

Leibniz Institute for Baltic Sea Research Warnemünde

Monitoring cruise

FS „Elisabeth Mann Borgese“

Cruise- No. EMB-147

07th February – 18th February 2017

Western and Central Baltic Sea

This report is based on preliminary data

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1. Basic information

Ship: FS Elisabeth Mann Borgese
Nationality: Germany
Operating Authority: Baltic Sea Research Institute Warnemünde (IOW)
Cruise: EMB-147
Date: 07.02.-18.02.2017
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 measurement programmes to follow environmental changes after the intensive inflow activity in the years 2014-2016.

Research staff:

| | Name | On board | Institution | Responsibility |
|----|--------------------|-------------------|-------------|--|
| 1 | Michael Naumann | 07.02.-18.02.2017 | IOW | sediment coring, mooring work chief scientist |
| 2 | Johann Ruickoldt | 07.02.-18.02.2017 | IOW | CTD, CTD-maintenance |
| 3 | Jan Donath | 07.02.-18.02.2017 | IOW | CTD, QM CTD-measurements |
| 4 | Birgit Sadkowiak | 07.02.-18.02.2017 | IOW | Nutrients, QM laboratory analysis |
| 5 | Lars Kreuzer | 07.02.-18.02.2017 | IOW | Nutrients, Dissolved oxygen |
| 6 | Ines Hand | 07.02.-18.02.2017 | IOW | Organic contaminants |
| 7 | Susanne Schöne | 07.02.-18.02.2017 | IOW | Organic contaminants |
| 8 | Madleen Dierken | 07.02.-18.02.2017 | IOW | Dissolved oxygen |
| 9 | Michael Pöttsch | 07.02.-18.02.2017 | IOW | Biological sampling, sediment coring, mooring work, |
| 10 | Natalia Osma | 07.02.-18.02.2017 | IOW | Biological sampling |
| 11 | Dawid Zacharzewski | 07.02.-18.02.2017 | 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 2017 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 February 07th and 18th February 2017. 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.

Additionally, the measurements were focused to investigate the impact of the intensified inflow activity since 2014. Surprisingly, the Farö Deep in the northern Central Basin was ventilated and for the first time water bodies of oxygen propagated farther north from the eastern Gotland Basin.

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. 5). Additional stations were done in the northern Central Basin and western Gotland Basin to investigate possible influences from the inflow activity in this distant region (Fig. 8). In the eastern Gotland Basin a few additional stations were sampled to get a more area-wide overview of the physical, chemical and biological conditions after the Major Baltic Inflows of December 2014, November 2015, January-February 2016 and additional smaller inflows in between. At the bottom of the Gotland Deep the situation shifts back to anoxic-euxinic conditions below 160 m water depth (Fig. 5, 6). The mooring “GODESS – Gotland Deep Environmental Sampling Station” equipped with multiple hydrographic and chemical sensors in daily profiling mode through the water column was recovered. On the tour back home to Rostock additional stations were sampled in the Arkona Basin to try individual water sampling compared a grid of standard sampling depths.

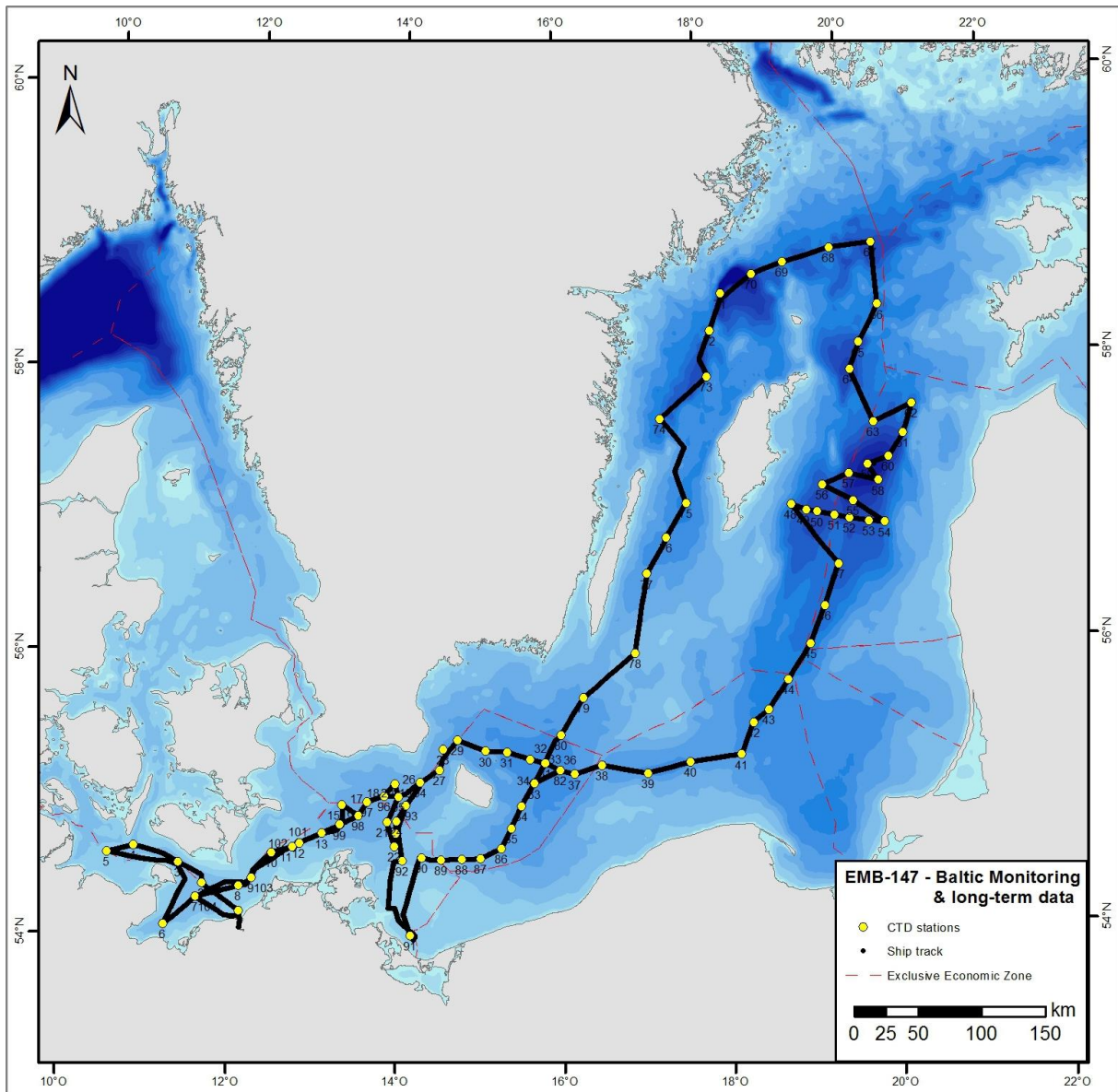


Figure 1: Map of stations and ship track of cruise EMB-147 from 7th to 18th February 2017. Yellow dots indicate the position of CTD stations with labels of the station number (Tab. 3).

- The **weather situation** during the cruise was continuously calm to moderate winds under influence of the large high pressure cell “Erika” with up to 1050 hPa across Scandinavia. The situation changed at the 18th February to stormy conditions from westerly directions. Air pressure ranged between 1015 and 1042 hPa, compared to the very stormy last years cruise of 979 to 1019 hPa. The wind speed changed between 0 and 8 Bft (0-36 kn), but ranged 80 % of the cruise between 0 and 5 Bft. Air temperature ranged between -4.3 °C (7th Feb.) up to 8.3 °C (18th Feb.) and stayed half of the cruise below 0 °C.

