

ELISABETH MANN BORGESE – Berichte

***Baltic Monitoring Programme (BMP) of HELCOM and
IOW's long-term observations, western Baltic to central Baltic Proper***

Cruise No. EMB286

2022-02-07 – 2022-02-17

Rostock-Marienehe to Rostock-Marienehe (Germany)

ACRONYM: HELCOM /long-term obs



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2022

Table of Contents

1	Cruise Summary	3
1.1	Summary in English.....	3
1.2	Zusammenfassung.....	3
2	Participants.....	4
2.1	Principal Investigators.....	4
2.2	Scientific Party.....	4
2.3	Participating Institutions	4
3	Research Program.....	4
3.1	Description of the Work area	4
3.2	Aims of the cruise	4
3.3	Agenda of the cruise	5
4	Narrative of the Cruise	5
5	Preliminary Results.....	6
5.1	Oxygen situation in the deep water.....	6
5.2	Nutrient situation.....	8
5.3	Additional sampling.....	9
6	Ship's Meteorological Station	9
7	Station List.....	9
7.1	Full station list.....	9
7.2	CTD measurements list.....	11
7.2	Profile list – organic sampling.....	12
7.3	Station list – sediment sampling.....	13
8	Data and Sample Storage and Availability.....	13
9	References.....	13
	Appendix Water sampling-parameters and number.....	14

1 Cruise Summary

1.1 Summary in English

EMB286 campaign is the first one in a series of five cruises to study the spatial and temporal variations of the Baltic Sea ecosystem by numerous hydrographic, chemical and biological parameters. It is conducted in the frame of the COMBINE Programme of the Helsinki Commission (HELCOM) as well as measurements outside the German territorial waters for the IOW's long term data programme, performed since 1969. The data acquired are used for the regular national and international assessments of the state of the Baltic Sea, and provide the scientific basis for measures to be taken for the protection of the ecosystem Baltic Sea.

During this expedition 53 CTD casts were measured from the western to the central Baltic Sea. Water sampling at discrete depths was done for measuring numerous parameters of nutrients and pollutants, as well as extraction of phytoplankton and zooplankton samples. Along the transects roughly 300 l surface water were filtered for analysing organic pollutants. Sediment sampling of the uppermost 3-5 cm was done at selected stations in the German EEZ for analysis of organic contaminants.

The cruise was carried out under windy conditions, 9 out of 12 days with more than 6 Bft. Over two days the ship hid between Sweden and Oeland Island waiting for the weather/sea conditions to improve. Because of the forecast after the work interruption the ship headed towards Rostock and only the repeat stations were occupied. The cruise terminated in the evening of 16th february, one day earlier than scheduled.

1.2 Zusammenfassung

Die EMB286 Messkampagne ist die erste in einer Serie von fünf Fahrten zur Untersuchung der räumlichen und zeitlichen Veränderungen des Ökosystems der Ostsee anhand zahlreicher hydrographischer, chemischer und biologischer Parameter. Sie wird im Rahmen des COMBINE-Programms der Helsinki-Kommission (HELCOM) sowie im Rahmen von Messungen außerhalb der deutschen Hoheitsgewässer für das Langzeitdatenprogramm des IOW durchgeführt, das seit 1969 läuft. Die gewonnenen Daten werden für die regelmäßige nationale und internationale Bewertung des Zustands der Ostsee genutzt und bilden die wissenschaftliche Grundlage für Maßnahmen zum Schutz des Ökosystems Ostsee.

Während der Expedition wurden 53 CTD-Profilen von der westlichen bis zur zentralen Ostsee ausgehend gemessen. Es wurden Wasserproben in verschiedenen Tiefen entnommen, um den Gehalt an Nähr- und Schadstoffen zu messen und Proben von Phytoplankton und Zooplankton zu gewinnen. Entlang der Schnitte wurden etwa 300 l Oberflächenwasser für die Analyse organischer Schadstoffe gefiltert. An ausgewählten Stationen in der deutschen AWZ wurden Sedimentproben aus den obersten 3-5 cm für die Analyse organischer Schadstoffe an ausgewählten Stationen entnommen.

Die Fahrt fand unter windigen Bedingungen statt, an 9 von 12 Tagen mit mehr als 6 Bft. Zwei Tage lang hielt sich das Schiff zwischen Schweden und der Insel Oeland auf, um auf eine Verbesserung der Wetter-/Seebedingungen zu warten. Aufgrund der Vorhersage nach der Arbeitsunterbrechung steuerte das Schiff Rostock an und nur auf den Wiederholungsstationen wurden gemessen. Die Reise endete am Abend des 16. Februars, einen Tag früher als geplant.

2 Participants

2.1 Principal Investigators

Name	Institution
Waniek, Joanna, Prof. Dr.	IOW

2.2 Scientific Party

Name	Discipline	Institution
Waniek, Joanna Prof. Dr.	Physical Oceanography/chief scientist	IOW
Wagner, Robert Dr.	Physical Oceanography	IOW
Donath, Jan	Physical Oceanography	IOW
Fechtel, Christin	Biological Oceanography	IOW
Pirrung, Sarah	Biological Oceanography	IOW
Hand, Ines	Marine Chemistry	IOW
Kreuzer, Lars	Marine Chemistry	IOW
Dierken, Madleen	Marine Chemistry	IOW
Bimberg, Nelly	Marine Chemistry	IOW
Cramer, Friederike	Marine Chemistry	IOW
Marquez Lencina Avila, Janine, Dr	Marine Chemistry	IOW

2.3 Participating Institutions

IOW Leibniz Institute for Baltic Sea Research Warnemünde, Germany

3 Research Program

3.1 Description of the Work Area

The investigation area of the cruise EMB286 covered the western and central Baltic from the Kiel Bight to the northern Bornholm Basin (Fig. 3.1). The majority of stations is located along the talweg transect of the Baltic Sea, describing the hydrographic conditions in all basins on the pathway of saltwater inflows from the North Sea (Fig. 3.1; Fig. 5). These inflows are the solely source for ventilation of the deep basins.

3.2 Aims of the Cruise

The performed meteorological, hydrographic, chemical and biological sampling and measurements lead to an assessment of the actual winter situation of the Baltic Sea ecosystem from Kiel Bight to the northern Bornholm Basin. In the frame of the COMBINE Programme of the Helsinki Commission (HELCOM), national monitoring demands and scientific interest in long-term variations /trends (IOW's long-term data programme 1969-present), the acquired data will be used for regular national and international assessments of the state of the Baltic Sea (e.g. HELCOM 2018), and used in numerous publications, as well as will provide the scientific basis for measures to be taken for the protection of the ecosystem Baltic Sea.

