

**FS Alkor AL511 17/10 2018
(25.06.-12.07.2018)**

Cruise Report / Fahrtbericht

Der geologisch/ sedimentologische Aufbau und die Habitatverteilung im Übergangsbereich Watt – Schelf zwischen der Amrumbank und der Eiderrinne

Nordfriesland Süd

**Institut für Geowissenschaften
Sedimentologie, Küsten- und Schelfgeologie**

**Klaus Schwarzer
Gianna Persichini
Tim Willems**

Content

1. Introduction.....	5
2. Participants of the cruise:.....	1
3. Cruise Narrative.....	2
4. Methods	6
5. Preliminary scientific results	7
6. References	9
7. Appendix.....	10

Abbreviations used in this report:

Benthos 1624 - Sidescan Sonar (towed)	SSS
Innomar Subbottom Profiler	SES
Acoustic Doppler Current Profiler	ADCP
HELCOM Grab Sampler	GS
Giant Box Corer	GBC
Underwater Video System	UWV
Conductivity – Temperature – Depth probe	CTD
Institute of Geosciences	IfG
Christian Albrechts Universität zu Kiel	CAU

1. Participants of the cruise

Dr. Klaus Schwarzer (chief scientist), IfG, CAU

Dr. Peter Richter (scientist), IfG, CAU (only 25.06.2018)

Carolin Wallmeier (scientist, BSc student), IfG, CAU

Charlotte Görtz (scientist, BSc student), IfG, CAU

Gianna Persichini (scientist, PhD student), IfG, CAU

Giuliana Diaz (scientist, MSc student), IfG, CAU

Jasmin Hiller (scientist, BSc student), IfG, CAU

Philipp Tabelow (scientist, BSc student), IfG, CAU

Tim Willems (scientist, PhD student), IfG, CAU (from 01.07. – 12.07.2018)

Vanessa Costa (scientist, MSc student), University Federal Rio Grande do Norte (UFRN), Natal (Brazil)

2. Cruise Narrative

Mo. 25.06.2018

Weather: Sunny
08:30 Departing Kiel, transit through Kiel Canal
19:00 Arrival in Brunsbüttel

Tu. 26.06.2018

Weather: Sunny; wind dir.: NW; wind vel. 3 Bft.
10:14 Arrival in working area
10:29 CTD station
10:41 Start of profiling (SSS; SES; ADCP)

We. 27.06.2018

Weather: Sunny; wind dir.: WSW; wind vel.: 3 Bft.
00:00-24:00 Profiling (SSS; SES; ADCP)

Th. 28.06.2018

Weather: Sunny; wind dir.: SW; wind vel.: 4 Bft.
00:00-24:00 Profiling (SSS; SES; ADCP)

Fr. 29.06.2018

Weather: Sunny; wind dir.: WSW; wind vel.: 4 Bft.
00:00-24:00 Profiling (SSS; SES; ADCP)

Sa. 30.06.2018

Weather: Sunny; wind dir.: SSW; wind vel.: 3 Bft.
04:49: End of profiling (SSS; SES; ADCP)
05:02 CTD station
06:13-15:05 GS
15:56 Start of profiling (SSS; SES; ADCP)

Su. 01.07.2018

Weather: Sunny; wind dir.: SE; wind vel.: 4 Bft.
03:56 End of profiling (SSS; SES; ADCP)
04:03 CTD station
04:41-09:28 GS
17:33 Start of profiling (SSS; SES; ADCP)

Mo. 02.07.2018

Weather: Sunny; wind dir.: SW; wind vel.: 2 Bft.
04:52 End of profiling (SSS; SES; ADCP)
04:58 CTD station
05:57-08:41 GS
08:53 CTD station
09:55-10:47 GBC
11:47 Start of profiling (SSS; SES; ADCP)

Tu. 03.07.2018

Weather: Cloudy to sunny; wind dir.: NW; wind vel.: 4 Bft.
05:45 End of profiling (SSS; SES; ADCP)
05:49 CTD station
06:03-08:29 GS

08:50-09:23 UWV
09:54-10:54 GBC
11:07 CTD station
11:48 Start of profiling (SSS; SES; ADCP)

We. 04.07.2018

Weather: Cloudy to sunny; wind dir.: W; wind vel.: 3 Bft.
05:45 End of profiling (SSS; SES; ADCP)
05:50 CTD
06:05-08:18 GS
08:45-09:38 UWV
10:05-11:20 GBC
12:07 Start of profiling (SSS; SES; ADCP)

Th. 05.07.2018

Weather: Cloudy to sunny; wind dir.: WNW; wind vel.: 4 Bft.
06:12 End of profiling (SSS; SES; ADCP)
06:21 CTD station
06:33-08:50 GS
09:07-10:00 UWV
10:35-11:02 GBC
11:40 Start of profiling (SSS; SES; ADCP)

Fr. 06.07.2018

Weather: Cloudy; wind dir.: NW; wind vel.: 6 Bft.
05:58 End of profiling (SSS; SES; ADCP)
06:04 CTD station
06:21-08:35 GS
08:49 CTD station
08:55 Transit to Helgoland due to bad weather forecast

Sa. 07.07.2018

Weather: Cloudy and rainy
09:00-17:00 Data processing; further organisation; Helgoland port

Su. 08.07.2018

Weather: Sunny; wind dir.: NW; wind vel.: 5 Bft.
07:00 Departure Helgoland port
08:58 CTD station
07:07-12:25 GS
12:38 CTD
13:08-16:28 Start of profiling (SSS; SES; ADCP)
16:30 Transit to Helgoland due to bad weather forecast

Mo. 09.07.2018

Weather: cloudy and rainy
09:00-17:00 Processing; further organisation; Helgoland port

Tu. 10.07.2018

Weather: Sunny; wind dir.: NNE; wind vel.: 5 Bft.
07:03 CTD
07:11 Start of profiling (SSS; SES; ADCP)

We. 11.07.2018

Weather: Cloudy to sunny; wind dir.: E; wind vel.: 4 Bft.
06:20 End of profiling (SSS; SES; ADCP)
06:23 CTD station
06:32-11:35 GS
11:45 Transit to Cuxhaven,

Th. 12.07.2018

Weather: Sunny
09:30 Arrival in Cuxhaven; disembarking equipment

3. Introduction

The research cruise AL-511 was part of the research project "Nordfriesland Süd – Der geologisch/sedimentologische Aufbau und die Habitatverteilung im Übergangsbereich Watt – Schelf zwischen der Amrumbank und der Eiderinne" (the geological / geological built up and the habitat distribution between Amrum Bank and Eider channel)", which is a cooperation between the Agency for Coastal Protection, National Park and Marine Conservation of Schleswig-Holstein (LKN), the State Office for Agriculture, Environment and Rural Areas Schleswig-Holstein (LLUR) and the Institute of Geosciences (working groups Coastal Geology and Sedimentology; Hydroacoustics and Marine Geophysics) of Kiel University (CAU). The cruise AL-511 is a follow up of previous cruises (L17-08, AL496, L18-06) which have been carried out in the frame of the same project.

Main objective of cruise AL-511 was the acquisition of high resolution hydroacoustic data (Figure 1 shows the tracklines of all hydroacoustic profiles) and sediment data to obtain information about the interdependence and interactions between geological structures in the subsurface, the physical properties of the seafloor (morphology and sediment distribution), the hydrodynamic conditions of tides and the setting in the water column. Two areas at the distal part of the two tidal channels Süderhever and Eider have been mapped repetitive. By collecting sediment samples with a HELCOM grab sampler and giant box corer, a special focus was put on the distribution of the razor clams of the genus *Ensis*.

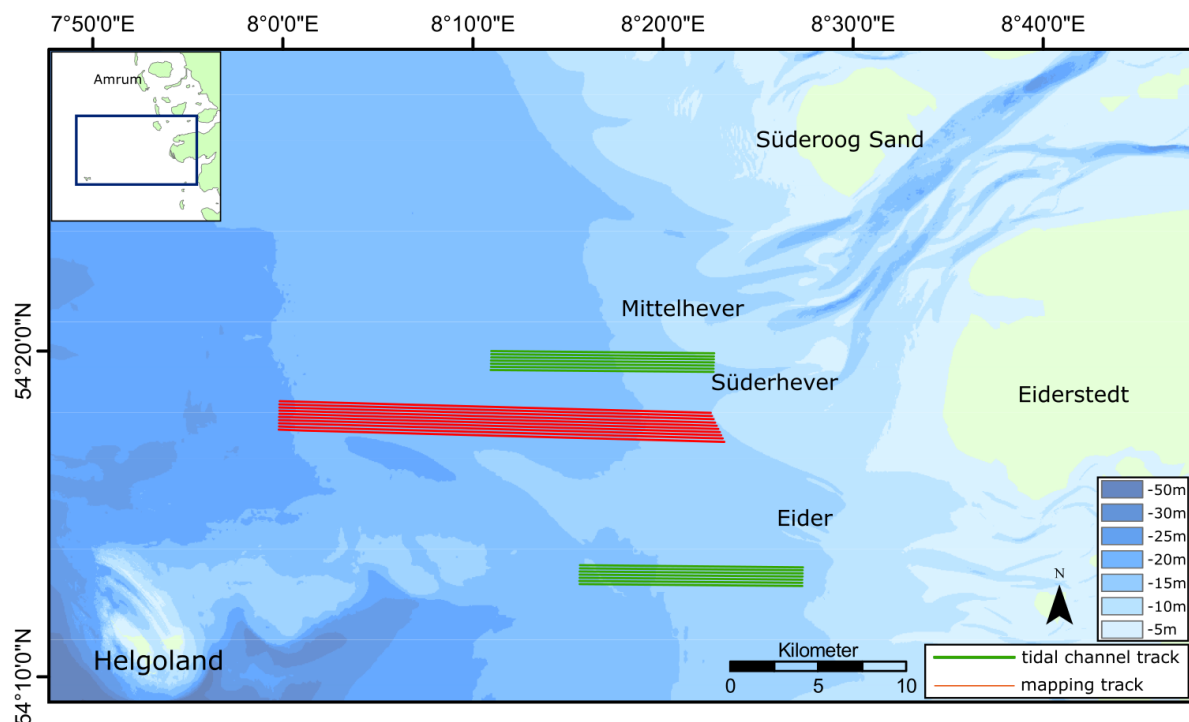


Figure 1: Investigation area and track lines. The green lines show the repeated SSS-survey lines to investigate the stability of bedforms and sediment distribution patterns during a whole spring – neap tidal cycle. The red lines show track lines that were not completed during the cruise L18-06 in May/June 2018. Whenever there was time, this mapping was continued.