The following hydrographical and hydrochemical characteristics have been observed during the cruise (cf. Tables 1 and 2, Figures 4 to 8):

- **Surface temperatures** varied slightly between 0.9 °C (Mecklenburg Bight, start of cruise) and 5.7 °C (Mecklenburg Bight, end of cruise). After regular cold winter weather in January (calculations of the German Weather Service: -0.3 K below the long-term mean 1981-2010) the surface temperatures cooled down rapidly. Especially in the western Baltic Sea the surface temperatures are ranging between 1-3 °C (cf. Fig. 5). The water column is mixed completely down to the halocline (cf. Fig. 5, 7).
- **Deep water layer temperatures** (bottom near depths) increases in the central Baltic Proper during the last two years due to the intensified inflow activity starting in 2014. Actually the Bornholm Deep is affected by warm bottom water due to a row of smaller intrusions during this winter, starting in October 2016. These intrusions of highly saline water showed warm temperatures from 12-6 °C in the western Baltic Sea (cf. continuous measurements at the MARNET station Darss Sill), filled the Bornholm Basin, passing the Slupsk Sill and are propagating along the “Thalweg” at the southwestern rim of the eastern Gotland Basins. In Figure 5 a longitudinal cross section of the basins and pathway of the salt water intrusion can be seen. At all key stations the temperatures are still higher as the long-term mean. Figure 7 shows the situation of cooler bottom layer temperatures in the western Gotland Basin. This distant area is not arrived by new inflow water since 2003.

| | Febr. 2014 | Febr. 2015 | Febr. 2016 | Febr. 2017 | Mean 1971/90 |
|--------------|------------|-------------|-------------|------------|--------------|
| Bornholm D. | 8.65 °C | 7.15 °C | 8.39 °C | 6.96 | 6.1 °C |
| Gotland Deep | 6.36 °C | 6.71 °C | 7.86 °C | 7.19 | 5.6 °C |
| Farö Deep | 5.76 °C | 6.17 °C | not sampled | 6.73 | 5.2 °C |
| Landsort D. | 5.34 °C | not sampled | 5.84 °C | 5.98 | 4.8 °C |
| Karlsö Deep | 5.08 °C | 5.03 °C | 5.22 °C | 5.53 | 4.2 °C |

- The major Baltic inflow from December 2014 and the following events of winter 2015/16 increased the **salinity in the bottom layer** in the central Baltic Proper rapidly to a value of 13.84 at the Gotland Deep in February 2016. Since that time a slightly decrease starts showing no further inflow impact at the bottom of the eastern Gotland Basin. Compared to long term salinity data at this station this level is among the highest values ever measured and comparable to the largest Major Baltic Inflow of 1951. The salinity in the northerly Farö Deep increased significantly during last year as well, but the western Gotland Basin stay nearly stagnant.

| | Nov. 2014 | Feb. 2015 | Feb. 2016 | Feb. 2017 |
|---------------|-----------|-------------|-------------|-----------|
| Gotland Deep | 12.23 | 12.31 | 13.84 | 13.50 |
| Farö Deep | 11.60 | 11.81 | not sampled | 12.68 |
| Landsort Deep | 10.45 | not sampled | 11.03 | 11.18 |
| Karlsö Deep | 9.75 | 9.78 | 9.97 | 10.34 |

- Thus, the **oxygen situation in the deep water** of central basins (>100 m water depth) documents this recent inflow activity very well. 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 and decreased drastically in the eastern Gotland Basin (2014-2015) and the Farö Deep in the northern Central Basin during 2015-2016. The Western Gotland Basin is not effected by this intrusions so far. Figure 5 visualize the propagation and ventilation of the inflowing highly saline water from the winter season 2016-2017 from the Bornholm Basin to the eastern Gotland Basin. In this area the upper part of the deep water layer between 70-120 m shows oxygen values between 1-2 ml/l (Fig. 5, 6). For the first time the Farö Deep shows a slightly ventilation with bottom values of 0.2 ml/l and up to 1.2 ml/l in 115-130 m water depth (Fig. 5).

| | Nov. 2014 | Feb. 2015 | Feb. 2016 | Feb. 2017 |
|---------------|------------|-------------|-------------|------------|
| Gotland Deep | -1.71 ml/l | -0.92 ml/l | 1.7 ml/l | -1.09 ml/l |
| Farö Deep | -2.41 ml/l | -1.07 ml/l | not sampled | 0.20 ml/l |
| Landsort Deep | -0.95 ml/l | not sampled | -1.28 ml/l | -0.89 ml/l |
| Karlsö Deep | -1.25 ml/l | -0.86 ml/l | -0.90 ml/l | -1.12 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 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 (table 2). The values are halved or even more decreased since November 2013. Also silicate concentrations have decreased from 126.8 $\mu\text{mol/l}$ to 43.7 $\mu\text{mol/l}$ in February 2016. During the last year the situation at the bottom water of the Gotland Deep has changed back into a beginning stagnation. Nitrate concentration are reduced and bound in the sediment, phosphate is released. Phosphate values increased from 2.1 $\mu\text{mol/l}$ to 4.97 $\mu\text{mol/l}$ and silcate as well from 43.75 $\mu\text{mol/l}$ to 64 $\mu\text{mol/l}$ during the last year at the station Gotland Deep.
- 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 (photospectrometric)(responsible scientist: Dr. B. Schneider)
Water samples for CH₄ and N₂O measurements in different water depths at 12 stations along the cruise track. Part of a Phd work on studies about greenhouse gas conversion in marine systems with distinct oxygen dynamics (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).

In the Pomeranian Bight the standard sampling stations OB Boje and TF150 were connected by geophysical measurements (Parametric Sediment Echosounder) of the geological subsurface up to 10 m below seafloor. The profile complements earlier measurements in this area taken in 2007-2008, 2014 for the SINCOS-II project to detect the palaeo outflow system of the Oder river and former coastlines (responsible scientist: Dr. M. Naumann, Prof. R. Lampe – Greifswald University).

Attachments:

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

Figures 2 and 3: detailed Track charts

Figure 4: Oxygen/hydrogen sulphide in the bottom near layer for selected stations

Figure 5: 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 6: Cross sections 2 showing the hydrographic situation in the eastern Gotland Basin as a West-East transect in more detail.

Figure 7: Cross section 4 showing the hydrographic situation from western Gotland Basin to the Pommeranian Bight.

Figure 8: TSO diagram of all stations

Table 3: List of stations

Warnemünde 20th March 2017

Dr. Michael Naumann
(scientist in charge)

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

| 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 07.02.2017 | TF0360/05 | 2,81 | 19,51 | 8,09 | 8,20 | 0,54 | 3,20 | 8,20 |
| Meckl.Bight 08.02.2017 | TF0012/07 | 2,95 | 12,52 | 8,29 | 8,44 | 0,56 | 4,37 | 11,30 |
| Lübeck Bight 08.02.2017 | TF0022/06 | 2,32 | 14,31 | 8,56 | not measured | 0,46 | 4,02 | 10,20 |
| Darss Sill 08.02.2017 | TF0030/12 | 3,13 | 8,48 | 8,64 | 8,79 | 0,48 | 3,55 | 12,50 |
| Arkona Basin 08.02.2017 | TF0113/16 | 3,56 | 7,94 | 8,58 | 8,95 | 0,53 | 5,27 | 15,90 |
| Bornholm Deep 09.02.2017 | TF0213/36 | 3,72 | 7,75 | 8,51 | 8,61 | 0,59 | 3,89 | 14,20 |
| Stolpe Channel 10.02.2017 | TF0222/39 | 3,37 | 7,44 | 8,59 | 8,67 | 0,64 | 3,89 | 16,00 |
| SE Gotland Basin 10.02.2017 | TF0259/42 | 3,44 | 7,35 | 8,59 | 8,68 | 0,68 | 3,68 | 17,10 |
| Gotland Deep 11.02.2017 | TF0271/59 | 3,64 | 7,52 | 8,47 | 8,53 | 0,63 | 4,20 | 15,30 |
| Farö Deep 13.02.2017 | TF0286/64 | 3,18 | 7,48 | 8,61 | 8,67 | 0,68 | 3,82 | 17,10 |
| Landsort Deep 14.02.2017 | TF0284/71 | 2,30 | 7,03 | 8,89 | 8,98 | 0,76 | 3,57 | 20,20 |
| Karlsö Deep 15.02.2017 | TF0245/75 | 2,34 | 7,15 | 8,86 | 8,92 | 0,82 | 3,34 | 23,40 |

* 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 07.02.2017 | TF0360/05 | 3,97 | 22,30 | 6,87 | 7,03 | 0,93 | 4,96 | 16,90 |
| Meckl.Bight 08.02.2017 | TF0012/07 | 3,75 | 21,12 | 7,16 | 7,27 | 0,75 | 3,95 | 12,10 |
| Lübeck Bight 08.02.2017 | TF0022/06 | 3,56 | 18,64 | 7,37 | 7,47 | 0,70 | 5,23 | 12,00 |
| Darss Sill 08.02.2017 | TF0030/12 | 3,15 | 8,48 | 8,62 | 8,74 | 0,48 | 3,54 | 13,40 |
| Arkona Basin 08.02.2017 | TF0113/16 | 6,21 | 20,50 | 5,07 | 5,57 | 0,87 | 7,04 | 18,70 |
| Bornholm Deep 09.02.2017 | TF0213/36 | 6,96 | 17,93 | 2,10 | 2,24 | 2,03 | 6,54 | 42,50 |
| Stolpe Channel 10.02.2017 | TF0222/39 | 8,83 | 15,26 | 3,61 | 3,71 | 1,39 | 8,26 | 30,00 |
| SE Gotland Basin 10.02.2017 | TF0259/42 | 6,73 | 11,77 | 1,30 | 1,56 | 2,15 | 7,01 | 42,30 |
| Gotland Deep 11.02.2017 | TF0271/59 | 7,19 | 13,50 | 0,00 | -1,09 | 4,97 | 0,00 | 64,00 |
| Farö Deep 13.02.2017 | TF0286/64 | 6,73 | 12,68 | 0,33 | 0,20 | 2,43 | 7,46 | 49,90 |
| Landsort Deep 14.02.2017 | TF0284/71 | 5,98 | 11,18 | -0,01 | -0,89 | 3,20 | 0,00 | 55,60 |
| Karlsö Deep 15.02.2017 | TF0245/75 | 5,53 | 10,34 | 0,01 | -1,12 | 3,67 | 0,00 | 59,50 |