3.3 Agenda of the cruise

The measurements in the western Baltic Sea during this cruise, were done on behalf of BSH as the German contribution to HELCOM (see also section 3.2). IOW runs five cruises each year for the annual Baltic Sea environmental assessment. EMB286 was the first cruise in 2022, whereas the stations along the talweg in the central Baltic Sea (Fig. 3.1) contribute to the long term data collection of the IOW.

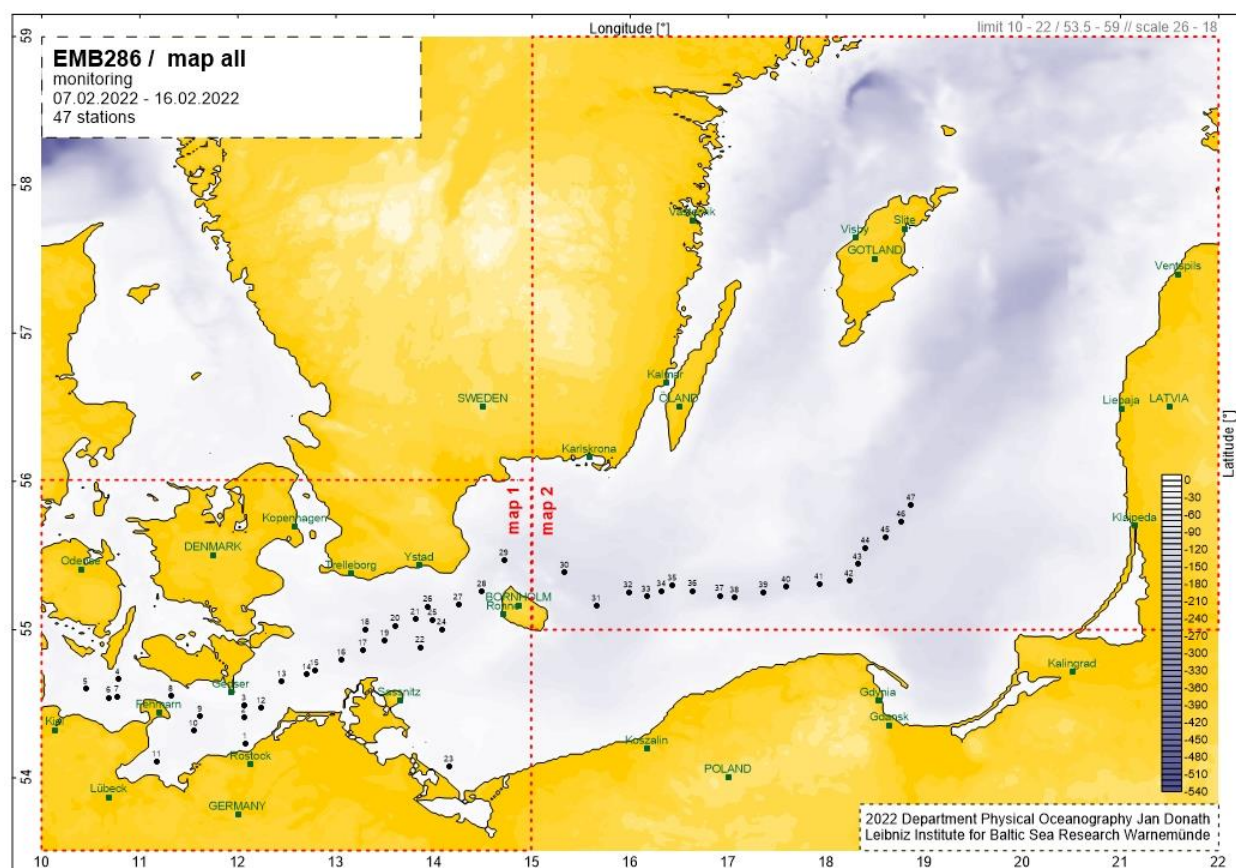


Fig. 3.1 Track chart of R/V Elisabeth Mann Borgese of cruise EMB286 including the occupied stations where CTD and MUC were deployed.

4 Cruise Narrative

Loading of equipment and the embarkation of the cruise participants took place on 7th of February 2022, with an early start at 7:30 at IOW. On arrival at the ship in Rostock-Marienehe first all participants had to take a Covid test, before being able to start working. After safety instruction late afternoon, the EMB departed from Rostock-Marienehe at 18:00 local time.

The ship headed towards Mecklenburg Bight, the weather forecast was moderate, 5-6°C, cloudy and westerly winds of 6 Bft, in gusts reaching 7 Bft. The station work started at station TF005, followed by TF0040 and TF0040 in the early evening hours. During the night to 08.02.2022 and during the day a number of stations in the western Baltic Sea (TF361, TF360; TF0010, TF0011, TF0012, TF0022, TF0046) was occupied, where hydrographic, phyto/zooplankton sampling and coring continued. 2 MUCs were taken close to Fehmarn (Fig. 3.1).

Initially the working conditions were good on 9th of February, but at station TF0069 the MUC was not deployed, as the sea conditions worsened (2 m waves). During the day winds were 7-8 Bft. We continued with the hydrographic work and arrived at station TF0113 at midday, continued with TF0104, TF0105 and ABBoje as well as ABBoje. On the next day (10.02.2022) EMB entered

the territorial waters of Denmark (TF0200, TF0214, TF 0213, TF 0221, TF 0225 and TF 0226). At night we entered the Polish waters and work at several stations (TF0227, TF0229, TF0222, TF0266, TF0267, TF0268, TF0256, TF0257, TF0259, TF0255, TF0258, TF0253).

The weather and sea conditions changed drastically during the day and the weather forecast did not promise any improvement. In contrast the weather/sea were expected to get worse (more than 8 Bft, and 3 m waves in the Gotland Basin), therefore we decided to hide and wait for improved conditions. Station work was terminated at station TF0253 in the afternoon on 11th February, and EMB headed close to the Swedish coast. There was no station work from afternoon 11th to 13th of February, actually until 14th of February midday. On 14th of February (12:00 UTC) we decided to head to station TF0213 and resume work. Station TF0213 was occupied on 15.02.2022 at 3 pm, we continued with TF0113, TF0030 till midnight. In the early morning on 16.02.2022 the last two repeated stations TF0045 and TD0012 were occupied and the station work terminated. EMB arrived in Rostock at 2 pm on 16th of February, and we started with cleaning the laboratories as well with packing the gear. From 8:00 in the morning to 10:45 (both local time) the loading of the gear into container and cars was carried out. The participants disembark and the cruise finished (Fig. 3.1).

