Lübeck Bight

Table 5: Overview of the performed work inside the area.

	Area 01	Area 02
Mapped area:	13.0 km^2	5.6 km^2
Water depth:	18.0 – 25.0 m	18.0 – 23.0 m
Acquired data:	• MBES • 1 SVP • 2 TV-CTD profiles • 21 Grab samples • 1 SBP • 5 CTD • 1 GoFlo • 2 AUV dives	• MBES • 4 SVP • 2 TV-CTD profiles • 6 Grab samples • 6 CTD • 2 GoFlo • 7 AUV dives • 2 mussel moorings

The first area in Lübeck Bight is a mainly flat area that shows some special features. In the west occur several shallow craters, which are 0.5 – 4 m deep (Figure 26). In the east of the area is a sediment-dumping ground visible. It extends around 3.5 m above the seafloor with terraces of 1 m height (Figure 27). This dump site is also clearly visible inside the backscatter and is characterized by high backscatter

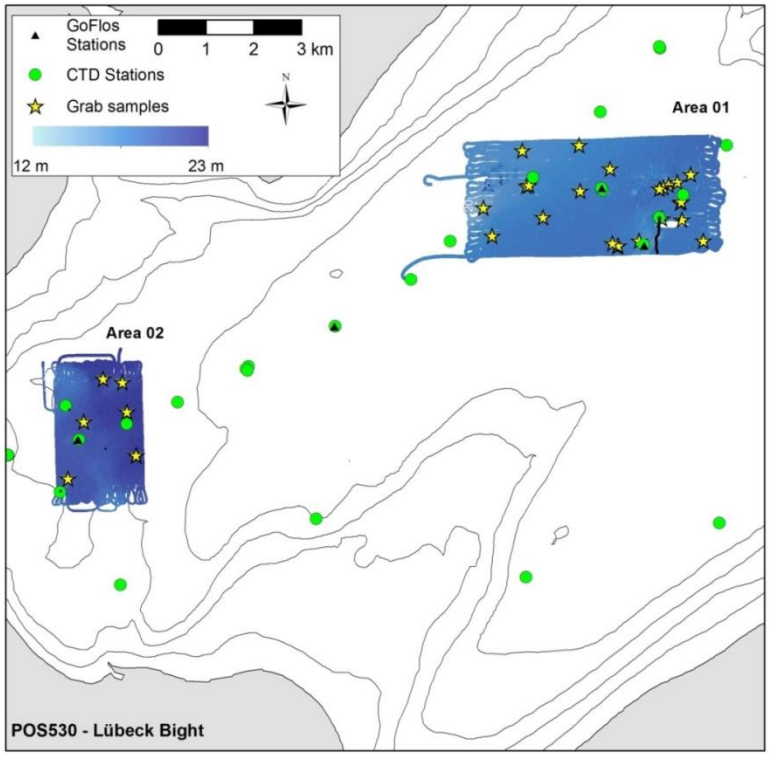


Figure 26: Inside the Lübeck Bight two areas were surveyed. The water depth ranges from 18 to 25m, whereby the seafloor is mainly flat. Green circles indicate CTD water sampling stations and the yellow stars mark grab sample locations. One video profile was acquired in area 01 and two in area 02.

amplitudes (Figure 30). Additionally a number of ca 100 suspicious objects was detected and at least one pile of mines and grenades was validated inside underwater video footage (Figure 28). Due to the very low visibility exact amounts of objects are difficult to estimate. Grab samples based on the backscatter map, show that high backscatter amplitudes are mainly correlated with outcropping hard and stony seafloor, compared to low amplitude silty fine sand and mud.

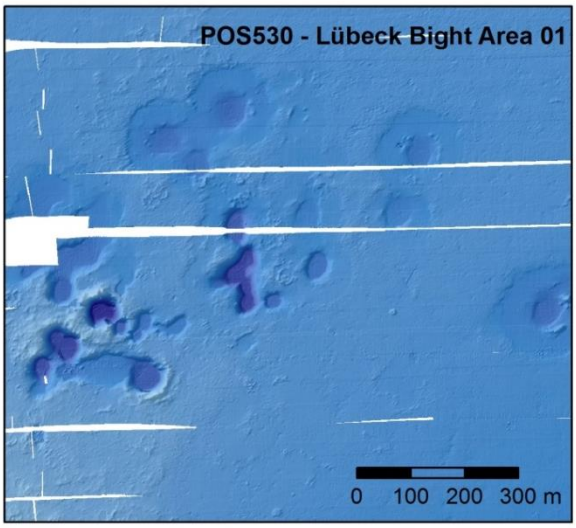


Figure 27: Shallow craters in the north west of area 01 in Lübeck Bight.

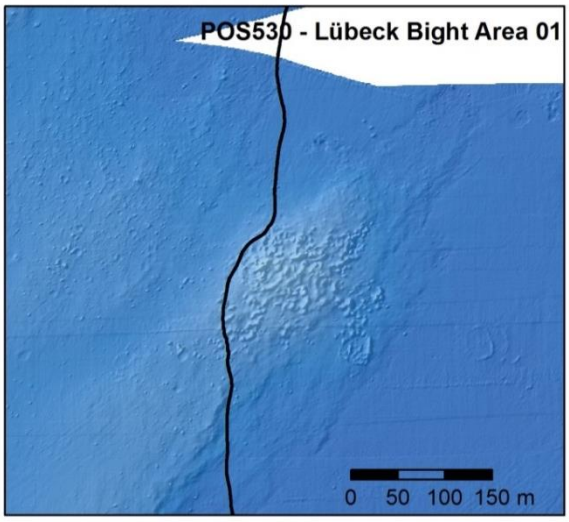


Figure 28: A video transect along a mound, which turned out to be composed of munition boxes and grenades.

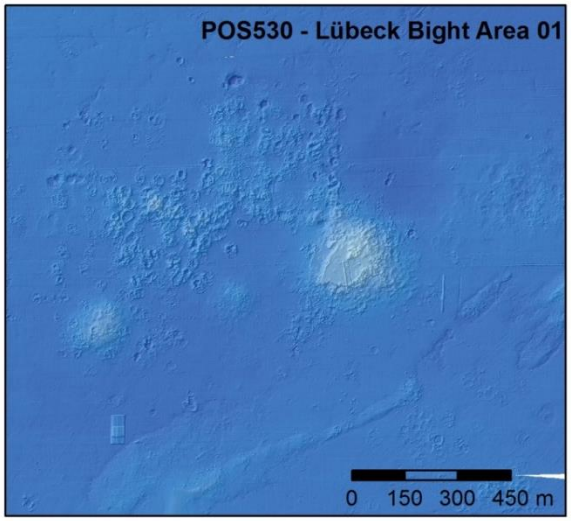


Figure 29: Bathymetry of a sediment dump site.

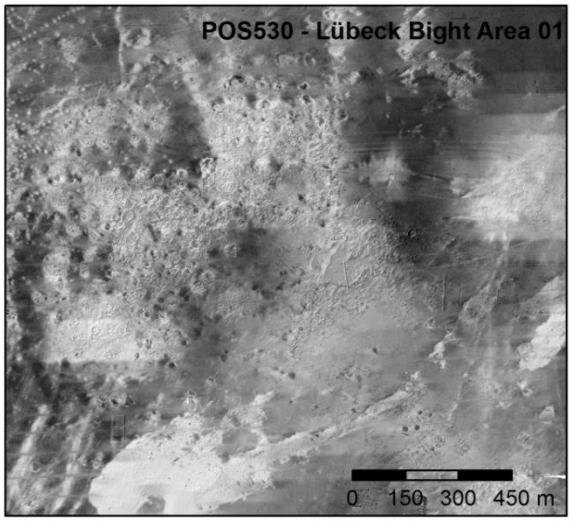


Figure 30: Backscatter of a sediment dump site. White indicates high and black low backscatter amplitudes.

AUV Dive Anton033 / Lübeck Bight Area 01

Date:	13th October 2018		
Mission Start:	10:55 UTC	Survey Time:	1:30 hours
Mission End:	12:25 UTC	Distance Traveled:	1,18 km

This mission was the first in the new area at the Bay of Lübeck. The payload of the AUV changed only marginally: The downlooking Hero3 GoPro could not be charged anymore and was thus replaced with a Hero4 GoPro. The multibeam stayed mounted on the vehicle until the end of the cruise, although it wasn't used in any of the following missions.

The goal of this mission was to investigate strange pearl string like patterns only visible in the multibeam backscatter data but because of the poor visibility, no useful images could be obtained.

Figure 31: Anton033, pearl string like patterns visible in the multibeam backscatter data.

The second area in Lübeck Bight is dominated by silt to fine sand on top of mud. Towards the east the sediment becomes coarser and sandier. One grab sample also had stones inside, mixed with mud. In the MBES data nine mounds of not definable composition could be detected. Diver and AUV footage show that at least two of these mounds are composed of hundreds of munition boxes, filled with grenades (Figure 32). Additionally three torpedoes of 8 m length were detected inside MBES data. During a photo survey with the AUV detailed images were recorded of one torpedo (Figure 33).

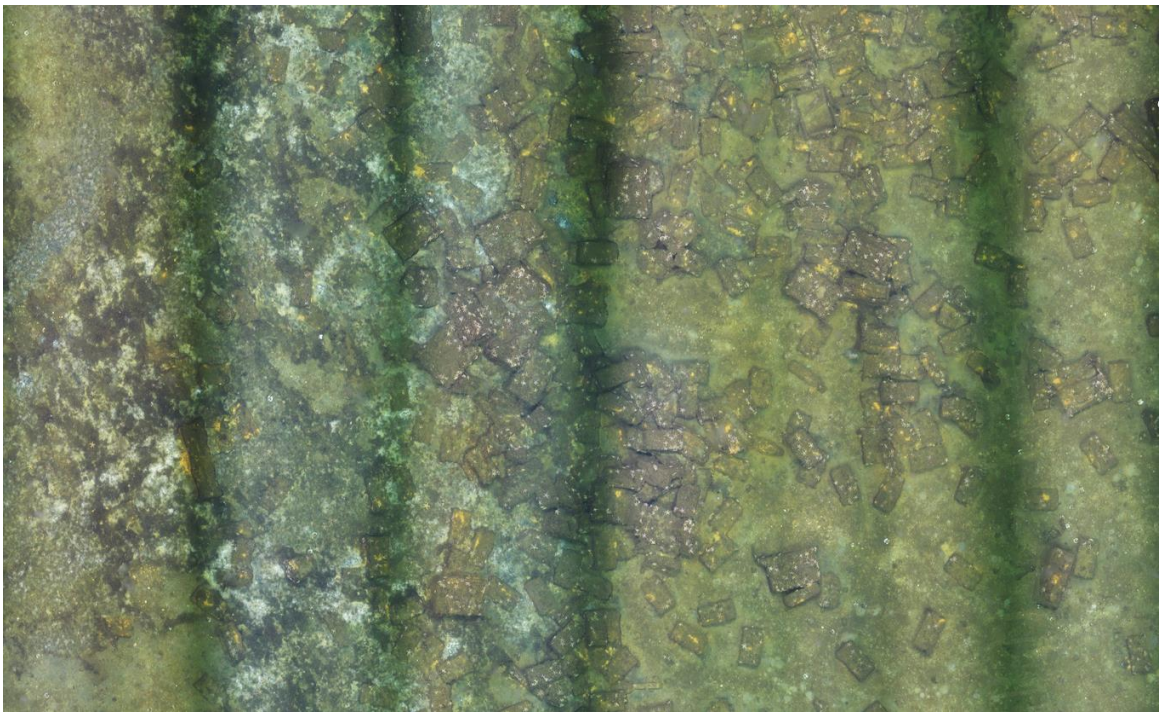


Figure 32: A pile of munition boxes filled with grenades in the area 02 in Lübeck Bight. The photo mosaic is based on footage acquired by the Girona 500 AUV.

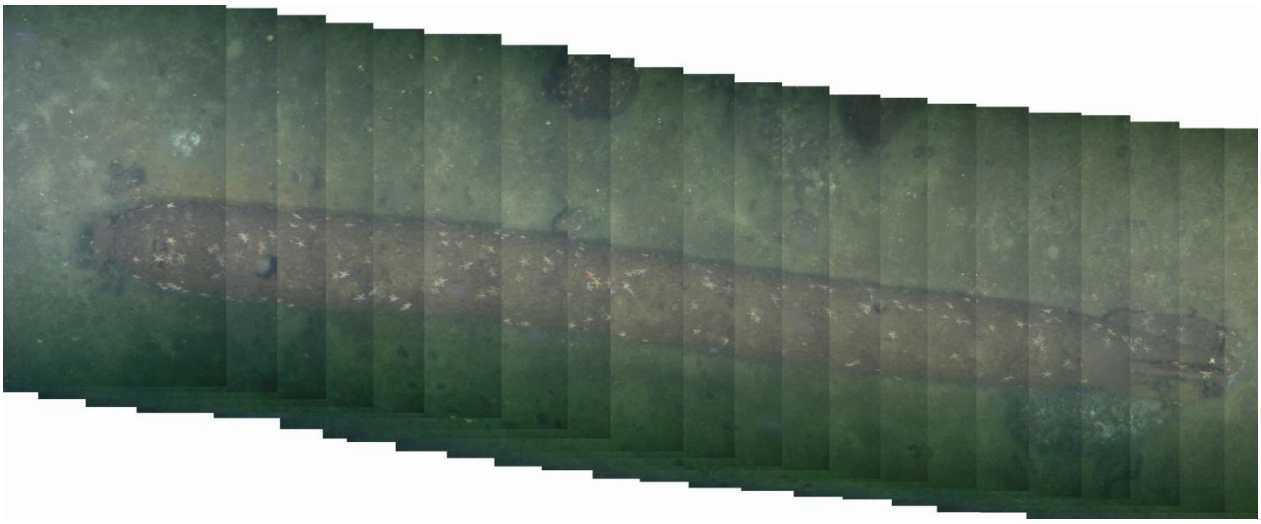


Figure 33: A torpedo of 8 m length. The photo mosaic is based on footage acquired by the Girona 500 AUV.

AUV Dive Anton034 / Lübeck Bight Area 02

Date:	13th October 2018		
Mission Start:	14:09 UTC	Survey Time:	0:32 hours
Mission End:	14:41 UTC	Distance Traveled:	0,3 km

The goal of this mission was to look at a promising location visible in the ships multibeam data. Because of the blurry images of the last dive, the speed of the AUV was reduced from 0.25 m/s to 0.15 m/s, while the altitude stayed fixed at 1.5 m. As a result, the quality of the images increased a bit and some

munition boxes could be spotted, but because of the bad visibility, the images were still extremely blurry. On this dive, the forward looking GoPro did not record any images (Figure 34).

Figure 34: Anton034, blurry image of an ammunition box.

AUV Dive Anton035 / Lübeck Bight Area 02

Date:	14th October 2018		
Mission Start:	07:30 UTC	Survey Time:	1:15 hours
Mission End:	08:45 UTC	Distance Traveled:	0,87 km

The goal of this mission was to investigate another site with small objects visible in the multibeam data with a height of around 0.25 m. On this day the visibility was better and thus somewhat good images with lots of munition crates could be acquired (Figure 35).

Figure 35: Anton035, pile of ammunition crates.

AUV Dive Anton036 / Lübeck Bight Area 02

Date:	14th October 2018		
Mission Start:	09:40 UTC	Survey Time:	0:35 hours
Mission End:	10:15 UTC	Distance Traveled:	1,03 km

This mission was made to take images of an explosion crater with a diameter of several meters. About half an hour after starting the mission (after leg 4 of 24), an error occurred which triggered an abort-and-surface maneuver. When the vehicle was back on the surface, a short check over the WIFI connection with the AUV near the Poseidon showed no obvious errors, so the mission was restarted.

However, the error occurred on the second try as well (this time at leg 11 of 24), so the AUV was recovered after resurfing. After digging though some log files, the reason for the recovery action was clear: The battery management system was giving one single faulty battery charge measurement. This was picked up by the software architecture and led to the mission abort. Instead of changing parts of the code right away, it was decided to just restart the vehicle first and see if the error would happen frequently in the following missions. As it did not, no changes to the code were made.

As a result of this, only half of the explosion crater was mapped (Figure 36).

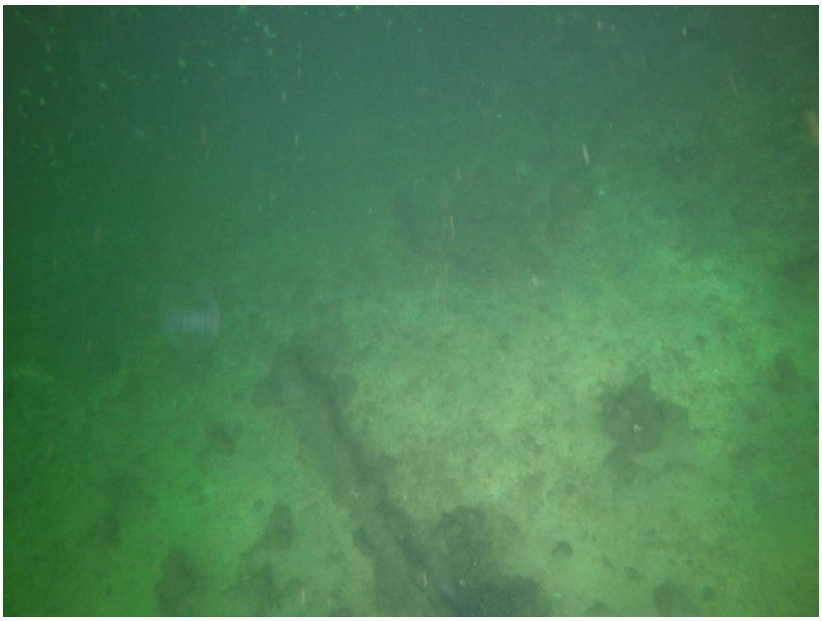


Figure 36: Anton036, picture of the crater rim with the center of the crater to the top left and some scrap metal in the lower part of the image

AUV Dive Anton037 / Lübeck Bight Area 02

Date:	15th October 2018		
Mission Start:	12:14 UTC	Survey Time:	1:10 hours
Mission End:	13:24 UTC	Distance Traveled:	0,78 km

The goal of this mission was to investigate another ammunition dump, but unfortunately the lights of the AUV had not been switched on, resulting in very greenish and blurry images.

AUV Dive Anton038 / Lübeck Bight Area 02

Date:	15th October 2018		
Mission Start:	14:25 UTC	Survey Time:	0:25 hours
Mission End:	14:50 UTC	Distance Traveled:	0,33 km

The goal of this mission was to take images of a small ammunition dump. Everything worked as expected but only very few boxes appeared in the images.

AUV Dive Anton039 / Lübeck Bight Area 02

Date:	16th October 2018		
Mission Start:	07:00 UTC	Survey Time:	1:22 hours
Mission End:	08:22 UTC	Distance Traveled:	0,91 km

This mission was designed to take pictures of three interesting spots, two of them being torpedo shaped and one ammunition dump (Figure 37). The distance between the spots was in the range of 60m. In addition to that, some rock like structures were visited at the beginning and at the end of the mission. The line spacing for each sub area was set to 1 m with a vehicle speed of 0.15 m/s. This resulted in a mission time of 1:22 hours, which was close to the maximum recording time of one of the GoPro cameras, especially with the cameras being starting before deployment.

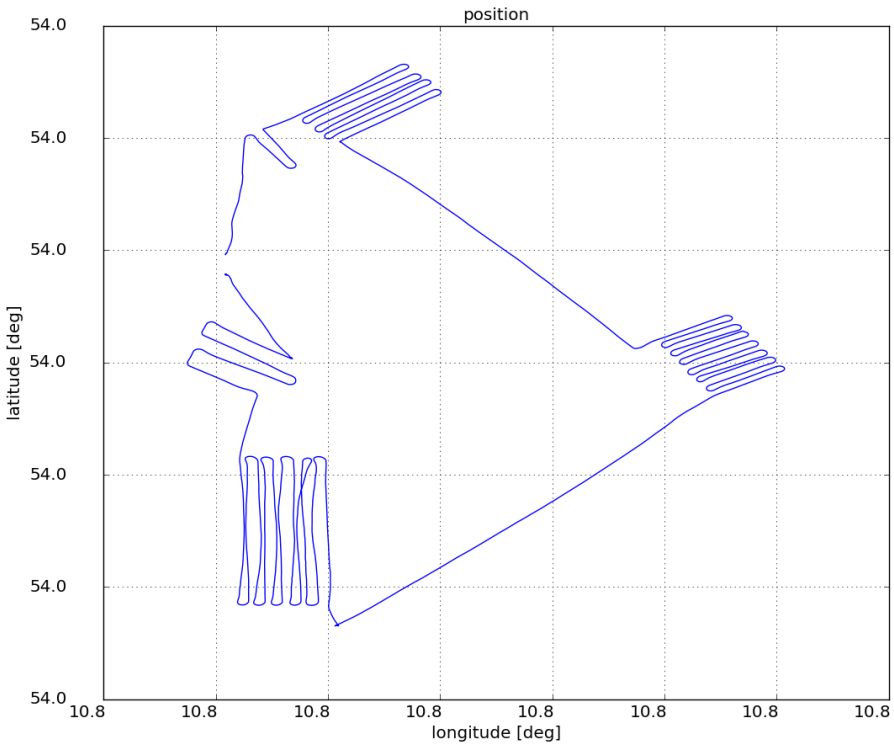


Figure 37: Track of mission Anton039.

AUV Dive Anton040 Lübeck Bight Area 02

Date:	16th October 2018		
Mission Start:	09:05 UTC	Survey Time:	0:28 hours
Mission End:	09:33 UTC	Distance Traveled:	0,23 km

This mission was supposed to take pictures of a structure resembling a very small submarine. In the ships multibeam data it appeared as an object with a length of 6 meters and a height of around 1.70 meters. The mission was executed as planned. After looking at the images, the object turned out to be a large but thin piece of scrap metal standing upright on the seafloor, possibly a part of a ship's side (Figure 38).

Figure 38: Anton040, the "submarine" structure, covered with starfishes.

AUV Dive Anton041 / Lübeck Bight Area 02

Date:	16th October 2018		
Mission Start:	10:53 UTC	Survey Time:	0:16 hours
Mission End:	11:09 UTC	Distance Traveled:	0,12 km

Because there were no particular spots of interest left in this area, and no other stations were planned, the opportunity was seized to design and execute three small test missions to observe the behavior of the vehicle in certain conditions. Neither multibeam nor any GoPro camera was used in these missions. The tested features were mission abort commands, the park type waypoint and what the vehicle would do, if a negative velocity was entered.

