ALKOR-Berichte

Acoustic Seafloor Classification of the German EEZ- Impact of sediment types, bioturbation, and natural and man-made seabed features on hydroacoustic images.

Cruise No. AL520-2

20.03.2019 – 04.04.2019,
Cuxhaven (Germany) – Cuxhaven (Germany)
ASKAWZ IV

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2019

Table of Contents

1 Cruise Summary

1.1 Summary in English

ALKOR cruise 520-2 was part of the project ASKAWZ (Acoustic Seafloor Classification of the German EEZ) coordinated and funded by the Federal Maritime and Hydrographic Agency (BSH) and the Federal Agency for Nature Conservation (BfN). The main goal of the cruise was the full area acoustic mapping of the westernmost part of the German EEZ (so called "Entenschnabel") by sidescan sonar and the detection of natural and man-made structures (trawl marks, etc.) on the seafloor. The full area mapping was achieved by 61 sidescan sonar profiles, covering an area of ca. 640 km². A single-beam echosounder with automatic seafloor classification (QTC 5.5) was running simultaneously to the sidescan sonar. The acoustic backscatter data was "ground truthed" using Shipek grab and Box-corer (Reineck-Type) samples. In addition an underwater video camera was used to gather further seabed information.
Additionally sidescan data was recorded in the Helgoland-Reef pockmark area. Here 13 lines were surveyed (ca. 10 km²) by sidescan sonar in order to document the development of the pockmark field.

1.2 Zusammenfassung

Die Forschungsfahrt ALKOR 520-2 fand im Rahmen des Projektes ASKAWZ (Akustische Seeboden Klassifizierung in der Deutschen AWZ- Horizontale und vertikale Abbildung von Sedimenttypen, Bioturbation und anthropogenen Bodenspuren in der Hydroakustik in der deutschen AWZ) in Kooperation mit dem Bundesamt für Seeschifffahrt und Hydrographie (BSH) und dem Bundesamt für Naturschutz (BfN) statt. Ziel der Reise war die flächendeckende Kartierung des westlichsten Teils der Deutschen AWZ (sog. "Entenschnabel") mit dem Sidescan Sonar, sowie die Detektion von natürlichen und anthropogenen Strukturen, wie Schleppspuren der Bodenfischerei auf dem Meeresboden.
Zur flächendeckenden Kartierung wurden 61 akustische Profile im Bereich des Entenschnabels aufgenommen (ca. 640 km²). Hier wurde zusätzlich ein Einstrahl-Echolot mit integrierter Meeresbodenklassifizierung (QTC 5.5) eingesetzt. Für das „ground truthing" der Rückstreudaten wurden Greiferproben vom Meeresboden entnommen (Shipek Greifer, Kastengreifer nach Reineck). Zur direkten Meeresbodenbeobachtung wurde eine Unterwasser Videokamera eingesetzt.
Weitere Profile mit dem Sidescan Sonar wurden im ‚Pockmark'-Gebiet des Helgoland Riffs (ca. 10 km²) gemessen. Hier war das Ziel, die Veränderungen des 2015 entstandenen ‚Pockmark'-Feldes zu dokumentieren.

2 Participants

2.1 Principal Investigators

Name	Institution
Dr. Holler, Peter.	SaM
Dr. Neumann, Andreas	HZG
Bruns, Ines MSc.	SaM

2.2 Scientific Party

Name	Discipline	Institution
Dr. Holler, Peter	Hydroacoustics / Chief Scientist	SaM
Dr. Neumann, Andreas	Biogeochemistry	HZG
Bruns, Ines, M.Sc.	Hydroacoustics/Sedimentology	SaM
Wilsenack, Maik	Electronics	SaM
Domenighini, Barbara	Student	SaM
Legatzki, Kassandra	Student	SaM
Göbeler, Norman	Student	SaM
Böger, Anna-Lena	Student	SaM

2.3 Participating Institutions

SaM Senckenberg am Meer, Abteilung für Meeresforschung, Wilhelmshaven
HZG Helmholtz-Zentrum Geesthacht, Geesthacht

2.4 Crew

Name	Rank
von Staa, Friedhelm	Master
Eilts, Enno	1st Officer
Zersen, Hendrik	2nd Officer
Freund, Hans-Jörg	Chief Engineer
Stöck, Thorsten	Electrician
Schwieger, Hardy	Boatswain
Delachaux dit-Gay, Lucian	A.B.
Grunert, Holger	A.B.
Christian, Ledwig	A.B.
Rieger, Willi	A.B.
Kirschnick, Thomas	Cook

3 Research Program

3.1 Aims of the Cruise

The main goal of the cruise was the full area acoustic mapping of the westernmost part of the German EEZ (so called "Entenschnabel") by sidescan sonar for the detection of natural and man-made structures (trawl marks) on the seafloor.
The main objective of A. Neumann (HZG) was to sample the sediment at five NOAH sites along the transit to measure benthic fluxes of oxygen and nutrients.

3.2 Agenda of the Cruise

In the working area in the northwestern tip of the German EEZ (Entenschnabel) sidescan sonar lines were run in northwesterly/southeasterly direction at a line spacing of 400m. The backscatter data were preliminary post-processed onboard and a backscatter mosaic was generated at a pixel size of 1m. This mosaic was used to identify regions with different backscatter intensities and man-made seafloor structures like trawl scars. In order to ground truth the different backscatter intensities, a underwater video system and grab samplers (box corer, Shipek grab) were used. On

the box cores, shear tests (vane shear test) were carried out and subsamples for further sedimentological analyses (e.g. grain size distribution) were taken.
On the way to the Entenschnabel area, some sidescan sonar lines were run in the NOAH-E area (Helgoland Reef), where pockmarks on the seafloor (Krämer, et al., 2017) has been discovered in November 2015 by RV Heincke (HE455)
The sediment samples for biogeochemical analyses (A. Neumann, HZG) were sampled at the NOAH sites D, E, F, H, and I, which are located along the transit route between Cuxhaven port and the primary study area at the Dogger Bank. Cores of the surface sediment were retrieved manually from box-cores and incubated at in-situ temperature in the temperature-controlled lab of Alkor. The measurements during the incubations include fluxes of oxygen and nutrients as well as rates of bioirrigation and bioturbation. Subsequent to the incubation, sediment cores were sampled for sediment analyses (porosity, chlorophyll) and macrofauna. The sediment samples were complemented by CTD casts at the NOAH sites for a basic characterization of the water column. Additional sediment samples from selected stations in the primary study area were retrieved from Shipek grabs for measurements of porosity and permeability.

3.2 Description of the Working Area

The main working area is located in the northwestern tip of the German EEZ, the so called Entenschnabel" (Fig.3.1). The south easterly border of the working area is the northern limit of

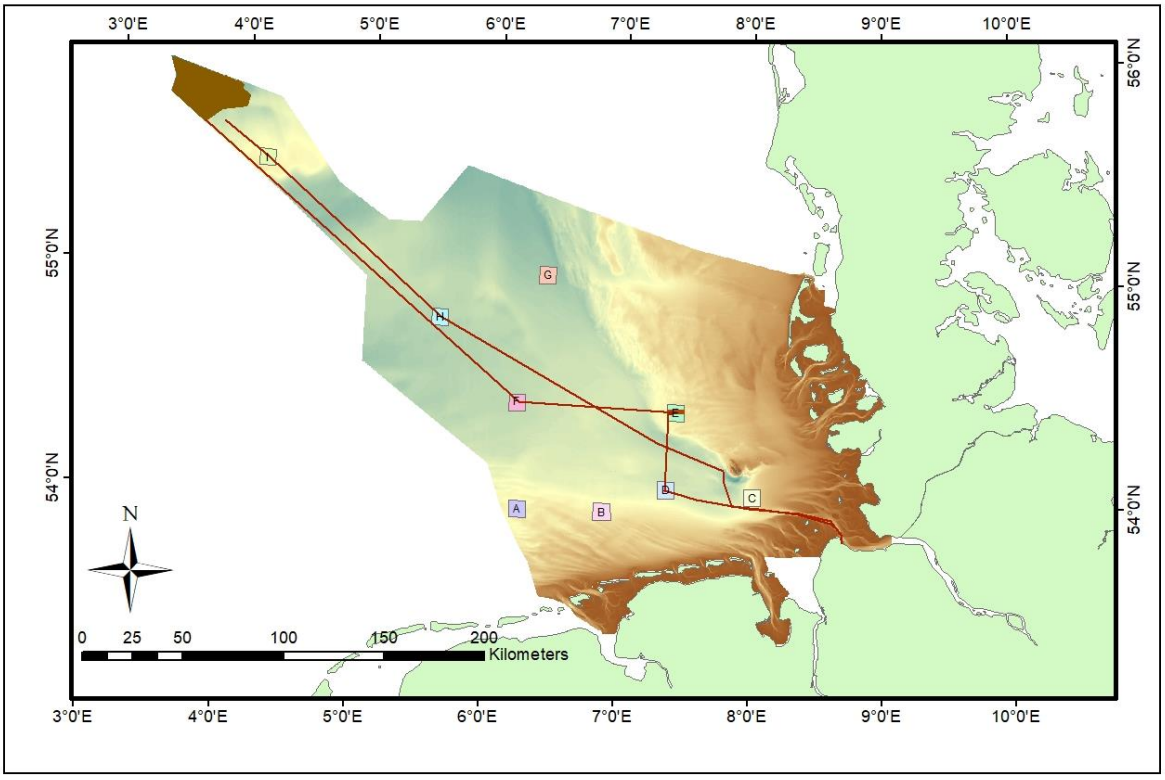

Fig. 3.1 Track chart of R/V ALKOR Cruise 520-2. The main working area was in the northwestern tip of the German EEZ (Entenschnabel) and the Helgoland Reef pockmark field (E). Bathymetry from BSH, Boxes A - I NOAH working areas.

the natural conservation area "Dogger Bank". Water depth in the study area varies between ca. 40m in the southeast to more than 68m in the northwest. Water depth continually increases from the southeast to the northwest.

Survey area NOAH-E is located in the Helgoland Reef area (Fig.3.1). The water depth in this area varies between ca. 28m and 30m.

4 Narrative of the Cruise

Mobilisation of equipment to RV ALKOR started on **March 19th 2019** at 10:45 in Cuxhaven. The sidescan sonar and single-beam echosounder with QTC 5.5 AGDS were installed by two of the scientific party. On **March 20th** the remaining scientific party boarded RV ALKOR at 10:00 and the vessel left Cuxhaven at 10:30 and headed to area NOAH-D (see Fig.3.1). The vessel arrived at the station on **20th March 2019 15:17**. A CTD and box grab were taken for biogeochemical analyses until 15:28. RV ALKOR was cruising to area NOAH-E (Pockmark area Helgoland Reef) until 17:34. The Klein System 4000 sidescan sonar was launched and sonar mapping was carried out from 17:40 to **07:22 on March 21st** . After taking a CTD and box grab at NOAH-E (until 08:09), RV ALKOR cruised to Station NOAH-F for another CTD and box grab (13:07 – 13:16). We then started the transit to the main working area in the northwestern tip of the German EEZ ("Entenschnabel"), where ALKOR arrived on **March 22nd at 06:55**. The Klein System 4000 sidescan sonar was launched and we surveyed until **March 24th 15:56**. Bad weather conditions (storm 8-9 Bft., waves > 4m) forced us to stop survey operations, pick up the sidescan sonar and to stand-by until **07:26 on March 26th 2019**. A test of the Klein System 4000 sidescan sonar revealed, that there was no connection between the deck-unit and the towfish. The single conductor cable (W5) of RV ALKOR was replaced by an own towcable and the system was working without any problems. We started to survey in the "Entenschnabel" area on **March 26th at 07:31**. The towfish remained in the water until **14:19 on March 31st** .The ground truthing by box grab and underwater video of the area started between 14:48 and 15:58 (1 CTD, 1 video transect, 2 box grabs). Between 16:23 and **April 1st 06:05** additional lines were surveyed by sidescan sonar. The ground truthing continued between 06:14 and 15:44 on April 1st (7 box grabs, 8 video transects). Between 15:44 and **April 2nd 05:58** the sidescan sonar was used for additional lines, before starting ground truthing until 15:44 (2 box grabs, 2 video transects, 14 Shipek Grabs). The night was again used for additional sidescan sonar lines. On **April 3rd** (06:09 to 06:18) a CTD and Box grab for biogeochemical analyses were retrieved at station NOAH I and NOAH H (12:33 to 12:48). RV ALKOR headed back to Cuxhaven, where the vessel moored on **April 4th** at **10:25**. After unloading the scientific equipment, the scientific party left the vessel at **12:00 on April 4th** and ALKOR cruise 520-2 ended.

5 Preliminary Results

5.1 Hydroacoustics

(P. Holler, I. Bruns)

5.1.1 System Overview and Data Processing

Sidescan Sonar

The hydro-acoustic surveys were carried out with a KLEIN 4000 sidescan sonar (fig. 5.1). The dual-frequency system (100 kHz and 400 kHz) emits simultaneously signals to both sides of the towfish and receives the backscatter from the seafloor. The range was set to 75 m (research area NOAH-E) and 200 m (research area "Entenschnabel"), which results in a swath of 150 m and 400 m (see table 3 in appendix). NOAH-E was mapped with 50 % overlap and "Entenschnabel" without overlap but 100 % coverage (space between transects 100 m and 400 m). The software SonarPro 14.1 was used for recording the data in SDF-format (SonarPro's own format) and Extended Triton Format (XTF). A Tritech SeaKing Sidescan sonar (330 kHz) was tested (Fig. 5.) on additional lines during the last part of the survey. For post-processing and generating the SSS-mosaic SonarWiz 7.04 was used.

Figure 5 .1: Towfish of the Klein System 4000 sidescan sonar. The tranducers are mounted at both sides of the towfish.

The processing steps to enhance the raw-data included bottom-tracking, empirical gain normalization (EGN), de-striping and nadir-filtering. A preliminary mosaic was created onboard in order to determine the sampling and video locations for ground-truthing.