* see attached map

** hydrogen sulphide was converted into negative oxygen equivalents

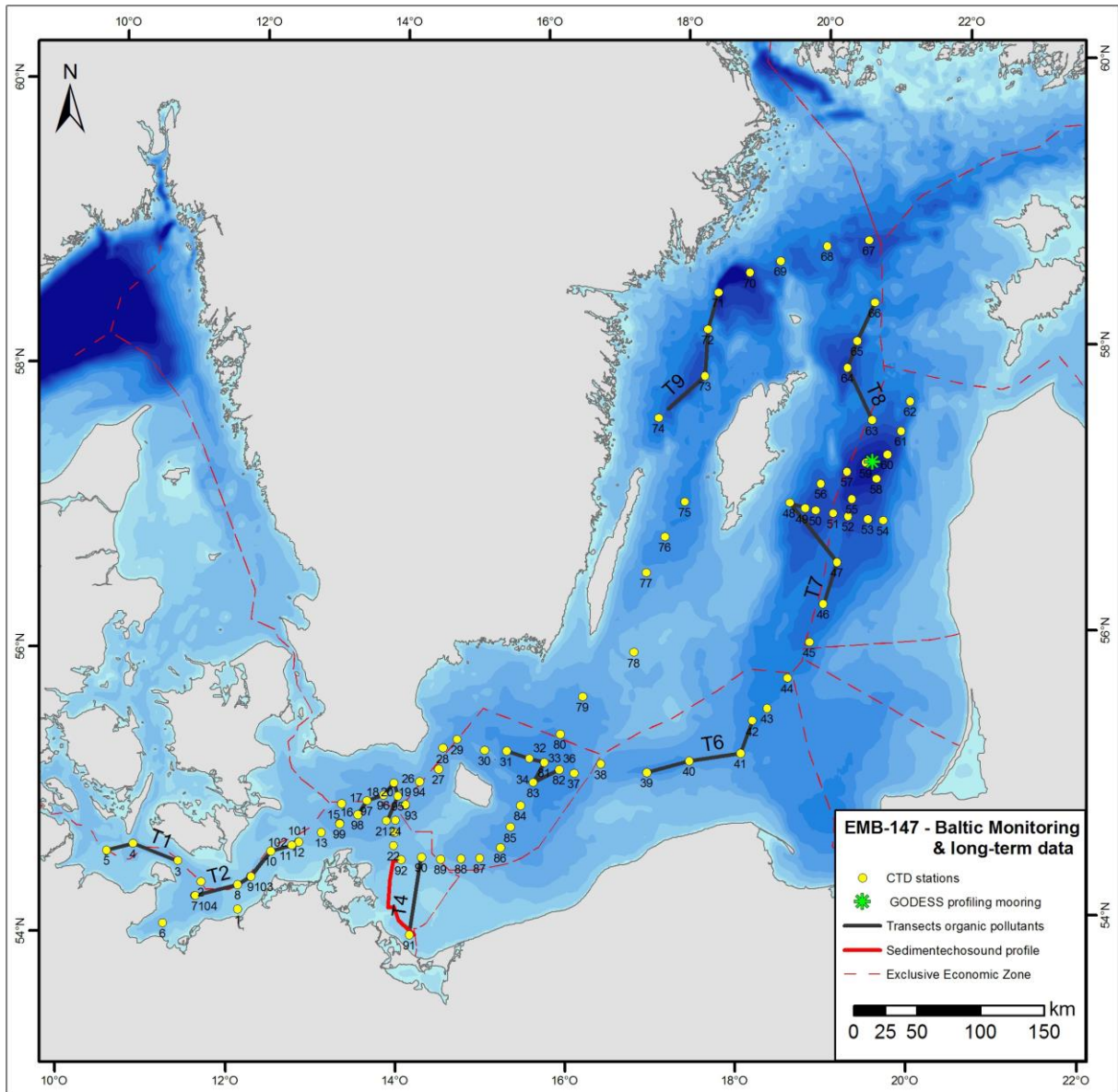


Figure 2: Map of CTD stations sampled during cruise EMB-147 from the western to the central Baltic Sea (labeled with station number -> Tab. 3) as well as transects of surface-water sampling for organic pollutants, mooring recovery and sediment echosounding measurements.

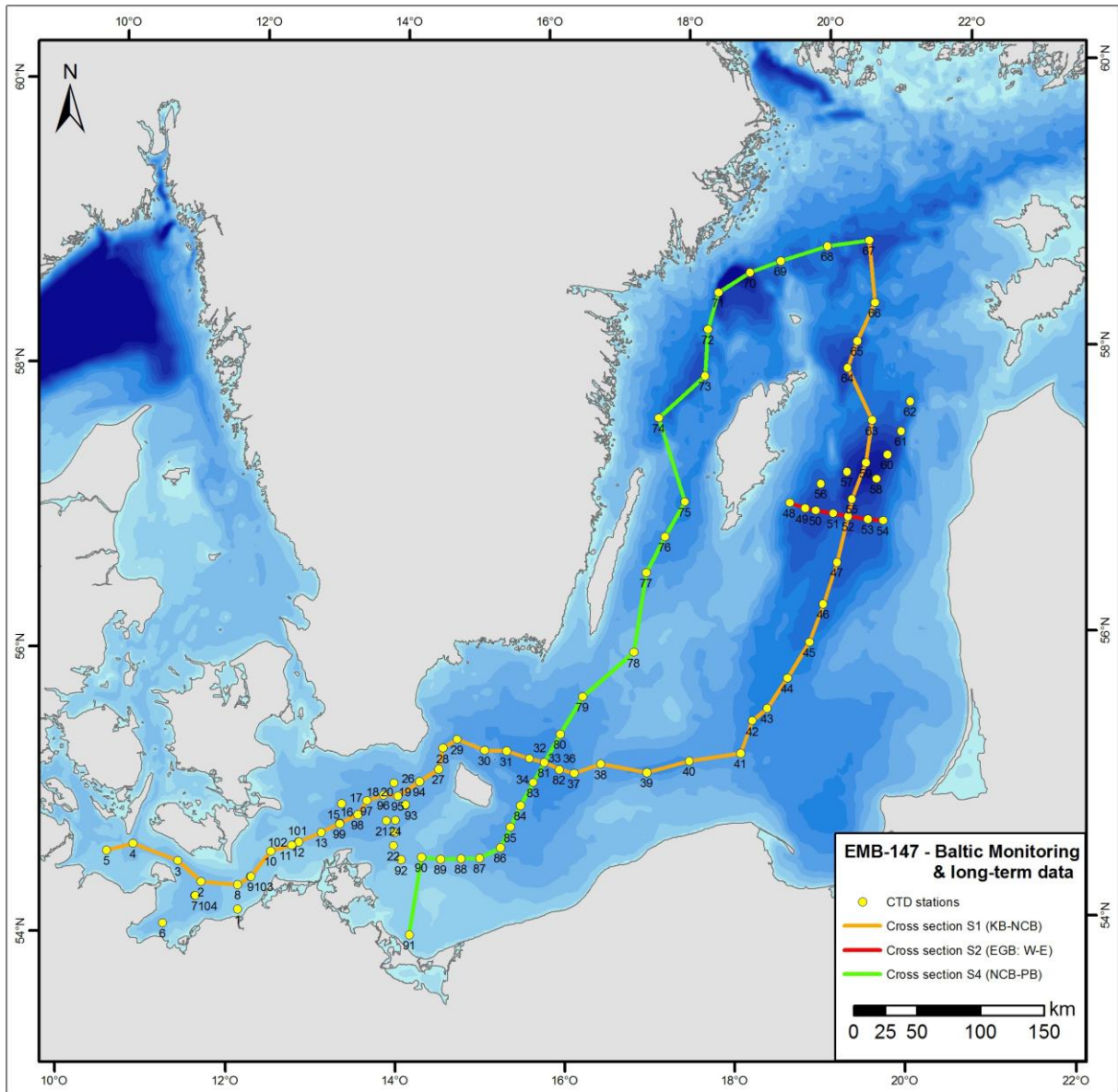


Figure 3: Map of CTD-stations (labeled with station number -> Tab. 3) and derived cross sections S1-S4.

