FS Poseidon

Cruise Report POS 505

SEDINO II - North Sea (west of Sylt)

12.09. – 26.09.2016

Institute of Geosciences (IfG)

Christian-Albrechts-Universität (CAU), Kiel

C | A | U
Christian-Albrechts-Universität zu Kiel

Dr. Peter P. Richter

Kiel, 10.02.2017

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1. Participants

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Tanita Averes	Scientist	IFG
Jan Bargmann	Scientist	IFG
Charlotte Decker	Scientist	IFG
Nils Steinfeld	Scientist	IFG
Daphne Bartels	Scientist	IFG

IFG: Institute of Geosciences – Sedimentology, Coastal– and Continental Shelf Research, Christian-Albrechts-University, Kiel

IOW: Leibniz Institute for Baltic Sea Research, Warnemünde

Abbreviations

Sidescan Sonar (towed) .... **SSS**

Multibeam Echosounder (hull mounted)............ **MBES**

Innomar Subbottom Profiler (Moon Pool) ....**SES**

Grab Sampler... **GS**

Giant Box Corer.. **GBC**

Underwater Video .... **UWV**

Conductivity Temperature Depth....................... **CTD**

2. **Cruise Narrative** (Time in UTC)

12th September 2016

- 6:00 Loading ship; installation of devices

- 13:30 Visit of the Federal Minister of Education and Research, Prof. Dr. Johanna Wanka together with the director of GEOMAR, Prof. Dr. Peter Herzig.

- 15:00: Departure from IFM Geomar

- Transit to study site

Weather: Sunny, 2 Bft E

13th September 2016

- Transit to study site via Skagerrak

- Installation of devices

Weather: Sunny, 3 Bft E - NE

14th September 2016

- 12:50 CTD measurement

- 13:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Sunny, 4 - 5 Bft E - NE

- During night: Profiles of SSS, SES and MBES

15th September 2016

- Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 5 Bft E

- During night: Profiles of SSS, SES and MBES

16th September 2016

Hydroakustic Profiles: SSS, SES, MBES

- 10:30 UWV

- 14:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 4-5 Bft E

- During night: Profiles of SSS, SES and MBES

17th September 2016

- 6:00 GS (20 stations)

- 15:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 6 Bft E

- During night: Profiles of SSS, SES and MBES

18th September 2016

- Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy,4- 5 Bft E

- During night: Profiles of SSS, SES and MBES

19th September 2016

- 10:00: UWV

- 14:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 5 Bft E

- During night: Profiles of SSS, SES and MBES

Weather: Sunny, 3Bft E

20th September 2016

- 6:00 GS (19 Stations)

- 15:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 4 Bft E

- During night: Profiles of SSS, SES and MBES

21st September 2016

- 6:00 CTD

- 6:20 GBC (5 Stations)

- 11:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 3 Bft E

- During night: Profiles of SSS, SES and MBES

22nd September 2016

- Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 3 - 4 Bft SW

- During night: Profiles of SSS, SES and MBES

23rd September 2016

- 6:00 GS (10 Stations)

- 15:30 Hydroacoustic Profiles: SSS, SES, MBES

Weather: Partly cloudy, 4 Bft W

- During night: Profiles of SSS, SES and MBES

24th September 2016

- 8:00: UW

- 13:30 Transit to Kiel via Skagerrak

Weather: Sunny, 4 Bft W

- During night: Profiles of SSS, SES and MBES

Wetter: Sunny, 3Bft E

25th September 2016

- Transit to Kiel, deinstallation of devices

Weather: Cloudy, partly sunny, 4 Bft S

- In der Nacht: Profile mit SSS, SES und MBES

26th September 2016

- Transit to Kiel

- 14:00 Arrival at IFM-Geomar Kiel

Weather: Sunny, 3 Bft SE

3. Introduction

Shallow coastal zones represent some of the most productive environments of the ocean and are characterized by complex distribution of benthic habitats (Gray 1997; Eyre and Maher, 2011; Micallef et al., 2012). As the quality, quantity and spatial distribution of these habitats becomes more and more important for the understanding of marine ecosystems, habitat mapping has become a major tool for investigating coastal marine environments (Jackson et al. 2001; Micallef et al., 2012). Acoustic backscatter data are nowadays the most widely used form of remote-sensed data (Brown et al. 2011). They provide a framework for mapping the distribution of benthic habitats and species (Kostylev et al.,2001; Valentine et al.,2005; Todd an Kostylev, 2011).

Historically, information on surface sediment distribution in the German Bight has been based on sampling on grids in combination with interpolation methods, initially without relation to benthic habitat distribution. The BSH-chart 2900 (Figge, 1981), which is originally based on ~25.000 grab samples, taken in a ten years period between 1964 and 1974, has been recently updated by Laurer et al. (2013) with an extended data set of 37.500 data points. Until now it is the only map showing a comprehensive surface sediment distribution of the German Bight. Gaps have been recently closed in the frame of the R & D project „Geopotenziale Deutsche Nordsee“. However, information on structure and distribution of potential habitats cannot be derived from this map. Investigations about habitat distributions on larger scales, like the "ICES North Sea Benthos Project 2000: Structure and dynamics of the North Sea benthos" - project (Rees et al., 2007) are based on grab sampling on even coarser grids than the BSH chart 2900, as this program is covering the entire North Sea. Furthermore, as there was interpolation between the sampling stations, a spatially undisturbed and comprehensive information is not available. Especially small- and meso scaled sedimentary structures, which allow conclusions on sediment dynamics, for instance sorted bedforms (Diesing 2006, Mielck et al, 2015) are not included in the BSH chart 2900. In consequence, sediment surface distribution can neither be correlated to sediment dynamic processes nor to the distribution of benthic communities.