Underwater Video Camera

Underwater videos were recorded using a *Kongsberg Simrad OE 1366* camera with analogue

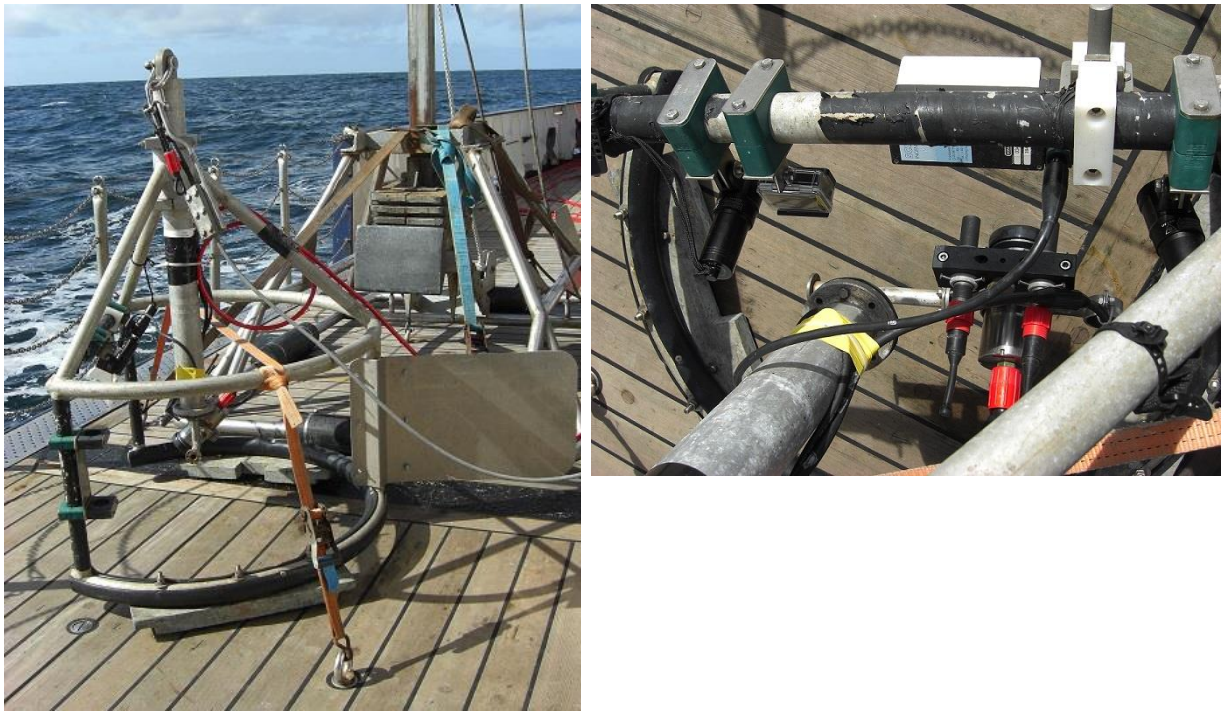

Figure 5.2: Camera frame (left) and mounting of the cameras and lights (right).

real-time transmission on deck. In addition, a digital *GoPro Hero 4+* camera was mounted on the camera frame. The data were saved in MPG format. Both cameras were mounted to a video frame, which was towed behind the ship while drifting (fig. 5.2).

Further ground-truthing was carried out by Reineck-Boxcorer (KG) and Shipek-Grab (ShG) for surface sediment sampling (Abb. 5.3).

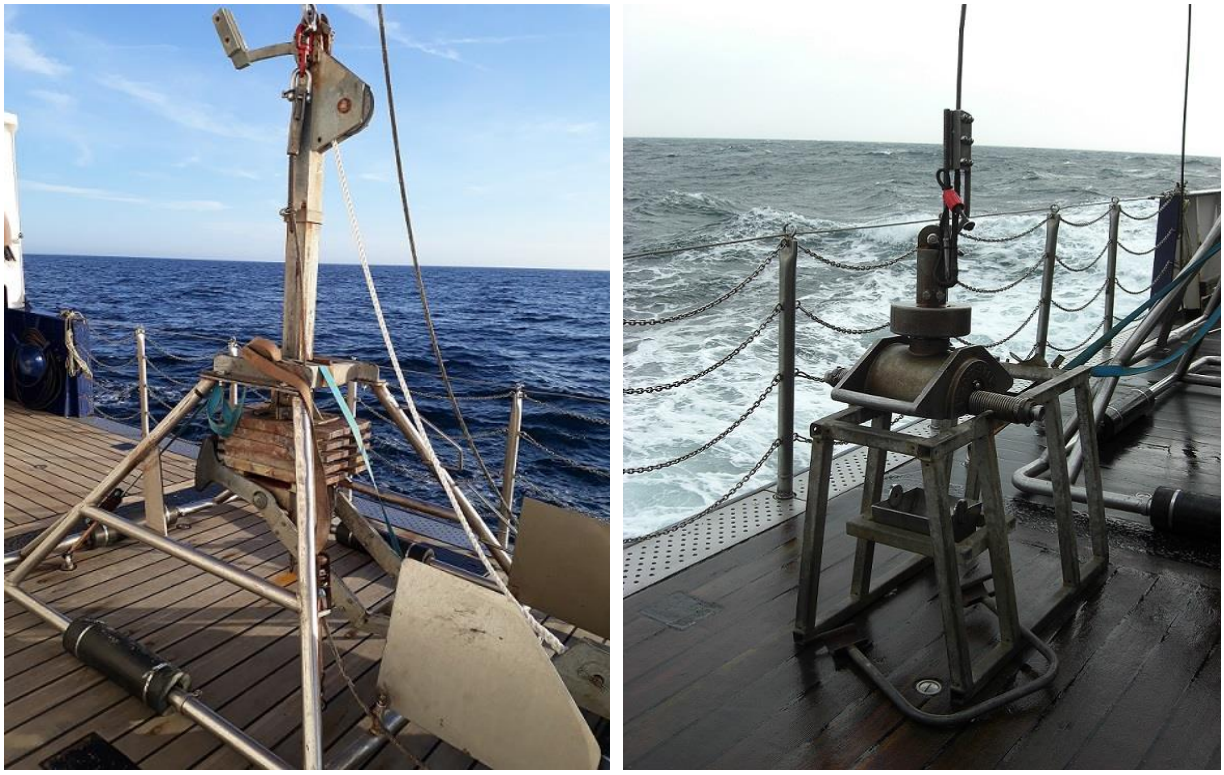

Figure 5.3: Reineck-Boxcorer (left) and Shipek-Grab (right)

5.1.2 Preliminary Results

On the way to the "Entenschnabel" survey area, we mapped a part of the NOAH-E box by sidescan sonar. In this area pockmarks were discovered in 2015 (Krämer, et al., 2017). A sidescan mosaic from 2017 (Fig. 5.4) shows still a large number of pockmarks on the seafloor. During AL520/2 the same area was mapped and no indications for pockmarks were found on the seafloor (Fig.5.5). This implies, that no more gas was seeping out of the seafloor and the existing pockmarks were levelled out by sediment dynamics in this area. However, it is strongly recommended to re-survey the area during future cruises in order to monitor the fate of the former pockmark area.

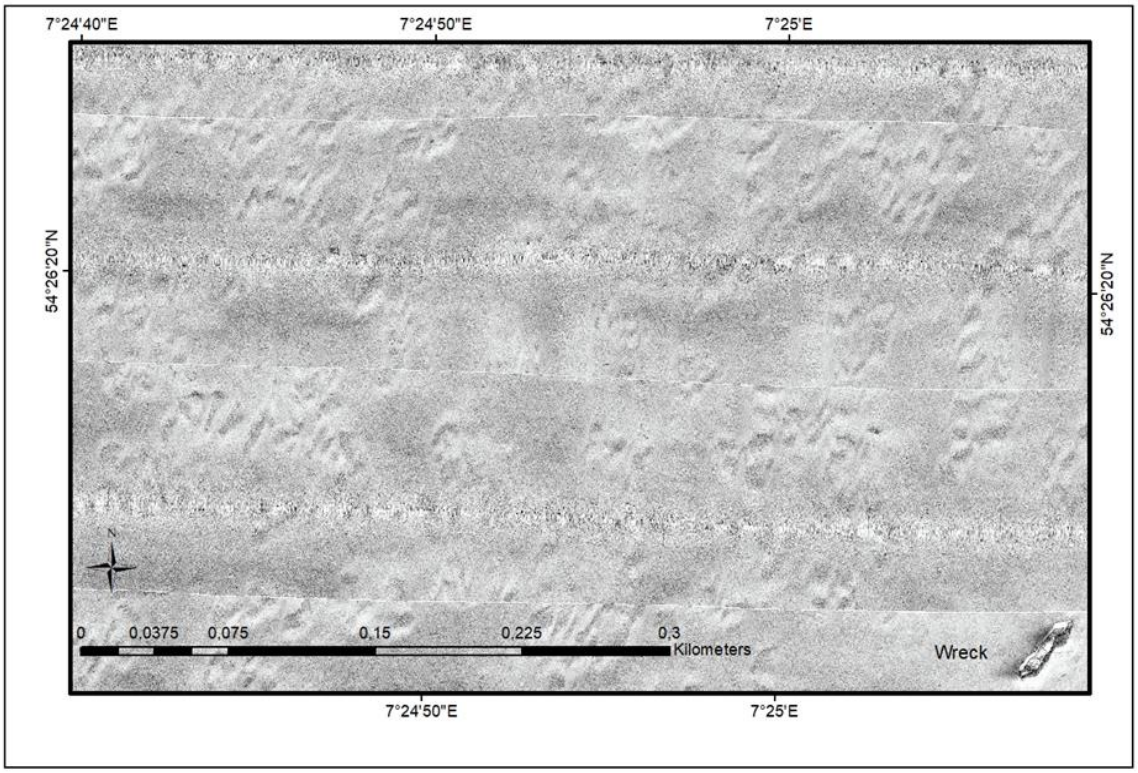

Figure 5.4: Sidescan sonar mosaic (August 2017) of part of NOAH-E box, showing pockmarks on the seafloor.

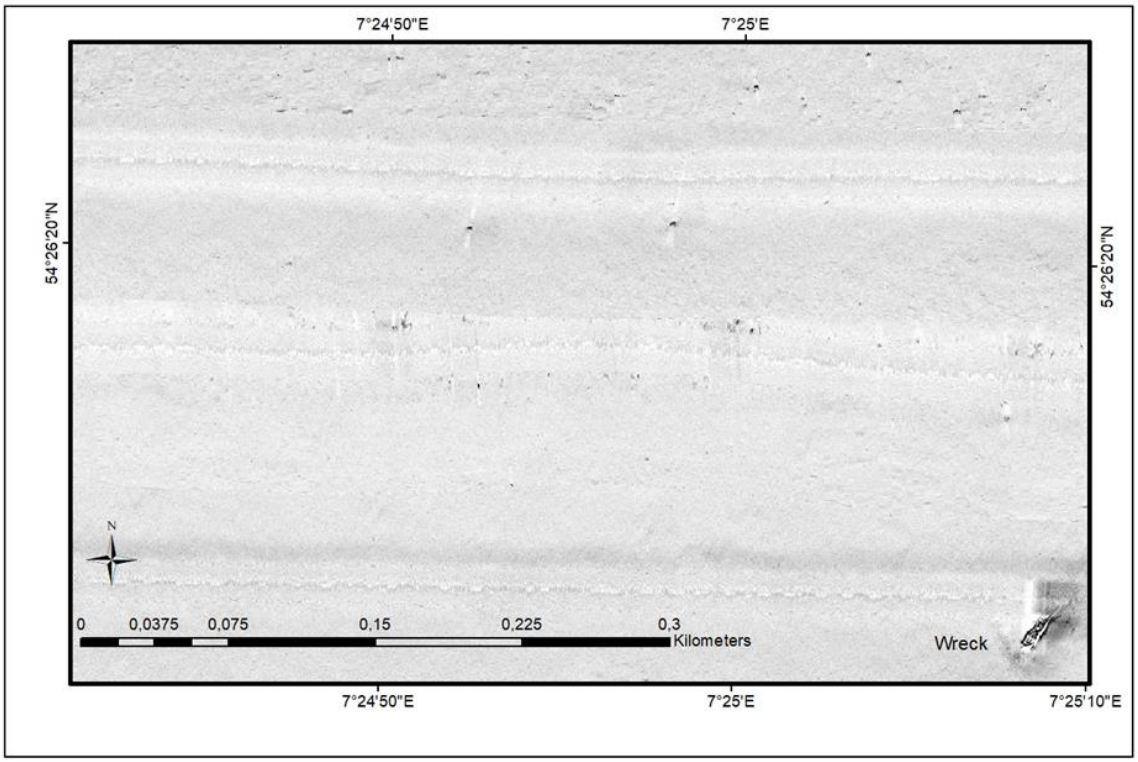

Figure 5.5: Sidescan sonar mosaic (March 2019) of part of NOAH-E box, showing a homogeneous seafloor

The main survey area was located in the "Entenschnabel" region of the German EEZ. The sidescan mosaic of this area (Fig.5.6) shows variations in backscatter from low backscatter to strong backscatter.

