

# Baltic Sea Research Institute Warnemünde

Cruise report  
No. 11/01/01 (Gauss 374a)  
r/v „Gauss“

Monitoring Cruise

25 October to 08 November 2001

Kiel Bight to northern Gotland Sea

**Monitoring Cruise: Cruise No. 11/01/01**  
r/v „Gauss“

**Warnemünde**  
12.11.2001

The fifth monitoring cruise in 2001 performed by the Baltic Sea Research Institute Warnemünde in the frame of the HELCOM COMBINE programme was carried out with r/v „Gauss“ between October 25<sup>th</sup> and November 8<sup>th</sup> 2001.

Scientific staff participating:

G. Nausch (scientist in charge)	25.10. - 08.11.2001
D. Betke	25.10. - 08.11.2001
J. Donath	25.10. - 08.11.2001
I. Petersohn	25.10. - 08.11.2001
S. Weinreben	25.10. - 08.11.2001
I. Glocksin	25.10. - 30.10.2001
G. Lehnert	25.10. - 30.10.2001
Ä. Welz	25.10. - 30.10.2001
K.-P.Wlost	25.10. - 30.10.2001
M. Zettler	25.10.- 30.10.2001
S. Busch	30.10. - 08.11.2001
B. Sadkowiak	30.10. - 08.11.2001
A. Schultz	30.10. - 08.11.2001

Master: K.-P.Walde

The area under investigation covered the Baltic Sea between Kiel Bight and northern Gotland Sea. Marine meteorological, hydrographic, hydrochemical and hydrobiological investigations were performed according to the COMBINE programme of HELCOM: The station map is attached to this report. Additionally to the standard programme the annual survey concerning macrozoobenthos was conducted.

The weather situation was dominated by several low pressure cells, passing the area under investigations shortly after each other and causing strong fluctuations in air pressure within short time scales. As a result, strong winds up to 9 Beaufort prevailed throughout the whole cruise (Fig. 1 and 2). Wind direction varied between SW, W and NW (Fig. 1 and 2).

The following hydrographic, hydrochemical and hydrobiological characteristics have been observed during the cruise (c.f. Tables 1 and 2 and Figs. 5 and 6):

- Surface temperatures varied between 8.37°C (Landort Deep) and 12.89°C in the Kiel Bight. With exception of the Stolpe Channel temperatures showed positive deviations up to 2.5°C (Arkona Basin) compared with the long-term mean 1971-1990.
- The bottom layer temperatures in the deep basins are still lying over the long-term average 1971-1990 (in brackets):

Bornholm Deep	6.99°C (6.62°C)
Gotland Deep	6.25°C (5.64°C)
Farö Deep	5.97°C (5.22°C)
Landsort Deep	5.34°C (4.85°C)

Whereas the temperature in the near bottom layer of the Bornholm Deep decreased from 8.83°C in February to 6.99°C at the end of October, the other 3 deeps showed only minor variations in temperature indicating the absence of inflow events.

- This is supported by the slowly decreasing salinities in the near bottom suggesting that the stagnation period has continued :

	February 2001	Oct./Nov. 2001 (PSU)
Bornholm Deep	16.54	15.52
Gotland Deep	12.11	12.03
Farö Deep	11.53	11.45

- The stagnation period lasting since 1995 can be seen also by the measured redox conditions in the deeper basins. In the Farö and Gotland Deep below 125m anoxic conditions prevailed. Also in the Landsort Deep, anoxic conditions were found from 100m water depth down the bottom. In Fig. 6 the oxygen concentrations in the near bottom layer are shown. Hydrogen sulphide is expressed as negative oxygen concentrations.
- The nutrient situation in the bottom layers of the main deep basins reflects the oxygen situation. High phosphate and ammonia values (f.e. 7.30 µmol/l and 34 µmol/l resp. in the Gotland Deep) were detected in the anoxic areas whereas nitrate concentrations were logically zero.
- The nutrient situation in the surface layer indicated the onset of autumnal decomposition processes combined with deeper reaching convection.
- At the end of the cruise an intensive inflow of highly saline water (up to 18 PSU) was measured in the western Baltic Sea. However, this inflow had not passed the Darss sill yet.

