ELISABETH MANN BORGESE-Berichte

Meereschemische, -physikalische und -biologischen Untersuchungen in der Ostsee im Rahmen der Meeresstrategierahmenrichtlinie (MSRL) und des nationalen Bund/Länder-Messprogrammes

Cruise No. EMB290

23.03.2022 – 04.04.2022

Rostock-Marienehe (Germany) – Rostock-Marienehe (Germany)

BMP

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2022

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1 Cruise Summary

1.1 Summary in English

A series of regular short-term cruises by the Leibniz Institute for Baltic Sea Research (IOW) serve to monitor the hydrographic, chemical and biological situation in the western, central and northern Baltic Sea. The work is carried out in the framework of the COMBINE Program of the Helsinki Commission (HELCOM), of the Bund-Länder-Messprogramm (BLANO) and of the long-term data program of the IOW. Results provide the scientific basis for research aiming at the assessment of the environmental state of the Baltic Sea and the understanding of climatic and anthropogenic forcing of environmental changes and associated ecosystem responses. The cruise in March generally serves to describe the spring-bloom situation in the south-western Baltic Sea. During the expedition, research was conducted at 99 stations along a transect from the western Baltic Sea (Kiel Bight, Bay of Mecklenburg) to the northern Baltic Sea via the major Basins (Arkona Sea, Bornholm Basin, Gotland Sea), which is referred to as 'Thalweg'. Three traverse transects were conducted with a towed CTD (ScanFish) in the western and eastern Gotland Basin in order to investigate the lateral transport of water. At selected stations, nutrient concentrations and various biological parameters describing the phyto- and zooplankton taxonomic composition and abundance were determined. These serve to understand the timing and composition of the spring phytoplankton bloom and the associated dynamics of zooplankton with regard to eutrophication and the effect of climatic change. Despite some necessary interruptions of the work the planned program was conducted successfully. The first results indicate the continuation of a stagnation period without inflows of saline oxygen-rich water at the bottom and increasing hydrogen sulfide concentrations in the deep basins.

1.2 Zusammenfassung

Die Reise EMB290 fand im Rahmen des langzeitlichen Monitorings der hydrographischen, chemischen und biologischen Situation in der westlichen, zentralen und nördlichen Ostsee durchgeführt. Die März-Reise ist Teil von fünf jährlich durchgeführten Fahrten und beschreibt die Situation während der Frühjahrsblüte in Abhängigkeit vom Seegebiet. Die Fahrten erfolgen im Rahmen des COMBINE Programms der Helsinki Kommission (HELKOM), des Bund-Länder-Messprogrammes Nord- und Ostsee (BLANO) und des Langzeitprogramms des Leibniz Institut für Ostseeforschung in der zentralen Ostsee. Die Daten bilden die Basis zur Erforschung des langzeitlichen Einflusses von Klimaveränderung und anthropogener Aktivität auf die Ökosystemdynamik und den Umweltzustand der Ostsee. Die Beprobung erfolgte auf insgesamt 99 Stationen entlang eines Schnittes von der Kieler Bucht in die zentrale und nördliche Ostsee. In der Gotland See dienten zudem drei Querschnitte mit einer geschleppten CTD (ScanFish) zur Beschreibung des lateralen Transports von Wasser aus den Küstenregionen in das Becken. An ausgewählten Stationen in den jeweiligen Seegebieten und Becken wurden zudem Proben zur Nährstoffverfügbarkeit und zur Beschreibung der Zusammensetzung und Abundanz der pelagischen Gemeinschaften (Phyto- und Zooplankton) gewonnen. Trotz einiger Unterbrechungen wurde ein Großteil des Fahrtprogrammes umgesetzt. Erste Ergebnisse weisen auf ein Andauern der seit 2017 bestehenden Stagnationsphase mit ausbleibenden großen Einströmen von salzigen, sauerstoffreichen Tiefenwasser hin, die zum Anstieg der Schwefelwasserstoffkonzentration in den bodennahem Wasserschichten der Becken führt.

2 Participants

2.1 Principal Investigators

Name	Institution
Dutz, Jörg, Dr.	IOW
Mohrholz, Volker, Dr.	IOW
Kuss, Joachim, Dr.	IOW

2.2 Scientific Party

Name	Discipline	Institution
Dutz, Jörg, Dr.	Marine Biology / Chief Scientist	IOW
Söder, Jens, Dr.	Oceanography	IOW
Avila, Jannine, Dr.	Marine Chemistry	IOW
Donath, Jan	Oceanography	IOW
Fechtel, Christine	Marine Biology	IOW
Kreuzer, Lars	Marine Chemistry	IOW
Mette, Jonathan	Oceanography	IOW
Schöne, Susanne	Marine Chemistry	IOW
Cramer, Friederieke	Marine Chemistry	IOW
Kohl, Miriam	Marine Biology	IOW

2.3 Participating Institutions

IOW Leibniz Institute for Baltic Sea Research Warnemünde

3 Research Program

3.1 Description of the Work Area

The area under investigation of the cruise *EMB290* covered the western and the central Baltic from the Kiel Bight to the northern Gotland Basin. The majority of stations were located along a transect that aims at describing the hydrographic conditions in all basins on the pathway of saltwater inflows from the North Atlantic and the change in biodiversity associated with the gradient in salinity from mesohaline to oligohaline surface water (Hernroth & Ackefors 1979). The deep inflows are the solely source for ventilation of the deep basins (Matthäus et al. 2008).

3.2 Aims of the Cruise

The cruise contributes to the international environmental monitoring program of the Helsinki Commission (HELCOM) carried out by the Leibniz-Institute for Baltic Sea Research in Warnemünde (IOW). Within the German Exclusive Economic Zone (EEZ), monitoring is conducted on behalf of the Federal Maritime and Hydrographic Agency (BSH). In the central Baltic Proper, long-term data is collected by the Leibniz Institute for Baltic Sea Research Warnemünde (IOW). The monitoring program was initiated in 1979 and run by the IOW's

predecessor institute and is continued by the IOW since 1992 in the framework of the COMBINE Programme of the Helsinki Commission (HELCOM). The acquired data will be used for the regular national and international assessments of the state of the Baltic Sea (e.g. HELCOM 2018) and the assessment of long-term trends in the hydrographical and biological data.

The spring cruise is of particular scientific interest for the study of the timing and composition of the spring phytoplankton bloom and the associated dynamics of heterotrophic zooplankton with regard to eutrophication effects and the impact of climatic change on the pelagic ecosystem.

Additional program:

- For the analysis of the long-term changes in the population dynamics of key copepod species in the Bornholm Basin, zooplankton nets (Apstein, mesh size 50 µm, WP-2 mesh size 100 µm) were deployed to quantitatively sample nauplii and copepodites (responsible scientist Dr. Jörg Dutz, IOW).
- Exchange of the long-term, Gotland north-east mooring. The data are used for long term observation of environmental conditions in the deep water of the Baltic and for detecting the impact of saline inflow events. (responsible scientist: Dr. V. Mohrholz, IOW).
- High resolution hydrographic transects with the ScanFish towed CTD (SF) in the Gotland Basin (responsible scientist Dr. V. Mohrholz, IOW).
- Exchange of Argo floats in the Gotland Basin (responsible scientist Dr. Henry Bittig, IOW)
- Continuous underway pH measurements using a Sunburst HydroFIA pH system (Dr. Jannine Avila, IOW)

The planned work went largely as scheduled and samples for BSH monitoring program and the hydrochemical measurements along the ‘Thalweg’-Transect were taken as planned. In addition, the planned three hydrographical ScanFish transects, the exchange of the long-term mooring in the northeastern Gotland Basin, the collection of an ARGO float and release of a new one, the collection of additional zooplankton samples and the continuous underway pH measurements were done. In contrast, seven hydrographical stations south of the island of Bornholm were skipped due to time constraints associated with unplanned visits in the harbors of Sassnitz/Slite and a forecast of extreme weather conditions for the last cruise day.

3.3 Agenda of the Cruise

The cruise had three major goals. The first focus of work encloses the BSH environmental monitoring program in the western Baltic Sea (Kiel Bight-Arkona Basin, Fig. 3.1, map 1). The second focus was the IOW’s Baltic Sea long term observation program in the central Baltic Sea (Fig. 3.1, map 2). Finally, high-resolution observations of the hydrographic situation perpendicular to the Thalweg-tansect were done in the eastern and the western Gotland Sea. Data acquisition was carried out using the following devices and measuring platforms. At stations and transects the CTD SBE 911+ with rosette water sampler (CTD), the towed ScanFish (SCF), Secchi disk, phytoplankton- and zooplankton nets were deployed. In addition, continuous underway measurements of the surface water properties and seawater pH were done. An overview of the sampled stations is provided in Fig. 3.1 and Table 7.1.

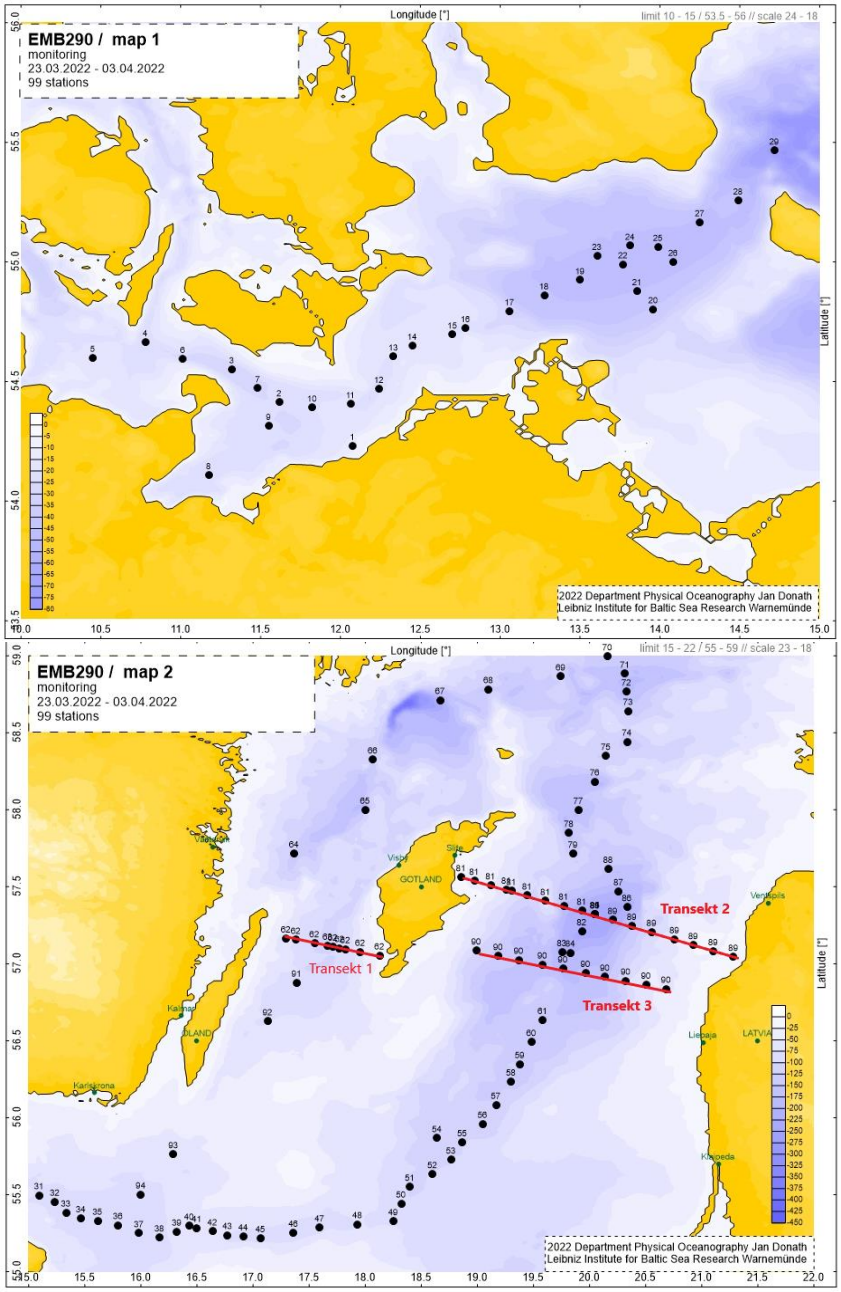


Fig. 3.1 Map of stations and ship track of cruise EMB290 from 23. March – 04. April 2022. Map 1 and 2 show the stations in the southern and the central Baltic Sea, respectively. Black dots indicate the positions and numbers of CTD stations. Red lines depict the ScanFish transects.

4 Narrative of the Cruise

The cruise *EMB290* started with the loading of the equipment and the installation of sampling devices during 22nd March 2022 (08:00-15:00). All COVID tests taken before entering the ship were negative. During the day, the safety instructions for the scientific crew were given.

The scientific crew was embarking in the morning of the 23rd March (07:00). All repeated tests for COVID were again negative, and, thus, RV EMB left the harbor at 08:00 in the morning at sunny weather conditions (no wind, air temperature 6.5°C, pressure 1032.1 hPa). After the successful test station TFO5, the ship headed towards the Kiel Bight. On the way, sampling for hydrographic profiles and chemical conditions (CTD, nutrients and oxygen) were done at the

'Thalweg'-stations TF0011, TF0010 and TF0361. The weather was sunny with air temperatures of 5.3-6.5 °C and a moderate breeze (BF 4, NE). In the early evening, hydro-graphical and chemical conditions were determined phyto- and zooplankton samples were taken at TF0360 in the Kiel Bight. Afterwards, the ship turned eastwards and the sampling continued along the 'Thalweg' into the Bay of Mecklenburg. During the night, samples were taken at stations TF0014, TF0013, TF0022 (Lübeck Bight), and finally TF0012, which included again biological sampling.