5 Preliminary Results

The results presented in the following section are preliminary and not comprehensive. CTD data is quality checked and validated. The aim of this section is to give a first impression on the collected data set. An advanced data analysis will be integrated following the complete validation of the data set.

The vertical temperature and salinity distribution along the “Talweg” based on the sampled stations until the northern Bornholm Basin is shown in Fig. 3.1. The western part of the transect until Arkona Basin is occupied by water of 5°C in the entire water column and fully mixed. In the Bornholm Basin from a bottom to roughly 20 m above the seabed water with higher temperatures (up to 9°C) was observed. The water column was mixed down to 60 m in the deeper areas along the transect. High salinity (~25) was seen in the shallow western part, especially in the Mecklenburg Bight, there is further towards East indication of flow of high salinity water near to the bottom. In the Arkona Basin salinity of ~15 was observed close to the bottom, whereas in the Bornholm Basin salinity below 10 was measured (Fig. 5.1).

Dissolved oxygen concentrations measured along the “Talweg” are high in the entire water column, apart from the deep regions in the Bornholm Basin (Fig. 5.1), with concentrations between 9 ml/L at surface and 4 ml/L at 60 m. Close to the bottom in the Bornholm Basin depleted concentrations and at some stations H₂S was measured.

5.1 Oxygen situation in the deep water

The oxygen situation in the deep waters (>60 m water depth) show the ongoing stagnation period, which started after the phase of several ventilations due to the inflow events 2014-2017. There is no indication for new ventilation events. Hydrogen sulphide concentrations (expressed as negative oxygen equivalents) in the near-bottom layer were measured in the Bornholm Basin. In addition, figure 5.1 and 5.2 visualize the situation at stations sampled on this cruise along the “Talweg”. At depth below 70 m H₂S was detected with concentration up to -1.3 ml/L in the Bornholm Basin. An overview of measured bottom near values of dissolved oxygen and/or H₂S at key stations is shown in figure 5.1.

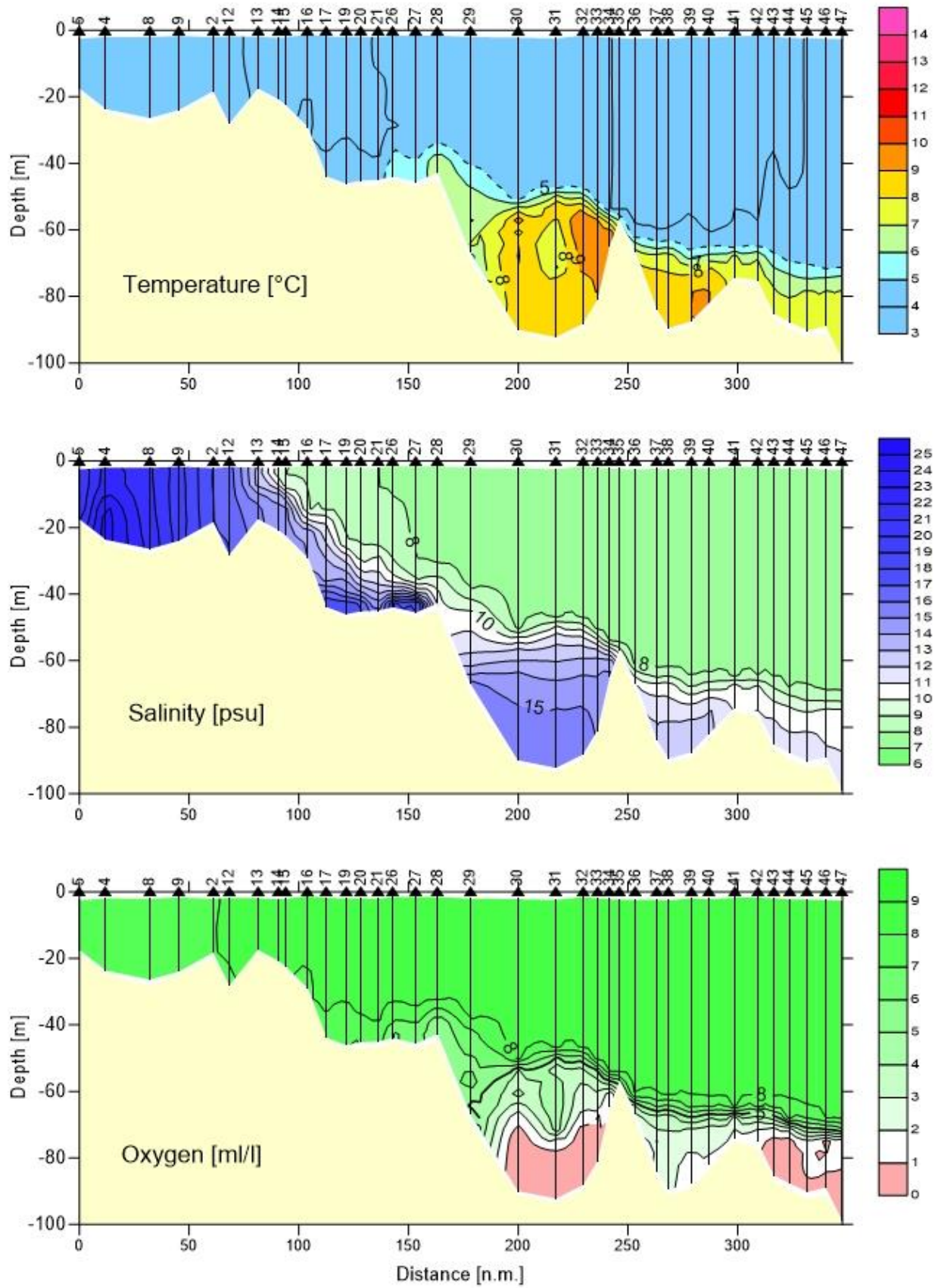


Fig. 5.1 Temperature, salinity and dissolved oxygen measured during EMB286.

