

# **RV Alkor AL 416**

## **Cruise Report**

SEDINO I North Sea (Sylt Outer Reef)

29th May – 13th June 2013

Institute of Geosciences

Sedimentology, Coastal- and Continental Shelf Research

Christian-Albrechts-University, Kiel



Dr. Klaus Schwarzer & Dr. Peter P. Richter

Kiel, September 3<sup>rd</sup>, 2013

### List of participants

Klaus Schwarzer	chief scientist	IFG	
Helmut Beese	technician	IFG	(29.05-06.06)
Eric Steen	technician	IFG	
Peter Richter	scientist	IFG	
Christoph Heinrich	scientist	IFG	(29.05-06.06)
Mareike Kampmeier	scientist	IFG	
Kerstin Wittbrodt	scientist	IFG	
Sebastian Sperling	scientist	IFG	
Sebastian Neumann	scientist	IFG	
Johannes Musiol	scientist	IFG	
Philipp Reuter	scientist	IFG	(06.06-13.06)

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### Objective of cruise AL - 416

The cruise AL – 416 was carried out in the frame of the project SEDINO I (*Entwicklung eines standardisierten Verfahrens zur flächendeckenden Erfassung und Beschreibung der sedimentologischen Eigenschaften und Prozesse auf der Meeresbodenoberfläche in der ausschließlichen Wirtschaftszone (AWZ) von Nord- und Ostsee Teilprojekt SEDINO I*). The objective was to collect high resolution sidescan sonar backscatter data, and seismic data to the geological built up of the seafloor and physical properties of seabottom sediments in the area west of Sylt Island (North Sea). Use of this knowledge will strongly improve the prediction of large scale and long term morphodynamics of the North Sea, particularly with regard to the spatial and temporal benthic habitat distribution.

### Abbreviations used in this report:

Teledyne Benthos 1624 side scan sonar (towed)	<b>SSS</b>
Multibeam Echosounder (Moon Pool)	<b>MBES</b>
Innomar Subbottom Profiler (hull mounted)	<b>SES</b>
Grab Sampler	<b>GS</b>
Giant Grab Sampler	<b>GGS</b>
Vibrocore	<b>VC</b>
Underwater Video	<b>UWV</b>
CTD	<b>CTD</b>

## **Cruise narrative (Time in UTC)**

### **29th May 2013:**

Weather Cloudy, partly sunny, Wind: E, 2 - 3 Bft  
06:00 Departure from Kiel and transit to research area.  
00:00 Arrival at research area.

### **30th May 2013:**

Weather Cloudy, partly sunny, short rain, Wind: NW, 3 - 4 Bft  
04:06 CTD measurement  
04:42 Start of SSS, MBES and SES profiling  
During the night hydroacoustic profiling with SSS, SES, MBES.

### **31st May 2013:**

Weather Sunny, Wind: NW, 5 Bft (increasing)  
07:40 Stop of SSS measurements  
08:00 Sampling with BC (6 Stations)  
14:12 Start of SSS, MBES and SES profiling  
17:17 Stop of measurements due to strong wind (NW 7-8 Bft), transit to Helgoland

### **1st June 2013:**

Weather Sunny, Wind: NW, 7 - 8 Bft  
Staying at Helgoland harbor due to strong wind

### **2nd June 2013:**

Weather Sunny, Wind: NW, 7 - 8 Bft  
Staying at Helgoland harbor due to strong wind

### **3rd June 2013:**

Weather Sunny, Wind: NW, 7 - 8 Bft (decreasing)  
06:00 Transit to working area  
10:20 Waiting until wind has decreased  
17:09 Deployment of devices and resuming of profiles (MBES, SSS, SES)  
During the night hydroacoustic profiling with SES, MBES and SSS.

### **4th June 2013:**

Weather Overcast, rain partly sunny, Wind: SW, 4-5 Bft  
During the whole day: Profiling with SSS, MBES and SES  
During the night hydroacoustic profiling with SES, MBES and SSS.

### **5th June 2013:**

Weather Overcast, rain partly sunny, Wind: SW, 4-5 Bft  
09:44 Stop of SSS measurements, transit to BC sampling station  
10:40 Sampling with BC (8 sampling stations)  
17:28 Deployment of devices and resuming of profiles (MBES, SSS, SES)  
During the night hydroacoustic profiling with SES, MBES and SSS.

### **6th June 2013:**

Weather Sunny, Wind: NE, 3-4 Bft  
03:42 Stop of all measurements and transit to Esbjerg Harbour  
10:30 Change of cruise participants

11:30 Transit to working area

15:20 CTD, then deployment of devices and resuming of profiles (MBES, SSS, SES)

During the night hydroacoustic profiling with SES, MBES and SSS

**7th June 2013:**

Weather Sunny, Wind: NE, 3-4 Bft

During the whole day: Profiling with SSS, MBES and SES

During the night hydroacoustic profiling with SES, MBES and SSS.

**8th June 2013:**

Weather Sunny, partly cloudy, Wind: NE, 3 Bft

02:26 Stop of all devices

Transit to Cuxhaven due to serious sickness of crew member

10:30 Transit to working area

16:49 Deployment of devices and resuming of profiles (MBES, SSS, SES)

During the night hydroacoustic profiling with SES, MBES and SSS

**9th June 2013:**

Weather Sunny, partly cloudy, Wind: NE, 3 Bft

During the whole day: Profiling with SSS, MBES and SES

During the night hydroacoustic profiling with SES, MBES and SSS.

**10th June 2013:**

Weather overcast, Wind: NE, 4-5 Bft

05:01 devices on deck

06:13 Sampling with VC. Hammer of the device got damaged

08:37 Resuming of profiles (MBES, SSS, SES)

During the night hydroacoustic profiling with SES, MBES and SSS

**11th June 2013:**

Weather overcast, cloudy, Wind: W, 2-3 Bft

04:56 Devices on deck

05:50 Sampling with VC. Hammer of the device damaged again.

06:52 BC stations (4 stations)

10:10 UWV Profiles (5 stations)

17:32 Resume profiling with MBES, SES and SSS

During the night hydroacoustic profiling with SES, MBES and SSS

**12th June 2013:**

Weather overcast, cloudy and rainy, Wind: W, 3-4 Bft

04:46 Devices on deck

04:55 Sampling with GS

16:50 Transit to Kiel

**13th June 2013:**

Weather overcast, Wind: W, 3-4 Bft..