The sunny, calm weather continued also during the 24th March (calm winds, 1.2 – 3.6 m/s, BF 2-3, pressure 1029.6 – 130.9 hPa). Sampling continued in the Bay of Mecklenburg with hydro-chemical stations TF0017, TF0041, TF0033, TF0002, TF0001 and station TF0046, which included plankton sampling. In the late afternoon, the first station work in the Arkona Basin was sampled at the Darss Sill (TF0030). During the evening and the night, a transect across the basin to the Bornholmsgat was followed (TF0115, TF0114, TF0113, TF0112, Arkona Boje, TF0122, TF0105, TF0104, TF0103, TF0109, TF0145, TF0144). At all stations hydro-chemical parameters were determined and at stations TF0030, TF0113 and TF0109 samples for pelagic biology were done. Perfect sampling weather was present during the transect with a light breeze (BF2-3, 2.3-5.3 m/s, 1029.6 – 130.9 hPa).

During March 25th, the work continued in the Bornholm Basin with further CTD measurements and nutrient analyses at selected stations (TF0206-0212). The weather was still sunny with temperatures increasing to 7.6 – 8.3 °C. The wind increased during the day from a gentle to a fresh breeze (BF 5, 9.4-10.3 m/s). In the evening, station TF0213 was sampled. In addition to the regular measurements of hydrographical and chemical conditions, plankton samples were taken for monitoring purposes. In addition, several Apstein (50 µm) and WP-2 (100 µm) nets were taken to support the analysis of the long-term changes in the population dynamics of key copepod species in the Bornholm Basin by quantitative samples for nauplii and copepodites. Due to a positive COVID 18 test, the work in the Bornholm Basin was interrupted in order to sail to Sassnitz for exchange of personnel during the night. Since all other tests were repeatedly negative, the cruise continued by sailing back to the Bornholm Basin.

The work in the Bornholm Basin resumed on the 26th March at 17:00 with the CTD-Stations (TF0221, TF0225, TF0226, TF0224). The weather was sunny (5.2°C, 1028.4 hPa) with a light breeze from northeast (3.1 m/s, BF: 2). In the evening and night, station work continued into the Slupsk Channel (TF0227, TF0228, TF0229, TF0222, TF0266, TF 0267, TF0268).

In the morning of the 27th March, sampling started in the southern Gotland Basin. The weather started to change with cloudy conditions and wind increasing to a moderate breeze (4.0°C, 1024.8 hPa, 7.6m/s, BF: 4, SE). After two CTD stations (TF-0256 and TF-0257), a biology station with plankton nets followed (TF-0259). The ship turned northwards and continued the measurements of hydrographical and chemical conditions along the Thalweg-Transect during the day (TF0255, -0258, -0252, - 0253, 0265) and the evening (TF0250, -0262, -0263, - 0261, 0260). According to the original plan, CTD-stations, two scanfish transect and an exchange of a mooring in the eastern Gotland Sea should follow. Due to a bad weather forecast for this area with strongly increasing wind for several days, it was decided to proceed work in the western Gotland Sea at better weather conditions. RV Elisabeth Mann Borgese sailed overnight to the southern tip of the island of Gotland to start the first scanfish transect from station SF032WGB to SF025WGB.

The towed ScanFish was set out in the morning of the 28th March and RV EMB sailed westwards with a speed of 6 kn. The wind conditions changed from a strong breeze to near gale (12.4-15.9m/s, BF: 6-7, N), but it was still sunny. The ScanFish transect ended with another CTD around noon at station SF025WGB. Afterwards, the Thalweg-Transect continued with stations directing northwards (TF0245, -0242, -0240) during the afternoon and evening. Strong winds from northwest persisted during this period (7.1°C, 1003.9 hPa, 16.1-17.3m/s, BF: 7-8, NW, near gale – gale). In the night, the CTD-stations wGB-3 and nGB-1 were sampled. At several of these stations, water samples for oxygen and hydrogen sulfide measurements were taken for comparison with the sensors on the CTD.

In the morning of the 29th March, RV EMB sailed further north to sample the northernmost stations of the Thalweg-Transect (TF0283, nGB-2, TF-0288, TF-0282). Cold wind came from north and the air temperature dropped to -1.3°C, but the wind calmed down to a moderate breeze (5.9-6.5m/s, BF: 4, N) while wave heights were still large (2m). These conditions prevailed during the day with short periods of increased wind force (5.4-8.4m/s, BF: 4-5, N, moderate to fresh breeze). RV EMB turned southwards around noon and followed the Thalweg into the eastern Gotland basin the evening and the night during which hydrographic and chemical measurements were continued (TF-0289, -0279, -0285, -0278, - 0277, -0286, -0290, -0287).

The Thalweg work was shortly interrupted in the early morning of the 30th March in order to recover an ARGO float (WMO-Number 6904116, IOW/BSH) close to station TF-0277. The float approached the surface at 04:00 and send a signal to locate its actual position. The position of the float was identified after a short while and it was retrieved onboard without any problems at 08:30. The original plan to continue the 'Thalweg'-Transect and to exchange the IOW south-east mooring was changed because of acute need for doctoral help. For this reason, RV EMB sailed to the harbor of Slite on the east-coast of Gotland.

Work resumed in the evening of the 30th March. The Scanfish was released into the water at station SF001EGB at 20:00 and the towed CTD transect perpendicular to the Thalweg-Transect was started. Half way the transect was interrupted at TF-0271 in the night to follow the Thalweg transect southward for vertical CTD profiling (TF-0275).

In the early morning of the 31st March, the permanent mooring located at station Gotland_SW was retrieved for maintenance and exchange of sensors. After a vertical CTD cast, the mooring was released with the first attempt and the replacement of the various sensors proceeded fast due to the calm weather conditions. The air temperature was -1.4°C and light air came from NW (1012.0 hPa, 0.8-1.1m/s, BF: 1). After a CTD cast at station TF-0272, RV EMB turned again northwards to sail back to Station TF-0271 where the intense hydrographical, chemical and biological measurements were started around noon. In total 8 CTD casts were performed for vertical profiles of temperature, salinity, oxygen, hydrogen sulfide, pH, CO2, turbidity, phytoplankton and Chla. At the redoxcline, samples were taken for molecular work. The station work finished with the release of an ARGO float 0.5 SM off station TF-0271. The stations Gotland NE, TF0276 and TF0270 were sampled during a short detour to the north in order to finish the Thalweg-Transect. Then, RV EMB sailed back to station TF0271 and the Scanfish was again set into waster to finish the perpendicular transect (SF001EGB-SF022EGB).

Station SF022EGB where the Scanfish transect ended was reached in the morning of the 1st of April. It was still cold and the wind increased to a fresh breeze (-0.1°C, 1015.1 hPa, 9.5-10.5m/s, BF: 5, NW, cloudy). After a short stop for another CTD profile at this station, RV EMB sailed

southwards to start another perpendicular Scanfish transect at station TF0411 which ended at position TF0403 close to the island of Gotland in the evening of the 1st of April. In the following, RV EMB sailed to the western Gotland basin to follow a series of stations southwards into the Bornholm Basin.

The work started with hydrographical and chemical measurements at stations WGB-1, WGB-SW and BB_N during the day of the 2nd April. During the transect, air temperature increased to 2.7°C and the wind direction changed to southerly winds at BF 4 (6.1-7.6m/s, moderate breeze, cloudy). Due to a bad weather forecast for the southern Baltic Sea for 3rd-4th March with up to BF 11 in gusts, the remaining program was shortened. The series of seven hydrographical stations south of Bornholm was skipped in favor of finishing the biological monitoring in the Bornholm Basin, the Arkona Sea and the Bay of Mecklenburg on the return journey. In the late evening of the 2nd of April station TF0213 was reached and the BSH monitoring program was started. The sampling program included hydrographical, chemical and plankton measurements. It was still windy with a moderate to strong breeze (2.7°C, 1016.2 hPa, 7.6-10.4 m/s, BF: 4-5, S, cloudy).

During the 3rd of April, the station work continued at station TF0113, TF0030, TF0064 and TF0012. The wind has again changed to north and increased from a moderate and strong breeze to near gale in the turn of the day (7.2 – 15.6 m/S, BF: 4-7, sunny, air temperature 3.0 – 4.2 °C). After finishing station TF0012, RV EMB returned to the harbor in Rostock-Marienehe, where the ship arrived at 19:00.

The unloading of the scientific equipment took place in the morning of the 4th of April.

5 Preliminary Results

The following results are only preliminary and not comprehensive, since they are based in most cases on unevaluated raw data or are descriptive. Their presentation aims at providing a first overview and general evaluation of the hydrographic and chemical data. A final assessment requires the advanced analysis of data and samples and their validation.

5.1 Meteorological conditions

The meteorological conditions during the beginning of the cruise were determined by a high pressure cell located in central Europe resulting in ideal working conditions during the first week (23.03. – 26.03.2022, Fig. 5.1). The weather was characterized by calm wind conditions varying between a light to fresh breeze (BF 2-5, 1.3-10.3 m/s) and relatively warm air temperatures (5.0-8.3 °C). During the 27th to 28th March, when RV EMB was sailing into the Gotland Basin, the weather was increasingly influenced by a low pressure cell over northwestern Russia (Fig. 5.1, 28.03.). The air temperature dropped to 4.0-5.4 °C, the northern wind increased from a strong breeze to near gale – gale (BF 6-8, 12.4-17.3 m/s). Afterwards, the weather continuously calm down again leading to sunny, ideal working conditions for the uptake of a ARGO float, exchange of the SW MOORING and two ScanFish transects (BF 1-5, 0.8-8.4 m/s), while the air temperature dropped considerably to -0.8 to -1.4 °C (Fig. 5.1, 30.03.). During the return journey, the cruise got increasingly influenced by two low pressure cells moving sequential from Island to Estonia resulting into a storm with forecasts of winds up to BF 11 in gusts (Fig. 5.1, 03.04.).

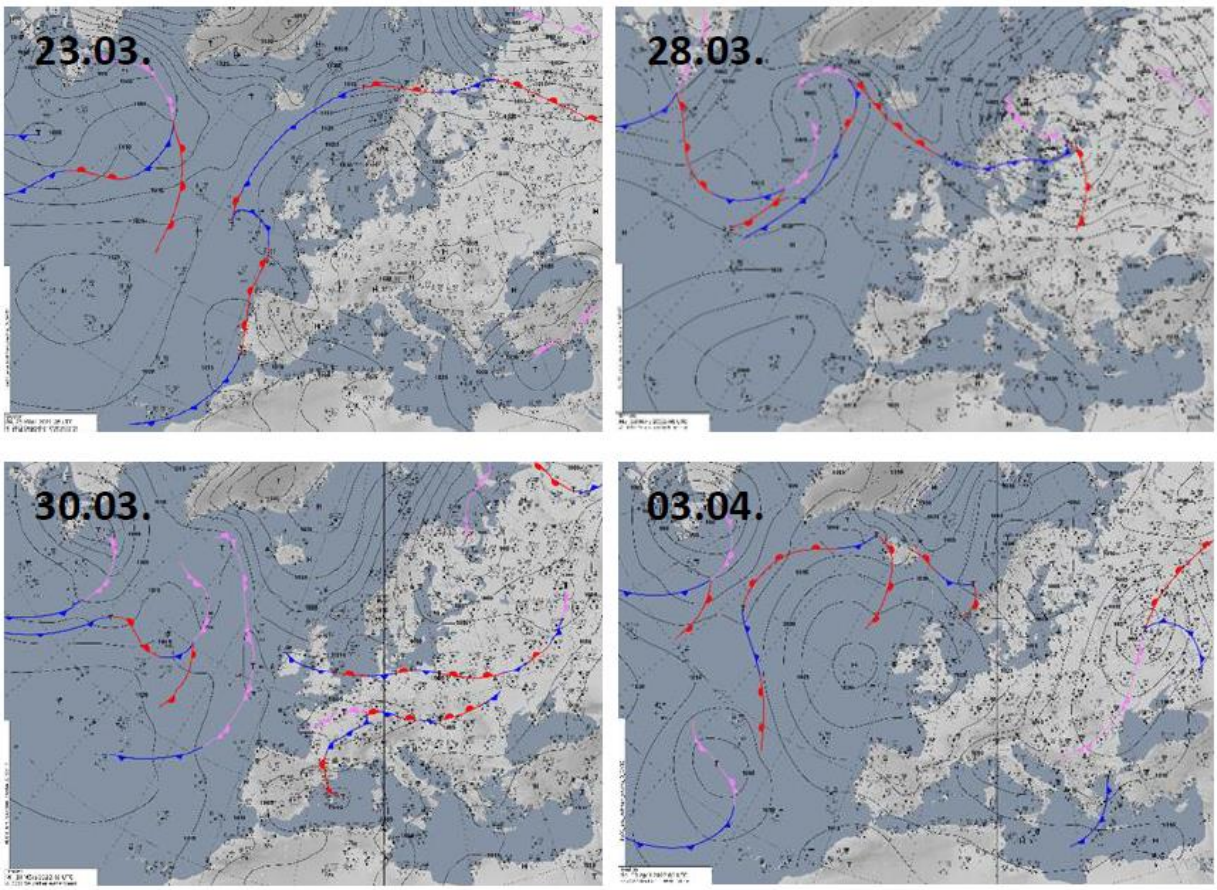


Fig. 5.1 The weather condition during the cruise EMB290 on the 23.03, 28.03., 30.03. and the 03.04.2022. (all figures provided the Deutscher Wetterdienst (www.dwd.de)).

