

Leibniz Institute for Baltic Sea Research Warnemünde

Monitoring cruise

FS „Elisabeth Mann Borgese“

Cruise- No. EMB-175

30th January – 9th February 2018

Western and Central Baltic Sea

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1. Basic information

Ship: FS Elisabeth Mann Borgese
 Nationality: Germany
 Operating Authority: Baltic Sea Research Institute Warnemünde (IOW)
 Cruise: EMB-175
 Date: 30.01.-09.02.2018
 Master: Uwe Scholz
 Number of crew: 11
 Chief scientist: Dr. Michael Naumann
 Number of research staff: 11

Geographical area in which ship has operated:

western and central Baltic Sea

Purpose of the cruise

Monitoring cruise in the framework of HELCOM programme, additional measurements for IOW's long-term data programme in the southern to central Baltic Sea 1969-2017.

Research staff:

	Name	On board	Institution	Responsibility
1	Michael Naumann	30.01.-09.02.2018	IOW	chief scientist, CTD, water sampling, sediment coring
2	Johann Ruickoldt	30.01.-09.02.2018	IOW	CTD, CTD-maintenance
3	Jan Donath	30.01.-09.02.2018	IOW	CTD, QM CTD-measurements
4	Lars Kreuzer	30.01.-09.02.2018	IOW	Nutrients, QM laboratory analysis
5	Susanne Schöne	30.01.-09.02.2018	IOW	Nutrients, Dissolved oxygen
6	Ines Hand	30.01.-09.02.2018	IOW	Organic contaminants
7	Jenny Jeschek	30.01.-09.02.2018	IOW	Organic contaminants
8	Vyacheslav Smirnov	30.01.-09.02.2018	IOW	Dissolved oxygen, Nutrients
9	Michael Pötzsch	30.01.-09.02.2018	IOW	Biological sampling, sediment coring
10	Torsten Mehlretter	30.01.-31.01.2018	ZDF	Journalist

11	Tim Risto Kube	30.01.-01.02.2018	IOW	Student
12	Sven Anders	30.01.-01.02.2018	4H-Jena	Development EMB - Minimesscontainer
13	Franz Jendersie	01.02.-09.02.2017	IOW	Mooring work - GODESS
14	Louis Rautmann	01.02.-09.02.2017	IOW	Development of nitrate sensors
15	Marian Domachowski	01.02.-09.02.2017	IOW	Observer polish territorial waters

Scientific equipment:

CTD + Rosette water sampler, in situ pump for sampling of organic pollutants (PAH), Phytoplankton net (Apstein), Zooplankton net (WP2), Secchi disk, nutrient analyser, oxygen analyser, Frahmplot sediment corer

2. General remarks and preliminary result:

The first monitoring cruise of the year 2018 in a series of five expeditions performed annually by the Leibniz Institute for Baltic Sea Research Warnemünde was carried out with FS “Elisabeth Mann Borgese“ between 30th January and 9th February 2018. The cruise is part of the German contribution to the HELCOM COMBINE program and contributes to IOW’s long term data series in the central Baltic Sea. The data acquired are used for regular national and international assessments of the state of the Baltic Sea, are analysed in numerous publications, and provide the scientific basis for measures to be taken for the protection of the ecosystem Baltic Sea.

The area under investigation covered the Baltic Sea between Kiel Bight and the northern Gotland Sea (Fig. 1). Marine meteorological, hydrographic, hydrochemical and hydrobiological investigations were performed according to the COMBINE program of HELCOM. The majority of stations is located along a SW-NE transect, describing the state in the succession of basins from the western to the central Baltic as main information (Fig. 4). Additional stations were done on a transect from the Slupsk Channel crossing the sill into the Bornholm Basin to investigate the overflow and mixing of weak inflow events of autumn 2017 in a high resolution of stations. The mooring “GODESS – Gotland Deep Environmental Sampling Station” equipped with multiple hydrographic and chemical sensors in daily profiling mode through the water column couldn’t be recovered a new deployed because of bad weather.