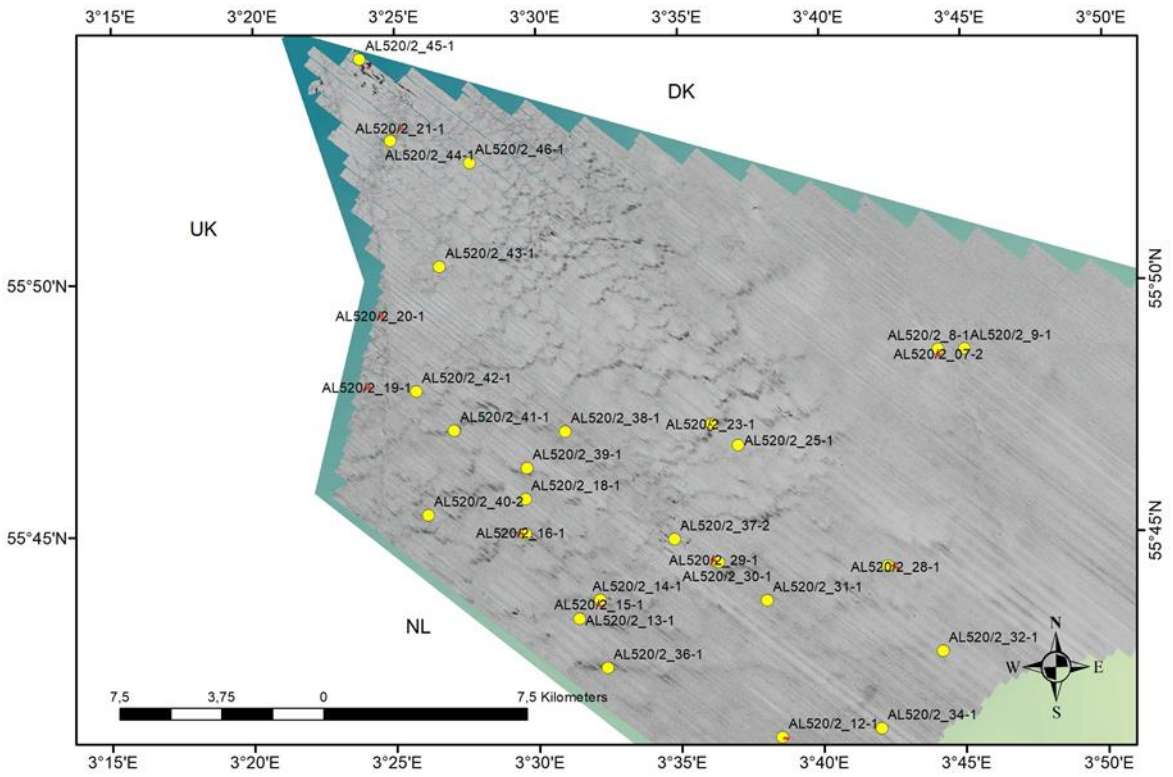

Figure 5.6: Sidescan sonar mosaic of the whole "Entenschnabel" survey area. The backscatter intensity varies from low (light grey) to strong backscattering (dark grey). The yellow dots represent sampling stations, red lines video transects.

A more detailed view of the backscatter characteristics within the area is shown in Figures 5.7 to 5.9. Figure 5.7 is located in the upper northwest corner of the survey area. Here strong backscatter is shown as dark grey-tones. Based on the grab sample and video transect, the strong backscattering is related to gravel and shell debris, whereas the low backscatter is relates to finer sandy sediments.

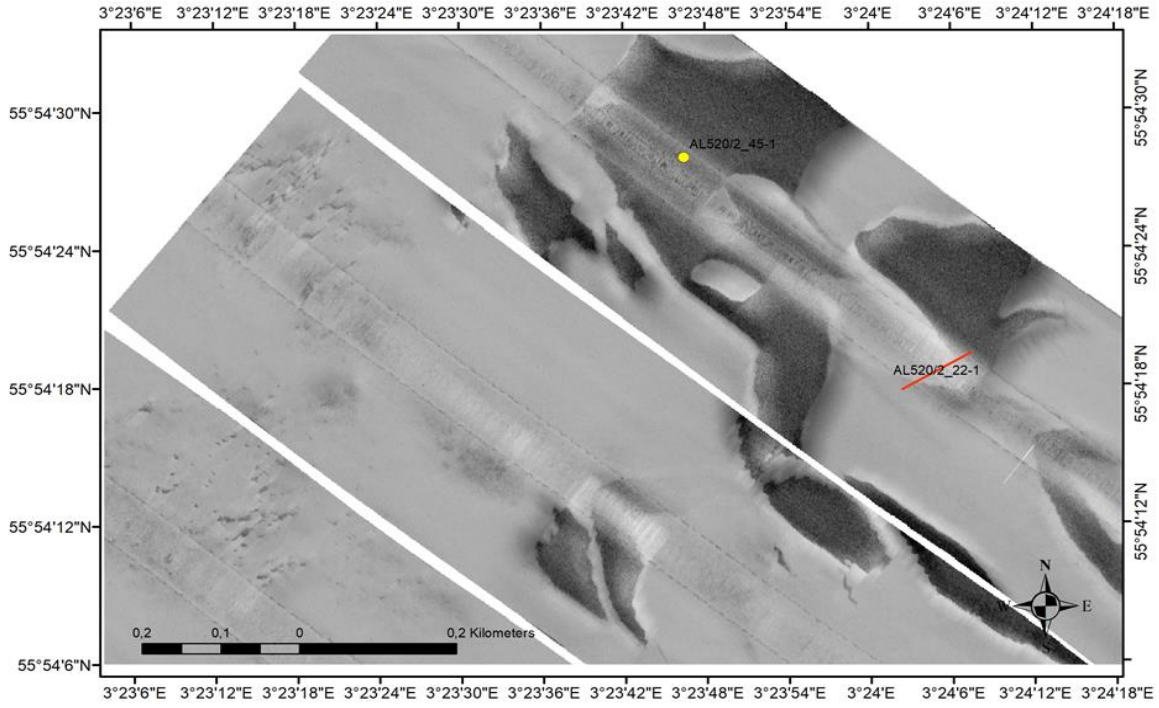

Figure 5.7: Sidescan sonar mosaic of the "Entenschnabel" area. The dark areas are characterized by strong backscattering. The yellow dot represents a sampling station, the red line a video transects.

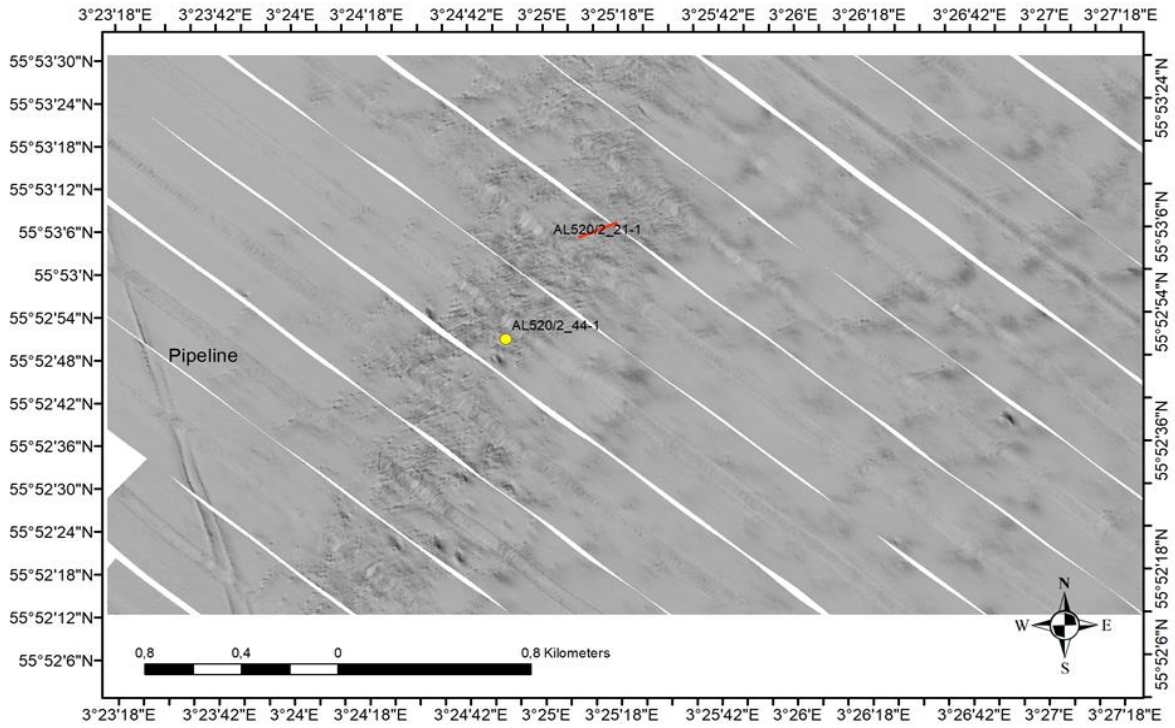

Figure 5.8: Sidescan sonar mosaic of the "Entenschnabel" area. The backscatter intensity shows a higher value in the centre of Fig.5.8 and along southwest-northeast trending bands. The yellow dot represents a sampling station, the red lines a video transect.

The sidescan sonar mosaic of Fig. 5.8 shows a slightly higher backscatter in the central part and roughly southwest-northeast trending bands of higher backscatter. The higher backscatter is created by rougher seafloor caused by shell debris on the seafloor as seen in the underwater video.

In Figure 5.9 parallel trawl marks are visible in areas of higher backscatter. Based on the geometry of the trawl marks, beam-trawls most probably generated these marks on the seafloor. The higher backscatter of this area is caused by a high amount of shell debris on the seafloor, as verified by underwater video. The areas characterized by a weaker backscatter are composed by of finer sandy sediments.

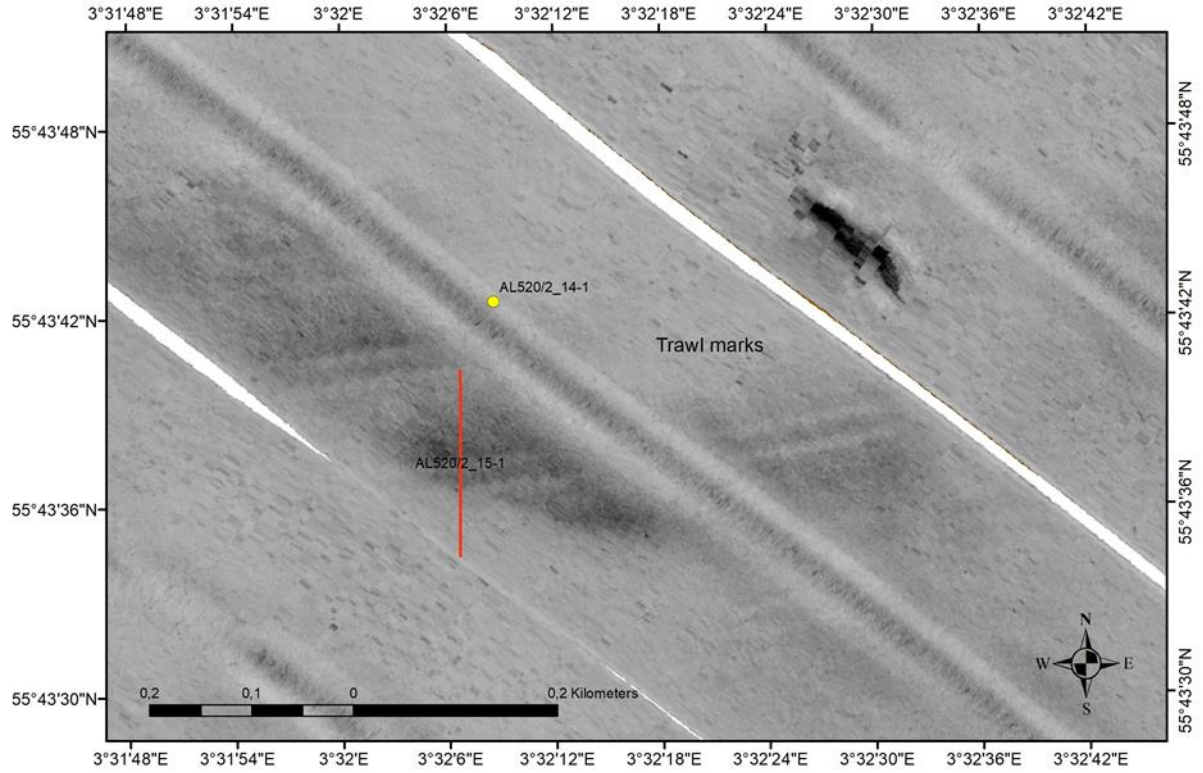

Figure 5.9: Sidescan sonar mosaic of the "Entenschnabel" area. Trawl marks caused by beam trawls are visible in an area of higher backscattering. The yellow dot represents a sampling station, the red line a video transect.

The fact that no trawl marks in the finer sediments are visible may be explained by an increased sediment dynamics caused by currents

5.1.3 Ground Truthing

Ground truthing was carried out by underwater video tows and sediment samples taken by Reineck box corer and Shipek grab. The locations for ground trothing were selected onboard from a preliminary sidescan sonar mosaic in order to minimize the amount of samples. The samples were photographed and described immediately after retrieval from the seafloor. On the box cores shear tests using a hand-held pocket vane, a laboratory vane shear test device and a pocket penetrometer were carried out.
Table 5.1 summarizes the sample descriptions

ALKOR Station	SAM_Sample Number	Primary Component	Secondary Component	Shell Content
AL520/2_8-1	AL520_02_10KG	fine sand	medium sand	ca. 10 %
AL520/2_9-1	AL520_02_11KG	fine sand	gravel	top ca. 10 %, bottom ca. 20 %
AL520/2_12-1	AL520_02_13KG	fine sand	mud	ca. 10 %
AL520/2_13-1	AL520_02_14KG	fine sand		top < 10%, bottom ca. 15 %
AL520/2_14-1	AL520_02_15KG	fine sand	medium sand	5-10 %
AL520/2_17-1	AL520_02_18KG	fine sand	gravel	ca. 20 %
AL520/2_18-1	AL520_02_19KG	fine sand	mud	ca. 10 %
AL520/2_24-1	AL520_02_25KG	fine sand	gravel	10-15%
AL520/2_25-1	AL520_02_26KG	fine sand		< 10 %
AL520/2_27-1	AL520_02_27KG	fine sand	mud	< 10 %
AL520/2_30-1	AL520_02_30KG	fine sand		ca. 5 %
AL520/2_31-1	AL520_03_31KG	fine sand		ca. 5 %
AL520/2_32-1	AL520_02_32SG	fine sand	medium sand	ca. 5 %
AL520/2_34-1	AL520_02_34SG	fine sand	medium sand	< 5 %
AL520/2_35-1	AL520_02_35SG	fine sand		< 5 %
AL520/2_36-1	AL520_02_36SG	fine sand	mud	< 5 %
AL520/2_37-2	AL520_02_37SG	fine sand		ca. 5 %
AL520/2_38-1	AL520_02_39SG	fine sand	mud	< 5 %
AL520/2_39-1	AL520_02_41SG	fine sand	mud	< 5 %
AL520/2_40-2	AL520_02_42SG	fine sand	mud	< 5 %
AL520/2_41-1	AL520_02_43SG	fine sand		ca. 15 %
AL520/2_42-1	AL520_02_44SG	fine sand		ca. 10 %
AL520/2_43-1	AL520_02_45SG	fine sand		< 5 %
AL520/2_44-1	AL520_02_47SG	fine sand	mud	< 5 %
AL520/2_45-1	AL520_02_48SG	gravel	fine sand	ca. 40 %
AL520/2_46-1	AL520_02_49SG	fine sand	mud	< 5 %

Table 5.1: Summary of sediment sample descriptions

The dominant sediment type in the survey area “Entenschnabel” is fine sand. Mud, medium sand and gravel were found as secondary components. One sample from a strong sidescan sonar backscatter area was composed of gravel (Fig.5.10). The amount of shells varies between <5% and ca.40%. However, these estimates are preliminary and more exact values will be available after grain-size analyses.