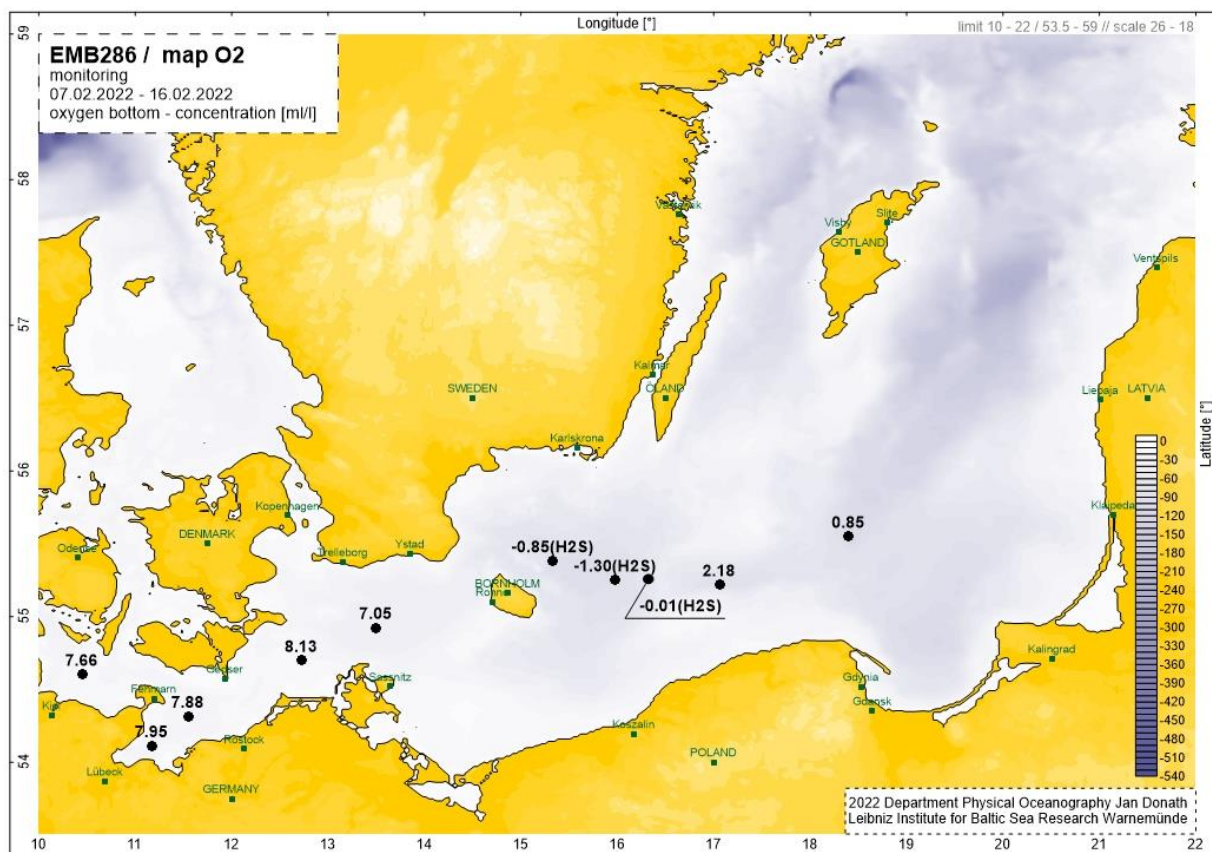


Fig. 5.2 Dissolved oxygen/hydrogen sulphide conditions in the bottom near layer for selected key stations (hydrogen sulphide was converted into negative oxygen equivalents).

5.2 Nutrient situation

The nutrient situation in the water column layer is typical for the winter season. In all key areas phosphate and nitrate values are on a high winter level, because the biological production did not start yet. There is no indication for end of the stagnation period in the deep basins, and no sign for ventilation of the basins by waters from the North Sea. H₂S occurred in Bornholm Basin (Fig. 5.2) in the 20 m above the sea bed.

Tab. 5.1 Surface water layer (about 3 m depth) - hydrographic and chemical properties.

Area /Date	Station Name /No.*	Temp. °C	Sal.	O ₂ (sensor) ml/l	O ₂ (titration) ml/l	PO4 µM	NO3 µM	SiO4 µM
Kiel Bight, 08.02.2022	TF0360 / 5	4.461	20.199	7.65 / 7.70	7.88	0.76	6.28	24.3
Meckl.Bight, 08.02.2022	TF0012 / 10	4.339	19.139	7.74 / 7.79	7.94	0.64	5.79	23.0
Darss Sill, 09.02.2022	TF0001 / 14	3.909	9.306	8.36 / 8.40	8.36	0.61	4.09	17.8
Arkona Basin, 09.02.2022	TF0113 / 19	3.879	8.601	8.50 / 8.55	8.50	0.57	2.89	15.4
Bornholm Deep, 10.02.2022	TF0213 / 32	4.167	7.659	8.34 / 8.31	8.55	0.63	2.94	15.5

Tab. 5.2 Deep water layer (bottom near depths) - hydrographic and chemical properties.

Area /Date	Station Name /No.*	Temp. °C	Sal.	O ₂ (sensor) ml/l	O ₂ (titration) ml/l	PO4 µM	NO3 µM	SiO4 µM
Kiel Bight, 08.02.2022	TF0360 / 5	4.52	20.938	7.49 / 7.53	7.66	0.76	6.32	23.2
Mecklenburg Bight, 08.02.2022	TF0012 / 10	4.331	19.359	7.66 / 7.71	7.88	0.65	5.71	22.6

Darss Sill, 09.02.2022	TF0001 / 14	3.919	14.385	8.04 / 8.09	8.13	0.69	5.34	19.7
Arkona Basin, 09.02.2022	TF0113 / 19	4.563	18.051	6.96 / 7.01	7.05	0.87	6.66	19.5
Bornholm Deep, 10.02.2022	TF0213 / 32	8.411	15.413	0.08 / 0.03	-1.30 *(H ₂ S)	7.30	n.d.	79.5

* Hydrogen sulphide was converted into negative oxygen equivalents; n.d. – no data/not determined

5.3 Additional sampling

Samples for phyto- and zooplankton as well as dissolved gases were collected for later analysis in home laboratory.

6 Ship's Meteorological Station

The weather conditions were harsh during the cruise influenced by a series of low pressure cells crossing northern Europe. The first 4 days (7-11.02) were characterized by wind between 6 and 7 Bft allowing for station work. The station work was interrupted on 11.02.2022 and we hid close to Sweden. On 13th of February weather conditions improved allowing to continue station work. However, the approaching extreme storms from NW forced the ship to head towards Rostock.

