



Cruise Report

R/V "HEINCKE"

Cruise- No. HE-316 (06HK1001)

27 January - 05 February 2010

This report is based on preliminary data !

Leibniz Institut für Ostseeforschung Warnemünde

an der Universität Rostock

Seestraße 15

D-18119 Rostock- Warnemünde

GERMANY

Tel +49-381-5197-0

Fax +49-381-5197 440

1. Cruise No.: HE-316 (06HK1001)

2. Dates of the cruise: from 27/01/2010 to 05/02/2010

3. Particulars of the research vessel:

Name: r/v 'HEINCKE'
Nationality: Germany
Operating Authority: Alfred-Wegener-Institut für Polar- und Meeresforschung
Sektion Biologische Anstalt Helgoland, Postfach 180,
D-27483 Helgoland

4. Geographical area in which ship has operated:

Baltic Sea between Kiel Bight and northern Gotland Sea

5. Dates and names of ports of call

29/01/2010 Warnemünde

6. Purpose of the cruise

Joint cruise for Monitoring in the frame of the COMBINE program of HELCOM and long term observation program of IOW

7. Crew :

Name of master: R. Voss
Number of crew: 12

8. Research staff:

Chief scientist: Klaus Nagel

Participants :

27/01 - 05/02/2010	Susanne Busch	Ursula Hennings
	Jan Donath	Lars Kreuzer
	Ines Hand	Ingo Schuffenhauer
	Uwe Hehl	Erika Trost

27/01 - 29/01/2010 Birgit Sadkowiak

9. Co-operating institutions:

All institutions dealing with the COMBINE program of HELCOM

10. Scientific equipment : CTD
water samplers
plankton net

11. General remarks and preliminary results

The cruise HE316 was a joint cruise between the German contribution to the COMBINE program of HELCOM and the long term data series of IOW. The area under investigation covered the Baltic Sea between Kiel Bight and the northern Gotland Basin as shown in the attached maps. Marine meteorological, hydrographic, chemical and biological investigations were performed at 74 stations. The measurements were supplemented by continuous registration of standard meteorological parameters as well as surface water temperature and salinity.

For selected stations, which are characteristic for different regions of the Baltic Sea, preliminary data of hydrographic and hydrochemical parameters in the surface and the near-bottom layer are compiled in the attached tables. These results are also compared with mean values calculated from the measurements performed during the February cruises of the years 1993 to 2007.

Except some short periods on 27/01/2010, 30/01/2010 and 02/02/2009 with wind speeds of about 20 m/s and heavy snow showers, the weather during the cruise was rather calm for this time of the year. Generally wind speed varied between 5 m/s and 15 m/s with only short periods of lower or higher values. Due to the passage of some low pressure areas, no predominating wind direction was observed.

As the cruise started at the end of an longer period of very cold days with minimum air temperatures far below -10°C, large ice fields were found in the coastal areas of the western Baltic Sea and the Pomeranian Bight. During the cruise air temperature increased and varied around 0°C in all areas covered. Surface water temperature increased from -0.5°C in the Lübeck Bight to 1.5°C in the Arkona Basin and are lower than expected from long term observations. In the central areas of the Baltic Sea surface water temperatures varied between 2°C and 3°C.

Salinity in the surface layer was within the values expected from long term measurements in all regions of the Baltic Sea and varied between 7 – 8 in all areas except Kiel and Mecklenburg Bight. A halocline was observed between 40 m and 45 m in the Arkona Basin, slightly below 50 m in the Bornholm Basin and between 70 m and 80 m in the Eastern and Western Gotland Basins. Salinities measured in the bottom layer in the central areas of the Baltic Sea are in the range expected from long term observations and varied around 12. However, salinities in the bottom layer of the western Baltic (13 - 16), Mecklenburg Bight (below 10) and in the Arkona Basin (10 - 13) are significantly lower than expected.

The western Baltic Sea and the Arkona basin were well oxygenated down to the sea floor with oxygen concentrations of more than 8 ml/l at most stations. Oxygen concentration in the Bornholm Basin dropped below 2 ml/l at depths exceeding 70 m, but increased again in the bottom layer, where up to 3.5 ml/l O₂ were measured. Anoxic conditions had been observed only at 5 station in the central eastern Gotland Basin and at the Karlsö Deep station at depths below 100 m to 110 m. In the bottom layer of the eastern Gotland Basin concentrations of up to 4.6 mg/l H₂S were found. In the Karlsö Deep hydrogen sulphide concentration was rather low (0.2 mg/l H₂S).

Nitrate concentrations in the surface layer were normal for this time of the year and vary between 3 µmol/l and almost 5 µmol/l, which is within the range expected from long term observations for most stations. At most stations, phosphate concentrations in the surface layer were close to those found at the same time one year ago and are in good agreement with the values expected from IOW's long term data series. However, at some stations in the southern Baltic Sea and the eastern Gotland Basin significantly lower Phosphate concentrations were measured. In the bottom layer concentrations of nitrate and phosphate are controlled by the presence of oxygen or hydrogen sulphide and were found in the expected range for most stations. Due to the ongoing stagnation phosphate concentrations at the bottom were significantly higher (5 µmol/l) and correlate with relatively high amounts of H₂S.

Stations in the Bornholm Basin have been analysed two times, on 31/01/2010 and four days later on 04/02/2010. The measurements showed that the bottom layer of the Bornholm Basin is filled with warm and high saline water with relatively high oxygen concentrations as a result of the last saltwater inflow some weeks ago. By comparison of the two data sets the propagation of this water mass from the Bornholm Basin into the Słupsk Channel can be followed (see attached figures).