Figure 5.10: Photos of sediment samples. Most sediments consist primarily of fine sand with varying amounts of mud, medium sand, and gravel. One sample (lower right) mainly consists of gravel. The amount of shells varies between <5% and ca. 40%.

The results of the shear strength measurements (Table 5.2) show partly a good agreement between the hand held pocket vane test and the laboratory vane test. Shear strength varies between ca. 3.2 and 9 kPa. The pocket penetrometer could not be used successfully. A further evaluation of these measurements will be carried out after completion of grain-size analyses.

ALKOR Station	**SAM Sample Number**	**shear strength τ [kPa]** pocket vane test	shear vane test	pocket penetrometer (compressive strength Δσf ~ τ)	**remarks**
AL520/2_8-1	AL520_02_10KG	8,30	8,58	no push in possible	
AL520/2_9-1	AL520_02_11KG	9,00	6,78	470,88	
AL520/2_12-1	AL520_02_13KG	6,45	6,78	no push in possible	
AL520/2_13-1	AL520_02_14KG	3,75	6,78	no push in possible	
AL520/2_14-1	AL520_02_15KG	5,25	6,32	no push in possible	
AL520/2_17-1	AL520_02_18KG	3,88	0,00	no push in possible	high shell content
AL520/2_18-1	AL520_02_19KG	4,88	6,78	no push in possible	
AL520/2_24-1	AL520_02_25KG	3,28	0,00	no push in possible	high shell content
AL520/2_25-1	AL520_02_26KG	4,88	0,00	no push in possible	high shell content
AL520/2_26-1	AL520_02_27KG	4,13	6,10	no push in possible	
AL520/2_29-1	AL520_02_30KG	5,38	6,78	no push in possible	
AL520/2_30-1	AL520_02_31KG	6,50	6,10	no push in possible	

Table 5.2 :Results of shear strength measurements on box core samples.

5.2 Biogeochemistry at NOAH sites

(Andreas Neumann)

The sediment at five NOAH sites was sampled and incubated successfully (Tab. 5.3). As a very first result, measured benthic respiration rates were in the range of 1.5 to 12.2 mmol O_2 m^{-2} d^{-1}. These rates are among the lowest respiration rates observed so far and mark the minimum of benthic activity at the transition from late winter into early spring. Samples taken during the incubations will be analyzed for nutrients (ammonium, nitrite, nitrate, phosphate, and silicate) to establish benthic fluxes for these compounds. However, the analyses in the HZG lab are currently not completed. Analogously unfinished is the analysis of samples that were taken for the measurement of tracers for bioirrigation and bioturbation. The same applies to the sediment samples.

ALKOR Station	NOAH site	Latitude	Longitude	Samples and Measurements
1	D	54.093833	7.351492	CTD, core incubation
3	E	54.43689	7.457683	CTD, core incubation
4	F	54.465062	6.19372	CTD, core incubation
7		55.808643	3.736817	CTD
33		55.711467	3.737807	porosity, permeability
37		55.74837	3.57955	porosity, permeability
38		55.784387	3.515928	porosity, permeability
43		55.839218	3.443027	porosity, permeability
46		55.873213	3.460403	porosity, permeability
49	I	55.505605	4.172313	CTD, core incubation
50	H	54.827543	5.579997	CTD, core incubation

Table. 5.3: Summary of sampled stations during cruise AL520/2

For a basic characterization of the water column, salinity, temperature, and irradiance were measured by CTD casts (Fig. 5.11). The measured water column salinities ranged from 32.4 PSU in coastal waters (AL520/2-1) to 35.1 PSU farther offshore (AL520/2-7). The corresponding water temperatures ranged from 6.2° C (AL520/2-1) to 7° C (AL520/2-7). The light penetration depth where irradiance dipped below 1 µE ranged from 17 m (AL520/2-1) in rather turbid, coastal water to 42 m in clearer offshore water (AL520/2-7).

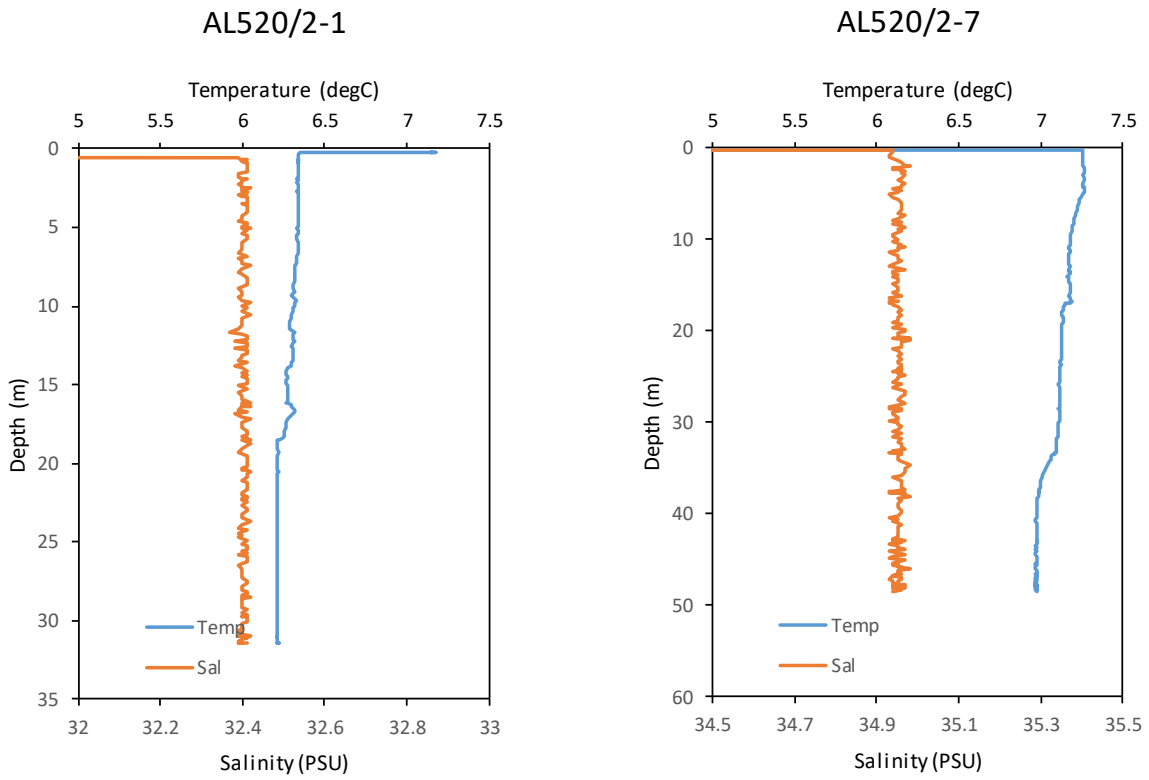

Figure 5.11: Salinity and temperature at two stations during cruise AL520/2.

The results of measurements and sample analyses will add to the observation of the seasonal and spatial variability of sediment characteristics and ecosystem functions at the NOAH sites. A couple of earlier attempts failed to sample these sites in March, which is expected to represent a period of minimal benthic activity. The preliminary respiration rates confirm this assumption and hence the results of the cruise AL520/2 will close a remaining gap in observations.

6 Station List AL520-2

6.1 Overall Station List

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
ALKOR	SaM	2019		[UTC]	[°N]	[°E]	[m]	
AL520/2_1-1	AL520_2_01_CTD	20.03	CTD	15:17	54° 05.648' N	007° 21.080' E	36.1	NOAH-D
AL520/2_1-2	AL520_2_02_KG	20.03	KG	15:23	54° 05.621' N	007° 21.092' E	36.2	NOAH-D
AL520/2_2-1		20.03	SSS	17:34	54° 26.101' N	007° 20.756' E	30.2	SSS NOAH-E
AL520/2_3-1	AL520_2_03_CTD	21.03	CTD	07:53	54° 26.213' N	007° 27.461' E	27.6	NOAH-E
AL520/2_3-2	AL520_2_04_KG	21.03	KG	07:59	54° 26.132' N	007° 27.633' E	27.6	NOAH-E
AL520/2_3-3	AL520_2_05_KG	21.03	KG	08:06	54° 26.091' N	007° 27.742' E	26.8	NOAH-E
AL520/2_4-1	AL520_2_06_CTD	21.03	CTD	13:07	54° 27.904' N	006° 11.623' E	41.3	NOAH-F
AL520/2_4-2	AL520_2_07_KG	21.03	KG	13:13	54° 27.914' N	006° 11.665' E	41.1	NOAH-F
AL520/2_5-1		22.03	SSS	06:55	55° 38.019' N	003° 40.570' E	39.2	SSS Entenschnabel
AL520/2_6-1		26.03	SSS	07:26	55° 41.340' N	003° 45.704' E	42.5	SSS Entenschnabel
AL520/2_7-1	AL520_2_08_CTD	31.03	CTD	14:48	55° 48.519' N	003° 44.202' E	52.8	
AL520/2_7-2	AL520_2_09_CAM	31.03	CAM	14:57	55° 48.528' N	003° 44.197' E	49.3	
AL520/2_8-1	AL520_2_10_KG	31.03	KG	15:34	55° 48.627' N	003° 44.108' E	51.5	
AL520/2_9-1	AL520_2_11_KG	31.3	KG	15:54	55° 48.639' N	003° 45.037' E	51.6	
AL520/2_10-1		31.3	SSS	16:23	55° 47.809' N	003° 44.975' E	49.6	SSS Entenschnabel
AL520/2_11-1	AL520_2_12_CAM	010.4	CAM	06:14	55° 40.943' N	003° 38.532' E	46.2	
AL520/2_12-1	AL520_2_13_KG	01.04	KG	06:49	55° 40.952' N	003° 38.514' E	46.2	
AL520/2_13-1	AL520_2_14_KG	01.04	KG	07:38	55° 43.334' N	003° 31.407' E	51.9	
AL520/2_14-1	AL520_2_15_KG	01.04	KG	07:57	55° 43.709' N	003° 32.142' E	50.9	
AL520/2_15-1	AL520_2_16_CAM	01.04	CAM	08:08	55° 43.673' N	003° 32.110' E	51.1	
AL520/2_16-1	AL520_2_17_CAM	01.04	CAM	08:54	55° 45.037' N	003° 29.467' E	54.4	
AL520/2_17-1	AL520_2_18_KG	01:04	KG	09:20	55° 45.031' N	003° 29.530' E	53.6	
AL520/2_18-1	AL520_2_19_KG	01.04	KG	09:48	55° 45.723' N	003° 29.537' E	55.6	
AL520/2_19-1	AL520_2_20_CAM	01.04	CAM	10:32	55° 47.921' N	003° 23.853' E	57.0	
AL520/2_20-1	AL520_2_21_CAM	01.04	CAM	11:20	55° 49.328' N	003° 24.380' E	58.9	
AL520/2_21-1	AL520_2_22_CAM	01.04	CAM	12:18	55° 53.082' N	003° 25.137' E	65.2	
AL520/2_22-1	AL520_2_23_CAM	01.04	CAM	13:01	55° 54.297' N	003° 24.038' E	67.6	
AL520/2_23-1	AL520_2_24_CAM	01.04	CAM	14:35	55° 47.169' N	003° 36.066' E	54.3	
AL520/2_24-1	AL520_2_25_KG	01.04	KG	15.08	55° 47.180' N	003° 36.111' E	54.4	