09:00 Arrival at Kiel harbour

## Working area

The study site extends from  $\sim 51^{\circ} 25'N$  to  $\sim 54^{\circ} 35'N$ , as well as from  $07^{\circ}50'E$ - $07^{\circ}40'E$ . In the west it borders to the working area of the BMBF project Aufmod F.

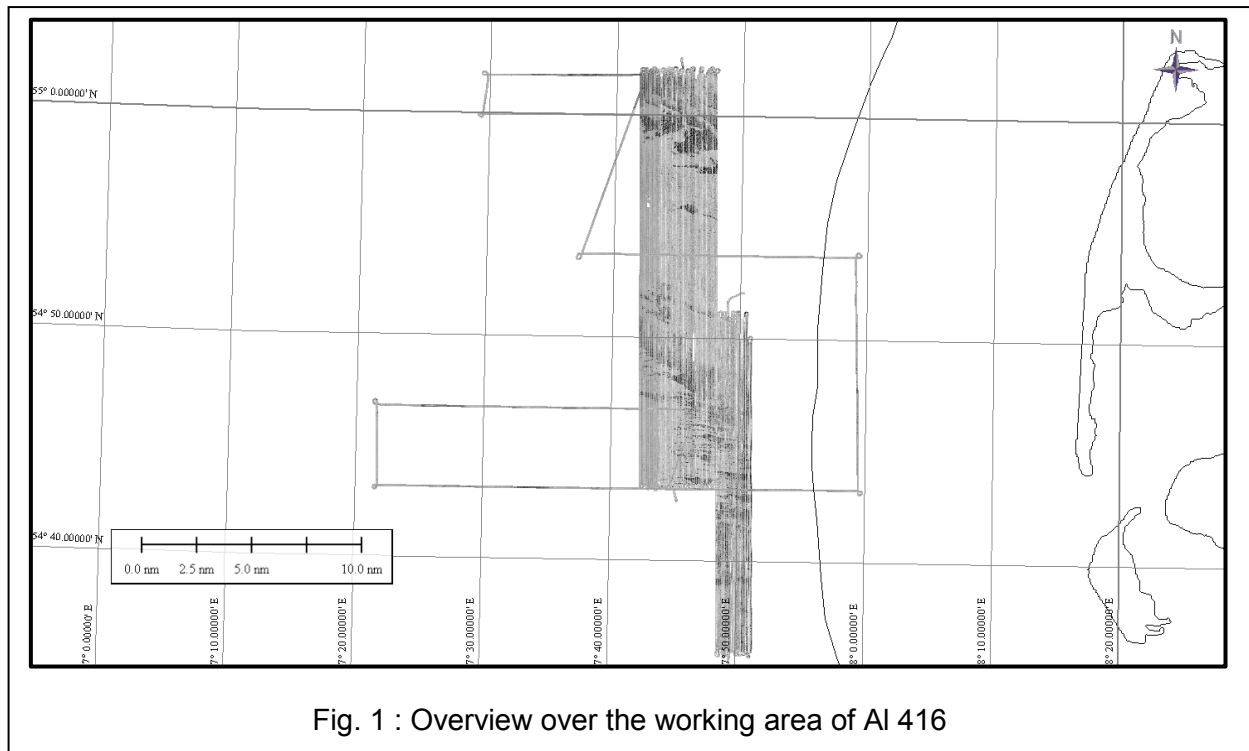


Fig. 1 : Overview over the working area of AI 416

## Methods

### *Side scan sonar*

To obtain high resolution sonographs of the sea floor the Teledyne Benthos SIS-1624™ Side scan sonar was used. The device was towed behind the vessel in water depth of approximately 10-15 m running with 4 - 5 knots. The SIS-1624™ Side scan sonar transmits acoustic pulses with 100kHz and 400 kHz. A range of 100 m on each side was applied, whereas each swath has an overlapping of 20 m with the neighbouring swath. Data were recorded and mosaiced with the Isis SONAR software (Triton Isis -Version 7.1.500.104).

### *Multibeam echosounder*

For bathymetric mapping data was collected with the multibeam echosounder (MBES) 'SEABEAM 1000' (L3-Communications, ELAC Nautic GmbH). Operating with a sonar frequency of 180 kHz, the system collects bathymetric data with a swath width of  $153^{\circ}$ . The system was deployed in the moon pool of ALKOR. The data were acquired using the software Hydrostar (L3-Communications, ELAC Nautik GmbH).

### *HELCOM-standard grab sampler*

Sampling for ground truthing of side scan sonar data and sedimentological analyses was carried out with a HELCOM-standard grab sampler. Each grab sample was described, photographed and sampled.

### *Giant Grab Sampler*

To gain in situ samples with an undisturbed sediment surface, a giant grab sampler was used. Each box was described, photographed and sampled. In total 16 stations were successfully approached and sampled.

### *Vibro Corer*

For vibro coring the VK-300 from Kiel University was used. The device has a tube length of 3m and 10x10 cm width. Unfortunately the vibro corer was partially damaged during the third deployment. In total only 3 cores could be retrieved from the seafloor.

### *Underwater video*

For optical ground truthing an underwater video camera (Mariscope Micro) was used. The device was dragged from the research vessel a few decimetres above the sea floor. The video images are transferred via a coax-cable to a monitor in real-time. The images were stored on a hard disk. Towing speed was below 1 m/s.

### *CTD*

Sound velocities in the water column depend on water density which is influenced by salinity, temperature and pressure. For this reason, CTD- profiles were taken in order to calculate sound velocity profiles through the water column.

## **Performed work and preliminary results**

The research area was surveyed with side scan sonar with 100% coverage, MBES, SES for precise large-scale mapping). Ground truthing was conducted deploying the grab sampler (39 stations) GGS (18 stations). During the cruise problems with the MBES motion sensor occurred. The vessel's motions could not be merged correctly with bathymetry data during recording. Additionally five video profiles have been carried out. The drilling campaign unfortunately had to be stopped after 3 cores due to instrument failure and bad weather conditions.

Sediment sampling was done based on the sidescan sonar mosaic (Fig. 1). This mosaic shows a pattern of WNW – ESE striking areas of different sediment properties which indicate an alteration of fine grained and coarse grained sediment. Figure 3 shows in some more detail the alteration of high- (dark colours) and low backscatter (light colours) of the seafloor sediment.