5.2 Sea Surface Temperature, Salinity and Chlorophyll-a Distribution

Sea surface temperature, surface salinity and Chlorophyll a –fluorescence during the cruise were compiled from data of the ships thermosalinograph. The distribution of the hydrological parameters in the study area, however, still needs validation.

The surface temperature (SST) and salinity (SSS) showed a west-east gradient typical for the Baltic Sea (Fig. 5.2). In the Kiel Bight, the SST was about 5.2 to 5.4°C, which is above the long-term climatological mean. The salinity varied from 11.4-15.2 PSU indicating the typical transition zone between the Baltic and North Seas. The surface water in the Bight of Mecklenburg showed already the influence of the Baltic Proper with a salinity ranging from 8.6 to 9.9 PSU, the temperature ranged from 4.5 to 4.8 °C and was slightly cooler compared to the shallower Kiel Bight.

Along the Thalweg the SST and SSS decreased further towards the central Baltic. SST and SSS varied between 4.6 to 4.8 °C and 8.0 to 8.1 PSU in the Arkona Basin and between 4.4 to 4.6 °C and 7.6-7.9 PSU in the Bornholm Basin, respectively. Further east and north the decrease of SST and SSS continued with 3.4 to 4.4 °C and 7.4 to 7.5 PSU in the Stolpe Channel and central Gotland Basin, respectively. The minimum SST of 2.9 to 3.1 °C was observed at the northernmost stations, while the minimum salinity of 6.4 to 6.9 PSU were found in the western Gotland Basin and close to the Latvian coast at the end of the ScanFish transects in the eastern Gotland Basin (Fig. 5.2).

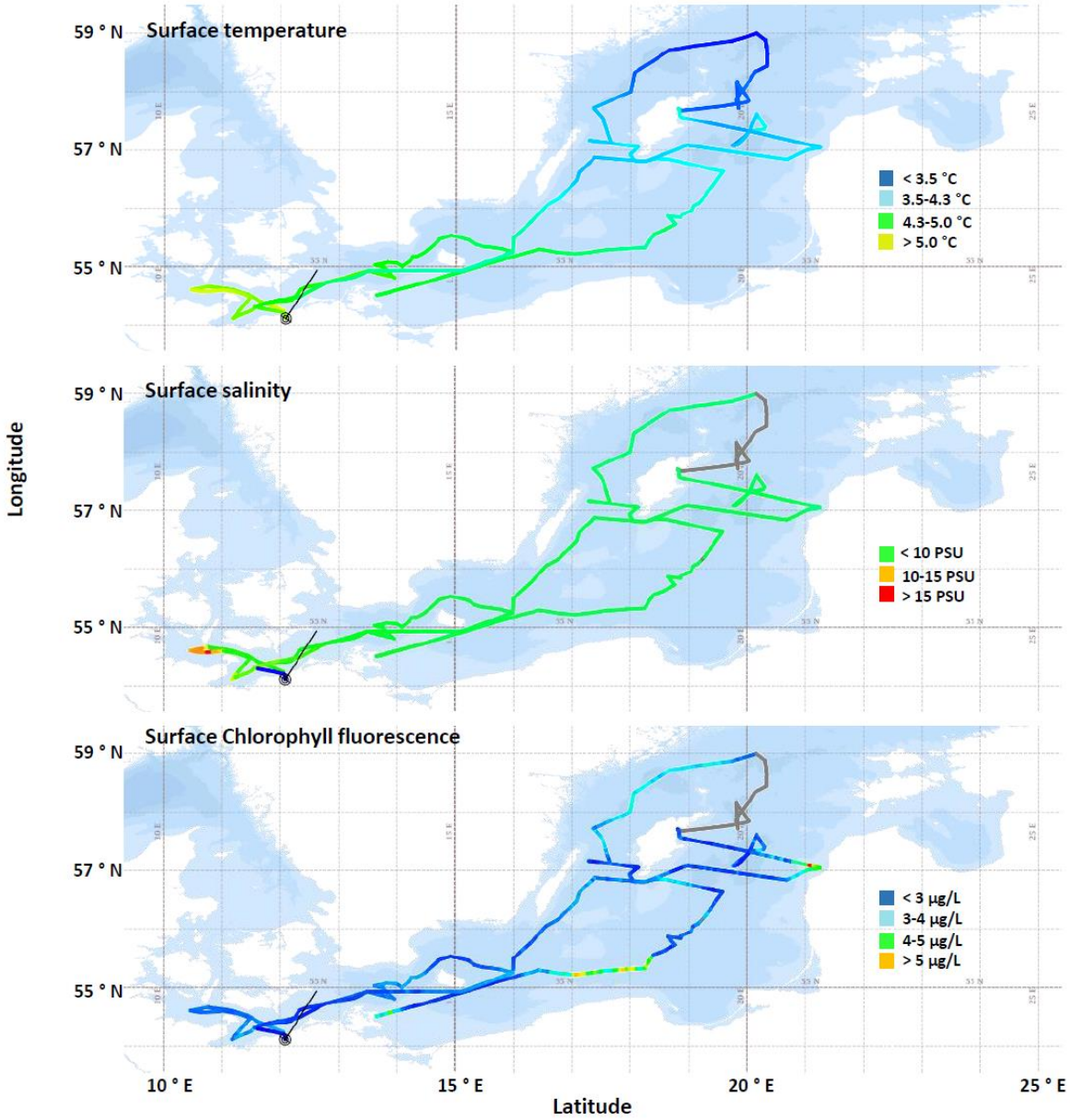


Fig. 5.2 Surface temperature (top), surface salinity (middle) and surface Chlorophyll a fluorescence (bottom) along the cruise track of RV EMB during the cruise EMB290. Grey track lines in the northern Gotland Basin indicate malfunction of the sensors.

The surface distribution of Chlorophyll *a* fluorescence provides information about the temporal development of the spring bloom (Fig. 5.2). In the Baltic Sea, a gradient in the timing of the spring bloom is typically observed with a delay in the spring bloom maximum in February-March in the Kiel Bight to March-April in the central and northern Baltic Sea (Wasmund & Siegel 2008, Groetsch et al. 2016).

A higher Chlorophyll *a* fluorescence of 4.3-7.9 µg/L was observed in the shallower Stolpe Channel and close to the Latvian coast, which characterizes an ongoing spring bloom. In addition, the fluorescence of 3.0-3.8 µg/L in the western Gotland Basin indicated that the spring bloom was about to start. In contrast, the fluorescence in the surface waters of the western Baltic Sea was low (< 3 µg/L). Higher values of 2.3- 3.2 µg/L in the Kiel Bight and Bay of Mecklenburg in subsurface waters and close to the bottom, however, indicate the end of spring bloom in these waters. Low values of Chlorophyll-a fluorescence together with low nutrient concentrations suggest that this was also the case in the Bornholm and Arkona Basins.

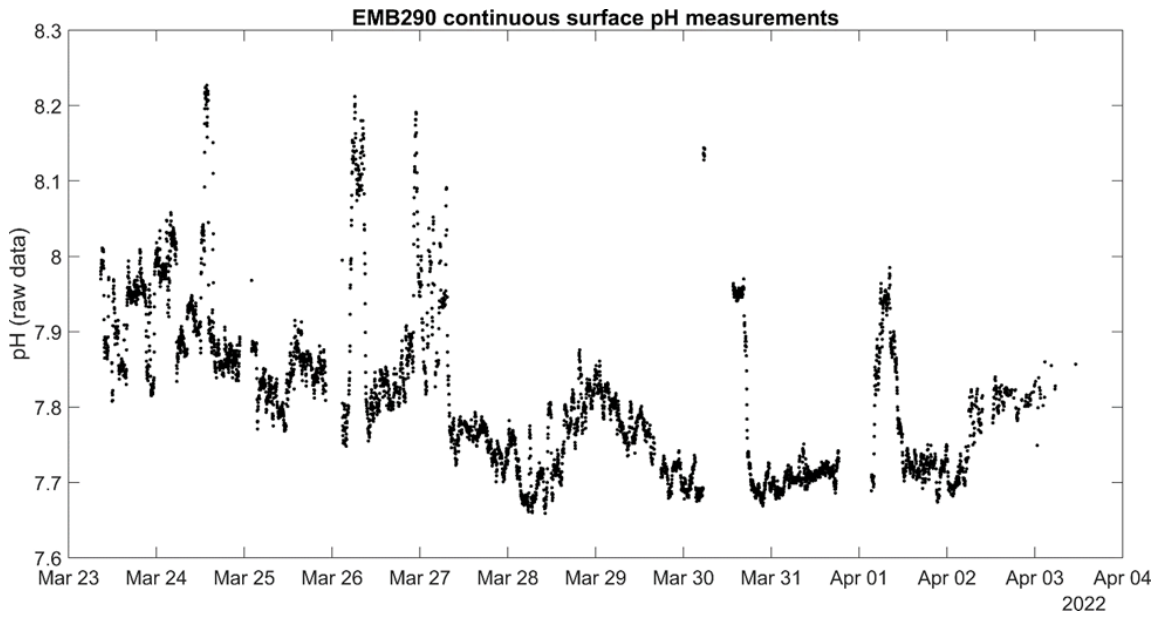


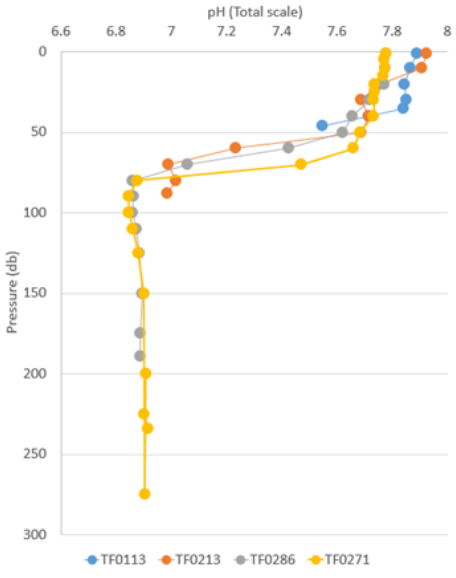
Fig. 5.3 Temporal distribution of underway surface pH (raw data) measured using a Sunburst HydroFIA pH system along the cruise track of RV EMB during the cruise EMB290.

5.2 Continuous underway pH measurements

Continuous underway pH measurements were performed using Sunburst HydroFIA pH systems (Fig. 5.3). The surface pH values ranged from 7.659 to 8.227 with an average ± standard deviation of 7.818 ± 0.108 (total scale). Higher pH values found in the Stolpe Channel (26-27th March, compare Table 7.1, stations TF0222-0268) and close to the Latvian coast during the eastern Gotland Sea ScanFish transects (31st March, 1st April) that coincide with the high Chlorophyll *a* fluorescence found in these areas. The higher pH values in the Kiel Bight and Bay of Mecklenburg further corroborate the interpretation that the spring bloom in these areas was already declining (see chapter 5.1).

Water column pH measurements were also done for four stations using a Carter pH measuring system. Station discrete measurements included low oxygen depths, showing pH values around 6.8 at depths higher than 75 m and reaching almost 8.0 at surface (Fig. 5.3).

Fig. 5.3 Vertical pH profiles (raw data) at selected stations during the cruise EMB290: TF0113 (blue), TF0213 (orange), TF0286 (grey), and TF0271 (yellow).



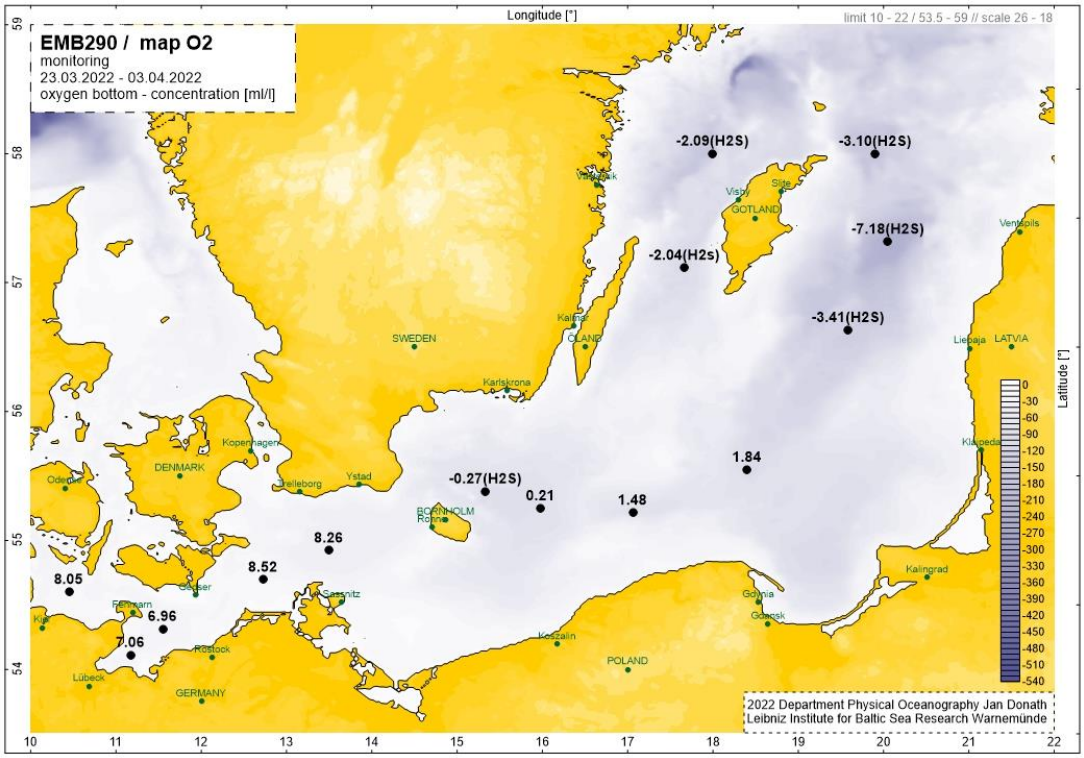


Fig. 5.4 Distribution of oxygen and hydrogen sulphide concentrations (negative values) near bottom at main stations of the long term observation program (Conversion factors: µmol l^{-1} H_2S * -0.0448 = negative oxygen equivalent ml l^{-1} O_2).