AL520/2_25-1	AL520_2_26_KG	01.04	KG	15:28	55° 46.758' N	003° 37.036' E	53.9	
AL520/2_26-1		01.04	SSS	15:44	55° 46.606' N	003° 37.497' E	53.4	SSS Entenschnabel
AL520/2_27-1	AL520_2_27_KG	02.04	KG	06:07	55° 44.334' N	003° 42.274' E	47.1	
AL520/2_28-1	AL520_2_28_CAM	02.04	CAM	06:21	55° 44.353' N	003° 42.410' E	46.8	
AL520/2_29-1	AL520_2_29_CAM	02.04	CAM	07:20	55° 44.512' N	003° 36.049' E	51.5	
AL520/2_30-1	AL520_2_30_KG	02.04	KG	07:45	55° 44.441' N	003° 36.318' E	52.1	
AL520/2_31-1	AL520_2_31_KG	02.04	KG	08:07	55° 43.677' N	003° 38.008' E	47.3	
AL520/2_32-1	AL520_2_32_SG	02.04	SG	08:54	55° 42.636' N	003° 44.176' E	45.2	
AL520/2_33-1	AL520_2_33_SG	02.04	SG	08:58	55° 42.645' N	003° 44.238' E	45.7	HZG
AL520/2_34-1	AL520_2_34_SG	02.04	SG	09.24	55° 41.113' N	003° 42.006' E	41.9	
AL520/2_35-1	AL520_2_35_SG	02.04	SG	09:52	55° 39.457' N	003° 39.026' E	42.2	
AL520/2_36-1	AL520_2_36_SG	02.04	SG	10:31	55° 42.363' N	003° 32.387' E	49.5	
AL520/2_37-1		02.04	SG	11:01	55° 44.894' N	003° 34.733' E	52.6	No sample
AL520/2_37-2	AL520_2_37_SG	02.04	SG	11:05	55° 44.902' N	003° 34.773' E	52.6	
AL520/2_37-3	AL520_2_38_SG	02.04	SG	11:09	55° 44.911' N	003° 34.800' E	52.7	HZG
AL520/2_38-1	AL520_2_39_SG	02.04	SG	11:42	55° 47.057' N	003° 30.950' E	55.8	
AL520/2_38-2	AL520_2_40_SG	02.04	SG	11:47	55° 47.048' N	003° 30.972' E	54.6	HZG
AL520/2_39-1	AL520_2_41_SG	02.04	SG	12:05	55° 46.337' N	003° 29.588' E	55.4	
AL520/2_40-1		02.04	SG	12:33	55° 45.405' N	003° 26.110' E	53.5	No sample
AL520/2_40-2	AL520_2_42_SG	02.04	SG	12:36	55° 45.412' N	003° 26.111' E	55.7	
AL520/2_41-1	AL520_2_43_SG	02.04	SG	12:58	55° 47.092' N	003° 27.041' E	55.3	
AL520/2_42-1	AL520_2_44_SG	02.04	SG	13:16	55° 47.866' N	003° 25.710' E	58.1	
AL520/2_43-1	AL520_2_45_SG	02.04	SG	13:42	55° 50.341' N	003° 26.557' E	61.5	
AL520/2_43-2	AL520_2_46_SG	02.04	SG	13:47	55° 50.353' N	003° 26.582' E	60,5	HZG
AL520/2_44-1	AL520_2_47_SG	02.04	SG	14.13	55° 52.845' N	003° 24.847' E	66.1	
AL520/2_45-1	AL520_2_48_SG	02.04	SG	14.36	55° 54.466' N	003° 23.774' E	68.0	
AL520/2_46-1	AL520_2_49_SG	02.04	SG	15:24	55° 52.401' N	003° 27.638' E	62.9	
AL520/2_46-2	AL520_2_50_SG	02.04	SG	15:30	55° 52.387' N	003° 27.607' E	63.3	HZG
AL520/2_47-1		02.04	SSS	15:44	55° 52.266' N	003° 27.669' E	63.0	SSS Dogger Bank
AL520/2_48-1	AL520_2_51_CTD	03.04	CTD	06:09	55° 30.413' N	004° 10.358' E	31.6	NOAH-I
AL520/2_49-1	AL520_2_52_KG	03.04	KG	06.16	55° 30.336' N	004° 10.339' E	32.1	NOAH-I
AL520/2_50-1	AL520_2_53_KG	03.04	KG	12:33	54° 49.653' N	005° 34.800' E	43.6	NOAH-H
AL520/2_50-2	AL520_2_54_CTD	03.04	CTD	12:45	54° 49.675' N	005° 34.839' E	43.8	NOAH-H

6.2 Profile Station List AL520-2

ALKOR Station	SAM Line Name	Start of Line	End of Line	Start Latitude ° N	Start Longitude °E	Range
AL520/2_2-1	sonar_data190320194400	20.03.2019 17:40	20.03.2019 18:25	54.435.612	7.358.217	75
AL520/2_2-1	sonar_data190320192600	20.03.2019 18:25	20.03.2019 18:34	54.435.610	7.465.312	75
AL520/2_2-1	sonar_data190320194300	20.03.2019 18:42	20.03.2019 19:27	54.436.540	7.484.693	75
AL520/2_2-1	sonar_data190320202800	20.03.2019 19:27	20.03.2019 19:39	54.436.558	7.384.180	75
AL520/2_2-1	sonar_data190320204900	20.03.2019 19:48	20.03.2019 20:33	54.437.268	7.358.278	75
AL520/2_2-1	sonar_data190320213400	20.03.2019 20:33	20.03.2019 20:43	54.437.443	7.462.025	75
AL520/2_2-1	sonar_data190320215600	20.03.2019 20:55	20.03.2019 21:40	54.438.368	7.485.122	75
AL520/2_2-1	sonar_data190320224100	20.03.2019 21:40	20.03.2019 21:49	54.438.460	7.379.320	75
AL520/2_2-1	sonar_data190320225700	20.03.2019 21:56	20.03.2019 22:41	54.439.593	7.357.332	75
AL520/2_2-1	sonar_data190320234200	20.03.2019 22:41	20.03.2019 22:55	54.439.248	7.464.365	75
AL520/2_2-1	sonar_data190321000000	20.03.2019 22:59	20.03.2019 23:44	54.440.803	7.494.787	75
AL520/2_2-1	sonar_data190321004500	20.03.2019 23:44	20.03.2019 23:57	54.440.183	7.388.728	75
AL520/2_2-1	sonar_data190321010600	20.03.2019 00:05	20.03.2019 00:50	54.441.068	7.358.530	75
AL520/2_2-1	sonar_data190321015100	20.03.2019 00:50	20.03.2019 00:59	54.441.072	7.464.852	75
AL520/2_2-1	sonar_data190321021100	20.03.2019 01:10	20.03.2019 01:55	54.442.385	7.486.940	75
AL520/2_2-1	sonar_data190321025600	20.03.2019 01:55	20.03.2019 02:04	54.441.947	7.379.782	75
AL520/2_2-1	sonar_data190321031300	20.03.2019 02:12	20.03.2019 02:57	54.443.007	7.358.748	75
AL520/2_2-1	sonar_data190321035800	20.03.2019 02:57	20.03.2019 03:07	54.442.833	7.464.352	75
AL520/2_2-1	sonar_data190321041600	20.03.2019 03:15	20.03.2019 04:00	54.443.708	7.486.695	75
AL520/2_2-1	sonar_data190321050100	20.03.2019 04:00	20.03.2019 04:10	54.443.728	7.381.788	75
AL520/2_2-1	sonar_data190321051900	20.03.2019 04:18	20.03.2019 05:03	54.444.630	7.357.773	75
AL520/2_2-1	sonar_data190321060400	20.03.2019 05:03	20.03.2019 05:13	54.444.588	7.463.762	75
AL520/2_2-1	sonar_data190321062100	20.03.2019 05:20	20.03.2019 06:05	54.445.435	7.486.177	75
AL520/2_2-1	sonar_data190321070600	20.03.2019 06:05	20.03.2019 06:17	54.445.512	7.384.938	75
AL520/2_2-1	sonar_data190321072600	20.03.2019 06:26	20.03.2019 07:10	54.446.328	7.357.363	75
AL520/2_2-1	sonar_data190321081100	20.03.2019 07:10	20.03.2019 07:18	54.446.340	7.466.692	75
AL520/2_5-1	sonar_data190322080600	22.03.2019 07:05	22.03.2019 07:50	55.642.218	3.658.167	200
AL520/2_5-1	sonar_data190322085100	22.03.2019 07:50	22.03.2019 08:35	55.679.088	3.575.443	200
AL520/2_5-1	sonar_data190322093600	22.03.2019 08:35	22.03.2019 09:20	55.715.452	3.492.275	200
AL520/2_5-1	sonar_data190322102100	22.03.2019 09:20	22.03.2019 09:34	55.752.557	3.407.930	200
AL520/2_5-1	sonar_data190322104200	22.03.2019 09:41	22.03.2019 10:26	55.766.693	3.386.368	200
AL520/2_5-1	sonar_data190322112700	22.03.2019 10:26	22.03.2019 11:11	55.727.147	3.476.058	200
AL520/2_5-1	sonar_data190322121200	22.03.2019 11:11	22.03.2019 11:56	55.687.522	3.566.513	200
AL520/2_5-1	sonar_data190322125700	22.03.2019 11:56	22.03.2019 11:58	55.647.935	3.656.597	200
AL520/2_5-1	sonar_data190322130400	22.03.2019 12:03	22.03.2019 12:48	55.650.675	3.661.065	200
AL520/2_5-1	sonar_data190322134900	22.03.2019 12:48	22.03.2019 13:33	55.687.597	3.576.500	200
AL520/2_5-1	sonar_data190322143400	22.03.2019 13:33	22.03.2019 14:18	55.726.347	3.488.673	200
AL520/2_5-1	sonar_data190322151900	22.03.2019 14:18	22.03.2019 14:29	55.764.748	3.401.108	200
AL520/2_5-1	sonar_data190322153500	22.03.2019 14:34	22.03.2019 15:19	55.776.070	3.386.055	200
AL520/2_5-1	sonar_data190322162000	22.03.2019 15:19	22.03.2019 16:04	55.739.153	3.469.575	200
AL520/2_5-1	sonar_data190322170500	22.03.2019 16:04	22.03.2019 16:49	55.702.550	3.552.842	200
AL520/2_5-1	sonar_data190322175000	22.03.2019 16:49	22.03.2019 17:05	55.665.852	3.636.230	200
AL520/2_5-1	sonar_data190322181100	22.03.2019 17:10	22.03.2019 17:55	55.654.857	3.672.472	200
AL520/2_5-1	sonar_data190322185600	22.03.2019 17:55	22.03.2019 18:40	55.690.288	3.591.283	200
AL520/2_5-1	sonar_data190322194100	22.03.2019 18:40	22.03.2019 19:25	55.726.057	3.509.718	200
AL520/2_5-1	sonar_data190322202600	22.03.2019 19:25	22.03.2019 19:47	55.762.458	3.426.815	200
AL520/2_5-1	sonar_data190322205300	22.03.2019 19:52	22.03.2019 20:37	55.783.408	3.390.225	200
AL520/2_5-1	sonar_data190322213800	22.03.2019 20:37	22.03.2019 21:22	55.742.543	3.482.483	200
AL520/2_5-1	sonar_data190322222300	22.03.2019 21:22	22.03.2019 22:07	55.703.267	3.572.192	200
AL520/2_5-1	sonar_data190322230800	22.03.2019 22:07	22.03.2019 22:14	55.662.322	3.665.247	200

AL520/2_5-1	sonar_data190322231900	22.03.2019 22:18	22.03.2019 23:03	55.659.872	3.681.922	200
AL520/2_5-1	sonar_data190323000400	22.03.2019 23:03	22.03.2019 23:48	55.696.632	3.597.508	200
AL520/2_5-1	sonar_data190323004900	22.03.2019 23:48	23.03.2019 00:33	55.734.405	3.511.460	200
AL520/2_5-1	sonar_data190323013400	23.03.2019 00:33	23.03.2019 00:51	55.772.513	3.424.533	200
AL520/2_5-1	sonar_data190323015700	23.03.2019 00:56	23.03.2019 01:41	55.791.128	3.392.635	200
AL520/2_5-1	sonar_data190323024200	23.03.2019 01:41	23.03.2019 02:26	55.752.912	3.479.528	200
AL520/2_5-1	sonar_data190323032700	23.03.2019 02:26	23.03.2019 03:11	55.714.298	3.567.368	200
AL520/2_5-1	sonar_data190323041200	23.03.2019 03:11	23.03.2019 03:27	55.674.817	3.657.213	200
AL520/2_5-1	sonar_data190323043300	23.03.2019 03:32	23.03.2019 04:17	55.664.183	3.692.402	200
AL520/2_5-1	sonar_data190323051800	23.03.2019 04:17	23.03.2019 05:02	55.701.598	3.606.807	200
AL520/2_5-1	sonar_data190323060300	23.03.2019 05:02	23.03.2019 05:47	55.738.142	3.523.555	200
AL520/2_5-1	sonar_data190323064800	23.03.2019 05:47	23.03.2019 06:19	55.771.983	3.446.408	200
AL520/2_5-1	sonar_data190323072500	23.03.2019 06:24	23.03.2019 07:09	55.799.455	3.394.238	200
AL520/2_5-1	sonar_data190323081000	23.03.2019 07:09	23.03.2019 07:54	55.760.685	3.482.538	200
AL520/2_5-1	sonar_data190323085500	23.03.2019 07:54	23.03.2019 08:39	55.724.270	3.565.588	200
AL520/2_5-1	sonar_data190323094000	23.03.2019 08:39	23.03.2019 09:02	55.686.028	3.652.628	200
AL520/2_5-1	sonar_data190323101000	23.03.2019 09:08	23.03.2019 09:53	55.669.302	3.701.472	200
AL520/2_5-1	sonar_data190323105500	23.03.2019 09:53	23.03.2019 10:38	55.705.525	3.618.750	200
AL520/2_5-1	sonar_data190323114000	23.03.2019 10:38	23.03.2019 11:23	55.742.837	3.533.837	200
AL520/2_5-1	sonar_data190323122500	23.03.2019 11:23	23.03.2019 11:47	55.783.360	3.441.293	200
AL520/2_5-1	sonar_data190323125200	23.03.2019 11:51	23.03.2019 12:36	55.807.022	3.397.712	200
AL520/2_5-1	sonar_data190323133700	23.03.2019 12:36	23.03.2019 13:21	55.766.823	3.489.225	200
AL520/2_5-1	sonar_data190323142200	23.03.2019 13:21	23.03.2019 14:06	55.726.862	3.580.352	200
AL520/2_5-1	sonar_data190323150700	23.03.2019 14:06	23.03.2019 14:28	55.688.283	3.668.232	200
AL520/2_5-1	sonar_data190323153300	23.03.2019 14:32	23.03.2019 15:17	55.673.028	3.713.452	200
AL520/2_5-1	sonar_data190323161800	23.03.2019 15:17	23.03.2019 16:02	55.710.293	3.628.512	200
AL520/2_5-1	sonar_data190323170300	23.03.2019 16:02	23.03.2019 16:47	55.746.112	3.546.792	200
AL520/2_5-1	sonar_data190323174800	23.03.2019 16:47	23.03.2019 17:23	55.781.477	3.466.317	200
AL520/2_5-1	sonar_data190323182800	23.03.2019 17:27	23.03.2019 18:12	55.814.255	3.402.263	200
AL520/2_5-1	sonar_data190323191300	23.03.2019 18:12	23.03.2019 18:57	55.774.902	3.491.738	200
AL520/2_5-1	sonar_data190323195800	23.03.2019 18:57	23.03.2019 19:42	55.737.300	3.577.445	200
AL520/2_5-1	sonar_data190323204300	23.03.2019 19:42	23.03.2019 20:11	55.700.680	3.660.728	200
AL520/2_5-1	sonar_data190323211800	23.03.2019 20:17	23.03.2019 21:02	55.677.520	3.724.027	200
AL520/2_5-1	sonar_data190323220300	23.03.2019 21:02	23.03.2019 21:47	55.714.375	3.639.935	200
AL520/2_5-1	sonar_data190323224800	23.03.2019 21:47	23.03.2019 22:32	55.752.122	3.553.980	200
AL520/2_5-1	sonar_data190323233300	23.03.2019 22:32	23.03.2019 23:06	55.790.217	3.467.248	200
AL520/2_5-1	sonar_data190324001200	23.03.2019 23:11	23.03.2019 23:56	55.822.222	3.404.962	200
AL520/2_5-1	sonar_data190324005700	23.03.2019 23:56	24.03.2019 00:41	55.783.222	3.493.507	200
AL520/2_5-1	sonar_data190324014200	24.03.2019 00:41	24.03.2019 01:26	55.744.503	3.581.623	200
AL520/2_5-1	sonar_data190324022700	24.03.2019 01:26	24.03.2019 01:59	55.706.483	3.668.092	200
AL520/2_5-1	sonar_data190324030300	24.03.2019 02:02	24.03.2019 02:02	55.682.713	3.732.963	200
AL520/2_5-1	sonar_data190324030301	24.03.2019 02:02	24.03.2019 02:47	55.682.788	3.732.803	200
AL520/2_5-1	sonar_data190324034800	24.03.2019 02:47	24.03.2019 03:32	55.721.395	3.644.498	200
AL520/2_5-1	sonar_data190324043300	24.03.2019 03:32	24.03.2019 04:17	55.758.782	3.559.248	200
AL520/2_5-1	sonar_data190324051800	24.03.2019 04:17	24.03.2019 04:58	55.795.823	3.475.055	200
AL520/2_5-1	sonar_data190324060300	24.03.2019 05:02	24.03.2019 05:47	55.829.555	3.408.818	200
AL520/2_5-1	sonar_data190324064800	24.03.2019 05:47	24.03.2019 06:32	55.790.483	3.497.532	200
AL520/2_5-1	sonar_data190324073300	24.03.2019 06:32	24.03.2019 07:17	55.750.687	3.588.178	200
AL520/2_5-1	sonar_data190324081800	24.03.2019 07:17	24.03.2019 07:49	55.711.332	3.677.787	200
AL520/2_5-1	sonar_data190324085600	24.03.2019 07:54	24.03.2019 08:39	55.687.858	3.742.317	200
AL520/2_5-1	sonar_data190324094100	24.03.2019 08:39	24.03.2019 09:24	55.725.352	3.655.955	200
AL520/2_5-1	sonar_data190324102600	24.03.2019 09:25	24.03.2019 10:10	55.762.495	3.571.767	200
AL520/2_5-1	sonar_data190324111100	24.03.2019 10:10	24.03.2019 10:51	55.799.985	3.486.290	200
AL520/2_5-1	sonar_data190324115700	24.03.2019 10:56	24.03.2019 11:41	55.838.028	3.410.523	200