AUV Dive Anton042 / Lübeck Bight Area 02

Date:	16th October 2018		
Mission Start:	12:00 UTC	Survey Time:	0:36 hours
Mission End:	12:36 UTC	Distance Traveled:	0,48 km

The last mission of this day was used for some ground truthing. The goal was to verify that rock like looking objects in the multibeam data were indeed rocks.

AUV Dive Anton043 / Lübeck Bight Area 02

Date:	17th October 2018		
Mission Start:	11:23 UTC	Survey Time:	0:57 hours
Mission End:	12:20 UTC	Distance Traveled:	0,63 km

This mission was designed to take pictures of two ammunition dump sites, approximately 60 m apart. During the on deck test, the GPS didn't work correctly, which was solved by a complete restart of the vehicle. The visibility in the water on that day was very good, so a lot of useful images could be obtained (Figure 39).

Figure 39: Anton043, dump site with ammunition and grenades

5.4 Rügen

Table 6. Overview of the performed work inside the area.

Area 01	
Mapped area:	16.3 km^2
Water depth:	45.0 – 49.0 m
Acquired data:	• MBES • 3 SVP • 2 TV-CTD • 4 Grab samples • 1 SBP • 3 CTD • 1 GoFlo

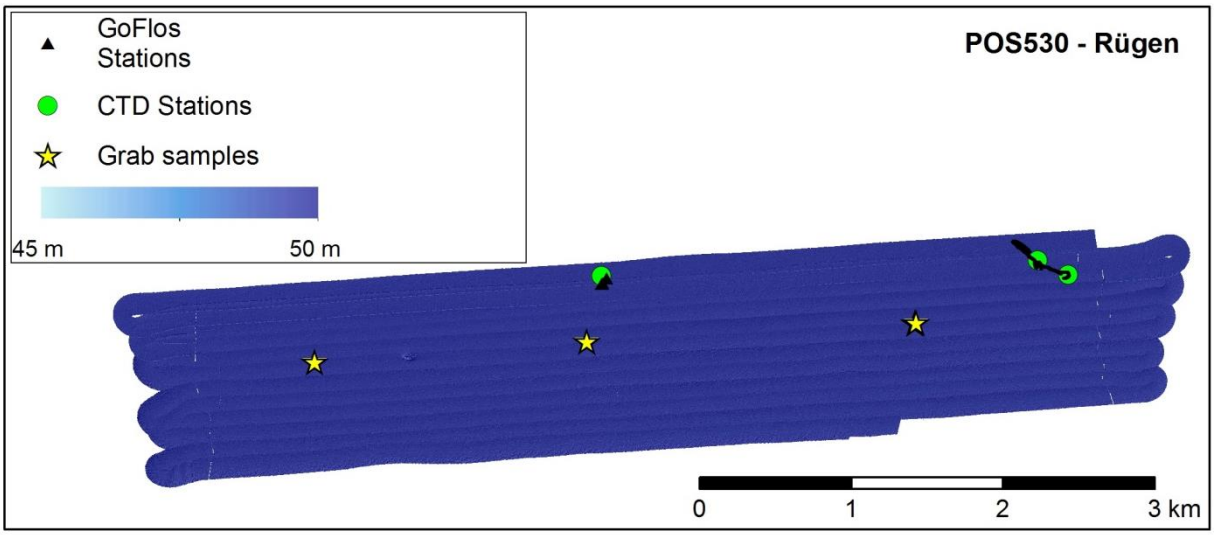


Figure 40: The seafloor of the research area north of Rügen is very flat. Green circles indicate CTD water sampling stations and the yellow stars mark grab sample locations. One video profile was acquired above a wooden shipwreck.

The research area in the north of Rügen is characterized by homogeneous fine sediments and flat seafloor (Figure 40). No suspicious munition objects were found, but two shipwrecks can be seen inside the MBES data. The bigger one is 50 m long and 15 m wide, resting on its hull (Figure 41). The sediment has formed a 1 m deep scour around the wreck. The second shipwreck is made of wood with a length of around 45 m and width of ca 25 m. The sediment samples do not show major changes throughout the area.

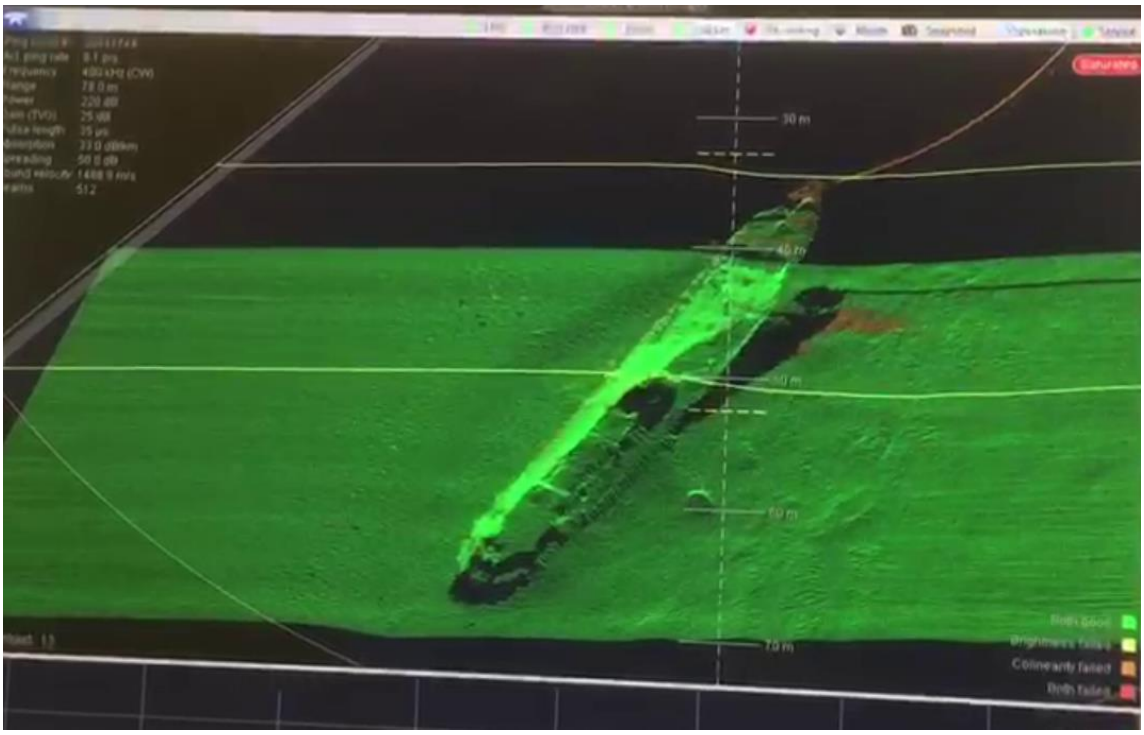


Figure 41: MBES raw data showing a 50 m long wreck in the area north of Rügen.

6 Preliminary Results: Geochemistry

Spatial coverage of water sampling was particularly high-resolution at known munitions contamination sites (e.g., Fehmarn Sound, Lübeck Bight), which had not been previously investigated during the UDEMM project. During the current cruise, 114 stations were occupied and 552 individual samples were taken. The samples were processed on board as described above and analyzed in land-based laboratories. The new methods developed during the UDEMM project enabled us to achieve exceptional spatial and depth resolution.

The preliminary spatial distribution of TNT is shown in Figure 42. TNT concentrations were highest near the shore, especially in Kiel Bay and Fehmarn Sound, although some high concentrations were also found near Gelting Bight and Lübeck Bight. Increased values corresponded to generally known ammunition contamination, although some sites, such as the Fehmarn Belt, have a higher water flow and may reflect transport from other sites. The lowest concentrations were found off Rostock and in the Arkona Basin.

Depending on the water depth, vertical profiles included between three and nine depths. The vertical distribution of munition compounds generally showed the highest concentrations near the seabed (Figure 43). Significant spatial differences were observed between the different munition compounds analyzed. The munition compounds shown in Figure 24 were all derived from primary explosives (TNT = trinitrotoluene, RDX = 1,3,5- Trinitro-1,3,5-triazinane, DNB = dinitrobenzene, TNB = trinitrobenzene), but not all of these compounds showed enrichment at the same sites. For example, TNT and TNB concentrations were highest in Kolberger Heide, while RDX and DNB were highest in Lübeck Bight. Relatively high DNB concentrations were also found in Gelting Bight (not evident in Figure 43 to scaling).

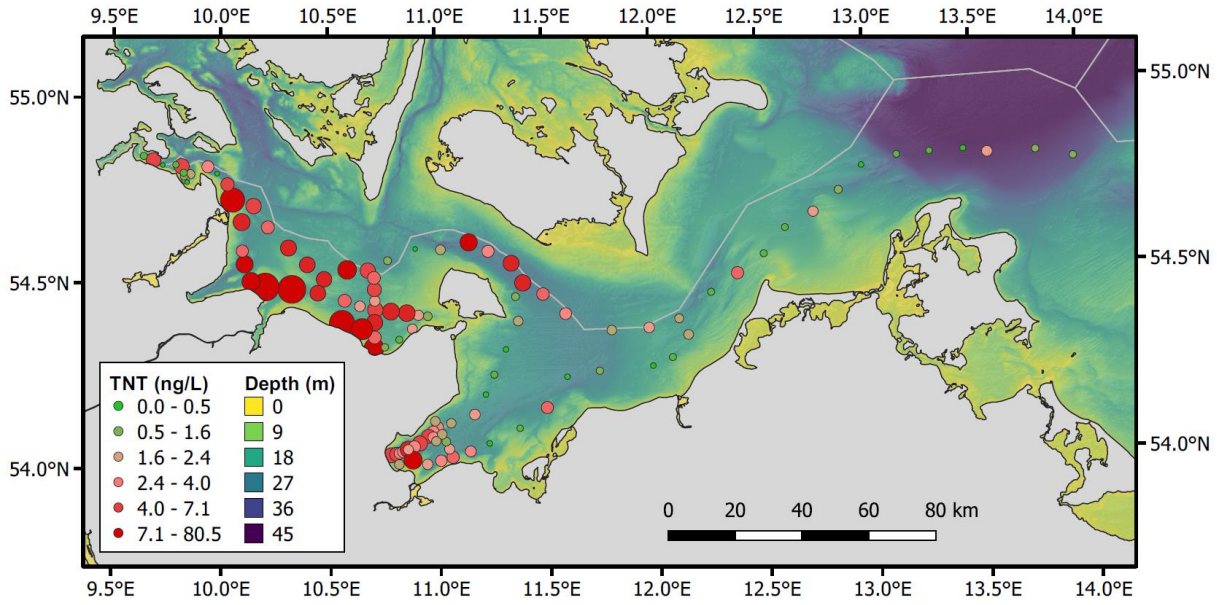


Figure 42: Spatial distribution of dissolved TNT in bottom water. Symbol size and color indicates concentration.

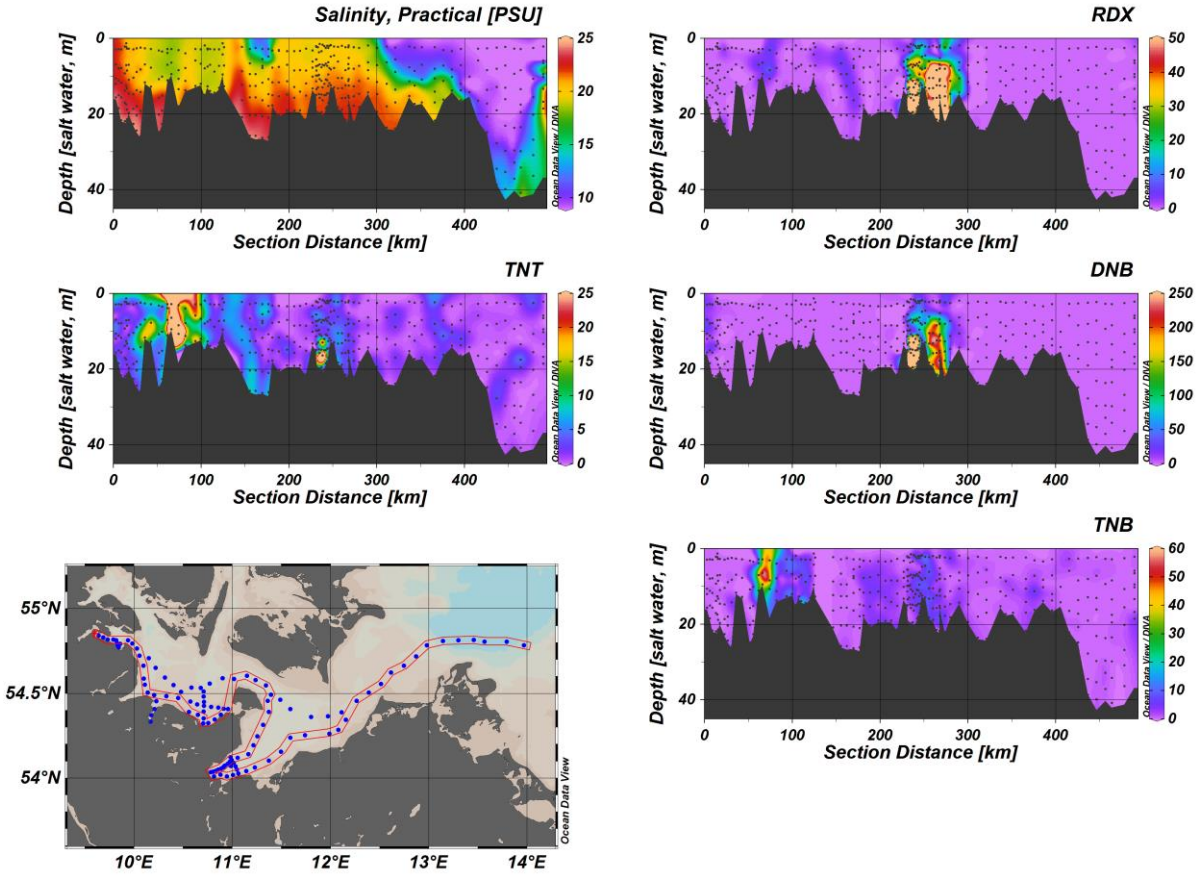


Figure 43: Sections showing depth profiles of munitions compounds along the nearshore cruise track. Particularly high explosives contamination is evident at Kolberger Heide (~75 km) and Lübeck Bight (~250 km). Black points indicate positions of individual samples used for contouring. TNT = trinitrotoluene, RDX = 1,3,5-Trinitro-1,3,5-triazinane, DNB = dinitrobenzene, TNB = trinitrobenzene.

Concentrations of munitions compounds found during the current cruise were generally similar to the levels we have previously observed in the Baltic Sea. However, RDX and DNB were far higher in Lübeck Bight than previous measurements at any other location (Figure 43). This strongly indicates a high degree of variability in the type of munitions and explosives present at different dumpsites. It also highlights the importance of measuring a suite of munitions compounds in order to capture munitions signatures from diverse explosive sources.

High-resolution water sample profiles collected adjacent to munition surfaces in Fehmarn Sound and Lübeck Bight showed concentrations that declined sharply away from the surface (Figure 44). This is consistent with our previous results in Kolberger Heide (Beck et al., 2019), and reflects the explosive dissolution and release of munitions compounds from breaches in the munition housing.

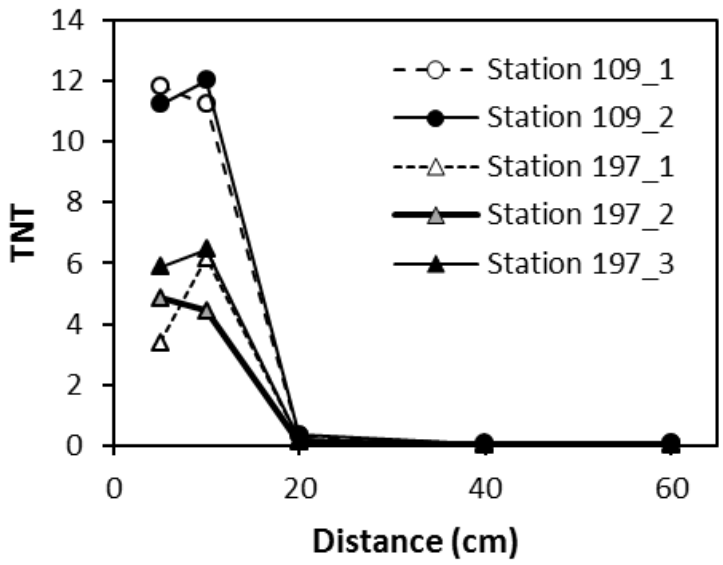


Figure 44: High-resolution water samples directly adjacent to underwater munition surfaces. Station 109: Fehmarn Sound; Station 197: Lübeck Bight. Concentrations are µg/L.

Experiments conducted on-board during the cruise showed no evidence of munition compound degradation (Figure 45). This is consistent with our previous results, and is likely due to the low incubation temperature (5°C). The length of the experiments may also have been insufficient to capture slow degradation. These results imply that munition compounds released into deep waters of the Baltic Sea are likely to persist long enough to be transported away from the munition point source.

Taken together, the preliminary geochemical results provide a clear picture of munition compound release from relic munitions in the Baltic Sea. These chemicals are subject to limited degradation, particularly in the deep waters where they are released, leading to the buildup of high concentrations. As a result, plumes of contamination emanate from munitions dumpsites, and spreads regionally due to lateral transport.

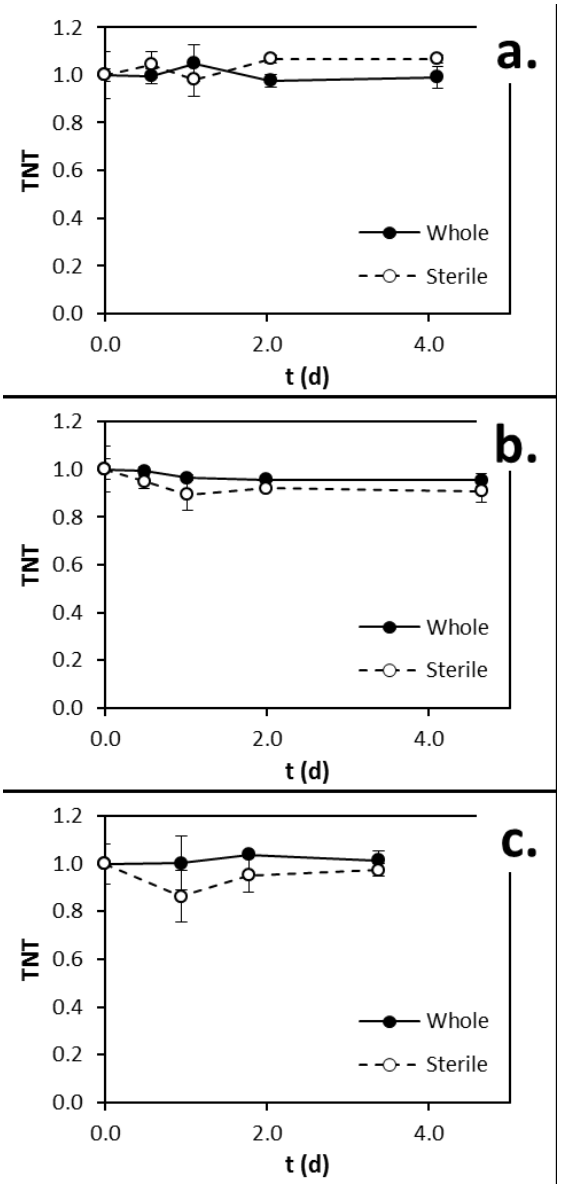


Figure 45: TNT in degradation experiments, normalized to the initial concentration. (a) Gelting Bight, (b) Fehmarn Sound, (c) Lübeck Bight. Solid symbols and hollow symbols represent whole and filter-sterilized treatments, respectively. Error bars represent the standard deviation of triplicate treatments.

7 Acknowledgements

We thank the captain and crew of RV Poseidon for their excellent support during the scientific campaign of POS530, the MELUND, the THW and German Navy for the reliable support during the crew exchange and the GEOMAR data management team for their proactive spirit in conducting and developing the data management plan.