7 Station List EMB286

7.1 Full station list

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/ Recovery
EMB	IOW	2022		[UTC]	[°N]	[°E]	[m]	
EMB286_1-1	TF05	07.02.	CTD	20:51	54°13.8677	12°04.547	13.1	test
EMB286_1-2	TF05	07.02.	CTD	21:06	54°13.8677	12°04.547	13.1	
EMB286_1-3	TF05	07.02.	CTD	21:19	54°13.9000	12°04.5478	13.5	
EMB286_2-1	TF0041	07.02.	CTD	22:51	54°24.4064	12°03.7297	19.9	
EMB286_3-1	TF0040	07.02.	CTD	23:48	54°26.1772	12°04.1678	12.8	
EMB286_3-2	TF0040	07.02.	CTD	23:52	54°26.1772	12°04.1678	12.8	
EMB286_4-1	TF0361	08.02.	CTD	04:51	54°39.8821	54°39.8821	24.8	
EMB286_5-1	TF0360	08.02.	CTD	06:40	54°35.9933	10°26.9702	18.7	
EMB286_5-2	TF0360	08.02.	WP2 net	07:00	54°35.9933	10°26.9702	18.7	3 times
EMB286_6-1	FeMa2	08.02.	CTD	08:36	54°32.4989	10°41.1808	23.3	
EMB286_6-2	FeMa2	08.02.	MUC	09:25	54°32.4989	10°41.1808	23.3	sliced
EMB286_6-3	FeMa2	08.02.	vanVeen	09:45	54°32.4989	10°41.1808	23.3	3 times
EMB286_7-1	FeMa1	08.02.	CTD	10:28	54°32.9336	10°46.1938	23.4	
EMB286_7-2	FeMa1	08.02.	MUC	09:00	54°32.9336	10°46.1938	23.4	sliced
EMB286_7-3	FeMa1	08.02.	vanVeen	10:30	54°32.9336	10°46.1938	23.4	3 times
EMB286_8-1	TF0010	08.02.	CTD	14:16	54°33.0394	11°19.2610	28.2	O2 calibration
EMB286_8-2	TF0010	08.02.	CTD	14:27	54°33.0862	11°19.1992	28.3	
EMB286_8-3	TF0010	08.02.	CTD	14:52	54°33.0916	11°19.1925	28.5	O2 calibration
EMB286_8-4	TF0010	08.02.	MUC	15:15	54°33.0916	11°19.1925	28.5	0-2 cm
EMB286_9-1	TF011	08.02.	CTD	17:09	54°24.7841	11°37.0030	24.9	
EMB286_10-1	TF0012	08.02.	CTD	18:15	54°18.9080	11°32.9912	24.7	
EMB286_10-2	TF0012	08.02.	MUC	19:05	54°18.9080	11°32.9912	24.7	0-2 cm
EMB286_10-3	TF0012	08.02.	WP2 net	19:30	54°18.9080	11°32.9912	24.7	2 times
EMB286_11-1	TF0022	08.02.	CTD	21:13	54°06.6047	11°10.4867	23.3	
EMB286_12-1	TF0046	09.02.	CTD	01:37	54°28.1999	12°14.4749	21.0	
EMB286_12-1	TF0046	09.02.	WP2 net	02:03	54°28.1999	12°14.4749	21.0	3 times
EMB286_13-1	TF0002	09.02.	CTD	03:41	54°39.0200	12°27.0383	18.5	