AL520/2_5-1	sonar_data190324124200	24.03.2019 11:41	24.03.2019 12:26	55.797.617	3.501.710	200
AL520/2_5-1	sonar_data190324132700	24.03.2019 12:26	24.03.2019 13:11	55.758.117	3.591.827	200
AL520/2_5-1	sonar_data190324141200	24.03.2019 13:11	24.03.2019 13:45	55.718.563	3.682.032	200
AL520/2_5-1	sonar_data190324145100	24.03.2019 13:50	24.03.2019 14:35	55.690.767	3.757.043	200
AL520/2_5-1	sonar_data190324153600	24.03.2019 14:35	24.03.2019 15:20	55.727.330	3.672.598	200
AL520/2_5-1	sonar_data190324162100	24.03.2019 15:20	24.03.2019 15:48	55.765.698	3.585.035	200
AL520/2_6-1	sonar_data190326083100	26.03.2019 07:29	26.03.2019 08:14	55.803.477	3.499.045	200
AL520/2_6-1	sonar_data190326091600	26.03.2019 08:14	26.03.2019 08:59	55.843.915	3.406.690	200
AL520/2_6-1	sonar_data190326100100	26.03.2019 08:59	26.03.2019 09:44	55.850.245	3.403.393	200
AL520/2_6-1	sonar_data190326104600	26.03.2019 09:44	26.03.2019 10:29	55.813.093	3.487.548	200
AL520/2_6-1	sonar_data190326113100	26.03.2019 10:29	26.03.2019 10:33	55.774.608	3.575.242	200
AL520/2_6-1	sonar_data190326114000	26.03.2019 10:38	26.03.2019 11:23	55.737.177	3.660.588	200
AL520/2_6-1	sonar_data190326122500	26.03.2019 11:23	26.03.2019 12:08	55.699.813	3.745.485	200
AL520/2_6-1	sonar_data190326131000	26.03.2019 12:08	26.03.2019 12:53	55.696.532	3.763.587	200
AL520/2_6-1	sonar_data190326135500	26.03.2019 12:53	26.03.2019 13:38	55.734.488	3.676.720	200
AL520/2_6-1	sonar_data190326144000	26.03.2019 13:38	26.03.2019 13:45	55.772.428	3.590.290	200
AL520/2_6-1	sonar_data190326145200	26.03.2019 13:50	26.03.2019 14:35	55.809.772	3.505.233	200
AL520/2_6-1	sonar_data190326153700	26.03.2019 14:35	26.03.2019 15:20	55.847.435	3.419.283	200
AL520/2_6-1	sonar_data190326162200	26.03.2019 15:20	26.03.2019 16:05	55.862.420	3.395.862	200
AL520/2_6-1	sonar_data190326170700	26.03.2019 16:05	26.03.2019 16:50	55.824.162	3.483.018	200
AL520/2_6-1	sonar_data190326175200	26.03.2019 16:50	26.03.2019 17:04	55.785.902	3.570.178	200
AL520/2_6-1	sonar_data190326181100	26.03.2019 17:09	26.03.2019 17:54	55.747.305	3.658.053	200
AL520/2_6-1	sonar_data190326185600	26.03.2019 17:54	26.03.2019 18:39	55.708.072	3.747.470	200
AL520/2_6-1	sonar_data190326194100	26.03.2019 18:39	26.03.2019 19:24	55.701.010	3.774.018	200
AL520/2_6-1	sonar_data190326202600	26.03.2019 19:24	26.03.2019 20:09	55.738.737	3.687.993	200
AL520/2_6-1	sonar_data190326211100	26.03.2019 20:09	26.03.2019 20:19	55.775.603	3.603.728	200
AL520/2_6-1	sonar_data190326212700	26.03.2019 20:25	26.03.2019 21:10	55.813.560	3.517.243	200
AL520/2_6-1	sonar_data190326221200	26.03.2019 21:10	26.03.2019 21:55	55.851.113	3.431.552	200
AL520/2_6-1	sonar_data190326225700	26.03.2019 21:55	26.03.2019 22:40	55.874.650	3.388.968	200
AL520/2_6-1	sonar_data190326234200	26.03.2019 22:40	26.03.2019 23:25	55.835.695	3.477.198	200
AL520/2_6-1	sonar_data190327002700	26.03.2019 23:25	26.03.2019 23:49	55.796.898	3.565.863	200
AL520/2_6-1	sonar_data190327005600	26.03.2019 23:54	27.03.2019 00:39	55.759.180	3.651.968	200
AL520/2_6-1	sonar_data190327014100	27.03.2019 00:39	27.03.2019 01:24	55.722.178	3.736.010	200
AL520/2_6-1	sonar_data190327022600	27.03.2019 01:24	27.03.2019 02:09	55.704.698	3.786.128	200
AL520/2_6-1	sonar_data190327031100	27.03.2019 02:09	27.03.2019 02:54	55.743.083	3.698.565	200
AL520/2_6-1	sonar_data190327035600	27.03.2019 02:54	27.03.2019 03:18	55.781.585	3.610.948	200
AL520/2_6-1	sonar_data190327042500	27.03.2019 03:23	27.03.2019 04:08	55.819.580	3.524.392	200
AL520/2_6-1	sonar_data190327051000	27.03.2019 04:08	27.03.2019 04:53	55.857.313	3.438.312	200
AL520/2_6-1	sonar_data190327055500	27.03.2019 04:53	27.03.2019 05:38	55.885.340	3.384.473	200
AL520/2_6-1	sonar_data190327064000	27.03.2019 05:38	27.03.2019 06:23	55.845.083	3.476.572	200
AL520/2_6-1	sonar_data190327072500	27.03.2019 06:23	27.03.2019 06:54	55.806.783	3.563.998	200
AL520/2_6-1	sonar_data190327080200	27.03.2019 07:00	27.03.2019 07:45	55.767.537	3.653.460	200
AL520/2_6-1	sonar_data190327084700	27.03.2019 07:45	27.03.2019 08:30	55.728.007	3.743.347	200
AL520/2_6-1	sonar_data190327093200	27.03.2019 08:30	27.03.2019 09:15	55.706.678	3.802.495	200
AL520/2_6-1	sonar_data190327101700	27.03.2019 09:15	27.03.2019 10:00	55.744.978	3.715.002	200
AL520/2_6-1	sonar_data190327110200	27.03.2019 10:00	27.03.2019 10:28	55.783.523	3.627.220	200
AL520/2_6-1	sonar_data190327113500	27.03.2019 10:33	27.03.2019 11:18	55.821.850	3.539.732	200
AL520/2_6-1	sonar_data190327122000	27.03.2019 11:18	27.03.2019 12:03	55.859.547	3.453.680	200
AL520/2_6-1	sonar_data190327130500	27.03.2019 12:03	27.03.2019 12:48	55.897.227	3.369.400	200
AL520/2_6-1	sonar_data190327135000	27.03.2019 12:48	27.03.2019 13:33	55.898.913	3.374.755	200
AL520/2_6-1	sonar_data190327143500	27.03.2019 13:33	27.03.2019 14:16	55.861.370	3.460.157	200
AL520/2_6-1	sonar_data190327151900	27.03.2019 14:17	27.03.2019 14:20	55.824.890	3.543.370	200
AL520/2_6-1	sonar_data190327152200	27.03.2019 14:20	27.03.2019 15:05	55.788.692	3.625.858	200
AL520/2_6-1	sonar_data190327160700	27.03.2019 15:05	27.03.2019 15:50	55.751.658	3.710.215	200

AL520/2_6-1	sonar_data190327165200	27.03.2019 15:50	27.03.2019 16:35	55.715.528	3.792.295	200
AL520/2_6-1	sonar_data190327173700	27.03.2019 16:35	27.03.2019 17:20	55.708.277	3.819.237	200
AL520/2_6-1	sonar_data190327182200	27.03.2019 17:20	27.03.2019 18:05	55.745.340	3.734.632	200
AL520/2_6-1	sonar_data190327190700	27.03.2019 18:05	27.03.2019 18:18	55.782.422	3.650.378	200
AL520/2_6-1	sonar_data190327192400	27.03.2019 18:23	27.03.2019 19:08	55.818.770	3.567.455	200
AL520/2_6-1	sonar_data190327200900	27.03.2019 19:08	27.03.2019 19:53	55.856.043	3.482.432	200
AL520/2_6-1	sonar_data190327205400	27.03.2019 19:53	27.03.2019 20:38	55.892.418	3.399.407	200
AL520/2_6-1	sonar_data190327213900	27.03.2019 20:38	27.03.2019 21:23	55.910.882	3.368.170	200
AL520/2_6-1	sonar_data190327222400	27.03.2019 21:23	27.03.2019 22:08	55.872.860	3.454.577	200
AL520/2_6-1	sonar_data190327230900	27.03.2019 22:08	27.03.2019 22:27	55.835.238	3.540.455	200
AL520/2_6-1	sonar_data190327233500	27.03.2019 22:33	27.03.2019 23:18	55.797.618	3.626.242	200
AL520/2_6-1	sonar_data190328002000	27.03.2019 23:18	28.03.2019 00:03	55.759.600	3.712.860	200
AL520/2_6-1	sonar_data190328010500	28.03.2019 00:03	28.03.2019 00:48	55.721.332	3.799.900	200
AL520/2_6-1	sonar_data190328015000	28.03.2019 00:48	28.03.2019 01:33	55.710.002	3.836.105	200
AL520/2_6-1	sonar_data190328023500	28.03.2019 01:33	28.03.2019 02:18	55.747.523	3.750.487	200
AL520/2_6-1	sonar_data190328032000	28.03.2019 02:18	28.03.2019 02:34	55.785.555	3.663.818	200
AL520/2_6-1	sonar_data190328034100	28.03.2019 02:39	28.03.2019 03:24	55.823.787	3.576.648	200
AL520/2_6-1	sonar_data190328042600	28.03.2019 03:24	28.03.2019 04:09	55.862.888	3.487.768	200
AL520/2_6-1	sonar_data190328051100	28.03.2019 04:09	28.03.2019 04:54	55.900.853	3.401.100	200
AL520/2_6-1	sonar_data190328055600	28.03.2019 04:54	28.03.2019 05:39	55.909.833	3.391.117	200
AL520/2_6-1	sonar_data190328064100	28.03.2019 05:39	28.03.2019 06:24	55.870.947	3.479.842	200
AL520/2_6-1	sonar_data190328072600	28.03.2019 06:24	28.03.2019 06:32	55.833.035	3.566.347	200
AL520/2_6-1	sonar_data190328073900	28.03.2019 06:37	28.03.2019 07:22	55.794.738	3.653.472	200
AL520/2_6-1	sonar_data190328082400	28.03.2019 07:22	28.03.2019 08:07	55.755.977	3.741.632	200
AL520/2_6-1	sonar_data190328090900	28.03.2019 08:07	28.03.2019 08:52	55.716.683	3.830.847	200
AL520/2_6-1	sonar_data190328095400	28.03.2019 08:52	28.03.2019 09:37	55.712.013	3.852.103	200
AL520/2_6-1	sonar_data190328103900	28.03.2019 09:37	28.03.2019 10:22	55.749.293	3.766.962	200
AL520/2_6-1	sonar_data190328112400	28.03.2019 10:22	28.03.2019 10:31	55.787.023	3.680.988	200
AL520/2_6-1	sonar_data190328113800	28.03.2019 10:36	28.03.2019 11:21	55.824.462	3.595.728	200
AL520/2_6-1	sonar_data190328122300	28.03.2019 11:21	28.03.2019 12:06	55.862.557	3.508.997	200
AL520/2_6-1	sonar_data190328130800	28.03.2019 12:06	28.03.2019 12:51	55.900.917	3.421.595	200
AL520/2_6-1	sonar_data190328135300	28.03.2019 12:51	28.03.2019 13:36	55.903.707	3.426.323	200
AL520/2_6-1	sonar_data190328143800	28.03.2019 13:36	28.03.2019 14:21	55.866.255	3.511.337	200
AL520/2_6-1	sonar_data190328152300	28.03.2019 14:21	28.03.2019 14:22	55.829.210	3.595.580	200
AL520/2_6-1	sonar_data190328152900	28.03.2019 14:28	28.03.2019 15:13	55.792.347	3.679.618	200
AL520/2_6-1	sonar_data190328161400	28.03.2019 15:13	28.03.2019 15:58	55.755.452	3.763.412	200
AL520/2_6-1	sonar_data190328165900	28.03.2019 15:58	28.03.2019 16:43	55.719.243	3.845.565	200
AL520/2_6-1	sonar_data190328174400	28.03.2019 16:43	28.03.2019 17:28	55.713.462	3.869.190	200
AL520/2_6-1	sonar_data190328182900	28.03.2019 17:28	28.03.2019 18:13	55.752.780	3.779.515	200
AL520/2_6-1	sonar_data190328191400	28.03.2019 18:13	28.03.2019 18:23	55.790.918	3.692.858	200
AL520/2_6-1	sonar_data190328193000	28.03.2019 18:29	28.03.2019 19:14	55.827.040	3.610.772	200
AL520/2_6-1	sonar_data190328201500	28.03.2019 19:14	28.03.2019 19:59	55.863.343	3.528.047	200
AL520/2_6-1	sonar_data190328210000	28.03.2019 19:59	28.03.2019 20:44	55.898.747	3.458.887	200
AL520/2_6-1	sonar_data190328214500	28.03.2019 20:44	28.03.2019 21:29	55.860.037	3.546.208	200
AL520/2_6-1	sonar_data190328223000	28.03.2019 21:29	28.03.2019 22:10	55.821.060	3.634.878	200
AL520/2_6-1	sonar_data190328231700	28.03.2019 22:15	28.03.2019 23:00	55.782.153	3.723.223	200
AL520/2_6-1	sonar_data190329000200	28.03.2019 23:00	28.03.2019 23:45	55.743.208	3.811.813	200
AL520/2_6-1	sonar_data190329004700	28.03.2019 23:45	29.03.2019 00:30	55.715.258	3.886.333	200
AL520/2_6-1	sonar_data190329013200	29.03.2019 00:30	29.03.2019 01:15	55.753.710	3.798.142	200
AL520/2_6-1	sonar_data190329021700	29.03.2019 01:15	29.03.2019 01:50	55.791.630	3.711.778	200
AL520/2_6-1	sonar_data190329025700	29.03.2019 01:55	29.03.2019 02:40	55.829.432	3.626.008	200
AL520/2_6-1	sonar_data190329034200	29.03.2019 02:40	29.03.2019 03:25	55.867.985	3.538.435	200
AL520/2_6-1	sonar_data190329042700	29.03.2019 03:25	29.03.2019 04:10	55.892.778	3.492.988	200
AL520/2_6-1	sonar_data190329051200	29.03.2019 04:10	29.03.2019 04:55	55.854.000	3.580.840	200