8 References

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9 Appendix

9.1 Overall Station List

(Reduced navigation precision due to confidential position data)

Activity - Device Operation	GEOMAR ID	Timestamp	Device	Action	Latitude	Longitude	Depth (m)	Comment
POS530_1-1	POS530#1_CTD-001	2018-10-01 14:13	CTD	in the water	54°20.0' N	010°10.0' E	7.5	Commence of research operations POS 530
POS530_1-1	POS530#1_CTD-001	2018-10-01 14:31	CTD	max depth/on ground	54°19.9' N	010°10.0' E	7.3	3 m max; male function of TV-CTD
POS530_1-1	POS530#1_CTD-001	2018-10-01 14:33	CTD	on deck	54°19.9' N	010°10.0' E	7.1	
POS530_1-2	POS530#1_CTD-001	2018-10-01 14:46	CTD	in the water	54°19.9' N	010°10.0' E	7.2	
POS530_1-2	POS530#1_CTD-001	2018-10-01 14:50	CTD	max depth/on ground	54°20.0' N	010°10.0' E	7.2	SL max = 7m
POS530_1-2	POS530#1_CTD-001	2018-10-01 14:52	CTD	on deck	54°20.0' N	010°10.0' E	7.2	
POS530_2-1	POS530#2_CTD-002	2018-10-01 15:48	CTD	in the water	54°22.3' N	010°10.3' E	10	
POS530_2-1	POS530#2_CTD-002	2018-10-01 15:52	CTD	max depth/on ground	54°22.3‘ N	010°10.3' E	10.3	SL max = 11m
POS530_2-1	POS530#2_CTD-002	2018-10-01 15:54	CTD	on deck	54°22.3‘ N	010°10.3' E	10.3	

POS530_3-1	POS530#3_CTD-003	2018-10-01 16:33	CTD	in the water	54°24.4' N	010°12.5' E	10.8	
POS530_3-1	POS530#3_CTD-003	2018-10-01 16:36	CTD	max depth/on ground	54°24.4' N	010°12.5' E	10.8	SL max = 11m
POS530_3-1	POS530#3_CTD-003	2018-10-01 16:38	CTD	on deck	54°24.4' N	010°12.5' E	10.5	
POS530_4-1	POS530#4_CTD-004	2018-10-01 17:16	CTD	in the water	54°27.2' N	010°13.6' E	12.8	
POS530_4-1	POS530#4_CTD-004	2018-10-01 17:21	CTD	on deck	54°27.2' N	010°13.6' E	13.5	
POS530_4-1	POS530#4_CTD-004	2018-10-01 17:23	CTD	in the water	54°27.2' N	010°13.6' E	13.1	
POS530_4-1	POS530#4_CTD-004	2018-10-01 17:25	CTD	max depth/on ground	54°27.2' N	010°13.6' E	13.4	SL max = 14m
POS530_4-1	POS530#4_CTD-004	2018-10-01 17:28	CTD	on deck	54°27.2' N	010°13.6' E	13.5	
POS530_5-1	POS530#5_SVP-001	2018-10-01 18:28	Sound Velocity Profiler	in the water	54°29.0' N	010°19.6' E	15.7	
POS530_5-1	POS530#5_SVP-001	2018-10-01 18:33	Sound Velocity Profiler	max depth/on ground	54°29.0' N	010°19.6' E	15.3	16 m max
POS530_5-1	POS530#5_SVP-001	2018-10-01 18:36	Sound Velocity Profiler	on deck	54°29.0' N	010°19.6' E	15.4	
POS530_6-1	POS530#6_MB-001	2018-10-01 18:55	Multibeam echosounder	profile start	54°29.0' N	010°20.0' E	15.8	

POS530_6-1	POS530#6_MB-001	2018-10-01 20:27	Multibeam echosounder	profile end	54°28.2' N	010°20.5E	10.6	
POS530_7-1	POS530#7_CTD-005	2018-10-01 21:28	CTD	in the water	54°29.4' N	010°12.2' E	7.1	
POS530_7-1	POS530#7_CTD-005	2018-10-01 21:31	CTD	max depth/on ground	54°29.4' N	010°12.2' E	7.1	7 m max
POS530_7-1	POS530#7_CTD-005	2018-10-01 21:33	CTD	on deck	54°29.4' N	010°12.2' E	7	
POS530_8-1	POS530#8_CTD-006	2018-10-01 22:02	CTD	in the water	54°30.2' N	010°8.34E	8.5	
POS530_8-1	POS530#8_CTD-006	2018-10-01 22:05	CTD	max depth/on ground	54°30.2' N	010°8.33E	8.5	9 m max
POS530_8-1	POS530#8_CTD-006	2018-10-01 22:07	CTD	on deck	54°30.3N	010°8.35E	8.4	
POS530_9-1	POS530#9_CTD-007	2018-10-01 22:42	CTD	in the water	54°33.0' N	010°6.57E	20	
POS530_9-1	POS530#9_CTD-007	2018-10-01 22:45	CTD	max depth/on ground	54°33.0' N	010°6.57E	20.5	21 m max
POS530_9-1	POS530#9_CTD-007	2018-10-01 22:48	CTD	on deck	54°33.1' N	010°6.58E	20.2	
POS530_10-1	POS530#10_CTD-008	2018-10-01 23:17	CTD	in the water	54°35.2N	010°5.92E	22.6	
POS530_10-1	POS530#10_CTD-008	2018-10-01 23:20	CTD	max depth/on ground	54°35.2' N	010°5.92E	22.7	23 m max

POS530_10-1	POS530#10_CTD-008	2018-10-01 23:23	CTD	on deck	54°35.2' N	010°5.92E	22.5	
POS530_11-1	POS530#11_CTD-009	2018-10-02 0:27	CTD	in the water	54°39.8' N	010°5.75E	9.3	
POS530_11-1	POS530#11_CTD-009	2018-10-02 0:29	CTD	max depth/on ground	54°39.9' N	010°5.74E	9.8	10 m max
POS530_11-1	POS530#11_CTD-009	2018-10-02 0:31	CTD	on deck	54°39.9' N	010°5.74E	9.7	
POS530_12-1	POS530#12_CTD-010	2018-10-02 1:16	CTD	in the water	54°43.4' N	010°3.23E	9	
POS530_12-1	POS530#12_CTD-010	2018-10-02 1:18	CTD	max depth/on ground	54°43.4' N	010°3.22E	9	9 m max
POS530_12-1	POS530#12_CTD-010	2018-10-02 1:20	CTD	on deck	54°43.4' N	010°3.23E	9.2	
POS530_13-1	POS530#13_CTD-011	2018-10-02 2:09	CTD	in the water	54°47.7' N	009°58.9' E	21.8	
POS530_13-1	POS530#13_CTD-011	2018-10-02 2:13	CTD	max depth/on ground	54°47.7' N	009°58.9' E	21.7	SL max = 22m
POS530_13-1	POS530#13_CTD-011	2018-10-02 2:16	CTD	on deck	54°47.7' N	009°58.9' E	21.6	
POS530_14-1	POS530#14_CTD-012	2018-10-02 3:23	CTD	in the water	54°47.6' N	009°51.4' E	17	
POS530_14-1	POS530#14_CTD-012	2018-10-02 3:26	CTD	max depth/on ground	54°47.6' N	009°51.4' E	17.1	Sl max = 18m
POS530_14-1	POS530#14_CTD-012	2018-10-02 3:29	CTD	on deck	54°47.6' N	009°51.4' E	17	

POS530_15-1	POS530#15_SVP-002	2018-10-02 4:13	Sound Velocity Profiler	in the water	54°48.4' N	009°50.5' E	18.2	
POS530_15-1	POS530#15_SVP-002	2018-10-02 4:17	Sound Velocity Profiler	max depth/on ground	54°48.4' N	009°50.5' E	18.4	SL max = 20m
POS530_15-1	POS530#15_SVP-002	2018-10-02 4:19	Sound Velocity Profiler	on deck	54°48.4' N	009°50.5' E	18.3	
POS530_16-1	POS530#16_MB-002	2018-10-02 4:58	Multibeam echosounder	profile start	54°48.8' N	009°50.4' E	18.9	
POS530_16-1	POS530#16_MB-002	2018-10-02 10:48	Multibeam echosounder	profile end	54°48.2' N	009°51.2' E	17.7	
POS530_17-1	POS530#17_SVP-003	2018-10-02 11:22	Sound Velocity Profiler	in the water	54°48.9' N	009°49.0' E	19.2	
POS530_17-1	POS530#17_SVP-003	2018-10-02 11:26	Sound Velocity Profiler	max depth/on ground	54°48.9' N	009°49.0' E	19.3	21 m max
POS530_17-1	POS530#17_SVP-003	2018-10-02 11:29	Sound Velocity Profiler	on deck	54°48.9' N	009°49.0' E	19.5	
POS530_18-1	POS530#18_MB-003	2018-10-02 11:44	Multibeam echosounder	profile start	54°48.8' N	009°48.5' E	19	
POS530_18-1	POS530#18_MB-003	2018-10-02 14:10	Multibeam echosounder	profile end	54°47.0' N	009°50.0' E	7.6	

POS530_19-1	POS530#19_SVP-004	2018-10-02 14:23	Sound Velocity Profiler	in the water	54°46.7' N	009°50.0' E	9	
POS530_19-1	POS530#19_SVP-004	2018-10-02 14:26	Sound Velocity Profiler	max depth/on ground	54°46.7' N	009°50.1' E	7.3	SL max = 7m
POS530_19-1	POS530#19_SVP-004	2018-10-02 14:27	Sound Velocity Profiler	on deck	54°46.8N	009°50.1' E	7.5	
POS530_20-1	POS530#20_MB-004	2018-10-02 14:39	Multibeam echosounder	profile start	54°47.0' N	009°49.9' E	11.1	
POS530_20-1	POS530#20_MB-004	2018-10-03 4:10	Multibeam echosounder	profile end	54°47.0' N	009°50.1' E	7.5	
POS530_21-1	POS530#21_CTD-013	2018-10-03 4:58	CTD	in the water	54°48.5' N	009°50.8' E	10.2	no video
POS530_21-1	POS530#21_CTD-013	2018-10-03 5:18	CTD	on deck	54°48.5' N	009°50.7' E	9.5	
POS530_22-1	POS530#22_TV-CTD-001	2018-10-03 6:58	TV-CTD	in the water	54°48.6N	009°50.7' E	11.3	Video
POS530_22-1	POS530#22_TV-CTD-001	2018-10-03 7:04	TV-CTD	max depth/on ground	54°48.5' N	009°50.7' E	9.5	9 m max
POS530_22-1	POS530#22_TV-CTD-001	2018-10-03 7:05	TV-CTD	profile start	54°48.5' N	009°50.7' E	9.5	
POS530_22-1	POS530#22_TV-CTD-001	2018-10-03 8:13	TV-CTD	profile end	54°48.7N	009°50.3' E	18	

POS530_22-1	POS530#22_TV-CTD-001	2018-10-03 8:14	TV-CTD	on deck	54°48.7N	009°50.3' E	20.5	
POS530_23-1	POS530#23_TV-CTD-002	2018-10-03 9:08	TV-CTD	in the water	54°47.0' N	009°49.9' E	8.6	Video
POS530_23-1	POS530#23_TV-CTD-002	2018-10-03 9:22	TV-CTD	max depth/on ground	54°47.0' N	009°49.9' E	9.6	9 m max
POS530_23-1	POS530#23_TV-CTD-002	2018-10-03 9:22	TV-CTD	profile start	54°47.0' N	009°49.9' E	10.1	
POS530_23-1	POS530#23_TV-CTD-002	2018-10-03 10:34	TV-CTD	profile end	54°47.2' N	009°49.5' E	10.6	
POS530_23-1	POS530#23_TV-CTD-002	2018-10-03 10:38	TV-CTD	on deck	54°47.2' N	009°49.5' E	10.3	
POS530_24-1	POS530#24_CTD-014	2018-10-03 11:37	CTD	in the water	54°47.3N	009°49.6' E	16.8	
POS530_24-1	POS530#24_CTD-014	2018-10-03 11:40	CTD	max depth/on ground	54°47.3N	009°49.6' E	17.3	18 m max
POS530_24-1	POS530#24_CTD-014	2018-10-03 11:42	CTD	on deck	54°47.3N	009°49.6' E	17.5	
POS530_24-2	POS530#24_Grab-001	2018-10-03 12:03	Grab	max depth/on ground	54°47.3' N	009°49.6' E	16.2	
POS530_24-2	POS530#24_Grab-001	2018-10-03 12:03	Grab	in the water	54°47.3' N	009°49.6' E	16.6	
POS530_24-2	POS530#24_Grab-001	2018-10-03 12:06	Grab	on deck	54°47.3' N	009°49.6' E	17.6	

POS530_25-1	POS530#25_Grab-002	2018-10-03 12:27	Grab	in the water	54°47.2' N	009°49.5' E	11.7	
POS530_25-1	POS530#25_Grab-002	2018-10-03 12:28	Grab	max depth/on ground	54°47.2' N	009°49.5' E	11.7	
POS530_25-1	POS530#25_Grab-002	2018-10-03 12:29	Grab	on deck	54°47.2' N	009°49.5' E	11.6	
POS530_26-1	POS530#26_Grab-003	2018-10-03 13:01	Grab	in the water	54°47.1' N	009°49.5' E	14.8	
POS530_26-1	POS530#26_Grab-003	2018-10-03 13:02	Grab	max depth/on ground	54°47.1' N	009°49.5' E	14.5	
POS530_26-1	POS530#26_Grab-003	2018-10-03 13:03	Grab	on deck	54°47.1' N	009°49.5' E	14.6	
POS530_27-1	POS530#27_Grab-004	2018-10-03 13:24	Grab	in the water	54°47.1' N	009°49.7' E	17.5	
POS530_27-1	POS530#27_Grab-004	2018-10-03 13:24	Grab	max depth/on ground	54°47.1' N	009°49.7' E	17.5	
POS530_27-1	POS530#27_Grab-004	2018-10-03 13:26	Grab	on deck	54°47.1' N	009°49.7' E	17.7	
POS530_28-1	POS530#28_Grab-005	2018-10-03 13:44	Grab	in the water	54°47.0' N	009°49.8' E	12.2	failed
POS530_28-1	POS530#28_Grab-005	2018-10-03 13:45	Grab	max depth/on ground	54°47.0' N	009°49.8' E	12.3	
POS530_28-1	POS530#28_Grab-005	2018-10-03 13:46	Grab	on deck	54°47.0' N	009°49.9E	12.3	
POS530_28-2	POS530#28_Grab-005	2018-10-03 13:51	Grab	in the water	54°47.0' N	009°49.8' E	13.2	

POS530_28-2	POS530#28_Grab-005	2018-10-03 13:51	Grab	max depth/on ground	54°47.0' N	009°49.8' E	15	
POS530_28-2	POS530#28_Grab-005	2018-10-03 13:52	Grab	on deck	54°47.0' N	009°49.8' E	12.1	
POS530_29-1	POS530#29_CTD-015	2018-10-03 14:32	CTD	in the water	54°46.3' N	009°50.5' E	9.1	
POS530_29-1	POS530#29_CTD-015	2018-10-03 14:34	CTD	max depth/on ground	54°46.3' N	009°50.5' E	10.5	SL max = 7m
POS530_29-1	POS530#29_CTD-015	2018-10-03 14:36	CTD	on deck	54°46.3' N	009°50.5' E	7.6	
POS530_30-1	POS530#30_CTD-016	2018-10-03 15:03	CTD	in the water	54°47.8' N	009°49.6' E	19.1	
POS530_30-1	POS530#30_CTD-016	2018-10-03 15:06	CTD	max depth/on ground	54°47.8' N	009°49.5' E	19.8	SL max = 19m
POS530_30-1	POS530#30_CTD-016	2018-10-03 15:09	CTD	on deck	54°47.8' N	009°49.5' E	2.1	
POS530_31-1	POS530#31_CTD-017	2018-10-03 15:40	CTD	in the water	54°49.1' N	009°47.3' E	19.5	
POS530_31-1	POS530#31_CTD-017	2018-10-03 15:43	CTD	max depth/on ground	54°49.1' N	009°47.4' E	19.5	SL max = 20m
POS530_31-1	POS530#31_CTD-017	2018-10-03 15:46	CTD	on deck	54°49.1' N	009°47.4' E	19.5	
POS530_32-1	POS530#32_CTD-018	2018-10-03 16:21	CTD	in the water	54°49.1N	009°43.7' E	19	

POS530_32-1	POS530#32_CTD-018	2018-10-03 16:24	CTD	max depth/on ground	54°49.1' N	009°43.7' E	19	SL max = 19m
POS530_32-1	POS530#32_CTD-018	2018-10-03 16:27	CTD	on deck	54°49.1N	009°43.7' E	18.8	
POS530_33-1	POS530#33_CTD-019	2018-10-03 16:53	CTD	in the water	54°49.9N	009°41.1' E	15.6	
POS530_33-1	POS530#33_CTD-019	2018-10-03 16:56	CTD	max depth/on ground	54°49.9N	009°41.1' E	15.7	SL max = 16m
POS530_33-1	POS530#33_CTD-019	2018-10-03 16:58	CTD	on deck	54°49.9' N	009°41.1' E	15.7	
POS530_34-1	POS530#34_CTD-020	2018-10-03 17:25	CTD	in the water	54°50.5' N	009°38.4' E	11.6	
POS530_34-1	POS530#34_CTD-020	2018-10-03 17:28	CTD	max depth/on ground	54°50.5' N	009°38.4' E	13.1	SL max = 13m
POS530_34-1	POS530#34_CTD-020	2018-10-03 17:30	CTD	on deck	54°50.5' N	009°38.4' E	13.2	
POS530_35-1	POS530#35_MB-005	2018-10-03 18:39	Multibeam echosounder	profile start	54°46.9' N	009°49.4' E	12.7	
POS530_35-1	POS530#35_MB-005	2018-10-04 4:07	Multibeam echosounder	profile end	54°48.9N	009°48.9' E	19.3	
POS530_36-1	POS530#36_SVP-004	2018-10-04 4:17	Sound Velocity Profiler	in the water	54°48.9' N	009°48.6' E	19.1	
POS530_36-1	POS530#36_SVP-004	2018-10-04 4:21	Sound Velocity Profiler	max depth/on ground	54°48.9' N	009°48.6' E	22.8	SL max = 21m

POS530_36-1	POS530#36_SVP-004	2018-10-04 4:23	Sound Velocity Profiler	on deck	54°48.9' N	009°48.6' E	19.2	
POS530_37-1	POS530#37_SVP-005	2018-10-04 4:40	Sound Velocity Profiler	station start	54°48.9' N	009°48.5' E	25.8	
POS530_37-1	POS530#37_SVP-005	2018-10-04 6:50	Sound Velocity Profiler	station end	54°47.3' N	009°49.5' E	11.1	
POS530_38-1	POS530#38_Dive-001	2018-10-04 8:24	Diving operations	station start	54°47.3' N	009°49.5' E	11.3	Divers underway with own boat
POS530_38-1	POS530#38_Dive-001	2018-10-04 10:21	Diving operations	station end	54°47.4' N	009°49.4' E	11.1	Divers back on board
POS530_39-1	POS530#39_TV-CTD-003	2018-10-04 11:05	TV-CTD	in the water	54°47.1' N	009°50.3' E	17.5	
POS530_39-1	POS530#39_TV-CTD-003	2018-10-04 11:13	TV-CTD	max depth/on ground	54°47.1' N	009°50.3' E	17	19 m max
POS530_39-1	POS530#39_TV-CTD-003	2018-10-04 11:14	TV-CTD	profile start	54°47.1' N	009°50.3E	17	
POS530_39-1	POS530#39_TV-CTD-003	2018-10-04 11:53	TV-CTD	profile end	54°47.0' N	009°50'	10.1	
POS530_39-1	POS530#39_TV-CTD-003	2018-10-04 11:55	TV-CTD	on deck	54°47.0' N	009°50.0' E	10.2	
POS530_40-1	POS530#40_Grab-006	2018-10-04 12:48	Grab	in the water	54°48.5' N	009°51.1' E	16.1	

POS530_40-1	POS530#40_Grab-006	2018-10-04 12:49	Grab	max depth/on ground	54°48.5' N	009°51.1' E	15.5
POS530_40-1	POS530#40_Grab-006	2018-10-04 12:49	Grab	on deck	54°48.5' N	009°51.1' E	15
POS530_41-1	POS530#41_Grab-007	2018-10-04 13:05	Grab	in the water	54°48.6N	009°50.7' E	11.8
POS530_41-1	POS530#41_Grab-007	2018-10-04 13:05	Grab	max depth/on ground	54°48.6' N	009°50.7' E	12
POS530_41-1	POS530#41_Grab-007	2018-10-04 13:06	Grab	on deck	54°48.6' N	009°50.7' E	12.6
POS530_42-1	POS530#42_Grab-008	2018-10-04 13:16	Grab	in the water	54°48.7N	009°50.6' E	19.1
POS530_42-1	POS530#42_Grab-008	2018-10-04 13:16	Grab	max depth/on ground	54°48.7N	009°50.6' E	19.2
POS530_42-1	POS530#42_Grab-008	2018-10-04 13:17	Grab	on deck	54°48.7N	009°50.6E	19.2
POS530_42-2	POS530#42_Grab-008	2018-10-04 13:26	Grab	in the water	54°48.6' N	009°50.3' E	15.5
POS530_42-2	POS530#42_Grab-008	2018-10-04 13:26	Grab	max depth/on ground	54°48.6' N	009°50.3' E	15.5
POS530_42-2	POS530#42_Grab-008	2018-10-04 13:27	Grab	on deck	54°48.6' N	009°50.3' E	15.6
POS530_43-2	POS530#43_Grab-009	2018-10-04 13:29	Grab	max depth/on ground	54°48.6' N	009°50.3' E	16.7

POS530_43-2	POS530#43_Grab-009	2018-10-04 13:29	Grab	on deck	54°48.6' N	009°50.3' E	17.1	
POS530_44-1	POS530#44_Grab-010	2018-10-04 13:43	Grab	in the water	54°48.7' N	009°50.3' E	18.8	formerly _43
POS530_44-1	POS530#44_Grab-010	2018-10-04 13:43	Grab	max depth/on ground	54°48.7' N	009°50.3' E	19	formerly _44
POS530_44-1	POS530#44_Grab-010	2018-10-04 13:45	Grab	on deck	54°48.7' N	009°50.3' E	19	formerly _45
POS530_44-1	POS530#44_-001	does not exist						FEHLER
POS530_45-1	POS530#45_SBP-001	2018-10-04 14:39	Parasound	profile start	54° 47.9' N	009° 48.8' E	18.8	
POS530_45-1	POS530#45_SBP-001	2018-10-04 15:05	Parasound	profile end	54° 46.9' N	009° 49.7' E	18.8	
POS530_46-1	POS530#46_CTD-021	2018-10-04 17:50	CTD	in the water	54° 48.8' N	009° 56.3' E	18.8	
POS530_46-1	POS530#46_CTD-021	2018-10-04 17:54	CTD	max depth/on ground	54° 48.8' N	009° 56.3' E	18.8	SL max = 21m
POS530_46-1	POS530#46_CTD-021	2018-10-04 17:57	CTD	on deck	54° 48.8' N	009° 56.3' E	21	
POS530_47-1	POS530#47_CTD-022	2018-10-04 18:52	CTD	in the water	54° 45.9' N	010° 01.8' E	24.3	
POS530_47-1	POS530#47_CTD-022	2018-10-04 18:55	CTD	max depth/on ground	54° 45.9' N	010° 01.8' E	24.1	25 m max
POS530_47-1	POS530#47_CTD-022	2018-10-04 18:59	CTD	on deck	54° 45.9' N	010° 01.8' E	24	

POS530_48-1	POS530#48_CTD-023	2018-10-04 19:55	CTD	in the water	54° 42.4' N	010° 09.0' E	21.7	
POS530_48-1	POS530#48_CTD-023	2018-10-04 19:58	CTD	max depth/on ground	54° 42.4' N	010° 09.0' E	21.5	22 m max
POS530_48-1	POS530#48_CTD-023	2018-10-04 20:01	CTD	on deck	54° 42.4' N	010° 09.0' E	21.6	
POS530_48-2	POS530#48_GoFlo-001	2018-10-04 20:06	GoFlo bottle	in the water	54° 42.4' N	010° 09.0' E	22	
POS530_48-2	POS530#48_GoFlo-001	2018-10-04 20:16	GoFlo bottle	max depth/on ground	54° 42.4' N	010° 08.9' E	21.7	
POS530_48-2	POS530#48_GoFlo-001	2018-10-04 20:20	GoFlo bottle	on deck	54° 42.4' N	010° 08.9' E	21.6	
POS530_49-1	POS530#49_CTD-024	2018-10-04 21:07	CTD	in the water	54° 39.0' N	010° 13.0' E	16.2	
POS530_49-1	POS530#49_CTD-024	2018-10-04 21:11	CTD	max depth/on ground	54° 39.0' N	010° 13.0' E	16.1	16 m max
POS530_49-1	POS530#49_CTD-024	2018-10-04 21:14	CTD	on deck	54° 39.0' N	010° 13.0' E	16.1	
POS530_50-1	POS530#50_CTD-025	2018-10-04 22:05	CTD	in the water	54° 35.6' N	010° 18.7' E	11.7	
POS530_50-1	POS530#50_CTD-025	2018-10-04 22:08	CTD	max depth/on ground	54° 35.7' N	010° 18.7' E	11.8	12 m max
POS530_50-1	POS530#50_CTD-025	2018-10-04 22:09	CTD	on deck	54° 35.7' N	010° 18.7' E	11.8	
POS530_50-2	POS530#50_GoFlo-002	2018-10-04 22:15	GoFlo bottle	in the water	54° 35.8' N	010° 18.7' E	12	