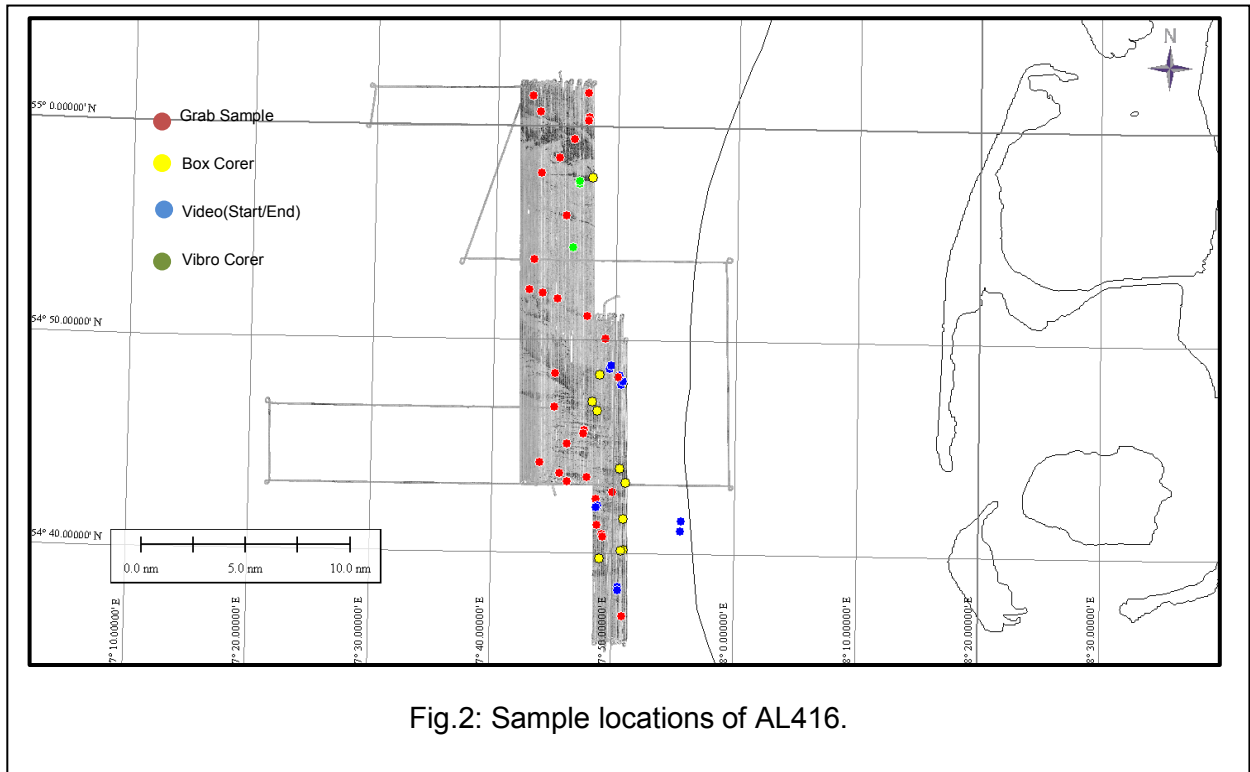


Fig.2: Sample locations of AL416.

Based on the SES data an approximately E-W striking channel has been observed belonging probably to an old tidal flat channel system. The channel can be traced for several hundred meters to the west and the southern and northern flank can be identified (see Fig. 3).

