



Baltic Sea Research Institute Warnemünde

Cruise Report

R/V "ALKOR"

Cruise- No. 06AK / 08 / 02 (AL 313)

10 February - 20 February 2008

This report is based on preliminary data

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1. Cruise No.: 06AK/ 08 / 02 (AL 313))

2. Dates of the cruise: from 10/02/2008 to 20/02/2008

3. Particulars of the research vessel:

Name: r/v 'ALKOR'

Nationality: Germany

Operating Authority: Leibniz Institute of Marine Sciences at Kiel University
(IFM - GEOMAR), Kiel

4. Geographical area in which ship has operated:

Baltic Sea between Kiel Bight and central eastern Gotland Sea

5. Dates and names of ports of call

- / -

6. Purpose of the cruise

Monitoring cruise in the frame of the COMBINE program of HELCOM,
combined with long term observations of IOW

7. Crew:

Name of master: J. P. Lass

Number of crew: 11

8. Research staff:

Chief scientist: Klaus Nagel

Participants :	Jan Donath	Johann Ruickoldt
	Christiane Gottfried	Doris Setzkorn
	Ines Hand	Sven Trinkler
	Ursula Hennings	Erika Trost

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 area under investigation covered the Baltic Sea between Kiel Bight and the central eastern Gotland Basin as shown in the attached maps. Marine meteorological, hydrographic, chemical and biological investigations were performed at 56 stations according to the COMBINE program of HELCOM. The measurements were supplemented by continuous registration of standard meteorological parameters as well as of surface water temperature and salinity.

At several stations plankton was sampled with WP2 nets in depths chosen according to the measured temperature and salinity profiles. Additionally samples for Chlorophyll analysis are taken and frozen for later analysis. Furthermore, on 6 tracks and at 14 stations samples for analysis of organic contaminants are taken and prepared for analysis in the laboratory after the cruise.

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.

The weather during the cruise can be separated into three phases. During the first three days of the cruise air pressure increased from 1035 hPa to 1040 hPa and the wind was rather calm. Air temperature varied between 3 °C and 7 °C. After two days of a decrease to 1030 hPa air pressure increases again to a maximum of 1043 hPa on 16/02/2008. On 16/02/2008 and 17/02/2008 air pressure decreases from 1043 hPa to 1014 hPa within 36 hours. During this period some stormy events were separated by some hours of calm weather. Air temperature decreased during this time down to -2.7°C and was below 0 °C for most of the time. The last period extending from 18/02/2008 to the end of the cruise was characterised by stable air pressure, calm wind conditions and moderate temperatures between 3 °C and 5 °C. No worth mentioning precipitation was observed during the cruise.

Surface temperature during the 2008 February cruise was rather uniform in all areas under investigation and ranged between 3.5 °C and 4.5 °C. These values were generally above the means calculated from the observations during the February cruises of the years 1993 to 2007, but close to those found in 2007 at the same time. The upper part of the water column was well mixed showing almost homogenous distribution for physical and chemical parameters in depth profiles from the surface down to the sea floor or the halocline. The halocline was found at depths of approximately 30 m in the Arkona Basin, 50 m in the

Bornholm Basin and around 60 m in the south - eastern parts of the Baltic Sea and the eastern Gotland Basin. West of Darß Sill (Kiel Bight, Lübeck Bight, Mecklenburg Bight) surface salinity varied between 10 and 19, while east of Darß Sill (Arkona Basin, Bornholm Basin and central eastern areas) surface salinity was generally close to 8. These values are in good accordance with those expected from long term observations during February cruises.