The research cruise POS505 aims to investigate the impact of sediment- and morphodynamics on the distribution of benthic habitats. Based on comprehensive and high resolution acoustic backscatter data, a synoptic sampling campaign was accomplished, to provide information about the occurrence of different macrofauna communities. The purpose of here applied research is twofold: Firstly the surficial geology will be described as interpreted form geological and hydroacoustic data. Secondly the benthic habitats will be characterized based on statistical analyses of biological data. The second part will be supported and implemented by the working group on ecology of benthic organisms of the Leibniz Institute for Baltic Sea Research Warnemünde (IOW).

The study site is located in an area northwest of Sylt Island and focusses on an area where underlying moraine deposits of Saalian ages crop out to the surface (Figge 1981, Zeiler, 2008,). Hydroacoustic measurements carried out during cruise P474 (Schwarzer & Richter, 2014) cover the periphery of these pleistocene deposits and show small scaled alternations in the sediment surface distribution. Hydroacoustic measurements of cruise POS 489 (Schwarzer, Kiefer, Richter, 2015)) are located in the south. The grain size composition ranges from very fine sand to gravel and suggests a large number of structure related habitats. It can be assumed, that the highest diversity can be found in the central area of these Pleistocene deposits and is therefore most suitable to verify possible correspondences with the distribution of different macrofaunal communities.

Cruise POS505 was performed in the frame of the project SEDINO II (**SED**imentdynamik **I**n **N**ord- und **O**stsee). The project is funded by the Federal Agency of Nature Conservation (BfN) via the Federal Maritime Agency (BSH).

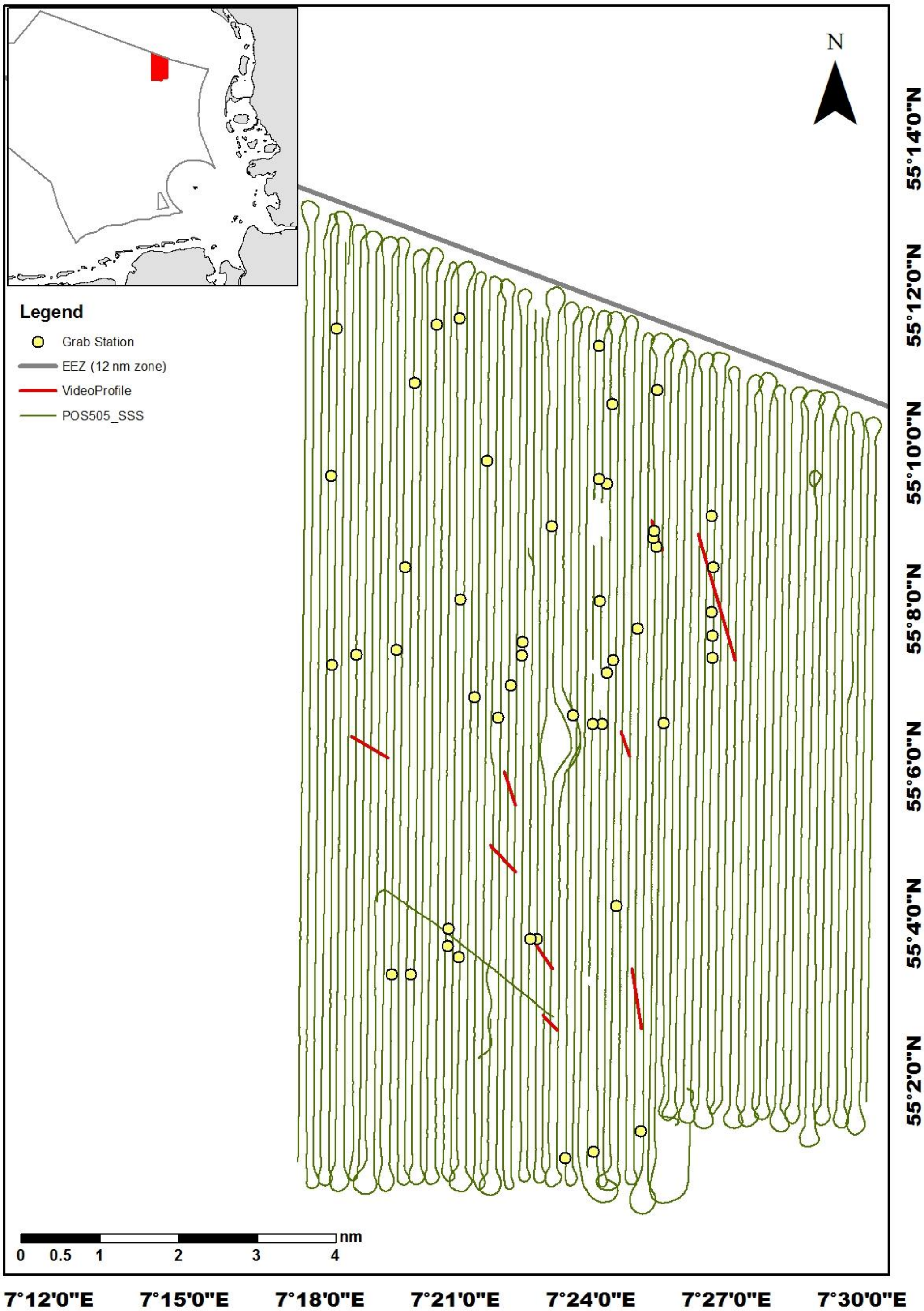


Fig. 1: Hydroacoustic Profiles and sampling locations of cruise POS 505.

4. Equipment

To provide information about the spatial distribution of bathymetry, sediment consistency and sedimentary texture, the application of high resolution hydroacoustic measuring techniques is common (Kenny et al. 2002, Hamilton 2005, Boyed et al. 2007, Blondel 2009, Lamarche, 2011). This method offers new detailed insights in the sedimentary structure and the sea bed properties (Diesing & Schwarzer 2006, Schwarzer & Diesing 2003, 2004, Feldens et al. 2010; Mielck 2014), and allow conclusions on recent sediment dynamics (Zeiler et al. 2000, Chang et al. 2006, Bartholomä, 2006, Mienert & Weaver 2012). Moreover, these modern methods can be used in combination with sediment classification systems and under water video systems, for mapping habitats and benthic communities (Cochrane & Lafferty 2002, Ehrhold et al. 2006, Rooper & Zimmermann 2007, Degraer et al. 2008a,b, Le Bas & Huvenne 2009, van Overmeeren 2009, van Rein et al. 2011, Barberá 2012).