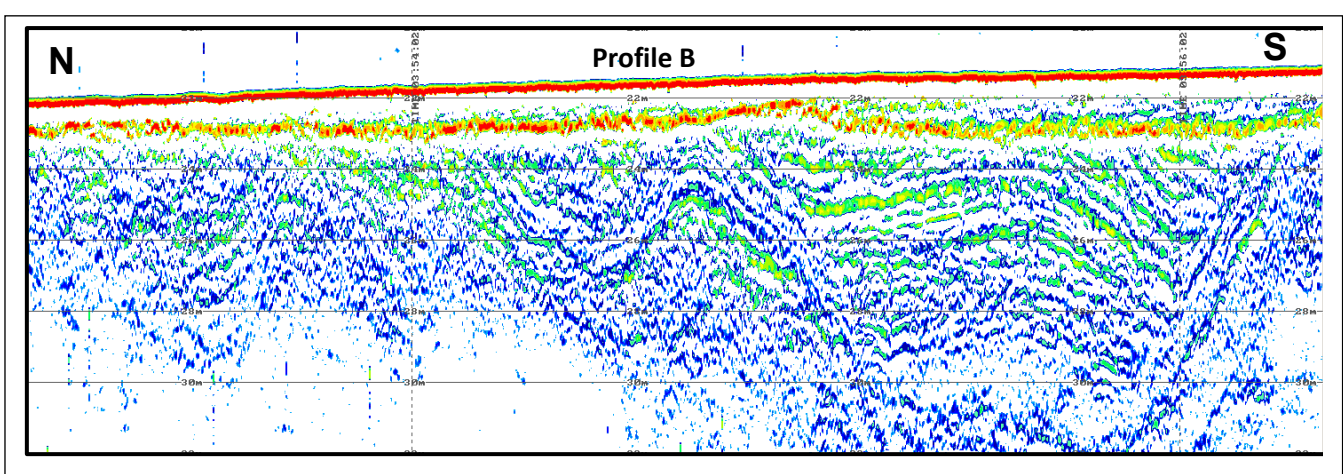
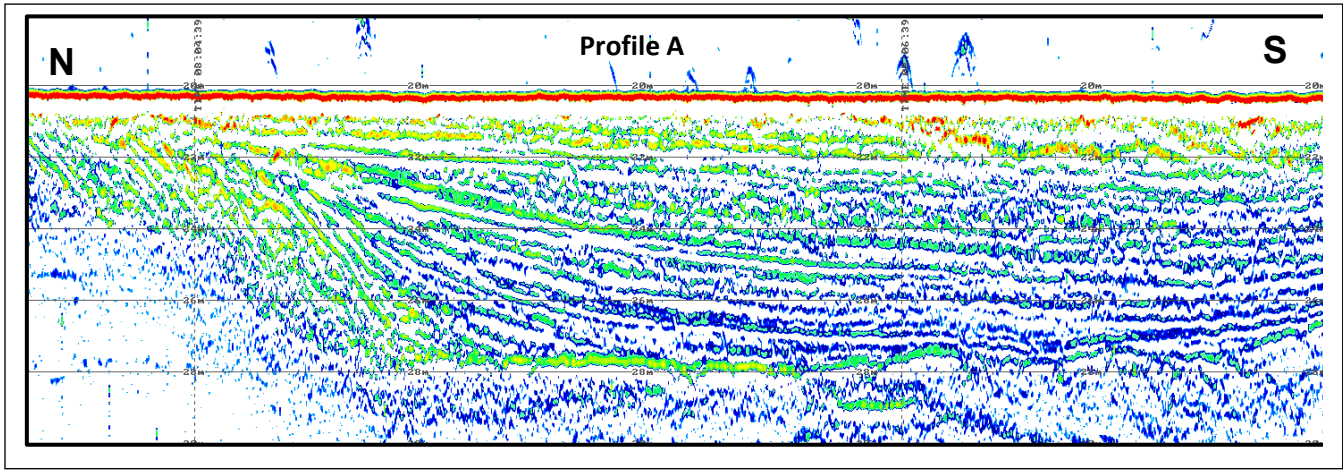
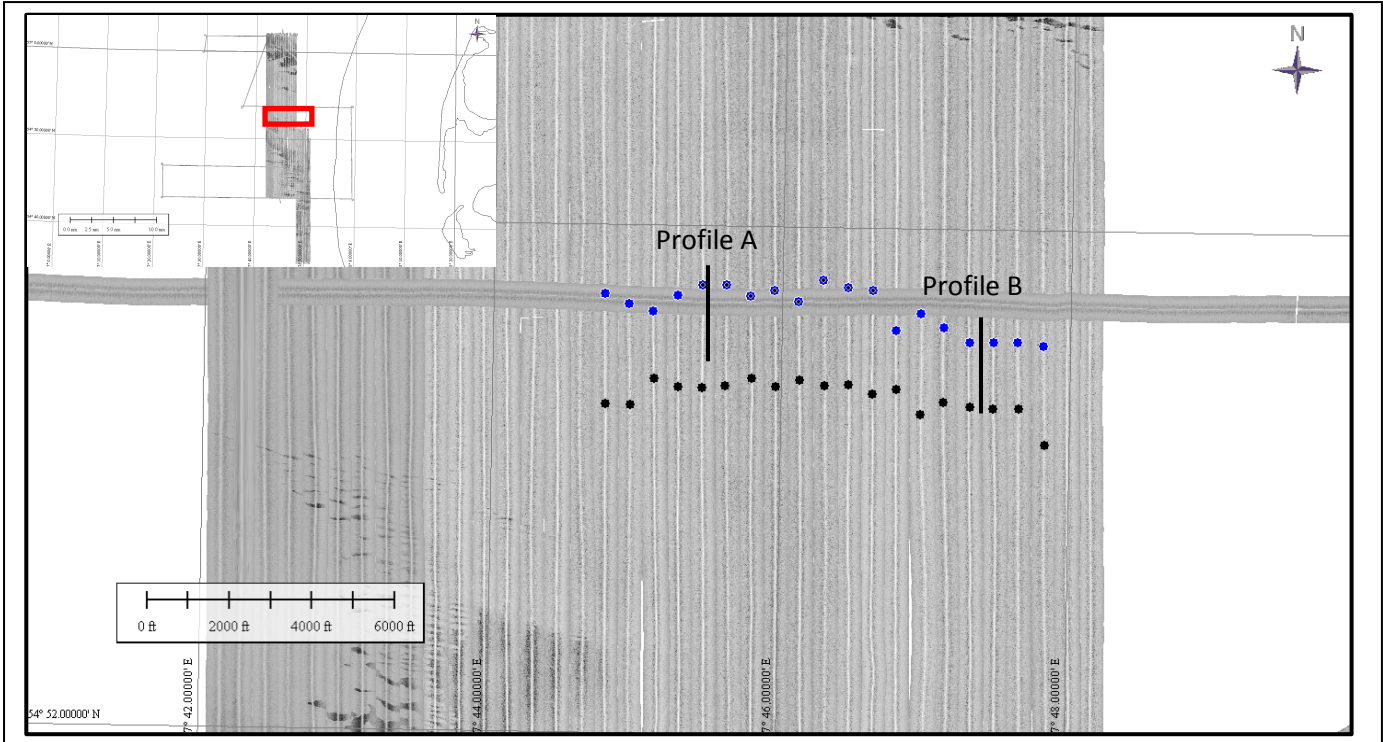


Fig. 3: Former tidal channel with perpendicular cross sections from the SES.



Areas where the high backscatter is not induced by coarse grained sediment, which is responsible for a rough sediment-surface, it is caused by a very dense population of the benthic organism *Lanice conchilega*. These areas could be identified already during AL-378 (see cruise report). In Figure 4 the grab sample AL-378-280811-018 is shown. The whole sediment surface is densely populated by *Lanice conchilega*. Screen shots from the video profiles taken in this area are also shown in Figure 4. Grain size distributions from areas which are covered with different densities of *Lanice conchilega* and from areas where no *Lanice conchilega* were observed show no big difference in the sediment grain size distribution indicating that differences in backscatter strength of the sidescan sonar signal are induced by the benthic organism. During cruise AL416 only weak indicators for the presence of *Lanice conchilega* could be observed in the sidescan sonar signals. For comparison a video profile was taken exactly at the same coordinates where *L. conchilega* could be observed during AL378. It was obvious that the density of the population has decreased strongly; however in the water column a lot of fragments of *Lanice conchilega* tubes can be observed. Probably this is due to the stormy weather conditions at the beginning of the cruise.