EMB286_14-1	TF0001	09.02.	CTD	05:01	54°41.8000	12°42.3485	21.7	
EMB286_15-1	TF0030	09.02.	CTD	05:48	54°43.4248	12°47.0076	23.2	
EMB286_15-1	TF0030	09.02.	WP2 net	06:15	54°43.4248	12°47.0076	23.2	2 times
EMB286_16-1	TF0115	09.02.	CTD	07:34	54°47.6859	13°03.4535	30.2	
EMB286_17-1	TF0114	09.02.	CTD	08:48	54°51.6437	13°16.5083	44.9	
EMB286_18-1	TF0069	09.02.	CTD	09:58	55°00.0158	13°18.0866	46.4	
EMB286_18-2	TF0069	09.02.	CTD	10:10	55°00.0002	13°18.0184	47.2	
EMB286_18-3	TF0069	09.02.	CTD	10:16	55°00.0017	13°18.0071	46.3	O2 calibration
EMB286_18-4	TF0069	09.02.	MUC					Cancelled, bad weather
EMB286_19-1	TF0113	09.02.	CTD	12:46	54°55.4932	13°29.9849	47.0	
EMB286_19-2	TF0113	09.02.	CTD	13:42	54°55.4942	13°29.9949	46.3	
EMB286_19-3	TF0113	09.02.	CTD	14:10	54°55.4942	13°29.9949	46.3	4 times
EMB286_20-1	TF0105	09.02.	CTD	14:53	55°01.5078	13°36.4474	46.8	
EMB286_21-1	TF104	09.02.	CTD	16:04	55°04.0874	13°48.7946	46.6	
EMB286_22-1	ABBoje	09.02.	CTD	17:39	54°52.7586	13°51.7148	45.4	
EMB286_23-1	OBBoje	09.02.	CTD	22:33	54°04.5319	14°09.2645	15.1	
EMB286_23-1	OBBoje	09.02.	MUC	23:45	54°04.5319	14°09.2645	15.1	0-2 cm
EMB286_24-1	TF0109	10.02	CTD	04:36	54°59.9999	14°04.9964	48.1	
EMB286_24-2	TF0109	10.02	WP2 net	05:00	54°59.9999	14°04.9964	48.1	5 times
EMB286_25-1	TF0103	10.02.	CTD	06:11	55°03.8069	13°59.3377	47.1	
EMB286_26-1	TF0102	10.02.	CTD	07:06	55°09.3331	13°56.4875	44.9	
EMB286_27-1	TF0145	10.02.	CTD	08:31	55°10.0032	14°15.0115	47.2	
EMB286_28-1	TF0144	10.02.	CTD	09:48	55°15.4115	14°29.4464	45.2	
EMB286_29-1	TF0140	10.02.	CTD	11:30	55°27.9906	14°42.9821	69.6	
EMB286_30-1	TF0200	10.02.	CTD	13:43	55°22.9751	15°20.0324	91.0	O2 calibration
EMB286_30-2	TF0200	10.02.	CTD	13:52	55°22.990	15°20.0165	91.1	
EMB286_30-3	TF0200	10.02.	CTD	14:14	55°22.9984	15°20.0050	91.2	O2 calibration
EMB286_31-1	TF0214	10.02.	CTD	16:09	55°09.5900	15°39.6149	93.6	
EMB286_32-1	TF0213	10.02	CTD	17:48	55°14.9831	15°59.0003	89.8	
EMB286_32-2	TF0213	10.02	CTD	18:54	55°14.9831	15°59.0164	90.0	
EMB286_32-3	TF0213	10.02	WP2 net	19:30	55°14.9831	15°59.0164	90.0	10 times
EMB286_33-1	TF0221	10.02	CTD	21:17	55°13.3001	16°10.0427	82.3	
EMB286_34-1	TF0225	10.02	CTD	22:16	55°15.5361	16°19.2814	66.5	
EMB286_35-1	TF0226	10.02	CTD	23:08	55°17.7991	16°25.9204	58.2	
EMB286_36-1	TF0227	11.02	CTD	00:13	55°15.6795	16°38.3305	69.4	
EMB286_37-1	TF0229	11.02	CTD	01:11	55°13.7177	16°54.8161	85.66	
EMB286_38-1	TF0222	11.02	CTD	02:28	55°12.9892	17°03.9880	91.1	
EMB286_39-1	TF0266	11.02	CTD	03:55	55°15.0528	17°21.5730	89.3	
EMB286_40-1	TF0267	11.02	CTD	05:22	55°17.1638	17°35.613	83.4	
EMB286_41-1	TF0268	11.02	CTD	06:56	55°18.4562	17°55.8130	75.6	
EMB286_42-1	TF0256	11.02	CTD	08:22	55°19.6048	18°14.1136	77.1	
EMB286_43-1	TF0257	11.02	CTD	09:29	55°26.4681	18°19.2662	87.7	
EMB286_43-2	TF0257	11.02	CTD	09:39	55°26.4743	18°19.2491	87.5	O2 calibration
EMB286_43-3	TF0257	11.02	CTD	09:43	55°26.4773	18°19.2443	87.9	O2 calibration
EMB286_43-4	TF0257	11.02	CTD	09:45	55°26.4704	18°19.2578	87.4	O2 calibration
EMB286_44-1	TF0259	11.02	CTD	10:42	55°33.0001	18°24.0739	89.8	
EMB286_44-2	TF0259	11.02	WP2 net	11:10	55°33.0001	18°24.0739	89.8	3 times
EMB286_45-1	TF0255	11.02	CTD	12:12	55°37.3937	18°36.3166	92.1	
EMB286_46-1	TF0258	11.02	CTD	13:25	55°43.6413	18°45.9023	90.6	
EMB286_47-1	TF0253	11.02	CTD	14:34	55°50.3891	18°52.0132	101.5	
EMB286_48-1	TF0213	15.02	CTD	04:58	55°15.0195	15°58.9886	89.7	
EMB286_48-2	TF0213	15.02	CTD	06:12	55°14.9782	15°58.9906	90.3	O2 calibration
EMB286_48-3	TF0213	15.02	CTD	06:15	55°14.9891	15°59.0050	90.1	O2 calibration

EMB286_48-4	TF0213	15.02	CTD	06:16	55°14.9966	15°59.0177	89.9	O2 calibration
EMB286_48-5	TF0213	15.02	WP2 net	06:20	55°14.9966	15°59.0177	89.9	10 times
EMB286_49-1	TF0113	15.02	CTD	16:15	54°55.4696	13°30.0320	47.5	
EMB286_49-2	TF0113	15.02	WP2 net	16:45	54°55.4696	13°30.0320	47.5	3 times
EMB286_50-1	X_0050	15.02	MUC	17:25	54°57.7028	13°20.5775	46.3	0-2 cm
EMB286_50-2	X_0050	15.02	CTD	18:14	54°57.7028	13°20.5775	46.3	
EMB286_51-1	TF0030	15.02	CTD	21:17	54°43.4240	12°46.9939	23.3	
EMB286_52-1	TF0046	16.02	CTD	05:10	54°28.1378	12°14.5214	28.38	
EMB286_52-2	TF0046	16.02	CTD	05:15	54°28.1348	12°14.5242	28.3	O2 calibration
EMB286_52-3	TF0046	16.02	CTD	05:19	54°28.1324	12°14.5219	28.6	O2 calibration
EMB286_52-4	TF0046	16.02	WP2 net	06:00	55°14.9966	15°59.0177	28.4	2 times
EMB286_53-1	TF0012	16.02	CTD	08:15	54°18.8738	11°33.0268	24.7	
EMB286_53-1	TF0012	16.02	WP2 net	09:15	54°18.8738	11°33.0268	24.7	5 times