5.3 Observations at Main Stations and the Baltic Thalweg Transect

The most important hydrographic and chemical parameters at the main stations of the investigation are summarized in Tables 5.1 and 5.2 as well as Figure 5.4. The position for these station are provided in s by Figure 3.1.

The values for the surface temperature and salinity have already been described in chapter 5.2 and reflect the decrease in both parameters in west-east and south-north direction typical for the Baltic Sea in spring (Tab. 5.1). The deep water conditions diverge from this picture (Tab. 5.2). In the shallower western Baltic, bottom temperature was slightly lower in the bottom waters indicating the onset of surface warming. In contrast to the surface, temperatures in the waters increased towards the central and eastern basins, which is typical for the hydrography during stagnation periods. The salinity values at depth were high only for the Kiel Bight and Bay of Mecklenburg, while they were rather low for the Arkona, Bornholm and Gotland Basins reinforcing that no inflow of saline water has taken place during winter. This is reflected in the spatial distribution of bottom oxygen conditions derived from water bottle samples and from the CTD-sensors (Fig. 5.4). Nearly the entire central Baltic was covered by anoxic bottom waters, enriched with free hydrogen sulphide. In the Bornholm Basin, the Stolpe channel and the entrance to the Gotland Basin, oxygen levels were lower than 2 ml/L.

The nutrient situation was typical for spring with low nitrate and phosphate concentrations in the surface waters (Tab. 5.1). Especially in the western areas and the Stolpe channel depletion or levels of nitrate support the notion that the Chl*a* values reflect a spring phytoplankton bloom in its wane.

Tab. 5.1 Surface water layer (about 3 m depth) - hydrographic and hydrochemical properties at main stations.

Area /Date	Station No. IOW	Temp °C	Sal. g/kg	O_2 (sensor) mL/L	O_2 (titration) mL/L	PO_4 [µM]	NO_3 [µM]	SiO_4 [µM]
Kiel Bight	TF0360	5.4	15.2	8.8	8.40	0.04	0.9	6.8
Meckl.Bight	TF0012	4.8	9.9	9.5	9.83	0.01	0.15	5.7
Darss Sil	TF0030	5.1	8.1	10.9	9.68	0.00	2.56	7.7
Arkona Basin	TF0113	4.8	8.1	9.1	9.13	0.37	0.28	11.5
Bornholm Deep	TF0213	4.4	7.6	9.3	9.73	0.36	0.04	13.9
Stolpe Channel	TF0222	4.7	7.4	10.3	10.55	0.06	0.00	5.9
SE Gotland Basin	TF0259	4.0	7.4	9.7	9.37	0.32	0.17	13.6
Gotland Deep	TF0271	3.4	7.3	8.9	9.38	0.58	1.94	18.1
Farö Deep	TF0286	3.1	7.1	9.0	9.25	0.49	1.48	16.9
Landsort Deep	TF0284	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Karlsö Deep	TF0245	3.6	7.3	9.1	9.12	0.45	0.58	17.9

Tab. 5.2 Deep water layer - hydrographic and hydrochemical properties at main stations. Hydrogen sulphide was converted into negative oxygen equivalents (Conversion factors: µmol l^{-1} H_2S * -0.0448 = negative oxygen equivalent ml l^{-1} O_2).

Area /Date	Station Name IOW	Temp °C	Sal. g/kg	O_2 (sensor) mL/L	O_2 (titration) mL/L	PO_4 [µM]	NO_3 [µM]	SiO_4 [µM]
Kiel Bight	TF0360	4.6	20.1	8.05	pending	0.15	2.49	9.2
Meckl.Bight	TF0012	4.5	20.2	6.96	pending	0.59	6.90	23.0
Darss Sill	TF0030	4.1	8.8	8.52	pending	0.25	1.56	11.6
Arkona Basin	TF0113	4.5	12.9	8.26	pending	0.69	6.87	20.1
Bornholm Deep	TF0213	7.8	15.5	0.21	pending	4.10	9.22	70.3
Stolpe Channel	TF0222	8.1	13.6	1.48	pending	2.56	8.19	55.2
SE Gotland Basin	TF0259	7.1	11.8	1.84	pending	2.06	6.55	48.2
Gotland Deep	TF0271	7.2	12.9	-7.18	pending	6.38	0.00	88.9
Farö Deep	TF0286	7.2	12.1	-3.10	pending	4.60	0.00	75.5
Landsort Deep.	TF0284	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Karlsö Deep	TF0245	6.2	10.4	-2.04	pending	4.50	0.00	82.8

The ‘Thalweg’ aligns stations along a transect from the Danish straits through the western Baltic Sea into the northern Gotland Basin and provides a detailed view of the environmental situation (Fig. 5.5). Due to the weather conditions, the transect could not be followed in sequence but in two parts with a first section from the Danish straits to the southern Gotland Basin and a second section from the northern to the central Gotland Basin. The transect describes the typical pattern of spring conditions and the situation during a stagnation period in the central Baltic Proper.

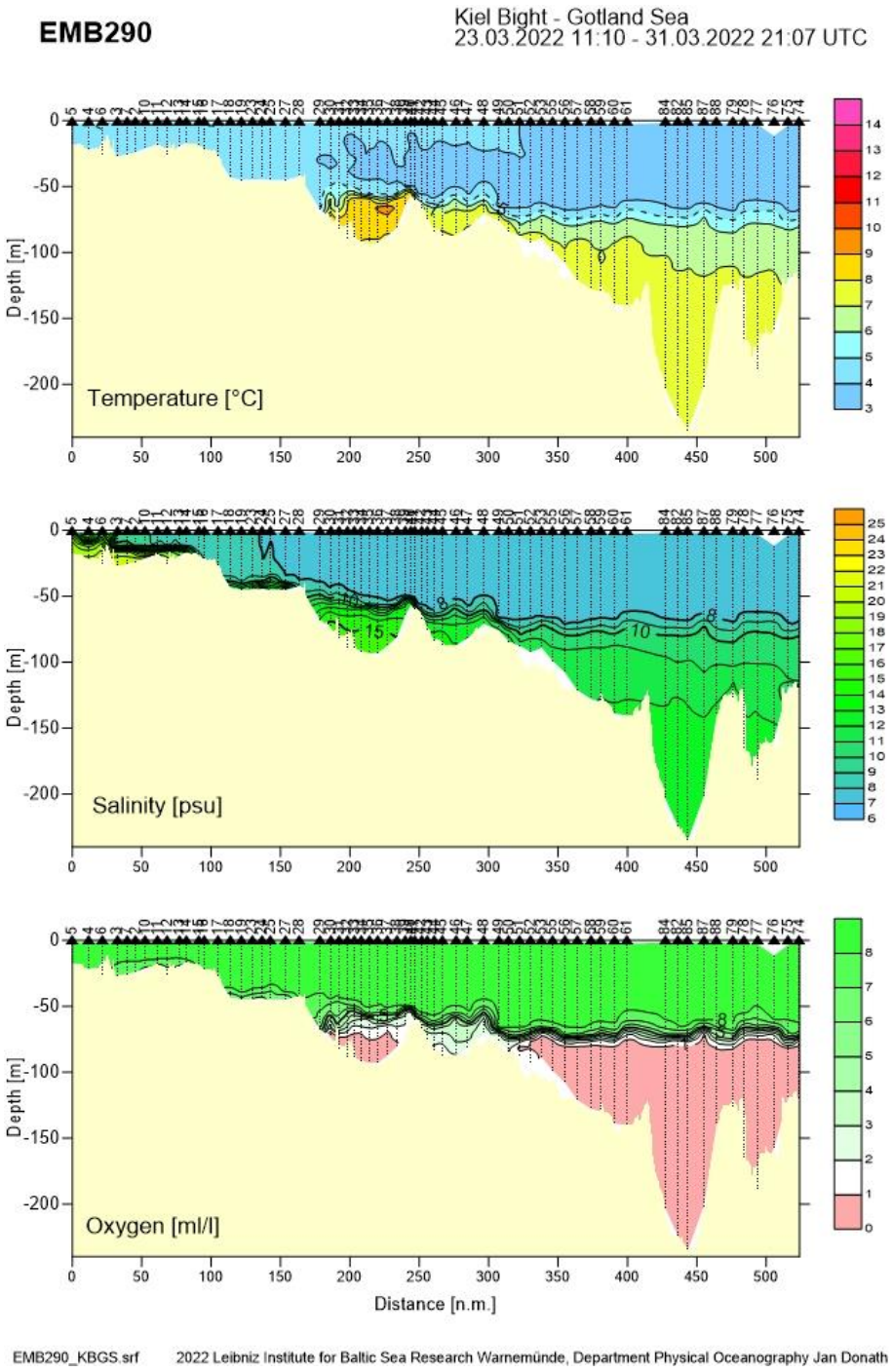


Fig. 5.5 Distribution of temperature (°C), salinity (PSU) and oxygen concentrations (ml/L) along the Thalweg transect of the Baltic Sea from the Kiel Bight to the eastern Gotland Basin. The figure is based on the preliminary CTD data collected during the cruise EMB290 from 23.03. - 31.03.2022.

The temperature in the surface layer was high at about 5.4 °C in the Kiel Bight and 4.4-4.8 °C in the Bay of Mecklenburg and the Arkona Basin, respectively, and indicate together with the salinity a well-mixed situation in these area except saline stratification in the Kiel Bight. In the Bornholm and the southern Gotland Basin, the spring warming lead to thermal stratification with an upper layer of > 4°C, while the central and northern Gotland Basin was mixed down to 60 m with a temperature < 4°C. Lowest values occurred in the northernmost stations down to the halocline. Below the halocline, water temperature increased to 6 to 8°C in the Gotland Basin, while the Bornholm deep water was warmer (8-9°C). Oxygen levels declined rapidly with increasing depth below the halocline and concentrations < 1 ml/L were observed below 70 and 80 m in the Bornholm and the Gotland Basin, respectively (Fig. 5.5).

The different water masses observed during the cruise can be clearly identified using its temperature, salinity and oxygen signature. Figure 5.5 gives an overview about the different water masses in two state diagrams: Western Baltic surface water (A), Fehmarn Belt bottom water (B), Central Baltic surface water (C), Bornholm Basin bottom water (D), Bornholm Basin halocline water (E), Slupsk Furrow bottom water (F), Gotland Basin deep water (G).

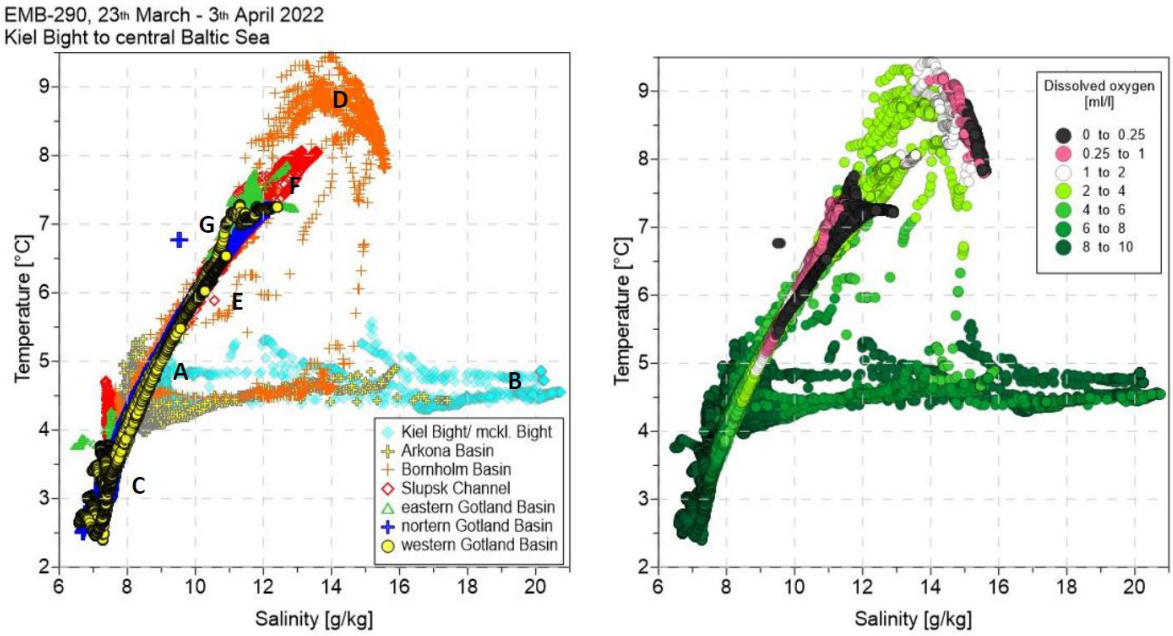


Fig. 5.5 TS-diagram (left) and TSO_2-diagram (right) of the Baltic transect.