## Attachments

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

Figs. 1-2: Wind speed and wind direction during the 1<sup>st</sup> and 2<sup>nd</sup> part of the cruise

Figs. 3-4: Track charts

Fig. 5: Transect from the Kiel Bight to the northern Gotland Basin for temperature, salinity and oxygen (unvalidated data)

Fig. 6: Oxygen /hydrogen sulphide concentrations in the bottom near layer for selected stations

Günther Nausch  
Scientist in charge

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

Area Date	Stat. Name/No. **	Temp. °C	Sal. PSU	PO <sub>4</sub> <sup>3-</sup>	NO <sub>3</sub> <sup>-</sup> *	SiO <sub>4</sub>
Kiel Bight 26 Oct 2001	360/0007	12.89	17.86	0.40	0.24	10.0
Meckl. Bight 25 Oct 2001	012/0002	11.27	8.82	0.41	0.73	10.6
Lübeck Bight 23 Oct 2001	023/0006	12.58	14.00	0.28	0.08	11.2
Arkona Basin 27 Oct 2001	113/0025	12.27	7.71	0.18	0.09	5.9
Pom. Bight 29 Oct 2001	162/0055	11.34	6.70	0.92	8.96	13.7
Bornholm Deep 28 Oct 2001	213/0038	11.22	7.04	0.15	0.16	7.1
Stolpe Channel 05 Nov 2001	222/0078	9.16	7.01	0.22	0.70	7.3
SE Gotland Basin 05 Nov 2001	259/0076	8.94	6.85	0.10	0.34	7.1
Gotland Deep 03 Nov 2001	271/0068	10.16	6.95	0.15	0.80	5.3
Fårö Deep 03 Nov 2001	286/0066	9.60	6.59	0.16	0.78	6.5
Landsort Deep 02 Nov 2001	284/0062	8.37	6.20	0.20	0.70	7.2
Karlsö Deep 02 Nov 2001	245/0059	8.66	6.41	0.16	0.57	8.2

\*  $\sum \text{NO}_2^- + \text{NO}_3^-$ 

\*\* see attached map

Table 2: Bottom near water

Area Date	Stat. Name/No. **	Depth m	Temp °C	.Sal. PSU	O <sub>2</sub> *** ml/l	PO <sub>4</sub> <sup>3-</sup>	NO <sub>32</sub> <sup>-</sup> * μmol/l	SiO <sub>4</sub>
Kiel Bight 26 Oct 2001	360/0007	15	12.95	18.44	5.50	0.52	0.33	11.3
Meckl. Bight 25 Oct 2001	012/0002	20	13.47	20.96	3.78	0.95	2.68	22.0
Lübeck Bight 25 Oct 2001	023/0006	22	12.59	21.87	0.72	2.76	5.11	57.3
Arkona Basin 27 Oct 2001	113/0025	44	13.08	18.01	4.42	0.74	2.40	16.8
Pom. Bight 29 Oct 2001	162/0055	13	11.34	6.70	6.78	0.93	9.02	77.4
Bornholm Deep 28 Oct 2001	213/0038	87	6.99	15.52	-0.16	7.25	0	13.7
Stople Channel 05 Nov 2001	222/0078	88	6.70	12.84	1.32	2.86	7.48	48.8
SE Gotland Basin 05 Nov 2001	259/0076	87	6.35	10.98	2.15	1.84	7.76	36.8
Gotland Deep 03 Nov 2001	271/0068	231	6.25	12.03	-4.74	7.30	0	86.8
Fårö Deep 03 Nov 2001	286/0066	189	5.97	11.45	-1.91	5.90	0	68.2
Landsort Deep 02 Nov 2001	284/0062	433	5.34	10.42	-0.95	4.95	0	56.4
Karlsö Deep 02 Nov 2001	245/0059	106	4.86	9.77	-0.95	4.80	0	58.4