Samples for the determination of HCH, CKW/PAK and Phyto- and Zooplankton were taken for later analysis in the laboratory.

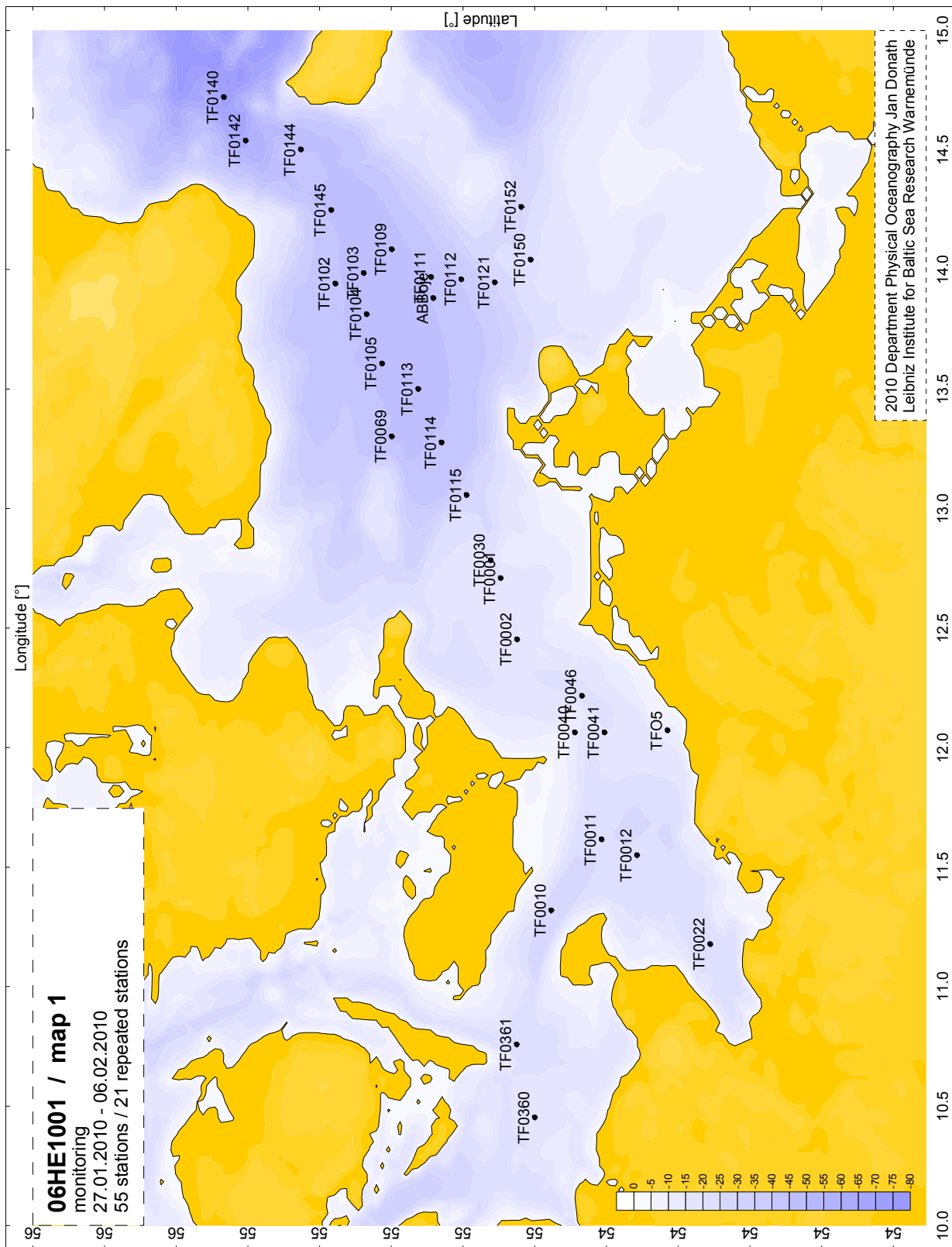
During the cruise two moorings have been recovered or deployed :