7.2 CTD measurements list

Cruise	St. No	St. Name	UTC	Date	Lat	Lon	Depth [m]	File
EMB 286	1	TFO5	20:51:38	07. Feb 22	54°13.8677N	12°04.5478E	12.92	V0001_01.hex
EMB 286	1	TFO5	21:06:20	07. Feb 22	54°13.8677N	12°04.5478E	13.11	V0001F01.hex
EMB 286	1	TFO5	21:09:33	07. Feb 22	54°13.8677N	12°04.5478E	13.51	V0001F01.hex
EMB 286	1	TFO5	21:19:06	07. Feb 22	54°13.9000N	12°04.5192E	13.31	V0001F02.hex
EMB 286	1	TFO5	21:21:26	07. Feb 22	54°13.9000N	12°04.5192E	13.41	V0001F02.hex
EMB 286	2	TF0041	22:51:33	07. Feb 22	54°24.4064N	12°03.7297E	19.98	V0002F01.hex
EMB 286	3	TF0040	23:48:10	07. Feb 22	54°26.1772N	12°04.1678E	12.75	V0003F01.hex
EMB 286	3	TF0040	23:52:00	07. Feb 22	54°26.1772N	12°04.1678E	12.75	V0003F02.hex
EMB 286	4	TF0361	04:51:24	08. Feb 22	54°39.8821N	11°09.2003E	24.78	V0004F01.hex
EMB 286	5	TF0360	06:40:04	08. Feb 22	54°35.9933N	10°26.9702E	18.72	V0005F01.hex
EMB 286	6	FeMa2	08:36:38	08. Feb 22	54°32.4989N	10°41.1808E	23.32	V0006F01.hex
EMB 286	7	FeMa1	10:28:21	08. Feb 22	54°32.9336N	10°46.1938E	23.42	V0007F01.hex
EMB 286	8	TF0010	14:16:22	08. Feb 22	54°33.0394N	11°19.2610E	28.16	V0008K01.hex
EMB 286	8	TF0010	14:27:04	08. Feb 22	54°33.0862N	11°19.1992E	28.26	V0008F02.hex
EMB 286	8	TF0010	14:52:51	08. Feb 22	54°33.0916N	11°19.1925E	28.45	V0008K03.hex
EMB 286	9	TF0011	17:09:42	08. Feb 22	54°24.7841N	11°37.0030E	24.97	V0009F01.hex
EMB 286	10	TF0012	18:15:01	08. Feb 22	54°18.9080N	11°32.9912E	24.65	V0010F01.hex
EMB 286	11	TF0022	21:13:36	08. Feb 22	54°06.6047N	11°10.4867E	23.30	V0011F01.hex
EMB 286	12	TF0046	01:37:51	09. Feb 22	54°28.1999N	12°14.4749E	21.02	V0012F01.hex
EMB 286	13	TF0002	03:41:49	09. Feb 22	54°39.0200N	12°27.0383E	18.52	V0013F01.hex
EMB 286	14	TF0001	05:01:44	09. Feb 22	54°41.8000N	12°42.3485E	21.74	V0014F01.hex
EMB 286	15	TF0030	05:48:33	09. Feb 22	54°43.4248N	12°47.0076E	23.16	V0015F01.hex
EMB 286	16	TF0115	07:34:58	09. Feb 22	54°47.6859N	13°03.4535E	30.24	V0016F01.hex
EMB 286	17	TF0114	08:48:31	09. Feb 22	54°51.6437N	13°16.5083E	44.86	V0017F01.hex
EMB 286	18	TF0069	09:58:39	09. Feb 22	55°00.0158N	13°18.0866E	46.43	V0018F01.hex
EMB 286	18	TF0069	10:10:28	09. Feb 22	55°00.0002N	13°18.0184E	47.20	V0018K02.hex
EMB 286	18	TF0069	10:16:07	09. Feb 22	55°00.0017N	13°18.0071E	46.34	V0018K03.hex
EMB 286	19	TF0113	12:46:18	09. Feb 22	54°55.4932N	13°29.9849E	47.01	V0019F01.hex
EMB 286	19	TF0113	13:42:25	09. Feb 22	54°55.4942N	13°29.9949E	46.32	V0019F02.hex
EMB 286	20	TF0105	14:53:30	09. Feb 22	55°01.5078N	13°36.4474E	46.80	V0020F01.hex
EMB 286	21	TF0104	16:04:11	09. Feb 22	55°04.0874N	13°48.7946E	46.58	V0021F01.hex
EMB 286	22	ABBoje	17:39:16	09. Feb 22	54°52.7586N	13°51.7148E	45.43	V0022F01.hex
EMB 286	23	OBBoje	22:33:22	09. Feb 22	54°04.5319N	14°09.2645E	15.09	V0023F01.hex
EMB 286	24	TF0109	04:36:03	10. Feb 22	54°59.9999N	14°04.9964E	48.18	V0024F01.hex
EMB 286	25	TF0103	06:11:02	10. Feb 22	55°03.8069N	13°59.3377E	47.18	V0025F01.hex
EMB 286	26	TF0102	07:06:27	10. Feb 22	55°09.3331N	13°56.4875E	44.94	V0026F01.hex
EMB 286	26	TF0102	07:13:47	10. Feb 22	55°09.3220N	13°56.5129E	45.42	V0026F01.hex
EMB 286	27	TF0145	08:31:00	10. Feb 22	55°10.0032N	14°15.0115E	47.17	V0027F01.hex

EMB 286	28	TF0144	09:48:09	10. Feb 22	55°15.4115N	14°29.4464E	45.05	V0028F01.hex
EMB 286	29	TF0140	11:30:00	10. Feb 22	55°27.9906N	14°42.9821E	69.55	V0029F01.hex
EMB 286	30	TF0200	13:43:04	10. Feb 22	55°22.9751N	15°20.0324E	90.99	V0030K01.hex
EMB 286	30	TF0200	13:52:58	10. Feb 22	55°22.9906N	15°20.0165E	91.09	V0030F02.hex
EMB 286	30	TF0200	14:14:02	10. Feb 22	55°22.9984N	15°20.0050E	91.18	V0030K03.hex
EMB 286	31	TF0214	16:09:15	10. Feb 22	55°09.5900N	15°39.6149E	93.57	V0031F01.hex
EMB 286	32	TF0213	17:48:24	10. Feb 22	55°14.9831N	15°59.0003E	89.78	V0032F01.hex
EMB 286	32	TF0213	18:54:41	10. Feb 22	55°14.9831N	15°59.0164E	89.97	V0032F02.hex
EMB 286	33	TF0221	21:17:04	10. Feb 22	55°13.3001N	16°10.0427E	82.32	V0033F01.hex
EMB 286	34	TF0225	22:16:29	10. Feb 22	55°15.5361N	16°19.2814E	66.51	V0034F01.hex
EMB 286	35	TF0226	23:08:31	10. Feb 22	55°17.7991N	16°25.9204E	58.18	V0035F01.hex
EMB 286	36	TF0227	00:13:35	11. Feb 22	55°15.6795N	16°38.3305E	69.43	V0036F01.hex
EMB 286	37	TF0229	01:31:45	11. Feb 22	55°13.7177N	16°54.8161E	85.66	V0037F01.hex
EMB 286	38	TF0222	02:28:34	11. Feb 22	55°12.9892N	17°03.9880E	91.10	V0038F01.hex
EMB 286	39	TF0266	03:55:22	11. Feb 22	55°15.0528N	17°21.5730E	89.29	V0039F01.hex
EMB 286	40	TF0267	05:22:11	11. Feb 22	55°17.1638N	17°35.6133E	83.35	V0040F01.hex
EMB 286	41	TF0268	06:56:08	11. Feb 22	55°18.4562N	17°55.8130E	75.61	V0041F01.hex
EMB 286	42	TF0256	08:22:26	11. Feb 22	55°19.6048N	18°14.1136E	77.13	V0042F01.hex
EMB 286	43	TF0257	09:29:35	11. Feb 22	55°26.4681N	18°19.2662E	87.74	V0043F01.hex
EMB 286	43	TF0257	09:39:14	11. Feb 22	55°26.4743N	18°19.2491E	87.55	V0043K02.hex
EMB 286	43	TF0257	09:42:59	11. Feb 22	55°26.4773N	18°19.2443E	87.92	V0043K03.hex
EMB 286	43	TF0257	09:45:22	11. Feb 22	55°26.4704N	18°19.2578E	87.44	V0043K03.hex
EMB 286	44	TF0259	10:42:49	11. Feb 22	55°33.0001N	18°24.0739E	89.84	V0044F01.hex
EMB 286	45	TF0255	12:12:22	11. Feb 22	55°37.3937N	18°36.3166E	92.11	V0045F01.hex
EMB 286	46	TF0258	13:25:50	11. Feb 22	55°43.6413N	18°45.9023E	90.64	V0046F01.hex
EMB 286	47	TF0253	14:34:29	11. Feb 22	55°50.3891N	18°52.0132E	101.54	V0047F01.hex
EMB 286	48	TF0213	04:58:47	15. Feb 22	55°15.0195N	15°58.9886E	89.68	V0048F01.hex
EMB 286	48	TF0213	06:12:39	15. Feb 22	55°14.9782N	15°58.9906E	90.32	V0048K02.hex
EMB 286	48	TF0213	06:15:14	15. Feb 22	55°14.9891N	15°59.0050E	90.13	V0048K02.hex
EMB 286	48	TF0213	06:16:55	15. Feb 22	55°14.9966N	15°59.0177E	89.94	V0048K03.hex
EMB 286	49	TF0113	16:57:05	15. Feb 22	54°55.4696N	13°30.0320E	47.49	V0049F01.hex
EMB 286	50	X_0050	18:14:15	15. Feb 22	54°57.7028N	13°20.5775E	46.33	V0050F01.hex
EMB 286	51	TF0030	21:17:44	15. Feb 22	54°43.4240N	12°46.9939E	23.03	V0051F01.hex
EMB 286	52	TF0046	05:10:13	16. Feb 22	54°28.1378N	12°14.5214E	28.38	V0052F01.hex
EMB 286	52	TF0046	05:15:28	16. Feb 22	54°28.1348N	12°14.5242E	28.25	V0052K02.hex
EMB 286	52	TF0046	05:19:30	16. Feb 22	54°28.1324N	12°14.5219E	28.64	V0052K03.hex
EMB 286	53	TF0012	08:15:03	16. Feb 22	54°18.8738N	11°33.0268E	24.70	V0053F01.hex