4. Methods

To obtain information about the sedimentological and geological built up of the seafloor, hydroacoustic data was acquired by applying the towed dual frequency (100 and 400 kHz) Teledyne Benthos SIS 1624 Sidescan Sonar System (SSS) (see Figure 2).



Figure 2: Overview of some of the used methods /from left to right): Sidescan sonar system attached to bouancy element, underwater video camera, HELCOM grab sampler, giant box corer.

For towing the SSS-System and data transfer a McCartney Cormac 4 winch was used. In between the towfish and the winch, a depressor weight serves for absorbing abrupt tensile forces on the SSS due to waves and ships movement. This towing configuration keeps the sonar system in a constant depth (Figure 3).

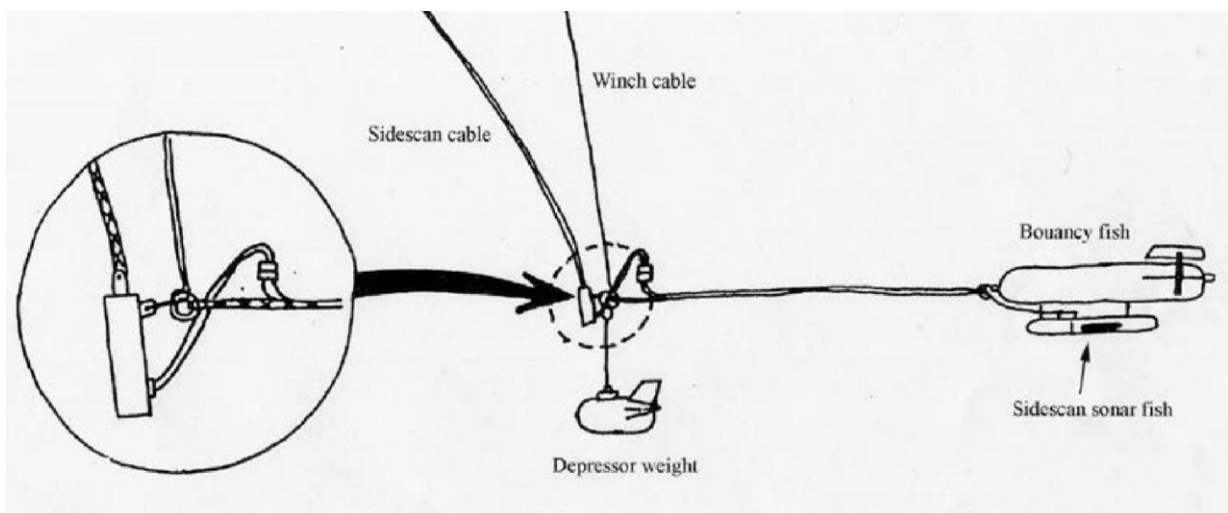


Figure 3: Towing configuration including a depressor weight for improving stability of SSS (Schwarzer and Wittbrodt, 2017).

By measuring the intensities of the backscattering acoustic signal, it is possible to draw conclusions about morphology and properties of the seafloor and sometimes the distribution of certain benthic species (Blondel & Murton, 1997; Lurton, 2002; Blondel, 2009). The range across track was set to 100 m to each side. Line spacing between the profiles was around 180m which results in a full coverage map with an overlap of about 20 m. After post-processing the data, high resolving acoustic images of the SSS can be used to elaborate geological facies of the seafloor (Lurton, 2002).

For ground truthing, sediment samples were collected with a HELCOM grab sampler (GS). By using an underwater video system, it is possible to get rough information about morphological structures, concentration of particles in suspension and benthic population on the seafloor. In order to gain more detailed information about the sea floor a giant box corer (GBC) was applied. The advantage of this method is that a lot of undisturbed material (structure of sediment layers are preserved) can be collected with one single grab. In addition this device penetrates deeper into the sediment compared to the HELCOM grab. Benthic organisms living in deeper layers can be sampled applying this method. Figure 4 shows the position of all sampling stations.

A high resolution parametric sediment echosounder (INNOMAR SES-2000 medium) operating with 100 kHz as primary (85 – 115 kHz frequency band for the second primary frequency) and resulting 8 kHz as secondary frequency, was applied to obtain further information about the subsurface built-up. According to Wunderlich & Müller (2003) the vertical resolution is smaller than 6 cm. During hydroacoustic measurements the vessel speed did not exceed 4.5 knots.

Current measurements were done by applying an Acoustic Doppler current profiler (ADCP).

In order to calibrate the hydroacoustic recordings, CTD-measurements were carried out regularly. Furthermore an optical sensor for measuring the turbidity was attached to the CTD-probe.

The data set focuses on three local areas. Two areas (of 13,2 and 14,4 km² in size) are located in the outer parts of the two tidal channels Süderhever and Eider. Landward limitation was due to low water-depth. In order to examine the hydrodynamic influence on sediment and habitat distribution, repeated measurements were carried out.

Additionally, residual tracks belonging to the research cruise L18-06 were mapped whenever it was possible to benefit from time gaps (see mapping track (red lines) in Figure 1).

5. Preliminary scientific results

Merged in an overview, the SSS mosaics show changes in backscatter intensity striking NW to SE (black arrows in Figure 4), what seems to correlate with the contour lines of the bathymetry. In several sediment samples descending from the NW–SE striking sections with higher backscatter intensity the polychaete *Lanice conchilega* was found. *L. conchilega* is a tube building worm using sand grains and shell fragments as construction element (see Figure 5). *L. conchilega* colonies (e.g. seen in underwater video footage in Figure 6) have an impact on the roughness of the sea floor and thus can be detected in Side-Scan Sonar im-

ages (Heinrich et al., 2017). Possibly the data shows preferred zones for *L. conchilega* colonies dependent on water depth slope of the sea floor and hydrodynamic conditions.

Concerning repeated measurements in the area of the tidal channels, many structures can be detected in different measurement cycles, which indicates that over small time scales they are more or less stable in their location and form (see Figure 7). A quantitative analysis, visualizing the changes should be done in further work.

Almost all GBC samples contained high numbers of the razor clam *Ensis* sp.. Partially *Ensis directus* which is an invasive species, originally living at the east coast of the United States and invaded into the North Sea in the late seventies by transport in ballast tanks of container ships (von Cosel, 1982) could be identified. For seven GBC sediment samples, the distribution of *Ensis* sp. was documented regarding their occurrence and their sizes. *Ensis* sp. larger than 3 cm are rarely seen in HELCOM grab samples, which is linked to a smaller penetration depth in combination with quickly (up to 1 cm/sec) into the deeper parts of the sediment fleeing razor clams (Alexander, 1979, Tulp et al. 2010, Winter and Hosoi, 2011). In Figure 8 (right picture) a 15 cm deep trace of escape can be observed in a GBC sample.

Figure 9 shows some CTD data collected in the area of the Eider tidal channel. Temperature gradients over the depth are not observable.

SES-data was collected in order to investigate the vertical architecture of the seafloor and to investigate whether there are links between surface morphology and subsurface geological built up. Figure 10 shows three examples of west-east striking SES-profiles. For example extraordinary differences between seafloor- heights along the profile of Figure 10a can partly be linked to distinct dipping reflectors in the subsurface. At some locations, where dipping reflectors are cut by the surface, clearly coarser material (gravel) lies on the seafloor. Coarser material depicts as dark patches in the SSS- mosaic.

In contrast, clear geological structures which do not influence the surface morphology can be seen in Figure 10b. Structures, representing incised valleys can be observed below a more or less horizontal reflector. The horizontal reflector cuts the valleys at their upper end indicating an erosive horizon, which is overlain by transgressive marine deposits. The marine sediments are displayed in greenish colours. Their internal reflections, caused by small-scaled local density differences and layers of shell fragments, create a distinct seismic picture. These sediments build up the uppermost meter of the marine deposits in this location.

Figure 10c shows a pronounced, small scaled morphology at the surface. This increase of surface- roughness can produce differences in the backscatter of an SSS on the one hand, and influences the sediment dynamics on the other hand. The increased roughness may be a product of high biological activity. A further difference to the other two SES- profiles is the clear horizontal stratification of sediment layers, indicated by various small reflectors close to the surface. Trapped gas limits the penetration depth of seismic waves. Therefore, the eastern part of the profile shows less horizontal layers, but blur parts up to 13 m depth.