. 5.5 ScanFish Transects

Three zonal transects of the distribution of hydrographical properties were done in the Gotland Basin. One covered the western Gotland Basin, the other two described the hydrographical situation at southern and central eastern Gotland Basin. The central transect is shown in Figure 5.7, the other two can be found in the appendix (Fig. 12. And 12.2). It depicts nearly uniform properties in the surface water along the entire transect separated from the deep water by a pronounced pycnocline at 60-70 m. Below the halocline at about 65m depth the oxygen concentration decreased rapidly to values < 1 ml/L.

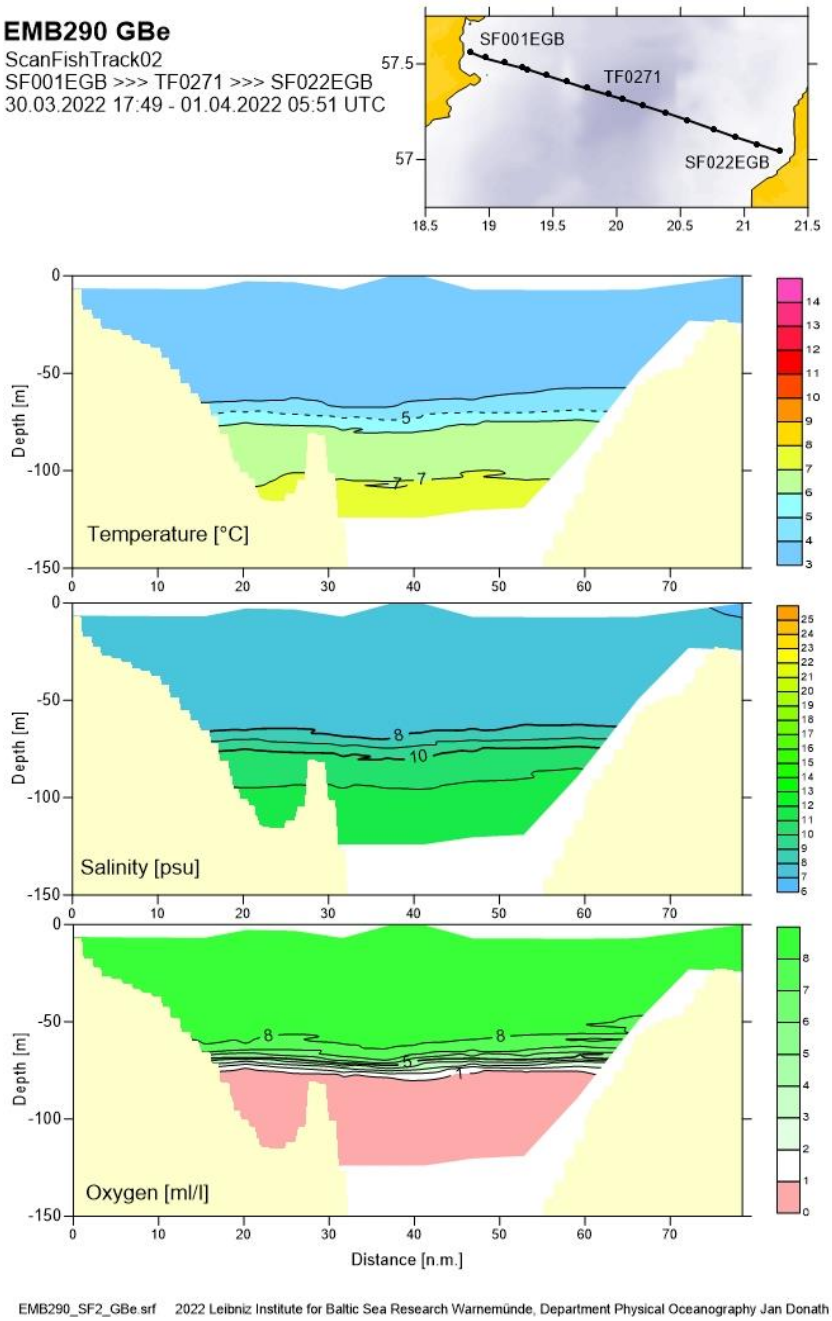


Fig. 5.7 Temperature (°C), salinity (PSU) and dissolved oxygen concentration (ml/L) distribution along the zonal transect at the southern rim of the Eastern Gotland Basin based on the ScanFish data during the transect SF001EGB – SF022EGB (30.03. and 01.04.2022).

. 5.6 Biological sampling

Samples for the investigation of the seasonal and long-term variation of the phytoplankton and zooplankton were collected on selected station for the later analysis in the laboratory. The analysis is time consuming and will only start at when samples are brought to the laboratory. Therefore, no preliminary results can be presented yet.

6 Ship's Meteorological Station

Not applicable on RV EMB. The meteorological conditions during the cruise are described in section 5.1, based on data of the automatic weather station of the ship.

7 Station List EMB290

7.1 Overall Station List

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
EMB	IOW	2022		[UTC]	[°N]	[°W]	[m]	
EMB290-1 - 1 EMB290-1 - 2	TF05	23.3.	ROS/CTD, Secci disk	8:15	54°13.87'N	12°04.48'E	12.8	
EMB290-2 - 1	TF0011	23.3.	ROS/CTD	11:03	54°24.88'N	11°36.96'E	25.1	
EMB290-3 - 1	TF0010	23.3.	ROS/CTD	12:47	54°33.13'N	11°19.35'E	28.2	
EMB290-4 - 1	TF0361	23.3.	ROS/CTD	15:16	54°39.54'N	10°45.88'E	19.9	
EMB290-5 - 1 EMB290-5 - 2 EMB290-5 - 3 EMB290-5 - 4	TF0360	23.3.	Secci disk, ROS/CTD, Apstein 20 WP-2	17:06	54°35.99'N	10°27.02'E	15.0	
EMB290-6 - 1	TF0014	23.3.	ROS/CTD	20:27	54°35.70'N	11°00.78'E	24.9	
EMB290-7 - 1	TF0013	23.3.	ROS/CTD	22:43	54°28.40'N	11°28.92'E	23.7	
EMB290-8 - 1	TF0022	24.3.	ROS/CTD	01:28	54°06.60'N	11°10.49'E	20.3	
EMB290-8 - 2	TF0022	24.3.	ROS/CTD	01:57	54°06.60'N	11°10.49'E	20.3	
EMB290-9 - 1 EMB290-9 - 2 EMB290-9 – 3-4	TF0012	24.3.	ROS/CTD, Apstein, 20 WP-2	04:08	54°18.93'N	11°33.01'E	21.7	2 x WP-2
EMB290-10 - 1	TF0017	24.3.	ROS/CTD	06:12	54°23.51'N	11°49.43'E	19.2	
EMB290-11 - 1	TF0041	24.3.	ROS/CTD	07:27	54°24.39'N	12°03.68'E	16.2	
EMB290-12 - 1 EMB290-12 - 2 EMB290-12 - 3 EMB290-12 – 4-5	TF0046	24.3.	ROS/CTD, Secci disk, Apstein, 20 WP-2	08:37	54°28.19'N	12°14.54'E	25.8	2 x WP-2
EMB290-13 - 1	TF0033	24.3.	ROS/CTD	10:16	54°36.30'N	12°19.92'E	17.0	
EMB290-14 - 1	TF0002	24.3.	ROS/CTD	11:09	54°38.99'N	12°26.99'E	14.7	
EMB290-15 - 1	TF0001	24.3.	ROS/CTD	12:27	54°41.81'N	12°42.08'E	18.2	
EMB290-16 - 1 EMB290-16 - 2	TF0030	24.3.	ROS/CTD, Apstein 20	13:18	54°43.40'N	12°47.00'E	19.9	
EMB290-17 - 1	TF0115	24.3.	ROS/CTD	14:45	54°47.68'N	13°03.52'E	27.3	
EMB290-18 - 1	TF0114	24.3.	ROS/CTD	16:00	54°51.63'N	13°16.60'E	42.5	
EMB290-19 - 1 EMB290-19 - 2 EMB290-19 - 3 EMB290-19 - 4	TF0113	24.3.	ROS/CTD, Secci disk, Apstein 20 WP-2	17:17	54°55.48'N	13°30.03'E	45.0	2 x WP-2
EMB290-19 - 2	TF0113	24.3.	ROS/CTD	18:03	54°55.49'N	13°30.00'E	45.2	
EMB290-20 - 1	TF0112	24.3.	ROS/CTD	20:08	54°48.16'N	13°57.55'E	38.1	
EMB290-21 - 1	ArkonaBoje	24.3.	ROS/CTD	21:06	54°52.69'N	13°51.49'E	43.6	
EMB290-22 - 1	TF0122	24.3.	ROS/CTD	22:11	54°59.40'N	13°46.18'E	45.0	
EMB290-23 - 1	TF0105	24.3.	ROS/CTD	23:07	55°01.50'N	13°36.41'E	44.3	
EMB290-24 - 1	TF0104	25.3.	ROS/CTD	00:14	55°04.09'N	13°48.80'E	44.3	
EMB290-25 - 1	TF0103	25.3.	ROS/CTD	01:15	55°03.77'N	13°59.29'E	45.0	
EMB290-26 - 1 EMB290-26 - 2 EMB290-26 – 3-4	TF0109	25.3.	ROS/CTD, Apstein 20 WP-2	02:06	55°00.00'N	14°05.00'E	46.1	2 x WP-2
EMB290-26 - 5	TF0109	25.3.	ROS/CTD	02:57	55°00.00'N	14°04.96'E	46.1	
EMB290-27 - 1	TF0145	25.3.	ROS/CTD	04:26	55°09.97'N	14°15.05'E	44.6	
EMB290-28 - 1	TF0144	25.3.	ROS/CTD	06:03	55°15.40'N	14°29.47'E	42.7	
EMB290-29 - 1	TF0140	25.3.	ROS/CTD	08:11	55°27.99'N	14°42.97'E	68.2	
EMB290-30 - 1	TF0206	25.3.	ROS/CTD	09:34	55°27.97'N	14°42.92'E	75.4	
EMB290-31 - 1	TF0207	25.3.	ROS/CTD	11:01	55°29.74'N	15°05.57'E	84.6	
EMB290-32 - 1	TF0208	25.3.	ROS/CTD	11:59	55°27.22'N	15°14.04'E	91.8	
EMB290-33 - 1	TF0200	25.3.	ROS/CTD	12:59	55°23.00'N	15°20.01'E	91.1	
EMB290-34 - 1	TF0209	25.3.	ROS/CTD	13:58	55°20.81'N	15°27.98'E	93.2	
EMB290-35 - 1	TF0211	25.3.	ROS/CTD	14:55	55°19.84'N	15°36.86'E	95.0	
EMB290-36 - 1	TF0212	25.3.	ROS/CTD	16:05	55°18.10'N	15°47.80'E	94.9	