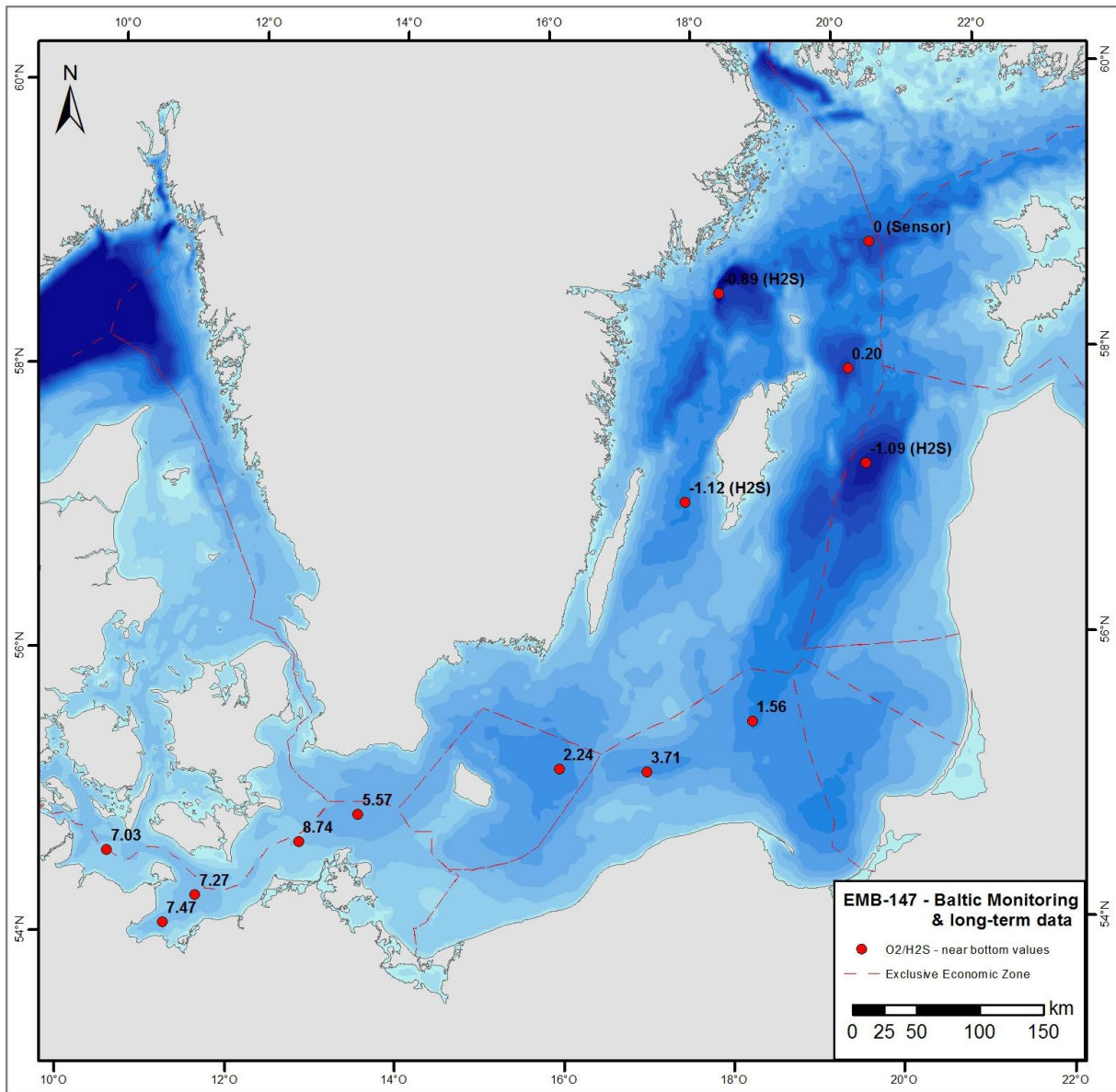


Figure 4: Oxygen/hydrogen sulphide in the bottom near layer for selected stations

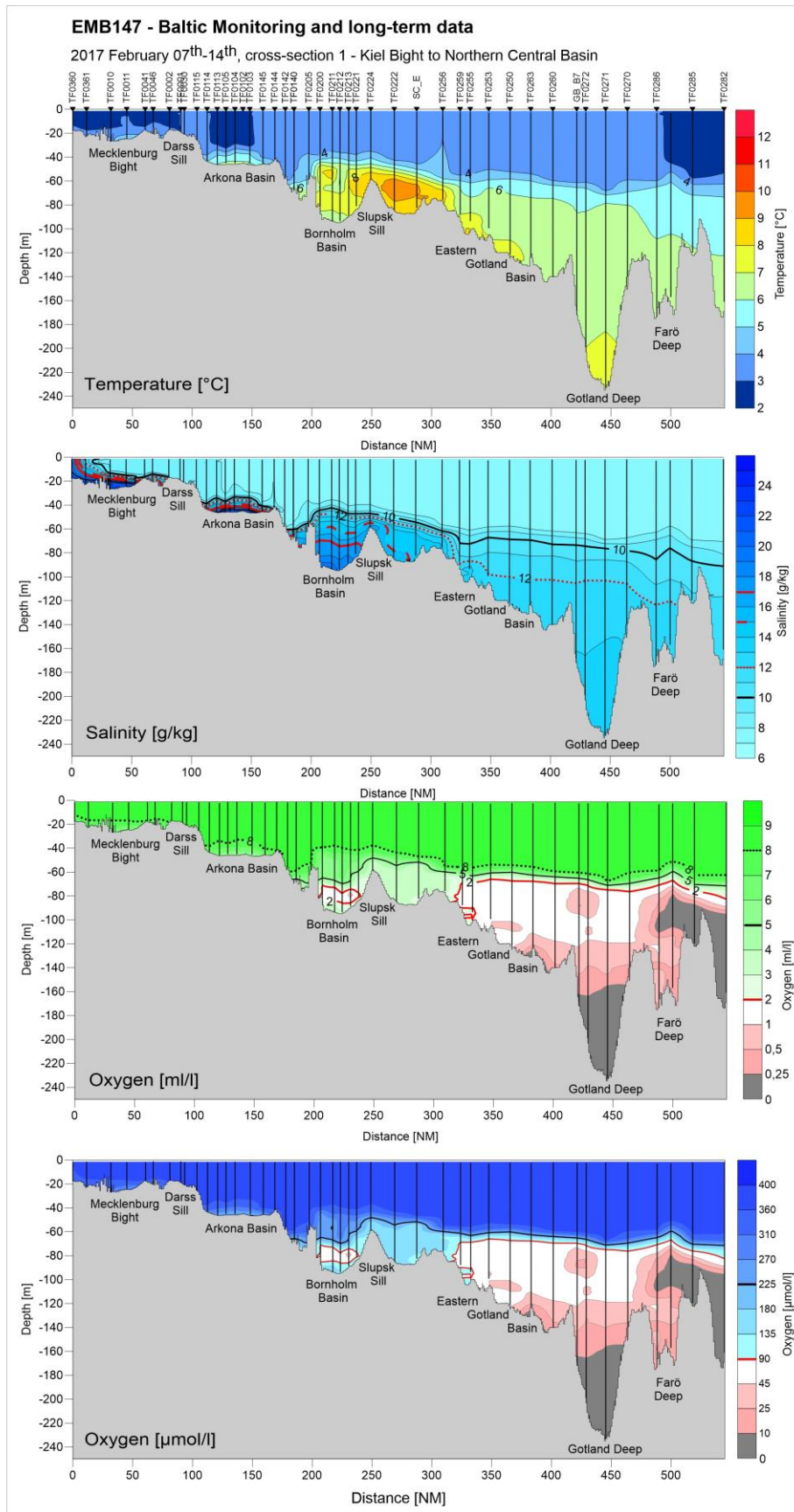


Figure 5: Cross section 1 from Kiel Bight to the Northern Central Basin on the “Thalweg” of Major Baltic Inflows. As consequence of the recent intensified inflow activity since 2014 a ventilated Farö Deep was found, which was only minor effected in advance.