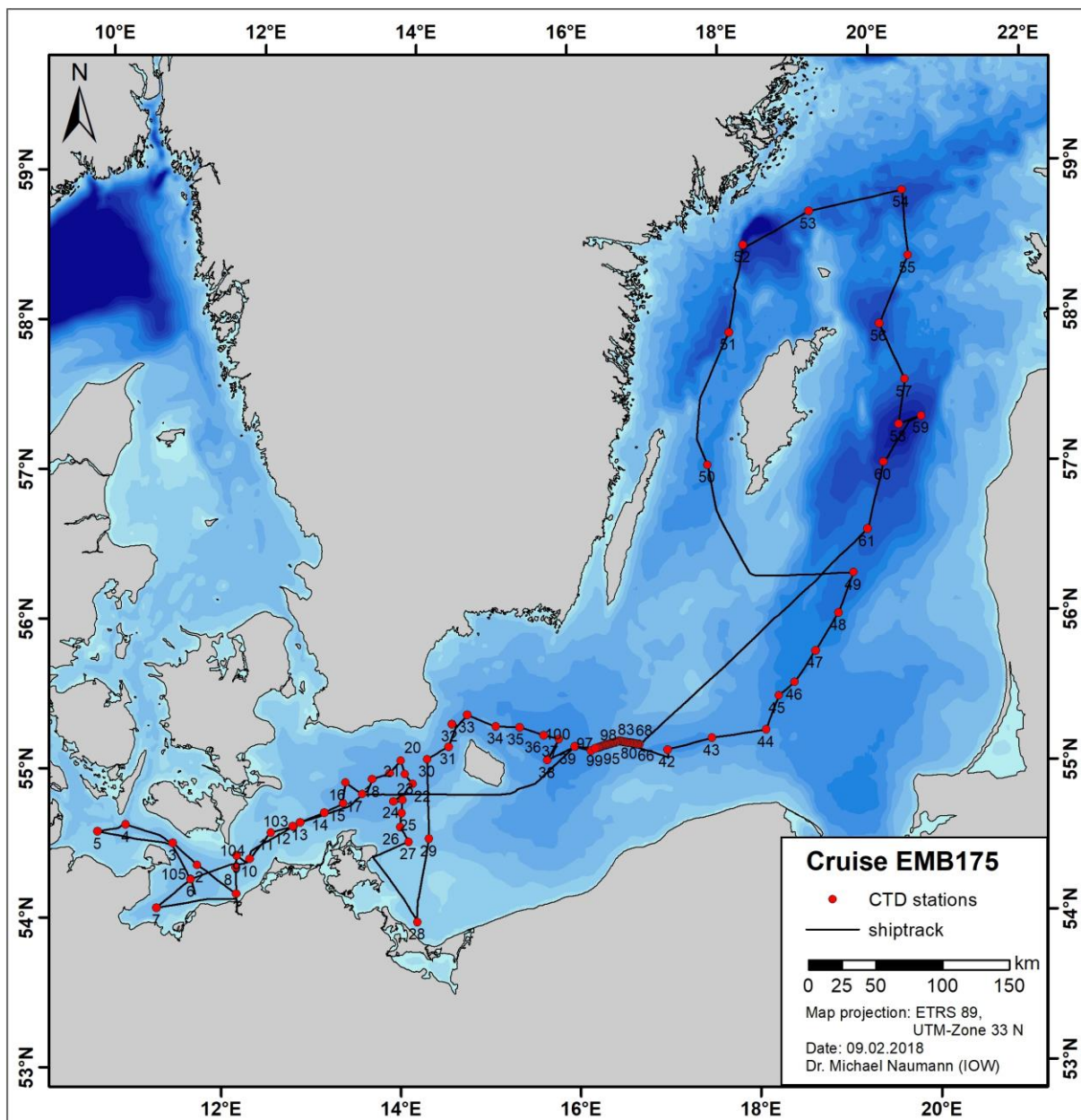


Figure 1: Map of stations and ship track of cruise EMB-175 from 30th January to 9th February 2018. Red dots indicate the position of CTD stations with labels of the station number (Tab. 3).

- The **weather situation** during the cruise was most of the time moderate to strong windy under influence of the large high pressure cell with up to 1035 hPa across southern Europe and low pressures “Jira”, “Kari”, “Lotti” crossing Scandinavia. In this period north-westerly to south-westerly winds occurred between 6-7 Bft, gusts up to 8 Bft. The 3rd January showed calm and sunny weather. On the track in the western Gotland Basin the weather changed to 7 Bft from north-eastern direction, sometimes snow shower occurred at 4th February and continued to 6th February. On the way back to the Bornholm Basin the wind calmed down and the last two days we had perfect sunny conditions and low easterly winds.

The following hydrographical and hydrochemical characteristics have been observed during the cruise (cf. Tables 1 and 2, Figures 3 to 5):

- **Surface temperatures** varied only slightly along the cruise track between 3.96 °C (Kiel Bight) and 4.56 °C (Bornholm Basin). Even the northern Baltic Proper showed temperatures above 4 °C (cf. Tab. 1). These warm water temperatures are the result of so far warm winter weather with continuous positive terrestrial temperature anomalies since October 2017. For example Warnemünde showed +2.3 K in October, +1.5 K in November, +1.9 K in December and +2.0 K in January 2018 (data DWD). The water column is mixed completely down to the halocline (cf. Fig. 4) by ongoing stormy weather of west-south-westerly to north-westerly direction since January 24th.
- **Deep water layer temperatures** (bottom near depths) increases in the central Baltic Proper since 2014, the start of an intensive inflow period of several events up to beginning of 2017. Since 2016 the Bornholm Deep is cooling down and more or less stagnating during the last year. The same situation is found bottom near in the Gotland Deep. More distant basins on the “Thalweg” of saltwater intrusions showed a slight temperature increase since 2016, as a time delayed result of the interaction of inflows during the last years. In Figure 4 a longitudinal cross section of the basins and pathway of the salt water intrusions can be seen. Relatively warm autumn water of up to 9 °C fills the lowermost parts in the Arkona Basin and propagates in the upper deep water through the Bornholm Basin on top of former, saltier inflow water just below the halocline. Recently the Slupsk Sill is passed by these water body. Figure 5 (left part) shows a temperature-salinity plot of all gathered data. The key areas are marked by symbols and different colours.

Location	Feb '13	Feb '14	Feb '15	Feb '16	Feb '17	Feb '18
Bornholm D.	5.82 °C	8.65 °C	7.15 °C	8.39 °C	6.96 °C	6.85 °C
Gotland Deep	6.41 °C	6.36 °C	6.71 °C	7.86 °C	7.19 °C	6.91 °C
Farö Deep	5.98 °C	5.76 °C	6.17 °C	not sampled	6.73 °C	6.80 °C
Landsort D.	5.58 °C	5.34 °C	not sampled	5.84 °C	5.98 °C	6.24 °C
Karlsö Deep	5.29 °C	5.08 °C	5.03 °C	5.22 °C	5.53 °C	5.58 °C

- The major Baltic inflow from December 2014 and the following events up to 2017 increased the **salinity in the bottom layer** in the central Baltic Proper rapidly to a maximum of 13.84 at the Gotland Deep in February 2016. Since that time a slightly decrease starts in the eastern Gotland Basin showing no further inflow impact at the bottom. The salinity at the northerly Farö Deep and Landsort Deep increased during last two years in order of 1 g/kg. The western Gotland Basin stay nearly stagnant with only a slight increase of 0.5 g/kg.

Location	Feb '13	Feb '14	Feb '15	Feb '16	Feb '17	Feb '18
Bornholm D.	15.62	15.99	19.81	19.19	17.93	17.14
Gotland Deep	12.07	12.23	12.31	13.84	13.50	13.3
Farö Deep	11.43	11.60	11.81	not sampled	12.68	12.79
Landsort D.	10.43	10.45	not sampled	11.03	11.18	11.38
Karlsö Deep	10.10	9.75	9.78	9.97	10.34	10.32

- Thus, the **oxygen situation in the deep water** of central basins (>100 m water depth) documents recently a starting stagnation period during the last year. The inflow activity 2014-2017 is mirrored in measurements of former years. Hydrogen sulphide concentrations (expressed as negative oxygen equivalents) in the near-bottom layer were high in November 2013 as maximum stage of the stagnation period 2004-2013 and decreased in the eastern Gotland Basin and Farö Deep completely and oxic periods occurred in these areas. At the Landsort Deep and Karlsö Deep in the western Gotland Basin hydrogen sulphide varied only slightly during the last 6 years between -0.9 ml/l to -1.6 ml/l, showing no major changes induced by the last saltwater intrusions. The oxygen situation at the bottom of the Bornholm Basin is more dynamic, showing short term changes even by weak inflows. Figure 4 visualize the situation along the “Thalweg”. Smaller intrusions of oxygenized water were detected at the bottom of the Slupsk Channel and between 80-120 m water depth in the eastern Gotland Basin. An areal overview of measured bottom near values at key stations is shown in figure 3.