7.3 Profile List – organic pollutants

No	Region	Date 2022	Begin [UTC]	Latitude [decimal]	Longitude [decimal]	Date 2022	End [UTC]	Latitude [decimal]	Longitude [decimal]
1	Kiel Bight/ Fehmarn Belt	08.02.	04:55	54.60 N	10.45 E	08.02.	13:25	54.552 E	11.32 E
2	Mecklenburg Bight	08.02.	23:00	54.258 N	11.607 E	09.02.	05:05	54.697 N	12.707 E
3	Arkona Sea	09.02.	13:10	54,925 N	13.50 E	09.02.	17:40	54.882 N	13.858 E
4	Pomeranian Bight	09.02.	19:10	54.644 N	13.94 E	09.02.	23:59	54.833 N	14.167 E
5	Bornhom Sea	10.02.	13:45	55.383 N	15.333 E	10.02.	18:50	55.25 N	15.983 E
6	Central Baltic Sea	11.02.	02:30	55.217 N	17.667E	11.02.	08:00	55.317 N	18.235 E
7	Western Gotland Sea	11.02.	18:30	56.36 N	18.133 E	11.02.	23:30	56.147 N	17.89 E

7.4 Station List – sediment sampling

Date 2022	Latitude [decimal]	Longitude [decimal]	Station Name	Station No.	Time UTC	Water Depth [m]	Sediment samples
08.02.	54. 5516 N	11.32 E	TF0010	8	15:15	28	MUC, 0-2cm
08.02.	54°18.9080N	11°32.9912E	TF0012	10	19:05	24	MUC, 0-2cm
09.02.	54°04.5319N	14°09.2645E	OB Boje	23	23:45	15	MUC, 0-2cm
15.02.	55°00.0002N	13°18.0184E	TF0069	18	17:25	47	MUC, 0-2cm
08.02.	54°32.9336N	10°46.1938E	FeMa1	7	09:00	23	MUC, sliced
08.02.	54°32.4989N	10°41.1808E	FeMa2	6	23:45	23	MUC, sliced

8 Data and Sample Storage and Availability

Data is intensively validated and will be freely available in the IOW DB by the online search and data download tool ODIN2 (<https://odin2.io-warnemuende.de/#/>). Afterwards the data will be imported into national and international databases (MUDAB, HELCOM, ICES).

Tab.8.1 Overview data availability. Monitoring data are automatically transferred to MUDAB, HELCOM, ICES from ODIN as soon as available there. * all data is available on request at any time.

Type	Database	Available	Free access	Contact
CTD data*	ODIN	Sep 2022	Sep 2022	michael.naumann@io-warnemuende.de
Nutrients*	ODIN	Sep 2022	Sep 2022	joanna.waniek@io-warnemuende.de
Plankton*	ODIN	Sep 2022	Sep 2023	anke.kremp@io-warnemuende.de
Sediments	ODIN	Sep 2022	end 2024	detlef.schulz-bull@io-warnemuende.de

9 References

HELCOM (2018). State of the Baltic Sea - Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155.
<https://www.helcom.fi/Lists/Publications/BSEP155.pdf>

20 22	E M B	2 8 6	4 7			-	-	-			-	-									TF0 253			
20 22	E M B	2 8 6	4 8	1 4	7	7	7	7			-	-	3	6	3	2				4	3		1	TF0 213
20 22	E M B	2 8 6	4 9	1		-	-	-			-	-	3	5	2					1				TF0 113
20 22	E M B	2 8 6	5 0			-	-	-			-	-	5	6	2							1		TF0 069
20 22	E M B	2 8 6	5 1	1		-	-	-			-	-	5	5	2					1				TF0 030
20 22	E M B	2 8 6	5 2	9		-	-	-			-	-	5	5	2					1				TF0 046
20 22	E M B	2 8 6	5 3	1		-	-	-			-	-	5	6	2					1				TF0 012
No samples				129	114	114	114	114	46	22	22	22	50	76	30	6	5	4	17	17	23	6	4	9
No stations				37	24	24	24	24	8	6	6	6	14	14	14	4	5	2	2	2	12	2	4	7