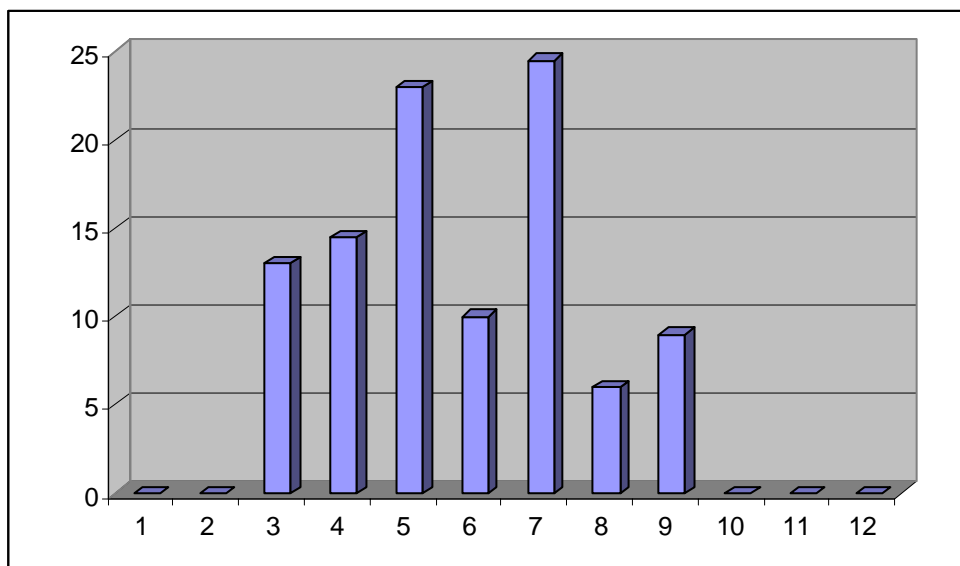
\*  $\sum \text{NO}_2^- + \text{NO}_3^-$ 

\*\* see attached map

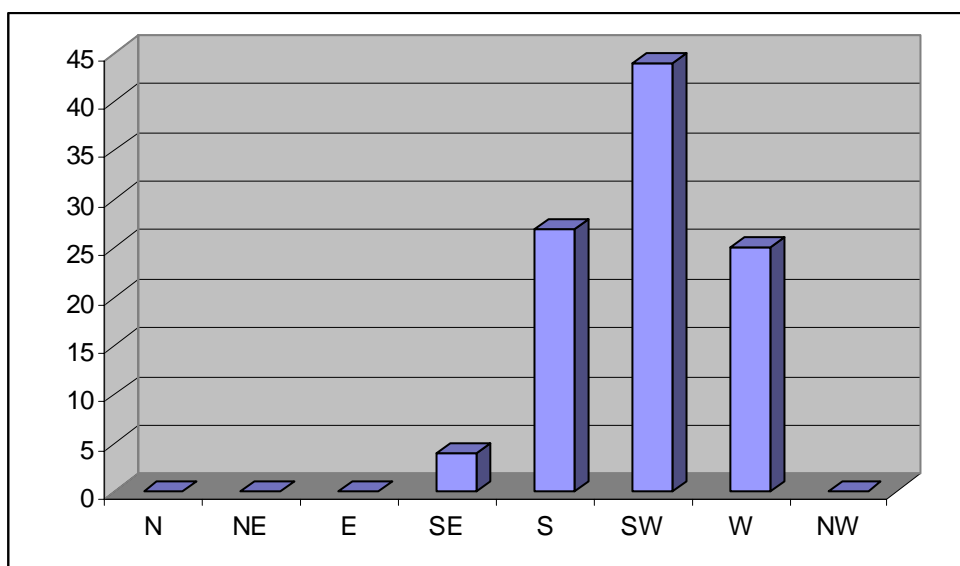
\*\*\* H<sub>2</sub>S is converted into negative oxygen equivalents