Location	Feb '13	Feb '14	Feb '15	Feb '16	Feb '17	Feb '18
Bornholm D.	3.4 ml/l	0.84 ml/l	5.38 ml/l	1.47 ml/l	2.24 ml/l	0.05 ml/l
Gotland Deep	-8.75 ml/l	-1.71 ml/l	-0.92 ml/l	1.7 ml/l	-1.09 ml/l	-0.87 ml/l
Farö Deep	-7.74 ml/l	-2.41 ml/l	-1.07 ml/l	not sampled	0.20 ml/l	-0.71 ml/l
Landsort D.	-1,32 ml/l	-0.95 ml/l	not sampled	-1.28 ml/l	-0.89 ml/l	-1.13 ml/l
Karlsö Deep	-1,20 ml/l	-1.25 ml/l	-0.86 ml/l	-0.90 ml/l	-1.12 ml/l	-1,64 ml/l

- The **nutrient situation** in the surface layer is typical for the winter season. In all key areas phosphate and nitrate values are on a higher winter level, because the biological production like the diatom bloom has not been started (table 1). In the western Baltic Sea the silicate values are doubled compared to winter 2017. For example Kiel Bight 8.2 µM (2017) to 20.4 µM, Mecklenburg Bight 11.3 µM (2017) to 21.6 µM.
- In the deep waters of the **central basins** (>100 m water depth), the hydrographic situation is mirrored. The ventilation of the Eastern Gotland Basin since summer 2014 caused decreasing phosphate, ammonium and silicate concentrations and rising nitrate concentrations during the inflow years. The values were halved or even more decreased since November 2013. Also silicate concentrations have decreased from 126.8 µmol/l to 43.7 µmol/l in February 2016. During the last two years the situation at the bottom water of the Gotland Deep has changed back into stagnation. Nitrate

concentration are reduced and bound in the sediment, phosphate is released. Phosphate values were more or less stable during the last year at the station Gotland Deep, 4.97 $\mu\text{mol/l}$ (Feb. 2017) and actual 4.32 $\mu\text{mol/l}$, as well as silicate from 64 $\mu\text{mol/l}$ (Feb. 2017) to 65.4 $\mu\text{mol/l}$. After a nitrate release at the Farö Deep in February 2017 (7.46 $\mu\text{mol/l}$) it is bound again in the sediment and phosphate increased to 4.1 $\mu\text{mol/l}$.

- Samples for **phyto- and zooplankton** were collected for later analysis in the laboratory.
- **Additional program:**
One complete depth profile of station TF271 for al longterm data collection of CT, AT, and pH(photospectrometic) (responsible scientist: Dr. B. Schneider)
Water samples for CH₄ N₂O and CO₂ measurements in different water depths at 6 stations along the cruise track. (responsible scientist: Prof. G. Rehder, Jan Werner).
At station TF213 (Bornholm Basin) are additional phyto- and microzooplankton samples taken by WP2 and Apstein nets as well as water samples (responsible scientist: Dr. J. Dutz).
For the analysis of organic pollutants are done watersampling by an in situ pumpsystem in the deep water layer of the Gotland Deep (station TF271) (responsible scientist: Ines Hand, Prof. D. Schulz-Bull).

Attachments:

Tables 1 and 2: Preliminary results of selected parameters in the surface layer and the near bottom water layer - (unvalidated results)

Figures 2: detailed Track chart of stations and transects

Figure 3: Oxygen/hydrogen sulphide in the bottom near layer for selected stations

Figure 4: Cross section 1 from Kiel Bight to eastern Gotland Basin showing the hydrographic parameters temperature, salinity and oxygen on the “Thalweg” of Major Baltic Inflows.

Figure 5: TSO diagram of all stations

Table 3: List of stations

Warnemünde 28th February 2018

Dr. Michael Naumann
(scientist in charge)

Area Date	Station Name /No.*	Temp. °C	Sal. psu	O ₂ (sensor) ml/l	O ₂ (titration) ml/l	PO ₄ µM	NO ₃ µM	SiO ₄ µM
Kiel Bight 30.01.18	TF0360/05	3,96	13,31	8,21	8,36	0,67	3,71	20,40
Meckl.Bight 30.01.18	TF0012/06	4,06	13,06	8,12	8,12	0,71	4,93	21,60
Lübeck Bight 31.01.18	TF0022/07	4,00	11,97	8,25	8,38	0,68	6,13	22,40
Darss Sill 31.01.18	TF0030/13	4,14	8,84	8,34	8,53	0,69	3,36	19,30
Arkona Basin 31.01.18	TF0113/17	4,49	7,92	8,19	8,27	0,67	2,81	19,10
Bornholm Deep 02.02.18	TF0213/39	4,56	7,50	8,01	8,07	0,67	2,57	18,00
Stolpe Channel 02.02.18	TF0222/42	4,28	7,45	8,18	8,32	0,69	3,26	20,20
SE Gotland Basin 03.02.18	TF0259/45	4,33	7,36	8,04	8,24	0,70	3,14	20,60
Gotland Deep 05.02.18	TF0271/58	4,47	7,37	8,05	8,33	0,68	3,40	18,40
Farö Deep 05.02.18	TF0286/56	4,45	7,34	7,98	8,43	0,65	3,94	17,60
Landsort Deep 04.02.18	TF0284/52	4,27	7,24	8,09	8,17	0,60	3,93	17,50
Karlsö Deep 03.02.18	TF0245/50	4,13	7,25	7,99	8,14	0,71	3,47	19,80

Table 1: Surface water layer (about 3 m depth)

* see attached map

Table 2: Deep water layer (bottom near layer depths)

Area Date	Station Name /No.*	Temp. °C	Sal. psu	O ₂ (sensor) ml/l	O ₂ (titration) ml/l	PO ₄ µM	NO ₃ µM	SiO ₄ µM
Kiel Bight 30.01.18	TF0360/05	4,24	17,79	7,38	7,46	0,68	4,99	20,70
Meckl.Bight 30.01.18	TF0012/06	4,20	15,55	7,74	7,92	0,70	4,36	20,50
Lübeck Bight 31.01.18	TF0022/07	4,46	17,23	7,04	not measured	0,73	4,05	22,80
Darss Sill 31.01.18	TF0030/13	4,21	9,17	8,30	not measured	0,69	3,46	19,90
Arkona Basin 31.01.18	TF0113/17	9,39	15,29	3,24	3,03	1,31	8,74	39,80
Bornholm Deep 02.02.18	TF0213/39	6,85	17,14	0,03	0,05	4,20	0,00	71,00
Stolpe Channel 02.02.18	TF0222/42	8,12	12,62	1,86	1,89	1,76	7,13	44,10
SE Gotland Basin 03.02.18	TF0259/45	7,08	11,96	0,80	not measured	2,32	6,42	50,80
Gotland Deep 05.02.18	TF0271/58	6,91	13,30	0,00	-0,87	4,32	0,00	65,40
Farö Deep 05.02.18	TF0286/56	6,80	12,79	0,00	-0,71	4,10	0,00	60,50
Landsort Deep 04.02.18	TF0284/52	6,24	11,38	0,00	-1,13	3,14	0,00	55,80
Karlsö Deep 03.02.18	TF0245/50	5,58	10,32	0,00	-1,64	3,80	0,00	61,80