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
EMB	IOW	2022		[UTC]	[°N]	[°W]	[m]	
EMB290-37 - 1 EMB290-37 - 2 EMB290-37 - 3 EMB290-37 - 4-7 EMB290-37 - 8 EMB290-37 – 9-11	TF0213	25.3.	ROS/CTD, Secci disk, Apstein 20 WP-2 ROS/CTD Apstein 50	17:15	55°14.99'N 55°14.99'N	15°58.99'E 15°58.97'E	89.6 89.3	 4 x WP-2 3 x Apstein
EMB290-38 - 1	TF0221	26.3.	ROS/CTD	16:08	55°13.28'N	16°09.96'E	82.5	
EMB290-39 - 1	TF0225	26.3.	ROS/CTD	17:07	55°15.51'N	16°19.19'E	65.1	
EMB290-40 - 1	TF0226	26.3.	ROS/CTD	18:00	55°17.81'N	16°25.83'E	56.4	
EMB290-41 - 1	TF0224	26.3.	ROS/CTD	18:36	55°17.00'N	16°29.93'E	60.7	
EMB290-42 - 1	TF0227	26.3.	ROS/CTD	19:31	55°15.67'N	16°38.29'E	68.6	
EMB290-43 - 1	TF0228	26.3.	ROS/CTD	20:28	55°14.22'N	16°46.39'E	77.1	
EMB290-44 - 1	TF0229	26.3.	ROS/CTD	21:22	55°13.70'N	16°54.84'E	85.7	
EMB290-45 - 1	TF0222	26.3.	ROS/CTD	22:17	55°12.98'N	17°03.98'E	91.3	
EMB290-46 - 1	TF0266	26.3.	ROS/CTD	23.44	55°15.13'N	17°21.15'E	88.7	
EMB290-47 - 1	TF0267	27.3.	ROS/CTD	01:02	55°17.17'N	17°55.82'E	83.1	
EMB290-48 - 1	TF0268	27.3.	ROS/CTD	02:40	55°18.41'N	17°55.82'E	74.3	
EMB290-49 - 1	TF0256	27.3.	ROS/CTD	04:25	55°19.58'N	18°15.03'E	78.2	
EMB290-50 - 1	TF0257	27.3.	ROS/CTD	06:02	55°26.46'N	18°19.24'E	87.4	
EMB290-51 - 1 EMB290-51 - 2	TF0259	27.3.	ROS/CTD, Apstein 20	07:32	55°33.01'N	18°24.00'E	89.4	
EMB290-52 - 1	TF0255	27.3.	ROS/CTD	08:52	55°37.97'N	18°35.99'E	95.0	
EMB290-53 - 1	TF0258	27.3.	ROS/CTD	10:00	55°43.63'N	18°45.93'E	92.0	
EMB290-54 - 1	TF0252	27.3.	ROS/CTD	11:34	55°52.00'N	18°38.44'E	114.1	
EMB290-55 - 1	TF0253	27.3.	ROS/CTD	12:48	55°50.43'N	18°51.97'E	101.2	
EMB290-56 - 1	TF0265	27.3.	ROS/CTD	14:18	55°57.54'N	19°02.77'E	112.1	
EMB290-57 - 1	TF0250	27.3.	ROS/CTD	15:45	56°05.00'N	19°10.00'E	124.7	
EMB290-58 - 1	TF0262	27.3.	ROS/CTD	17:15	56°14.08'N	19°18.08'E	132.5	
EMB290-59 - 1	TF0263	27.3.	ROS/CTD	18:35	56°20.80'N	19°22.76'E	134.8	
EMB290-60 - 1	TF0261	27.3.	ROS/CTD	20:02	56°29.51'N	19°28.91'E	144.0	
EMB290-61 - 1	TF0260	27.3.	ROS/CTD	21:27	56°37.99'N	19°35.04'E	145.7	
EMB290-62 – 1 EMB290-62 - 2	SF032WGB- SF025WGB	28.3.	Scanfish ROS/CTD	06:00 11:25	57°03.09'N 57°09.83'N	18°08.15'E 17°17.67'E	6.9 58.5	Towed CTD: SF032WGB- SF025WGB
EMB290-63 - 1	TF0245	28.3.	ROS/CTD	12:49	57°06.98'N	17°40.05'E	110.2	
EMB290-64 - 1	TF0242	28.3.	ROS/CTD	17:32	57°42.96'N	17°22.03'E	141.8	
EMB290-65 - 1	TF0240	28.3.	ROS/CTD	20:41	57°59.95'N	18°00.03'E	166.8	
EMB290-66 - 1	wGB-3	28.3.	ROS/CTD	23:11	58°19.52'N	18°04.09'E	160.3	
EMB290-67 - 1	nGB-1	29.3.	ROS/CTD	02:35	58°42.68'N	18°40.14'E	250.0	
EMB290-68 - 1	TF0283	29.3.	ROS/CTD	04:47	58°46.94'N	19°06.02'E	133.2	
EMB290-69 - 1	nGB-2	29.3.	ROS/CTD	07:46	58°51.91'N	19°44.65'E	162.0	
EMB290-70 - 1	TF0288	29.3.	ROS/CTD	10:02	58°59.75'N	20°09.55'E	145.0	
EMB290-71 - 1	TF0282	29.3.	ROS/CTD	11:31	58°52.99'N	20°18.98'E	166.1	
EMB290-72 - 1	TF0289	29.3.	ROS/CTD	12:48	58°45.97'N	20°19.83'E	194.1	
EMB290-73 - 1	TF0279	29.3.	ROS/CTD	14:07	58°38.45'N	20°20.68'E	165.5	
EMB290-74 - 1	TF0285	29.3.	ROS/CTD	16:00	58°26.47'N	20°20.03'E	123.3	
EMB290-75 - 1	TF0278	29.3.	ROS/CTD	17:23	58°20.97'N	20°08.79'E	122.0	
EMB290-76 - 1	TF0277	29.3.	ROS/CTD	19:05	58°10.96'N	20°02.96'E	163.3	
EMB290-77 - 1	TF0286	29.3.	ROS/CTD	21:01	57°59.99'N	19°54.05'E	196.2	
EMB290-77 - 2	TF0286	29.3.	ROS/CTD	22:11	58°00.00'N	19°53.99'E	196.4	
EMB290-78 - 1	TF0290	29.3.	ROS/CTD	23:33	57°50.97'N	19°48.98'E	172.4	
EMB290-79 - 1	TF0287	30.3.	ROS/CTD	00:58	57°42.88'N	19°51.22'E	130.2	
EMB290-80 - 1		30.3.	Boat	06:00	58°09.23'N	19°49.57'E	162.9	ARGO-Recovery
EMB290-81 - 1 EMB290-81 - 2	SF001EGB TF0271	30.3. 31.3.	Scanfish ROS/CTD	17:45 02:05	57°33.78'N 57°19.31'N	18°51.55'E 20°02.93'E	19.1 241.4	Towed CTD: SF001EGB-TF0271
EMB290-82 - 1	TF0275	31.3.	ROS/CTD	03:43	57°12.61'N	19°55.88'E	231.4	
EMB290-83 - 1 EMB290-83 - 2-3	Gotland SW	31.3.	ROS/CTD Mooring	05:28	57°04.53'N	19°45.21'E	217.1	 Exchange Mooring
EMB290-84 - 1	TF0272	31.3.	ROS/CTD	08:00	57°04.30'N	19°49.85'E	210.0	

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
EMB	IOW	2022		[UTC]	[°N]	[°W]	[m]	
EMB290-85 - 1	TF0271	31.3.	ROS/CTD	10:19	57°19.21‘N	20°03.04‘E	241.4	
EMB290-85 – 2			Apstein 20					
EMB290-85 - 3			Secci disk					
EMB290-85 – 4-9			ROS/CTD	11:31	57°19.19‘N	20°03.00‘E	242.9	6 x ROS/CTD
EMB290-86 - 1	GotlandNE	31.3.	ROS/CTD	18:08	57°21.97‘N	20°20.02‘E	221.4	
EMB290-87 - 1	TF0276	31.3.	ROS/CTD	19:27	57°28.19‘N	20°15.57‘E	208.6	
EMB290-88 - 1	TF0270	31.3.	ROS/CTD	21:00	57°36.98‘N	20°10.00‘E	144.9	
EMB290-89 - 1	TF0271-	31.3.	Scanfish	23:27	57°19.31‘N	20°02.50‘E	241.4	Towed CTD:
EMB290-89 - 2	SF022EGB	01.4.	ROS/CTD	07:00	57°02.64‘N	21°16.89‘E	18.3	TF0271-SF022EGB
EMB290-90 - 1	TF0411-	01.4.	Scanfish	10:07	56°50.12‘N	21°16.98‘E	56.4	Towed CTD:
EMB290-90 - 2	TF0403	01.4.	ROS/CTD	19:55	57°05.09‘N	18°95.44‘E	103.5	TF0411-TF0403
EMB290-91 - 1	WGB-1	02.4.	ROS/CTD	02:20	56°52.57‘N	17°23.33‘E	95.7	
EMB290-92 - 1	WGB-SW	02.4.	ROS/CTD	04:35	56°37.49‘N	17°07.85‘E	77.4	
EMB290-93 - 1	BB_N	02.4.	ROS/CTD	11:47	55°45.70‘N	16°17.42‘E	62.4	
EMB290-94 - 1	TF0220	02.4.	ROS/CTD	14:02	55°30.02‘N	16°00.08‘E	79.5	
EMB290-95 - 1	TF0213	02.4.	ROS/CTD		55°14.96‘N	15°58.95‘E	90.3	
EMB290-95 - 2			Secci disk					
EMB290-95 - 3			Apstein 20					
EMB290-95 - 4-9			WP-2					6 x WP-2
EMB290-95 - 10-12			Apstein 50					3 x Apstein
EMB290-96 - 1	TF0113	03.4.	ROS/CTD	03:19	54°55.49‘N	13°30.06‘E	45.0	
EMB290-96 - 2			Secci disk					
EMB290-96 - 3			Apstein 20					
EMB290-96 - 4			WP-2					
EMB290-97 - 1	TF0030	03.4.	ROS/CTD	07:01	54°43.40‘N	12°47.04‘E	19.7	
EMB290-97 - 2			Apstein 20					
EMB290-98 - 1	TF0046	03.4.	ROS/CTD	10:09	54°28.19‘N	12°14.55‘E	25.7	
EMB290-98 - 2			Secci disk					
EMB290-98 – 3			Apstein 20					
EMB290-98 – 4-6			WP-2					3 x WP-2
EMB290-99 - 1	TF0012	03.4.	ROS/CTD	13:51	54°18.87’N	11°33.04’E	21.5	
EMB290-99 - 2			Secci disk					
EMB290-99 - 3			Apstein 20					
EMB290-99 - 4			WP-2					

7.2 Profile Station List

Station No.	Profile Station No.	Date	Time	Latitude	Longitude	Max. Depth	Bottom	Profile numbers
EMB		2015	h	[°N]	[°W]	[m]	[m]	
EMB290-1 - 1	01	23.3.	8:15	54°13.87'N	12°04.48'E	12.8	12.8	V001F01
EMB290-2 - 1	02	23.3.	11:03	54°24.88'N	11°36.96'E	25.1	25.1	V002F01
EMB290-3 - 1	03	23.3.	12:47	54°33.13'N	11°19.35'E	28.2	28.2	V003F01
EMB290-4 - 1	04	23.3.	15:16	54°39.54'N	10°45.88'E	19.9	19.9	V004F01
EMB290-5 - 1	05	23.3.	17:06	54°35.99'N	10°27.02'E	15.0	15.0	V005F01
EMB290-6 - 1	06	23.3.	20:27	54°35.70'N	11°00.78'E	24.9	24.9	V006F01
EMB290-7 - 1	07	23.3.	22:43	54°28.40'N	11°28.92'E	23.7	23.7	V007F01
EMB290-8 - 1	08	24.3.	01:28	54°06.60'N	11°10.49'E	20.3	20.3	V008F01
EMB290-8 - 2	09	24.3.	01:57	54°06.60'N	11°10.49'E	20.3	20.3	V008F02
EMB290-9 - 1	10	24.3.	04:08	54°18.93'N	11°33.01'E	21.7	21.7	V009F01
EMB290-10 - 1	11	24.3.	06:12	54°23.51'N	11°49.43'E	19.2	19.2	V010F01
EMB290-11 - 1	12	24.3.	07:27	54°24.39'N	12°03.68'E	16.2	16.2	V011F01
EMB290-12 - 1	13	24.3.	08:37	54°28.19'N	12°14.54'E	25.8	25.8	V012F01
EMB290-13 - 1	14	24.3.	10:16	54°36.30'N	12°19.92'E	17.0	17.0	V013F01
EMB290-14 - 1	15	24.3.	11:09	54°38.99'N	12°26.99'E	14.7	14.7	V014F01
EMB290-15 - 1	16	24.3.	12:27	54°41.81'N	12°42.08'E	18.2	18.2	V015F01
EMB290-16 - 1	17	24.3.	13:18	54°43.40'N	12°47.00'E	19.9	19.9	V016F01
EMB290-17 - 1	18	24.3.	14:45	54°47.68'N	13°03.52'E	27.3	27.3	V017F01
EMB290-18 - 1	19	24.3.	16:00	54°51.63'N	13°16.60'E	42.5	42.5	V018F01
EMB290-19 - 1	20	24.3.	17:17	54°55.48'N	13°30.03'E	45.0	45.0	V019F01
EMB290-19 - 2	21	24.3.	18:03	54°55.49'N	13°30.00'E	45.2	45.2	V019F02
EMB290-20 - 1	22	24.3.	20:08	54°48.16'N	13°57.55'E	38.1	38.1	V020F01
EMB290-21 - 1	23	24.3.	21:06	54°52.69'N	13°51.49'E	43.6	43.6	V021F01
EMB290-22 - 1	24	24.3.	22:11	54°59.40'N	13°46.18'E	45.0	45.0	V022F01
EMB290-23 - 1	25	24.3.	23:07	55°01.50'N	13°36.41'E	44.3	44.3	V023F01
EMB290-24 - 1	26	25.3.	00:14	55°04.09'N	13°48.80'E	44.3	44.3	V024F01
EMB290-25 - 1	27	25.3.	01:15	55°03.77'N	13°59.29'E	45.0	45.0	V025F01
EMB290-26 - 1	28	25.3.	02:06	55°00.00'N	14°05.00'E	46.1	46.1	V026F01
EMB290-26 - 5	29	25.3.	02:57	55°00.00'N	14°04.96'E	46.1	46.1	V026F02
EMB290-27 - 1	30	25.3.	04:26	55°09.97'N	14°15.05'E	44.6	44.6	V027F01
EMB290-28 - 1	31	25.3.	06:03	55°15.40'N	14°29.47'E	42.7	42.7	V028F01
EMB290-29 - 1	32	25.3.	08:11	55°27.99'N	14°42.97'E	68.2	68.2	V029F01
EMB290-30 - 1	33	25.3.	09:34	55°27.97'N	14°42.92'E	75.4	75.4	V030F01
EMB290-31 - 1	34	25.3.	11:01	55°29.74'N	15°05.57'E	84.6	84.6	V031F01
EMB290-32 - 1	35	25.3.	11:59	55°27.22'N	15°14.04'E	91.8	91.8	V032F01
EMB290-33 - 1	36	25.3.	12:59	55°23.00'N	15°20.01'E	91.1	91.1	V033F01
EMB290-34 - 1	37	25.3.	13:58	55°20.81'N	15°27.98'E	93.2	93.2	V034F01
EMB290-35 - 1	38	25.3.	14:55	55°19.84'N	15°36.86'E	95.0	95.0	V035F01
EMB290-36 - 1	39	25.3.	16:05	55°18.10'N	15°47.80'E	94.9	94.9	V036F01
EMB290-37 - 1	40	25.3.	17:15	55°14.99'N	15°58.99'E	89.6	89.6	V037F01
EMB290-37 - 8	41	25.3.	18:29	55°14.99'N	15°58.97'E	89.3	89.3	V037F02
EMB290-38 - 1	42	26.3.	16:08	55°13.28'N	16°09.96'E	82.5	82.5	V038F01
EMB290-39 - 1	43	26.3.	17:07	55°15.51'N	16°19.19'E	65.1	65.1	V039F01
EMB290-40 - 1	44	26.3.	18:00	55°17.81'N	16°25.83'E	56.4	56.4	V040F01
EMB290-41 - 1	45	26.3.	18:36	55°17.00'N	16°29.93'E	60.7	60.7	V041F01
EMB290-42 - 1	46	26.3.	19:31	55°15.67'N	16°38.29'E	68.6	68.6	V002F01
EMB290-43 - 1	47	26.3.	20:28	55°14.22'N	16°46.39'E	77.1	77.1	V043F01
EMB290-44 - 1	48	26.3.	21:22	55°13.70'N	16°54.84'E	85.7	85.7	V044F01
EMB290-45 - 1	49	26.3.	22:17	55°12.98'N	17°03.98'E	91.3	91.3	V045F01
EMB290-46 - 1	50	26.3.	23.44	55°15.13'N	17°21.15'E	88.7	88.7	V046F01
EMB290-47 - 1	51	27.3.	01:02	55°17.17'N	17°55.82'E	83.1	83.1	V047F01
EMB290-48 - 1	52	27.3.	02:40	55°18.41'N	17°55.82'E	74.3	74.3	V048F01
EMB290-49 - 1	53	27.3.	04:25	55°19.58'N	18°15.03'E	78.2	78.2	V049F01
EMB290-50 - 1	54	27.3.	06:02	55°26.46'N	18°19.24'E	87.4	87.4	V050F01
EMB290-51 - 1	55	27.3.	07:32	55°33.01'N	18°24.00'E	89.4	89.4	V051F01
EMB290-51 - 2	56	27.3.	07:34	55°33.02'N	18°23.99'E	89.8	89.8	V051F02
EMB290-52 - 1	57	27.3.	08:52	55°37.97'N	18°35.99'E	95.0	95.0	V052F01