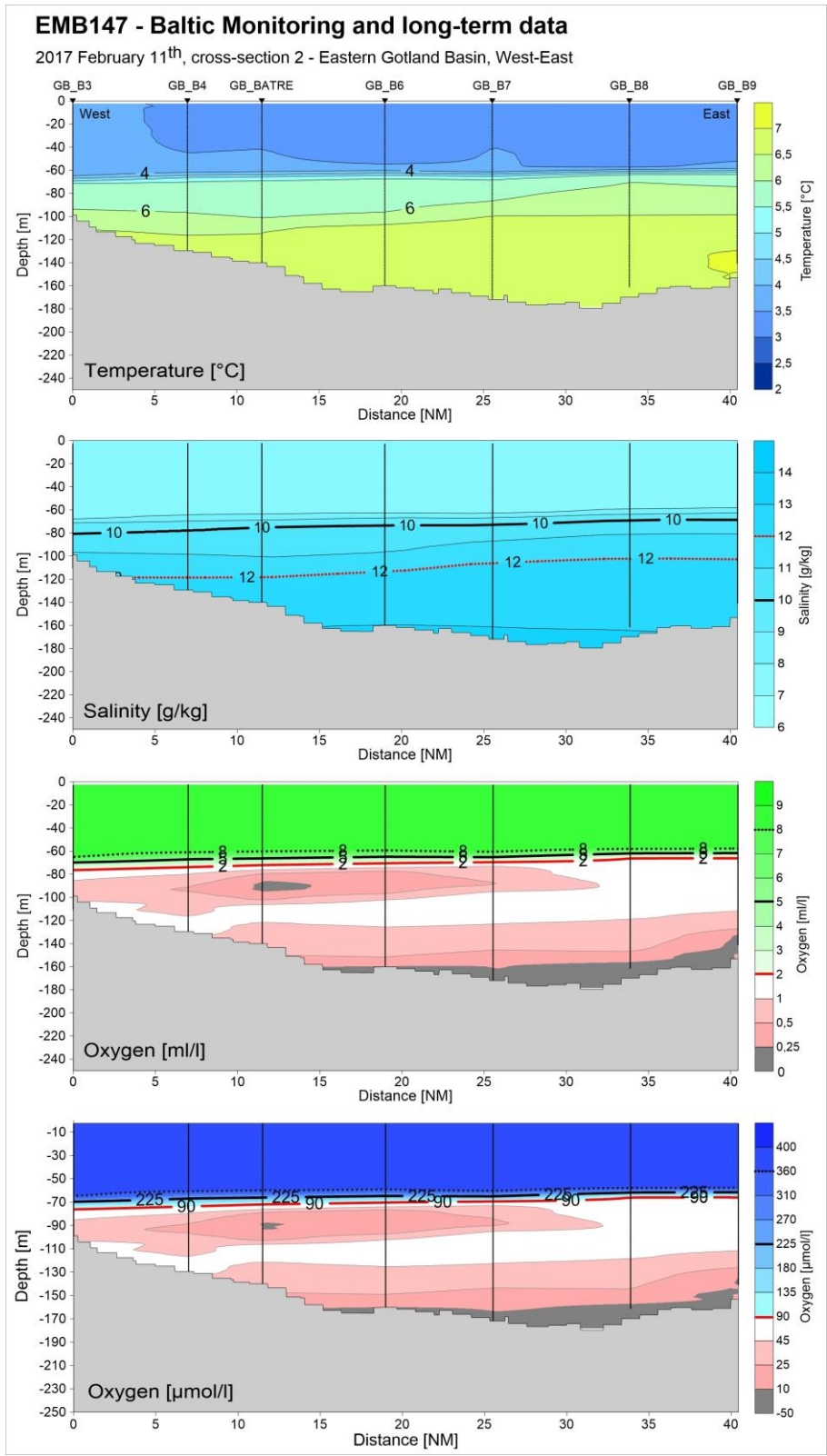


Figure 6: Cross sections 2 showing the hydrographic situation in the eastern Gotland Basin in more detail as a West-East transect in the centre of this basin.

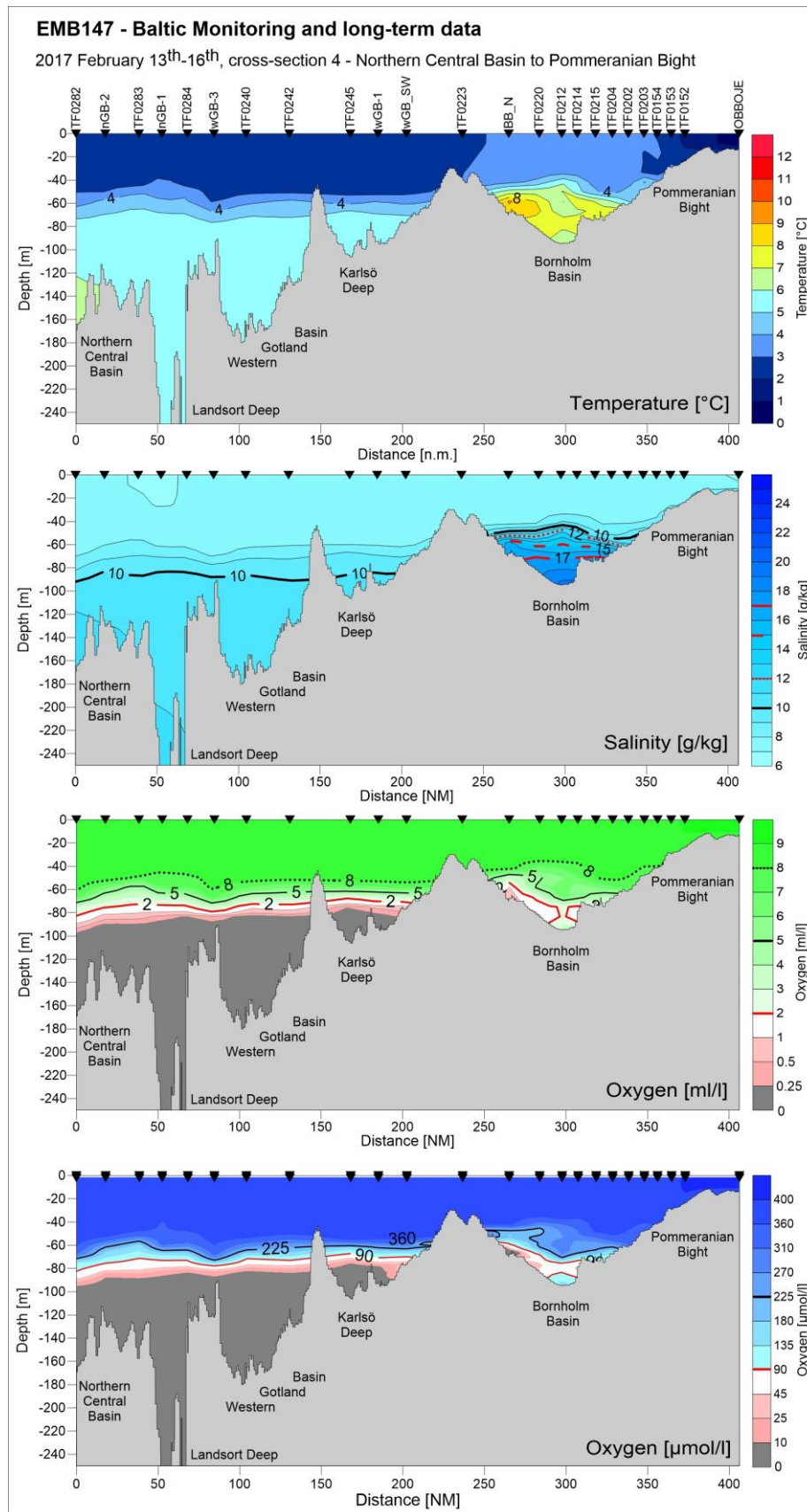


Figure 7: Cross section 4 showing the hydrographic situation from western Gotland Basin to the Pommeranian Bight. Anoxic conditions remain in the western Gotland Basin and no signs of ventilation processes since the start of intensified inflow activity in 2014 are visible up to this stage.