In the western areas of the Baltic, from Kiel Bight to the isle of Bornholm, salinity in the bottom layer was found to be between 15 and 22, with highest values at station TF0361 (salinity 22.71) and the northern part of the Arkona Basin (station TF0104 , salinity 22.23), indicating that higher saline inflow waters dominate in these parts of the Baltic. East of Bornholm, bottom salinity varied around 15 in the Bornholm Basin and 12 in the eastern central areas and is within the range expected from long term observations. Temperature in the bottom layer was found around 4 °C in the western areas, between 5 °C and 6 °C in the Arkona Basin, above 8 °C in the Bornholm Basin and the south of the Gotland Basin and slightly above 6 °C in the central eastern Gotland Basin. Highest water temperature during this cruise was found at station TF0212 at a depth of 60 m, where 9.3 °C were measured. At this station, temperature at the bottom (93 m) was almost 1 °C lower.

The western Baltic Sea and the Arkona basin were well oxygenated down to the sea floor with oxygen concentrations varying around 8 ml/l. Due to the relatively high water temperature oxygen concentrations are slightly below the values expected from long term observations. In the Eastern Gotland basin hydrogen sulphide was measured below the 125 m horizon in concentrations reaching up to 5 mg/l in the bottom layer at station TF0271. This values was twice as high as that found in February 2007.

A special situation was found in the Bornholm Basin, where traces of H₂S (below 0.4 mg/l) were measured on 13/02/2008, while traces of oxygen (0.17 ml/l) were found on 19/02/2008. At both times, concentrations of 2.0 ml/l oxygen were measured slightly above 60 m.

Nitrate concentrations in the surface layer were normal for this time of the year and vary between 2 µmol/l and 4 µmol/l, which is within the range expected from long term observations. Only at stations TF0360 and TF0012 nitrate concentrations of more than 7.3 µmol/l and 9 µmol/l, respectively, are found due to the inflow of high saline and nitrate rich water. 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 long term observations. Only at stations TF0360 and TF0012 higher values were observed. However, as the whole water column is well mixed at both stations and as the concentrations are within the ranges expected for the bottom layer, these values may be explained by mixing effects. In the bottom layer of the deeper stations in the regions east of Bornholm concentrations of

nitrate and phosphate are controlled by the presence of oxygen or hydrogen sulphide and lie in the expected range.