POS530_50-2	POS530#50_GoFlo-002	2018-10-04 22:17	GoFlo bottle	max depth/on ground	54° 35.8' N	010° 18.6' E	12	
POS530_50-2	POS530#50_GoFlo-002	2018-10-04 22:20	GoFlo bottle	on deck	54° 35.8' N	010° 18.6' E	12	
POS530_51-1	POS530#51_CTD-026	2018-10-04 23:10	CTD	in the water	54° 32.9' N	010° 23.9' E	14	
POS530_51-1	POS530#51_CTD-026	2018-10-04 23:13	CTD	max depth/on ground	54° 32.9' N	010° 23.9' E	14.2	14 m max
POS530_51-1	POS530#51_CTD-026	2018-10-04 23:15	CTD	on deck	54° 32.9' N	010° 23.9' E	14.1	
POS530_52-1	POS530#52_CTD-027	2018-10-04 23:57	CTD	in the water	54° 30.6' N	010° 28.5' E	12	
POS530_52-1	POS530#52_CTD-027	2018-10-04 23:59	CTD	max depth/on ground	54° 30.6' N	010° 28.5' E	12.1	12 m max
POS530_52-1	POS530#52_CTD-027	2018-10-05 0:01	CTD	on deck	54° 30.6' N	010° 28.5' E	12	
POS530_52-2	POS530#52_GoFlo-003	2018-10-05 0:04	GoFlo bottle	in the water	54° 30.6' N	010° 28.5' E	12	
POS530_52-2	POS530#52_GoFlo-003	2018-10-05 0:08	GoFlo bottle	max depth/on ground	54° 30.6' N	010° 28.5' E	12	
POS530_52-2	POS530#52_GoFlo-003	2018-10-05 0:10	GoFlo bottle	on deck	54° 30.6' N	010° 28.5' E	12	
POS530_53-1	POS530#53_CTD-028	2018-10-05 0:53	CTD	in the water	54° 32.1' N	010° 35.0' E	12	

POS530_53-1	POS530#53_CTD-028	2018-10-05 0:55	CTD	max depth/on ground	54° 32.1' N	010° 35.0' E	11.8	12 m max
POS530_53-1	POS530#53_CTD-028	2018-10-05 0:57	CTD	on deck	54° 32.1' N	010° 35.0' E	12	
POS530_54-1	POS530#54_CTD-029	2018-10-05 1:35	CTD	in the water	54° 31.9' N	010° 40.6' E	19.5	
POS530_54-1	POS530#54_CTD-029	2018-10-05 1:38	CTD	max depth/on ground	54° 31.9' N	010° 40.7' E	19.5	20 m max
POS530_54-1	POS530#54_CTD-029	2018-10-05 1:40	CTD	on deck	54° 31.9' N	010° 40.7' E	19.6	
POS530_54-2	POS530#54_GoFlo-004	2018-10-05 1:45	GoFlo bottle	in the water	54° 31.9' N	010° 40.7' E	19.5	
POS530_54-2	POS530#54_GoFlo-004	2018-10-05 1:48	GoFlo bottle	max depth/on ground	54° 31.9' N	010° 40.6' E	19.3	
POS530_54-2	POS530#54_GoFlo-004	2018-10-05 1:51	GoFlo bottle	on deck	54° 31.9' N	010° 40.6' E	19.6	
POS530_55-1	POS530#55_CTD-030	2018-10-05 2:43	CTD	in the water	54° 33.5' N	010° 46.2' E	19.6	
POS530_55-1	POS530#55_CTD-030	2018-10-05 2:46	CTD	max depth/on ground	54° 33.5' N	010° 46.2' E	19.7	SL max = 20m
POS530_55-1	POS530#55_CTD-030	2018-10-05 2:48	CTD	on deck	54° 33.5' N	010° 46.2' E	19.7	
POS530_56-1	POS530#56_CTD-031	2018-10-05 3:55	CTD	in the water	54° 35.3' N	010° 53.9' E	14.7	

POS530_56-1	POS530#56_CTD-031	2018-10-05 3:59	CTD	max depth/on ground	54° 35.3' N	010° 53.9' E	14.7	SL max = 15m
POS530_56-1	POS530#56_CTD-031	2018-10-05 4:01	CTD	on deck	54° 35.3' N	010° 53.9' E	14.7	
POS530_56-2	POS530#56_GoFlo-005	2018-10-05 4:04	GoFlo bottle	in the water	54° 35.3' N	010° 53.9' E	14.7	
POS530_56-2	POS530#56_GoFlo-005	2018-10-05 4:08	GoFlo bottle	max depth/on ground	54° 35.3' N	010° 53.9' E	14.5	SL max = 15m
POS530_56-2	POS530#56_GoFlo-005	2018-10-05 4:12	GoFlo bottle	on deck	54° 35.3' N	010° 53.9' E	14.5	
POS530_57-1	POS530#57_CTD-032	2018-10-05 5:00	CTD	information	54° 35.1' N	011° 00.9' E	18.5	inklusive SVP
POS530_57-1	POS530#57_CTD-032	2018-10-05 5:01	CTD	in the water	54° 35.1' N	011° 00.9' E	18.5	
POS530_57-1	POS530#57_CTD-032	2018-10-05 5:04	CTD	max depth/on ground	54° 35.1' N	011° 00.9' E	18.5	SL max = 20m
POS530_57-1	POS530#57_CTD-032	2018-10-05 5:07	CTD	on deck	54° 35.1' N	011° 00.9' E	18.3	
POS530_58-1	POS530#58_MB-006	2018-10-05 7:18	Multibeam echosounder	profile start	54° 34.6' N	010° 49.5' E	16.6	
POS530_59-1	POS530#59_MB-006	2018-10-06 4:32	Multibeam echosounder	profile end	54° 24.7' N	010° 54.4' E	7.5	
POS530_59-1	POS530#59_MB-006	2018-10-05 17:32	Multibeam echosounder	profile start	54° 24.5' N	010° 49.1' E	8	
POS530_60-1	POS530#60_CTD-	2018-10-06 4:53	CTD	on deck	54° 24.6' N	010° 54.6' E	9	

	033							
POS530_60-1	POS530#60_CTD-033	2018-10-06 4:51	CTD	max depth/on ground	54° 24.6' N	010° 54.6' E	7.6	SL max = 9m
POS530_60-1	POS530#60_CTD-033	43379.19861	CTD	in the water	54° 24.6' N	010° 54.6' E	7.8	
POS530_60-1	POS530#60_CTD-033	2018-10-06 4:45	CTD	information	54° 24.6' N	010° 54.6' E	7.7	inklusive SVP
POS530_60-2	POS530#60_GoFlo-006	2018-10-06 5:00	GoFlo bottle	on deck	54° 24.6' N	010° 54.5' E	7.6	
POS530_60-2	POS530#60_GoFlo-006	2018-10-06 4:58	GoFlo bottle	max depth/on ground	54° 24.6' N	010° 54.5' E	7.5	SL max = 10m
POS530_60-2	POS530#60_GoFlo-006	2018-10-06 4:56	GoFlo bottle	in the water	54° 24.6' N	010° 54.5' E	8.5	
POS530_61-1	POS530#61_CTD-034	2018-10-06 6:27	CTD	on deck	54° 24.4' N	010° 57.2' E	10.6	
POS530_61-1	POS530#61_CTD-034	2018-10-06 6:25	CTD	max depth/on ground	54° 24.4' N	010° 57.1' E	10.1	10 m max
POS530_61-1	POS530#61_CTD-034	2018-10-06 6:21	CTD	in the water	54° 24.4' N	010° 57.1' E	10.3	
POS530_61-2	POS530#61_GoFlo-007	2018-10-06 6:34	GoFlo bottle	on deck	54° 24.4' N	010° 57.2' E	10.6	
POS530_61-2	POS530#61_GoFlo-007	2018-10-06 6:32	GoFlo bottle	max depth/on ground	54° 24.4' N	010° 57.2' E	10.5	
POS530_61-2	POS530#61_GoFlo-007	2018-10-06 6:29	GoFlo bottle	in the water	54° 24.4' N	010° 57.2' E	10.2	

POS530_62-1	POS530#62_CTD-035	2018-10-06 7:20	CTD	on deck	54° 25.0' N	010° 51.4' E	7.5	
POS530_62-1	POS530#62_CTD-035	2018-10-06 7:18	CTD	max depth/on ground	54° 25.0' N	010° 51.4' E	8.7	7 m max
POS530_62-1	POS530#62_CTD-035	2018-10-06 7:16	CTD	in the water	54° 25.0' N	010° 51.3' E	7.3	
POS530_62-2	POS530#62_GoFlo-008	2018-10-06 7:28	GoFlo bottle	on deck	54° 25.0' N	010° 51.4' E	7.5	
POS530_62-2	POS530#62_GoFlo-008	2018-10-06 7:26	GoFlo bottle	max depth/on ground	54° 25.0' N	010° 51.4' E	7.7	
POS530_62-2	POS530#62_GoFlo-008	2018-10-06 7:23	GoFlo bottle	in the water	54° 25.0' N	010° 51.4' E	7.5	
POS530_63-1	POS530#63_TV-CTD-004	2018-10-06 9:17	TV-CTD	on deck	54° 24.4' N	010° 50.8' E	8.8	
POS530_63-1	POS530#63_TV-CTD-004	2018-10-06 9:13	TV-CTD	profile end	54° 24.4' N	010° 50.7' E	8.5	
POS530_63-1	POS530#63_TV-CTD-004	2018-10-06 8:03	TV-CTD	profile start	54° 24.7' N	010° 50.3' E	9	
POS530_63-1	POS530#63_TV-CTD-004	2018-10-06 8:02	TV-CTD	max depth/on ground	54° 24.7' N	010° 50.3' E	7.8	7 m max
POS530_63-1	POS530#63_TV-CTD-004	2018-10-06 7:57	TV-CTD	in the water	54° 24.7' N	010° 50.3' E	9.1	Video
POS530_64-1	POS530#64_TV-CTD-005	2018-10-06 11:04	TV-CTD	on deck	54° 24.5' N	010° 51.1' E	8.5	

POS530_64-1	POS530#64_TV-CTD-005	2018-10-06 11:00	TV-CTD	profile end	54° 24.5' N	010° 51.0' E	8.5	
POS530_64-1	POS530#64_TV-CTD-005	2018-10-06 10:36	TV-CTD	profile start	54° 24.7' N	010° 51.0' E	8	
POS530_64-1	POS530#64_TV-CTD-005	2018-10-06 10:35	TV-CTD	max depth/on ground	54° 24.7' N	010° 51.0' E	7.8	
POS530_64-1	POS530#64_TV-CTD-005	2018-10-06 10:33	TV-CTD	in the water	54° 24.7' N	010° 51.0' E	7.8	Video
POS530_65-1	POS530#65_TV-CTD-006	2018-10-06 12:00	TV-CTD	on deck	54° 24.7' N	010° 51.0' E	8	
POS530_65-1	POS530#65_TV-CTD-006	2018-10-06 11:56	TV-CTD	profile end	54° 24.7' N	010° 51.1' E	8	
POS530_65-1	POS530#65_TV-CTD-006	2018-10-06 11:16	TV-CTD	profile start	54° 24.5' N	010° 51.2' E	8	
POS530_65-1	POS530#65_TV-CTD-006	2018-10-06 11:16	TV-CTD	max depth/on ground	54° 24.5' N	010° 51.2' E	8	
POS530_65-1	POS530#65_TV-CTD-006	2018-10-06 11:13	TV-CTD	in the water	54° 24.5' N	010° 51.2' E	8	
POS530_66-1	POS530#66_AUV-001	2018-10-06 13:30	Autonomous Underwater Vehicle	on deck	54° 24.6' N	010° 51.1' E	8.1	
POS530_66-1	POS530#66_AUV-001	2018-10-06 12:24	Autonomous Underwater Vehicle	in the water	54° 24.6' N	010° 51.1' E	7.8	

POS530_67-1	POS530#67_AUV-001	2018-10-06 15:03	Autonomous Underwater Vehicle	on deck	54° 24.6' N	010° 54.5' E	7.7	
POS530_67-1	POS530#67_AUV-001	2018-10-06 14:30	Autonomous Underwater Vehicle	in the water	54° 24.5' N	010° 54.5' E	7.5	
POS530_68-1	POS530#68_CTD-039	2018-10-06 16:11	CTD	on deck	54° 25.3' N	010° 47.0' E	8.8	
POS530_68-1	POS530#68_CTD-039	2018-10-06 16:09	CTD	max depth/on ground	54° 25.3' N	010° 47.0' E	8.8	SL max = 8m
POS530_68-1	POS530#68_CTD-039	2018-10-06 16:07	CTD	in the water	54° 25.3' N	010° 47.0' E	8.8	
POS530_69-1	POS530#69_CTD-040	2018-10-06 16:53	CTD	on deck	54° 25.6' N	010° 42.7' E	15.8	
POS530_69-1	POS530#69_CTD-040	2018-10-06 16:50	CTD	max depth/on ground	54° 25.6' N	010° 42.7' E	15.7	SL max = 16m
POS530_69-1	POS530#69_CTD-040	2018-10-06 16:47	CTD	in the water	54° 25.5' N	010° 42.7' E	15.7	
POS530_69-2	POS530#69_GoFlo-009	2018-10-06 17:01	GoFlo bottle	on deck	54° 25.6' N	010° 42.6' E	15.7	
POS530_69-2	POS530#69_GoFlo-009	2018-10-06 16:59	GoFlo bottle	max depth/on ground	54° 25.6' N	010° 42.6' E	16	SL max = 15m
POS530_69-2	POS530#69_GoFlo-009	2018-10-06 16:57	GoFlo bottle	in the water	54° 25.6' N	010° 42.6' E	15.8	
POS530_70-1	POS530#70_CTD-041	2018-10-06 17:40	CTD	on deck	54° 26.2' N	010° 38.4' E	14.8	

POS530_70-1	POS530#70_CTD-041	2018-10-06 17:38	CTD	max depth/on ground	54° 26.2' N	010° 38.4' E	14.8	SL max = 15m
POS530_70-1	POS530#70_CTD-041	2018-10-06 17:35	CTD	in the water	54° 26.2' N	010° 38.4' E	14.8	
POS530_71-1	POS530#71_CTD-042	2018-10-06 18:25	CTD	on deck	54° 27.1' N	010° 34.2' E	14.7	
POS530_71-1	POS530#71_CTD-042	2018-10-06 18:23	CTD	max depth/on ground	54° 27.1' N	010° 34.2' E	14.6	15 m max
POS530_71-1	POS530#71_CTD-042	2018-10-06 18:20	CTD	in the water	54° 27.1' N	010° 34.2' E	15.1	
POS530_71-2	POS530#71_GoFlo-010	2018-10-06 18:34	GoFlo bottle	on deck	54° 27.1' N	010° 34.2' E	14.8	
POS530_71-2	POS530#71_GoFlo-010	2018-10-06 18:31	GoFlo bottle	max depth/on ground	54° 27.1' N	010° 34.2' E	14.7	
POS530_71-2	POS530#71_GoFlo-010	2018-10-06 18:28	GoFlo bottle	in the water	54° 27.1' N	010° 34.2' E	14.7	
POS530_72-1	POS530#72_SVP-006	2018-10-06 20:00	Sound Velocity Profiler	on deck	54° 24.4' N	010° 48.2' E	10.2	
POS530_72-1	POS530#72_SVP-006	2018-10-06 19:59	Sound Velocity Profiler	max depth/on ground	54° 24.4' N	010° 48.2' E	10.3	
POS530_72-1	POS530#72_SVP-006	2018-10-06 19:55	Sound Velocity Profiler	in the water	54° 24.5' N	010° 48.2' E	10.2	

POS530_73-1	POS530#73_MB-007	2018-10-07 6:25	Multibeam echosounder	profile end	54° 24.7' N	010° 49.2' E	8
POS530_73-1	POS530#73_MB-007	2018-10-06 20:17	Multibeam echosounder	profile start	54° 24.5' N	010° 49.2' E	7.7
POS530_74-1	POS530#74_MB-007	2018-10-07 7:11	Multibeam echosounder	profile start	54° 24.7' N	010° 49.0' E	8.8
POS530_75-1	POS530#75_Grab-011	2018-10-07 12:11	Grab	in the water	54° 24.7' N	010° 54.4' E	8.1
POS530_75-1	POS530#75_Grab-011	2018-10-07 12:11	Grab	max depth/on ground	54° 24.7' N	010° 54.4' E	7.1
POS530_75-1	POS530#75_Grab-011	2018-10-07 12:11	Grab	on deck	54° 24.7' N	010° 54.4' E	7.2
POS530_76-1	POS530#76_Grab-012	2018-10-07 12:23	Grab	in the water	54° 24.7' N	010° 54.3' E	7.8
POS530_76-1	POS530#76_Grab-012	2018-10-07 12:23	Grab	max depth/on ground	54° 24.7' N	010° 54.3' E	7.8
POS530_76-1	POS530#76_Grab-012	2018-10-07 12:24	Grab	on deck	54° 24.7' N	010° 54.3' E	8
POS530_76-2	POS530#76_Grab-012	2018-10-07 12:27	Grab	in the water	54° 24.7' N	010° 54.3' E	7.8
POS530_76-2	POS530#76_Grab-012	2018-10-07 12:28	Grab	max depth/on ground	54° 24.7' N	010° 54.3' E	7.6
POS530_76-2	POS530#76_Grab-012	2018-10-07 12:28	Grab	on deck	54° 24.7' N	010° 54.3' E	7.7
POS530_77-1	POS530#77_Grab-	2018-10-07	Grab	in the water	54° 24.7' N	010° 54.2' E	8

	013	12:37					
POS530_77-1	POS530#77_Grab-013	2018-10-07 12:38	Grab	max depth/on ground	54° 24.7' N	010° 54.2' E	8.1
POS530_77-1	POS530#77_Grab-013	2018-10-07 12:39	Grab	on deck	54° 24.7' N	010° 54.2' E	8
POS530_78-1	POS530#78_Grab-014	2018-10-07 12:58	Grab	in the water	54° 24.6' N	010° 54.2' E	8.8
POS530_78-1	POS530#78_Grab-014	2018-10-07 12:58	Grab	max depth/on ground	54° 24.6' N	010° 54.2' E	9
POS530_78-1	POS530#78_Grab-014	2018-10-07 12:59	Grab	on deck	54° 24.6' N	010° 54.2' E	9.1
POS530_79-1	POS530#79_Grab-015	2018-10-07 13:16	Grab	in the water	54° 24.5' N	010° 53.3' E	10.1
POS530_79-1	POS530#79_Grab-015	2018-10-07 13:16	Grab	max depth/on ground	54° 24.5' N	010° 53.3' E	10.1
POS530_79-1	POS530#79_Grab-015	2018-10-07 13:17	Grab	on deck	54° 24.5' N	010° 53.3' E	10.2
POS530_80-1	POS530#80_Grab-016	2018-10-07 13:25	Grab	in the water	54° 24.6' N	010° 53.3' E	9.6
POS530_80-1	POS530#80_Grab-016	2018-10-07 13:26	Grab	max depth/on ground	54° 24.6' N	010° 53.3' E	9.7
POS530_80-1	POS530#80_Grab-016	2018-10-07 13:27	Grab	on deck	54° 24.6' N	010° 53.3' E	9.6
POS530_81-1	POS530#81_Grab-017	2018-10-07 13:53	Grab	in the water	54° 24.6' N	010° 51.4' E	8.1

POS530_81-1	POS530#81_Grab-017	2018-10-07 13:53	Grab	max depth/on ground	54° 24.6' N	010° 51.4' E	7.5
POS530_81-1	POS530#81_Grab-017	2018-10-07 13:55	Grab	on deck	54° 24.6' N	010° 51.4' E	8.8
POS530_81-2	POS530#81_Grab-017	2018-10-07 13:56	Grab	in the water	54° 24.6' N	010° 51.4' E	7.8
POS530_81-2	POS530#81_Grab-017	2018-10-07 13:57	Grab	max depth/on ground	54° 24.6' N	010° 51.4' E	7.8
POS530_81-2	POS530#81_Grab-017	2018-10-07 13:57	Grab	on deck	54° 24.6' N	010° 51.4' E	7.7
POS530_81-3	POS530#81_Grab-017	2018-10-07 13:58	Grab	in the water	54° 24.6' N	010° 51.4' E	7.8
POS530_81-3	POS530#81_Grab-017	2018-10-07 13:59	Grab	max depth/on ground	54° 24.6' N	010° 51.4' E	7.6
POS530_81-3	POS530#81_Grab-017	2018-10-07 14:00	Grab	on deck	54° 24.6' N	010° 51.4' E	7.6
POS530_82-1	POS530#82_Grab-018	2018-10-07 14:14	Grab	in the water	54° 24.5' N	010° 51.1' E	9.2
POS530_82-1	POS530#82_Grab-018	2018-10-07 14:15	Grab	max depth/on ground	54° 24.5' N	010° 51.1' E	8.3
POS530_82-1	POS530#82_Grab-018	2018-10-07 14:15	Grab	on deck	54° 24.5' N	010° 51.1' E	8.5
POS530_83-1	POS530#83_Grab-019	2018-10-07 14:43	Grab	in the water	54° 24.6' N	010° 50.3' E	7.8

POS530_83-1	POS530#83_Grab-019	2018-10-07 14:44	Grab	max depth/on ground	54° 24.6' N	010° 50.3' E	8
POS530_83-1	POS530#83_Grab-019	2018-10-07 14:45	Grab	on deck	54° 24.6' N	010° 50.3' E	9.1
POS530_84-1	POS530#84_Grab-020	2018-10-07 14:59	Grab	in the water	54° 24.6' N	010° 50.0' E	8.2
POS530_84-1	POS530#84_Grab-020	2018-10-07 14:59	Grab	max depth/on ground	54° 24.6' N	010° 50.0' E	8.1
POS530_84-1	POS530#84_Grab-020	2018-10-07 15:00	Grab	on deck	54° 24.6' N	010° 50.0' E	8.5
POS530_85-1	POS530#85_CTD-043	2018-10-07 16:10	CTD	in the water	54° 19.4' N	010° 42.2' E	10.6
POS530_85-1	POS530#85_CTD-043	2018-10-07 16:13	CTD	max depth/on ground	54° 19.4' N	010° 42.2' E	10.5
POS530_85-1	POS530#85_CTD-043	2018-10-07 16:15	CTD	on deck	54° 19.4' N	010° 42.2' E	10.6
POS530_85-2	POS530#85_GoFlo-011	2018-10-07 16:17	GoFlo bottle	in the water	54° 19.4' N	010° 42.2' E	10.6
POS530_85-2	POS530#85_GoFlo-011	2018-10-07 16:21	GoFlo bottle	max depth/on ground	54° 19.4' N	010° 42.2' E	10.6
POS530_85-2	POS530#85_GoFlo-011	2018-10-07 16:23	GoFlo bottle	on deck	54° 19.4' N	010° 42.3' E	10.6
POS530_86-1	POS530#86_CTD-044	2018-10-07 16:50	CTD	in the water	54° 21.1' N	010° 42.4' E	12.6