Station No.	Profile Station No.	Date	Time	Latitude	Longitude	Max. Depth	Bottom	Profile numbers
EMB		2015	h	[°N]	[°W]	[m]	[m]	
EMB290-53 - 1	58	27.3.	10:00	55°43.63‘N	18°45.93‘E	92.0	92.0	V053F01
EMB290-54 - 1	59	27.3.	11:34	55°52.00‘N	18°38.44‘E	114.1	114.1	V054F01
EMB290-55 - 1	60	27.3.	12:48	55°50.43‘N	18°51.97‘E	101.2	101.2	V055F01
EMB290-56 - 1	61	27.3.	14:18	55°57.54‘N	19°02.77‘E	112.1	112.1	V056F01
EMB290-57 - 1	62	27.3.	15:45	56°05.00‘N	19°10.00‘E	124.7	124.7	V057F01
EMB290-58 - 1	63	27.3.	17:15	56°14.08‘N	19°18.08‘E	132.5	132.5	V058F01
EMB290-59 - 1	64	27.3.	18:35	56°20.80‘N	19°22.76‘E	134.8	134.8	V059F01
EMB290-60 - 1	65	27.3.	20:02	56°29.51‘N	19°28.91‘E	144.0	144.0	V060F01
EMB290-61 - 1	66	27.3.	21:27	56°37.99‘N	19°35.04‘E	145.7	145.7	V061F01
EMB290-62 - 1	67	28.3.	06:00	57°03.09‘N	18°08.15‘E	6.9	6.9	F062S01
EMB290-62 - 2	68	28.3.	11:25	57°09.83‘N	17°17.67‘E	58.5	58.5	V062F01
EMB290-63 - 1	69	28.3.	12:49	57°06.98‘N	17°40.05‘E	110.2	110.2	V063F01
EMB290-64 - 1	70	28.3.	17:32	57°42.96‘N	17°22.03‘E	141.8	141.8	V064F01
EMB290-65 - 1	71	28.3.	20:41	57°59.95‘N	18°00.03‘E	166.8	166.8	V065F01
EMB290-66 - 1	72	28.3.	23:11	58°19.52‘N	18°04.09‘E	160.3	160.3	V066F01
EMB290-67 - 1	73	29.3.	02:35	58°42.68‘N	18°40.14‘E	250.0	250.0	V067F01
EMB290-68 - 1	74	29.3.	04:47	58°46.94‘N	19°06.02‘E	133.2	133.2	V068F01
EMB290-69 - 1	75	29.3.	07:46	58°51.91‘N	19°44.65‘E	162.0	162.0	V069F01
EMB290-70 - 1	76	29.3.	10:02	58°59.75‘N	20°09.55‘E	145.0	145.0	V070F01
EMB290-71 - 1	77	29.3.	11:31	58°52.99‘N	20°18.98‘E	166.1	166.1	V071F01
EMB290-72 - 1	78	29.3.	12:48	58°45.97‘N	20°19.83‘E	194.1	194.1	V072F01
EMB290-73 - 1	79	29.3.	14:07	58°38.45‘N	20°20.68‘E	165.5	165.5	V073F01
EMB290-74 - 1	80	29.3.	16:00	58°26.47‘N	20°20.03‘E	123.3	123.3	V074F01
EMB290-75 - 1	81	29.3.	17:23	58°20.97‘N	20°08.79‘E	122.0	122.0	V075F01
EMB290-76 - 1	82	29.3.	19:05	58°10.96‘N	20°02.96‘E	163.3	163.3	V076F01
EMB290-77 - 1	83	29.3.	21:01	57°59.99‘N	19°54.05‘E	196.2	196.2	V077F01
EMB290-77 - 2	84	29.3.	22:11	58°00.00‘N	19°53.99‘E	196.4	196.4	V077F01
EMB290-78 - 1	85	29.3.	23:33	57°50.97‘N	19°48.98‘E	172.4	172.4	V078F01
EMB290-79 - 1	86	29.3.	00:58	57°42.88‘N	19°51.22‘E	130.2	130.2	V079F01
EMB290-81 - 1	88	30.3.	17:45	57°33.78‘N	18°51.55‘E	19.1	19.1	F081S01
EMB290-81 - 2	89	31.3.	02:05	57°19.31‘N	20°02.93‘E	241.4	241.4	V081F01
EMB290-82 - 1	90	31.3.	03:43	57°12.61‘N	19°55.88‘E	231.4	231.4	V082F01
EMB290-83 - 1	91	31.3.	05:28	57°04.53‘N	19°45.21‘E	217.1	217.1	V083F01
EMB290-84 - 1	92	31.3.	08:00	57°04.30‘N	19°49.85‘E	210.0	210.0	V084F01
EMB290-85 - 1	93	31.3.	10:19	57°19.21‘N	20°03.04‘E	241.4	241.4	V085F01
EMB290-85 - 4	94	31.3.	11:31	57°19.19‘N	20°03.00‘E	242.9	242.9	V085F02
EMB290-85 - 5	95	31.3.	12:35	57°19.19‘N	20°03.04‘E	241.4	241.4	V085F03
EMB290-85 - 6	96	31.3.	13:59	57°19.25‘N	20°02.98‘E	241.4	241.4	V085F04
EMB290-85 - 7	97	31.3.	15:11	57°19.23‘N	20°02.98‘E	241.4	241.4	V085F05
EMB290-85 - 8	98	31.3.	16:07	57°19.21‘N	20°02.97‘E	242.5	242.5	V085F06
EMB290-85 - 9	99	31.3.	16:36	57°19.20‘N	20°03.01‘E	241.4	241.4	V085F07
EMB290-86 - 1	100	31.3.	18:08	57°21.97‘N	20°20.02‘E	221.4	221.4	V086F01
EMB290-87 - 1	101	31.3.	19:27	57°28.19‘N	20°15.57‘E	208.6	208.6	V087F01
EMB290-88 - 1	102	31.3.	21:00	57°36.98‘N	20°10.00‘E	144.9	144.9	V088F01
EMB290-89 - 1	103	31.3.	23:27	57°19.31‘N	20°02.50‘E	241.4	241.4	F089S01
EMB290-89 - 2	104	01.4.	07:00	57°02.64‘N	21°16.89‘E	18.3	18.3	V089F01
EMB290-90 - 1	105	01.4.	10:07	56°50.24‘N	20°41.11‘E	56.4	56.4	F090S01
EMB290-90 - 2	106	01.4.	19:55	57°05.09‘N	18°95.44‘E	103.5	103.5	V090F01
EMB290-91 - 1	107	02.4.	02:20	56°52.57‘N	17°23.33‘E	95.7	95.7	V091F01
EMB290-92 - 1	108	02.4.	04:35	56°37.49‘N	17°07.85‘E	77.4	77.4	V092F01
EMB290-93 - 1	109	02.4.	11:47	55°45.70‘N	16°17.42‘E	62.4	62.4	V093F01
EMB290-94 - 1	110	02.4.	14:02	55°30.02‘N	16°00.08‘E	79.5	79.5	V094F01
EMB290-95 - 1	111	02.4.	16:00	55°14.96‘N	15°58.95‘E	90.3	90.3	V095F01
EMB290-96 - 1	112	03.4.	03:19	54°55.49‘N	13°30.06‘E	45.0	45.0	V096F01
EMB290-97 - 1	113	03.4.	02:01	54°43.40‘N	12°47.04‘E	19.7	19.7	V097F01
EMB290-98 - 1	114	03.4.	10:09	54°28.19‘N	12°14.55‘E	25.7	25.8	V098F01
EMB290-99 - 1	115	03.4.	13:51	54°18.87’N	11°33.04’E	21.5	21.5	V099F01

7.3 Sample Station List

Station No. EMB290_x	Institute-Station-Number	Sichtiefe	O_2	H_2S	PO_4	NO_3	NO_2	SiO_4	NH_4	P-Total	N-Total	POM/DOM	DNA	Phyto-WS	Chla	Phyto-Netz	Zooplalnkto
1	TFO5	1	1	-	3	3	3	3	3	2	2	2	-	-	-	-	-
2	TF0011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TF0010	-	1	-	4	4	4	4	-	-	-	-	-	-	-	-	-
4	TF0361	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
5	TF0360	1	1	-	3	3	3	3	3	3	3	3	-	3	5	3	1
6	TF0014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TF0013	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	TF0022	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	TF0012	1	1	-	4	4	4	4	4	3	3	3	2	3	5	2	2
10	TF0017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	TF0041	-	1	-	3	3	3	3	-	-	-	-	-	-	-	-	-
12	TF0046	1	1	-	4	4	4	4	-	-	-	-	-	2	6	2	2
13	TF0033	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TF0002	-	3	-	3	3	3	3	-	-	-	-	-	-	-	-	-
15	TF0001	-	3	-	3	3	3	3	-	-	-	-	-	-	-	-	-
16	TF0030	-	1	-	4	4	4	4	-	-	-	-	-	3	5	2	-
17	TF0115	-	4	-	4	4	4	4	-	-	-	-	-	-	-	-	-
18	TF0114	-	1	-	5	5	5	5	-	-	-	-	-	-	-	-	-
19	TF0113	1	7	-	7	7	7	7	7	4	4	4	2	3	6	2	2
20	TF0112	-	1	-	4	4	4	4	-	-	-	-	-	-	-	-	-
21	ArkonaBoje	-	2	-	2	2	2	2	-	-	-	-	-	-	-	-	-
22	TF0122	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	TF0105	-	1	-	5	5	5	5	-	-	-	-	-	-	-	-	-
24	TF0104	-	1	-	5	5	5	5	-	-	-	-	-	-	-	-	-
25	TF0103	-	1	-	5	5	5	5	-	-	-	-	-	-	-	-	-
26	TF0109	1	-	-	5	5	5	5	5	4	4	4	-	3	5	2	2
27	TF0145	-	1	-	5	5	5	5	-	-	-	-	-	-	-	-	-
28	TF0144	-	2	-	5	5	5	5	-	-	-	-	-	-	-	-	-
29	TF0140	-	1	-	6	6	6	6	-	-	-	-	-	-	-	-	-
30	TF0206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	TF0207	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	TF0208	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TF0200	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
34	TF0209	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	TF0211	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	TF0212	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	TF0213	1	10	3	10	10	10	10	10	6	6	6	-	3	6	3	7
38	TF0221	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	TF0225	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	TF0226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	TF0224	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	TF0227	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	TF0228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	TF0229	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	TF0222	-	7	-	7	7	7	7	-	-	-	-	-	-	-	-	-
46	TF0266	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	TF0267	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	TF0268	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	TF0256	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	TF0257	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	TF0259	-	7	2	7	7	7	7	7	-	-	-	-	3	5	2	-
52	TF0255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	TF0258	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	TF0252	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	TF0253	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	TF0265	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	TF0250	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Station No. EMB290_x	Institute-Station-Number	Sichtiefe	O_2	H_2S	PO_4	NO_3	NO_2	SiO_4	NH_4	P-Total	N-Total	POM/DOM	DNA	Phyto-WS	Chla	Phyto-Netz	Zooplalnkto
58	TF0262	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	TF0263	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	TF0261	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	TF0260	-	9	4	9	9	9	9	9	-	-	-	-	-	-	-	-
62	SF032WGB-SF025WGB	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63	TF0245	-	8	4	8	8	8	8	8	-	-	-	-	-	-	-	-
64	TF0242	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	TF0240	-	7	5	10	10	10	10	10	-	-	-	-	-	-	-	-
66	wGB-3	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
67	nGB-1	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
68	TF0283	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
69	nGB-2	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
70	TF0288	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71	TF0282	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
72	TF0289	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	TF0279	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
74	TF0285	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
75	TF0278	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
76	TF0277	1	7	9	16	16	16	16	16	6	6	6	-	-	-	-	-
77	TF0286	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	TF0290	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
79	TF0287	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	ARGO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	SF001EGB TF0271	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	TF0275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	Gotland SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	TF0272	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	TF0271	1	29	13	21	21	21	21	34	17	17	17	52	3	6	2	
86	GotlandNE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	TF0276	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
88	TF0270	-	1	-	-	-	-	-	-	3	3	3	-	-	-	-	-
89	TF0271-SF022EGB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	TF0411-TF0403	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	WGB-1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92	WGB-SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	BB_N	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	TF0220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	TF0213	-	6	1	7	7	7	7	-	-	-	-	-	3	5	3	7
96	TF0113	-	1	-	-	-	-	-	-	-	-	-	-	3	6	2	1
97	TF0030	-	1	-	-	-	-	-	-	-	-	-	-	5	5	2	-
98	TF0046	-	1	-	-	-	-	-	-	-	-	-	-	5	6	2	2
99	TF0012	-	1	-	-	-	-	-	-	-	-	-	-	5	5	2	1

Numbers refer to the number of measurements taken.