6. References

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7. Appendix

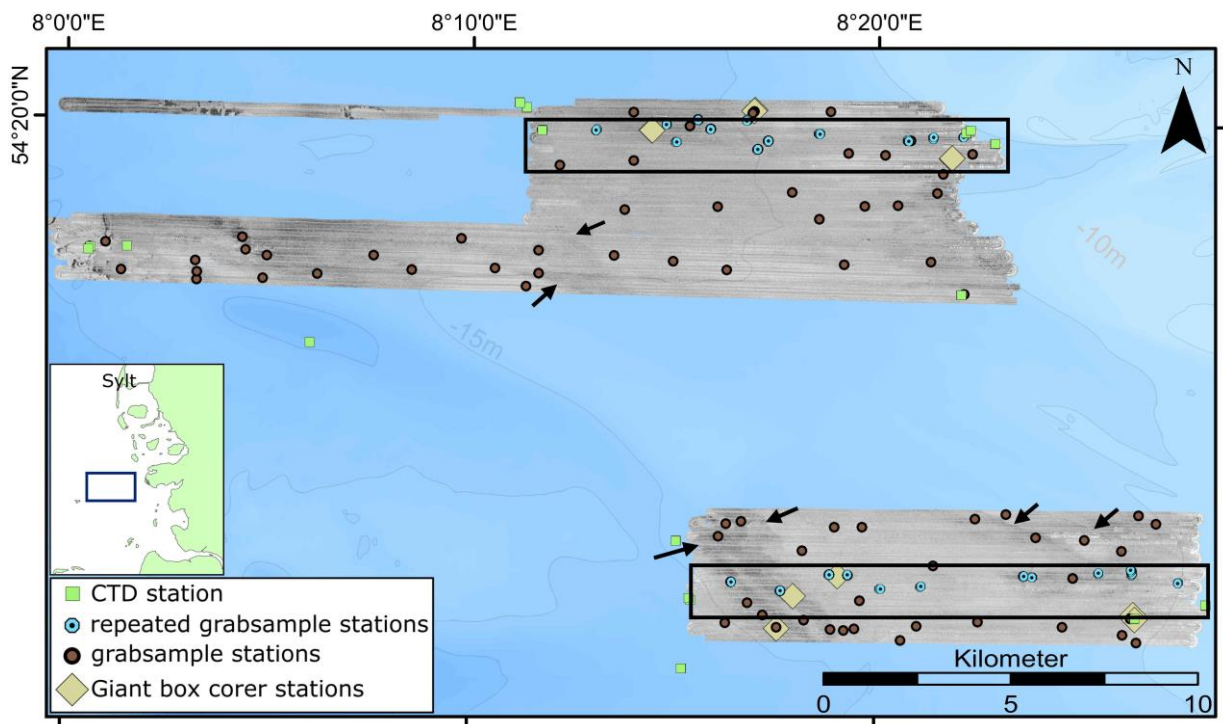


Figure 4: View of combined surface data. The black rectangles show the subsections where repeated measurements have been done (north: Hever, south: Eider). Black arrows highlight NW-SE striking variations in backscatter intensities.



Figure 5: *L. conchilega* tubes can reach a length of up to 40 cm (Ziegelmeier 1969). The adult species (present example was taken from box corer sample AL511_20180702_GKG_1) can include bigger shell fragments in the tube's structure.



Figure 6: *L. conchilega* colony in underwater video recording. On top, several starfishes can be seen.

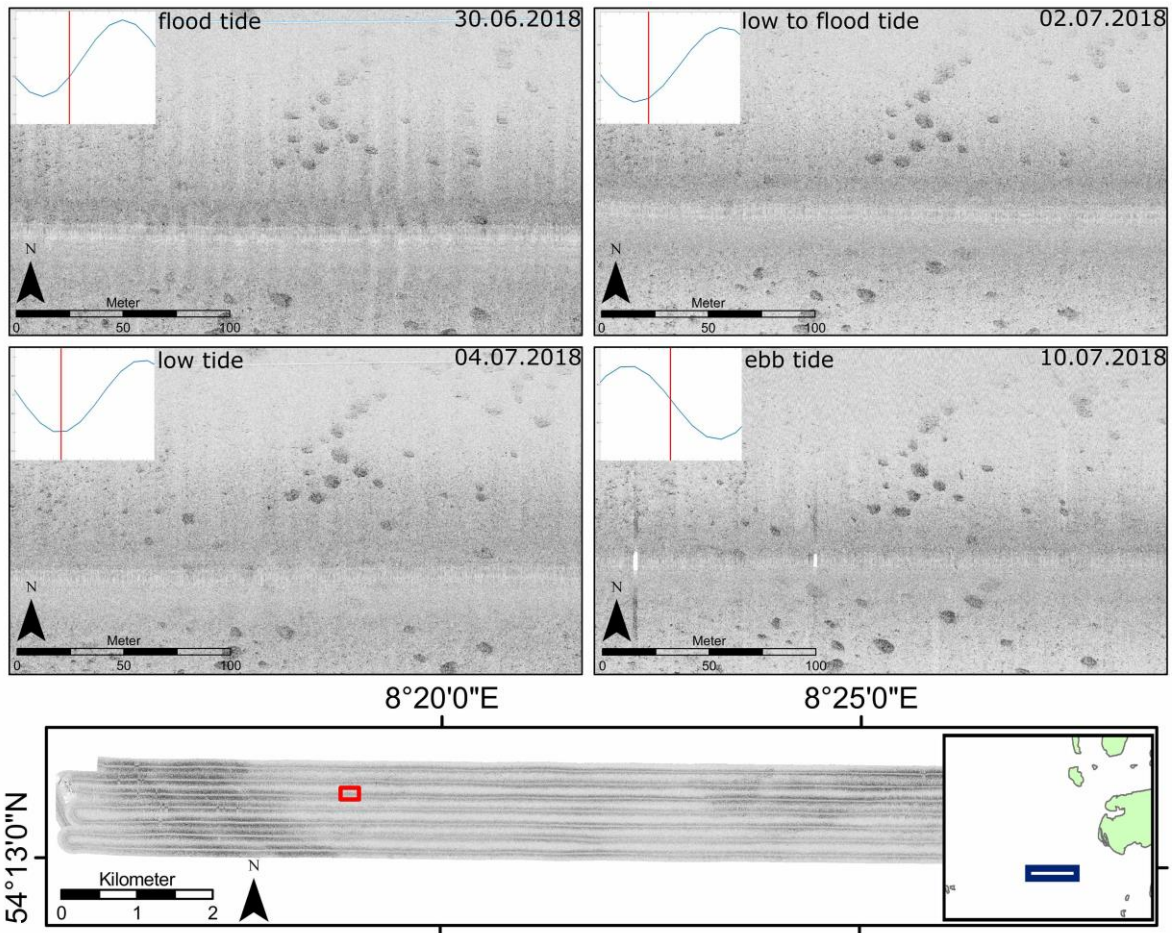


Figure 7: Rough comparison of repeated measurements for a subsection in the Eider channel. The location of the subsection is highlighted by the red rectangle. Illustration top left in each subsection-measurement indicates the tidal condition during recording. Some structures seem to be very persistent over the tidal cycle.



Figure 8: Giant box corer sediment sample AL-511-GKG_20170702_1 from Hever tidal channel (54° 19,904'N 8°14,388'E). *Ensis* sp. burrows can be observed down to 15cm. *Ensis* sp. is capable to quickly pull itself back into the sediment.

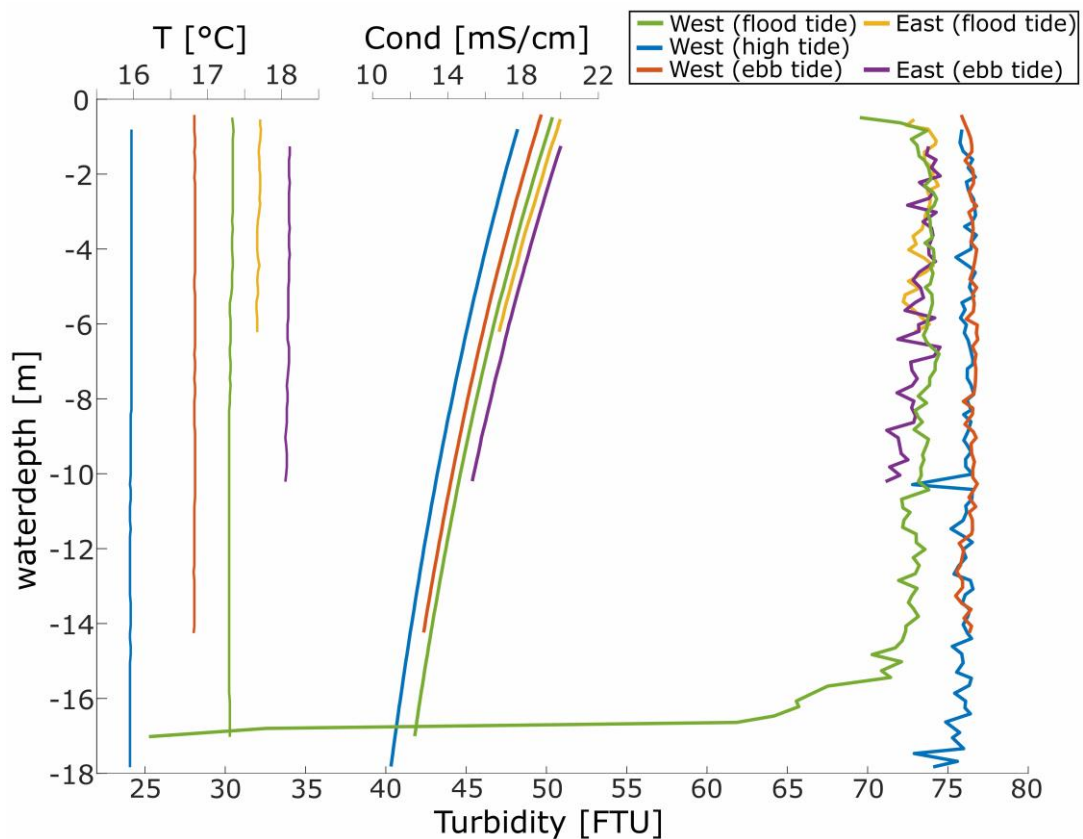


Figure 9: CTD measurements located in the area in front of the Eider tidal channel. For calibration water-samples were taken in different depths. The profiles show temperature, conductivity and turbidity over depth.