POS530_86-1	POS530#86_CTD-044	2018-10-07 16:53	CTD	max depth/on ground	54° 21.1' N	010° 42.4' E	12.6
POS530_86-1	POS530#86_CTD-044	2018-10-07 16:55	CTD	on deck	54° 21.1' N	010° 42.4' E	12.5
POS530_87-1	POS530#87_CTD-045	2018-10-07 17:27	CTD	in the water	54° 23.5' N	010° 42.5' E	14.2
POS530_87-1	POS530#87_CTD-045	2018-10-07 17:30	CTD	max depth/on ground	54° 23.5' N	010° 42.4' E	14.2
POS530_87-1	POS530#87_CTD-045	2018-10-07 17:32	CTD	on deck	54° 23.5' N	010° 42.4' E	14.2
POS530_87-2	POS530#87_GoFlo-012	2018-10-07 17:35	GoFlo bottle	in the water	54° 23.5' N	010° 42.4' E	14.2
POS530_87-2	POS530#87_GoFlo-012	2018-10-07 17:38	GoFlo bottle	max depth/on ground	54° 23.5' N	010° 42.4' E	14.2
POS530_87-2	POS530#87_GoFlo-012	2018-10-07 17:40	GoFlo bottle	on deck	54° 23.5' N	010° 42.4' E	14.2
POS530_88-1	POS530#88_CTD-046	2018-10-07 18:23	CTD	in the water	54° 27.0' N	010° 42.6' E	16.6
POS530_88-1	POS530#88_CTD-046	2018-10-07 18:26	CTD	max depth/on ground	54° 27.0' N	010° 42.5' E	16.6
POS530_88-1	POS530#88_CTD-046	2018-10-07 18:29	CTD	on deck	54° 27.0' N	010° 42.5' E	16.5
POS530_89-1	POS530#89_CTD-047	2018-10-07 19:00	CTD	in the water	54° 28.8' N	010° 42.4' E	16.7

POS530_89-1	POS530#89_CTD-047	2018-10-07 19:03	CTD	max depth/on ground	54° 28.8' N	010° 42.4' E	16.5
POS530_89-1	POS530#89_CTD-047	2018-10-07 19:06	CTD	on deck	54° 28.8' N	010° 42.4' E	16.6
POS530_89-2	POS530#89_GoFlo-013	2018-10-07 19:10	GoFlo bottle	in the water	54° 28.9' N	010° 42.4' E	16.5
POS530_89-2	POS530#89_GoFlo-013	2018-10-07 19:13	GoFlo bottle	max depth/on ground	54° 28.9' N	010° 42.4' E	16.6
POS530_89-2	POS530#89_GoFlo-013	2018-10-07 19:16	GoFlo bottle	on deck	54° 28.9' N	010° 42.4' E	16.6
POS530_90-1	POS530#90_CTD-048	2018-10-07 19:43	CTD	in the water	54° 30.7' N	010° 42.4' E	13.8
POS530_90-1	POS530#90_CTD-048	2018-10-07 19:47	CTD	max depth/on ground	54° 30.7' N	010° 42.4' E	13.7
POS530_90-1	POS530#90_CTD-048	2018-10-07 19:49	CTD	on deck	54° 30.7' N	010° 42.4' E	14
POS530_91-1	POS530#91_CTD-049	2018-10-07 21:15	CTD	in the water	54° 28.3' N	010° 26.8' E	11.3
POS530_91-1	POS530#91_CTD-049	2018-10-07 21:18	CTD	max depth/on ground	54° 28.3' N	010° 26.8' E	11.3
POS530_91-1	POS530#91_CTD-049	2018-10-07 21:21	CTD	on deck	54° 28.3' N	010° 26.8' E	11.1
POS530_91-2	POS530#91_GoFlo-014	2018-10-07 21:23	GoFlo bottle	in the water	54° 28.3' N	010° 26.8' E	11.3

POS530_91-2	POS530#91_GoFlo-014	2018-10-07 21:24	GoFlo bottle	max depth/on ground	54° 28.3' N	010° 26.8' E	11.3
POS530_91-2	POS530#91_GoFlo-014	2018-10-07 21:31	GoFlo bottle	on deck	54° 28.2' N	010° 26.8' E	11.3
POS530_92-1	POS530#92_CTD-050	2018-10-07 22:30	CTD	in the water	54° 23.5' N	010° 33.4' E	10
POS530_92-1	POS530#92_CTD-050	2018-10-07 22:32	CTD	max depth/on ground	54° 23.5' N	010° 33.4' E	9.8
POS530_92-1	POS530#92_CTD-050	2018-10-07 22:34	CTD	on deck	54° 23.5' N	010° 33.4' E	9.8
POS530_93-1	POS530#93_CTD-051	2018-10-07 23:15	CTD	in the water	54° 22.5' N	010° 38.9' E	9.3
POS530_93-1	POS530#93_CTD-051	2018-10-07 23:17	CTD	max depth/on ground	54° 22.5' N	010° 38.9' E	9.5
POS530_93-1	POS530#93_CTD-051	2018-10-07 23:19	CTD	on deck	54° 22.5' N	010° 38.9' E	9.6
POS530_94-1	POS530#94_CTD-052	2018-10-08 0:08	CTD	in the water	54° 19.5' N	010° 45.2' E	11.3
POS530_94-1	POS530#94_CTD-052	2018-10-08 0:10	CTD	max depth/on ground	54° 19.5' N	010° 45.2' E	11.3
POS530_94-1	POS530#94_CTD-052	2018-10-08 0:12	CTD	on deck	54° 19.5' N	010° 45.2' E	11.3
POS530_95-1	POS530#95_CTD-053	2018-10-08 0:44	CTD	in the water	54° 20.7' N	010° 49.2' E	11.5

POS530_95-1	POS530#95_CTD-053	2018-10-08 0:46	CTD	max depth/on ground	54° 20.7' N	010° 49.2' E	11.5
POS530_95-1	POS530#95_CTD-053	2018-10-08 0:48	CTD	on deck	54° 20.7' N	010° 49.2' E	11.5
POS530_96-1	POS530#96_CTD-054	2018-10-08 1:27	CTD	in the water	54° 22.4' N	010° 52.8' E	10.6
POS530_96-1	POS530#96_CTD-054	2018-10-08 1:29	CTD	max depth/on ground	54° 22.4' N	010° 52.8' E	10.6
POS530_96-1	POS530#96_CTD-054	2018-10-08 1:31	CTD	on deck	54° 22.4' N	010° 52.8' E	10.7
POS530_97-1	POS530#97_MB-008	2018-10-08 2:24	Multibeam echosounder	profile start	54° 24.8' N	010° 52.2' E	9.1
POS530_97-1	POS530#97_MB-008	2018-10-08 6:59	Multibeam echosounder	profile end	54° 24.8' N	010° 49.2' E	8.7
POS530_98-1	POS530#98_AUV-002	2018-10-08 7:34	Autonomous Underwater Vehicle	in the water	54° 24.5' N	010° 50.5' E	8
POS530_98-1	POS530#98_AUV-002	2018-10-08 8:46	Autonomous Underwater Vehicle	on deck	54° 24.6' N	010° 50.5' E	7.8
POS530_99-1	POS530#99_MB-009	2018-10-08 9:56	Multibeam echosounder	profile start	54° 24.6' N	010° 54.4' E	7
POS530_99-1	POS530#99_MB-009	2018-10-08 12:48	Multibeam echosounder	profile end	54° 24.6' N	010° 54.5' E	7.1

POS530_100-1	POS530#100_AUV-003	2018-10-08 13:28	Autonomous Underwater Vehicle	in the water	54° 24.7' N	010° 54.4' E	6.8
POS530_100-1	POS530#100_AUV-003	2018-10-08 15:11	Autonomous Underwater Vehicle	on deck	54° 24.6' N	010° 54.2' E	9.3
POS530_101-1	POS530#101_SVP-007	2018-10-08 16:14	Sound Velocity Profiler	in the water	54° 24.6' N	010° 54.0' E	9.3
POS530_101-1	POS530#101_SVP-007	2018-10-08 16:17	Sound Velocity Profiler	on deck	54° 24.6' N	010° 54.0' E	9.5
POS530_102-1	POS530#102_MB-010	2018-10-08 16:40	Multibeam echosounder	profile start	54° 24.8' N	010° 54.5' E	8.1
POS530_102-1	POS530#102_MB-010	2018-10-09 5:40	Multibeam echosounder	profile end	54° 24.9' N	010° 51.4' E	8.1
POS530_103-1	POS530#103_AUV-004	2018-10-09 6:14	Autonomous Underwater Vehicle	in the water	54° 24.6' N	010° 53.1' E	9
POS530_103-1	POS530#103_AUV-004	2018-10-09 8:09	Autonomous Underwater Vehicle	on deck	54° 24.7' N	010° 53.2' E	8.8
POS530_104-1	POS530#104_AUV-005	2018-10-09 8:39	Autonomous Underwater Vehicle	in the water	54° 24.6' N	010° 53.1' E	9

POS530_104-1	POS530#104_AUV-005	2018-10-09 10:07	Autonomous Underwater Vehicle	on deck	54° 24.7' N	010° 53.1' E	8.8	
POS530_105-1	POS530#105_MB-011	2018-10-09 10:33	Multibeam echosounder	profile start	54° 24.8' N	010° 53.6' E	8.8	
POS530_105-1	POS530#105_MB-011	2018-10-09 12:50	Multibeam echosounder	profile end	54° 24.8' N	010° 54.4' E	8.3	
POS530_106-1	POS530#106_AUV-006	2018-10-09 13:24	Autonomous Underwater Vehicle	in the water	54° 24.9' N	010° 54.3' E	8.3	
POS530_106-1	POS530#106_AUV-006	2018-10-09 15:19	Autonomous Underwater Vehicle	on deck	54° 24.9' N	010° 53.7' E	8.5	
POS530_107-1	POS530#107_SVP-008	2018-10-09 16:13	Sound Velocity Profiler	in the water	54° 24.9' N	010° 53.5' E	8.7	
POS530_107-1	POS530#107_SVP-008	2018-10-09 16:16	Sound Velocity Profiler	on deck	54° 24.9' N	010° 53.5' E	9.7	
POS530_108-1	POS530#108_MB-012	2018-10-09 16:41	Multibeam echosounder	profile start	54° 24.8' N	010° 54.4' E	7.5	
POS530_108-1	POS530#108_MB-012	2018-10-10 5:51	Multibeam echosounder	profile end	54° 24.4' N	010° 54.6' E	9.7	
POS530_109-1	POS530#109_Dive-002	2018-10-10 7:49	Diving operations	station start	54° 24.6' N	010° 54.2' E	9.2	Divers leave VSL with own boat

POS530_109-1	POS530#109_Dive-002	2018-10-10 11:26	Diving operations	station end	54° 24.6' N	010° 54.2' E	9.1	Divers back on board
POS530_110-1	POS530#110_Grab-021	2018-10-10 12:19	Grab	in the water	54° 24.8' N	010° 53.9' E	8.2	
POS530_110-1	POS530#110_Grab-021	2018-10-10 12:19	Grab	max depth/on ground	54° 24.8' N	010° 53.9' E	8.2	
POS530_110-1	POS530#110_Grab-021	2018-10-10 12:20	Grab	on deck	54° 24.8' N	010° 53.9' E	8.2	
POS530_110-2	POS530#110_Grab-021	2018-10-10 12:21	Grab	in the water	54° 24.8' N	010° 53.9' E	8.1	
POS530_110-2	POS530#110_Grab-021	2018-10-10 12:23	Grab	on deck	54° 24.8' N	010° 53.9' E	8	
POS530_110-2	POS530#110_Grab-021	2018-10-10 12:23	Grab	max depth/on ground	54° 24.8' N	010° 53.9' E	8.1	
POS530_110-3	POS530#110_Grab-021	2018-10-10 12:25	Grab	in the water	54° 24.8' N	010° 53.9' E	8	
POS530_110-3	POS530#110_Grab-021	2018-10-10 12:25	Grab	max depth/on ground	54° 24.8' N	010° 53.9' E	8.8	
POS530_110-3	POS530#110_Grab-021	2018-10-10 12:26	Grab	on deck	54° 24.8' N	010° 53.8' E	8.1	
POS530_111-1	POS530#111_Grab-022	2018-10-10 12:33	Grab	in the water	54° 24.7' N	010° 53.9' E	8.3	
POS530_111-1	POS530#111_Grab-022	2018-10-10 12:34	Grab	max depth/on ground	54° 24.7' N	010° 53.9' E	8.5	
POS530_111-1	POS530#111_Grab-022	2018-10-10 12:34	Grab	on deck	54° 24.7' N	010° 53.9' E	8.6	

POS530_112-1	POS530#112_Grab-023	2018-10-10 12:41	Grab	in the water	54° 24.7' N	010° 54.0' E	9.5
POS530_112-1	POS530#112_Grab-023	2018-10-10 12:41	Grab	max depth/on ground	54° 24.7' N	010° 54.0' E	9.3
POS530_112-1	POS530#112_Grab-023	2018-10-10 12:42	Grab	on deck	54° 24.7' N	010° 54.0' E	9.2
POS530_113-1	POS530#113_Grab-024	2018-10-10 12:51	Grab	in the water	54° 24.5' N	010° 54.1' E	9.8
POS530_113-1	POS530#113_Grab-024	2018-10-10 12:51	Grab	max depth/on ground	54° 24.5' N	010° 54.1' E	9.8
POS530_113-1	POS530#113_Grab-024	2018-10-10 12:51	Grab	on deck	54° 24.5' N	010° 54.1' E	9.8
POS530_114-1	POS530#114_Grab-025	2018-10-10 12:59	Grab	in the water	54° 24.6' N	010° 54.2' E	8
POS530_114-1	POS530#114_Grab-025	2018-10-10 12:59	Grab	max depth/on ground	54° 24.6' N	010° 54.2' E	8
POS530_114-1	POS530#114_Grab-025	2018-10-10 13:00	Grab	on deck	54° 24.6' N	010° 54.2' E	8
POS530_115-1	POS530#115_Grab-026	2018-10-10 13:17	Grab	in the water	54° 24.7' N	010° 54.3' E	7.5
POS530_115-1	POS530#115_Grab-026	2018-10-10 13:17	Grab	max depth/on ground	54° 24.7' N	010° 54.3' E	7.3
POS530_115-1	POS530#115_Grab-026	2018-10-10 13:19	Grab	on deck	54° 24.7' N	010° 54.3' E	7.5
POS530_116-1	POS530#116_Grab-027	2018-10-10 13:30	Grab	in the water	54° 24.7' N	010° 54.3' E	7.2

POS530_116-1	POS530#116_Grab-027	2018-10-10 13:30	Grab	max depth/on ground	54° 24.7' N	010° 54.3' E	7.2
POS530_116-1	POS530#116_Grab-027	2018-10-10 13:31	Grab	on deck	54° 24.8' N	010° 54.3' E	7.1
POS530_116-2	POS530#116_Grab-027	2018-10-10 13:32	Grab	in the water	54° 24.8' N	010° 54.3' E	7.1
POS530_116-2	POS530#116_Grab-027	2018-10-10 13:33	Grab	max depth/on ground	54° 24.8' N	010° 54.3' E	7.2
POS530_116-2	POS530#116_Grab-027	2018-10-10 13:34	Grab	on deck	54° 24.8' N	010° 54.3' E	7.2
POS530_116-3	POS530#116_Grab-027	2018-10-10 13:34	Grab	in the water	54° 24.8' N	010° 54.3' E	7.1
POS530_116-3	POS530#116_Grab-027	2018-10-10 13:34	Grab	max depth/on ground	54° 24.8' N	010° 54.3' E	7.1
POS530_116-3	POS530#116_Grab-027	2018-10-10 13:35	Grab	on deck	54° 24.8' N	010° 54.3' E	7.3
POS530_117-1	POS530#117_Grab-028	2018-10-10 13:49	Grab	in the water	54° 24.8' N	010° 54.4' E	8.2
POS530_117-1	POS530#117_Grab-028	2018-10-10 13:50	Grab	max depth/on ground	54° 24.8' N	010° 54.4' E	8.2
POS530_117-1	POS530#117_Grab-028	2018-10-10 13:52	Grab	on deck	54° 24.9' N	010° 54.4' E	8.3
POS530_118-1	POS530#118_Grab-029	2018-10-10 14:10	Grab	in the water	54° 24.7' N	010° 54.2' E	7.8

POS530_118-1	POS530#118_Grab-029	2018-10-10 14:11	Grab	max depth/on ground	54° 24.7' N	010° 54.2' E	7.8
POS530_118-1	POS530#118_Grab-029	2018-10-10 14:11	Grab	on deck	54° 24.7' N	010° 54.2' E	7.8
POS530_119-1	POS530#119_Grab-030	2018-10-10 14:20	Grab	in the water	54° 24.7' N	010° 54.3' E	7.7
POS530_119-1	POS530#119_Grab-030	2018-10-10 14:21	Grab	max depth/on ground	54° 24.7' N	010° 54.3' E	7.6
POS530_119-1	POS530#119_Grab-030	2018-10-10 14:21	Grab	on deck	54° 24.7' N	010° 54.3' E	7.8
POS530_119-2	POS530#119_Grab-030	2018-10-10 14:22	Grab	in the water	54° 24.7' N	010° 54.2' E	7.7
POS530_119-2	POS530#119_Grab-030	2018-10-10 14:22	Grab	max depth/on ground	54° 24.7' N	010° 54.2' E	7.8
POS530_119-2	POS530#119_Grab-030	2018-10-10 14:23	Grab	on deck	54° 24.7' N	010° 54.2' E	7.7
POS530_120-1	POS530#120_SVP-009	2018-10-10 22:03	Sound Velocity Profiler	in the water	54° 28.5' N	011° 27.5' E	23.6
POS530_120-1	POS530#120_SVP-009	2018-10-10 22:08	Sound Velocity Profiler	on deck	54° 28.6' N	011° 27.5' E	24
POS530_121-1	POS530#121_MB-013	2018-10-10 22:20	Multibeam echosounder	profile start	54° 28.4' N	011° 26.7' E	23.2
POS530_121-1	POS530#121_MB-013	2018-10-11 4:44	Multibeam echosounder	profile end	54° 23.8' N	011° 30.8' E	20.8

POS530_122-1	POS530#122_CTD-055	2018-10-11 6:06	CTD	in the water	54° 27.4' N	011° 21.5' E	15.5	
POS530_122-1	POS530#122_CTD-055	2018-10-11 6:09	CTD	max depth/on ground	54° 27.4' N	011° 21.5' E	15.6	15 m max
POS530_122-1	POS530#122_CTD-055	2018-10-11 6:12	CTD	on deck	54° 27.4' N	011° 21.5' E	15.6	
POS530_123-1	POS530#123_CTD-056	2018-10-11 6:58	CTD	in the water	54° 23.4' N	011° 22.1' E	18.8	
POS530_123-1	POS530#123_CTD-056	2018-10-11 7:00	CTD	max depth/on ground	54° 23.4' N	011° 22.1' E	18.8	18 m max
POS530_123-1	POS530#123_CTD-056	2018-10-11 7:03	CTD	on deck	54° 23.4' N	011° 22.1' E	18.7	
POS530_124-1	POS530#124_CTD-057	2018-10-11 7:56	CTD	in the water	54° 18.9' N	011° 18.6' E	16.8	
POS530_124-1	POS530#124_CTD-057	2018-10-11 7:59	CTD	max depth/on ground	54° 18.9' N	011° 18.6' E	17.6	16 m max
POS530_124-1	POS530#124_CTD-057	2018-10-11 8:01	CTD	on deck	54° 18.9' N	011° 18.6' E	17.1	
POS530_125-1	POS530#125_CTD-058	2018-10-11 8:51	CTD	in the water	54° 14.8' N	011° 15.2' E	17.3	
POS530_125-1	POS530#125_CTD-058	2018-10-11 8:54	CTD	max depth/on ground	54° 14.8' N	011° 15.3' E	18.6	16 m max
POS530_125-1	POS530#125_CTD-058	2018-10-11 8:57	CTD	on deck	54° 14.8' N	011° 15.3' E	18.1	
POS530_126-1	POS530#126_CTD-059	2018-10-11 9:36	CTD	in the water	54° 11.6' N	011° 12.9' E	17	

POS530_126-1	POS530#126_CTD-059	2018-10-11 9:39	CTD	max depth/on ground	54° 11.6' N	011° 12.9' E	17.7	16 m max
POS530_126-1	POS530#126_CTD-059	2018-10-11 9:41	CTD	on deck	54° 11.6' N	011° 12.9' E	17.2	
POS530_127-1	POS530#127_CTD-060	2018-10-11 10:22	CTD	in the water	54° 08.5' N	011° 09.7' E	19.2	
POS530_127-1	POS530#127_CTD-060	2018-10-11 10:24	CTD	max depth/on ground	54° 08.5' N	011° 09.7' E	20.2	19 m max
POS530_127-1	POS530#127_CTD-060	2018-10-11 10:26	CTD	on deck	54° 08.4' N	011° 09.7' E	19	
POS530_128-1	POS530#128_CTD-061	2018-10-11 11:12	CTD	in the water	54° 07.1' N	011° 03.2' E	11.2	
POS530_128-1	POS530#128_CTD-061	2018-10-11 11:15	CTD	max depth/on ground	54° 07.1' N	011° 03.2' E	13	10 m max
POS530_128-1	POS530#128_CTD-061	2018-10-11 11:17	CTD	on deck	54° 07.1' N	011° 03.2' E	10.6	
POS530_129-1	POS530#129_CTD-062	2018-10-11 12:17	CTD	in the water	54° 04.3' N	010° 55.3' E	17.7	
POS530_129-1	POS530#129_CTD-062	2018-10-11 12:20	CTD	max depth/on ground	54° 04.3' N	010° 55.3' E	17.7	17 m max
POS530_129-1	POS530#129_CTD-062	2018-10-11 12:22	CTD	on deck	54° 04.3' N	010° 55.3' E	17.8	
POS530_129-2	POS530#129_SVP-010	2018-10-11 12:38	Sound Velocity Profiler	in the water	54° 04.3' N	010° 55.3' E	17.7	