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AL520/2_6-1	sonar_data190329062800	29.03.2019 05:26	29.03.2019 06:11	55.778.078	3.753.365	200
AL520/2_6-1	sonar_data190329071300	29.03.2019 06:11	29.03.2019 06:56	55.740.035	3.839.710	200
AL520/2_6-1	sonar_data190329075800	29.03.2019 06:56	29.03.2019 07:41	55.716.965	3.902.748	200
AL520/2_6-1	sonar_data190329084300	29.03.2019 07:41	29.03.2019 08:26	55.755.230	3.815.517	200
AL520/2_6-1	sonar_data190329092800	29.03.2019 08:26	29.03.2019 08:56	55.792.442	3.730.875	200
AL520/2_6-1	sonar_data190329100400	29.03.2019 09:02	29.03.2019 09:47	55.831.318	3.642.833	200
AL520/2_6-1	sonar_data190329104900	29.03.2019 09:47	29.03.2019 10:32	55.869.245	3.556.423	200
AL520/2_6-1	sonar_data190329113400	29.03.2019 10:32	29.03.2019 11:17	55.887.037	3.527.317	200
AL520/2_6-1	sonar_data190329121900	29.03.2019 11:17	29.03.2019 12:02	55.847.687	3.616.020	200
AL520/2_6-1	sonar_data190329130400	29.03.2019 12:02	29.03.2019 12:21	55.808.908	3.704.093	200
AL520/2_6-1	sonar_data190329132800	29.03.2019 12:26	29.03.2019 13:11	55.770.523	3.791.195	200
AL520/2_6-1	sonar_data190329141300	29.03.2019 13:11	29.03.2019 13:56	55.732.652	3.877.047	200
AL520/2_6-1	sonar_data190329145800	29.03.2019 13:56	29.03.2019 14:41	55.718.500	3.919.870	200
AL520/2_6-1	sonar_data190329154300	29.03.2019 14:41	29.03.2019 15:26	55.755.662	3.835.173	200
AL520/2_6-1	sonar_data190329162800	29.03.2019 15:26	29.03.2019 15:46	55.792.417	3.751.875	200
AL520/2_6-1	sonar_data190329165300	29.03.2019 15:51	29.03.2019 16:36	55.830.302	3.665.935	200
AL520/2_6-1	sonar_data190329173800	29.03.2019 16:36	29.03.2019 17:21	55.868.577	3.578.893	200
AL520/2_6-1	sonar_data190329182300	29.03.2019 17:21	29.03.2019 18:06	55.881.512	3.560.328	200
AL520/2_6-1	sonar_data190329190800	29.03.2019 18:06	29.03.2019 18:51	55.843.078	3.647.258	200
AL520/2_6-1	sonar_data190329195300	29.03.2019 18:51	29.03.2019 19:03	55.804.710	3.734.273	200
AL520/2_6-1	sonar_data190329201100	29.03.2019 19:09	29.03.2019 19:54	55.766.583	3.820.980	200
AL520/2_6-1	sonar_data190329205600	29.03.2019 19:54	29.03.2019 20:39	55.728.478	3.907.302	200
AL520/2_6-1	sonar_data190329214100	29.03.2019 20:39	29.03.2019 21:24	55.720.333	3.936.310	200
AL520/2_6-1	sonar_data190329222600	29.03.2019 21:24	29.03.2019 22:09	55.758.493	3.849.437	200
AL520/2_6-1	sonar_data190329231100	29.03.2019 22:09	29.03.2019 22:21	55.795.955	3.764.403	200
AL520/2_6-1	sonar_data190329232800	29.03.2019 22:26	29.03.2019 23:11	55.834.212	3.677.663	200
AL520/2_6-1	sonar_data190330001300	29.03.2019 23:11	29.03.2019 23:56	55.873.090	3.589.468	200
AL520/2_6-1	sonar_data190330005800	29.03.2019 23:56	30.03.2019 00:41	55.876.372	3.593.075	200
AL520/2_6-1	sonar_data190330014300	30.03.2019 00:41	30.03.2019 01:26	55.838.520	3.678.683	200
AL520/2_6-1	sonar_data190330022800	30.03.2019 01:26	30.03.2019 01:28	55.799.995	3.765.893	200
AL520/2_6-1	sonar_data190330023400	30.03.2019 01:32	30.03.2019 02:17	55.761.620	3.852.680	200
AL520/2_6-1	sonar_data190330031900	30.03.2019 02:17	30.03.2019 03:02	55.723.398	3.939.317	200
AL520/2_6-1	sonar_data190330040400	30.03.2019 03:02	30.03.2019 03:47	55.721.857	3.953.417	200
AL520/2_6-1	sonar_data190330044900	30.03.2019 03:47	30.03.2019 04:32	55.759.645	3.867.402	200
AL520/2_6-1	sonar_data190330053400	30.03.2019 04:32	30.03.2019 04:38	55.798.122	3.780.233	200
AL520/2_6-1	sonar_data190330054500	30.03.2019 04:43	30.03.2019 05:28	55.836.525	3.693.045	200
AL520/2_6-1	sonar_data190330063000	30.03.2019 05:28	30.03.2019 06:13	55.871.027	3.625.935	200
AL520/2_6-1	sonar_data190330071500	30.03.2019 06:13	30.03.2019 06:58	55.831.997	3.714.137	200
AL520/2_6-1	sonar_data190330080000	30.03.2019 06:58	30.03.2019 07:34	55.793.523	3.801.198	200
AL520/2_6-1	sonar_data190330084200	30.03.2019 07:40	30.03.2019 08:25	55.755.805	3.886.528	200
AL520/2_6-1	sonar_data190330092700	30.03.2019 08:25	30.03.2019 09:10	55.724.048	3.969.012	200
AL520/2_6-1	sonar_data190330101200	30.03.2019 09:10	30.03.2019 09:55	55.761.722	3.883.352	200
AL520/2_6-1	sonar_data190330105700	30.03.2019 09:55	30.03.2019 10:36	55.799.545	3.797.885	200
AL520/2_6-1	sonar_data190330114300	30.03.2019 10:41	30.03.2019 11:26	55.837.632	3.711.342	200
AL520/2_6-1	sonar_data190330122800	30.03.2019 11:26	30.03.2019 12:11	55.865.365	3.659.520	200
AL520/2_6-1	sonar_data190330131300	30.03.2019 12:11	30.03.2019 12:56	55.827.225	3.745.658	200
AL520/2_6-1	sonar_data190330135800	30.03.2019 12:56	30.03.2019 13:27	55.788.732	3.832.885	200
AL520/2_6-1	sonar_data190330143300	30.03.2019 13:32	30.03.2019 14:17	55.749.347	3.922.063	200
AL520/2_6-1	sonar_data190330151800	30.03.2019 14:17	30.03.2019 15:02	55.730.478	3.975.035	200
AL520/2_6-1	sonar_data190330160300	30.03.2019 15:02	30.03.2019 15:47	55.768.648	3.888.378	200
AL520/2_6-1	sonar_data190330164800	30.03.2019 15:47	30.03.2019 16:12	55.807.618	3.800.263	200
AL520/2_6-1	sonar_data190330171800	30.03.2019 16:17	30.03.2019 17:02	55.845.630	3.714.300	200
AL520/2_6-1	sonar_data190330180300	30.03.2019 17:02	30.03.2019 17:47	55.860.298	3.691.765	200