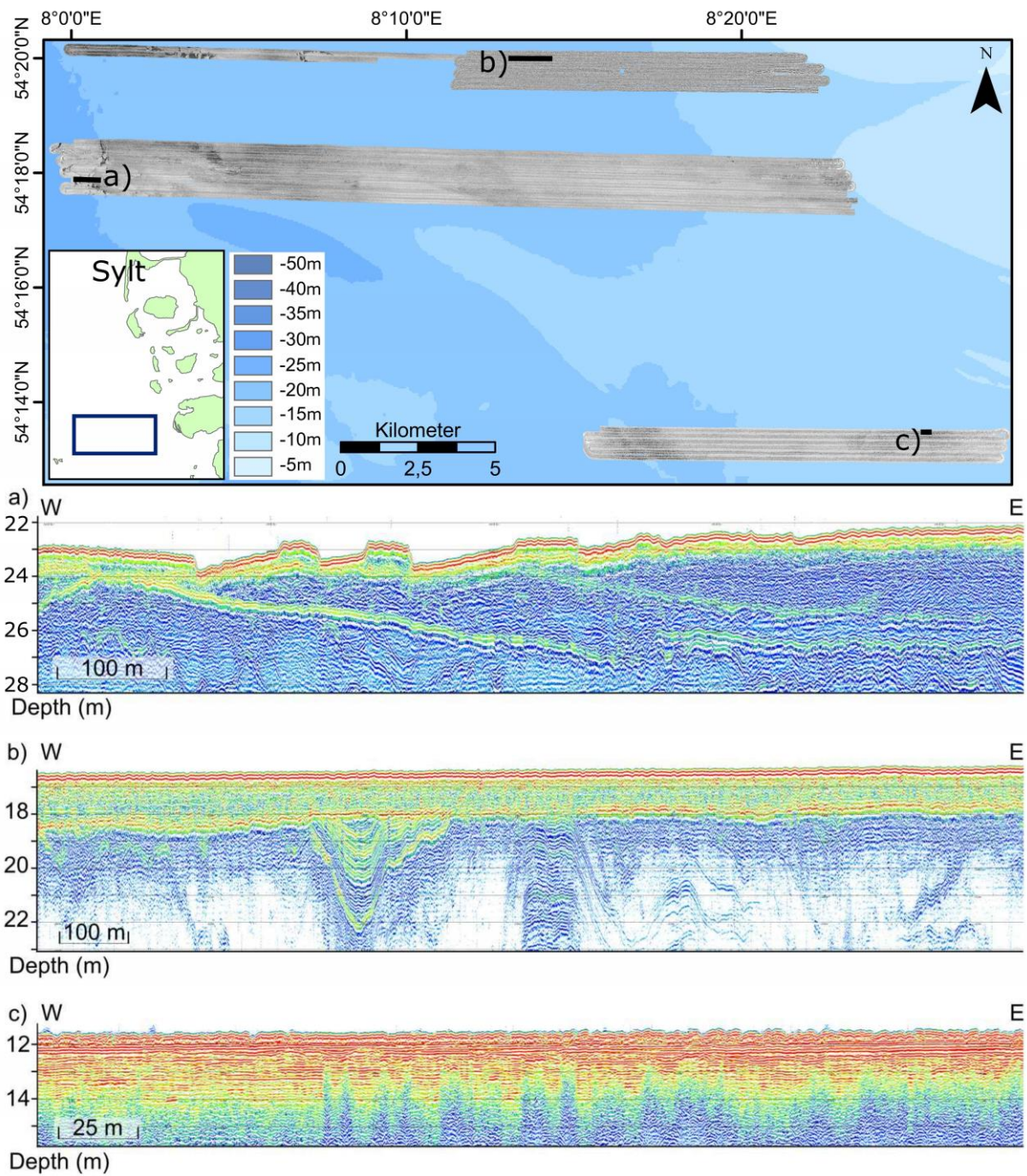


Figure 10: Three different SES Profiles at different locations: a) dipping reflectors that may influence the surface morphology; b) layered depression-like structures that are incised into a deeper seismic unit. The upper seismic layer appears chaotic, in contrast to c) horizontal reflectors near the surface and a pronounced, choppy surface morphology.

Table 1: Hydroacoustic profiling SSS & SES

Profile No.	Date	Time[UTC]	Latitude	Longitude	Remark
1	26.06.2018	11:49	54° 12.597' N	008° 15.842' E	start profile; SSS & SES
1		13:29	54° 12.588' N	008° 27.534' E	end profile; SSS & SES
2		13:35	54° 12.683' N	008° 27.537' E	start profile; SSS & SES
2		15:15	54° 12.689' N	008° 15.831' E	end profile; SSS & SES
3		15:23	54° 12.782' N	008° 15.884' E	start profile; SSS & SES
3		17:04	54° 12.875' N	008° 27.534' E	end profile; SSS & SES
4		17:12	54° 12.875' N	008° 27.534' E	start profile; SSS & SES
4		18:59	54° 12.878' N	008° 15.849' E	end profile; SSS & SES
5		19:07	54° 12.972' N	008° 16.054' E	start profile; SSS & SES
5		20:46	54° 12.977' N	008° 27.579' E	end profile; SSS & SES
6		20:57	54° 13.072' N	008° 27.517' E	start profile; SSS & SES
6		22:37	54° 13.078' N	008° 15.872' E	end profile; SSS & SES
7		22:45	54° 13.188' N	008° 15.884' E	start profile; SSS & SES
7	27.06.2018	00:28	54° 13.171' N	008° 27.528' E	end profile; SSS & SES
8		00:35	54° 13.272' N	008° 27.526' E	start profile; SSS & SES
8		02:13	54° 13.264' N	008° 15.880' E	end profile; SSS & SES
9		02:22	54° 13.344' N	008° 15.880' E	start profile; SSS & SES
9		04:03	54° 13.359' N	008° 27.583' E	end profile; SSS & SES
10		04:12	54° 13.457' N	008° 27.486' E	start profile; SSS & SES
10		05:56	54° 13.456' N	008° 15.871' E	end profile; SSS & SES
11		06:02	54° 13.544' N	008° 15.900' E	start profile; SSS & SES
11		07:41	54° 13.550' N	008° 27.578' E	end profile; SSS & SES
12		07:52	54° 13.645' N	008° 27.466' E	start profile; SSS & SES
12		09:31	54° 13.647' N	008° 15.892' E	end profile; SSS & SES
13		09:38	54° 13.736' N	008° 15.914' E	start profile; SSS & SES
13		11:17	54° 13.741' N	008° 27.556' E	end profile; SSS & SES
14		11:24	54° 13.847' N	008° 27.563' E	start profile; SSS & SES
14		13:05	54° 13.842' N	008° 15.887' E	end profile; SSS & SES
15		13:13	54° 13.937' N	008° 15.919' E	start profile; SSS & SES
15		14:55	54° 13.927' N	008° 27.587' E	end profile; SSS & SES
16		15:03	54° 14.030' N	008° 27.537' E	start profile; SSS & SES
16		16:45	54° 14.026' N	008° 15.869' E	end profile; SSS & SES
17		16:55	54° 14.120' N	008° 15.941' E	start profile; SSS & SES
17		18:35	54° 14.124' N	008° 27.586' E	end profile; SSS & SES
18		18:42	54° 14.217' N	008° 27.559' E	start profile; SSS & SES
18		20:26	54° 14.217' N	008° 15.886' E	end profile; SSS & SES
19		20:33	54° 14.310' N	008° 15.925' E	start profile; SSS & SES
19		22:16	54° 14.316' N	008° 27.578' E	end profile; SSS & SES
20		22:24	54° 14.410' N	008° 27.594' E	start profile; SSS & SES
20	28.06.2018	00:05	54° 14.406' N	008° 15.888' E	end profile; SSS & SES
21		00:15	54° 14.399' N	008° 15.872' E	start profile; SSS & SES