POS530_129-2	POS530#129_SVP-010	2018-10-11 12:43	Sound Velocity Profiler	on deck	54° 04.3' N	010° 55.3' E	17.8	
POS530_130-1	POS530#130_MB-014	2018-10-11 13:28	Multibeam echosounder	profile start	54° 04.1' N	011° 00.1' E	18.8	
POS530_130-1	POS530#130_MB-014	2018-10-12 9:12	Multibeam echosounder	profile end	54° 05.0' N	011° 00.2' E	18.6	
POS530_131-1	POS530#131_TV-CTD-007	2018-10-12 9:30	TV-CTD	in the water	54° 04.8' N	010° 59.8' E	18.8	Video and Watersamples
POS530_131-1	POS530#131_TV-CTD-007	2018-10-12 9:50	TV-CTD	max depth/on ground	54° 04.8' N	010° 59.8' E	18.6	19 m max
POS530_131-1	POS530#131_TV-CTD-007	2018-10-12 9:51	TV-CTD	profile start	54° 04.8' N	010° 59.8' E	18.7	
POS530_131-1	POS530#131_TV-CTD-007	2018-10-12 10:50	TV-CTD	profile end	54° 04.5' N	010° 59.7' E	18.6	
POS530_131-1	POS530#131_TV-CTD-007	2018-10-12 10:52	TV-CTD	on deck	54° 04.5' N	010° 59.7' E	18.5	
POS530_132-1	POS530#132_TV-CTD-008	2018-10-12 11:15	TV-CTD	in the water	54° 04.5' N	010° 59.3' E	18.5	Video
POS530_132-1	POS530#132_TV-CTD-008	2018-10-12 11:28	TV-CTD	max depth/on ground	54° 04.5' N	010° 59.3' E	18.6	
POS530_132-1	POS530#132_TV-CTD-008	2018-10-12 11:28	TV-CTD	profile start	54° 04.5' N	010° 59.3' E	19.3	

POS530_132-1	POS530#132_TV-CTD-008	2018-10-12 13:06	TV-CTD	profile end	54° 04.2' N	010° 59.3' E	0	
POS530_132-1	POS530#132_TV-CTD-008	2018-10-12 13:11	TV-CTD	on deck	54° 04.1' N	010° 59.3' E	18.8	
POS530_133-1	POS530#133_CTD-065	2018-10-12 13:54	CTD	in the water	54° 06.4' N	010° 59.5' E	18	
POS530_133-1	POS530#133_CTD-065	2018-10-12 13:57	CTD	max depth/on ground	54° 06.4' N	010° 59.4' E	18.1	17 m max
POS530_133-1	POS530#133_CTD-065	2018-10-12 13:59	CTD	on deck	54° 06.4' N	010° 59.4' E	18.5	
POS530_133-2	POS530#133_CTD-065	2018-10-12 14:01	CTD	in the water	54° 06.5' N	010° 59.4' E	18.1	
POS530_133-2	POS530#133_CTD-065	2018-10-12 14:05	CTD	max depth/on ground	54° 06.5' N	010° 59.4' E	17.8	SL max = 17m
POS530_133-2	POS530#133_CTD-065	2018-10-12 14:07	CTD	on deck	54° 06.5' N	010° 59.4' E	18.1	
POS530_134-1	POS530#134_CTD-066	2018-10-12 14:27	CTD	in the water	54° 05.7' N	010° 58.3' E	17.7	
POS530_134-1	POS530#134_CTD-066	2018-10-12 14:30	CTD	max depth/on ground	54° 05.7' N	010° 58.3' E	18	SL max = 18m
POS530_134-1	POS530#134_CTD-066	2018-10-12 14:32	CTD	on deck	54° 05.7' N	010° 58.3' E	17.7	
POS530_135-1	POS530#135_CTD-067	2018-10-12 14:49	CTD	in the water	54° 05.0' N	010° 57.0' E	18.1	

POS530_135-1	POS530#135_CTD-067	2018-10-12 14:52	CTD	max depth/on ground	54° 05.0' N	010° 56.9' E	17.6	SL max = 18m
POS530_135-1	POS530#135_CTD-067	2018-10-12 14:55	CTD	on deck	54° 05.0' N	010° 56.9' E	17.6	
POS530_136-1	POS530#136_CTD-068	2018-10-12 15:21	CTD	in the water	54° 03.9' N	010° 54.6' E	18.1	
POS530_136-1	POS530#136_CTD-068	2018-10-12 15:24	CTD	max depth/on ground	54° 03.9' N	010° 54.5' E	18.1	SL max = 18m
POS530_136-1	POS530#136_CTD-068	2018-10-12 15:27	CTD	on deck	54° 03.9' N	010° 54.5' E	18.1	
POS530_137-1	POS530#137_SVP-011	2018-10-12 16:27	Sound Velocity Profiler	in the water	54° 05.0' N	011° 01.1' E	18.8	
POS530_137-1	POS530#137_SVP-011	2018-10-12 16:31	Sound Velocity Profiler	on deck	54° 05.0' N	011° 01.0' E	19	
POS530_138-1	POS530#138_MB-015	2018-10-12 16:45	Multibeam echosounder	profile start	54° 05.0' N	011° 00.2' E	18.2	
POS530_138-1	POS530#138_MB-015	2018-10-13 5:40	Multibeam echosounder	profile end	54° 05.1' N	010° 59.3' E	18.3	
POS530_139-1	POS530#139_CTD-069	2018-10-13 7:10	CTD	in the water	54° 02.0' N	010° 46.7' E	9.8	
POS530_139-1	POS530#139_CTD-069	2018-10-13 7:13	CTD	max depth/on ground	54° 02.0' N	010° 46.7' E	9.5	10 m max
POS530_139-1	POS530#139_CTD-069	2018-10-13 7:14	CTD	on deck	54° 02.0' N	010° 46.7' E	9.5	

POS530_139-2	POS530#139_CTD-069	2018-10-13 7:15	CTD	in the water	54° 02.0' N	010° 46.7' E	9.2	
POS530_139-2	POS530#139_CTD-069	2018-10-13 7:19	CTD	max depth/on ground	54° 02.1' N	010° 46.7' E	9.5	10 m max
POS530_139-2	POS530#139_CTD-069	2018-10-13 7:20	CTD	on deck	54° 02.1' N	010° 46.7' E	9.2	
POS530_140-1	POS530#140_CTD-070	2018-10-13 7:38	CTD	in the water	54° 02.2' N	010° 48.1' E	12.5	
POS530_140-1	POS530#140_CTD-070	2018-10-13 7:41	CTD	max depth/on ground	54° 02.2' N	010° 48.1' E	12.5	12 m max
POS530_140-1	POS530#140_CTD-070	2018-10-13 7:42	CTD	on deck	54° 02.2' N	010° 48.1' E	12.5	
POS530_140-2	POS530#140_GoFlo-015	2018-10-13 7:45	GoFlo bottle	in the water	54° 02.2' N	010° 48.1' E	12.3	
POS530_140-2	POS530#140_GoFlo-015	2018-10-13 7:49	GoFlo bottle	max depth/on ground	54° 02.2' N	010° 48.1' E	12.3	
POS530_140-2	POS530#140_GoFlo-015	2018-10-13 7:51	GoFlo bottle	on deck	54° 02.2' N	010° 48.1' E	12.2	
POS530_141-1	POS530#141_CTD-071	2018-10-13 8:06	CTD	in the water	54° 02.4' N	010° 49.0' E	15.2	
POS530_141-1	POS530#141_CTD-071	2018-10-13 8:09	CTD	max depth/on ground	54° 02.4' N	010° 49.0' E	15.2	SL max = 15m
POS530_141-1	POS530#141_CTD-071	2018-10-13 8:11	CTD	on deck	54° 02.4' N	010° 49.0' E	15.1	

POS530_142-1	POS530#142_CTD-072	2018-10-13 8:29	CTD	in the water	54° 02.6' N	010° 50.0' E	16.2	
POS530_142-1	POS530#142_CTD-072	2018-10-13 8:31	CTD	max depth/on ground	54° 02.6' N	010° 50.0' E	16.2	16 m max
POS530_142-1	POS530#142_CTD-072	2018-10-13 8:33	CTD	on deck	54° 02.6' N	010° 50.0' E	16.3	
POS530_143-1	POS530#143_CTD-073	2018-10-13 8:53	CTD	in the water	54° 03.0' N	010° 51.4' E	16.8	
POS530_143-1	POS530#143_CTD-073	2018-10-13 8:57	CTD	max depth/on ground	54° 03.0' N	010° 51.4' E	16.8	17 m max
POS530_143-1	POS530#143_CTD-073	2018-10-13 8:59	CTD	on deck	54° 03.0' N	010° 51.4' E	16.8	
POS530_144-1	POS530#144_CTD-074	2018-10-13 9:20	CTD	in the water	54° 03.4' N	010° 53.1' E	18.1	
POS530_144-1	POS530#144_CTD-074	2018-10-13 9:24	CTD	max depth/on ground	54° 03.4' N	010° 53.1' E	17.7	18 m max
POS530_144-1	POS530#144_CTD-074	2018-10-13 9:27	CTD	on deck	54° 03.4' N	010° 53.1' E	17.8	
POS530_144-2	POS530#144_GoFlo-016	2018-10-13 9:29	GoFlo bottle	in the water	54° 03.4' N	010° 53.0' E	17.8	
POS530_144-2	POS530#144_GoFlo-016	2018-10-13 9:35	GoFlo bottle	max depth/on ground	54° 03.4' N	010° 53.0' E	17.8	
POS530_144-2	POS530#144_GoFlo-016	2018-10-13 9:39	GoFlo bottle	on deck	54° 03.4' N	010° 53.0' E	17.8	

POS530_145-1	POS530#145_AUV-007	2018-10-13 10:47	Autonomous Underwater Vehicle	in the water	54° 04.8' N	010° 57.8' E	18.5	
POS530_145-1	POS530#145_AUV-007	2018-10-13 12:26	Autonomous Underwater Vehicle	on deck	54° 04.8' N	010° 57.9' E	18.3	
POS530_146-1	POS530#146_CTD-075	2018-10-13 13:10	CTD	in the water	54° 04.9' N	010° 58.3' E	18.3	
POS530_146-1	POS530#146_CTD-075	2018-10-13 13:13	CTD	max depth/on ground	54° 04.9' N	010° 58.3' E	18.3	8 m max
POS530_146-1	POS530#146_CTD-075	2018-10-13 13:14	CTD	on deck	54° 04.9' N	010° 58.3' E	18.1	
POS530_146-2	POS530#146_CTD-075	2018-10-13 13:16	CTD	in the water	54° 04.9' N	010° 58.2' E	18.2	
POS530_146-2	POS530#146_CTD-075	2018-10-13 13:19	CTD	max depth/on ground	54° 04.9' N	010° 58.2' E	18.3	18 m max
POS530_146-2	POS530#146_CTD-075	2018-10-13 13:21	CTD	on deck	54° 04.9' N	010° 58.3' E	18.3	
POS530_146-3	POS530#146_GoFlo-017	2018-10-13 13:26	GoFlo bottle	in the water	54° 04.9' N	010° 58.2' E	18.3	
POS530_146-3	POS530#146_GoFlo-017	2018-10-13 13:33	GoFlo bottle	on deck	54° 04.9' N	010° 58.3' E	18.3	
POS530_147-1	POS530#147_AUV-008	2018-10-13 14:03	Autonomous Underwater Vehicle	in the water	54° 04.2' N	010° 57.5' E	18.5	

POS530_147-1	POS530#147_AUV-008	2018-10-13 14:49	Autonomous Underwater Vehicle	on deck	54° 04.3' N	010° 57.5' E	18.6
POS530_148-1	POS530#148_SVP-012	2018-10-13 16:07	Sound Velocity Profiler	in the water	54° 03.0' N	010° 47.7' E	10.1
POS530_148-1	POS530#148_SVP-012	2018-10-13 16:12	Sound Velocity Profiler	on deck	54° 03.0' N	010° 47.7' E	10.2
POS530_149-1	POS530#149_MB-016	2018-10-13 16:20	Multibeam echosounder	profile start	54° 02.9' N	010° 47.6' E	9.1
POS530_149-1	POS530#149_MB-016	2018-10-14 6:56	Multibeam echosounder	profile end	54° 01.7' N	010° 48.8' E	12.3
POS530_150-1	POS530#150_AUV-008	2018-10-14 7:21	Autonomous Underwater Vehicle	in the water	54° 01.8' N	010° 48.1' E	13.4
POS530_150-1	POS530#150_AUV-008	2018-10-14 8:50	Autonomous Underwater Vehicle	on deck	54° 01.7' N	010° 48.1' E	13.4
POS530_151-1	POS530#151_AUV-009	2018-10-14 9:35	Autonomous Underwater Vehicle	in the water	54° 02.1' N	010° 48.3' E	13.1
POS530_151-1	POS530#151_AUV-009	2018-10-14 11:12	Autonomous Underwater Vehicle	on deck	54° 02.1' N	010° 48.3' E	13.2
POS530_152-1	POS530#152_CTD-076	2018-10-14 11:45	CTD	in the water	54° 00.6' N	010° 48.8' E	10.3

POS530_152-1	POS530#152_CTD-076	2018-10-14 11:47	CTD	max depth/on ground	54° 00.6' N	010° 48.8' E	10.3	11 m max
POS530_152-1	POS530#152_CTD-076	2018-10-14 11:48	CTD	on deck	54° 00.6' N	010° 48.8' E	10.3	
POS530_153-1	POS530#153_CTD-077	2018-10-14 12:28	CTD	in the water	54° 01.2' N	010° 52.6' E	16.2	
POS530_153-1	POS530#153_CTD-077	2018-10-14 12:30	CTD	max depth/on ground	54° 01.2' N	010° 52.6' E	16.2	16 m max
POS530_153-1	POS530#153_CTD-077	2018-10-14 12:32	CTD	on deck	54° 01.2' N	010° 52.6' E	16.2	
POS530_154-1	POS530#154_CTD-078	2018-10-14 13:18	CTD	in the water	54° 00.5' N	010° 56.6' E	16.9	
POS530_154-1	POS530#154_CTD-078	2018-10-14 13:20	CTD	max depth/on ground	54° 00.5' N	010° 56.6' E	16.9	17 m max
POS530_154-1	POS530#154_CTD-078	2018-10-14 13:22	CTD	on deck	54° 00.5' N	010° 56.6' E	17	
POS530_155-1	POS530#155_CTD-079	2018-10-14 13:58	CTD	in the water	54° 01.1' N	011° 00.3' E	19.4	
POS530_155-1	POS530#155_CTD-079	2018-10-14 14:01	CTD	max depth/on ground	54° 01.1' N	011° 00.3' E	19.4	SL max = 19m
POS530_155-1	POS530#155_CTD-079	2018-10-14 14:04	CTD	on deck	54° 01.1' N	011° 00.3' E	19.5	
POS530_156-1	POS530#156_CTD-080	2018-10-14 14:33	CTD	in the water	54° 01.6' N	011° 03.6' E	13.1	

POS530_156-1	POS530#156_CTD-080	2018-10-14 14:36	CTD	max depth/on ground	54° 01.6' N	011° 03.6' E	13.3	SL max = 14m
POS530_156-1	POS530#156_CTD-080	2018-10-14 14:38	CTD	on deck	54° 01.6' N	011° 03.5' E	13.3	
POS530_156-2	POS530#156_GoFlo-018	2018-10-14 14:41	GoFlo bottle	in the water	54° 01.6' N	011° 03.5' E	13.4	
POS530_156-2	POS530#156_GoFlo-018	2018-10-14 14:44	GoFlo bottle	max depth/on ground	54° 01.6' N	011° 03.5' E	13.3	SL max = 15m
POS530_156-2	POS530#156_GoFlo-018	2018-10-14 14:46	GoFlo bottle	on deck	54° 01.6' N	011° 03.5' E	13.3	
POS530_157-1	POS530#157_CTD-081	2018-10-14 15:25	CTD	in the water	54° 02.9' N	011° 02.7' E	19.8	
POS530_157-1	POS530#157_CTD-081	2018-10-14 15:28	CTD	max depth/on ground	54° 02.9' N	011° 02.7' E	19.9	SL max = 20m
POS530_157-1	POS530#157_CTD-081	2018-10-14 15:30	CTD	on deck	54° 02.9' N	011° 02.6' E	19.8	
POS530_158-1	POS530#158_CTD-082	2018-10-14 15:58	CTD	in the water	54° 04.1' N	011° 01.8' E	20.3	
POS530_158-1	POS530#158_CTD-082	2018-10-14 16:03	CTD	max depth/on ground	54° 04.1' N	011° 01.8' E	19.2	SL max = 19 m
POS530_158-1	POS530#158_CTD-082	2018-10-14 16:05	CTD	on deck	54° 04.1' N	011° 01.8' E	19.6	
POS530_158-2	POS530#158_GoFlo-019	2018-10-14 16:08	GoFlo bottle	in the water	54° 04.2' N	011° 01.7' E	19.7	

POS530_158-2	POS530#158_GoFlo-019	2018-10-14 16:13	GoFlo bottle	max depth/on ground	54° 04.2' N	011° 01.6' E	19.4	SL max = 20m
POS530_158-2	POS530#158_GoFlo-019	2018-10-14 16:16	GoFlo bottle	on deck	54° 04.2' N	011° 01.6' E	19.6	
POS530_159-1	POS530#159_CTD-083	2018-10-14 16:45	CTD	in the water	54° 05.3' N	011° 00.7' E	19.3	
POS530_159-1	POS530#159_CTD-083	2018-10-14 16:49	CTD	max depth/on ground	54° 05.3' N	011° 00.7' E	19.2	SL max = 19m
POS530_159-1	POS530#159_CTD-083	2018-10-14 16:51	CTD	on deck	54° 05.3' N	011° 00.7' E	19.2	
POS530_160-1	POS530#160_CTD-084	2018-10-14 17:40	CTD	in the water	54° 07.5' N	010° 58.8' E	15.2	
POS530_160-1	POS530#160_CTD-084	2018-10-14 17:43	CTD	max depth/on ground	54° 07.5' N	010° 58.8' E	12.8	SL max = 13m
POS530_160-1	POS530#160_CTD-084	2018-10-14 17:45	CTD	on deck	54° 07.5' N	010° 58.8' E	13	
POS530_160-2	POS530#160_GoFlo-020	2018-10-14 17:48	GoFlo bottle	in the water	54° 07.5' N	010° 58.8' E	13.1	
POS530_160-2	POS530#160_GoFlo-020	2018-10-14 17:51	GoFlo bottle	max depth/on ground	54° 07.5' N	010° 58.9' E	15.2	SL max = 15m
POS530_160-2	POS530#160_GoFlo-020	2018-10-14 17:54	GoFlo bottle	on deck	54° 07.5' N	010° 58.9' E	13.2	
POS530_161-1	POS530#161_CTD-084	2018-10-14 19:00	CTD	in the water	54° 04.2' N	010° 59.0' E	17.6	

POS530_161-1	POS530#161_CTD-084	2018-10-14 19:04	CTD	max depth/on ground	54° 04.2' N	010° 59.0' E	17.7	18 m max
POS530_161-1	POS530#161_CTD-084	2018-10-14 19:07	CTD	on deck	54° 04.2' N	010° 59.0' E	17.7	
POS530_161-2	POS530#161_GoFlo-021	2018-10-14 19:10	GoFlo bottle	in the water	54° 04.2' N	010° 59.0' E	20.3	
POS530_161-2	POS530#161_GoFlo-021	2018-10-14 19:14	GoFlo bottle	max depth/on ground	54° 04.2' N	010° 59.0' E	17.7	
POS530_161-2	POS530#161_GoFlo-021	2018-10-14 19:14	GoFlo bottle	on deck	54° 04.2' N	010° 59.0' E	17.7	
POS530_162-1	POS530#162_SBP-002	2018-10-14 20:37	Subbottom Profiler	profile start	54° 04.2' N	010° 55.7' E	18.3	
POS530_162-1	POS530#162_SBP-002	2018-10-15 6:29	Subbottom Profiler	profile end	54° 05.4' N	010° 58.5' E	18.2	
POS530_163-1	POS530#163_TV-CTD-009_010	2018-10-15 8:10	TV-CTD	in the water	54° 02.6' N	010° 47.9' E	10.7	Video
POS530_163-1	POS530#163_TV-CTD-009_010	2018-10-15 8:34	TV-CTD	max depth/on ground	54° 02.6' N	010° 47.8' E	12.2	SL max = 1o m
POS530_163-1	POS530#163_TV-CTD-009_010	2018-10-15 8:34	TV-CTD	profile start	54° 02.6' N	010° 47.8' E	10.7	
POS530_163-1	POS530#163_TV-CTD-009_010	2018-10-15 10:17	TV-CTD	profile end	54° 02.5' N	010° 47.9' E	12	
POS530_163-1	POS530#163_TV-CTD-009_010	2018-10-15 10:19	TV-CTD	on deck	54° 02.5' N	010° 47.9' E	12.1	

POS530_164-1	POS530#164_TV-CTD-011	2018-10-15 10:47	TV-CTD	in the water	54° 01.6' N	010° 47.7' E	11.7	Video
POS530_164-1	POS530#164_TV-CTD-011	2018-10-15 10:59	TV-CTD	max depth/on ground	54° 01.6' N	010° 47.7' E	11.8	
POS530_164-1	POS530#164_TV-CTD-011	2018-10-15 11:00	TV-CTD	profile start	54° 01.6' N	010° 47.7' E	11.8	
POS530_164-1	POS530#164_TV-CTD-011	2018-10-15 11:39	TV-CTD	profile end	54° 01.6' N	010° 48.0' E	13	
POS530_164-1	POS530#164_TV-CTD-011	2018-10-15 11:43	TV-CTD	on deck	54° 01.6' N	010° 48.0' E	13	
POS530_165-1	POS530#165_AUV-010	2018-10-15 12:08	Autonomous Underwater Vehicle	in the water	54° 01.7' N	010° 48.3' E	13.1	
POS530_165-1	POS530#165_AUV-010	2018-10-15 13:30	Autonomous Underwater Vehicle	on deck	54° 01.7' N	010° 48.3' E	13.1	
POS530_166-1	POS530#166_AUV-011	2018-10-15 14:19	Autonomous Underwater Vehicle	in the water	54° 01.7' N	010° 48.6' E	11.6	
POS530_166-1	POS530#166_AUV-011	2018-10-15 14:57	Autonomous Underwater Vehicle	on deck	54° 01.7' N	010° 48.6' E	12	
POS530_167-1	POS530#167_SVP-013	2018-10-15 16:11	Sound Velocity Profiler	in the water	54° 03.2' N	010° 48.9' E	15.7	