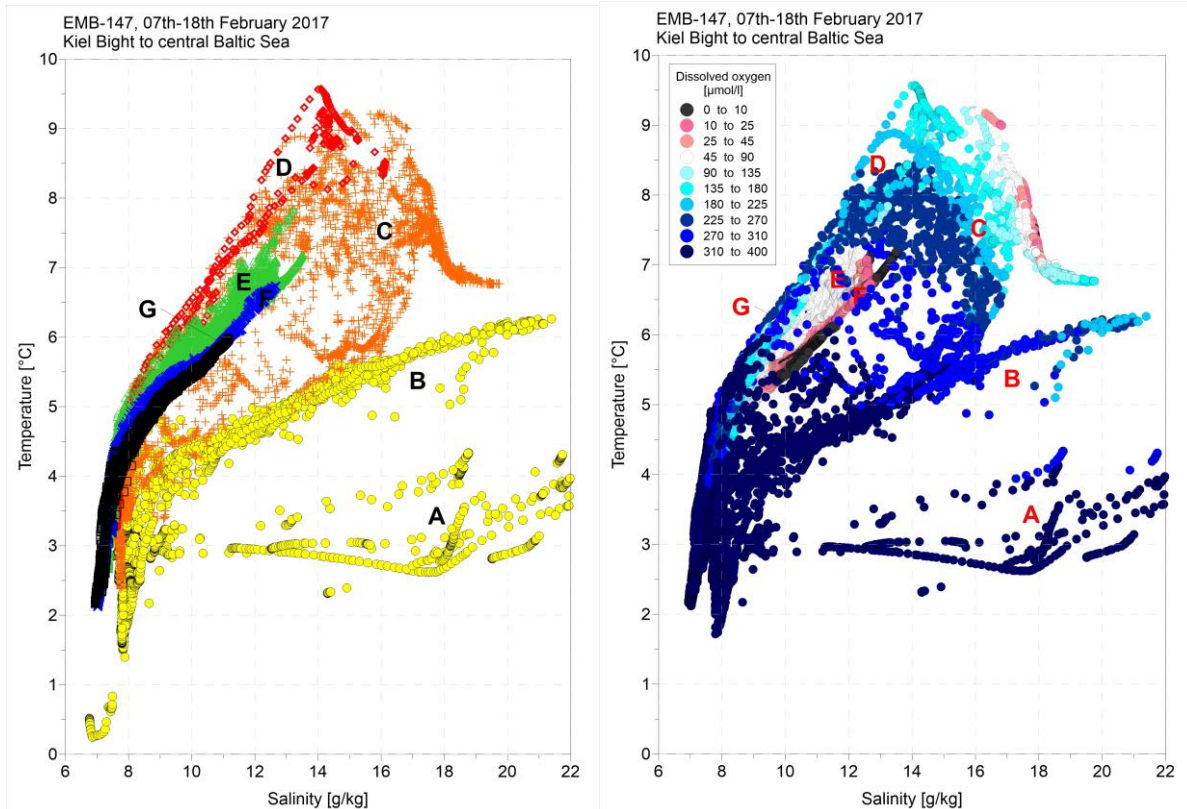


Figure 8: Temperature-Salinity diagram (left) of all stations, A – Kiel Bight – Mecklenburg Bight (yellow); B – Arkona Basin (yellow); C – Bornholm Basin (orange); D – Slupsk Channel (red); E – Eastern Gotland Basin (green); F – Northern Central Basin (blue); G – Western Gotland Basin (black). Diagram on right side shows all temperature – salinity values and dissolved oxygen classified in color.

Tab. 3: List of stations, mooring recovery and deployments carried out during the cruise EMB-147.

| Stat.No. | Stat.Name | Latitude | Longitude | Lot-Depth [m] | | Date | Time [UTC] | CTD cast(s) | Remarks |
|----------|-------------------|-------------|-------------|---------------|--------------|--------------------------|----------------|--|--|
| | Marienehe harbour | | | | Begin | 07.02.2017 | 7:30 | | Start of cruise |
| 1 | TF05 | 54°13,8662N | 12°04,5089E | 13,41 | Begin End | 07.02.2017 | 9:02 9:07 | V0001F01.hex | O2, nutrients, Secchi disk |
| 2 | TF0011 | 54°24,8738N | 11°36,9461E | 25,63 | Begin End | 07.02.2017 | 11:02 11:51 | V0002F01.hex V0002K02.hex V0002K03.hex V0002K04.hex | O2, nutrients |
| 3 | TF0010 | 54°33,1536N | 11°19,1750E | 28,47 | Begin End | 07.02.2017 | 13:17 13:22 | V0003F01.hex | O2, nutrients, 2x Frahmplot |
| 4 | TF0361 | 54°39,5516N | 10°45,8330E | 23,15 | Begin End | 07.02.2017 | 16:06 16:10 | V0004F01.hex | O2, nutrients |
| 5 | TF0360 | 54°35,9716N | 10°26,9494E | 19,03 | Begin End | 07.02.2017 07.02.2017 | 17:46 18:16 | V0005F01.hex V0005F02.hex | O2, nutrients, Secchi disk, Bio net |
| 6 | TF0022 | 54°06,6232N | 11°10,4851E | 24,02 | Begin End | 08.02.2017 | 0:48 0:52 | V0006F01.hex | O2, nutrients, 2x Bio net |
| 7 | TF0012 | 54°18,9066N | 11°32,9342E | 24,8 | Begin End | 08.02.2017 | 3:05 3:09 | V0007F01.hex | O2, nutrients, Secchi disk, Secchi disk, Bio net, 2x Frahmplot |
| 8 | TF0041 | 54°24,3764N | 12°03,6443E | 19,52 | Begin End | 08.02.2017 | 6:00 6:09 | V0008F01.hex | O2, nutrients |
| 9 | TF0046 | 54°27,9723N | 12°12,9833E | 24,65 | Begin End | 08.02.2017 | 7:13 7:19 | V0009F01.hex | O2, nutrients, Secchi disk, Bio net |
| 10 | TF0002 | 54°39,0260N | 12°26,9220E | 18,71 | Begin End | 08.02.2017 | 9:12 9:17 | V0010F01.hex | O2 |
| 11 | TF0001 | 54°41,7924N | 12°42,3712E | 21,69 | Begin End | 08.02.2017 | 10:32 10:34 | V0011F01.hex | O2 |
| 12 | TF0030 | 54°43,3778N | 12°46,9647E | 23,41 | Begin End | 08.02.2017 | 11:19 11:22 | V0012F01.hex | O2, nutrients, Secchi disk |
| 13 | TF0115 | 54°47,7060N | 13°03,4642E | 29,52 | Begin End | 08.02.2017 | 12:56 13:01 | V0013F01.hex | O2 |
| 14 | TF0114 | 54°51,6229N | 13°16,6789E | 44,47 | Begin End | 08.02.2017 | 14:05 14:12 | V0014F01.hex | O2 |
| 15 | TF0069 | 54°59,9725N | 13°17,8216E | 46,24 | Begin End | 08.02.2017 | 15:21 15:25 | V0015F01.hex | O2, nutrients, 2x Frahmplot |
| 16 | TF0113 | 55°00,0602N | 13°17,8388E | 47,12 | Begin End | 08.02.2017 | 16:23 18:29 | V0015F01.hex V0016F01.hex V0016F02.hex | O2, nutrients, Secchi disk, 3x Bio net |
| 17 | TF0105 | 55°01,5071N | 13°36,3566E | 46,67 | Begin End | 08.02.2017 | 20:00 20:06 | V0017F01.hex | O2, nutrients |