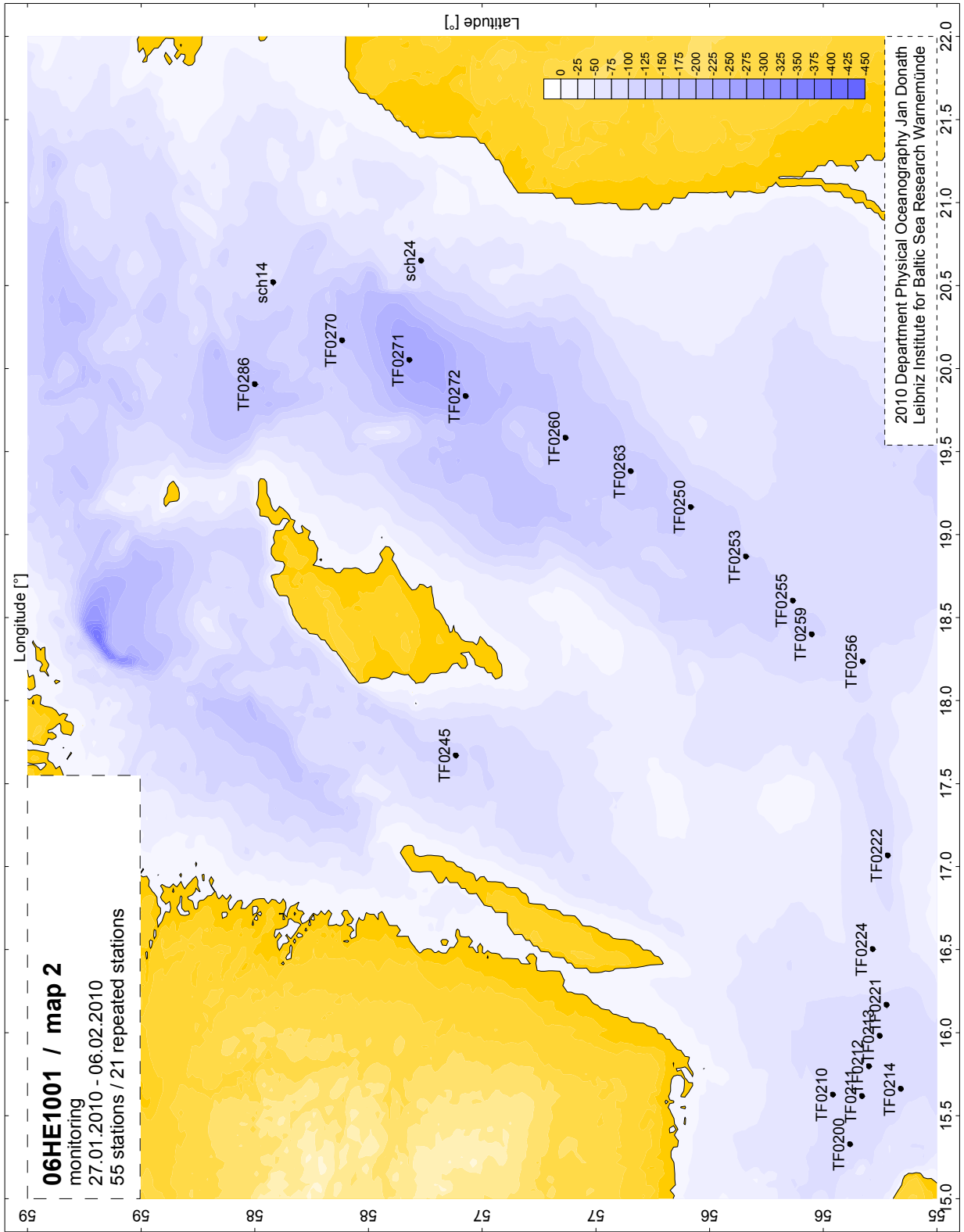
- Sediment trap recovered 57° 19.11' N , 020° 10.48' E
- Sediment trap deployed 57° 19.22' N , 020° 07.65' E

Klaus Nagel
Scientist in charge

Attachments :

- station charts
- tables of preliminary results for selected stations (surface layer and near bottom layer)
- comparison of actual data with mean values calculated from the measurements during the February cruises of the years 1993 – 2007 (surface layer and near bottom layer)
- transects of temperature, salinity and oxygen concentration between Kiel Bight and northern Gotland Sea
- map showing oxygen concentrations in near the bottom water layer (hydrogen sulphide concentration is given as negative O₂ equivalents)
- transects of temperature, salinity and oxygen concentration in the Bornholm Basin on 31/01/2010 and 04/02/2010





Preliminary results of hydrographic and hydrochemical parameters at selected stations

- surface layer -

Station Date	Stat.Name Stat.No. **)	Temp. °C	Salinity	NO₃ *) µmol/l	PO₄ µmol/l	SiO₄ µmol/l	O₂ ml/l
Kiel Bight 27/01/2010	TF0360 4	0.18	16.79	5.26	0.48	14.1	8.74
Mecklenburg Bight 27/01/2010	TF0012 2	0.16	8.78	4.73	0.61	14.2	9.19
Arkona Basin 28/01/2010	TF0113 17	1.50	7.70	4.25	0.54	13.5	9.04
Bornholm Deep 31/01/2010	TF0213 35	2.05	7.37	3.70	0.55	14.2	9.04
Stolpe Channel 31/01/2010	TF0222 38	2.18	7.28	3.20	0.31	16.0	8.82
SE Gotland Basin 31/01/2010	TF0259 40	2.91	7.56	4.10	0.14	10.9	8.46
Gotland Deep 01/02/2010	TF0271 47	2.42	7.35	3.61	0.31	9.6	8.72
Fårö Deep 02/02/2010	TF0286 51	2.10	7.02	3.94	0.50	13.3	8.68
Landsort Deep	TF0284						
Karlsö Deep 03/02/2010	TF0245 52	2.34	6.84	3.55	0.49	14.9	8.77

*) NO₃ is given as sum of NO₃⁻ and NO₂⁻ (in most samples NO₂⁻ was present only in traces)

**) see attached maps

Preliminary results of hydrographic and hydrochemical parameters at selected stations