Sidescan Sonar (SSS)

The seafloor is imaged by using a Side-Scan Sonar, Teledyne Benthos, SIS-1624 - dual frequnecy (Fig. 2). The device is commonly referred to as “towfish” which is towed behind the vessel. Transducers on each side of the device generate and transmit acoustic beams into the water-column and record them after their reflection and refraction from the seafloor. The travel time to reach the seabottom is converted into water depth, whereas the energy of the reflected acoustic signal provides information about sediment surface properties. Generating acoustic signals in different frequencies display different features of the same seafloor properties. The applied frequencies during this cruise accounted for 160kHz and 400kHz. Since ships movement are reflected in the raw data of acoustic signals, the tow vehicle includes pitch, roll and heading sensors to correct the collected signals.

The range, the length of the profiled area to each side, was set to 100 m. By setting the distance between the Profiles to 0.1 nautical mile (app. 185 m), overlap of approximately 20 m between neighboring profiles was intended. The altitude of the towfish above the seafloor is adjusted to the water depth and prevailing wave conditions. The layback of the towfish behind the ship during Profiling was in the range of 10 to 15 m. The layback was controlled by IfG’s own winch (Cormac Q, Mac Artney Underwater Technology). The ship’s speed was kept between 4 to 5 knots.

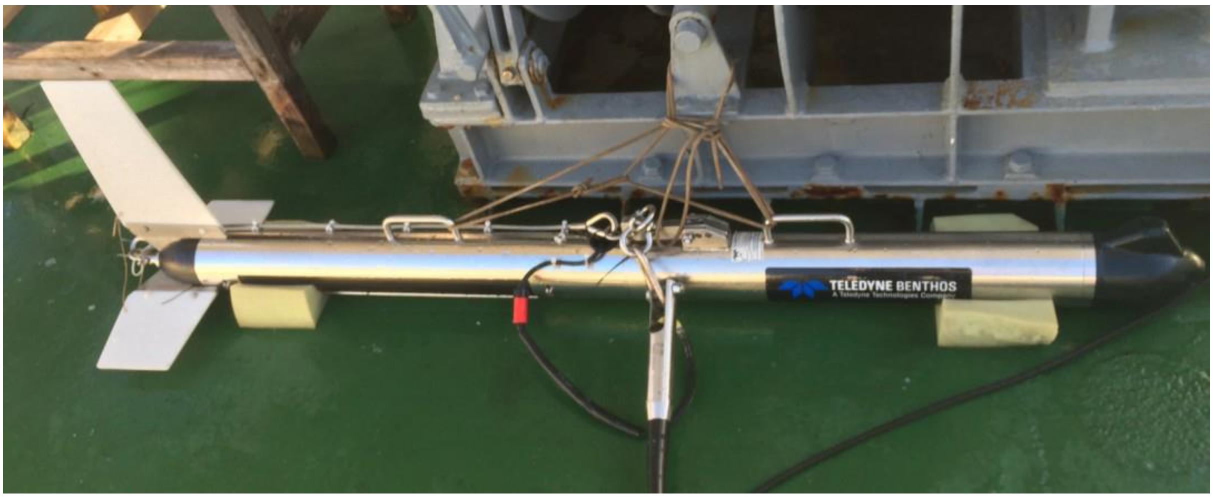


Figure 2: The employed Sidescan Sonar Teledyne Benthos, SIS-1624

Multibeam Echo Sounder (MBES)

The hull mounted MBS-system SeaBeam 3050 from ELAC Nautik GmbH was used to acquire bathymetrical data. The MBES transmits multiple pings, which are separated into two swaths (dual swath), into the water column. The applied frequency was 53 kHz. The bathymetric data is corrected for the ships pitch and roll. CTD Profiles are used to calibrate the sound velocity which depends on the actual water mass density. The water density in turn is a function of pressure, temperature and salinity.

Sediment Echo Sounder (SES)

The sub-bottom is profiled by a SES-2000 standard narrow beam parametric sub bottom profiler (Innomar Technologie GmbH). Sub-seafloor sediment structures are surveyed by the reflection of echo-signals at layers and/or objects. The travel-time of the reflected signal through the water column is converted into distances. The penetration depth of the sound signal depends on the transmitted frequency, where the lower frequency (4-15kHz) using the parametric acoustical effect is used to detect deeper structures in contrast to the higher frequency (100kHz) which primary follows the seafloor. A Kongsberg-EM 3000 motion sensor is used for correction of heave, roll and pitch of the ships movement

Grab Sampler (GS)

Van Veen grab sampling (here a HELCOM grab sampler) is a fast method to sample surface sediments precisely with low effort. During POS505 the sampling stations were chosen based on a roughly prepared Side-Scan Sonar mosaic. The grab sampler is deployed from the ship by a winch. Due its own weight the shovels penetrate into the sediment. Obviously, the sediment surface gets partly disturbed under these conditions. Sediment samples are used to validate the data of the performed hydroacoustic survey. The samples are described on board and prepared for further laboratory analysis at Kiel University.

Giant Box Corer (GBC)

The giant box corer allows to investigate undisturbed samples from the sediment surface. The surface area which is sampled amounts to 0.25 m^2 (50 cm x 50 cm); the maximum penetration is 60cm in soft sediments. On a sandy seafloor the penetration seldom reaches more than 20 – 30 cm.

Figure 3: The employed giant box corer (box not installed) during the cruise POS505.