8 Data and Sample Storage and Availability

All data will be stored on a data repository in the IOW immediately after the cruise. The processed and validated data will be stored in the ODIN data base (https://odin2.io-warnemuende.de). According to the IOW data policy and to facilitate the international exchange of data, all metadata will be made available under the international ISO 19115 standards for georeferenced metadata. Afterwards the data will be delivered to national and international databases (MUDAB, HELCOM, ICES).

The access to the data itself will be restricted for three years after data acquisition to protect the research process, including scientific analysis and publication. After that period the data becomes openly available to any person or any organization who requests them, under the international Creative Commons (CC, https://creativecommons.org/licenses/by/4.0/) data license of type CC BY 4.0. For further details refer to the IOW data policy document.

Table 8.1 Overview of data availability

Type	Database	Available	Free Access	Contact
Hydrographic data	ODIN	01.05.2022	01.05.2025	volker.mohrholz@io-warnemuende.de
Nutrient data	ODIN	01.05.2022	01.05.2025	joachim.kuss@io-warnemuende.de
Biological data	MUDAB	01.08.2023	01.08.2023	Joerg.dutz@io-warnemuende.de

9 Acknowledgements

We would like to thank the captain and the crew of the RV Elisabeth Mann Borgese for their support during the cruise, as well as the cruise participants from the Leibniz Institute for Baltic Sea Research Warnemünde who carried out the measurements as part of the HELCOM's Baltic Sea monitoring program and the IOW's long-term measuring program. We are also grateful to all colleagues involved in the preparations of the cruise. The cruise was funded by institutional funds of the IOW and the Federal Maritime and Hydrographic Agency, Hamburg and Rostock

10 References

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11 Abbreviations

None.

12 Appendices

12.1 ScanFish transects

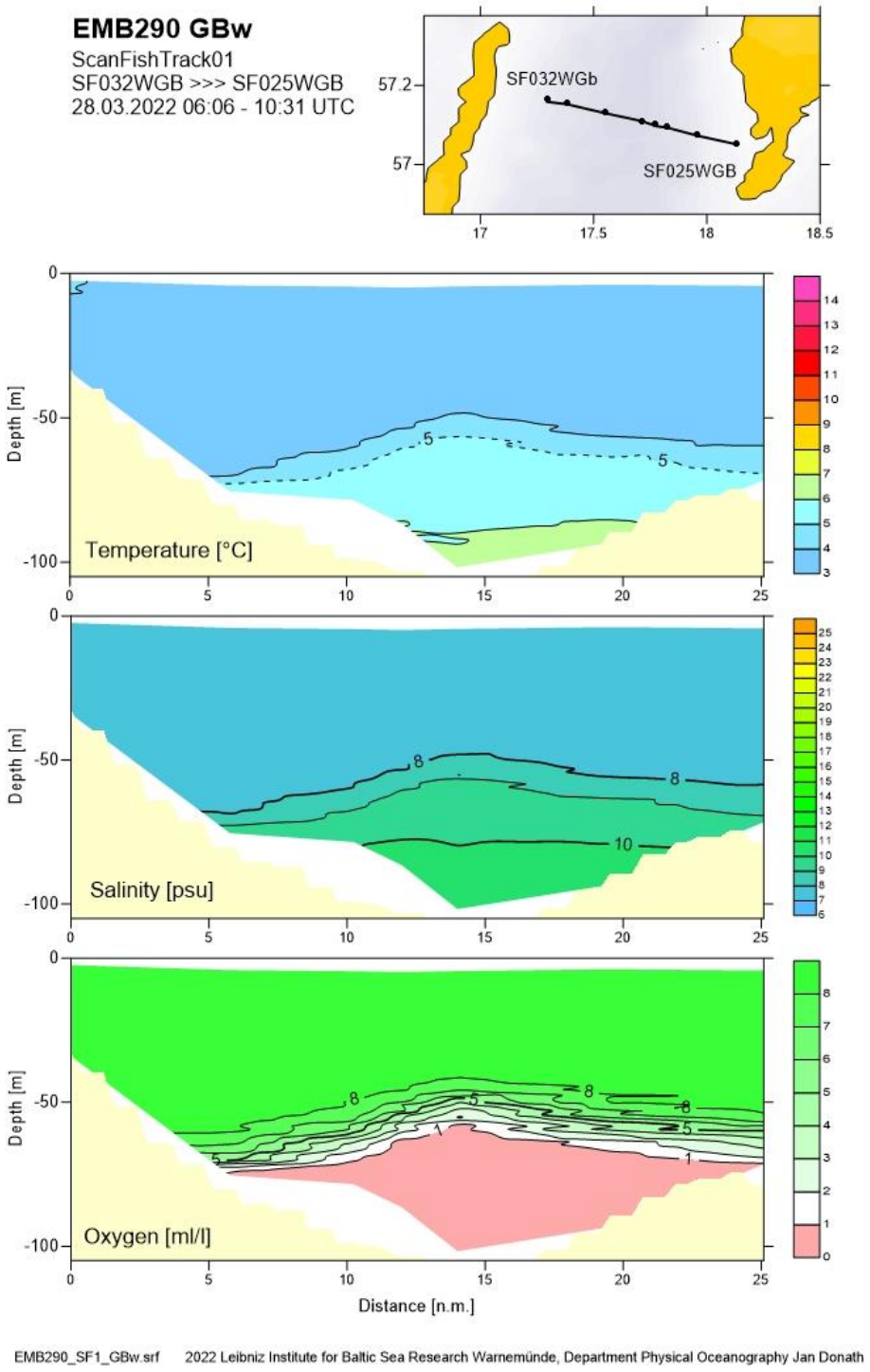

Fig. 12.1 Temperature (°C), salinity (PSU) and dissolved oxygen concentration (ml/L) distribution along the zonal transect at the southern rim of the Eastern Gotland Basin based on the ScanFish data during the transect SF032WGB- SF025WGB (28.03.2022).

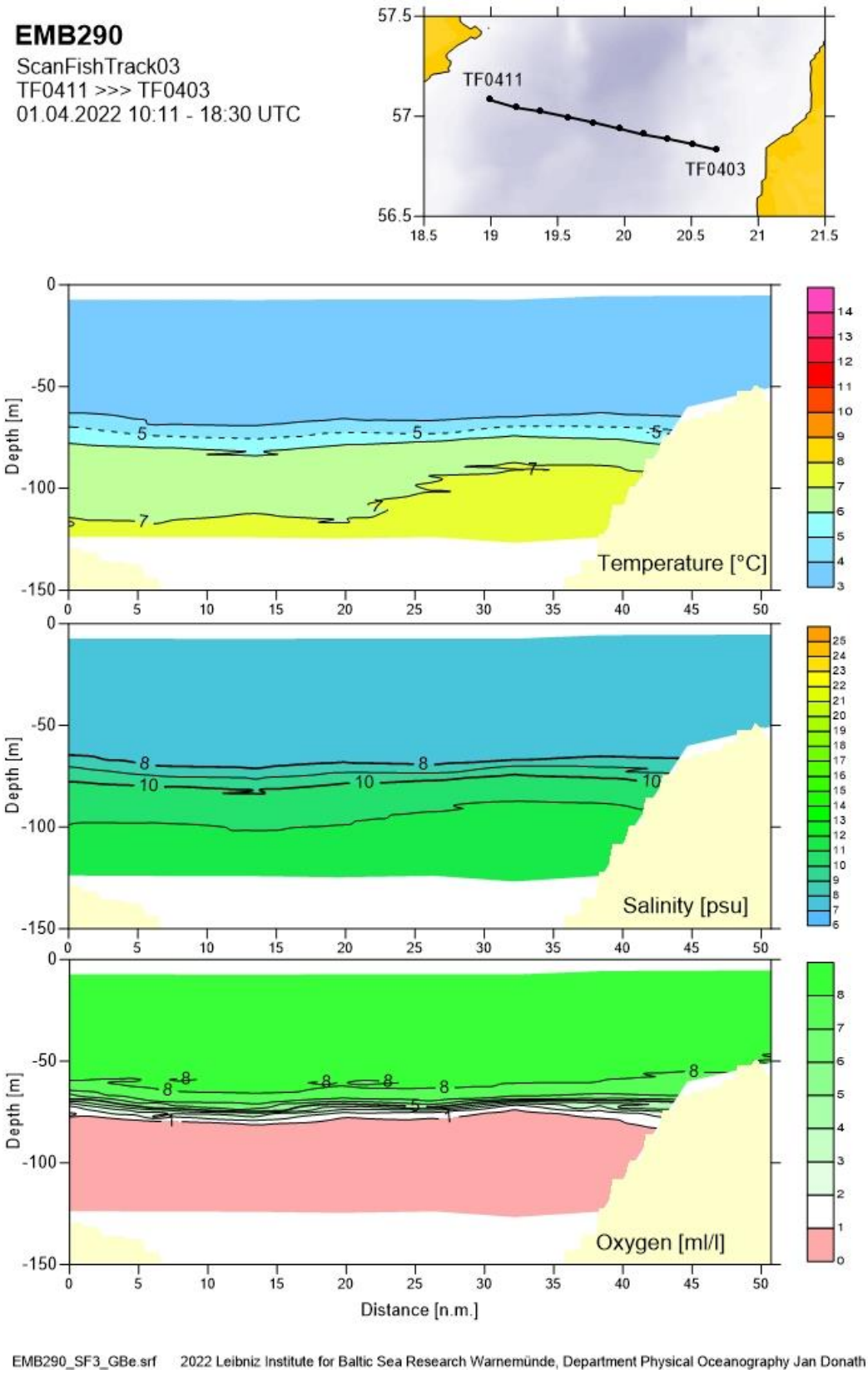

Fig. 12.2 Temperature (°C), salinity (PSU) and dissolved oxygen concentration (ml/L) distribution along the zonal transect at the southern rim of the Eastern Gotland Basin based on the ScanFish data during the transect TF0403- TF0411 (01.04.2022).

12.2 Sketch of the deployed mooring

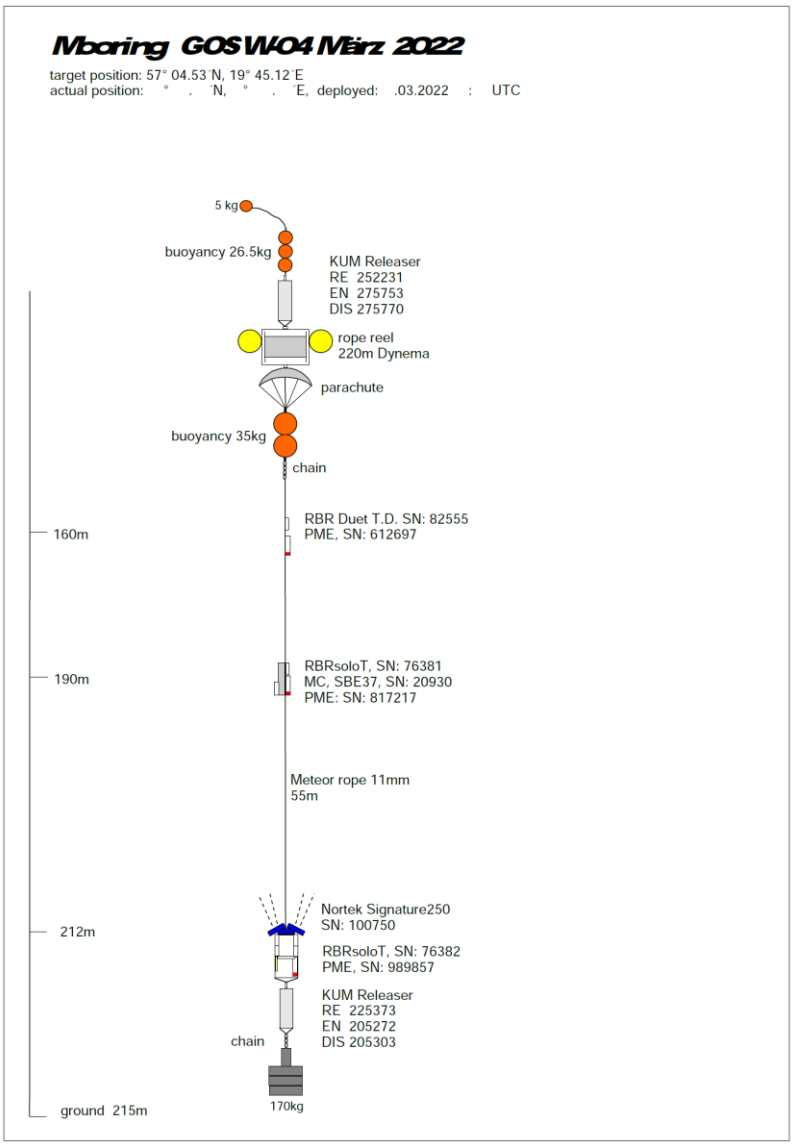

Fig. 12.3 Sketch of the mooring deployed at 57°04.53'N, 19°45.21'E in the central Gotland Basin.