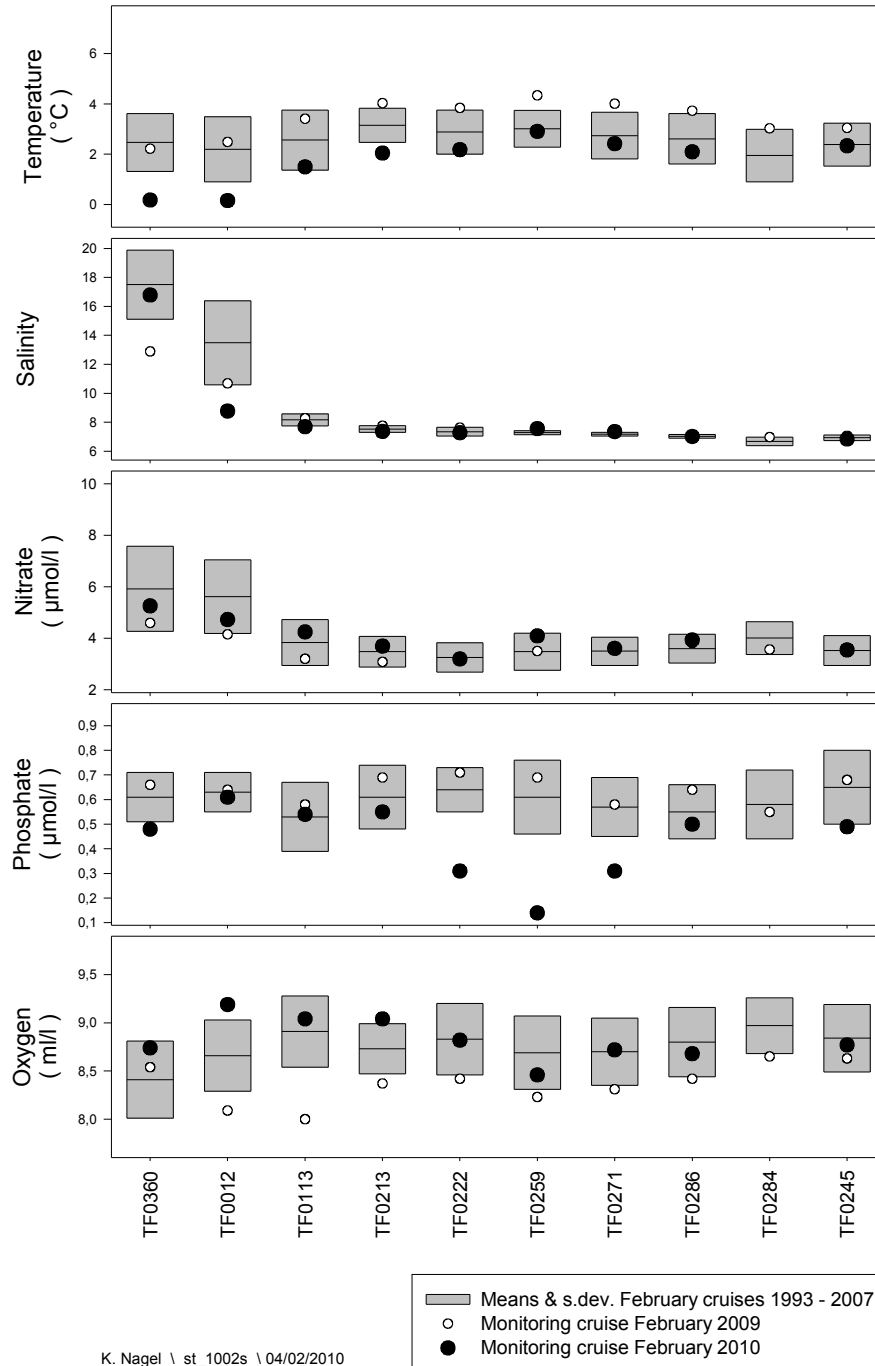
– near bottom layer -

Station Date	Stat.Name Stat.No. **)	Depth m	Temp. °C	Salinity PSU	NO ₃ *) µmol/l	PO ₄ µmol/l	SiO ₄ µmol/l	O ₂ ml/l
Kiel Bight 27/01/2010	TF0360 4	17	0.20	16.82	5.26	0.46	13.3	8.73
Mecklenburg Bight 27/01/2010	TF0012 2	24	2.81	12.77	7.04	0.70	19.5	7.93
Arkona Basin 28/01/2010	TF0113 17	45	4.25	13.0	8.42	1,16	24.7	5.48
Bornholm Deep 31/01/2010	TF0213 35	87	9.30	17.24	8.69	1.45	28.7	3.48
Stolpe Channel 31/01/2010	TF0222 38	89	9.63	14.55	7.77	1.57	40.3	2.77
SE Gotland Basin 31/01/2010	TF0259 40	87	7.99	12.61	6.49	1.43	33.0	0.31
Gotland Deep 01/02/2010	TF0271 47	233	6.31	12.45	- / -	4.50	87.6	-5.93 (H ₂ S)
Fårö Deep 02/02/2009	TF0286 #	186	6.57	11.84	- / -	4.55	71.5	-2.98 (H ₂ S)
Landsort Deep	TF0284							
Karlsö Deep 03/02/2010	TF0245 52	105	5.30	9.80	- / -	5.0	58.7	-0.27 (H ₂ S)