* see attached map

** hydrogen sulphide was converted into negative oxygen equivalents

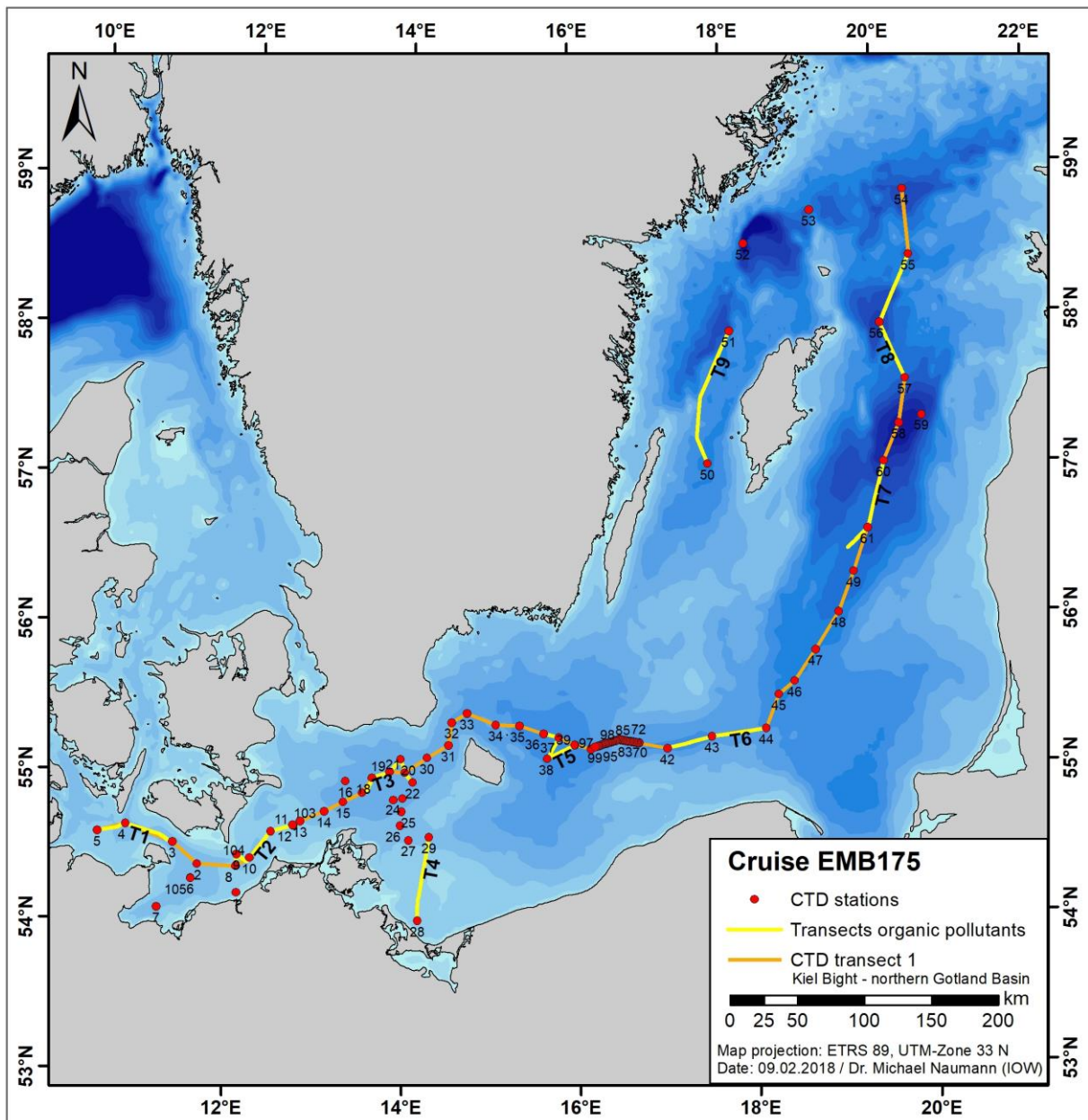


Figure 2: Map of CTD stations sampled during cruise EMB-175 from the western to the central Baltic Sea (labeled with station number -> Tab. 3) as well as transects of surface-water sampling for organic pollutants and derived CTD transect from Kiel Bight to the northern Gotland Basin (see Fig. 4).