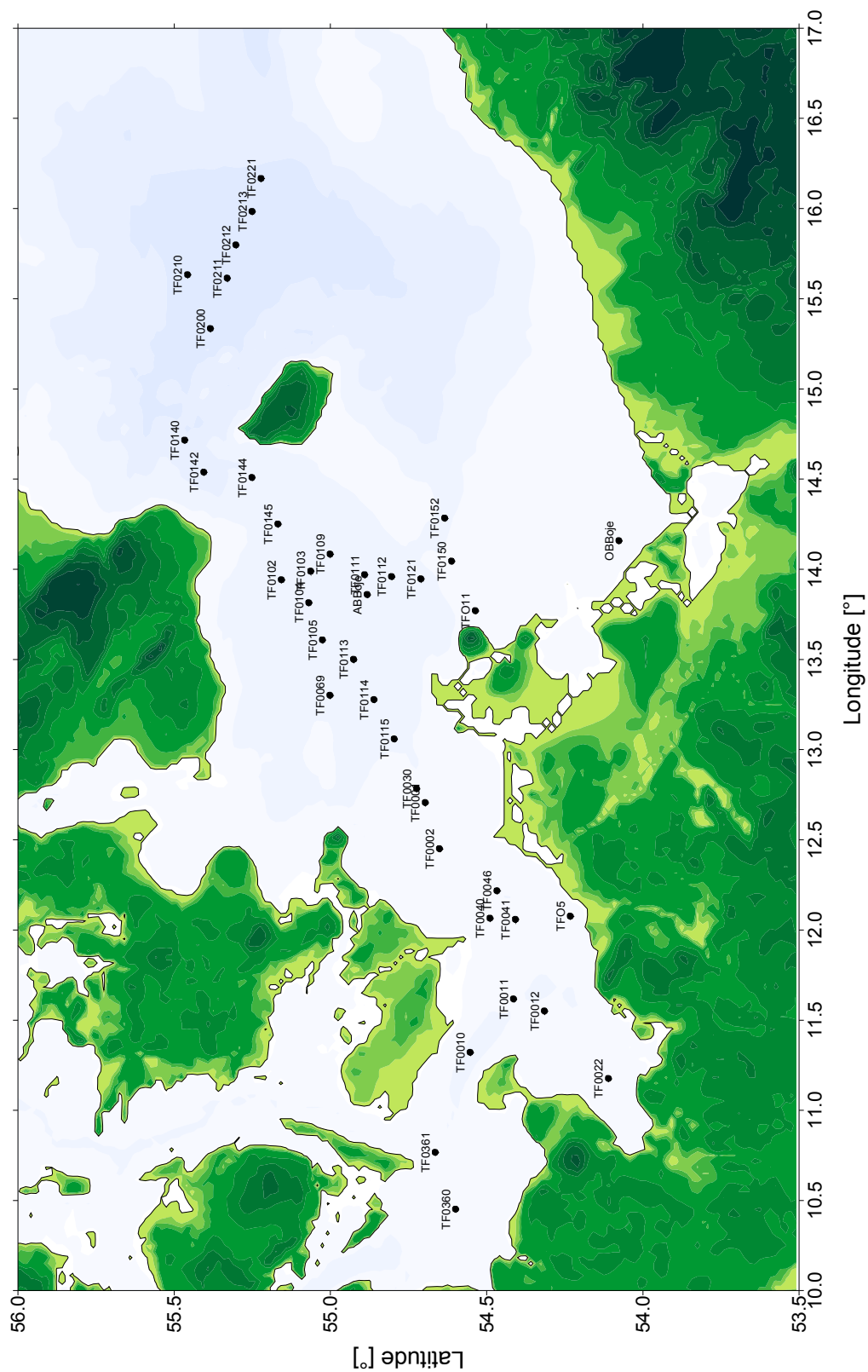
Klaus Nagel
Scientist in charge

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 Gotland Sea
- map showing oxygen concentrations in near the bottom water layer
(hydrogen sulphide concentration is given as negative O₂ equivalents)