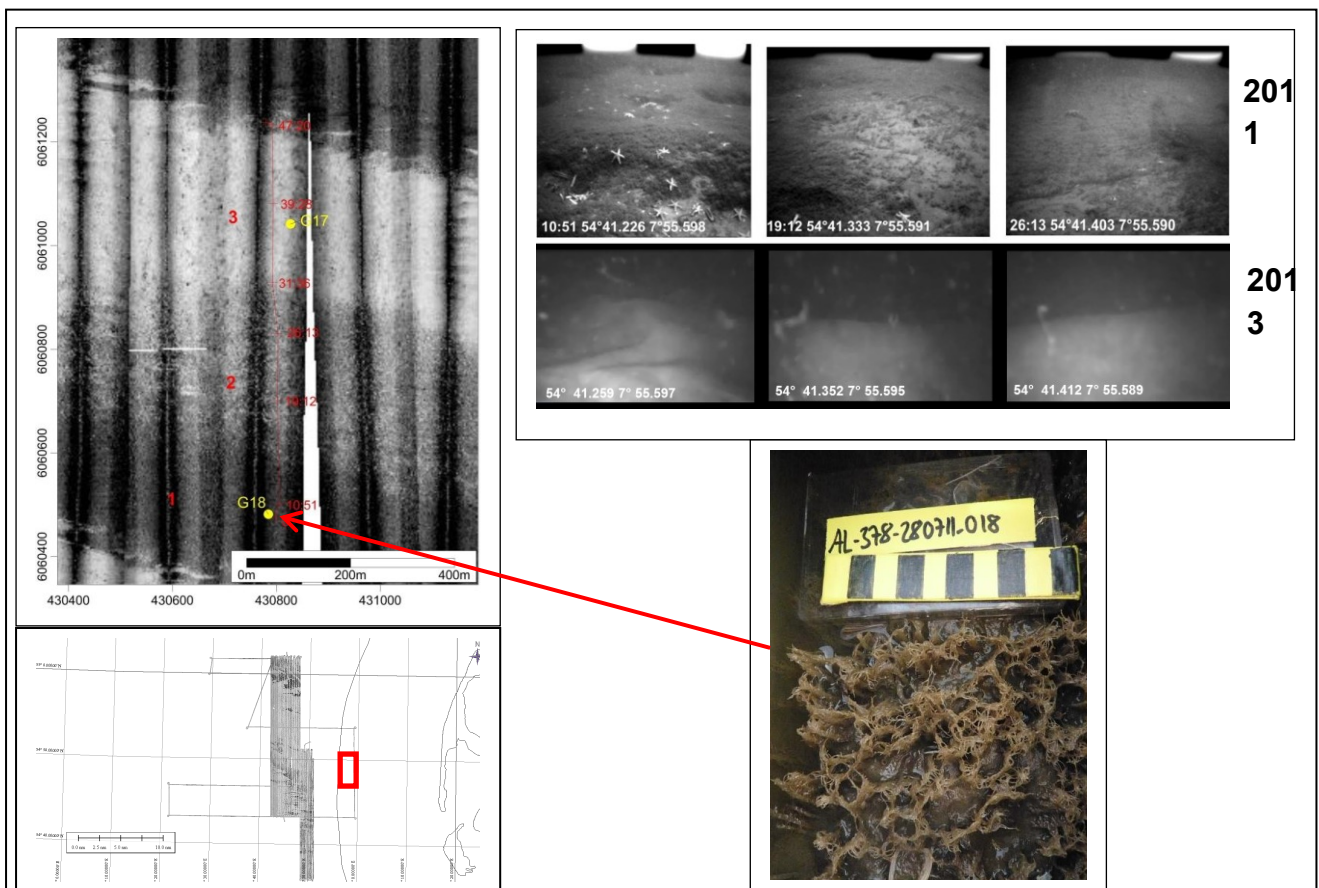


Fig. 4: Comparison of area with *Lanice Conchilega* population from 2011 and from 2013 shortly after a storm. Sidescan Sonar mosaic, UWV – screenshots from 2011 and GS picture is taken from the Cruise Report of AL 378.

Areas with large scaled sorted bedforms (Fig. 5) which are assumed to be an indicator for sediment dynamics and particularly for a sediment starving shelf areas (Ferrini & Flood 2005, Goff et al. 2005, Diesing et al. 2006) could be observed. The BSH sediment chart 2900 ('Figge chart'), which is the only map showing a comprehensive picture of the sediment distribution for the German Bight, obviously shows that structures derived from Side Scan Sonar mapping do not correspond with the structures of the map. Although they show the same striking, the Sidescan Sonar picture shows a much more detailed and patchy distribution pattern compared to the Figge chart. Beside the E-W striking structures, which spread over the whole study site, small fields of small scale different types of sediments (bright and dark areas) can be observed showing sharp contacts. Grain size distribution patterns do not show smooth and gradual transitions but sudden discontinuities from fine sand to coarse sand or gravel.