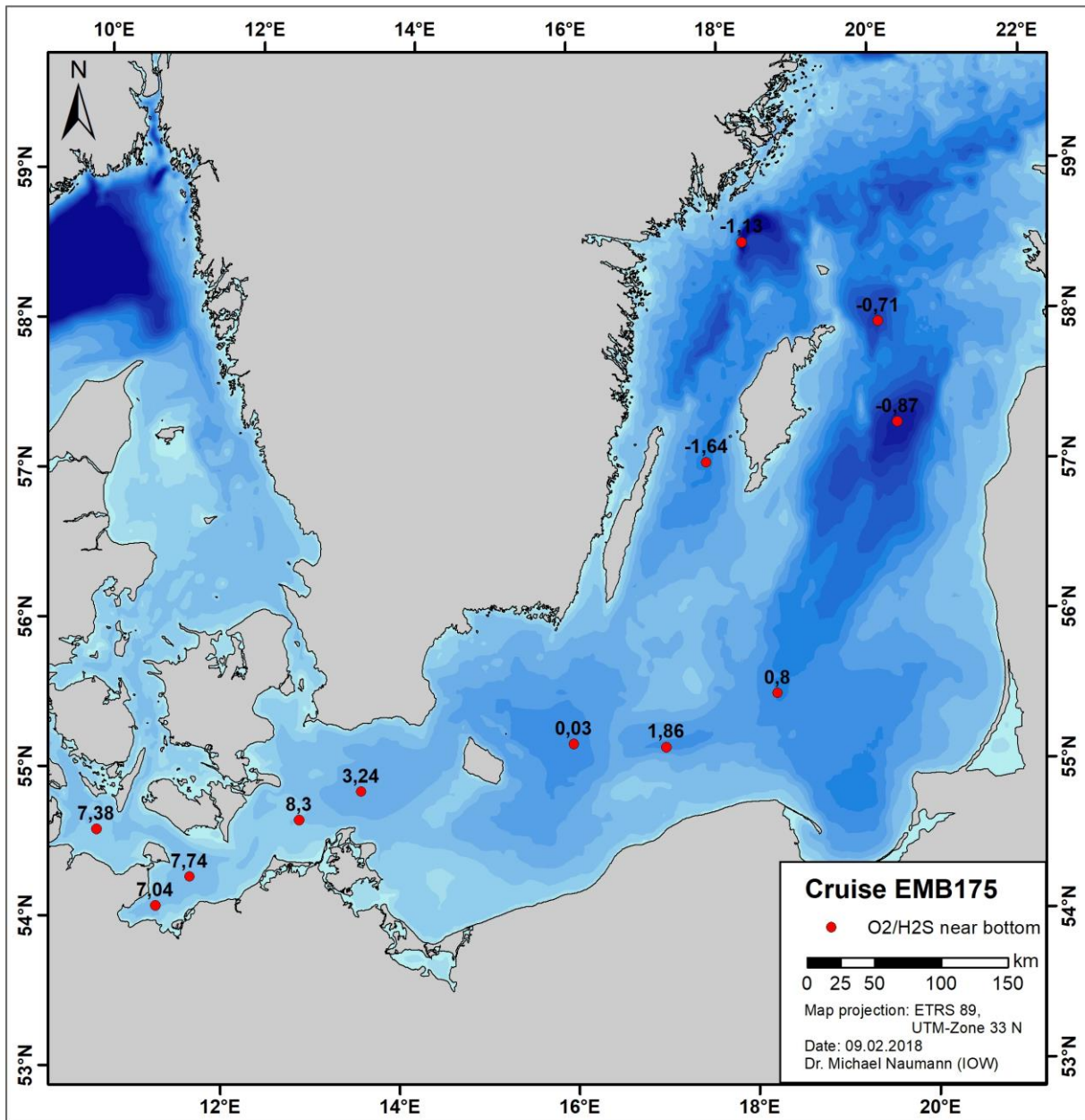


Figure 3: Oxygen/hydrogen sulphide (ml/l) in the bottom near layer for selected stations. Hydrogen sulphide is displayed as negative oxygen equivalents.

EMB175 - Baltic Monitoring and long-term data

2018 January 30th - February 06th, cross-section 1 - Kiel Bight to northern Gotland Basin

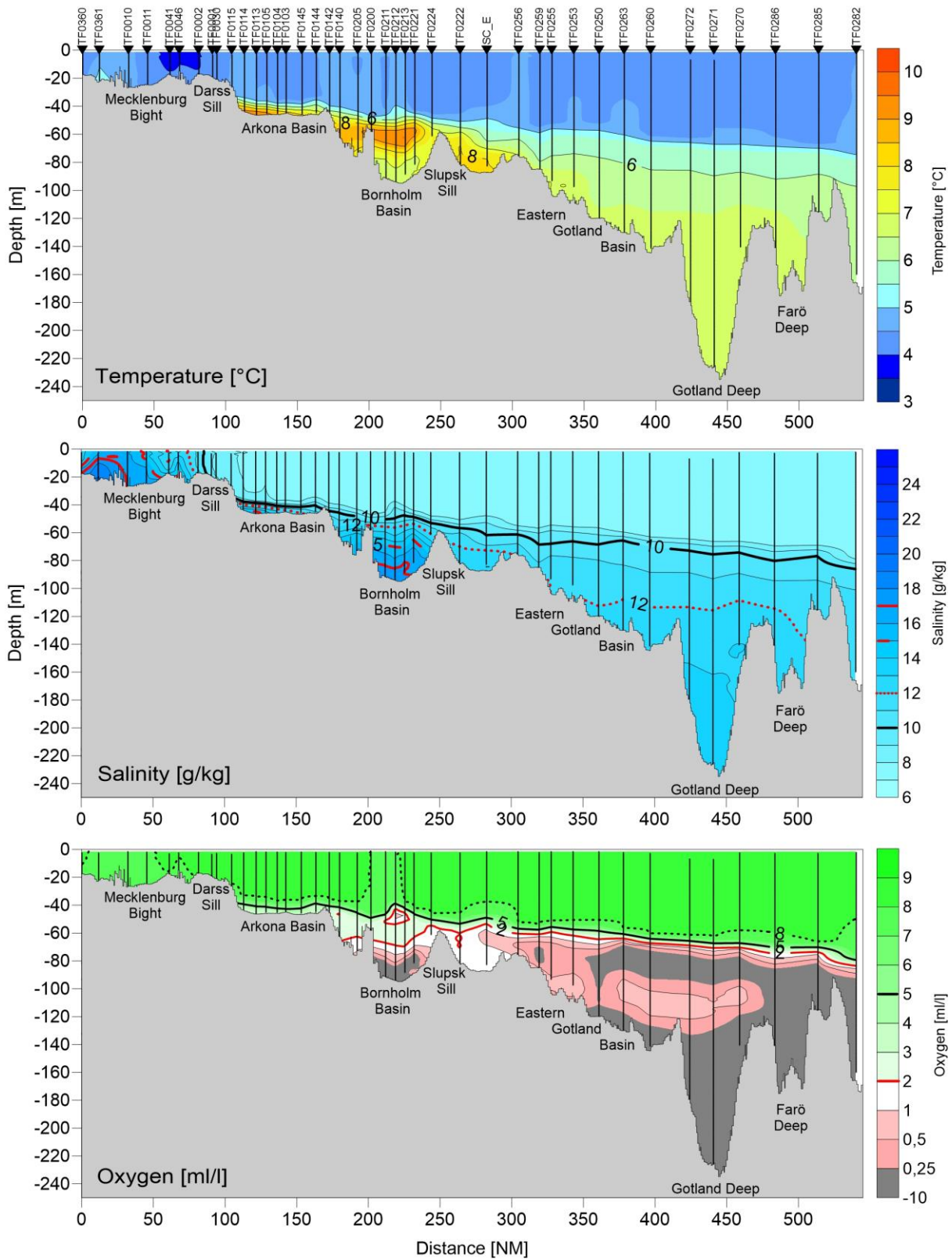


Figure 4: Cross section 1 from Kiel Bight to the Northern Central Basin on the “Thalweg” of Major Baltic Inflows. As consequence of weak winter inflow activity an inflow in the eastern Gotland Basin was detected in depths between 100-120 m.