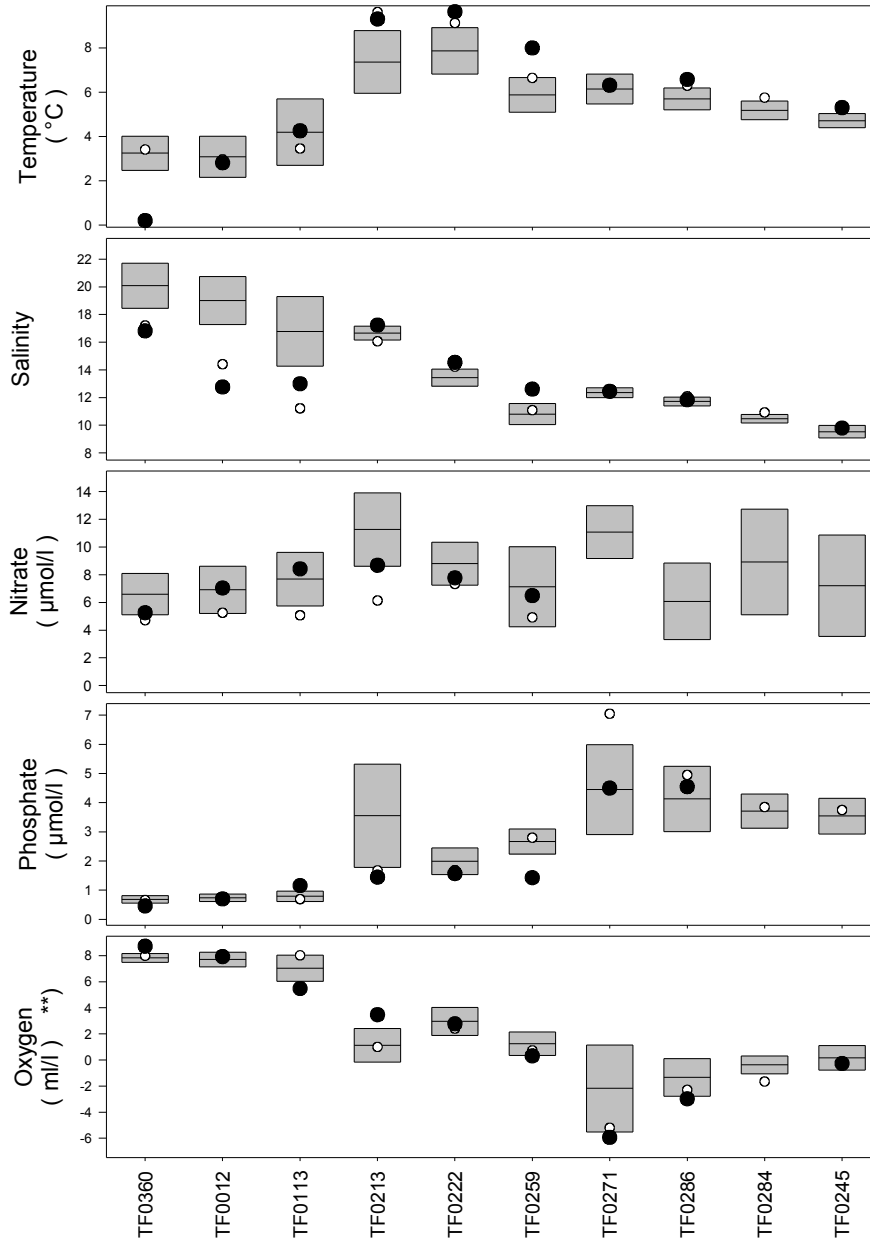
*) NO₃ is given as sum of NO₃⁻ and NO₂⁻ (in most samples NO₂⁻ was present only in traces)