Stationmap K1
monitoring 06AK0802

40 Stationen

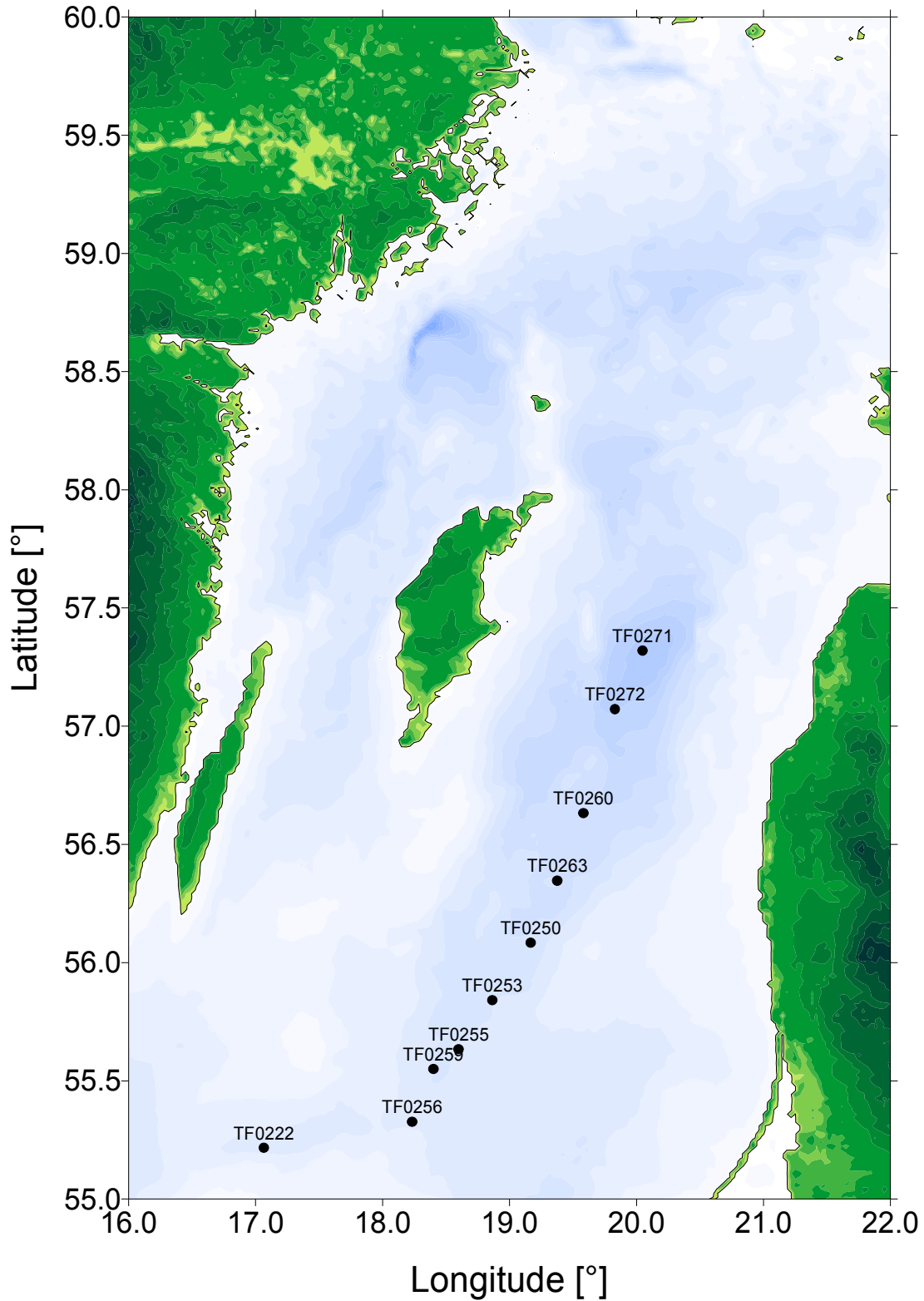


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Stationmap K2
monitoring 06AK0802

10 Stationen



Preliminary results of hydrographic and hydrochemical parameters at selected stations

surface layer

Station Date	Stat.Name Stat.No. **)	Temp. °C	Salinity	NO ₃ *) µmol/l	PO ₄ µmol/l	SiO ₄ µmol/l	O ₂ ml/l
Kiel Bight 10/02/2008	TF0360 5	4.18	18.55	7.26	0.79	20.5	8.11
Mecklenburg Bight 11/02/2008	TF0012 7	3.84	15.71	8.92	0.80	20.4	8.34
Arkona Basin 12/02/2008	TF0113 25	4.11	8.15	2.92	0.62	13.8	8.70
Bornholm Deep 13/02/2008	TF0213 39	4.42	7.62	3.46	0.74	14.3	8.35
Stolpe Channel 19/02/2008	TF0222 49	3.99	7.49	3.24	0.72	14.2	8.53
SE Gotland Basin 18/02/2008	TF0259 48	3.85	7.34	2.62	0.72	15.1	8.64
Gotland Deep 16/02/2008	TF0271 41	4.00	7.35	3.40	0.64	12.0	8.51