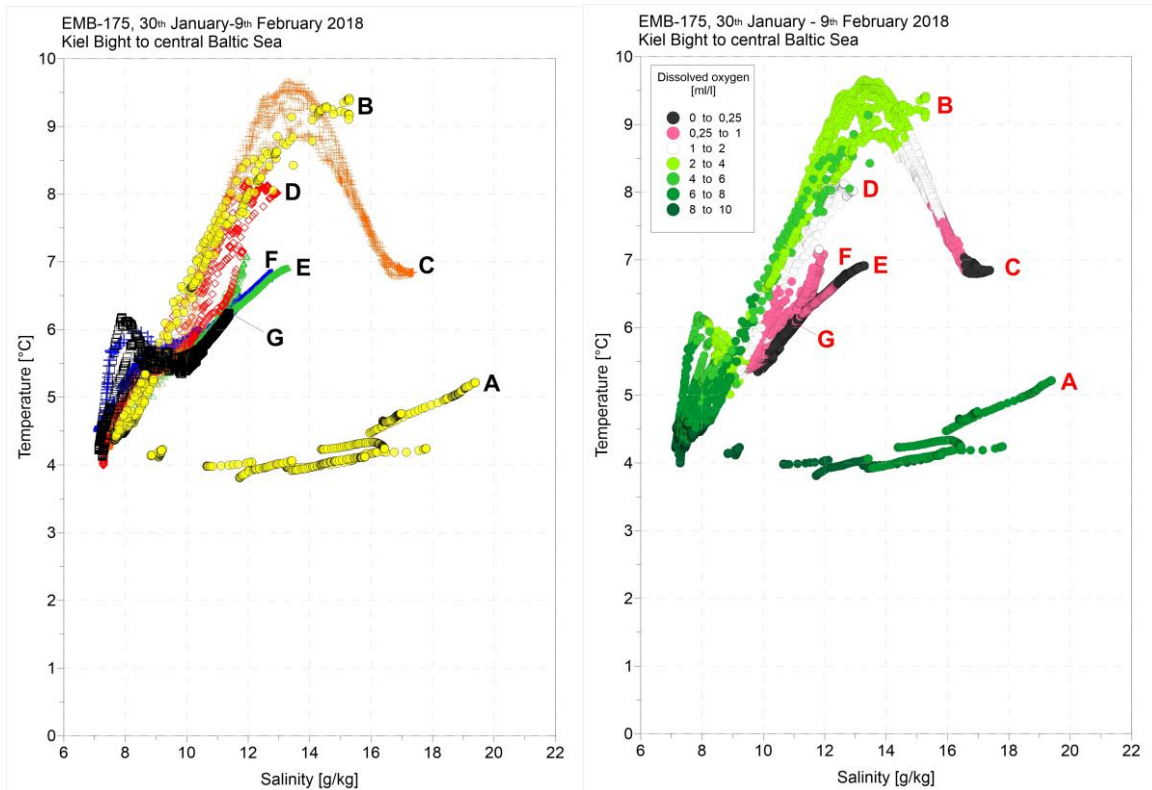


Figure 5: Temperature-Salinity diagram (left) of all stations, A – Kiel Bight – Mecklenburg Bight (yellow); B – Arkona Basin (yellow); C – Bornholm Basin (orange); D – Slupsk Channel (red); E – Eastern Gotland Basin (green); F – Northern Central Basin (blue); G – Western Gotland Basin (black). Diagram on right side shows all temperature – salinity values and dissolved oxygen classified in color.

Tab. 3: List of stations carried out during the cruise EMB-175.

Stat.No.	Stat.Name	CTD cast(s)	Latitude	Longitude	Lot-Depth [m]	Date	Time [UTC]	Remarks
	Marienehe harbour					30.01.18	7:00	Start of cruise
1	TF05	V0001F01.hex	54°13,8878N	12°04,5031E	12,7	30.01.18	08:22:31	O2, nutrients, Secchi disk
2	TF0011	V0002F01.hex	54°24,7559N	11°37,0190E	24,6	30.01.18	10:56:02	O2, nutrients
3	TF0010	V0003F01.hex	54°33,0942N	11°19,2479E	27,7	30.01.18	12:39:46	O2, nutrients, pollutants, sediment
4	TF0361	V0004F01.hex	54°39,4884N	10°46,1001E	22,9	30.01.18	15:19:32	O2, nutrients, Secchi disk
5	TF0360	V0005F01.hex	54°35,9843N	10°26,9477E	17,9	30.01.18	17:12:08	O2, nutrients, pollutants, plankton
6	TF0012	V0006F01.hex	54°18,8815N	11°33,0308E	24,3	30.01.18	21:59:54	O2, nutrients, pollutants, plankton
7	TF0022	V0007F01.hex	54°06,6232N	11°10,5047E	22,7	31.01.18	00:25:50	O2, nutrients, pollutants, plankton
		V0007F02.hex	54°06,6032N	11°10,5084E	22,6	31.01.18	00:41:53	
8	TF0041	V0008F01.hex	54°24,4231N	12°03,7158E	18,5	31.01.18	08:40:10	O2, nutrients
9	TF0040	V0009F01.hex	54°29,2618N	12°04,0184E	11,5	31.01.18	09:32:53	O2
10	TF0046	V0010F01.hex	54°28,0183N	12°13,0294E	25,3	31.01.18	10:34:15	O2, nutrients, pollutants, plankton
11	TF0002	V0011F01.hex	54°39,0318N	12°27,0007E	17,3	31.01.18	12:26:11	O2
12	TF0001	V0012F01.hex	54°41,7594N	12°42,4286E	20,3	31.01.18	13:34:58	O2
		V0012K02.hex	54°41,6569N	12°42,4860E	5,6	31.01.18	14:04:39	
		V0012K03.hex	54°41,6133N	12°42,4224E	0,1	31.01.18	14:10:03	
13	TF0030	V0013F01.hex	54°43,3947N	12°46,9761E	21,8	31.01.18	14:50:04	O2, nutrients, pollutants, plankton, sediment
14	TF0115	V0014F01.hex	54°47,6977N	13°03,5312E	28,7	31.01.18	16:27:52	O2
15	TF0114	V0015F01.hex	54°51,6009N	13°16,6005E	43,2	31.01.18	17:46:15	O2
16	TF0069	V0016F01.hex	54°59,9839N	13°18,0183E	44,8	31.01.18	19:03:02	O2, nutrients, sediment
17	TF0113	V0017F01.hex	54°55,4767N	13°29,9892E	1,8	31.01.18	20:39:42	O2, nutrients, pollutants, gas, plankton
		V0017F02.hex	54°55,4801N	13°30,0022E	45,5	31.01.18	20:44:55	
18	TF0105	V0018F01.hex	55°01,5058N	13°36,4143E	44,6	31.01.18	22:31:57	O2, nutrients
19	TF0104	V0019F01.hex	55°04,1188N	13°48,8438E	44,5	31.01.18	23:37:45	O2, nutrients
20	TF0102	V0020F01.hex	55°09,3050N	13°56,5568E	43,2	01.02.18	00:41:05	O2, nutrients
21	TF0103	V0021F01.hex	55°03,8259N	13°59,4098E	45,2	01.02.18	01:44:25	O2, nutrients
22	TF0109	V0022F01.hex	54°59,9939N	14°05,0432E	46,3	01.02.18	02:45:56	O2, nutrients, pollutants, plankton, sediment
23	ABBoje	V0023F01.hex	54°52,7976N	13°51,6638E	43,7	01.02.18	05:56:35	O2, nutrients
24	TF0111	V0024F01.hex	54°53,3638N	13°58,1316E	43,2	01.02.18	06:45:53	O2, nutrients
25	TF0112	V0025F01.hex	54°48,2124N	13°57,5039E	39	01.02.18	07:43:13	O2, nutrients
26	TF0121	V0026F01.hex	54°42,5944N	13°56,8376E	28,9	01.02.18	08:45:18	O2, nutrients
27	TF0150	V0027F01.hex	54°36,7179N	14°02,5941E	21	01.02.18	09:44:31	O2, nutrients
28	OBBoje	V0028F01.hex	54°04,4268N	14°09,5119E	13,7	01.02.18	15:22:40	O2, nutrients, pollutants, sediment
29	TF0152	V0029_01.hex	54°38,0046N	14°17,0014E	30	01.02.18	20:02:55	pollutants
		V0029K02.hex	54°37,9971N	14°17,0062E	18,1	01.02.18	20:21:25	
		V0029K03.hex	54°37,9940N	14°16,9959E	0,1	01.02.18	20:26:24	
30	TF0145	V0030F01.hex	55°10,0352N	14°15,0261E	45,1	01.02.18	23:38:40	O2, nutrients
31	TF0144	V0031F01.hex	55°15,0911N	14°30,0800E	44	02.02.18	01:05:55	O2, nutrients
32	TF0142	V0032F01.hex	55°24,3204N	14°32,1904E	58,3	02.02.18	02:41:31	O2, nutrients
33	TF0140	V0033F01.hex	55°27,9953N	14°43,0506E	67,5	02.02.18	04:00:09	O2, nutrients
34	TF0205	V0034_01.hex	55°23,4070N	15°03,4319E	73,4	02.02.18	05:42:09	
35	TF0200	V0035F01.hex	55°22,9999N	15°19,9768E	89,4	02.02.18	07:12:24	O2, H2S, nutrients
36	TF0211	V0036_01.hex	55°19,7991N	15°36,9015E	93,1	02.02.18	08:37:57	pollutants
37	TF0212	V0037F01.hex	55°18,1101N	15°47,7940E	92,9	02.02.18	09:50:52	
38	TF0214	V0038F01.hex	55°09,5886N	15°39,5919E	91,7	02.02.18	11:19:36	O2
39	TF0213	V0039F01.hex	55°15,0254N	15°59,0523E	87,6	02.02.18	13:10:51	O2, nutrients, gas, plankton, secchi
		V0039F02.hex	55°15,0099N	15°59,0382E	41,8	02.02.18	14:00:24	
		V0039K03.hex	55°15,0209N	15°59,0193E	0,1	02.02.18	14:06:25	
		V0039K04.hex	55°15,0086N	15°59,0330E	6,1	02.02.18	14:13:40	
40	TF0221	V0040F01.hex	55°13,3021N	16°10,0950E	80,5	02.02.18	16:19:18	O2
41	TF0224	V0041_01.hex	55°17,0035N	16°30,0779E	60,5	02.02.18	17:54:07	
42	TF0222	V0042F01.hex	55°13,0064N	17°04,0192E	88,8	02.02.18	20:39:50	O2, H2S, nutrients, pollutants
43	SC_E	V0043F01.hex	55°17,1867N	17°35,6499E	81,9	02.02.18	23:12:16	
44	TF0256	V0044F01.hex	55°19,5739N	18°14,1296E	76,3	03.02.18	01:35:47	O2, H2S, nutrients
Stat.No.	Stat.Name	CTD cast(s)	Latitude	Longitude	Lot-Depth [m]	Date	Time [UTC]	Remarks
45	TF0259	V0045F01.hex	55°33,0120N	18°24,0716E	87,4	03.02.18	03:22:55	O2, nutrients, plankton