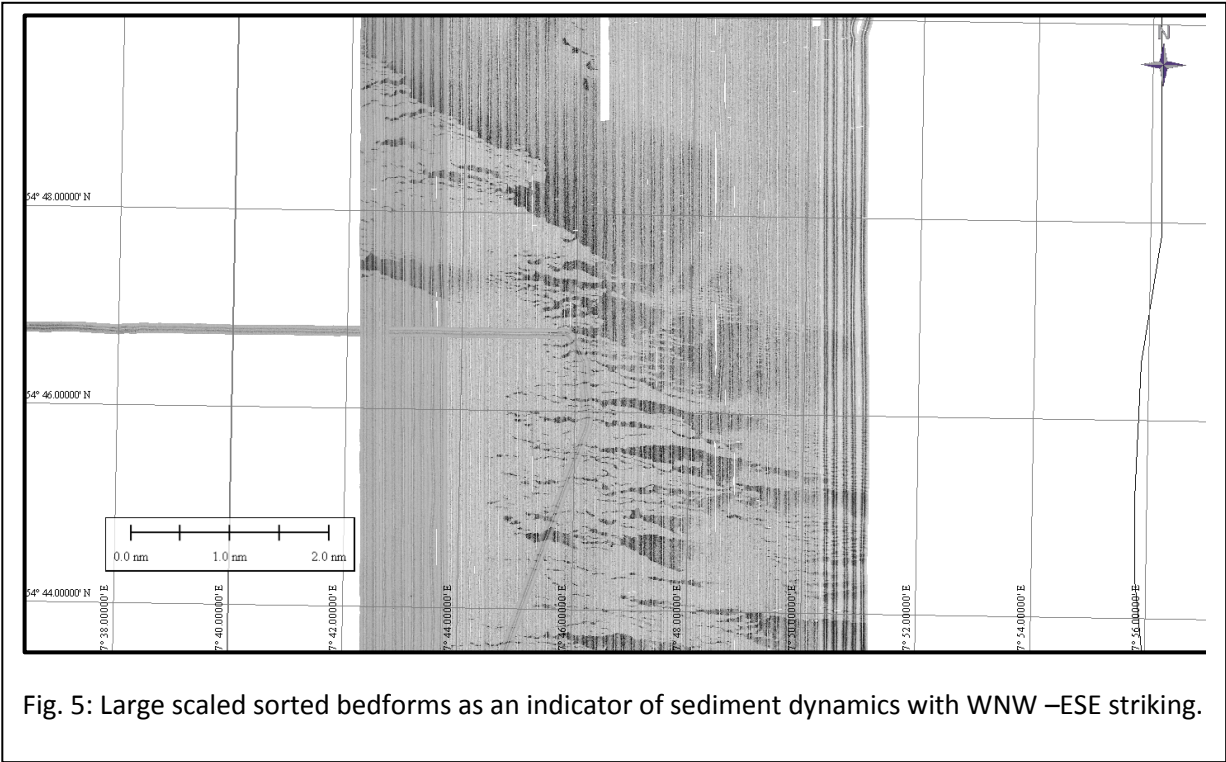


Fig. 5: Large scaled sorted bedforms as an indicator of sediment dynamics with WNW –ESE striking.

## **Acknowledgements**

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## **References**

Ferrini, V.L., Flood, R.D., 2005. A comparison of Rippled Scour Depressions identified with multibeam sonar: Evidence of sediment transport in inner shelf environments. – *Continental Shelf Research*, 25, 1979 – 1995.

Figge, K., 1981. Sedimentverteilung in der Deutschen Bucht. Maßstab 1 : 250.000. DHI Karte Nr. 2900 mit Begleitheft.

Goff, J.A., Mayer, L.A., Traykovski, P., Buynevich, R.W., Raymond, R., Glang, G., Evans, R.L., Olson, H., Jenkins, C., 2005. Detailed investigations of sorted bedforms, or "rippled scour depressions", within the Martha's Vineyard Coastal Observatory, Massachusetts. – *Continental Shelf Research*, 25, 461 – 484.

Diesing, M., Kubicki, A., Winter, C., Schwarzer, K., 2006. Decadal scale stability of sorted bedforms, German Bight, southeastern North Sea. *Cont. Shelf Res.*, 26, 902-916.

## Appendices

Hydroacoustic profiling:

No.	Date	Time	Lat	Long	Remarks
Profil 1	30. 05 2013	03:33:51	54° 36.432	07° 51.308	start
Profil 1	30. 05 2013	05:51:48	54° 50.160	07°50.960	end
Profil 2	30. 05 2013	06:10:56	54° 49.824	07° 50.745	start
Profil 2	30. 05 2013	07:27:22	54° 36.222	07° 51.156	end
Profil 3	30. 05 2013	08:35:02	54°36.161	07° 51.036	start
Profil 3	30. 05 2013	11:15:04	54°51.036	07°50.596	end
Profil 4	30. 05 2013	11:15:04	54°50.970	07°50.438	start
Profil 4	30. 05 2013	13:53:24	54°36.058	07°50.855	end
Profil 5	30. 05 2013	13:53:24	54°36.194	07°50.640	start
Profil 5	30. 05 2013	16:28:12	54°50.350	07°50.540	end
Profil 6	30. 05 2013	16:28:12	54°50.357	07°50.551	start
Profil 6	30. 05 2013	19:03:16	54°36.058	07°50.530	end
Profil 7	30. 05 2013	19:03:16	54°36.101	07°50.310	start
Profil 7	30. 05 2013	21:40:24	54°51.002	07°49.948	end
Profil 8	30. 05 2013	21:40:24	54°51.000	07°49.854	start
Profil 8	31. 05 2013	00:15:30	54°36.135	07°50.155	end
Profil 9	31. 05 2013	00:15:30	54°36.177	07°49.978	start
Profil 9	31. 05 2013	02:52:32	54°50.022	07°49.579	end
Profil 10	31. 05 2013	02:52:32	54°50.999	07°49.416	start
Profil 10	31. 05 2013	05:31:48	54°36.168	07°49.816	end
Profil 11	31. 05 2013	12:15:62	54°36.301	07°49.635	start
Profil 11	31. 05 2013	15:16:00	54°51.028	07°49.266	end
Profil 12	31. 05 2013	15:16:00	54°51.002	07°49.076	start
Profil 12	03. 06 2013	19:27:22	54°36.149	07°49.423	end
Profil 13	03. 06 2013	19:27:22	54°36.149	07°49.327	start
Profil 13	03. 06 2013	22:28:00	54°51.997	07°48.953	end
Profil 14	03. 06 2013	22:28:00	54°51.033	07°48.707	start

Profil 14	04. 06 2013 02:32:08	54°36.140	07°49.147	end
Profil 15	04. 06 2013 02:32:08	54°36.165	07°48.980	start
Profil 15	04. 06 2013 05:17:58	54°50.996	07°48.576	end
Profil 16	04. 06 2013 05:17:58	54°51.007	07°48.576	start
Profil 16	04. 06 2013 07:57:00	54°36.184	07°48.837	end
Profil 17	04. 06 2013 07:57:00	54°36.171	07°48.590	start
Profil 17	04. 06 2013 11:32:10	55°01.988	07°47.904	end
Profil 18	04. 06 2013 11:32:10	55°01.839	07°47.744	start
Profil 18	04. 06 2013 15:34:18	54°43.659	07°48.290	end
Profil 19	04. 06 2013 15:34:18	54°43.683	07°48.105	start
Profil 19	04. 06 2013 18:44:28	55°01.970	07°47.561	end
Profil 20	04. 06 2013 18:44:28	55°01.940	07°47.395	start
Profil 20	04. 06 2013 21:57:38	54°43.646	07°47.883	end
Profil 21	04. 06 2013 21:57:38	54°43.665	07°47.778	start
Profil 21	05. 06 2013 01:09:30	55°01.976	07°47.236	end
Profil 22	05. 06 2013 01:09:30	55°01.928	07°47.087	start
Profil 22	05. 06 2013 04:18:30	54°43.678	07°47.606	end
Profil 23	05. 06 2013 04:18:30	54°43.699	07°47.453	start
Profil 23	05. 06 2013 07:28:04	55°01.968	07°46.988	end
Profil 24	05. 06 2013 15:26:13	54°01.960	07°46.888	start
Profil 24	05. 06 2013 18:33:14	54°43.661	07°47.265	end
Profil 25	05. 06 2013 18:33:14	54°43.659	07°47.097	start
Profil 25	05. 06 2013 22:07:28	55°01.940	07°46.552	end
Profil 26	05. 06 2013 22:07:28	55°01.938	07°46.383	start
Profil 26	06. 06 2013 01:42:32	54°43.657	07°46.929	end
Profil 27	06. 06 2013 06:49:36	54°43.656	07°46.762	start
Profil 27	06. 06 2013 15:11:40	55°01.936	07°46.214	end
Profil 28	06. 06 2013 15:11:40	55°01.935	07°46.045	start
Profil 28	06. 06 2013 18:40:40	54°43.654	07°46.594	end
Profil 29	06. 06 2013 18:40:40	54°43.652	07°46.426	start