## Reise ,374-1.Abschnitt vom 25.10.-31.10.2001

Windstärkenhäufigkeit ,374-1.Abschnitt in %

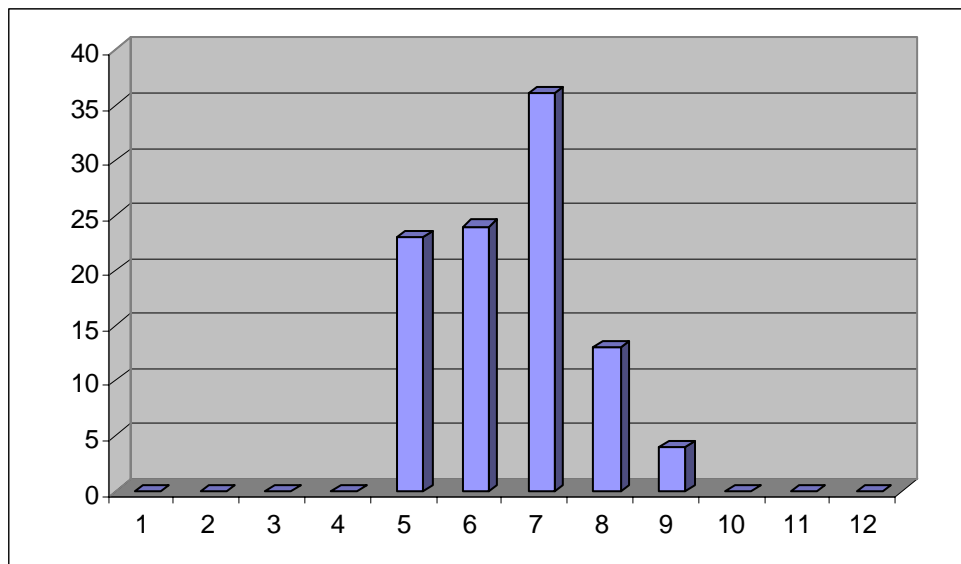