		V0045F02.hex	55°33,0144N	18°24,0664E	21,4	03.02.18	03:51:54	
46	TF0255	V0046F01.hex	55°38,0366N	18°36,0322E	92,3	03.02.18	05:02:43	O2, H2S, nutrients
47	TF0253	V0047F01.hex	55°50,3885N	18°52,0225E	96,4	03.02.18	07:03:05	
48	TF0250	V0048F01.hex	56°05,0133N	19°09,9981E	120,6	03.02.18	09:06:10	O2, H2S
49	TF0263	V0049F01.hex	56°20,8455N	19°22,7144E	129,5	03.02.18	11:08:57	O2, H2S
50	TF0245	V0050F01.hex	57°07,0011N	17°40,0131E	107,1	03.02.18	19:53:58	O2, H2S, nutrients, pollutants
51	TF0240	V0051F01.hex	57°59,9623N	17°59,9702E	162,2	04.02.18	01:58:48	O2, H2S, nutrients
52	TF0284	V0052F01.hex	58°34,8864N	18°13,8357E	436,5	04.02.18	10:04:56	O2, H2S, nutrients, plankton
		V0052F02.hex	58°34,9001N	18°13,8869E	154,4	04.02.18	13:27:34	
		V0052F03.hex	58°34,9104N	18°13,9773E	40,9	04.02.18	13:59:55	
		V0052K04.hex	58°34,9620N	18°13,9508E	0,4	04.02.18	14:12:55	
		V0052K05.hex	58°34,9654N	18°13,9392E	30,3	04.02.18	14:36:03	
		V0052F06.hex	58°34,9586N	18°13,8467E	118,8	04.02.18	15:29:44	
53	TF0283	V0053F01.hex	58°46,9907N	19°05,9722E	127,1	04.02.18	20:51:49	O2, H2S
54	TF0282	V0054F01.hex	58°52,9999N	20°18,9889E	158,7	05.02.18	03:12:43	O2, H2S, nutrients
55	TF0285	V0055F01.hex	58°26,4845N	20°19,9484E	118,9	05.02.18	06:21:03	O2, H2S, nutrients, pollutants
		V0055_02.hex	58°26,4776N	20°20,0350E	100,6	05.02.18	06:38:04	
		V0055_03.hex	58°26,4880N	20°20,0034E	100,3	05.02.18	06:41:22	
		V0055_04.hex	58°26,4914N	20°19,9405E	101,1	05.02.18	06:45:09	
		V0055_05.hex	58°26,4948N	20°19,8972E	100,3	05.02.18	06:49:04	
56	TF0286	V0056F01.hex	58°00,0207N	19°53,9848E	188,8	05.02.18	09:59:25	O2, H2S, nutrients
		V0056F02.hex	57°59,9967N	19°53,9408E	111,4	05.02.18	11:01:09	
57	TF0270	V0057F01.hex	57°36,9706N	20°09,9858E	139,4	05.02.18	13:41:09	O2, H2S, nutrients
58	TF0271	V0058F01.hex	57°19,1528N	20°02,9824E	232,7	05.02.18	15:45:25	O2, H2S, nutrients, pollutants, gas, plankton
		V0058F02.hex	57°19,1631N	20°02,9669E	119,6	05.02.18	16:44:35	
		V0058F03.hex	57°19,2181N	20°02,9597E	40,6	05.02.18	17:33:35	
		V0058K04.hex	57°19,2078N	20°02,9240E	21,9	05.02.18	18:29:15	
		V0058K05.hex	57°19,2113N	20°02,9302E	0,3	05.02.18	18:34:57	
		V0058F06.hex	57°19,1837N	20°02,9766E	169,2	05.02.18	20:11:54	
		V0058F07.hex	57°19,1356N	20°03,0491E	232,7	06.02.18	06:59:44	
59	Gotland_NE	V0059_01.hex	57°21,8893N	20°20,4118E	211,1	06.02.18	08:39:57	
60	TF0272	V0060F01.hex	57°04,2667N	19°49,8485E	201,8	06.02.18	11:49:39	O2, H2S, nutrients, pollutants
61	TF0260	V0061F01.hex	56°37,9889N	19°34,9191E	139,9	06.02.18	14:49:20	O2, H2S, nutrients
62	X_0062	V0062_01.hex	55°15,4417N	16°44,5839E	72,2	07.02.18	05:10:08	
63	X_0063	V0063F01.hex	55°15,6026N	16°43,7509E	72,9	07.02.18	05:30:29	
64	X_0064	V0064_01.hex	55°15,5961N	16°42,8581E	71,5	07.02.18	05:52:24	
65	X_0065	V0065_01.hex	55°15,7116N	16°42,0031E	71	07.02.18	06:13:20	
66	X_0066	V0066_01.hex	55°15,8137N	16°41,1564E	70,1	07.02.18	06:36:14	
67	X_0067	V0067_01.hex	55°15,9010N	16°40,2977E	69,2	07.02.18	07:02:25	
68	X_0068	V0068_01.hex	55°15,9625N	16°39,3898E	68,3	07.02.18	07:29:04	
69	X_0069	V0069_01.hex	55°16,0681N	16°38,5386E	66,9	07.02.18	07:53:18	
70	X_0070	V0070F01.hex	55°16,1464N	16°37,6609E	66	07.02.18	08:16:59	
71	X_0071	V0071_01.hex	55°16,2520N	16°36,8617E	66	07.02.18	08:43:04	
72	X_0072	V0072_01.hex	55°16,3372N	16°35,9197E	66,4	07.02.18	09:11:28	
73	X_0073	V0073_01.hex	55°16,4493N	16°35,0555E	65,9	07.02.18	09:34:44	
74	X_0074	V0074_01.hex	55°16,5260N	16°34,1885E	65,4	07.02.18	09:57:40	
75	X_0075	V0075_01.hex	55°16,6260N	16°33,2706E	63,9	07.02.18	10:21:40	
76	X_0076	V0076F01.hex	55°16,7099N	16°32,5115E	64,3	07.02.18	10:42:10	
77	X_0077	V0077_01.hex	55°16,8367N	16°31,6119E	62,7	07.02.18	11:13:04	
78	X_0078	V0078_01.hex	55°16,9299N	16°30,7878E	60,9	07.02.18	11:37:12	
79	TF0224	V0079_01.hex	55°16,9901N	16°29,9834E	60,3	07.02.18	11:59:46	
80	X_0080	V0080_01.hex	55°16,8636N	16°29,1800E	59,1	07.02.18	12:18:20	
81	X_0081	V0081_01.hex	55°16,7120N	16°28,3625E	57,9	07.02.18	12:42:36	
82	X_0082	V0082_01.hex	55°16,5734N	16°27,5254E	56,6	07.02.18	13:08:44	
83	X_0083	V0083_01.hex	55°16,4235N	16°26,6722E	57,3	07.02.18	13:37:20	
84	X_0084	V0084_01.hex	55°16,3001N	16°25,7966E	56,4	07.02.18	14:00:37	
85	X_0085	V0085_01.hex	55°16,1650N	16°24,9780E	58	07.02.18	14:20:56	
86	X_0086	V0086_01.hex	55°16,0248N	16°24,1214E	59,1	07.02.18	14:43:34	