Underwater Video (UWV)

Video tracks are recorded and displayed in real time with a „1Cam Alpha SubC Imaging" underwater video camera from the IOW. The ship velocity during this procedure is below 1 nm. Underwater video survey is applied to validate the sediment properties inferred by backscatter data and for detailed imaging of marine habitat areas.

Conductivity Temperature Depth (CTD) probe

In order to calibrate the sound velocity of all hydroacoustic devices, sound-velocity Profilees are taken by a CTD ("Sea & Sun Technology"), which measures the parameters pressure, salinity and temperature with depth, defining the sound velocity. The CTD probe is lowered in the water with a wire cable, where the data cable is attached, down to 1 m above the sea-floor.

5. Performed work and preliminary Results

During POS 505 in total an area of 275 km² was covered by comprehensive and high resolution Sidescan Sonar measurements, which corresponds to a distance of ~840 nm of hydroacoustic profiles. Sediment sampling was done based on the Sidescan Sonar mosaic (Fig. 2), consisting of a processed 400 kHz frequency. Overall 49 grab samples and 5 giant box corer samples were taken. The Side Scan Sonar mosaic shows a pattern of mainly WNW – ESE striking areas of different sediment properties, which indicate an alteration of fine grained and coarse grained sediments. This sediment distribution patterns are separated by huge homogeneous sandy areas. This reflects, that the overlying Holocene sedimentary sequence consists of large scale areas of fine- to medium-grained marine sands (bright backscatter), formed after the last glacial period, and reworked Pleistocene material also containing coarser sand fractions. Certainly, the Pleistocene subsurface still imprints the seafloor. Partly areas are noticed where the underlying Pleistocene sediments are cropping out or are at least coming up close to the surface (dark backscatter) (Fig. 4).

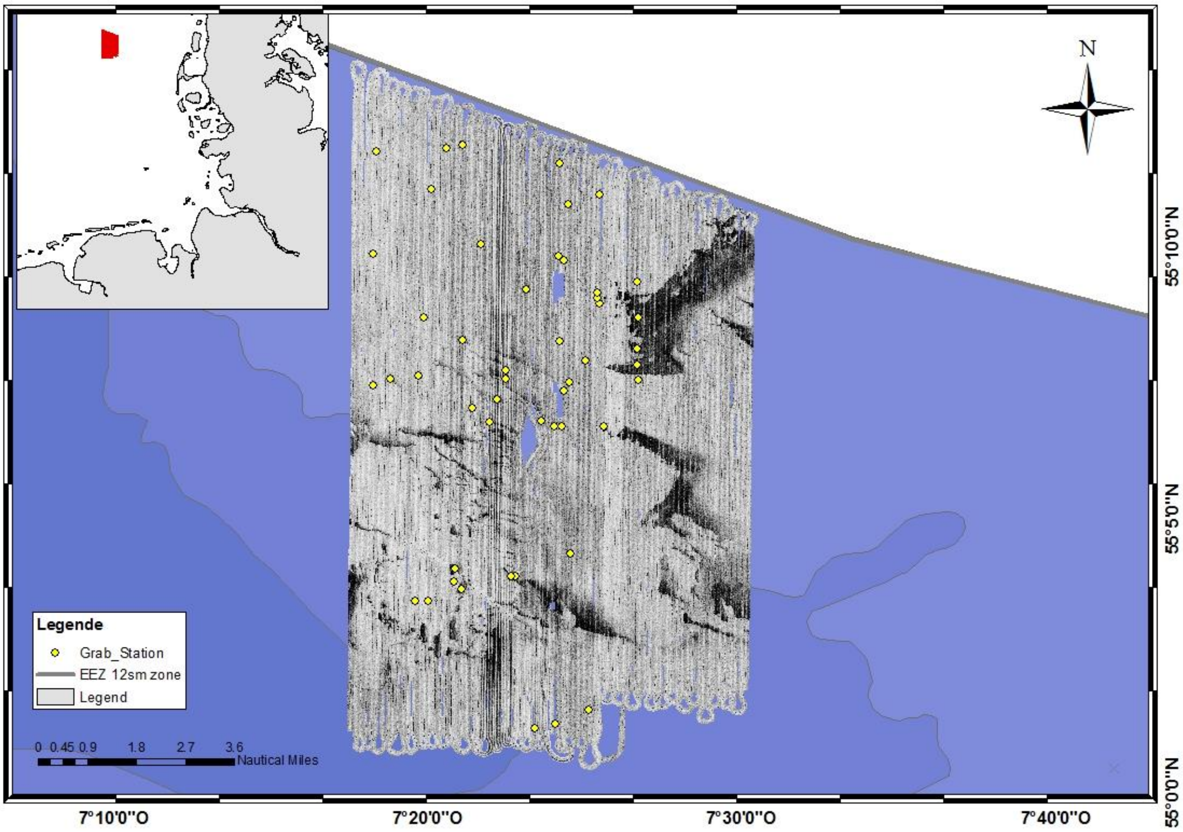


Fig. 4: Side Scan Sonar Mosaic of POS505 with grab sample stations.

The outcrop of these sediments is mainly composed of coarse sand and gravel, sometimes merging with areas of medium to coarse sand. In the Sidescan Sonar Mosaic not only parts with fine and coarse material can be differentiated, also different kind of fine sand can be distinguished. In this case, the major differentiator is the density of the fine sand areas, accompanying with slight differences in grain size composition. Predominantly the surface sediments consist of dense fine sand, disturbed with expanded areas of fine sand with medium density. These areas are slightly elongated and show as well an ESE – WNW orientated striking directions.

On an average in the working area the mobile sand coverage has a thickness of ~0,5 m (Fig. 5). At the sharp boarders of the different sequences this offset is clearly visible in the SES data. Moreover, to the different sediment types different benthic communities can be assigned. The fine sand in this area is mainly characterized by only a few organisms of the tube worm *Lanice conchilega* and some urchins. In contrast the coarse sand and gravel fractions are characterized by a huge amount of *Amphioxus*. These organisms and additional other occurring species are currently counted and statistically analyzed.