Profil 29	06. 06 2013 21:53:22	55°01.933	07°45.876	end
Profil 30	06. 06 2013 21:53:22	55°01.931	07°45.707	start
Profil 30	07. 06 2013 01:03:48	54°43.651	07°46.259	end
Profil 31	07. 06 2013 01:03:48	54°43.649	07°46.091	start
Profil 31	07. 06 2013 04:19:04	55°01.930	07°45.538	end
Profil 32	07. 06 2013 04:19:04	55°01.928	07°45.369	start
Profil 32	07. 06 2013 07:25:32	54°43.647	07°45.923	end
Profil 33	07. 06 2013 07:25:32	54°43.646	07°45.756	start
Profil 33	07. 06 2013 11:38:22	55°01.926	07°45.200	end
Profil 34	07. 06 2013 11:38:22	55°01.925	07°45.031	start
Profil 34	07. 06 2013 14:50:50	54°43.644	07°45.588	end
Profil 35	07. 06 2013 14:50:50	54°43.642	07°45.420	start
Profil 35	07. 06 2013 17:58:20	55°01.923	07°44.863	end
Profil 36	07. 06 2013 17:58:20	55°01.921	07°44.694	start
Profil 36	07. 06 2013 21:12:50	54°43.641	07°45.253	end
Profil 37	07. 06 2013 21:12:50	54°43.639	07°45.085	start
Profil 37	08. 06 2013 00:23:50	55°01.919	07°44.525	end
Profil 38	08. 06 2013 00:23:50	55°01.918	07°44.356	start
Profil 38	08. 06 2013 18:10:42	54°43.637	07°44.917	end
Profil 39	08. 06 2013 18:10:42	54°43.636	07°44.750	start
Profil 39	08. 06 2013 21:41:44	55°01.916	07°44.187	end
Profil 40	08. 06 2013 21:41:44	55°01.914	07°44.018	start
Profil 40	09. 06 2013 00:36:46	54°43.634	07°44.582	end
Profil 41	09. 06 2013 00:36:46	54°43.632	07°44.414	start
Profil 41	09. 06 2013 03:45:22	55°01.912	07°43.849	end
Profil 42	09. 06 2013 03:45:22	55°01.911	07°43.680	start
Profil 42	09. 06 2013 07:07:46	54°43.630	07°44.247	end
Profil 43	09. 06 2013 07:07:46	54°43.629	07°44.079	start
Profil 43	09. 06 2013 10:22:00	55°01.909	07°43.511	end
Profil 44	09. 06 2013 10:22:00	55°01.907	07°43.342	start

Profil 44	09. 06 2013 13:34:42	54°43.627	07°43.911	end
Profil 45	09. 06 2013 13:34:42	54°43.625	07°43.744	start
Profil 45	09. 06 2013 16:40:24	55°01.905	07°43.173	end
Profil 46	09. 06 2013 16:40:24	55°01.904	07°43.004	start
Profil 46	09. 06 2013 20:09:14	54°43.623	07°43.576	end
Profil 47	09. 06 2013 20:09:14	54°43.622	07°43.408	start
Profil 47	09. 06 2013 23:22:42	55°01.902	07°42.835	end
Profil 48	09. 06 2013 23:22:42	55°01.900	07°42.666	start
Profil 48	10. 06 2013 02:34:18	54°43.620	07°43.241	end
Profil 49	10. 06 2013 02:34:18	54°43.618	07°43.073	start
Profil 49	10. 06 2013 08:43:04	55°01.898	07°42.498	end
Profil 50	10. 06 2013 08:43:04	55°01.897	07°42.329	start
Profil 50	10. 06 2013 14:21:50	54°43.616	07°42.905	end
Profil 51	10. 06 2013 14:21:50	54°43.615	07°42.738	start
Profil 51	10. 06 2013 16:01:26	55°01.925	07°42.224	end
Profil 52	10. 06 2013 16:01:26	55°01.904	07°42.221	start
Profil 52	10. 06 2013 18:12:18	54° 43.593	07°42.733	end
Querprofil 1	10. 06 2013 18:12:18	54° 43.593	07°42.733	start
Querprofil 1	11. 06 2013 17:18:14	55°01.948	07°42.059	end
Profil 53	11. 06 2013 17:18:14	55°01.948	07°42.059	start
Profil 53	11. 06 2013 20:40:30	54°43.623	07°42.452	end
Profil 54	11. 06 2013 20:40:30	54°43.575	07°42.414	start
Profil 54	11. 06 2013 23:53:32	55°01.952	07°41.870	end
Querprofil 2	11. 06 2013 23:53:32	55°01.952	07°41.870	start
Querprofil 2	12. 06 2013 02:46:44	55°00.093	07°41.528	end

Grab sampling:

Name	Date	Time [UTC]	Longitude E [°dmin]	Latitude N [°dmin]	Water Detph [m]	Comment
BG20130612_01	12.06.2013	5:22	7°47.500	55°01.674	19,00	
BG20130612_02	12.06.2013	5:46	7°42.957	55°01.571	20,68	