**) see attached maps

Selected stations / February cruises : near-surface layer

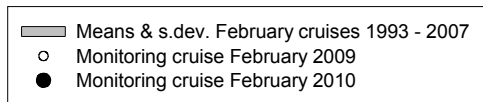


Selected stations / February cruises : near-bottom layer



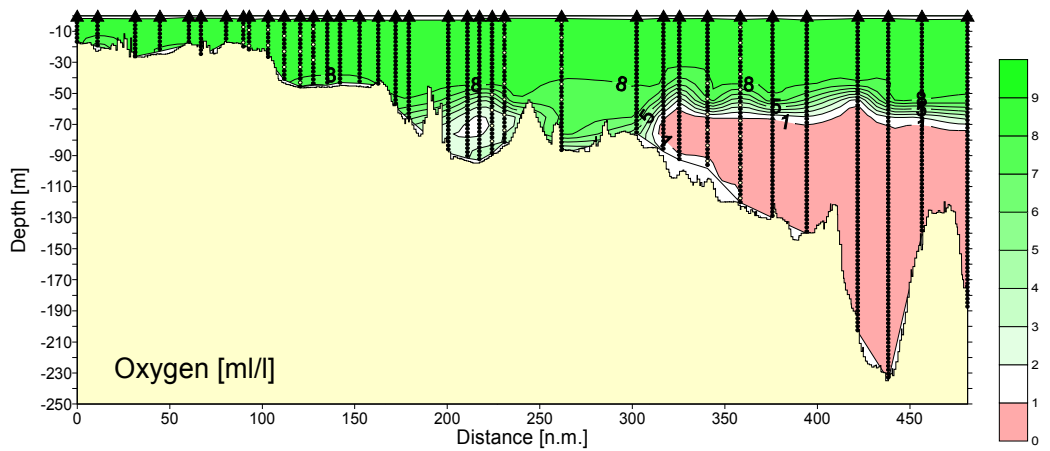
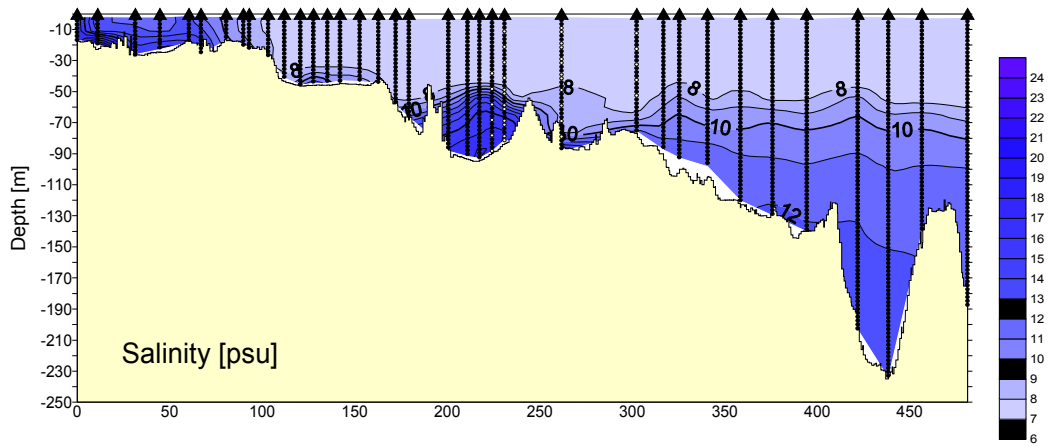
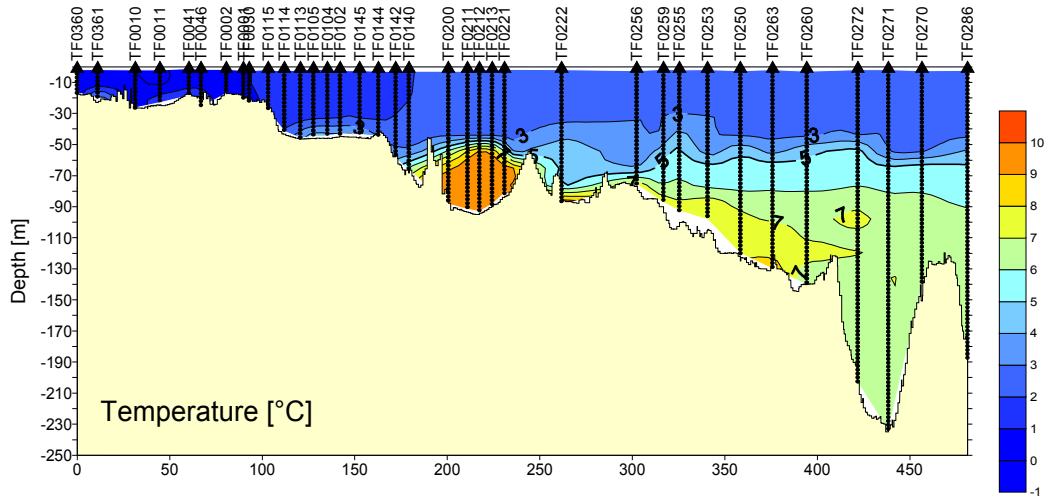
**): H₂S was converted to negative O₂ equivalents