| Stat.No. | Stat.Name | Latitude | Longitude | Lot-Depth [m] | | Date | Time [UTC] | CTD cast(s) | Remarks |
|----------|-----------|-------------|-------------|---------------|--------------|------------|----------------|------------------------------|--|
| 18 | TF0104 | 55°04,1106N | 13°48,8016E | 44,79 | Begin End | 08.02.2017 | 21:11 21:17 | V0018F01.hex | O2, nutrients |
| 19 | TF0102 | 55°09,3115N | 13°56,4952E | 44,64 | Begin End | 08.02.2017 | 22:15 22:20 | V0019F01.hex | O2, nutrients |
| 20 | TF0103 | 55°03,8166N | 13°59,3407E | 46,75 | Begin End | 08.02.2017 | 23:11 23:16 | V0020F01.hex | O2, nutrients |
| 21 | ABBOJE | 54°53,1101N | 13°51,2248E | 45,61 | Begin End | 09.02.2017 | 0:38 0:41 | V0021F01.hex | O2 |
| 22 | TF0121 | 54°42,6236N | 13°56,8507E | 30,84 | Begin End | 09.02.2017 | 2:03 2:08 | V0022F01.hex | O2, nutrients |
| 23 | TF0112 | 54°48,2416N | 13°57,4533E | 39,73 | Begin End | 09.02.2017 | 2:53 3:00 | V0023F01.hex | O2, nutrients |
| 24 | TF0111 | 54°53,3463N | 13°57,9546E | 44,21 | Begin End | 09.02.2017 | 4:27 4:32 | V0024F01.hex | O2, nutrients |
| 25 | TF0109 | 55°00,0413N | 14°05,0109E | 47,64 | Begin End | 09.02.2017 | 7:09 7:51 | V0025F01.hex V0025F02.hex | O2, nutrients, Secchi disk, Bio net, 2x Frahmot |
| 26 | TF0145 | 55°10,0035N | 14°15,0608E | 46,77 | Begin End | 09.02.2017 | 9:50 9:57 | V0026F01.hex | O2, nutrients |
| 27 | TF0144 | 55°15,3369N | 14°29,3683E | 44,47 | Begin End | 09.02.2017 | 11:08 11:18 | V0027F01.hex | O2, nutrients |
| 28 | TF0142 | 55°24,1832N | 14°32,3564E | 60,35 | Begin End | 09.02.2017 | 12:34 12:42 | V0028F01.hex | O2, nutrients |
| 29 | TF0140 | 55°28,0008N | 14°43,0241E | 69,41 | Begin End | 09.02.2017 | 13:50 13:57 | V0029F01.hex | O2, nutrients |
| 30 | TF0205 | 55°23,3637N | 15°03,4491E | 74,81 | Begin End | 09.02.2017 | 15:25 15:31 | V0030F01.hex | O2 |
| 31 | TF0200 | 55°23,0072N | 15°19,9627E | 90,58 | Begin End | 09.02.2017 | 16:48 16:57 | V0031F01.hex | O2, nutrients |
| 32 | TF0211 | 55°19,7760N | 15°36,8482E | 95,41 | Begin End | 09.02.2017 | 18:19 18:30 | V0032F01.hex | O2 |
| 33 | TF0212 | 55°18,1049N | 15°47,7854E | 95 | Begin End | 09.02.2017 | 19:27 19:37 | V0033F01.hex | O2 |
| 34/35 | TF0214 | 55°09,5958N | 15°39,5678E | 93,69 | Begin End | 09.02.2017 | 21:01 21:12 | V0034F01.hex | O2, nutrients |
| 36 | TF0213 | 55°14,9989N | 15°58,9715E | 90,47 | Begin End | 09.02.2017 | 22:46 23:31 | V0035F01.hex V0035F02.hex | O2, nutrients, Secchi disk, 2x Bi+B52:J77o net |
| 37 | TF0221 | 55°13,2966N | 16°09,9327E | 82,46 | Begin End | 10.02.2017 | 2:07 2:13 | V0037F01.hex | O2 |
| 38 | TF0224 | 55°16,9945N | 16°29,9463E | 61,64 | Begin End | 10.02.2017 | 3:40 3:44 | V0038F01.hex | O2 |
| 39 | TF0222 | 55°13,0133N | 17°03,9772E | 90,6 | Begin End | 10.02.2017 | 6:06 6:16 | V0039F01.hex | O2, nutrients |

| Stat.No. | Stat.Name | Latitude | Longitude | Lot-Depth [m] | | Date | Time [UTC] | CTD cast(s) | Remarks |
|----------|------------|-------------|-------------|---------------|--------------|------------|----------------|------------------------------|------------------------|
| 40 | SC_E | 55°17,1877N | 17°35,6145E | 84,09 | Begin End | 10.02.2017 | 8:27 8:37 | V0040F01.hex | O2 |
| 41 | TF0256 | 55°19,6120N | 18°14,0464E | 77,29 | Begin End | 10.02.2017 | 11:41 11:49 | V0041F01.hex | O2, nutrients |
| 42 | TF0259 | 55°32,9904N | 18°24,0100E | 89,08 | Begin End | 10.02.2017 | 13:32 13:42 | V0042F01.hex | O2, nutrients, Bio net |
| 43 | TF0255 | 55°37,9772N | 18°35,8366E | 94,95 | Begin End | 10.02.2017 | 14:53 15:04 | V0043F01.hex | O2, nutrients |
| 44 | TF0253 | 55°50,3922N | 18°51,9225E | 100,96 | Begin End | 10.02.2017 | 16:49 16:55 | V0044F01.hex | O2 |
| 45 | TF0250 | 56°05,0161N | 19°09,9861E | 122,94 | Begin End | 10.02.2017 | 18:58 19:09 | V0045F01.hex | O2, nutrients |
| 46 | TF0263 | 56°20,8345N | 19°22,6742E | 132,13 | Begin End | 10.02.2017 | 20:57 21:21 | V0046F01.hex V0046F02.hex | O2 |
| 47 | TF0260 | 56°38,0504N | 19°35,0961E | 143,59 | Begin End | 10.02.2017 | 23:27 23:42 | V0047F01.hex | O2, nutrients |
| 48 | GB_B3 | 57°04,4279N | 19°01,4182E | 113,52 | Begin End | 11.02.2017 | 3:20 3:26 | V0048_01.hex | |
| 49 | GB_B4 | 57°01,7303N | 19°13,2599E | 159,41 | Begin End | 11.02.2017 | 4:34 4:42 | V0049_01.hex | |
| 50 | GB_(BATRE) | 57°00,5642N | 19°21,2540E | 173,29 | Begin End | 11.02.2017 | 5:38 5:49 | V0050F01.hex | O2 |
| 51 | GB_B6 | 56°58,8086N | 19°34,6011E | 165,95 | Begin End | 11.02.2017 | 7:05 7:19 | V0051F01.hex | O2 |
| 52 | GB_B7 | 56°57,1310N | 19°46,1784E | 181,43 | Begin End | 11.02.2017 | 8:18 8:31 | V0052F01.hex | O2, H2S |
| 53 | GB_B8 | 56°55,3794N | 20°01,1130E | 163,86 | Begin End | 11.02.2017 | 9:39 9:51 | V0053F01.hex | O2 |
| 54 | GB_B9 | 56°54,3323N | 20°12,9797E | 144,06 | Begin End | 11.02.2017 | 10:47 10:56 | V0054F01.hex | |
| 55 | TF0272 | 57°04,2887N | 19°49,9204E | 205,43 | Begin End | 11.02.2017 | 12:44 13:04 | V0055F01.hex | O2, nutrients |
| 56 | GB_B12 | 57°11,7916N | 19°26,5646E | 162,56 | Begin End | 11.02.2017 | 14:37 14:47 | V0056_01.hex | |
| 57 | GB_B13 | 57°15,9983N | 19°47,7601E | 205,48 | Begin End | 11.02.2017 | 16:19 16:27 | V0057_01.hex | |
| 58 | GB_B14 | 57°12,1494N | 20°10,2299E | 230,69 | Begin End | 11.02.2017 | 18:09 18:26 | V0058F01.hex | O2, H2S |

| Stat.No. | Stat.Name | Latitude | Longitude | Lot-Depth [m] | | Date | Time [UTC] | CTD cast(s) | Remarks |
|----------|------------|-------------|-------------|---------------|-------|------------|------------|--|--|
| 59 | TF0271 | 57°19,2078N | 20°02,9099E | 236,38 | Begin | 11.02.2017 | 19:40 | V0059F01.hex V0059F02.hex V0059F03.hex V0059F04.hex V0059F05.hex V0059F06.hex V0059F07.hex | O2, H2S, nutrients, Secchi disk, 3x Bio net, mooring recovery of "GODESS", 3x in situ pump organic pollutants |
| | | | | | End | 12.02.2017 | 20:04 | V0059F08.hex | |
| 60 | Gotland_NE | 57°21,9821N | 20°20,0072E | 216,54 | Begin | 13.02.2017 | 4:13 | V0060F01.hex | O2 |
| | | | | | End | | 4:22 | | |
| 61 | GB_B15 | 57°31,4565N | 20°32,6522E | 156,35 | Begin | 13.02.2017 | 5:52 | V0061F01.hex | O2 |
| | | | | | End | | 6:05 | | |
| 62 | GB_B16 | 57°43,6468N | 20°41,4845E | 134,68 | Begin | 13.02.2017 | 7:51 | V0062F01.hex | |
| | | | | | End | | 8:14 | V0062F02.hex | |
| 63 | TF0270 | 57°37,0085N | 20°10,1563E | 143,34 | Begin | 13.02.2017 | 10:52 | V0063F01.hex | O2, nutrients |
| | | | | | End | | 11:09 | | |
| 64 | TF0286 | 57°59,9485N | 19°54,1007E | 191,45 | Begin | 13.02.2017 | 13:50 | V0064F01.hex | O2, nutrients |
| | | | | | End | | 14:40 | V0064F02.hex | |
| 65 | GB_B24 | 58°11,0043N | 20°03,0986E | 160,47 | Begin | 13.02.2017 | 16:03 | V0065F01.hex | O2 |
| | | | | | End | | 16:10 | | |
| 66 | TF0285 | 58°26,5086N | 20°19,9934E | 122,06 | Begin | 13.02.2017 | 18:12 | V0066F01.hex | O2, H2S, nutrients |
| | | | | | End | | 18:27 | | |
| 67 | TF0282 | 58°53,0102N | 20°19,0006E | 161,41 | Begin | 13.02.2017 | 21:12 | V0067F01.hex | O2, H2S |
| | | | | | End | | 21:23 | | |
| 68 | nGB-2 | 58°51,9479N | 19°44,7001E | 158,11 | Begin | 13.02.2017 | 23:20 | V0068_01.hex | |
| | | | | | End | | 23:30 | | |
| 69 | TF0283 | 58°46,9872N | 19°05,9980E | 122,79 | Begin | 14.02.2017 | 1:43 | V0069F01.hex | O2 |
| | | | | | End | | 1:50 | | |
| 70 | nGB-1 | 58°42,7451N | 18°40,2218E | 235,98 | Begin | 14.02.2017 | 3:20 | V0070F01.hex | O2, H2S |
| | | | | | End | | 3:37 | | |
| 71 | TF0284 | 58°34,9964N | 18°14,0399E | 438,42 | Begin | 14.02.2017 | 6:49 | V0071F01.hex V0071F02.hex V0071F03.hex V0071F04.hex V0071F05.hex | O2, H2S, nutrients, Secchi disk, 2x Bio net |
| | | | | | End | | 14:13 | V0071F06.hex | |
| 72 | wGB-3 | 58°19,5334N | 18°04,0051E | 160,59 | Begin | 14.02.2017 | 16:13 | V0072_01.hex | |
| | | | | | End | | 16:21 | | |
| 73 | TF0240 | 57°59,9967N | 17°59,9747E | 165,82 | Begin | 14.02.2017 | 18:57 | V0073F01.hex | O2, H2S, nutrients |
| | | | | | End | | 19:14 | | |
| 74 | TF0242 | 57°42,9558N | 17°21,9037E | 139,1 | Begin | 14.02.2017 | 22:07 | V0074F01.hex | |
| | | | | | End | | 22:17 | | |