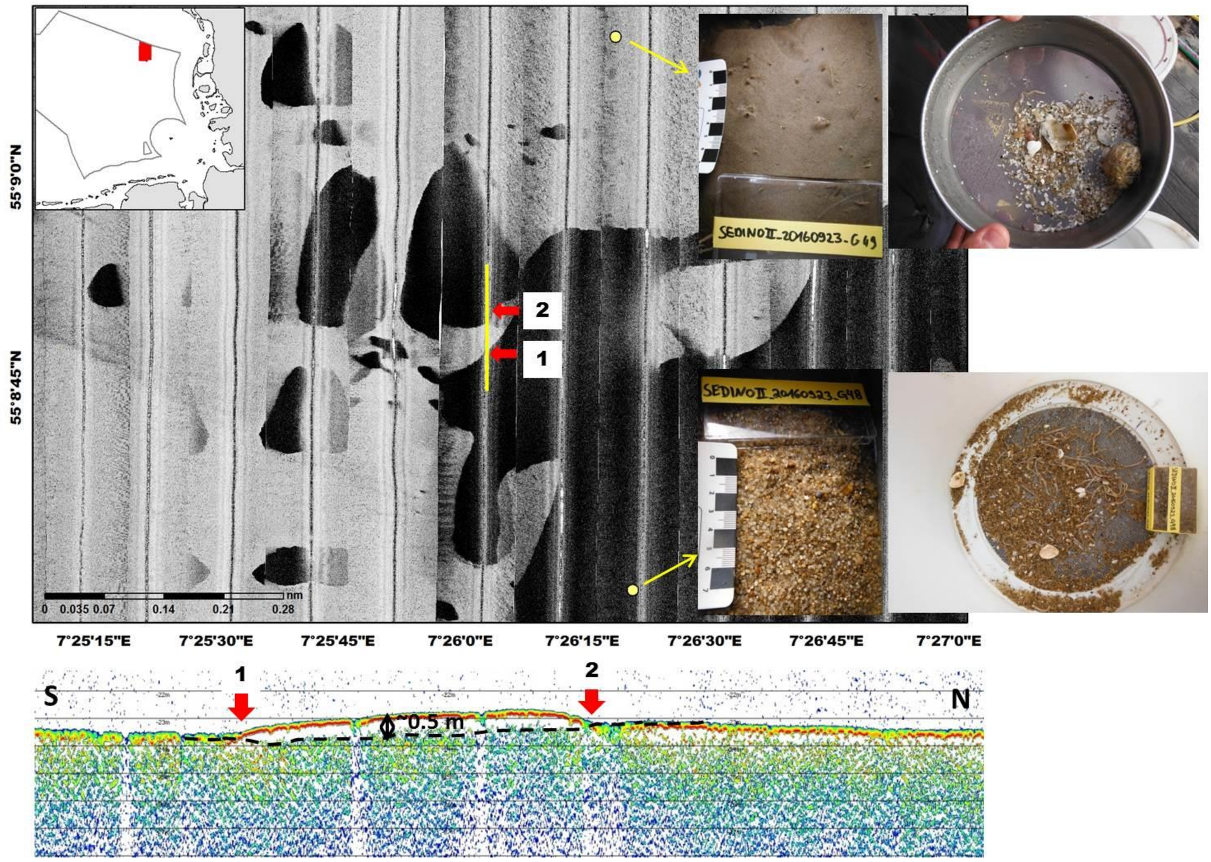
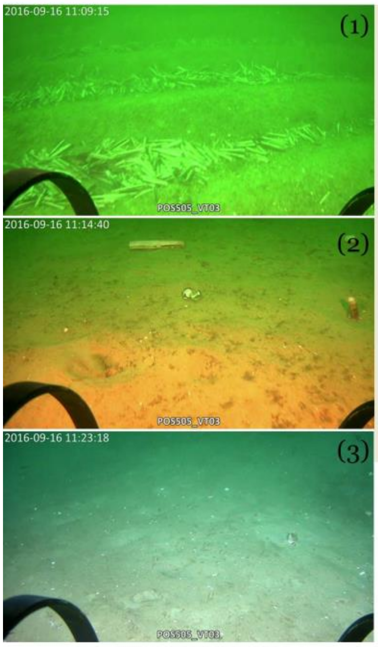


Fig. 5: SES profile in combination with Side Scan Sonar mosaic, showing a thickness of ~0,5 m, of the mobile sand coverage. The bright backscatter reflects grain size fractions of fine sand, including organisms of Lanice conchillega. The dark backscatter reflects coarse sand to gravel and is providing a habitat for Amphioxus.

Profiles of underwater video illustrate that areas of different backscatter can be assigned to different benthic communities (Fig. 6). Areas of coarse sand to gravel corresponding to the dark backscatter can also occur including rippel marks. In the ripple through huge amounts of *Ensis* shells can be noticed, presumably beside the gravel also responsible for the dark backscatter (Fig. 6 (1)). In the fine sand areas with medium density, organisms of the tube worm *Lanice conchilega* can be found (Fig. 6 (2)). In contrast the areas with very dense fine sand shows a considerably limited population of benthic organisms (Fig. 6 (3)).



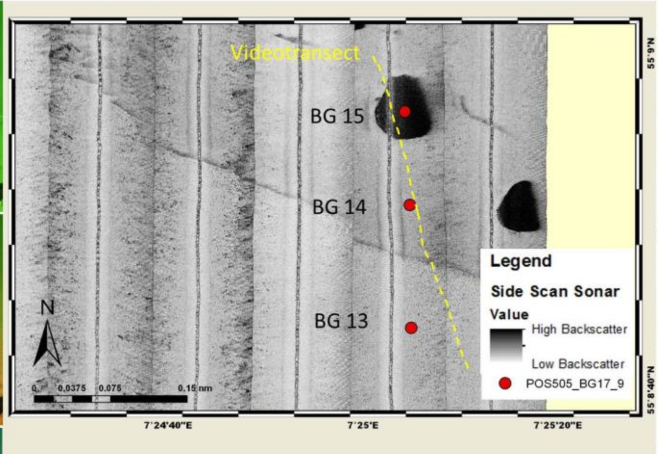


Fig. 6: Example of a Sidescan Sonar image with different backscatter values. Grab samples show sediments with differnt grain sizes (from gravel (High backscatter) to fine sand (Low backscatter)). With video images, differnt benthic communities can be assigned to the different substrates.