Profile No.	Date	Time[UTC]	Latitude	Longitude	Remark
21		01:26	54° 18.459' N	008° 11.011' E	end profile; SSS & SES
22		01:40	54° 18.463' N	008° 11.775' E	start profile; SSS & SES
22		03:07	54° 18.478' N	008° 22.157' E	end profile; SSS & SES
23		03:14	54° 18.567' N	008° 21.990' E	start profile; SSS & SES
23		04:42	54° 18.556' N	008° 11.763' E	end profile; SSS & SES
24		04:52	54° 18.647' N	008° 11.826' E	start profile; SSS & SES
24		06:18	54° 18.673' N	008° 21.815' E	end profile; SSS & SES
25		06:25	54° 18.761' N	008° 21.631' E	start profile; SSS & SES
25		07:52	54° 18.751' N	008° 11.762' E	end profile; SSS & SES
26		07:59	54° 18.841' N	008° 11.821' E	start profile; SSS & SES
26		09:23	54° 18.865' N	008° 21.565' E	end profile; SSS & SES
27		09:31	54° 18.961' N	008° 21.476' E	start profile; SSS & SES
27		10:56	54° 18.944' N	008° 11.828' E	end profile; SSS & SES
28		11:03	54° 19.038' N	008° 11.805' E	start profile; SSS & SES
28		12:27	54° 19.048' N	008° 21.506' E	end profile; SSS & SES
29		12:37	54° 19.150' N	008° 21.274' E	start profile; SSS & SES
29		13:59	54° 19.132' N	008° 11.766' E	end profile; SSS & SES
30		14:07	54° 19.223' N	008° 11.819' E	start profile; SSS & SES
30		15:32	54° 19.238' N	008° 21.638' E	end profile; SSS & SES
31		15:39	54° 19.327' N	008° 21.747' E	start profile; SSS & SES
31		17:06	54° 19.323' N	008° 11.799' E	end profile; SSS & SES
32		17:15	54° 19.416' N	008° 11.844' E	start profile; SSS & SES
32		18:42	54° 19.439' N	008° 21.894' E	end profile; SSS & SES
33		18:56	54° 19.541' N	008° 22.676' E	start profile; SSS & SES
33		20:34	54° 19.512' N	008° 11.791' E	end profile; SSS & SES
34		20:42	54° 19.605' N	008° 11.856' E	start profile; SSS & SES
34		22:16	54° 19.633' N	008° 22.713' E	end profile; SSS & SES
35		22:24	54° 19.726' N	008° 22.345' E	start profile; SSS & SES
35		23:56	54° 19.709' N	008° 11.829' E	end profile; SSS & SES
36	29.06.2018	00:03	54° 19.812' N	008° 11.808' E	start profile; SSS & SES
36		01:33	54° 19.817' N	008° 22.151' E	end profile; SSS & SES
37		01:38	54° 19.933' N	008° 22.042' E	start profile; SSS & SES
37		03:06	54° 19.894' N	008° 11.856' E	end profile; SSS & SES
38		03:13	54° 19.997' N	008° 11.811' E	start profile; SSS & SES
38		04:41	54° 20.007' N	008° 21.874' E	end profile; SSS & SES
39		04:48	54° 20.103' N	008° 21.574' E	start profile; SSS & SES
39		06:14	54° 20.086' N	008° 11.805' E	end profile; SSS & SES
40		06:20	54° 20.179' N	008° 11.860' E	start profile; SSS & SES
40		07:42	54° 20.194' N	008° 21.378' E	end profile; SSS & SES
41		07:50	54° 20.295' N	008° 20.949' E	start profile; SSS & SES
41		09:10	54° 20.280' N	008° 11.814' E	end profile; SSS & SES
42		10:51	54° 18.546' N	008° 00.069' E	start profile; SSS & SES
42		13:46	54° 18.360' N	008° 22.701' E	end profile; SSS & SES

Profile No.	Date	Time[UTC]	Latitude	Longitude	Remark
43		13:52	54° 18.258' N	008° 22.752' E	start profile; SSS & SES
43		16:47	54° 18.467' N	008° 00.047' E	end profile; SSS & SES
44		16:59	54° 18.381' N	008° 00.188' E	start profile; SSS & SES
44		19:54	54° 18.166' N	008° 22.846' E	end profile; SSS & SES
45		20:01	54° 18.068' N	008° 22.896' E	start profile; SSS & SES
45		22:59	54° 18.274' N	008° 00.085' E	end profile; SSS & SES
46		23:06	54° 18.160' N	008° 00.054' E	start profile; SSS & SES
46	30.06.2018	02:03	54° 17.970' N	008° 22.981' E	end profile; SSS & SES
47		02:09	54° 17.892' N	008° 23.062' E	start profile; SSS & SES
47		04:49	54° 18.059' N	008° 02.218' E	end profile; SSS & SES
48		16:10	54° 13.716' N	008° 15.007' E	start profile; SSS & SES
48		16:51	54° 13.650' N	008° 15.913' E	end profile; SSS & SES
49		16:51	54° 13.660' N	008° 17.510' E	start profile; SSS & SES
49		18:32	54° 13.659' N	008° 15.893' E	end profile; SSS & SES
50		18:41	54° 13.650' N	008° 27.576' E	start profile; SSS & SES
50		20:26	54° 13.548' N	008° 27.552' E	end profile; SSS & SES
51		20:35	54° 13.554' N	008° 15.881' E	start profile; SSS & SES
51		22:15	54° 13.451' N	008° 15.886' E	end profile; SSS & SES
52		22:23	54° 13.456' N	008° 27.523' E	start profile; SSS & SES
52	01.07.2018	00:05	54° 13.367' N	008° 27.560' E	end profile; SSS & SES
53		00:11	54° 13.357' N	008° 15.901' E	start profile; SSS & SES
53		01:54	54° 13.259' N	008° 15.848' E	end profile; SSS & SES
54		02:00	54° 13.260' N	008° 27.523' E	start profile; SSS & SES
54		03:42	54° 13.168' N	008° 27.583' E	end profile; SSS & SES
55		17:45	54° 20.176' N	008° 11.008' E	start profile; SSS & SES
55		19:08	54° 20.187' N	008° 11.843' E	end profile; SSS & SES
56		19:13	54° 20.197' N	008° 21.373' E	start profile; SSS & SES
56		20:40	54° 20.069' N	008° 21.569' E	end profile; SSS & SES
57		20:48	54° 20.089' N	008° 11.823' E	start profile; SSS & SES
57		22:14	54° 19.988' N	008° 11.864' E	end profile; SSS & SES
58		22:23	54° 20.022' N	008° 21.756' E	start profile; SSS & SES
58		23:51	54° 19.933' N	008° 22.030' E	end profile; SSS & SES
59		23:58	54° 19.901' N	008° 11.852' E	start profile; SSS & SES
59	02.07.2018	01:28	54° 19.803' N	008° 11.809' E	end profile; SSS & SES
60		01:35	54° 19.827' N	008° 22.116' E	start profile; SSS & SES
60		03:04	54° 19.743' N	008° 22.359' E	end profile; SSS & SES
61		03:12	54° 19.705' N	008° 11.839' E	start profile; SSS & SES
61		04:47	54° 19.611' N	008° 11.821' E	end profile; SSS & SES
62		11:47	54° 18.229' N	008° 03.550' E	start profile; SSS & SES
62		12:20	54° 18.247' N	008° 02.769' E	end profile; SSS & SES
63		12:26	54° 18.271' N	008° 00.050' E	start profile; SSS & SES
63		15:26	54° 18.173' N	008° 00.071' E	end profile; SSS & SES
64		15:27	54° 17.971' N	008° 23.021' E	start profile; SSS & SES

Profile No.	Date	Time[UTC]	Latitude	Longitude	Remark
64		18:41	54° 13.658' N	008° 15.911' E	end profile; SSS & SES
65		18:48	54° 13.648' N	008° 27.586' E	start profile; SSS & SES
65		20:30	54° 13.552' N	008° 27.534' E	end profile; SSS & SES
66		20:38	54° 13.552' N	008° 15.881' E	start profile; SSS & SES
66		22:19	54° 13.461' N	008° 15.918' E	end profile; SSS & SES
67		22:28	54° 13.455' N	008° 27.622' E	start profile; SSS & SES
67	03.07.2018	00:10	54° 13.356' N	008° 27.604' E	end profile; SSS & SES
68		00:16	54° 13.361' N	008° 15.903' E	start profile; SSS & SES
68		01:57	54° 13.252' N	008° 15.885' E	end profile; SSS & SES
69		02:06	54° 13.262' N	008° 27.534' E	start profile; SSS & SES
69		03:45	54° 13.167' N	008° 27.565' E	end profile; SSS & SES
70		03:53	54° 13.167' N	008° 15.917' E	start profile; SSS & SES
70		05:37	54° 13.073' N	008° 15.865' E	end profile; SSS & SES
71		12:00	54° 17.867' N	008° 23.051' E	start profile; SSS & SES
71		14:59	54° 18.079' N	008° 00.030' E	end profile; SSS & SES
72		15:05	54° 17.978' N	008° 00.092' E	start profile; SSS & SES
72		18:07	54° 17.766' N	008° 23.186' E	end profile; SSS & SES
73		18:38	54° 19.602' N	008° 22.313' E	start profile; SSS & SES
73		20:10	54° 19.604' N	008° 11.808' E	end profile; SSS & SES
74		20:18	54° 19.698' N	008° 11.847' E	start profile; SSS & SES
74		21:48	54° 19.723' N	008° 22.220' E	end profile; SSS & SES
75		21:51	54° 19.800' N	008° 22.139' E	start profile; SSS & SES
75		23:22	54° 19.803' N	008° 11.842' E	end profile; SSS & SES
76		23:28	54° 19.887' N	008° 11.808' E	start profile; SSS & SES
76	04.07.2018	00:56	54° 19.917' N	008° 22.018' E	end profile; SSS & SES
77		01:02	54° 20.013' N	008° 21.947' E	start profile; SSS & SES
77		02:30	54° 20.001' N	008° 11.860' E	end profile; SSS & SES
78		03:37	54° 20.101' N	008° 11.812' E	start profile; SSS & SES
78		04:05	54° 20.106' N	008° 21.636' E	end profile; SSS & SES
79		04:15	54° 20.200' N	008° 21.352' E	start profile; SSS & SES
79		05:45	54° 20.182' N	008° 11.828' E	end profile; SSS & SES
80		12:22	54° 17.674' N	008° 23.230' E	start profile; SSS & SES
80		15:21	54° 17.879' N	008° 00.020' E	end profile; SSS & SES
81		17:30	54° 13.647' N	008° 15.907' E	start profile; SSS & SES
81		19:12	54° 13.649' N	008° 27.574' E	end profile; SSS & SES
82		21:02	54° 13.551' N	008° 27.512' E	start profile; SSS & SES
82		21:10	54° 13.548' N	008° 15.883' E	end profile; SSS & SES
83		22:50	54° 13.462' N	008° 15.911' E	start profile; SSS & SES
83		22:58	54° 13.459' N	008° 27.526' E	end profile; SSS & SES
84	05.07.2018	00:41	54° 13.362' N	008° 27.561' E	start profile; SSS & SES
84		00:47	54° 13.359' N	008° 15.908' E	end profile; SSS & SES
85		02:29	54° 13.255' N	008° 15.861' E	start profile; SSS & SES
85		02:36	54° 13.271' N	008° 27.529' E	end profile; SSS & SES