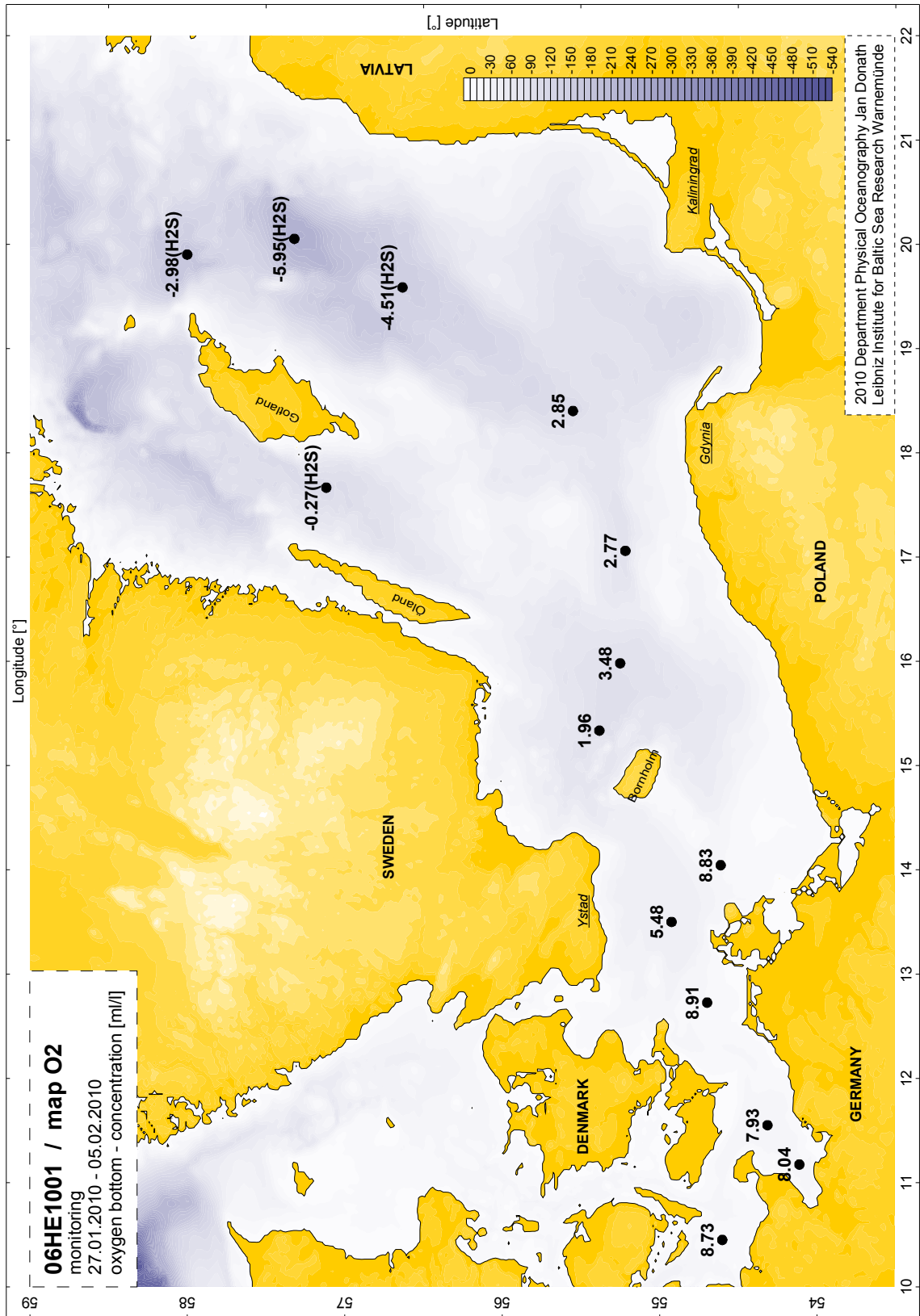
K. Nagel \ st_1002b \ 04/02/2009



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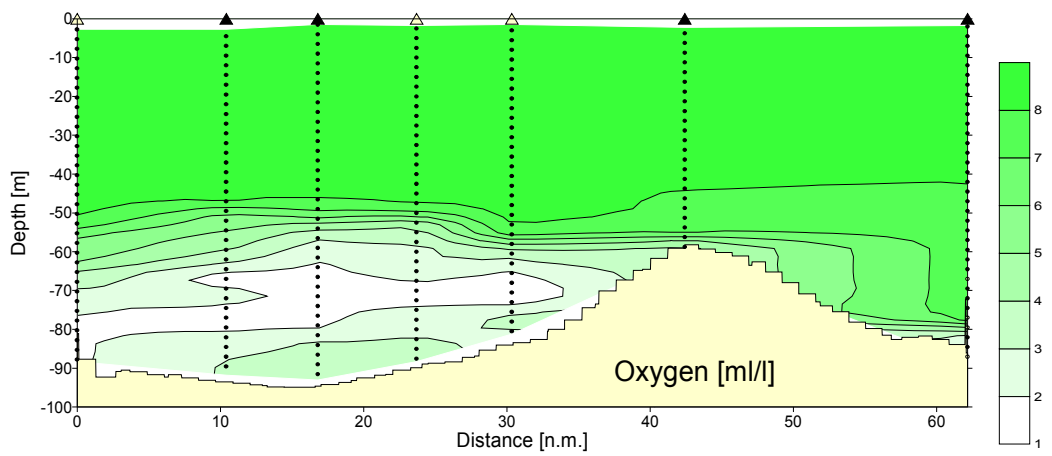
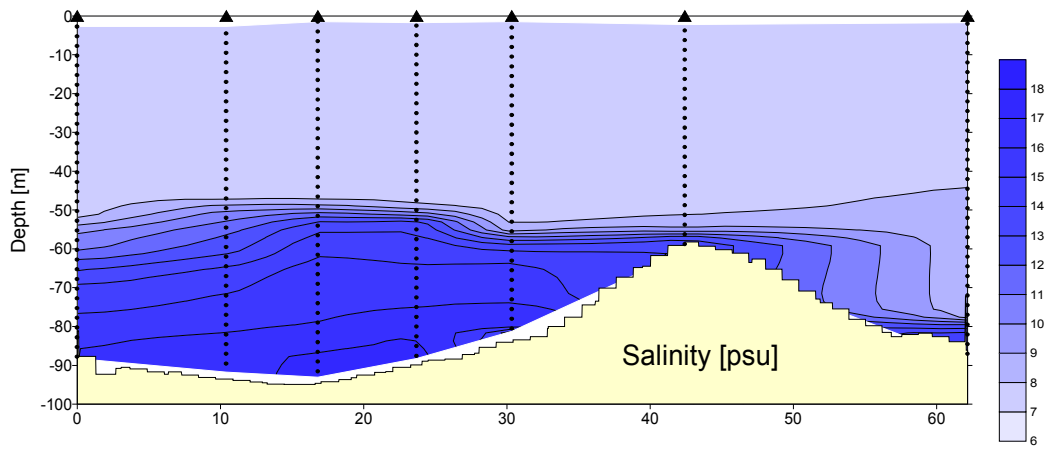
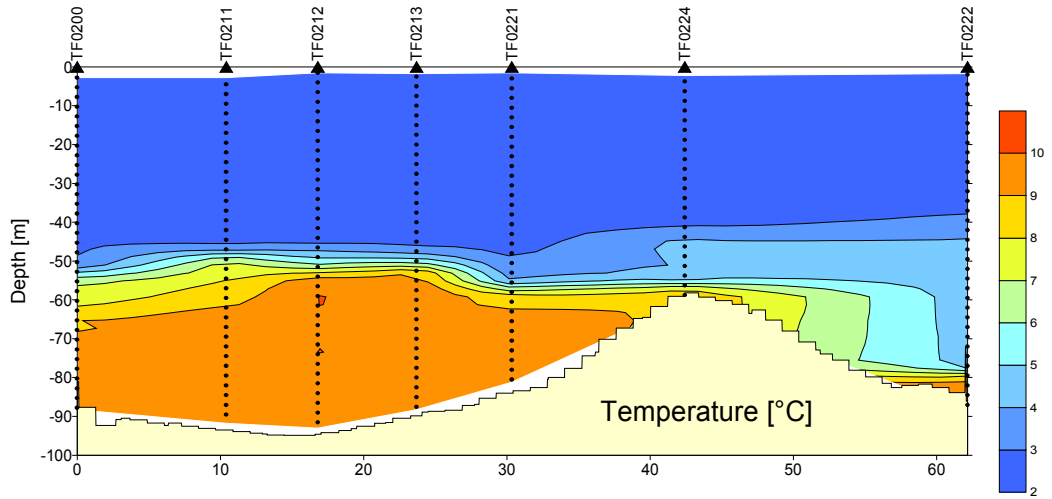
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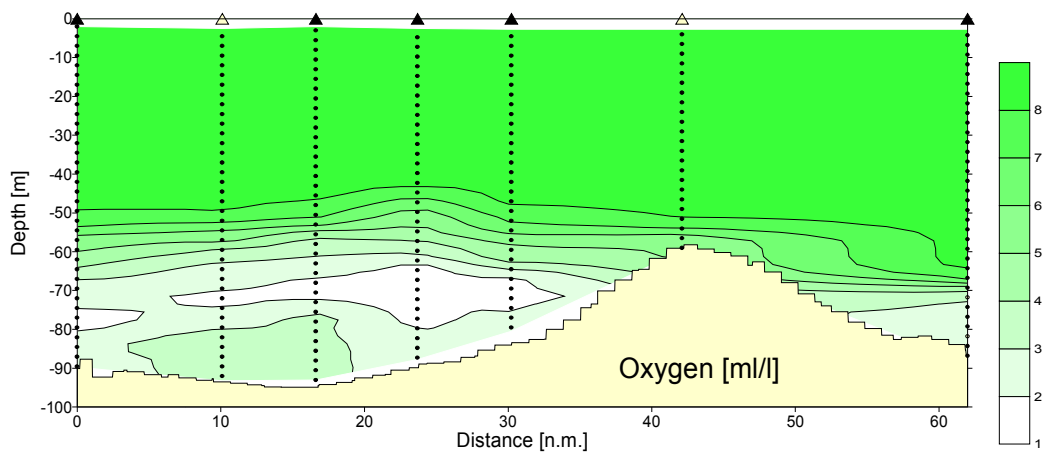