6. Acknowledgements

We would like to thank master (M. Günther) and the crew of FS Poseidon for giving us all kind of support during this cruise.

7. References

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8. Appendix

(Time in UTC)

Samples

A) Grab samples

Name	Latitude	Longitude
SEDINOII_20160817_G1	7° 23.714	55° 11.267
SEDINOII_20160817_G2	7° 25.024	55° 10.724
SEDINOII_20160817_G3	7° 24.036	55° 10.555
SEDINOII_20160817_G4	7° 23.787	55° 9.582
SEDINOII_20160817_G5	7° 23.928	55° 9.505
SEDINOII_20160817_G6	7° 25.061	55° 8.937
SEDINOII_20160817_G7	7° 25.073	55° 8.845
SEDINOII_20160817_G8	7° 25.080	55° 8.723
SEDINOII_20160817_G9	7° 23.906	55° 8.020
SEDINOII_20160817_G10	7° 24.741	55° 7.696
SEDINOII_20160817_G11	7° 24.126	55° 7.267
SEDINOII_20160817_G12	7° 24.096	55° 7.119
SEDINOII_20160817_G13	7° 23.911	55° 6.577
SEDINOII_20160817_G14	7° 23.704	55° 6.479
SEDINOII_20160817_G15	7° 23.936	55° 6.479
SEDINOII_20160817_G16	7° 25.272	55° 6.518
SEDINOII_20160817_G17	7° 24.276	55° 4.191
SEDINOII_20160817_G18	7° 23.320	55° 3.551
SEDINOII_20160817_G19	7° 25.025	55° 1.312
SEDINOII_20160817_G20	7° 23.968	55° 1.041
SEDINOII_20160820_G21	7° 20.597	55° 11.594
SEDINOII_20160820_G22	7° 20.065	55° 11.495
SEDINOII_20160820_G23	7° 19.639	55° 10.773
SEDINOII_20160820_G24	7° 21.342	55° 9.796
SEDINOII_20160820_G25	7° 22.753	55° 8.995
SEDINOII_20160820_G26	7° 19.520	55° 8.462

SEDINOII_20160820_G27	7° 20.742	55° 8.017
SEDINOII_20160820_G28	7° 19.347	55° 7.349
SEDINOII_20160820_G29	7° 22.136	55° 7.517
SEDINOII_20160820_G30	7° 22.160	55° 7.286
SEDINOII_20160820_G31	7° 21.919	55° 6.941
SEDINOII_20160820_G32	7° 21.059	55° 6.777
SEDINOII_20160820_G33	7° 21.672	55° 6.516
SEDINOII_20160820_G34	7° 20.650	55° 3.809
SEDINOII_20160820_G35	7° 20.688	55° 3.608
SEDINOII_20160820_G36	7° 20.896	55° 3.468
SEDINOII_20160820_G37	7° 20.623	55° 2.808
SEDINOII_20160820_G38	7° 20.149	55° 2.793
SEDINOII_20160820_G39	7° 19.711	55° 2.732
SEDINOII_20160823_G40	7° 23.359	55° 0.932
SEDINOII_20160823_G41	7° 17.885	55° 11.368
SEDINOII_20160823_G42	7° 17.858	55° 9.535
SEDINOII_20160823_G43	7° 18.506	55° 7.282
SEDINOII_20160823_G44	7° 17.958	55° 7.132
SEDINOII_20160823_G45	7° 17.421	55° 3.526
SEDINOII_20160823_G46	7° 26.364	55° 7.625
SEDINOII_20160823_G47	7° 26.318	55° 7.928
SEDINOII_20160823_G48	7° 26.356	55° 8.510
SEDINOII_20160823_G49	7° 26.278	55° 9.161

B) *Giant Box Corerer samples*

Name	**Longitude**	**Latitude**
SEDINOII_20160921_GK1	55° 06,775‘ N	07° 21,199‘ E
SEDINOII_20160921_GK2	55° 07,288‘ N	07° 24,182‘ E
SEDINOII_20160921_GK3	55° 08,410‘ N	07° 19,512‘ E
SEDINOII_20160921_GK4	55° 08,848‘ N	07° 25,015‘ E
SEDINOII_20160921_GK5	55° 08,973 N	07° 22,741‘ E

C) *Hydroacoustic Profiles*

Description	**Longitude**	**Latitude**	**Date/Time**
Profile 1 , Begin	55.014435	7.42241	14.09.2016 12:50
Profile 1 , End	55.185522	7.41655	14.09.2016 15:06
Profile 2 , Begin	55.185522	7.41655	14.09.2016 15:06
Profile 2 , End	55.01476	7.417905	14.09.2016 17:26
Profile 3 , Begin	55.01476	7.417905	14.09.2016 17:26