POS530_167-1	POS530#167_SVP-013	2018-10-15 16:14	Sound Velocity Profiler	on deck	54° 03.2' N	010° 48.9' E	15.6
POS530_168-1	POS530#168_MB-017	2018-10-15 16:30	Multibeam echosounder	profile start	54° 02.9' N	010° 48.9' E	13.1
POS530_168-1	POS530#168_MB-017	2018-10-16 5:20	Multibeam echosounder	profile end	54° 01.5' N	010° 48.8' E	9.2
POS530_169-1	POS530#169_SVP-014	2018-10-16 5:37	Sound Velocity Profiler	in the water	54° 01.7' N	010° 48.2' E	13.1
POS530_169-1	POS530#169_SVP-014	2018-10-16 5:39	Sound Velocity Profiler	on deck	54° 01.7' N	010° 48.2' E	13.1
POS530_170-1	POS530#170_AUV-012	2018-10-16 6:55	Autonomous Underwater Vehicle	in the water	54° 02.2' N	010° 48.5' E	15.5
POS530_170-1	POS530#170_AUV-012	2018-10-16 8:20	Autonomous Underwater Vehicle	on deck	54° 02.1' N	010° 48.5' E	13
POS530_171-1	POS530#171_AUV-013	2018-10-16 8:59	Autonomous Underwater Vehicle	in the water	54° 02.6' N	010° 47.7' E	10.7
POS530_171-1	POS530#171_AUV-013	2018-10-16 9:41	Autonomous Underwater Vehicle	on deck	54° 02.6' N	010° 47.7' E	10.5

POS530_172-1	POS530#172_AUV-014	2018-10-16 10:49	Autonomous Underwater Vehicle	in the water	54° 02.6' N	010° 47.8' E	10.7
POS530_172-1	POS530#172_AUV-014	2018-10-16 11:24	Autonomous Underwater Vehicle	on deck	54° 02.6' N	010° 47.7' E	10.8
POS530_173-1	POS530#173_AUV-015	2018-10-16 11:56	Autonomous Underwater Vehicle	in the water	54° 02.7' N	010° 47.8' E	10.7
POS530_173-1	POS530#173_AUV-015	2018-10-16 12:42	Autonomous Underwater Vehicle	on deck	54° 02.8' N	010° 47.8' E	10.2
POS530_174-1	POS530#174_Grab-031	2018-10-16 14:10	Grab	in the water	54° 04.3' N	011° 00.2' E	19.5
POS530_174-1	POS530#174_Grab-031	2018-10-16 14:10	Grab	max depth/on ground	54° 04.3' N	011° 00.2' E	18.7
POS530_174-1	POS530#174_Grab-031	2018-10-16 14:11	Grab	on deck	54° 04.3' N	011° 00.2' E	19
POS530_175-1	POS530#175_Grab-032	2018-10-16 14:31	Grab	in the water	54° 04.5' N	010° 59.8' E	18.6
POS530_175-1	POS530#175_Grab-032	2018-10-16 14:31	Grab	max depth/on ground	54° 04.5' N	010° 59.8' E	18.5
POS530_175-1	POS530#175_Grab-032	2018-10-16 14:32	Grab	on deck	54° 04.5' N	010° 59.8' E	18.6
POS530_176-1	POS530#176_Grab-033	2018-10-16 14:46	Grab	in the water	54° 04.7' N	010° 59.7' E	18.6

POS530_176-1	POS530#176_Grab-033	2018-10-16 14:48	Grab	max depth/on ground	54° 04.7' N	010° 59.7' E	18.7
POS530_176-1	POS530#176_Grab-033	2018-10-16 14:50	Grab	on deck	54° 04.7' N	010° 59.8' E	18.6
POS530_176-2	POS530#176_Grab-033	2018-10-16 14:52	Grab	in the water	54° 04.7' N	010° 59.8' E	18.6
POS530_176-2	POS530#176_Grab-033	2018-10-16 14:52	Grab	max depth/on ground	54° 04.7' N	010° 59.8' E	18.8
POS530_176-2	POS530#176_Grab-033	2018-10-16 14:53	Grab	on deck	54° 04.7' N	010° 59.8' E	18.6
POS530_176-3	POS530#176_Grab-033	2018-10-16 15:02	Grab	in the water	54° 04.7' N	010° 59.8' E	18.6
POS530_176-3	POS530#176_Grab-033	2018-10-16 15:03	Grab	max depth/on ground	54° 04.7' N	010° 59.8' E	18.6
POS530_176-3	POS530#176_Grab-033	2018-10-16 15:03	Grab	on deck	54° 04.7' N	010° 59.8' E	18.7
POS530_177-1	POS530#177_Grab-034	2018-10-16 15:26	Grab	in the water	54° 05.0' N	011° 00.0' E	18.3
POS530_177-1	POS530#177_Grab-034	2018-10-16 15:26	Grab	max depth/on ground	54° 05.0' N	011° 00.0' E	18.3
POS530_177-1	POS530#177_Grab-034	2018-10-16 15:27	Grab	on deck	54° 05.0' N	011° 00.0' E	18.3
POS530_178-1	POS530#178_Grab-035	2018-10-16 15:38	Grab	in the water	54° 04.9' N	010° 59.7' E	18.1

POS530_178-1	POS530#178_Grab-035	2018-10-16 15:39	Grab	max depth/on ground	54° 04.9' N	010° 59.7' E	18.2
POS530_178-1	POS530#178_Grab-035	2018-10-16 15:40	Grab	on deck	54° 04.9' N	010° 59.7' E	18.3
POS530_179-1	POS530#179_Grab-036	2018-10-16 15:49	Grab	in the water	54° 04.9' N	010° 59.5' E	16.2
POS530_179-1	POS530#179_Grab-036	2018-10-16 15:49	Grab	max depth/on ground	54° 04.9' N	010° 59.5' E	16.2
POS530_179-1	POS530#179_Grab-036	2018-10-16 15:50	Grab	on deck	54° 04.9' N	010° 59.5' E	16.1
POS530_180-1	POS530#180_Grab-037	2018-10-16 15:59	Grab	in the water	54° 04.9' N	010° 59.4' E	18.2
POS530_180-1	POS530#180_Grab-037	2018-10-16 15:59	Grab	max depth/on ground	54° 04.9' N	010° 59.4' E	18.1
POS530_180-1	POS530#180_Grab-037	2018-10-16 16:00	Grab	on deck	54° 04.9' N	010° 59.4' E	18.2
POS530_181-1	POS530#181_Grab-038	2018-10-16 16:07	Grab	in the water	54° 04.9' N	010° 59.4' E	18.6
POS530_181-1	POS530#181_Grab-038	2018-10-16 16:08	Grab	max depth/on ground	54° 04.9' N	010° 59.4' E	18.7
POS530_181-1	POS530#181_Grab-038	2018-10-16 16:09	Grab	on deck	54° 04.9' N	010° 59.4' E	18.7
POS530_182-1	POS530#182_Grab-039	2018-10-16 16:23	Grab	in the water	54° 04.5' N	010° 59.4' E	18.5

POS530_182-1	POS530#182_Grab-039	2018-10-16 16:24	Grab	max depth/on ground	54° 04.5' N	010° 59.4' E	18.6
POS530_182-1	POS530#182_Grab-039	2018-10-16 16:25	Grab	on deck	54° 04.5' N	010° 59.4' E	18.5
POS530_183-1	POS530#183_Grab-040	2018-10-16 16:39	Grab	in the water	54° 04.3' N	010° 58.9' E	17.8
POS530_183-1	POS530#183_Grab-040	2018-10-16 16:40	Grab	max depth/on ground	54° 04.3' N	010° 58.9' E	17.8
POS530_183-1	POS530#183_Grab-040	2018-10-16 16:40	Grab	on deck	54° 04.3' N	010° 58.9' E	18
POS530_184-1	POS530#184_Grab-041	2018-10-16 16:55	Grab	in the water	54° 04.2' N	010° 58.5' E	18.7
POS530_184-1	POS530#184_Grab-041	2018-10-16 16:56	Grab	max depth/on ground	54° 04.2' N	010° 58.5' E	18.6
POS530_184-1	POS530#184_Grab-041	2018-10-16 16:56	Grab	on deck	54° 04.2' N	010° 58.5' E	18.6
POS530_184-2	POS530#184_Grab-041	2018-10-16 16:57	Grab	in the water	54° 04.2' N	010° 58.5' E	18.7
POS530_184-2	POS530#184_Grab-041	2018-10-16 16:58	Grab	max depth/on ground	54° 04.2' N	010° 58.5' E	18.6
POS530_184-2	POS530#184_Grab-041	2018-10-16 16:59	Grab	on deck	54° 04.2' N	010° 58.5' E	18.6
POS530_185-1	POS530#185_Grab-042	2018-10-16 17:09	Grab	in the water	54° 04.3' N	010° 58.4' E	18.5

POS530_185-1	POS530#185_Grab-042	2018-10-16 17:09	Grab	max depth/on ground	54° 04.3' N	010° 58.4' E	18.5
POS530_185-1	POS530#185_Grab-042	2018-10-16 17:10	Grab	on deck	54° 04.3' N	010° 58.4' E	18.6
POS530_186-1	POS530#186_Grab-043	2018-10-16 17:32	Grab	in the water	54° 05.1' N	010° 58.4' E	18.2
POS530_186-1	POS530#186_Grab-043	2018-10-16 17:33	Grab	max depth/on ground	54° 05.1' N	010° 58.4' E	18.3
POS530_186-1	POS530#186_Grab-043	2018-10-16 17:34	Grab	on deck	54° 05.1' N	010° 58.4' E	18.3
POS530_187-1	POS530#187_Grab-044	2018-10-16 17:50	Grab	in the water	54° 04.9' N	010° 57.8' E	18.2
POS530_187-1	POS530#187_Grab-044	2018-10-16 17:51	Grab	max depth/on ground	54° 04.9' N	010° 57.8' E	18.3
POS530_187-1	POS530#187_Grab-044	2018-10-16 17:52	Grab	on deck	54° 04.9' N	010° 57.8' E	18.3
POS530_188-1	POS530#188_Grab-045	2018-10-16 18:10	Grab	in the water	54° 05.4' N	010° 57.8' E	17.7
POS530_188-1	POS530#188_Grab-045	2018-10-16 18:10	Grab	max depth/on ground	54° 05.4' N	010° 57.8' E	17.8
POS530_188-1	POS530#188_Grab-045	2018-10-16 18:13	Grab	on deck	54° 05.4' N	010° 57.8' E	17.8
POS530_189-1	POS530#189_Grab-046	2018-10-16 18:28	Grab	in the water	54° 05.3' N	010° 56.7' E	17.6

POS530_189-1	POS530#189_Grab-046	2018-10-16 18:29	Grab	max depth/on ground	54° 05.3' N	010° 56.7' E	17.7
POS530_189-1	POS530#189_Grab-046	2018-10-16 18:31	Grab	on deck	54° 05.3' N	010° 56.8' E	17.6
POS530_190-1	POS530#190_Grab-047	2018-10-16 18:54	Grab	in the water	54° 04.4' N	010° 56.1' E	18
POS530_190-1	POS530#190_Grab-047	2018-10-16 18:54	Grab	max depth/on ground	54° 04.4' N	010° 56.1' E	17.8
POS530_190-1	POS530#190_Grab-047	2018-10-16 18:55	Grab	on deck	54° 04.4' N	010° 56.1' E	18
POS530_191-1	POS530#191_Grab-048	2018-10-16 19:06	Grab	in the water	54° 04.7' N	010° 56.0' E	15.7
POS530_191-1	POS530#191_Grab-048	2018-10-16 19:06	Grab	max depth/on ground	54° 04.7' N	010° 56.0' E	16
POS530_191-1	POS530#191_Grab-048	2018-10-16 19:07	Grab	on deck	54° 04.7' N	010° 56.0' E	15.7
POS530_192-1	POS530#192_Grab-049	2018-10-16 19:25	Grab	in the water	54° 04.6' N	010° 57.1' E	18.3
POS530_192-1	POS530#192_Grab-049	2018-10-16 19:26	Grab	max depth/on ground	54° 04.6' N	010° 57.1' E	18.5
POS530_192-1	POS530#192_Grab-049	2018-10-16 19:27	Grab	on deck	54° 04.6' N	010° 57.1' E	18.3
POS530_193-1	POS530#193_Grab-050	2018-10-16 19:39	Grab	in the water	54° 04.9' N	010° 56.8' E	18.5

POS530_193-1	POS530#193_Grab-050	2018-10-16 19:39	Grab	max depth/on ground	54° 04.9' N	010° 56.8' E	18.6	
POS530_193-1	POS530#193_Grab-050	2018-10-16 19:40	Grab	on deck	54° 04.9' N	010° 56.8' E	18.7	
POS530_194-1	POS530#194_Grab-051	2018-10-16 19:54	Grab	in the water	54° 04.9' N	010° 56.8' E	19.1	
POS530_194-1	POS530#194_Grab-051	2018-10-16 19:55	Grab	max depth/on ground	54° 04.9' N	010° 56.8' E	18.8	
POS530_194-1	POS530#194_Grab-051	2018-10-16 19:56	Grab	on deck	54° 04.9' N	010° 56.9' E	19	
POS530_195-1	POS530#195_SVP-015	2018-10-16 20:35	Sound Velocity Profiler	in the water	54° 05.4' N	011° 00.5' E	19.5	
POS530_195-1	POS530#195_SVP-015	2018-10-16 20:39	Sound Velocity Profiler	on deck	54° 05.4' N	011° 00.5' E	19.5	
POS530_196-1	POS530#196_MB-018	2018-10-16 20:48	Multibeam echosounder	profile start	54° 05.5' N	011° 00.1' E	19.2	
POS530_196-1	POS530#196_MB-018	2018-10-17 5:08	Multibeam echosounder	profile end	54° 04.2' N	010° 57.5' E	18.5	
POS530_197-1	POS530#197_Dive-003	2018-10-17 7:18	Diving operations	station start	54° 02.1' N	010° 48.4' E	12.8	Divers leave VSL with own boat
POS530_197-1	POS530#197_Dive-003	2018-10-17 10:07	Diving operations	station end	54° 02.6' N	010° 47.9' E	10.8	Divers back on board

POS530_198-1	POS530#198_MB-019	2018-10-17 10:22	Multibeam echosounder	profile start	54° 02.4' N	010° 48.4' E	14
POS530_198-1	POS530#198_MB-019	2018-10-17 10:44	Multibeam echosounder	profile end	54° 01.7' N	010° 48.2' E	13.3
POS530_199-1	POS530#199_AUV-016	2018-10-17 11:18	Autonomous Underwater Vehicle	in the water	54° 01.8' N	010° 48.9' E	14.6
POS530_199-1	POS530#199_AUV-016	2018-10-17 12:33	Autonomous Underwater Vehicle	on deck	54° 01.8' N	010° 48.8' E	14.6
POS530_200-1	POS530#200_Grab-052	2018-10-17 12:57	Grab	in the water	54° 01.8' N	010° 47.8' E	13.1
POS530_200-1	POS530#200_Grab-052	2018-10-17 12:57	Grab	max depth/on ground	54° 01.8' N	010° 47.9' E	13
POS530_200-1	POS530#200_Grab-052	2018-10-17 12:58	Grab	on deck	54° 01.8' N	010° 47.8' E	13.1
POS530_201-1	POS530#201_Grab-053	2018-10-17 13:26	Grab	in the water	54° 02.4' N	010° 48.2' E	14
POS530_201-1	POS530#201_Grab-053	2018-10-17 13:26	Grab	max depth/on ground	54° 02.4' N	010° 48.2' E	13.8
POS530_201-1	POS530#201_Grab-053	2018-10-17 13:27	Grab	on deck	54° 02.4' N	010° 48.2' E	13.9
POS530_202-1	POS530#202_Grab-054	2018-10-17 13:47	Grab	in the water	54° 02.0' N	010° 49.2' E	15.6

POS530_202-1	POS530#202_Grab-054	2018-10-17 13:48	Grab	max depth/on ground	54° 02.0' N	010° 49.2' E	15.6
POS530_202-1	POS530#202_Grab-054	2018-10-17 13:48	Grab	on deck	54° 02.0' N	010° 49.2' E	15.5
POS530_202-2	POS530#202_Grab-054	2018-10-17 13:49	Grab	in the water	54° 02.0' N	010° 49.2' E	15.6
POS530_202-2	POS530#202_Grab-054	2018-10-17 13:49	Grab	max depth/on ground	54° 02.0' N	010° 49.2' E	15.5
POS530_202-2	POS530#202_Grab-054	2018-10-17 13:50	Grab	on deck	54° 02.0' N	010° 49.2' E	15.6
POS530_203-1	POS530#203_Grab-055	2018-10-17 14:06	Grab	in the water	54° 02.5' N	010° 49.0' E	15.7
POS530_203-1	POS530#203_Grab-055	2018-10-17 14:07	Grab	max depth/on ground	54° 02.5' N	010° 49.0' E	15.8
POS530_203-1	POS530#203_Grab-055	2018-10-17 14:07	Grab	on deck	54° 02.5' N	010° 49.0' E	15.7
POS530_204-1	POS530#204_Grab-056	2018-10-17 14:24	Grab	in the water	54° 02.9' N	010° 48.6' E	15.2
POS530_204-1	POS530#204_Grab-056	2018-10-17 14:24	Grab	max depth/on ground	54° 02.9' N	010° 48.6' E	15.4
POS530_204-1	POS530#204_Grab-056	2018-10-17 14:25	Grab	on deck	54° 02.9' N	010° 48.6' E	15.3
POS530_205-1	POS530#205_Grab-057	2018-10-17 14:37	Grab	in the water	54° 02.8' N	010° 48.9' E	13.3

POS530_205-1	POS530#205_Grab-057	2018-10-17 14:38	Grab	max depth/on ground	54° 02.8' N	010° 48.9' E	13.3	
POS530_205-1	POS530#205_Grab-057	2018-10-17 14:39	Grab	on deck	54° 02.8' N	010° 48.9' E	13.3	
POS530_205-2	POS530#205_Grab-057	2018-10-17 14:40	Grab	in the water	54° 02.8' N	010° 48.9' E	13.3	
POS530_205-2	POS530#205_Grab-057	2018-10-17 14:40	Grab	max depth/on ground	54° 02.8' N	010° 48.9' E	13.3	
POS530_205-2	POS530#205_Grab-057	2018-10-17 14:41	Grab	on deck	54° 02.8' N	010° 48.9' E	13.3	
POS530_206-1	POS530#206_CTD-087	2018-10-17 17:17	CTD	in the water	54° 03.0' N	010° 51.3' E	16.9	
POS530_206-1	POS530#206_CTD-087	2018-10-17 17:19	CTD	max depth/on ground	54° 03.0' N	010° 51.3' E	16.8	SL max = 17m
POS530_206-1	POS530#206_CTD-087	2018-10-17 17:20	CTD	on deck	54° 02.9' N	010° 51.3' E	17.5	
POS530_206-2	POS530#206_CTD-087	2018-10-17 17:22	CTD	in the water	54° 02.9' N	010° 51.3' E	16.9	
POS530_206-2	POS530#206_CTD-087	2018-10-17 17:25	CTD	max depth/on ground	54° 02.9' N	010° 51.3' E	16.7	SL max = 17m
POS530_206-2	POS530#206_CTD-087	2018-10-17 17:27	CTD	on deck	54° 02.9' N	010° 51.3' E	16.9	
POS530_207-1	POS530#207_CTD-088	2018-10-17 19:03	CTD	in the water	54° 02.5' N	011° 08.4' E	21.4	

POS530_207-1	POS530#207_CTD-088	2018-10-17 19:08	CTD	max depth/on ground	54° 02.5' N	011° 08.4' E	21	20 m max
POS530_207-1	POS530#207_CTD-088	2018-10-17 19:12	CTD	on deck	54° 02.5' N	011° 08.5' E	21.2	
POS530_208-1	POS530#208_CTD-089	2018-10-17 19:51	CTD	in the water	54° 03.8' N	011° 13.7' E	16.5	
POS530_208-1	POS530#208_CTD-089	2018-10-17 19:55	CTD	max depth/on ground	54° 03.8' N	011° 13.7' E	16.5	16 m max
POS530_208-1	POS530#208_CTD-089	2018-10-17 19:59	CTD	on deck	54° 03.7' N	011° 13.7' E	16.7	
POS530_209-1	POS530#209_CTD-090	2018-10-17 21:00	CTD	in the water	54° 06.1' N	011° 22.1' E	12.2	
POS530_209-1	POS530#209_CTD-090	2018-10-17 21:05	CTD	max depth/on ground	54° 06.1' N	011° 22.1' E	12.1	12 m max
POS530_209-1	POS530#209_CTD-090	2018-10-17 21:08	CTD	on deck	54° 06.1' N	011° 22.1' E	12.1	
POS530_210-1	POS530#210_CTD-091	2018-10-17 22:09	CTD	in the water	54° 09.4' N	011° 29.7' E	17.5	
POS530_210-1	POS530#210_CTD-091	2018-10-17 22:12	CTD	max depth/on ground	54° 09.4' N	011° 29.7' E	17.5	17 m max
POS530_210-1	POS530#210_CTD-091	2018-10-17 22:13	CTD	on deck	54° 09.4' N	011° 29.7' E	17.4	
POS530_211-1	POS530#211_CTD-092	2018-10-17 23:25	CTD	in the water	54° 14.3' N	011° 35.4' E	21.8	

POS530_211-1	POS530#211_CTD-092	2018-10-17 23:28	CTD	max depth/on ground	54° 14.3' N	011° 35.4' E	21.8	22 m max
POS530_211-1	POS530#211_CTD-092	2018-10-17 23:30	CTD	on deck	54° 14.3' N	011° 35.4' E	21.7	
POS530_212-1	POS530212_CTD-093	2018-10-18 0:36	CTD	in the water	54° 15.1' N	011° 44.3' E	21.6	
POS530_212-1	POS530#212_CTD-093	2018-10-18 0:39	CTD	max depth/on ground	54° 15.1' N	011° 44.4' E	21.6	22 m max
POS530_212-1	POS530#212_CTD-093	2018-10-18 0:41	CTD	on deck	54° 15.1' N	011° 44.4' E	21.7	
POS530_213-1	POS530#213_CTD-094	2018-10-18 2:10	CTD	in the water	54° 15.7' N	011° 59.1' E	13.3	
POS530_213-1	POS530#213_CTD-094	2018-10-18 2:12	CTD	max depth/on ground	54° 15.7' N	011° 59.1' E	13.2	SL max = 13m
POS530_213-1	POS530#213_CTD-094	2018-10-18 2:14	CTD	on deck	54° 15.7' N	011° 59.1' E	13.2	
POS530_214-1	POS530#214_CTD-095	2018-10-18 3:02	CTD	in the water	54° 17.0' N	012° 04.6' E	14.8	
POS530_214-1	POS530#214_CTD-095	2018-10-18 3:04	CTD	max depth/on ground	54° 17.0' N	012° 04.6' E	14.8	SL max = 15m
POS530_214-1	POS530#214_CTD-095	2018-10-18 3:06	CTD	on deck	54° 17.0' N	012° 04.6' E	14.7	
POS530_215-1	POS530#215_CTD-096	2018-10-18 3:59	CTD	in the water	54° 20.6' N	012° 09.1' E	14.9	