BG20130612_03	12.06.2013	6:07	7°43.532	55°00.754	20,50	
BG20130612_04	12.06.2013	6:07	7°47.560	55°00.511	19,00	
BG20130612_05	12.06.2013	6:41	7°47.504	55°00.409	18,70	
BG20130612_06	12.06.2013	6:50	7°46.339	54°59.486	19,20	
BG20130612_07	12.06.2013	7:12	7°45.235	54°58.643	22,20	
BG20130612_08	12.06.2013	7:31	7°43.725	54°57.928	21,20	
BG20130612_09	12.06.2013	7:53	7°45.832	54°55.925	20,00	
BG20130612_10	12.06.2013	8:21	7°43.178	54°53.833	19,20	
BG20130612_11	12.06.2013	8:42	7°42.872	54°52.410	20,00	
BG20130612_12	12.06.2013	8:59	7°43.996	54°52.290	18,30	
BG20130612_13	12.06.2013	9:13	7°45.277	54°52.022	18,50	
BG20130612_14	12.06.2013	9:31	7°47.712	54°51.214	18,50	
BG20130612_15	12.06.2013	9:59	7°49.249	54°50.154	18,25	
BG20130612_16	12.06.2013	10:31	7°50.317	54°48.363	17,90	
BG20130612_17	12.06.2013	11:07	7°45.080	54°48.549	18,47	
BG20130612_18	12.06.2013	11:26	7°45.120	54°46.961	19,90	
BG20130612_19	12.06.2013	11:47	7°47.533	54°45.885	18,59	
BG20130612_20a	12.06.2013	11:57	7°47.483	54°45.694	18,41	
BG20130612_20b	12.06.2013	/	7°47.476	54°45.699	18,36	/: no data
BG20130612_20c	12.06.2013	/	7°47.473	54°45.705	18,40	/: no data
BG20130612_21	12.06.2013	12:19	7°46.128	54°45.240	20,13	
BG20130612_22	12.06.2013	12:42	7°43.950	54°44.359	21,40	
BG20130612_23	12.06.2013	13:00	7°45.605	54°43.856	20,50	
BG20130612_24	12.06.2013	13:15	7°46.199	54°43.466	19,94	
BG20130612_25	12.06.2013	13:37	7°47.844	54°43.711	19,00	
BG20130612_26	12.06.2013	13:58	7°49.964	54°42.991	/	
BG20130612_27	12.06.2013	14:18	7°48.749	54°41.437	16,00	
BG20130612_28	12.06.2013	14:31	7°49.156	54°41.018	18,00	
BG20130612_29	12.06.2013	14:33	7°49.237	54°40.886	15,00	
BG20130612_30	12.06.2013	/	7°50.879	54°37.186	19,30	/: no data

Vibro Corer stations:

Vibro Corer Station	Date	Time [UTC]	Longitude [°dmin]	E	Latitude [°dmin]	N	Water Detph [m]
VC 20130610_01	10.06.2013	06:13	7°43.763		54°54.807		19,51
VC 20130610_01b	10.06.2013	06:55	7°43.742		54°54.820		20,15
VC 20130610_01c	10.06.2013	13:46	7°43.740		54°54.807		21,66
VC 20130611_01	11.06.2013	07:50	7°45.634		54°47.496		18,00
VC 20130611_02	11.06.2013	08:21	7°45.825		54°47.016		17,60



VC 20130611_02b	11.06.2013	08:40	7°45.822	54°47.026	17,87
VC 20130611_02c	11.06.2013	08:52	7°45.818	54°47.013	18,20

Box Corer stations:

Grab Sample Station	Date	Time [UTC]	Longitude [°dmin] E	Latitude [°dmin] N	Water Detph [m]
KG 20130531_01	31.05.2013	08:20	7°50.833	54°40.296	14,50
KG 20130531_01b	31.05.2013	08:40	7°50.881	54°40.285	16,40
KG 20130531_01c	31.05.2013	08:54	7°50.915	54°40.302	14,40
KG 20130531_02	31.05.2013	09:53	7°50.885	54°41.636	12,66
KG 20130531_02b	31.05.2013	10:03	7°50.879	54°41.645	12,88
KG 20130531_03	31.05.2013	10:23	7°50.880	54°41.732	12,94
KG 20130531_04	31.05.2013	11:11	7°50.997	54°43.414	14,40
KG 20130531_05a	31.05.2013	11:40	7°57.578	54°43.997	15,59
KG 20130531_05b	31.05.2013	11:52	7°50.576	54°43.997	15,65
KG 20130531_06a	31.05.2013	12:21	7°50.562	54°44.099	16,11
KG 20130531_06b	31.05.2013	12:37	7°50.546	54°44.101	16,10
KG 20130605_07	05.06.2013	10:44	7°47.992	54°57.718	22,03
KG 20130605_08	05.06.2013	12:13	7°48.810	54°48.490	18,16
KG 20130605_09	05.06.2013	12:50	7°50.664	54°48.083	17,77
KG 20130605_09b	05.06.2013	13:01	7°50.674	54°48.075	17,21
KG 20130605_10	05.06.2013	13:35	7°48.248	54°47.211	16,84
KG 20130605_10b	05.06.2013	13:41	7°48.247	54°47.205	16,70
KG 20130605_10c	05.06.2013	13:50	7°48.231	54°47.211	16,99
KG 20130605_11	05.06.2013	14:09	7°48.640	54°46.779	15,93
KG 20130605_12	05.06.2013	14:51	7°48.596	54°42.659	15,73
KG 20130605_13	05.06.2013	15:48	7°50.688	54°40.223	13,89
KG 20130605_14	05.06.2013	16:15	7°48.972	54°39.871	13,49
KG 20130605_14b	05.06.2013	16:24	7°48.961	54°39.872	13,94
KG 20130605_14c	05.06.2013	16:32	7°48.964	54°39.874	14,01
KG 20130611_15	11.06.2013	15:14	7°50.449	54°44.071	16,60
KG 20130611_15b	11.06.2013	15:22	7°50.444	54°44.070	16,70
KG 20130611_16	11.06.2013	16:00	7°47.848	54°46.905	17,50
KG 20130611_17	11.06.2013	16:24	7°45.803	54°47.010	18,70
KG 20130611_18	11.06.2013	16:44	7°45.626	54°47.507	18,80

CTD

No	Date	Time (UTC)	Latitude	Longitude
1	30. 05. 2013	04:06:40	54° 35,816'	07° 52,325'
2	07.06.2013	15:22:26	55° 02,614'	07° 45,378'