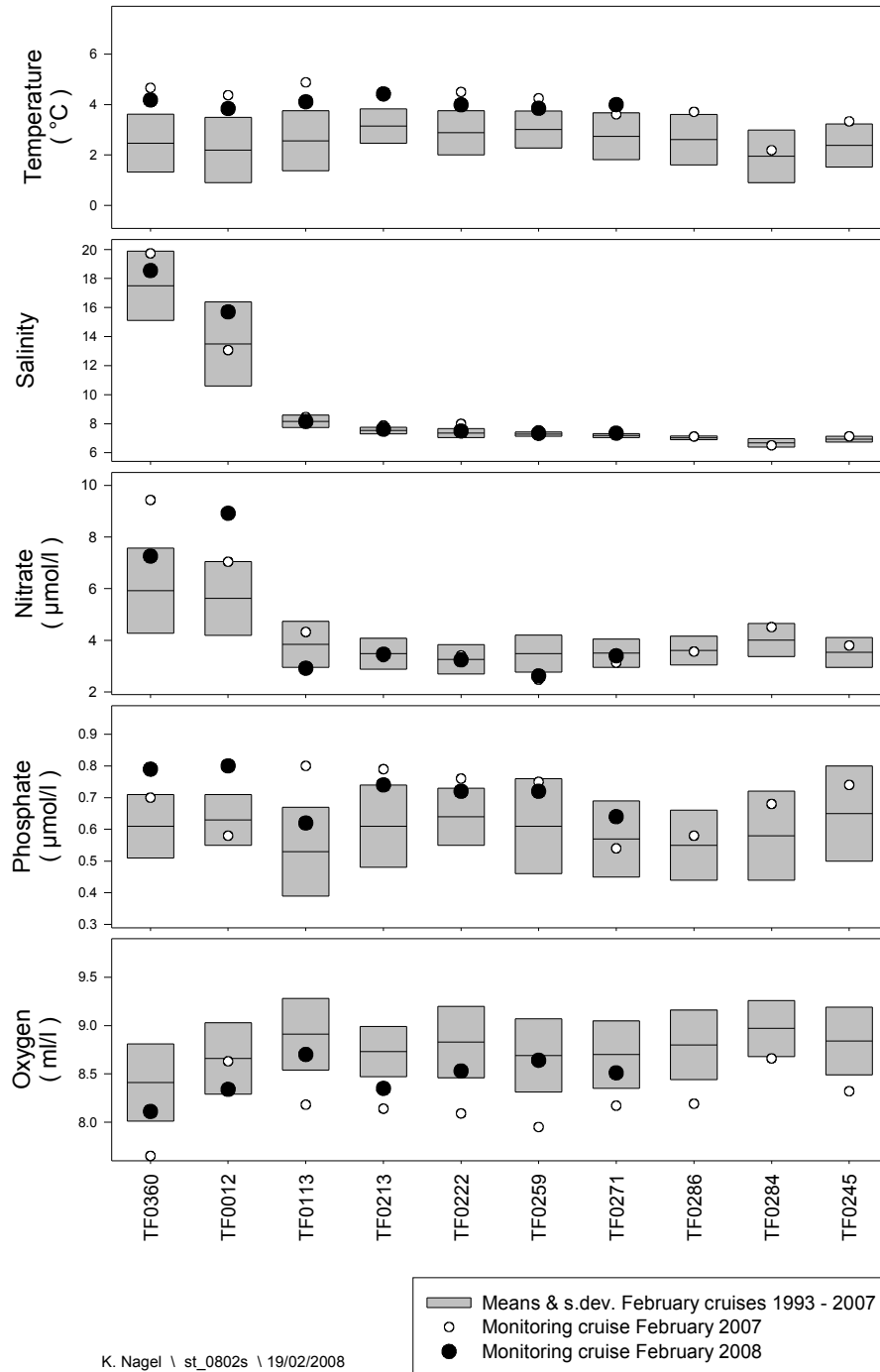
near bottom layer

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 10/02/2008	TF0360 5	18	4,32	19,84	7,42	0,79	19,8	7,78
Mecklenburg Bight 11/02/2008	TF0012 7	25	4,34	18,28	8,10	0,90	22,0	7,49
Arkona Basin 12/02/2008	TF0113 25	48	4.99	21.75	7.09	0.82	16.1	6.91
Bornholm Deep 13/02/2008	TF0213 39	88	8.60	15.82	-	6.45	70.5	-0.52 (H ₂ S)
Bornholm Deep 19/02/2008	TF0213 51	88	8.50	15.51	5.95	3.40	62.9	0.17
Stolpe Channel 19/02/2008	TF0222 49	76	8.39	12.86	8.00	2.10	42.2	2.30
SE Gotland Basin 18/02/2008	TF0259 48	87	6.05	10.88	3.70	3.45	52.4	0.30
Gotland Deep 16/02/2008	TF0271 41	235	6.50	12.71	-	4.45	81.3	-6.72 (H ₂ S)