Profile No.	Date	Time[UTC]	Latitude	Longitude	Remark
86		04:17	54° 13.175' N	008° 27.554' E	start profile; SSS & SES
86		04:24	54° 13.168' N	008° 15.846' E	end profile; SSS & SES
87		11:55	54° 17.567' N	008° 23.300' E	start profile; SSS & SES
87		14:56	54° 17.784' N	008° 00.034' E	end profile; SSS & SES
88		15:01	54° 17.688' N	008° 00.113' E	start profile; SSS & SES
88		18:05	54° 17.477' N	008° 23.426' E	end profile; SSS & SES
89		18:38	54° 19.602' N	008° 22.296' E	start profile; SSS & SES
89		20:11	54° 19.604' N	008° 11.805' E	end profile; SSS & SES
90		20:20	54° 19.706' N	008° 11.842' E	start profile; SSS & SES
90		21:54	54° 19.723' N	008° 22.309' E	end profile; SSS & SES
91		22:01	54° 19.803' N	008° 22.153' E	start profile; SSS & SES
91		23:31	54° 19.793' N	008° 11.852' E	end profile; SSS & SES
92		23:38	54° 19.899' N	008° 11.797' E	start profile; SSS & SES
92	06.07.2018	01:04	54° 19.914' N	008° 22.032' E	end profile; SSS & SES
93		01:14	54° 20.010' N	008° 21.883' E	start profile; SSS & SES
93		02:44	54° 19.995' N	008° 11.855' E	end profile; SSS & SES
94		02:51	54° 20.087' N	008° 11.815' E	start profile; SSS & SES
94		04:17	54° 20.104' N	008° 21.652' E	end profile; SSS & SES
95		04:52	54° 20.194' N	008° 18.406' E	start profile; SSS & SES
95		05:52	54° 20.187' N	008° 11.761' E	end profile; SSS & SES
96	08.07.2018	13:19	54° 20.044' N	008° 16.774' E	start profile; SSS & SES
96		15:15	54° 20.210' N	008° 00.117' E	end profile; SSS & SES
97		15:20	54° 20.105' N	008° 00.141' E	start profile; SSS & SES
97		16:22	54° 20.052' N	008° 09.030' E	end profile; SSS & SES
98	10.07.2018	07:24	54° 13.645' N	008° 15.914' E	start profile; SSS & SES
98		09:05	54° 13.650' N	008° 27.576' E	end profile; SSS & SES
99		09:11	54° 13.552' N	008° 27.531' E	start profile; SSS & SES
99		10:51	54° 13.548' N	008° 15.919' E	end profile; SSS & SES
100		10:59	54° 13.456' N	008° 15.890' E	start profile; SSS & SES
100		12:40	54° 13.452' N	008° 27.543' E	end profile; SSS & SES
101		12:44	54° 13.349' N	008° 27.568' E	start profile; SSS & SES
101		14:26	54° 13.359' N	008° 15.902' E	end profile; SSS & SES
102		14:33	54° 13.250' N	008° 15.879' E	start profile; SSS & SES
102		16:13	54° 13.263' N	008° 27.543' E	end profile; SSS & SES
103		16:19	54° 13.168' N	008° 27.530' E	start profile; SSS & SES
103		18:01	54° 13.167' N	008° 15.842' E	end profile; SSS & SES
104		18:07	54° 13.058' N	008° 15.948' E	start profile; SSS & SES
104		19:47	54° 13.073' N	008° 27.496' E	end profile; SSS & SES
105		21:15	54° 19.606' N	008° 22.299' E	start profile; SSS & SES
105		22:42	54° 19.607' N	008° 11.847' E	end profile; SSS & SES
106		22:49	54° 19.714' N	008° 11.813' E	start profile; SSS & SES
106	11.09.2018	00:16	54° 19.717' N	008° 22.301' E	end profile; SSS & SES
107		00:20	54° 19.807' N	008° 22.163' E	start profile; SSS & SES

Profile No.	Date	Time[UTC]	Latitude	Longitude	Remark
107		01:46	54° 19.801' N	008° 11.841' E	end profile; SSS & SES
108		01:52	54° 19.881' N	008° 11.834' E	start profile; SSS & SES
108		03:15	54° 19.912' N	008° 22.024' E	end profile; SSS & SES
109		03:21	54° 19.999' N	008° 21.851' E	start profile; SSS & SES
109		04:46	54° 19.995' N	008° 11.790' E	end profile; SSS & SES
110		04:51	54° 20.083' N	008° 11.864' E	start profile; SSS & SES
110		06:14	54° 20.107' N	008° 21.608' E	end profile; SSS & SES

Table 2: ADCP profiles

ID	Date	Time[UTC]	Latitude	Longitude	Status	Comment
1	26.06.2018	11:02	54° 12.462'	8° 15.803'	profile start	Eider overview
2	28.06.2018	00:07	54° 14.406'	8° 15.888'	end of profile	
3	28.06.2018	01:41	54° 18.463'	8° 11.979'	profile start	Hever overview
4	29.06.2018	09:26	54° 20.280'	8° 11.814'	end of profile	
5	29.06.2018	10:51	54° 18.546'	8° 00.069'	profile start	L18-06 tracks
6	30.06.2018	04:46	54° 18.057'	8° 02.798'	end of profile	
7	30.06.2018	16:06	54° 13.650'	8° 15.729'	profile start	Eider profiles (1)
8	01.07.2018	03:43	54° 13.175'	8° 15.719'	end of profile	
9	01.07.2018	17:45	54° 20.189'	8° 11.589'	profile start	Hever profiles (1)
10	02.07.2018	04:55	54° 19.600'	8° 22.296'	end of profile	
11	02.07.2018	11:58	54° 18.248'	8° 02.869'	profile start	L18-06 tracks
12	02.07.2018	15:26	54° 13.097'	8° 28.086'	end of profile	
13	02.07.2018	17:00	54° 13.658'	8° 15.911'	profile start	Eider profiles (2)
14	03.07.2018	05:37	54° 13.054'	8° 27.494'	end of profile	
15	03.07.2018	18:26	54° 18.742'	8° 22.552'	profile start	Hever profiles (2)
16	04.07.2018	05:39	54° 20.181'	8° 11.930'	end of profile	
17	04.07.2018	12:12	54° 17.704'	8° 23.891'	profile start	L18-06 tracks
18	04.07.2018	18:00	54° 13.647'	8° 15.907'	end of profile	
19	04.07.2018	18:18	54° 13.647'	8° 15.907'	profile start	Eider profiles (3)
20	05.07.2018	06:07	54° 13.075'	8° 27.673'	end of profile	
21	05.07.2018	12:05	54° 17.581'	8° 22.052'	profile start	L18-06 tracks
22	05.07.2018	18:26	54° 18.836'	8° 22.880'	end of profile	
23	05.07.2018	18:31	54° 19.302'	8° 22.749'	profile start	Hever profiles (3)
24	06.07.2018	07:52	54° 19.778'	8° 17.358'	end of profile	
25	06.07.2018	13:15	54° 10.430'	7° 53.663'	profile start	L18-06 tracks
26	06.07.2018	18:22	54° 10.431'	7° 53.666'	end of profile	
27	08.07.2018	13:15	54° 19.987'	8° 17.161'	profile start	L18-06 tracks
28	08.07.2018	18:23	54° 10.429'	7° 53.667'	end of profile	
29	10.07.2018	07:20	54° 13.594'	8° 15.402'	profile start	Eider profiles (4)
30	10.07.2018	22:50	54° 19.712'	8° 11.957'	end of profile	

ID	Date	Time[UTC]	Latitude	Longitude	Status	Comment
31	10.07.2018	23:13	54° 19.608'	8° 15.336'	profile start	Hever profiles (4)
32	11.07.2018	08:13	54° 19.978'	8° 14.767'	end of profile	