Profile 3 , End	55.184628	7.41116	14.09.2016 19:40
Profile 4, Begin	55.184628	7.41116	14.09.2016 19:40
Profile 4, End	55.015043	7.411813	14.09.2016 21:55
Profile 5, Begin	55.015043	7.411813	14.09.2016 21:55
Profile 5, End	55.187462	7.405185	15.09.2016 00:15
Profile 6, Begin	55.187462	7.405185	15.09.2016 00:15
Profile 6, End	55.015352	7.406447	15.09.2016 02:36
Profile 7, Begin	55.015352	7.406447	15.09.2016 02:36
Profile 7, End	55.189467	7.399723	15.09.2016 04:58
Profile 8, Begin	55.189467	7.399723	15.09.2016 04:58
Profile 8, End	55.015013	7.400858	15.09.2016 07:14
Profile 9, Begin	55.015013	7.400858	15.09.2016 07:14
Profile 9, End	55.190155	7.393833	15.09.2016 09:37
Profile 10, Begin	55.190155	7.393833	15.09.2016 09:37
Profile 10, End	55.01413	7.397647	15.09.2016 12:22
Profile 11, Begin	55.01413	7.397647	15.09.2016 12:22
Profile 11, End	55.1913	7.388287	15.09.2016 14:01
Profile 12, Begin	55.1913	7.388287	15.09.2016 14:01
Profile 12, End	55.014995	7.389698	15.09.2016 16:48
Profile 13, Begin	55.014995	7.389698	15.09.2016 16:48
Profile 13, End	55.192077	7.382573	15.09.2016 19:38
Profile 14, Begin	55.192077	7.382573	15.09.2016 19:38
Profile 14, End	55.01438	7.383752	15.09.2016 22:46
Profile 15, Begin	55.0144	7.383748	15.09.2016 22:46
Profile 15, End	55.19362	7.376135	16.09.2016 01:42
Profile 16, Begin	55.19362	7.376135	16.09.2016 01:42
Profile 16, End	55.013832	7.378228	16.09.2016 04:29
Profile 17, Begin	55.013832	7.378228	16.09.2016 04:29
Profile 17, End	55.193958	7.373857	16.09.2016 07:10
Profile 18, Begin	55.194895	7.371018	16.09.2016 07:22
Profile 18, End	55.014352	7.372755	16.09.2016 17:04
Profile 19, Begin	55.01437	7.37276	16.09.2016 17:04
Profile 19, End	55.195168	7.36551	16.09.2016 19:36
Profile 20, Begin	55.195145	7.365517	16.09.2016 19:36
Profile 20, End	55.014407	7.36657	16.09.2016 22:16
Profile 21, Begin	55.014407	7.36657	16.09.2016 22:16
Profile 21, End	55.196075	7.35992	17.09.2016 00:54
Profile 22, Begin	55.196075	7.35992	17.09.2016 00:54
Profile 22, End	55.014352	7.360787	17.09.2016 03:33
Profile 23, Begin	55.014352	7.360787	17.09.2016 03:33
Profile 23, End	55.1978	7.354153	17.09.2016 16:50
Profile 24, Begin	55.1978	7.354153	17.09.2016 16:50
Profile 24, End	55.014355	7.356078	17.09.2016 19:31
Profile 25, Begin	55.014355	7.356078	17.09.2016 19:31
Profile 25, End	55.19856	7.34829	17.09.2016 22:08

Profile 26, Begin	55.19856	7.34829	17.09.2016 22:08
Profile 26, End	55.014762	7.349813	18.09.2016 00:49
Profile 27, Begin	55.014762	7.349813	18.09.2016 00:49
Profile 27, End	55.20028	7.34222	18.09.2016 03:26
Profile 28, Begin	55.20028	7.34222	18.09.2016 03:26
Profile 28, End	55.014168	7.344358	18.09.2016 06:02
Profile 29, Begin	55.014168	7.344358	18.09.2016 06:02
Profile 29, End	55.20095	7.33741	18.09.2016 08:40
Profile 30, Begin	55.20095	7.33741	18.09.2016 08:40
Profile 30, End	55.014545	7.338417	18.09.2016 11:23
Profile 31, Begin	55.014545	7.338417	18.09.2016 11:23
Profile 31, End	55.201863	7.330632	18.09.2016 13:59
Profile 32, Begin	55.201863	7.330632	18.09.2016 13:59
Profile 32, End	55.01411	7.33306	18.09.2016 16:31
Profile 33, Begin	55.014132	7.333058	18.09.2016 16:31
Profile 33, End	55.203357	7.325705	18.09.2016 19:14
Profile 34, Begin	55.203357	7.325705	18.09.2016 19:14
Profile 34, End	55.013882	7.327728	18.09.2016 22:00
Profile 35, Begin	55.013882	7.327728	18.09.2016 22:00
Profile 35, End	55.205597	7.319937	19.09.2016 00:43
Profile 36, Begin	55.205597	7.319937	19.09.2016 00:43
Profile 36, End	55.012112	7.321378	19.09.2016 03:29
Profile 37, Begin	55.012112	7.321378	19.09.2016 03:29
Profile 37, End	55.205218	7.31431	19.09.2016 06:15
Profile 38, Begin	55.205218	7.31431	19.09.2016 06:15
Profile 38, End	55.187417	7.312262	19.09.2016 15:42
Profile 39, Begin	55.187417	7.312262	19.09.2016 15:42
Profile 39, End	55.121065	7.310913	19.09.2016 17:16
Profile 40, Begin	55.121045	7.310917	19.09.2016 17:16
Profile 40, End	55.101858	7.308403	19.09.2016 19:58
Profile 41, Begin	55.101858	7.308403	19.09.2016 19:58
Profile 41, End	55.122215	7.305107	19.09.2016 22:42
Profile 42, Begin	55.122215	7.305107	19.09.2016 22:42
Profile 42, End	55.09997	7.302665	20.09.2016 01:30
Profile 43, Begin	55.09997	7.302665	20.09.2016 01:30
Profile 43, End	55.210362	7.29742	20.09.2016 15:06
Profile 44, Begin	55.210362	7.29742	20.09.2016 15:06
Profile 44, End	55.013698	7.299362	20.09.2016 17:52
Profile 45, Begin	55.013698	7.299362	20.09.2016 17:52
Profile 45, End	55.209687	7.292473	20.09.2016 20:44
Profile 46, Begin	55.209667	7.292455	20.09.2016 20:44
Profile 46, End	55.01366	7.293835	20.09.2016 23:36
Profile 47, Begin	55.01366	7.293835	20.09.2016 23:36
Profile 47, End	55.210482	7.2863	21.09.2016 02:25
Profile 48, Begin	55.210482	7.2863	21.09.2016 02:25