Stat.No.	Stat.Name	CTD cast(s)	Latitude	Longitude	Lot-Depth [m]	Date	Time [UTC]	Remarks
87	X_0087	V0087_01.hex	55°15,8890N	16°23,3049E	60	07.02.18	15:02:55	

88	X_0088	V0088_01.hex	55°15,7765N	16°22,4644E	61	07.02.18	15:23:44	
89	X_0089	V0089_01.hex	55°15,6438N	16°21,7112E	62,4	07.02.18	15:38:24	
90	X_0090	V0090_01.hex	55°15,4788N	16°20,7118E	63,2	07.02.18	16:02:49	
91	X_0091	V0091_01.hex	55°15,3630N	16°19,9734E	64,3	07.02.18	16:17:50	
92	X_0092	V0092_01.hex	55°15,2148N	16°19,1500E	65,3	07.02.18	16:37:40	
93	X_0093	V0093_01.hex	55°15,0780N	16°18,2645E	66,7	07.02.18	17:03:33	
94	X_0094	V0094_01.hex	55°14,9498N	16°17,4050E	67,6	07.02.18	17:22:50	
95	X_0095	V0095_01.hex	55°14,7648N	16°16,6037E	69,3	07.02.18	17:43:36	
96	X_0096	V0096_01.hex	55°14,6414N	16°15,7735E	70,8	07.02.18	18:03:53	
97	X_0097	V0097_01.hex	55°14,4922N	16°14,9921E	72,3	07.02.18	18:20:55	
98	X_0098	V0098_01.hex	55°14,3767N	16°14,1055E	73,7	07.02.18	18:42:30	
99	X_0099	V0099_01.hex	55°14,1708N	16°13,2117E	75	07.02.18	19:10:27	
100	TF0213	V0100F01.hex	55°15,0130N	15°58,9309E	87,4	07.02.18	20:24:04	O2, plankton
		V0100K02.hex	55°15,0116N	15°59,0059E	13,8	07.02.18	21:31:32	
		V0100K03.hex	55°15,0099N	15°59,0093E	0,2	07.02.18	21:37:21	
101	TF0113	V0101F01.hex	54°55,4801N	13°29,9954E	45,8	08.02.18	06:44:47	O2, plankton, secchi
102	TF0030	V0102F01.hex	54°43,4129N	12°46,9438E	22	08.02.18	09:53:47	O2, plankton, secchi
103	TF0001	V0103F01.hex	54°41,8608N	12°41,8838E	20,5	08.02.18	10:47:45	O2
		V0103K02.hex	54°41,8766N	12°41,9061E	5,1	08.02.18	11:04:13	
		V0103K03.hex	54°41,8896N	12°41,9130E	0,3	08.02.18	11:08:00	
104	TF0046	V0104F01.hex	54°28,0280N	12°12,9843E	25,6	08.02.18	13:26:41	O2, plankton, secchi
105	TF0012	V0105F01.hex	54°18,8509N	11°32,9889E	23,7	08.02.18	16:15:24	O2, plankton, secchi
	Marienehe harbour					09.02.18	07:00	End of cruise