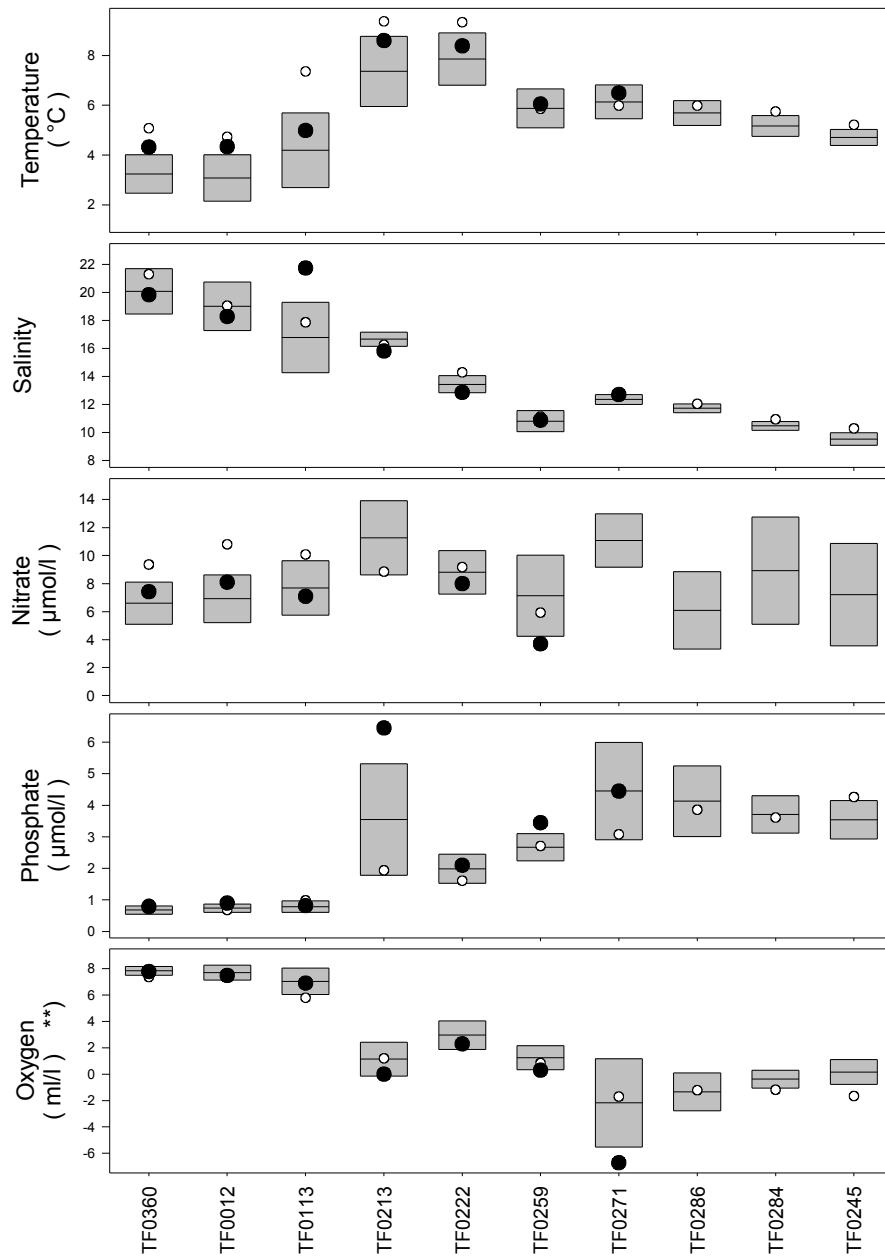
*) NO₃ is given as sum of NO₃⁻ and NO₂⁻ (in most samples NO₂⁻ was present only in traces)