Table 3: Listed CTD stations

ID	Date	Time[UTC]	Waterdepth [m]	Latitude	Longitude	Comment
1	26.06.2018	10:29	18.90	54° 12.143'	8° 15.255'	Eider West
2	30.06.2018	05:02	18.50	54° 18.134'	8° 01.498'	
3	01.07.2018	04:03	15.40	54° 13.980'	8° 15.095'	Eider West
4	02.07.2018	04:58	11.00	54° 19.733'	8° 22.861'	Hever Ost
5	02.07.2018	08:53	15.90	54° 19.874'	8° 11.699'	Hever West
6	03.07.2018	11:07	11.90	54° 12.909'	8° 26.383'	Eider Ost
7	04.07.2018	05:50	17.40	54° 20.192'	8° 11.300'	Hever West
8	05.07.2018	06:21	10.90	54° 13.112'	8° 28.131'	Eider Ost
9	06.07.2018	06:04	18.00	54° 20.276'	8° 11.123'	Hever West
10	06.07.2018	08:49	0.00	54° 19.884'	8° 22.154'	Hever Ost
11	08.07.2018	06:58	21.00	54° 18.117'	8° 00.593'	
12	08.07.2018	12:38	12.10	54° 17.555'	8° 22.059'	
13	10.07.2018	07:03	17.50	54° 13.129'	8° 15.461'	Eider West
14	11.07.2018	06:23	11.30	54° 19.923'	8° 22.256'	Hever Ost

Table 4: Stations of underwater video profiling

ID	Date	Time[UTC]	Waterdepth[m]	Latitude	Longitude
1	03.07.2018	08:50	13.60	54° 13.412'	8° 16.450'
2	03.07.2018	09:00	13.90	54° 13.411'	8° 16.410'
3	03.07.2018	09:11	14.20	54° 13.273'	8° 17.674'
4	03.07.2018	09:23	14.10	54° 13.268'	8° 17.635'
5	04.07.2018	08:45	15.10	54° 20.045'	8° 15.538'
6	04.07.2018	09:00	15.40	54° 20.101'	8° 15.635'
7	04.07.2018	09:25	10.50	54° 19.521'	8° 21.810'
8	04.07.2018	09:38	10.80	54° 19.559'	8° 21.753'
9	05.07.2018	09:07	14.60	54° 12.759'	8° 19.193'
10	05.07.2018	09:16	14.40	54° 12.782'	8° 19.185'
11	05.07.2018	09:44	11.20	54° 14.316'	8° 24.726'
12	05.07.2018	10:00	11.40	54° 14.300'	8° 24.686'

Table 5: Stations of Giant Box Corer Sampling

ID	Date	Time[UTC]	Waterdepth[m]	Latitude	Longitude	Comment
1	02.07.2018	09:55	16.5	54° 19.904'	8° 14.390'	
2	02.07.2018	10:27	15.5	54° 20.197'	8° 16.932'	
3	02.07.2018	10:44	15.6	54° 20.188'	8° 16.915'	
4	03.07.2018	09:54	14.4	54° 12.741'	8° 17.573'	
5	03.07.2018	10:34	11.5	54° 12.978'	8° 26.339'	
6	03.07.2018	10:52	11.6	54° 12.910'	8° 26.377'	
7	04.07.2018	10:05	10.7	54° 19.540'	8° 21.798'	empty
8	04.07.2018	10:25	10.9	54° 19.532'	8° 21.794'	
9	04.07.2018	10:35	10.9	54° 19.535'	8° 21.804'	
10	04.07.2018	11:18	16.8	54° 19.894'	8° 14.396'	
11	05.07.2018	10:35	14.1	54° 13.508'	8° 19.068'	
12	05.07.2018	10:59	14.7	54° 13.213'	8° 17.952'	

Table 6: Listed grab samples

Sample	Date	Time	Waterdepth [m]	Latitude	Longitude	Comment
1	30.06.2018	06:20	13.70	54°14.264'	8°16.672'	Eider_overview
2	30.06.2018	06:28	13.80	54°14.232'	8°16.311'	Eider_overview
3	30.06.2018	06:40	13.80	54°14.042'	8°16.129'	Eider_overview
4	30.06.2018	06:53	13.60	54°13.391'	8°16.449'	Eider_overview
5	30.06.2018	07:06	14.60	54°12.794'	8°16.327'	Eider_overview
6	30.06.2018	07:18		54°13.106'	8°16.875'	Eider_overview
7	30.06.2018	07:26	13.70	54°12.913'	8°17.229'	Eider_overview
8	30.06.2018	07:35	13.60	54°12.746'	8°17.574'	Eider_overview
9	30.06.2018	07:48	13.90	54°13.281'	8°17.675'	Eider_overview
10	30.06.2018	08:00	13.90	54°12.849'	8°18.239'	Eider_overview
11	30.06.2018	08:14	14.30	54°12.723'	8°18.928'	Eider_overview
12	30.06.2018	08:23	14.60	54°12.72'	8°19.247'	Eider_overview
13	30.06.2018	08:31	14.70	54°12.72'	8°19.247'	Eider_overview
14	30.06.2018	08:40	14.40	54°12.744'	8°19.516'	Eider_overview
15	30.06.2018	08:53	14.50	54°13.143'	8°19.64'	Eider_overview
16	30.06.2018	09:02	14.50	54°13.504'	8°19.342'	Eider_overview
17	30.06.2018		15.33	54°13.514'	8°18.866'	Eider_overview
18	30.06.2018	10:02	15.80	54°13.833'	8°18.197'	Eider_overview
19	30.06.2018	10:19	16.00	54°14.192'	8°18.992'	Eider_overview
20	30.06.2018	10:32	15.90	54°14.206'	8°19.675'	Eider_overview
21	30.06.2018	10:54	16.10	54°12.581'	8°20.649'	Eider_overview
22	30.06.2018	11:13	15.80	54°12.78'	8°21.042'	Eider_overview
23	30.06.2018	11:30	15.90	54°13.648'	8°21.472'	Eider_overview
24	30.06.2018	11:47	15.00	54°12.872'	8°22.5651'	Eider_overview
25	30.06.2018	12:03	14.60	54°14.326'	8°22.457'	Eider_overview

Sample	Date	Time	Waterdepth [m]	Latitude	Longitude	Comment
26	30.06.2018	12:15	13.80	54°14.4'	8°23.225'	Eider_overview
27	30.06.2018	12:27	14.20	54°14.073'	8°23.967'	Eider_overview
28	30.06.2018	12:37	14.80	54°13.513'	8°23.662'	Eider_overview
29	30.06.2018	12:51	14.00	54°12.785'	8°24.619'	Eider_overview
30	30.06.2018	13:05	14.20	54°13.485'	8°24.865'	Eider_overview
31	30.06.2018	13:20	13.30	54°14.027'	8°25.141'	Eider_overview
32	30.06.2018	13:34	12.90	54°14.398'	8°26.474'	Eider_overview
33	30.06.2018	13:46	12.50	54°14.285'	8°26.894'	Eider_overview
34	30.06.2018	14:00	13.13	54°13.897'	8°26.077'	Eider_overview
35	30.06.2018	14:14	13.13	54°13.592'	8°26.306'	Eider_overview
36	30.06.2018	14:26	13.00	54°13.558'	8°26.314'	Eider_overview
37	30.06.2018	14:38	12.70	54°12.92'	8°26.275'	Eider_overview
38	30.06.2018	14:50	12.50	54°12.57'	8°26.414'	Eider_overview
39	30.06.2018	15:03	12.70	54°12.677'	8°26.078'	Eider_overview
40	01.07.2018	04:40	16.60	54°18.757'	8°13.747'	Hever_overview
41	01.07.2018	04:58	16.00	54°18.18'	8°16.021'	Hever_overview
42	01.07.2018		14.70	54°19.006'	8°17.864'	Hever_overview
43	01.07.2018	05:44	14.24	54°18.638'	8°18.526'	Hever_overview
44	01.07.2018	05:52	12.50	54°18.825'	8°19.647'	Hever_overview
45	01.07.2018	06:08	11.20	54°18.835'	8°20.464'	Hever_overview
46	01.07.2018		9.90	54°19.025'	8°21.444'	Hever_overview
47	01.07.2018	06:27	10.20	54°19.292'	8°21.595'	Hever_overview
48	01.07.2018	06:39	10.40	54°19.594'	8°22.304'	Hever_overview
49	01.07.2018	06:52	10.70	54°19.773'	8°20.788'	Hever_overview
50	01.07.2018	07:04	10.90	54°19.555'	8°20.155'	Hever_overview
51	01.07.2018	07:14	11.60	54°19.577'	8°19.242'	Hever_overview
52	01.07.2018	07:26	11.90	54°20.181'	8°18.793'	Hever_overview
53	01.07.2018	07:40	13.90	54°19.747'	8°17.28'	Hever_overview
54	01.07.2018	07:49	14.20	54°19.629'	8°17.013'	Hever_overview
55	01.07.2018	08:00	14.00	54°20.171'	8°16.929'	Hever_overview
56	01.07.2018	08:10	14.00	54°20.156'	8°16.877'	Hever_overview
57	01.07.2018	08:21	14.30	54°20.044'	8°16.775'	Hever_overview
58	01.07.2018	08:30	15.00	54°18.918'	8°15.841'	Hever_overview
59	01.07.2018	08:43	15.40	54°20.047'	8°15.56'	Hever_overview
60	01.07.2018	08:51	15.50	54°19.925'	8°15.348'	Hever_overview
61	01.07.2018	09:02	16.20	54°20.163'	8°13.936'	Hever_overview
62	01.07.2018	09:14	16.80	54°19.447'	8°13.962'	Hever_overview
63	01.07.2018	09:26	16.50	54°19.375'	8°12.154'	Hever_overview
64	02.07.2018	05:57	10.90	54°19.839'	8°22.087'	Hever_13_Station
65	02.07.2018	06:12		54°19.824'	8°21.351'	Hever_12_Station
66	02.07.2018	06:20		54°19.772'	8°20.709'	Hever_11_Station
67	02.07.2018	06:32		54°19.863'	8°18.515'	Hever_10_Station
68	02.07.2018	06:44	14.30	54°19.75'	8°17.259'	Hever_9_Station