POS530_215-1	POS530#215_CTD-096	2018-10-18 4:01	CTD	max depth/on ground	54° 20.6' N	012° 09.1' E	14.8	SL max = 15m
POS530_215-1	POS530#215_CTD-096	2018-10-18 4:03	CTD	on deck	54° 20.6' N	012° 09.1' E	14.8	
POS530_216-1	POS530#216_CTD-097	2018-10-18 5:25	CTD	in the water	54° 27.4' N	012° 15.7' E	20.4	
POS530_216-1	POS530#216_CTD-097	2018-10-18 5:28	CTD	max depth/on ground	54° 27.4' N	012° 15.7' E	20.3	SL max = 20m
POS530_216-1	POS530#216_CTD-097	2018-10-18 5:30	CTD	on deck	54° 27.4' N	012° 15.7' E	20.6	
POS530_217-1	POS530#217_CTD-098	2018-10-18 6:28	CTD	in the water	54° 30.3' N	012° 23.2' E	13.3	
POS530_217-1	POS530#217_CTD-098	2018-10-18 6:31	CTD	max depth/on ground	54° 30.3' N	012° 23.2' E	13.6	14 m max
POS530_217-1	POS530#217_CTD-098	2018-10-18 6:34	CTD	on deck	54° 30.3' N	012° 23.2' E	13	
POS530_217-2	POS530#217_GoFlo-022	2018-10-18 6:36	GoFlo bottle	in the water	54° 30.3' N	012° 23.1' E	12.6	
POS530_217-2	POS530#217_GoFlo-022	2018-10-18 6:41	GoFlo bottle	max depth/on ground	54° 30.3' N	012° 23.1' E	12.7	
POS530_217-2	POS530#217_GoFlo-022	2018-10-18 6:44	GoFlo bottle	on deck	54° 30.3' N	012° 23.1' E	12.6	
POS530_218-1	POS530#218_CTD-099	2018-10-18 7:39	CTD	in the water	54° 33.3' N	012° 30.6' E	11.7	

POS530_218-1	POS530#218_CTD-099	2018-10-18 7:42	CTD	max depth/on ground	54° 33.3' N	012° 30.6' E	11.8	11 m max
POS530_218-1	POS530#218_CTD-099	2018-10-18 7:45	CTD	on deck	54° 33.3' N	012° 30.6' E	11.8	
POS530_219-1	POS530#219_CTD-100	2018-10-18 8:41	CTD	in the water	54° 37.4' N	012° 36.7' E	14.4	
POS530_219-1	POS530#219_CTD-100	2018-10-18 8:44	CTD	max depth/on ground	54° 37.4' N	012° 36.8' E	14.4	14 m max
POS530_219-1	POS530#219_CTD-100	2018-10-18 8:46	CTD	on deck	54° 37.4' N	012° 36.8' E	14.4	
POS530_219-2	POS530#219_GoFlo-023	2018-10-18 8:49	GoFlo bottle	in the water	54° 37.4' N	012° 36.8' E	14.4	
POS530_219-2	POS530#219_GoFlo-023	2018-10-18 8:52	GoFlo bottle	max depth/on ground	54° 37.4' N	012° 36.8' E	14.3	
POS530_219-2	POS530#219_GoFlo-023	2018-10-18 8:55	GoFlo bottle	on deck	54° 37.4' N	012° 36.8' E	14.3	
POS530_220-1	POS530#220_CTD-101	2018-10-18 9:48	CTD	in the water	54° 39.8' N	012° 44.8' E	13.1	
POS530_220-1	POS530#220_CTD-101	2018-10-18 9:51	CTD	max depth/on ground	54° 39.8' N	012° 44.7' E	13	12 m max
POS530_220-1	POS530#220_CTD-101	2018-10-18 9:53	CTD	on deck	54° 39.8' N	012° 44.8' E	13	
POS530_221-1	POS530#221_CTD-102	2018-10-18 10:50	CTD	in the water	54° 43.2' N	012° 52.0' E	19.8	

POS530_221-1	POS530#221_CTD-102	2018-10-18 10:53	CTD	max depth/on ground	54° 43.2' N	012° 52.0' E	19.8	19 m max
POS530_221-1	POS530#221_CTD-102	2018-10-18 10:55	CTD	on deck	54° 43.2' N	012° 52.0' E	19.8	
POS530_221-2	POS530#221_GoFlo-024	2018-10-18 10:58	GoFlo bottle	in the water	54° 43.2' N	012° 52.0' E	19.8	
POS530_221-2	POS530#221_GoFlo-024	2018-10-18 11:02	GoFlo bottle	max depth/on ground	54° 43.2' N	012° 52.1' E	19.8	
POS530_221-2	POS530#221_GoFlo-024	2018-10-18 11:06	GoFlo bottle	on deck	54° 43.2' N	012° 52.1' E	19.9	
POS530_222-1	POS530#222_CTD-103	2018-10-18 12:10	CTD	in the water	54° 47.0' N	012° 58.6' E	23.1	
POS530_222-1	POS530#222_CTD-103	2018-10-18 12:13	CTD	max depth/on ground	54° 47.0' N	012° 58.6' E	23.1	23 m max
POS530_222-1	POS530#222_CTD-103	2018-10-18 12:15	CTD	on deck	54° 47.0' N	012° 58.7' E	23.2	
POS530_223-1	POS530#223_CTD-104	2018-10-18 13:18	CTD	in the water	54° 48.5' N	013° 08.6' E	1.2	
POS530_223-1	POS530#223_CTD-104	2018-10-18 13:27	CTD	max depth/on ground	54° 48.5' N	013° 08.6' E	0.9	37 m max
POS530_223-1	POS530#223_CTD-104	2018-10-18 13:29	CTD	on deck	54° 48.5' N	013° 08.6' E	0.9	
POS530_223-2	POS530#223_GoFlo-025	2018-10-18 13:34	GoFlo bottle	in the water	54° 48.5' N	013° 08.6' E	0.6	

POS530_223-2	POS530#223_GoFlo-025	2018-10-18 13:42	GoFlo bottle	max depth/on ground	54° 48.5' N	013° 08.6' E	0.6	
POS530_223-2	POS530#223_GoFlo-025	2018-10-18 13:47	GoFlo bottle	on deck	54° 48.5' N	013° 08.6' E	1.2	
POS530_224-1	POS530#224_CTD-105	2018-10-18 14:47	CTD	in the water	54° 48.9' N	013° 17.8' E	41.1	
POS530_224-1	POS530#224_CTD-105	2018-10-18 14:51	CTD	max depth/on ground	54° 48.9' N	013° 17.8' E	40.8	SL max = 41m
POS530_224-1	POS530#224_CTD-105	2018-10-18 14:57	CTD	on deck	54° 48.9' N	013° 17.8' E	41.1	
POS530_225-1	POS530#225_CTD-106	2018-10-18 16:02	CTD	in the water	54° 49.0' N	013° 27.3' E	41.5	
POS530_225-1	POS530#225_CTD-106	2018-10-18 16:06	CTD	max depth/on ground	54° 49.0' N	013° 27.2' E	41.6	SL max = 37m
POS530_225-1	POS530#225_CTD-106	2018-10-18 16:14	CTD	on deck	54° 49.0' N	013° 27.2' E	42.1	
POS530_226-1	POS530#226_SVP-016	2018-10-18 17:25	Sound Velocity Profiler	in the water	54° 47.7' N	013° 37.9' E	40.7	
POS530_226-1	POS530#226_SVP-016	2018-10-18 17:32	Sound Velocity Profiler	in the water	54° 47.7' N	013° 37.9' E	40.6	
POS530_227-1	POS530#227_MB-019	2018-10-18 17:45	Multibeam echosounder	profile start	54° 47.7' N	013° 37.0' E	40.6	

POS530_227-1	POS530#227_MB-019	2018-10-19 8:16	Multibeam echosounder	profile end	54° 48.4' N	013° 37.0' E	40.8	
POS530_228-1	POS530#228_TV-CTD-012	2018-10-19 8:39	TV-CTD	in the water	54° 48.2' N	013° 36.7' E	40.7	Video
POS530_228-1	POS530#228_TV-CTD-012	2018-10-19 9:02	TV-CTD	max depth/on ground	54° 48.2' N	013° 36.8' E	40.8	41 m max
POS530_228-1	POS530#228_TV-CTD-012	2018-10-19 9:02	TV-CTD	profile start	54° 48.2' N	013° 36.8' E	41.1	
POS530_228-1	POS530#228_TV-CTD-012	2018-10-19 10:08	TV-CTD	profile end	54° 48.4' N	013° 36.5' E	41	
POS530_228-1	POS530#228_TV-CTD-012	2018-10-19 10:12	TV-CTD	on deck	54° 48.3' N	013° 36.5' E	41	
POS530_229-1	POS530#229_TV-CTD-013	2018-10-19 10:21	TV-CTD	in the water	54° 48.3' N	013° 36.6' E	42.1	Video
POS530_229-1	POS530#229_TV-CTD-013	2018-10-19 10:28	TV-CTD	max depth/on ground	54° 48.3' N	013° 36.6' E	41.2	
POS530_229-1	POS530#229_TV-CTD-013	2018-10-19 10:30	TV-CTD	profile start	54° 48.3' N	013° 36.6' E	42.5	
POS530_229-1	POS530#229_TV-CTD-013	2018-10-19 10:55	TV-CTD	profile end	54° 48.3' N	013° 36.6' E	42.7	
POS530_229-1	POS530#229_TV-CTD-013	2018-10-19 10:59	TV-CTD	on deck	54° 48.3' N	013° 36.6' E	41.7	

POS530_230-1	POS530#230_CTD-109	2018-10-19 11:29	CTD	in the water	54° 48.3' N	013° 33.9' E	41.7	
POS530_230-1	POS530#230_CTD-109	2018-10-19 11:37	CTD	max depth/on ground	54° 48.3' N	013° 33.9' E	41.1	40 m max
POS530_230-1	POS530#230_CTD-109	2018-10-19 11:40	CTD	on deck	54° 48.3' N	013° 33.9' E	41.1	
POS530_230-2	POS530#230_GoFlo-026	2018-10-19 11:44	GoFlo bottle	in the water	54° 48.3' N	013° 33.9' E	41.7	
POS530_230-2	POS530#230_GoFlo-026	2018-10-19 11:51	GoFlo bottle	max depth/on ground	54° 48.3' N	013° 33.9' E	41	
POS530_230-2	POS530#230_GoFlo-026	2018-10-19 11:55	GoFlo bottle	on deck	54° 48.3' N	013° 33.9' E	41.2	
POS530_231-1	POS530#231_CTD-110	2018-10-19 13:07	CTD	in the water	54° 48.4' N	013° 47.4' E	40.1	
POS530_231-1	POS530#231_CTD-110	2018-10-19 13:12	CTD	max depth/on ground	54° 48.4' N	013° 47.4' E	40.1	39 m max
POS530_231-1	POS530#231_CTD-110	2018-10-19 13:14	CTD	on deck	54° 48.4' N	013° 47.4' E	40.1	
POS530_232-1	POS530#232_CTD-111	2018-10-19 14:22	CTD	in the water	54° 47.0' N	013° 57.8' E	35.8	
POS530_232-1	POS530#232_CTD-111	2018-10-19 14:28	CTD	max depth/on ground	54° 47.0' N	013° 57.8' E	35.8	SL max = 35m
POS530_232-1	POS530#232_CTD-111	2018-10-19 14:31	CTD	on deck	54° 47.0' N	013° 57.8' E	36	

POS530_233-1	POS530#233_SVP-017	2018-10-19 16:23	Sound Velocity Profiler	in the water	54° 48.5' N	013° 37.7' E	41
POS530_233-1	POS530#233_SVP-017	2018-10-19 16:28	Sound Velocity Profiler	on deck	54° 48.5' N	013° 37.7' E	41.1
POS530_234-1	POS530#234_MB-020	2018-10-19 16:50	Multibeam echosounder	profile start	54° 48.5' N	013° 37.0' E	41.5
POS530_234-1	POS530#234_MB-020	2018-10-20 6:32	Multibeam echosounder	profile end	54° 49.1' N	013° 31.4' E	42
POS530_235-1	POS530#235_SBP-003	2018-10-20 7:35	Subbottom Profiler	profile start	54° 47.8' N	013° 31.5' E	40.8
POS530_235-1	POS530#235_SBP-003	2018-10-20 12:09	Subbottom Profiler	profile end	54° 47.6' N	013° 34.5' E	40.7
POS530_236-1	POS530#236_Grab-058	2018-10-20 12:30	Grab	in the water	54° 48.1' N	013° 35.8' E	41.2
POS530_236-1	POS530#236_Grab-058	2018-10-20 12:31	Grab	max depth/on ground	54° 48.1' N	013° 35.8' E	41
POS530_236-1	POS530#236_Grab-058	2018-10-20 12:32	Grab	on deck	54° 48.1' N	013° 35.8' E	41.2
POS530_236-2	POS530#236_Grab-058	2018-10-20 12:32	Grab	in the water	54° 48.1' N	013° 35.8' E	41
POS530_236-2	POS530#236_Grab-058	2018-10-20 12:33	Grab	max depth/on ground	54° 48.1' N	013° 35.8' E	41.1
POS530_236-2	POS530#236_Grab-058	2018-10-20 12:34	Grab	on deck	54° 48.1' N	013° 35.8' E	41.2

POS530_237-1	POS530#237_Grab-059	2018-10-20 13:00	Grab	in the water	54° 48.1' N	013° 33.8' E	41.6
POS530_237-1	POS530#237_Grab-059	2018-10-20 13:01	Grab	max depth/on ground	54° 48.1' N	013° 33.8' E	41.5
POS530_237-1	POS530#237_Grab-059	2018-10-20 13:03	Grab	on deck	54° 48.1' N	013° 33.8' E	41.3
POS530_238-1	POS530#238_Grab-060	2018-10-20 13:19	Grab	in the water	54° 48.1' N	013° 32.1' E	41.2
POS530_238-1	POS530#238_Grab-060	2018-10-20 13:20	Grab	max depth/on ground	54° 48.1' N	013° 32.1' E	42
POS530_238-1	POS530#238_Grab-060	2018-10-20 13:22	Grab	on deck	54° 48.1' N	013° 32.1' E	41.2
POS530_239-1	POS530#239_Grab-061	2018-10-20 13:37	Grab	in the water	54° 48.7' N	013° 32.1' E	41.5
POS530_239-1	POS530#239_Grab-061	2018-10-20 13:37	Grab	max depth/on ground	54° 48.7' N	013° 32.1' E	41.8
POS530_239-1	POS530#239_Grab-061	2018-10-20 13:39	Grab	on deck	54° 48.7' N	013° 32.1' E	41.5
POS530_239-2	POS530#239_SVP-018	2018-10-20 13:46	Sound Velocity Profiler	in the water	54° 48.7' N	013° 32.1' E	41.3
POS530_239-2	POS530#239_SVP-018	2018-10-20 13:50	Sound Velocity Profiler	on deck	54° 48.7' N	013° 32.1' E	41.5
POS530_240-1	POS530#240_MB-021	2018-10-20 14:04	Multibeam echosounder	profile start	54° 48.1' N	013° 32.3' E	41

POS530_240-1	POS530#240_MB-021	2018-10-20 14:45	Multibeam echosounder	profile end	54° 48.1' N	013° 32.2' E	41.1	
POS530_241-1	POS530#241_CTD-112	2018-10-20 22:16	CTD	in the water	54° 23.2' N	012° 06.6' E	17.1	
POS530_241-1	POS530#241_CTD-112	2018-10-20 22:19	CTD	max depth/on ground	54° 23.2' N	012° 06.6' E	16.8	16 m max
POS530_241-1	POS530#241_CTD-112	2018-10-20 22:21	CTD	on deck	54° 23.2' N	012° 06.6' E	16.8	
POS530_241-2	POS530#241_GoFlo-027	2018-10-20 22:25	GoFlo bottle	in the water	54° 23.2' N	012° 06.6' E	16.8	
POS530_241-2	POS530#241_GoFlo-027	2018-10-20 22:28	GoFlo bottle	max depth/on ground	54° 23.2' N	012° 06.6' E	17	
POS530_241-2	POS530#241_GoFlo-027	2018-10-20 22:30	GoFlo bottle	on deck	54° 23.2' N	012° 06.6' E	17	
POS530_242-1	POS530#242_CTD-113	2018-10-20 23:20	CTD	in the water	54° 21.9' N	011° 58.3' E	13.8	
POS530_242-1	POS530#242_CTD-113	2018-10-20 23:22	CTD	max depth/on ground	54° 21.9' N	011° 58.3' E	13.8	13 m max
POS530_242-1	POS530#242_CTD-113	2018-10-20 23:23	CTD	on deck	54° 21.9' N	011° 58.3' E	13.8	
POS530_243-1	POS530#243_CTD-114	2018-10-21 0:17	CTD	in the water	54° 21.6' N	011° 47.9' E	19.3	
POS530_243-1	POS530#243_CTD-114	2018-10-21 0:19	CTD	max depth/on ground	54° 21.6' N	011° 47.9' E	19.5	19 m max

POS530_243-1	POS530#243_CTD-114	2018-10-21 0:21	CTD	on deck	54° 21.6' N	011° 48.0' E	19.3	
POS530_243-2	POS530#243_GoFlo-028	2018-10-21 0:23	GoFlo bottle	in the water	54° 21.6' N	011° 48.0' E	19.3	
POS530_243-2	POS530#243_GoFlo-028	2018-10-21 0:28	GoFlo bottle	max depth/on ground	54° 21.6' N	011° 47.9' E	19.3	
POS530_243-2	POS530#243_GoFlo-028	2018-10-21 0:31	GoFlo bottle	on deck	54° 21.7' N	011° 47.9' E	19.5	
POS530_244-1	POS530#244_CTD-115	2018-10-21 1:42	CTD	in the water	54° 24.5' N	011° 35.3' E	21.6	
POS530_244-1	POS530#244_CTD-115	2018-10-21 1:44	CTD	max depth/on ground	54° 24.5' N	011° 35.3' E	21.5	21 m max
POS530_244-1	POS530#244_CTD-115	2018-10-21 1:44	CTD	on deck	54° 24.5' N	011° 35.3' E	21.7	
POS530_245-1	POS530#245_CTD-116	2018-10-21 2:29	CTD	in the water	54° 27.7' N	011° 29.1' E	22.6	
POS530_245-1	POS530#245_CTD-116	2018-10-21 2:32	CTD	max depth/on ground	54° 27.7' N	011° 29.1' E	22.6	SL max = 21m
POS530_245-1	POS530#245_CTD-116	2018-10-21 2:34	CTD	on deck	54° 27.7' N	011° 29.1' E	22.6	
POS530_245-2	POS530#245_GoFlo-029	2018-10-21 2:37	GoFlo bottle	in the water	54° 27.7' N	011° 29.1' E	22.6	
POS530_245-2	POS530#245_GoFlo-029	2018-10-21 2:44	GoFlo bottle	max depth/on ground	54° 27.7' N	011° 29.1' E	22.6	SL max = 20m

POS530_245-2	POS530#245_GoFlo-029	2018-10-21 2:47	GoFlo bottle	on deck	54° 27.7' N	011° 29.1' E	22.6	
POS530_246-1	POS530#246_CTD-117	2018-10-21 3:20	CTD	in the water	54° 29.6' N	011° 23.6' E	24.6	
POS530_246-1	POS530#246_CTD-117	2018-10-21 3:23	CTD	max depth/on ground	54° 29.6' N	011° 23.6' E	24.7	SL max = 24m
POS530_246-1	POS530#246_CTD-117	2018-10-21 3:25	CTD	on deck	54° 29.6' N	011° 23.6' E	25	
POS530_247-1	POS530#247_CTD-118	2018-10-21 4:04	CTD	in the water	54° 32.8' N	011° 20.5' E	24.8	
POS530_247-1	POS530#247_CTD-118	2018-10-21 4:07	CTD	max depth/on ground	54° 32.8' N	011° 20.5' E	24.8	SL max = 24m
POS530_247-1	POS530#247_CTD-118	2018-10-21 4:09	CTD	on deck	54° 32.8' N	011° 20.5' E	24.8	
POS530_247-2	POS530#247_GoFlo-030	2018-10-21 4:12	GoFlo bottle	in the water	54° 32.8' N	011° 20.4' E	24.8	
POS530_247-2	POS530#247_GoFlo-030	2018-10-21 4:17	GoFlo bottle	max depth/on ground	54° 32.8' N	011° 20.4' E	24.7	SL max = 25m
POS530_247-2	POS530#247_GoFlo-030	2018-10-21 4:21	GoFlo bottle	on deck	54° 32.8' N	011° 20.4' E	24.7	
POS530_248-1	POS530#248_CTD-119	2018-10-21 5:07	CTD	in the water	54° 34.8' N	011° 14.1' E	24.7	
POS530_248-1	POS530#248_CTD-119	2018-10-21 5:10	CTD	max depth/on ground	54° 34.8' N	011° 14.1' E	24.7	SL max = 24m

POS530_248-1	POS530#248_CTD-119	2018-10-21 5:12	CTD	on deck	54° 34.8' N	011° 14.1' E	24.7	
POS530_249-1	POS530#249_CTD-120	2018-10-21 6:05	CTD	in the water	54° 36.3' N	011° 08.8' E	23.3	
POS530_249-1	POS530#249_CTD-120	2018-10-21 6:09	CTD	max depth/on ground	54° 36.3' N	011° 08.8' E	23.8	24 m max
POS530_249-1	POS530#249_CTD-120	2018-10-21 6:12	CTD	on deck	54° 36.3' N	011° 08.8' E	23.7	
POS530_249-2	POS530#249_GoFlo-031	2018-10-21 6:14	GoFlo bottle	in the water	54° 36.3' N	011° 08.8' E	23.7	
POS530_249-2	POS530#249_GoFlo-031	2018-10-21 6:19	GoFlo bottle	max depth/on ground	54° 36.3' N	011° 08.7' E	23.6	
POS530_249-2	POS530#249_GoFlo-031	2018-10-21 6:24	GoFlo bottle	on deck	54° 36.3' N	011° 08.7' E	23.5	Completion of research activities POS 530