Profile 48, End	55.029018	7.424908	21.09.2016 10:16
Profile 49, Begin	55.029018	7.424908	21.09.2016 10:16
Profile 49, End	55.182283	7.424958	21.09.2016 12:33
Profile 50, Begin	55.182283	7.424958	21.09.2016 12:33
Profile 50, End	55.02938	7.429357	21.09.2016 14:45
Profile 51, Begin	55.02938	7.429357	21.09.2016 14:45
Profile 51, End	55.18232	7.430118	21.09.2016 16:56
Profile 52, Begin	55.18232	7.430118	21.09.2016 16:56
Profile 52, End	55.029085	7.435113	21.09.2016 19:09
Profile 53, Begin	55.029085	7.435113	21.09.2016 19:09
Profile 53, End	55.181405	7.436252	21.09.2016 21:24
Profile 54, Begin	55.181385	7.43625	21.09.2016 21:24
Profile 54, End	55.028187	7.441235	21.09.2016 23:41
Profile 55, Begin	55.028187	7.441235	21.09.2016 23:41
Profile 55, End	55.181642	7.442182	22.09.2016 01:55
Profile 56, Begin	55.181622	7.44218	22.09.2016 01:55
Profile 56, End	55.030632	7.446803	22.09.2016 04:06
Profile 57, Begin	55.030655	7.4468	22.09.2016 04:06
Profile 57, End	55.178782	7.447068	22.09.2016 06:17
Profile 58, Begin	55.178782	7.447068	22.09.2016 06:17
Profile 58, End	55.028812	7.452148	22.09.2016 08:28
Profile 59, Begin	55.028812	7.452148	22.09.2016 08:28
Profile 59, End	55.177653	7.453197	22.09.2016 10:38
Profile 60, Begin	55.177653	7.453197	22.09.2016 10:38
Profile 60, End	55.028525	7.457918	22.09.2016 12:50
Profile 61, Begin	55.028525	7.457918	22.09.2016 12:50
Profile 61, End	55.176882	7.459275	22.09.2016 15:01
Profile 62, Begin	55.17686	7.459267	22.09.2016 15:01
Profile 62, End	55.029175	7.463328	22.09.2016 17:09
Profile 63, Begin	55.029175	7.463328	22.09.2016 17:09
Profile 63, End	55.175428	7.464247	22.09.2016 19:18
Profile 64, Begin	55.175428	7.464247	22.09.2016 19:18
Profile 64, End	55.02899	7.468817	22.09.2016 21:28
Profile 65, Begin	55.029012	7.46882	22.09.2016 21:28
Profile 65, End	55.174513	7.470795	22.09.2016 23:38
Profile 66, Begin	55.174513	7.470795	22.09.2016 23:38
Profile 66, End	55.029387	7.47516	23.09.2016 01:40
Profile 67, Begin	55.029387	7.47516	23.09.2016 01:40
Profile 67, End	55.17333	7.475977	23.09.2016 03:48
Profile 68, Begin	55.17333	7.475977	23.09.2016 03:48
Profile 68, End	55.028543	7.480552	23.09.2016 13:15
Profile 69, Begin	55.028543	7.480552	23.09.2016 13:15
Profile 69, End	55.172062	7.48184	23.09.2016 15:24
Profile 70, Begin	55.172038	7.481828	23.09.2016 15:24
Profile 70, End	55.029108	7.485847	23.09.2016 17:30

Profile 71, Begin	55.029108	7.485847	23.09.2016 17:30
Profile 71, End	55.170972	7.487	23.09.2016 19:35
Profile 72, Begin	55.170972	7.487	23.09.2016 19:35
Profile 72, End	55.029023	7.492093	23.09.2016 21:38
Profile 73, Begin	55.029023	7.492093	23.09.2016 21:38
Profile 73, End	55.169708	7.493852	23.09.2016 23:42
Profile 74, Begin	55.169708	7.493852	23.09.2016 23:42
Profile 74, End	55.029	7.497502	24.09.2016 01:45
Profile 75, Begin	55.029	7.497502	24.09.2016 01:45
Profile 75, End	55.168668	7.498207	24.09.2016 03:46
Profile 76, Begin	55.168668	7.498207	24.09.2016 03:46
Profile 76, End	55.028618	7.500018	24.09.2016 05:43

VideoProfiles

Description	**Longitude**	**latitude**	**Date/Time**
Video 1 Start	55.056288	7.412210	16.09.2016 10:53:55
Video 1 Ende	55.043400	7.416707	16.09.2016 11:23:31
Video 2 Start	55.106452	7.406963	16.09.2016 12:16:38
Video 2 Ende	55.101050	7.409972	16.09.2016 13:11:51
Video 3 Start	55.151557	7.415010	16.09.2016 14:18:02
Video 3 Ende	55.145837	7.419612	16.09.2016 15:07:27
Video 4 Start	55.097118	7.363643	19.09.2016 11:11:56
Video 4 Ende	55.090208	7.368225	19.09.2016 11:43:57
Video 5 Start	55.081638	7.359255	19.09.2016 12:12:12
Video 5 Ende	55.075985	7.368628	19.09.2016 12:43:42
Video 6 Start	55.063043	7.374088	19.09.2016 13:10:59
Video 6 Ende	55.055675	7.383255	19.09.2016 13:47:19
Video 7 Start	55.046002	7.379762	19.09.2016 14:10:16
Video 7 Ende	55.148992	7.433117	24.09.2016 13:30:59
Video 8 Start	55.099667	7.320395	24.09.2016 09:23:47
Video 8 Ende	55.104020	7.306790	24.09.2016 10:01:02
Video 9 Start	55.123033	7.448155	24.09.2016 11:23:02
Video 9 Ende	55.137997	7.439138	24.09.2016 11:23:02