Windrichtungshäufigkeit ,374-1.Abschnitt in %

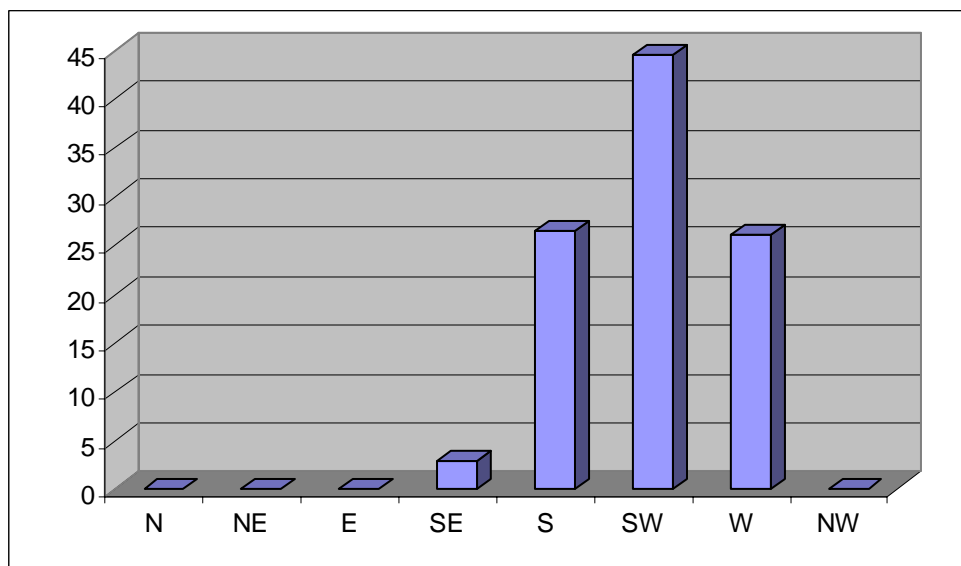


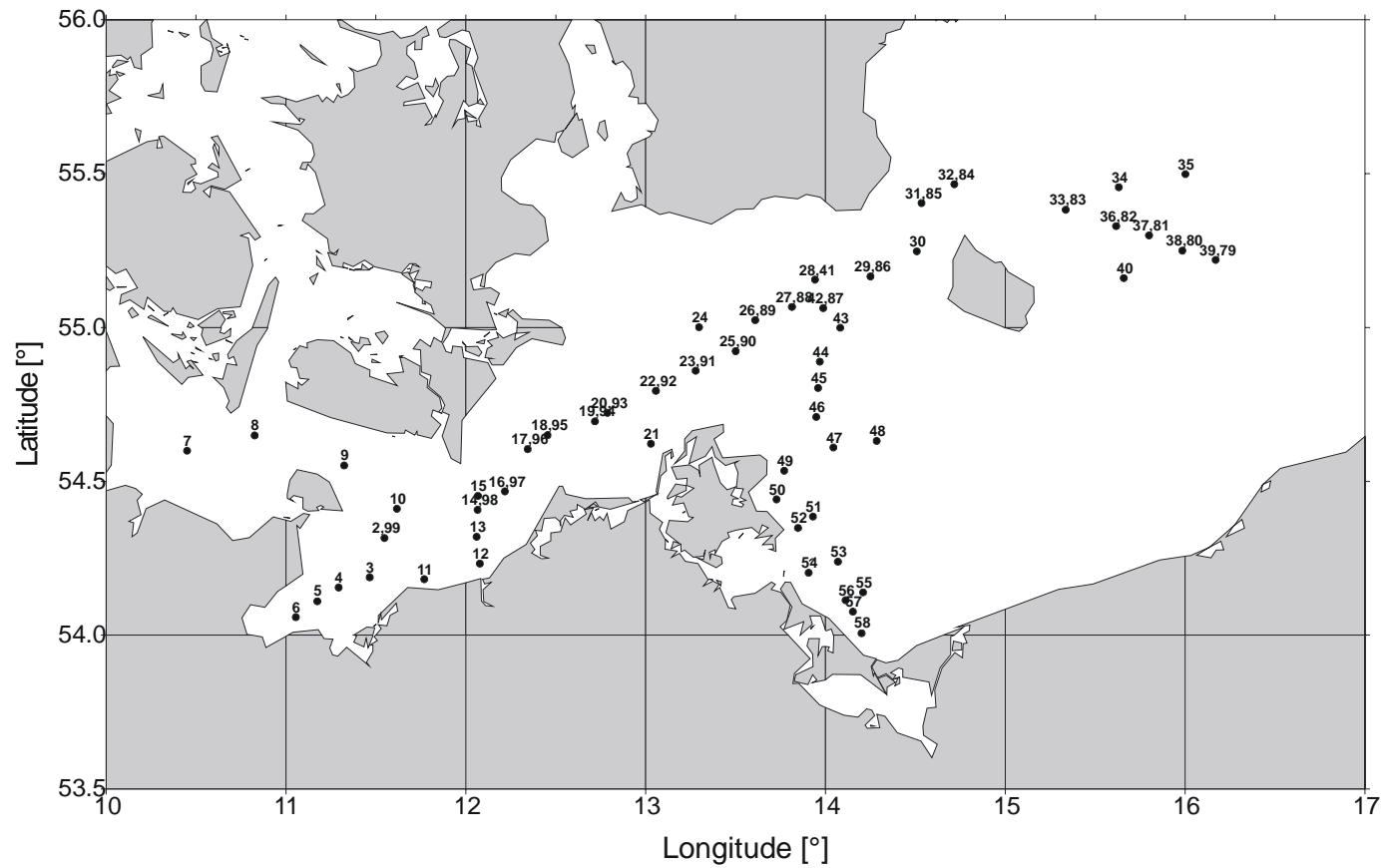
## Reise ,374-1.Abschnitt vom 01.11.-08.11.2001