| Stat.No. | Stat.Name | Latitude | Longitude | Lot-Depth [m] | | Date | Time [UTC] | CTD cast(s) | Remarks |
|----------|-----------|-------------|-------------|---------------|--------------|------------|----------------|--|---------------------------------------|
| 75 | TF0245 | 57°07,0234N | 17°39,9295E | 109,59 | Begin End | 15.02.2017 | 2:06 2:16 | V0075F01.hex | O2, H2S, nutrients |
| 76 | wGB-1 | 56°52,5869N | 17°23,3616E | 95,08 | Begin End | 15.02.2017 | 4:03 4:07 | V0076_01.hex | |
| 77 | wGB_SW | 56°37,5337N | 17°07,8801E | 77,23 | Begin End | 15.02.2017 | 6:00 6:06 | V0077F01.hex | O2 |
| 78 | TF0223 | 56°03,9552N | 16°56,8436E | 41,18 | Begin End | 15.02.2017 | 10:14 10:19 | V0078F01.hex | |
| 79 | BB_N | 55°45,7252N | 16°17,4126E | 61,81 | Begin End | 15.02.2017 | 13:07 13:11 | V0079F01.hex | O2, nutrients |
| 80 | TF0220 | 55°29,9679N | 15°59,9688E | 79,4 | Begin End | 15.02.2017 | 15:12 15:18 | V0080_01.hex | |
| 81 | TF0212 | 55°18,1211N | 15°47,7950E | 93,76 | Begin End | 15.02.2017 | 16:54 17:01 | V0081F01.hex | O2, nutrients |
| 82 | TF0213 | 55°15,0223N | 15°59,0368E | 89,3 | Begin End | 15.02.2017 | 18:07 19:38 | V0082F01.hex V0082F02.hex V0082F03.hex | O2, nutrients, 2x Bio net |
| 83 | TF0214 | 55°09,5769N | 15°39,6142E | 93,45 | Begin End | 15.02.2017 | 21:07 21:13 | V0083F01.hex | O2, nutrients |
| 84 | TF0215 | 54°59,9990N | 15°29,9927E | 76,26 | Begin End | 15.02.2017 | 22:30 22:38 | V0084F01.hex | O2, nutrients |
| 85 | TF0204 | 54°50,6985N | 15°22,5603E | 69,95 | Begin End | 15.02.2017 | 23:51 23:57 | V0085F01.hex | O2, nutrients |
| 86 | TF0202 | 54°42,0299N | 15°15,0209E | 64,29 | Begin End | 16.02.2017 | 1:08 1:12 | V0086_01.hex | |
| 87 | TF0203 | 54°37,7083N | 15°00,0265E | 51,83 | Begin End | 16.02.2017 | 2:25 2:28 | V0087_01.hex | |
| 88 | TF0154 | 54°37,4209N | 14°46,0548E | 46,97 | Begin End | 16.02.2017 | 3:30 3:33 | V0088F01.hex | O2, nutrients |
| 89 | TF0153 | 54°37,2109N | 14°31,3120E | 29,63 | Begin End | 16.02.2017 | 4:35 4:41 | V0089_01.hex | |
| 90 | TF0152 | 54°37,9778N | 14°17,0110E | 30,98 | Begin End | 16.02.2017 | 5:45 5:48 | V0090F01.hex | O2, nutrients |
| 91 | OBBOJE | 54°05,0291N | 14°09,0403E | 14,2 | Begin End | 16. Feb 17 | 13:22 13:30 | V0091F01.hex | O2, nutrients, Bio net, 2x Frahmot |
| 92 | TF0150 | 54°36,6993N | 14°02,6003E | 20,2 | Begin End | 16. Feb 17 | 22:20 23:11 | V0092F01.hex V0092F02.hex | O2, nutrients, Bio net |
| 93 | TF0109 | 55°00,0963N | 14°04,9607E | 45,6 | Begin End | 17. Feb 17 | 1:50 1:58 | V0093F01.hex | O2, nutrients |
| 94 | TF0145 | 55°10,0004N | 14°15,0219E | 44,7 | Begin End | 17. Feb 17 | 3:31 3:43 | V0094_01.hex V0094F02.hex | O2, nutrients |

| Stat.No. | Stat.Name | Latitude | Longitude | Lot-Depth [m] | | Date | Time [UTC] | CTD cast(s) | Remarks |
|----------|-------------------|-------------|-------------|---------------|--------------|------------|----------------|--|---|
| 95 | TF0103 | 55°03,8190N | 13°59,2509E | 44,7 | Begin End | 17. Feb 17 | 5:08 6:07 | V0095_01.hex V0095F02.hex V0095K03.hex V0095_04.hex | O2, nutrients |
| 96 | TF0104 | 55°04,0641N | 13°48,7668E | 43,9 | Begin End | 17. Feb 17 | 7:01 7:13 | V0096_01.hex V0096F02.hex | O2, nutrients |
| 97 | TF0105 | 55°01,5113N | 13°36,3659E | 44,1 | Begin End | 17. Feb 17 | 8:10 8:22 | V0097F01.hex V0097F02.hex | O2, nutrients |
| 98 | TF0113 | 54°55,5069N | 13°30,0146E | 45 | | 17. Feb 17 | 9:20 10:05 | V0098_01.hex V0098F02.hex V0098F03.hex | O2, nutrients, Secchi disk, 2x Bio net |
| 99 | TF0114 | 54°51,5672N | 13°16,5500E | 42,5 | Begin End | 17. Feb 17 | 11:31 11:45 | V0099_01.hex V0099F02.hex | O2, nutrients |
| 100 | TF0115 | 54°47,6998N | 13°03,5275E | 28,2 | Begin End | 17. Feb 17 | 12:53 13:01 | V0100_01.hex V0100F02.hex | O2, nutrients |
| 101 | TF0030 | 54°43,3985N | 12°47,1108E | 21,2 | Begin End | 17. Feb 17 | 14:20 14:29 | V0101_01.hex V0101F02.hex | O2, nutrients, Sechi disk, 2x Bio net |
| 102 | TF0001 | 54°41,7948N | 12°42,1715E | 19,6 | Begin End | 17. Feb 17 | 15:10 15:18 | V0102F01.hex | O2, nutrients |
| 103 | TF0046 | 54°28,0135N | 12°13,1487E | 24,4 | Begin End | 17. Feb 17 | 17:47 17:53 | V0103F01.hex | 2x Bio net |
| 104 | TF0012 | 54°18,9038N | 11°33,0112E | 23,5 | Begin End | 17. Feb 17 | 20:52 20:56 | V0104F01.hex | 2x Bio net |
| | Marienehe harbour | | | | End | 18.02.2017 | 7:00 | | End of cruise |