Sample	Date	Time	Waterdepth [m]	Latitude	Longitude	Comment
69	02.07.2018	06:58	14.50	54°19.632'	8°17.015'	Hever_8_Station
70	02.07.2018	07:10	14.40	54°19.623'	8°16.997'	Hever_8_Station
71	02.07.2018	07:22	14.30	54°20.052'	8°16.756'	Hever_7_Station
72	02.07.2018	07:33	14.90	54°19.915'	8°15.84'	Hever_6_Station
73	02.07.2018	07:45	14.90	54°20.048'	8°15.526'	Hever_5_Station
74	02.07.2018	07:57	15.50	54°19.721'	8°15.004'	Hever_4_Station
75	02.07.2018	08:09	15.40	54°19.977'	8°14.776'	Hever_3_Station
76	02.07.2018	08:24	16.10	54°19.888'	8°13.039'	Hever_2_Station
77	02.07.2018	08:39	15.90	54°19.875'	8°11.706'	Hever_1_Station
78	03.07.2018	06:03	10.90	54°13.442'	8°27.457'	Hever_1_Station
79	03.07.2018	06:17	11.40	54°13.546'	8°26.311'	Hever_2_Station
80	03.07.2018	06:29	11.40	54°13.604'	8°26.304'	Hever_3_Station
81	03.07.2018	06:45	11.50	54°13.564'	8°25.491'	Hever_4_Station
82	03.07.2018	06:55	12.60	54°13.507'	8°23.879'	Hever_5_Station
83	03.07.2018	07:07	12.50	54°13.512'	8°23.652'	Hever_6_Station
84	03.07.2018	07:23	13.60	54°13.35'	8°21.112'	Hever_7_Station
85	03.07.2018	07:38	13.60	54°13.317'	8°20.11'	Hever_8_Station
86	03.07.2018	07:49	13.50	54°13.51'	8°19.321'	Hever_9_Station
87	03.07.2018	07:59	13.40	54°13.514'	8°18.875'	Hever_10_Station
88	03.07.2018	08:11	14.14	54°13.272'	8°17.67'	Hever_11_Station
89	03.07.2018	08:23	13.70	54°13.398'	8°16.45'	Hever_12_Station
90	04.07.2018	06:03	17.40	54°19.883'	8°11.689'	Hever_1_Station
91	04.07.2018		17.10	54°19.899'	8°13.051'	Hever_2_Station
92	04.07.2018	06:30	16.70	54°19.985'	8°14.771'	Hever_3_Station
93	04.07.2018		16.60	54°19.733'	8°15'	Hever_4_Station
94	04.07.2018	06:48	16.10	54°20.052'	8°15.532'	Hever_5_Station
95	04.07.2018	06:59	16.00	54°19.92'	8°15.85'	Hever_6_Station
96	04.07.2018	7:12	14.90	54°20.059'	8°16.746'	Hever_7_Station
97	04.07.2018	07:22	15.20	54°19.636'	8°17.01'	Hever_8_Station
98	04.07.2018	07:30	14.60	54°19.743'	8°17.264'	Hever_9_Station
99	04.07.2018	07:44	14.80	54°19.87'	8°18.561'	Hever_10_Station
100	04.07.2018	07:57	11.40	54°19.788'	8°20.715'	Hever_11_Station
101	04.07.2018	08:06	11.20	54°19.826'	8°21.341'	Hever_12_Station
102	04.07.2018	08:16	10.30	54°19.833'	8°22.078'	Hever_13_Station
103	05.07.2018	06:31	11.20	54°13.441'	8°27.458'	Hever_1_Station
104	05.07.2018	06:43	11.90	54°13.56'	8°26.313'	Hever_2_Station
105	05.07.2018	06:52	11.80	54°13.601'	8°26.299'	Hever_3_Station
106	05.07.2018	07:04	12.00	54°13.566'	8°25.494'	Hever_4_Station
107	05.07.2018	07:23	13.10	54°13.504'	8°23.864'	Hever_5_Station
108	05.07.2018	07:34	12.70	54°13.509'	8°23.65'	Hever_6_Station
109	05.07.2018	07:50	14.00	54°13.349'	8°21.11'	Hever_7_Station
110	05.07.2018	08:02	13.90	54°13.318'	8°20.107'	Hever_8_Station
111	05.07.2018	08:13	13.70	54°13.507'	8°19.322'	Hever_9_Station

Sample	Date	Time	Waterdepth [m]	Latitude	Longitude	Comment
112	05.07.2018	08:24	14.10	54°13.512'	8°18.857'	Hever_10_Station
113	05.07.2018	08:36	14.28	54°13.278'	8°17.666'	Hever_11_Station
114	05.07.2018	08:47	13.71	54°13.399'	8°16.457'	Hever_12_Station
115	06.07.2018	06:20	17.10	54°19.884'	8°11.722'	Hever_1_Station
116	06.07.2018	06:32	18.20	54°19.877'	8°13.022'	Hever_2_Station
117	06.07.2018	06:45	17.80	54°19.979'	8°14.775'	Hever_3_Station
118	06.07.2018	06:55	17.40	54°19.723'	8°14.988'	Hever_4_Station
119	06.07.2018	07:07	17.11	54°20.044'	8°15.556'	Hever_5_Station
120	06.07.2018	07:18	17.00	54°19.917'	8°15.84'	Hever_6_Station
121	06.07.2018	7:28	15.60	54°20.05'	8°16.758'	Hever_7_Station
122	06.07.2018	07:39	15.30	54°19.629'	8°17.02'	Hever_8_Station
123	06.07.2018	07:48	15.50	54°19.748'	8°17.292'	Hever_9_Station
124	06.07.2018	08:01	13.90	54°19.867'	8°18.528'	Hever_10_Station
125	06.07.2018	08:13	12.20	54°19.769'	8°20.722'	Hever_11_Station
126	06.07.2018	08:22	12.00	54°19.802'	8°21.347'	Hever_12_Station
127	06.07.2018	08:32	11.80	54°19.832'	8°22.089'	Hever_13_Station
128	11.07.2018	06:31	12.00	54°19.834'	8°22.095'	Hever_13_Station
129	11.07.2018	06:42	12.60	54°19.827'	8°21.352'	Hever_12_Station
130	11.07.2018	06:51	13.20	54°19.772'	8°20.739'	Hever_11_Station
131	11.07.2018	07:04	14.90	54°19.86'	8°18.553'	Hever_10_Station
132	11.07.2018	07:13	16.50	54°19.755'	8°17.281'	Hever_9_Station
133	11.07.2018	07:22	16.50	54°19.633'	8°17.022'	Hever_8_Station
134	11.07.2018	07:41	17.30	54°19.915'	8°15.857'	Hever_6_Station
135	11.07.2018	07:54	17.40	54°20.046'	8°15.538'	Hever_5_Station
136	11.07.2018	7:55	17.10	54°20.042'	8°16.743'	Hever_7_Station
137	11.07.2018	08:04	18.20	54°19.729'	8°15.02'	Hever_4_Station
138	11.07.2018	08:12	18.30	54°19.978'	8°14.765'	Hever_3_Station
139	11.07.2018	08:23	18.70	54°19.888'	8°13.034'	Hever_2_Station
140	11.07.2018	08:55	18.70	54°19.882'	8°11.708'	Hever_1_Station
141	11.07.2018	09:17	16.11	54°13.4'	8°16.472'	Hever_12_Station
142	11.07.2018	09:27	16.96	54°13.283'	8°17.682'	Hever_11_Station
143	11.07.2018	09:39	16.20	54°13.516'	8°18.881'	Hever_10_Station
144	11.07.2018	09:49	16.50	54°13.517'	8°19.325'	Hever_9_Station
145	11.07.2018	10:02	16.10	54°13.316'	8°20.142'	Hever_8_Station
146	11.07.2018	10:14	15.60	54°13.36'	8°21.134'	Hever_7_Station
147	11.07.2018	10:33	14.60	54°13.518'	8°23.666'	Hever_6_Station
148	11.07.2018	10:45	14.70	54°13.502'	8°23.867'	Hever_5_Station
149	11.07.2018	11:00	13.20	54°13.575'	8°25.496'	Hever_4_Station
150	11.07.2018	11:12	13.30	54°13.619'	8°26.292'	Hever_3_Station
151	11.07.2018	11:20	12.80	54°13.567'	8°26.327'	Hever_2_Station
152	11.07.2018	11:34	12.10	54°13.432'	8°27.451'	Hever_1_Station