Windstärkenhäufigkeit ,374-2.Abschnitt in %



Windrichtungshäufigkeit ,374-2.Abschnitt in %





## Station map

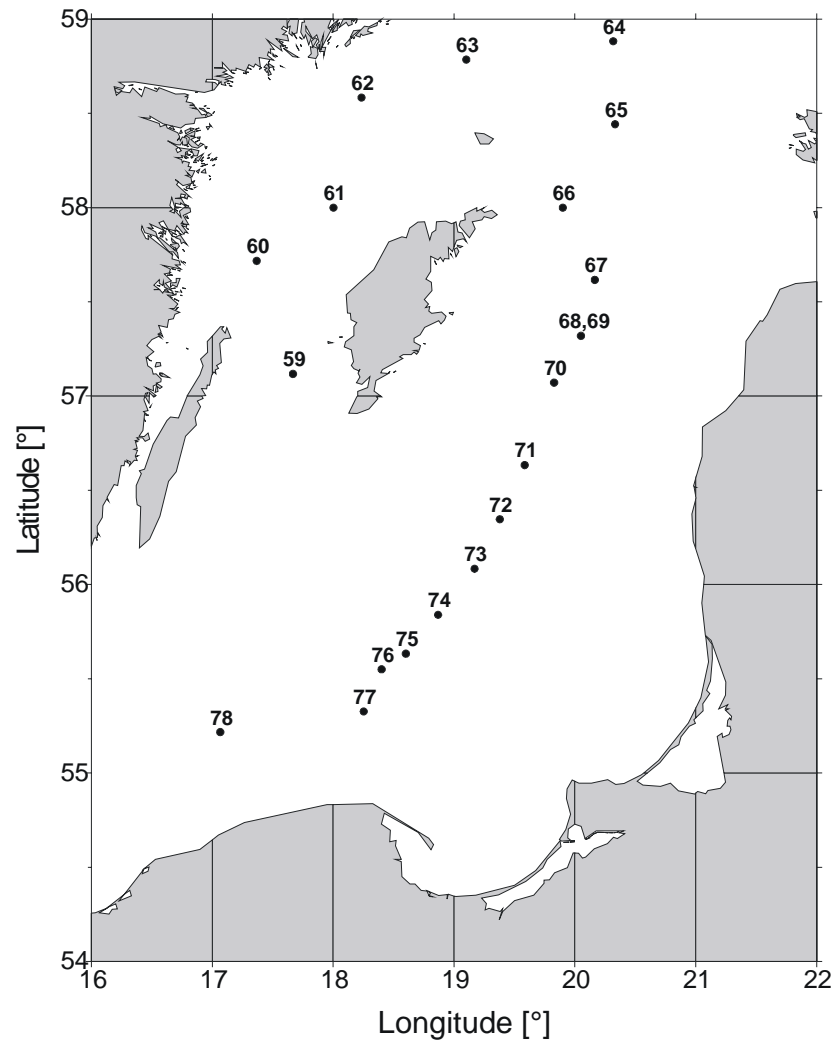
## Monitoring 2001

TF 2001 / 11

79 stations (part1)