AL520/2_6-1	sonar_data190330184900	30.03.2019 17:47	30.03.2019 18:32	55.822.547	3.777.095	200
AL520/2_6-1	sonar_data190330193400	30.03.2019 18:32	30.03.2019 18:46	55.784.928	3.862.223	200
AL520/2_6-1	sonar_data190330195300	30.03.2019 18:51	30.03.2019 19:36	55.747.308	3.947.322	200
AL520/2_6-1	sonar_data190330203800	30.03.2019 19:36	30.03.2019 20:21	55.738.312	3.977.852	200
AL520/2_6-1	sonar_data190330212300	30.03.2019 20:21	30.03.2019 21:06	55.776.513	3.891.347	200
AL520/2_6-1	sonar_data190330220800	30.03.2019 21:06	30.03.2019 21:20	55.814.355	3.805.683	200
AL520/2_6-1	sonar_data190330222800	30.03.2019 21:26	30.03.2019 22:11	55.854.852	3.724.852	200
AL520/2_6-1	sonar_data190330231300	30.03.2019 22:11	30.03.2019 22:56	55.815.105	3.814.712	200
AL520/2_6-1	sonar_data190330235800	30.03.2019 22:56	30.03.2019 23:40	55.776.183	3.902.775	200
AL520/2_6-1	sonar_data190331004600	30.03.2019 23:44	31.03.2019 00:29	55.745.552	3.982.070	200
AL520/2_6-1	sonar_data190331013100	31.03.2019 00:29	31.03.2019 01:14	55.779.435	3.905.737	200
AL520/2_6-1	sonar_data190331031600	31.03.2019 01:14	31.03.2019 01:53	55.812.282	3.831.472	200
AL520/2_6-1	sonar_data190331040000	31.03.2019 01:58	31.03.2019 01:43	55.849.480	3.757.933	200
AL520/2_6-1	sonar_data190331044500	31.03.2019 01:43	31.03.2019 03:28	55.811.817	3.842.903	200
AL520/2_6-1	sonar_data190331053000	31.03.2019 03:28	31.03.2019 04:13	55.773.603	3.929.167	200
AL520/2_6-1	sonar_data190331061900	31.03.2019 04:17	31.03.2019 05:02	55.753.048	3.985.618	200
AL520/2_6-1	sonar_data190331070400	31.03.2019 05:02	31.03.2019 05:47	55.790.583	3.900.827	200
AL520/2_6-1	sonar_data190331074900	31.03.2019 05:47	31.03.2019 06:14	55.828.310	3.815.752	200
AL520/2_6-1	sonar_data190331082200	31.03.2019 06:20	31.03.2019 07:05	55.844.125	3.790.682	200
AL520/2_6-1	sonar_data190331090700	31.03.2019 07:05	31.03.2019 07:50	55.806.290	3.876.220	200
AL520/2_6-1	sonar_data190331095200	31.03.2019 07:50	31.03.2019 08:05	55.768.457	3.961.327	200
AL520/2_6-1	sonar_data190331101200	31.03.2019 08:10	31.03.2019 08:55	55.760.527	3.989.508	200
AL520/2_6-1	sonar_data190331105700	31.03.2019 08:55	31.03.2019 09:40	55.798.468	3.903.895	200
AL520/2_6-1	sonar_data190331114200	31.03.2019 09:40	31.03.2019 09:53	55.836.095	3.818.760	200
AL520/2_6-1	sonar_data190331120000	31.03.2019 09:58	31.03.2019 10:43	55.838.450	3.824.070	200
AL520/2_6-1	sonar_data190331124500	31.03.2019 10:43	31.03.2019 11:28	55.799.498	3.912.072	200
AL520/2_6-1	sonar_data190331133000	31.03.2019 11:28	31.03.2019 11:28	55.768.225	3.992.833	200
AL520/2_6-1	sonar_data190331133500	31.03.2019 11:33	31.03.2019 12:18	55.808.185	3.902.552	200
AL520/2_6-1	sonar_data190331142000	31.03.2019 12:18	31.03.2019 12:58	55.642.218	3.658.167	200
AL520/2_6-1	sonar_data190331150500	31.03.2019 13:03	31.03.2019 13:48	55.679.088	3.575.443	200
AL520/2_6-1	sonar_data190331155000	31.03.2019 13:48	31.03.2019 14:12	55.715.452	3.492.275	200
AL520/2_10-1	So_31_Mrz_19_02_V4LOG	31.03.2019 19:03	31.03.2019 19:03	55.769.387	3.663.085	150
AL520/2_10-1	So_31_Mrz_19_04_V4LOG	31.03.2019 19:04	31.03.2019 19:56	55.733.662	3.975.848	150
AL520/2_10-1	So_31_Mrz_19_56_V4LOG	31.03.2019 19:56	31.03.2019 20:17	55.709.835	4.114.657	150
AL520/2_10-1	So_31_Mrz_20_17_V4LOG	31.03.2019 20:17	31.03.2019 20:50	55.712.940	4.124.075	150
AL520/2_10-1	So_31_Mrz_20_53_V4LOG	31.03.2019 20:54	31.03.2019 21:25	55.741.850	3.984.200	150
AL520/2_10-1	So_31_Mrz_21_28_V4LOG	31.03.2019 21:29	31.03.2019 22:00	55.720.443	4.136.235	150
AL520/2_10-1	So_31_Mrz_22_03_V4LOG	31.03.2019 22:03	31.03.2019 22:34	55.724.567	4.139.325	150
AL520/2_10-1	So_31_Mrz_22_38_V4LOG	31.03.2019 22:38	31.03.2019 23:08	55.726.987	4.152.803	150
AL520/2_10-1	So_31_Mrz_23_12_V4LOG	31.03.2019 23:12	31.03.2019 23:44	55.759.148	3.993.033	150
AL520/2_10-1	So_31_Mrz_23_49_V4LOG	31.03.2019 23:49	01.04.2019 00:19	55.734.625	4.163.525	150
AL520/2_10-1	Mo_01_Apr_00_23_V4LOG	01.04.2019 00:23	01.04.2019 00:54	55.763.533	3.992.843	150
AL520/2_10-1	Mo_01_Apr_00_58_V4LOG	01.04.2019 00:58	01.04.2019 01:29	55.750.225	3.743.368	150
AL520/2_10-1	Mo_01_Apr_01_33_V4LOG	01.04.2019 01:33	01.04.2019 02:04	55.748.992	3.743.155	150
AL520/2_10-1	Mo_01_Apr_02_08_V4LOG	01.04.2019 02:08	01.04.2019 02:39	55.678.495	3.727.662	150
AL520/2_10-1	Mo_01_Apr_02_42_V4LOG	01.04.2019 02:42	01.04.2019 03:13	55.652.367	3.736.438	150
AL520/2_10-1	Mo_01_Apr_03_17_V4LOG	01.04.2019 03:17	01.04.2019 03:48	55.622.750	3.792.817	150
AL520/2_10-1	Mo_01_Apr_03_51_V4LOG	01.04.2019 03:51	01.04.2019 04:22	55.647.525	3.731.240	150
AL520/2_10-1	Mo_01_Apr_04_26_V4LOG	01.04.2019 04:26	01.04.2019 04:58	55.618.258	3.787.458	150
AL520/2_10-1	Mo_01_Apr_04_58_V4LOG	01.04.2019 04:59	01.04.2019 05:36	55.643.340	3.725.182	150
AL520/2_10-1	Mo_01_Apr_05_36_V4LOG	01.04.2019 05:36	01.04.2019 06:10	55.614.407	3.780.685	150
AL520/2_10-1	Mo_01_Apr_06_14_V4LOG	01.04.2019 06:14	01.04.2019 06:48	55.638.080	3.721.835	150
AL520/2_10-1	Mo_01_Apr_06_51_V4LOG	01.04.2019 06:51	01.04.2019 07:21	55.609.938	3.775.243	150
AL520/2_10-1	Mo_01_Apr_07_21_V4LOG	01.04.2019 07:21	01.04.2019 08:07	55.634.732	3.713.662	150

AL520/2_26-1	Mo_01_Apr_18_04_V4LOG	01.04.2019 18:04	01.04.2019 20:15	55.605.702	3.769.377	150
AL520/2_26-1	Mo_01_Apr_20_15_V4LOG	01.04.2019 20:15	01.04.2019 21:16	55.630.707	3.707.377	150
AL520/2_26-1	Mo_01_Apr_21_16_V4LOG	01.04.2019 21:16	01.04.2019 21:25	55.601.722	3.763.025	150
AL520/2_26-1	Mo_01_Apr_21_25_V4LOG	01.04.2019 21:25	01.04.2019 22:28	55.626.533	3.701.355	150
AL520/2_26-1	Mo_01_Apr_22_34_V4LOG	01.04.2019 22:34	01.04.2019 23:40	55.597.180	3.757.797	150
AL520/2_26-1	Mo_01_Apr_23_44_V4LOG	01.04.2019 23:45	02.04.2019 00:23	55.622.330	3.695.522	150
AL520/2_26-1	Di_02_Apr_01_57_V4LOG	02.04.2019 01:57	02.04.2019 02:00	55.593.865	3.758.058	150
AL520/2_26-1	Di_02_Apr_02_06_V4LOG	02.04.2019 02:06	02.04.2019 03:15	55.626.363	3.801.642	150
AL520/2_26-1	Di_02_Apr_03_20_V4LOG	02.04.2019 03:20	02.04.2019 04:32	55.656.343	3.743.305	150
AL520/2_26-1	Di_02_Apr_04_37_V4LOG	02.04.2019 04:37	02.04.2019 05:51	55.631.180	3.805.862	150
AL520/2_26-1	Di_02_Apr_05_52_V4LOG	02.04.2019 05:52	02.04.2019 07:54	55.658.737	3.744.888	150
AL520/2_47-1	Mi_03_Apr_03_02_V4LOG	03.04.2019 03:02	03.04.2019 03:07	55.395.090	4.464.313	150
AL520/2_47-1	Mi_03_Apr_03_18_V4LOG	03.04.2019 03:18	03.04.2019 03:24	55.402.583	4.466.040	150
AL520/2_47-1	Mi_03_Apr_03_32_V4LOG	03.04.2019 03:32	03.04.2019 03:38	55.395.107	4.467.507	150
AL520/2_47-1	Mi_03_Apr_03_45_V4LOG	03.04.2019 03:45	03.04.2019 03:51	55.402.013	4.469.503	150
AL520/2_47-1	Mi_03_Apr_03_57_V4LOG	03.04.2019 03:57	03.04.2019 04:02	55.394.958	4.470.618	150
AL520/2_47-1	Mi_03_Apr_04_09_V4LOG	03.04.2019 04:09	03.04.2019 04:15	55.402.457	4.472.675	150
AL520/2_47-1	Mi_03_Apr_04_20_V4LOG	03.04.2019 04:20	03.04.2019 04:25	55.395.092	4.473.752	150
AL520/2_47-1	Mi_03_Apr_04_32_V4LOG	03.04.2019 04:32	03.04.2019 04:38	55.402.310	4.475.795	150
AL520/2_47-1	Mi_03_Apr_04_43_V4LOG	03.04.2019 04:44	03.04.2019 04:49	55.394.875	4.476.987	150
AL520/2_47-1	Mi_03_Apr_04_56_V4LOG	03.04.2019 04:56	03.04.2019 05:01	55.402.387	4.478.988	150
AL520/2_47-1	Mi_03_Apr_05_06_V4LOG	03.04.2019 05:06	03.04.2019 05:12	55.394.893	4.480.093	150
AL520/2_47-1	Mi_03_Apr_05_12_V4LOG	03.04.2019 05:12	03.04.2019 07:59	55.402.738	4.480.510	150

6.3 Sample Station List

Station No.		**Date**	**Gear**	**Time**	**Latitude**	**Longitude**	**Water Depth**	**Remarks/Recovery**
ALKOR	**SaM**	**2019**		**[UTC]**	**[°N]**	**[°E]**	**[m]**	
AL520/2_1-2	AL520_2_02_KG	20.03	KG	15:23	54° 05.621' N	007° 21.092' E	36.2	NOAH-D
AL520/2_3-2	AL520_2_04_KG	21.03	KG	07:59	54° 26.132' N	007° 27.633' E	27.6	NOAH-E
AL520/2_3-3	AL520_2_05_KG	21.03	KG	08:06	54° 26.091' N	007° 27.742' E	26.8	NOAH-E
AL520/2_4-2	AL520_2_07_KG	21.03	KG	13:13	54° 27.914' N	006° 11.665' E	41.1	NOAH-F
AL520/2_8-1	AL520_2_10_KG	31.03	KG	15:34	55° 48.627' N	003° 44.108' E	51.5	
AL520/2_9-1	AL520_2_11_KG	31.3	KG	15:54	55° 48.639' N	003° 45.037' E	51.6	
AL520/2_12-1	AL520_2_13_KG	01.04	KG	06:49	55° 40.952' N	003° 38.514' E	46.2	
AL520/2_13-1	AL520_2_14_KG	01.04	KG	07:38	55° 43.334' N	003° 31.407' E	51.9	
AL520/2_14-1	AL520_2_15_KG	01.04	KG	07:57	55° 43.709' N	003° 32.142' E	50.9	
AL520/2_17-1	AL520_2_18_KG	01:04	KG	09:20	55° 45.031' N	003° 29.530' E	53.6	
AL520/2_18-1	AL520_2_19_KG	01.04	KG	09:48	55° 45.723' N	003° 29.537' E	55.6	
AL520/2_24-1	AL520_2_25_KG	01.04	KG	15.08	55° 47.180' N	003° 36.111' E	54.4	
AL520/2_25-1	AL520_2_26_KG	01.04	KG	15:28	55° 46.758' N	003° 37.036' E	53.9	
AL520/2_27-1	AL520_2_27_KG	02.04	KG	06:07	55° 44.334' N	003° 42.274' E	47.1	

AL520/2_30-1	AL520_2_30_KG	02.04	KG	07:45	55° 44.441' N	003° 36.318' E	52.1	
AL520/2_31-1	AL520_2_31_KG	02.04	KG	08:07	55° 43.677' N	003° 38.008' E	47.3	
AL520/2_32-1	AL520_2_32_SG	02.04	SG	08:54	55° 42.636' N	003° 44.176' E	45.2	
AL520/2_33-1	AL520_2_33_SG	02.04	SG	08:58	55° 42.645' N	003° 44.238' E	45.7	HZG
AL520/2_34-1	AL520_2_34_SG	02.04	SG	09.24	55° 41.113' N	003° 42.006' E	41.9	
AL520/2_35-1	AL520_2_35_SG	02.04	SG	09:52	55° 39.457' N	003° 39.026' E	42.2	
AL520/2_36-1	AL520_2_36_SG	02.04	SG	10:31	55° 42.363' N	003° 32.387' E	49.5	
AL520/2_37-2	AL520_2_37_SG	02.04	SG	11:05	55° 44.902' N	003° 34.773' E	52.6	
AL520/2_37-3	AL520_2_38_SG	02.04	SG	11:09	55° 44.911' N	003° 34.800' E	52.7	HZG
AL520/2_38-1	AL520_2_39_SG	02.04	SG	11:42	55° 47.057' N	003° 30.950' E	55.8	
AL520/2_38-2	AL520_2_40_SG	02.04	SG	11:47	55° 47.048' N	003° 30.972' E	54.6	HZG
AL520/2_39-1	AL520_2_41_SG	02.04	SG	12:05	55° 46.337' N	003° 29.588' E	55.4	
AL520/2_40-2	AL520_2_42_SG	02.04	SG	12:36	55° 45.412' N	003° 26.111' E	55.7	
AL520/2_41-1	AL520_2_43_SG	02.04	SG	12:58	55° 47.092' N	003° 27.041' E	55.3	
AL520/2_42-1	AL520_2_44_SG	02.04	SG	13:16	55° 47.866' N	003° 25.710' E	58.1	
AL520/2_43-1	AL520_2_45_SG	02.04	SG	13:42	55° 50.341' N	003° 26.557' E	61.5	
AL520/2_43-2	AL520_2_46_SG	02.04	SG	13:47	55° 50.353' N	003° 26.582' E	60,5	HZG
AL520/2_44-1	AL520_2_47_SG	02.04	SG	14.13	55° 52.845' N	003° 24.847' E	66.1	
AL520/2_45-1	AL520_2_48_SG	02.04	SG	14.36	55° 54.466' N	003° 23.774' E	68.0	
AL520/2_46-1	AL520_2_49_SG	02.04	SG	15:24	55° 52.401' N	003° 27.638' E	62.9	
AL520/2_46-2	AL520_2_50_SG	02.04	SG	15:30	55° 52.387' N	003° 27.607' E	63.3	HZG
AL520/2_49-1	AL520_2_52_KG	03.04	KG	06.16	55° 30.336' N	004° 10.339' E	32.1	NOAH-I
AL520/2_50-1	AL520_2_53_KG	03.04	KG	12:33	54° 49.653' N	005° 34.800' E	43.6	NOAH-H

7 Data and Sample Storage and Availability

The sidescan sonar mosaics, sediment distribution maps, track data, and grain size distributions of sediment samples will be stored in the BSH ´Shelf Geo Explorer´ database and will be available from the BSH´ GeoSeaPortal´. Raw data of the hydroacoustic lines, grain size analyses and underwater videos are stored at Senckenberg am Meer, Wilhelmshaven.
Results of the biogeochemical analyses will be stored in and made accessible by the HZG data repository ‘coastmap’ and the ‘Pangaea’ data repository. Water and sediment samples will be consumed by the analyses and no long-term storage of samples is intended.

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9 References

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10 Abbreviations

CAM	Underwater Video Camera
CTD	Conductivity Temperature Depth probe
EEZ	Exclusive Economic Zone
HZG	Helmholtz Zentrum Geesthacht
KG	Box Corer (Reineck Type)
NOAH	North Sea observation and Assessment of Habitats
SaM	Senckenberg am Meer, Abteilung für Meeresforschung, Wilhelmshaven
SG	Shipek Grab
SSS	Sidescan Sonar (Klein System 4000)

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