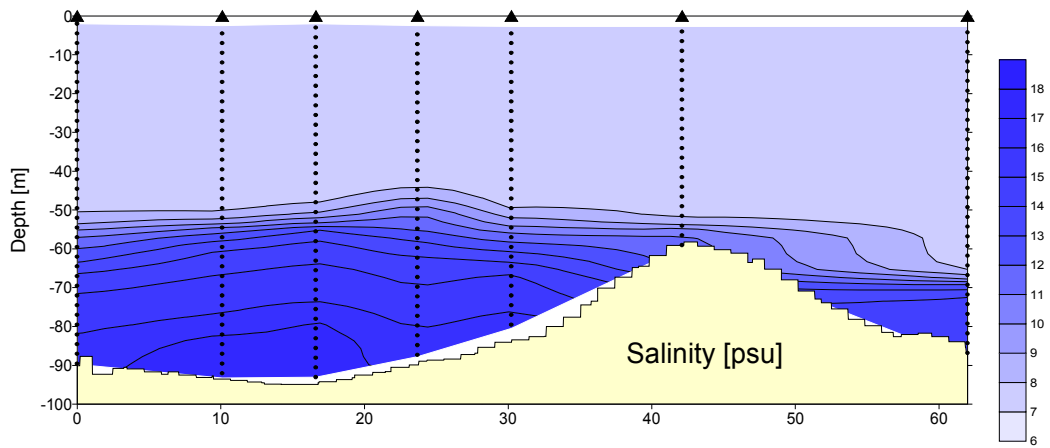
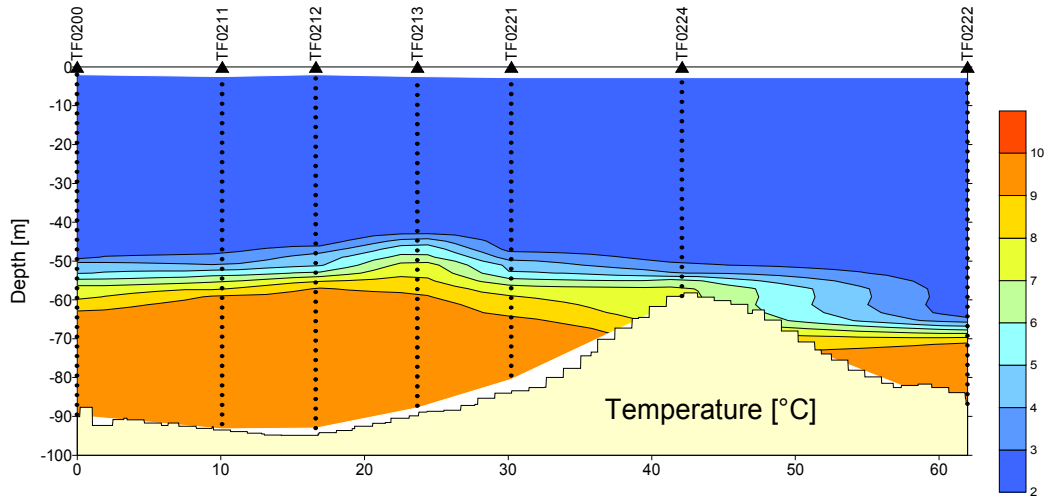
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monitoring
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06HE1001

monitoring um Bornholm zurück
04.02.2010 02:18 - 14:22 UTC



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