25.10.01 - 30.10.01





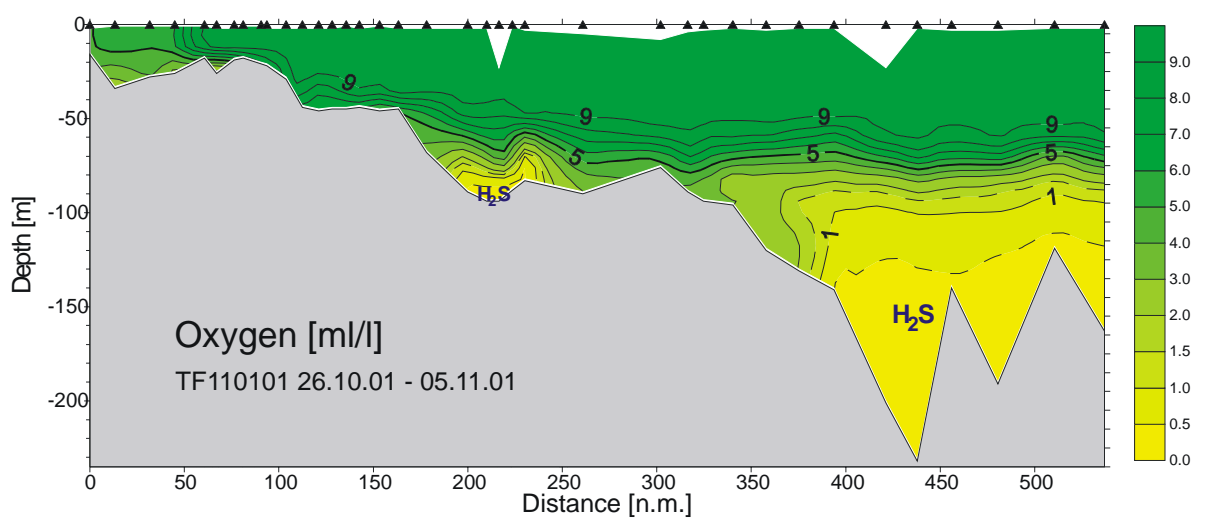
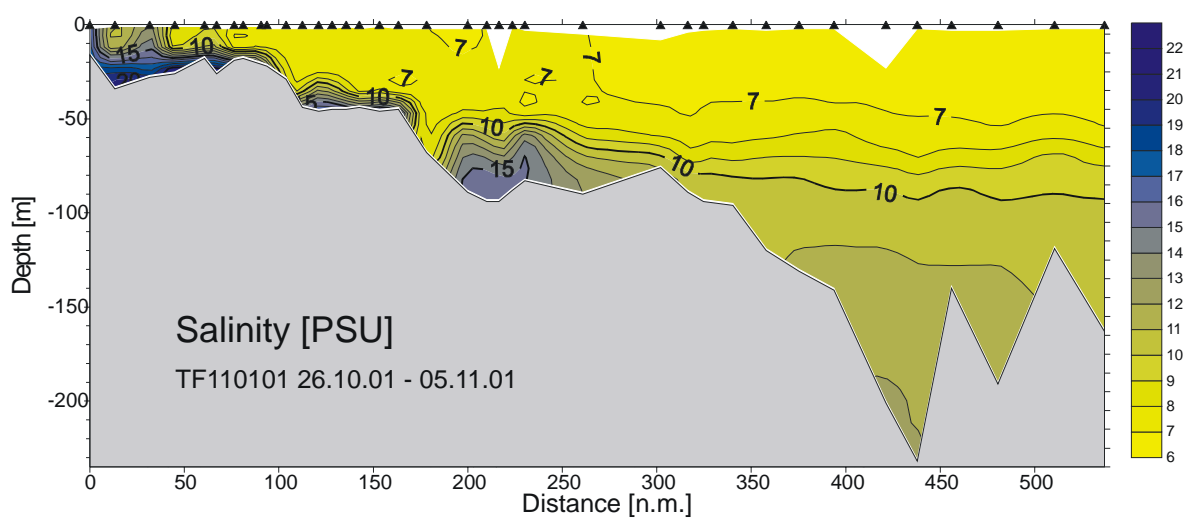
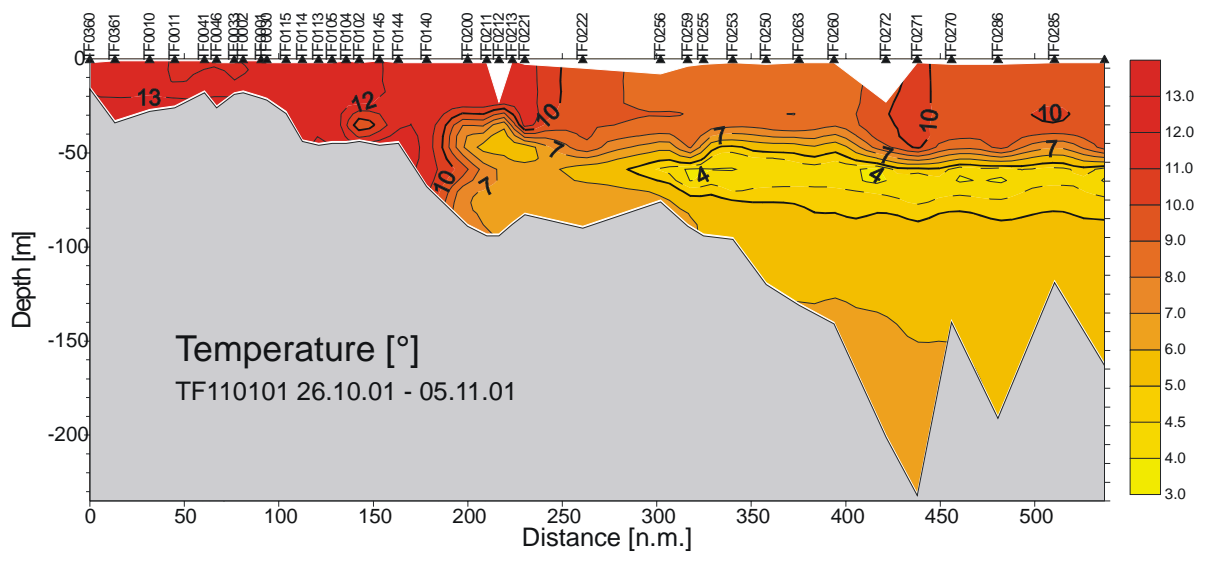
## Station map

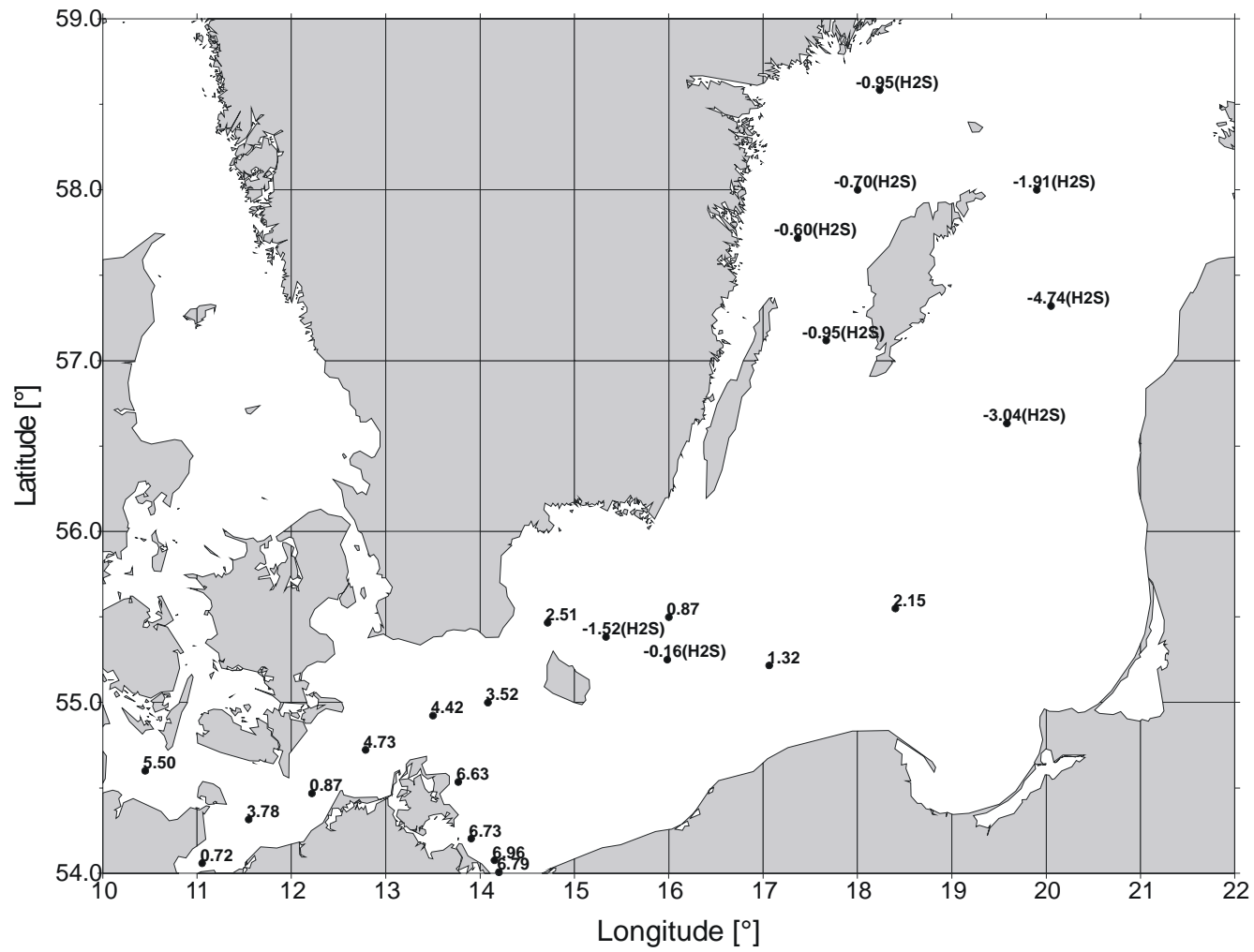
## Monitoring 2001

TF 2001 / 11

20 stations (part 2)

25.10.01 - 05.11.01





## Station map

## Monitoring 2001

TF 2001/11

Oxygen bottom  
concentration

25.10.01 - 05.11.01