***) see attached maps

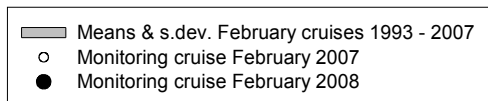
Monitoring stations / February cruises : near-surface layer



Monitoring stations / February cruises : near-bottom layer



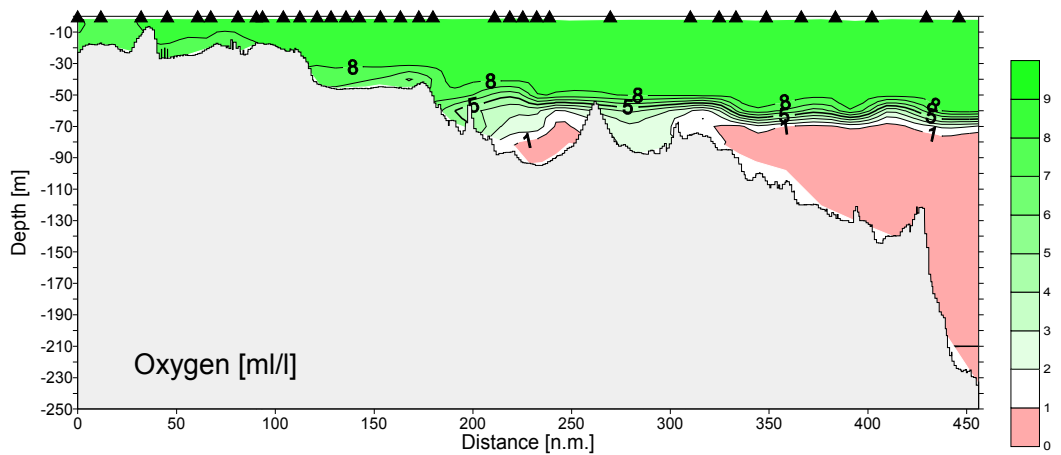
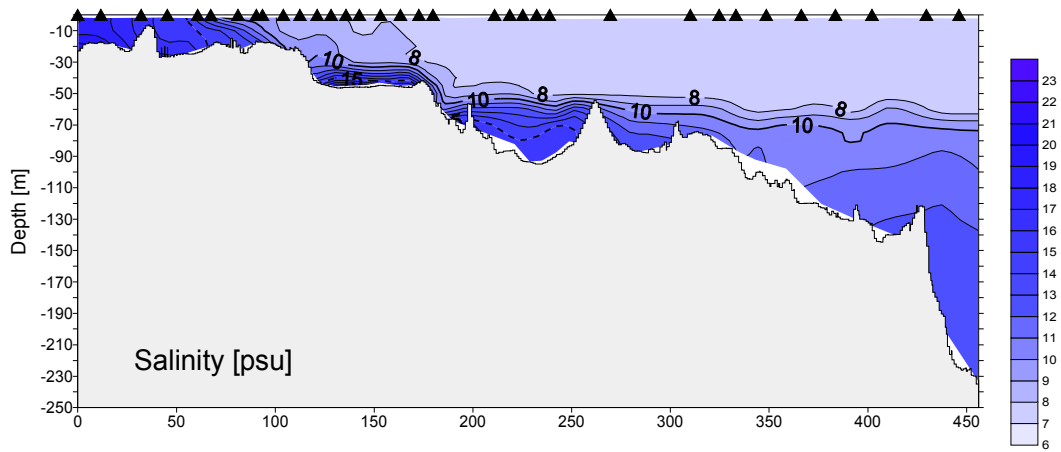
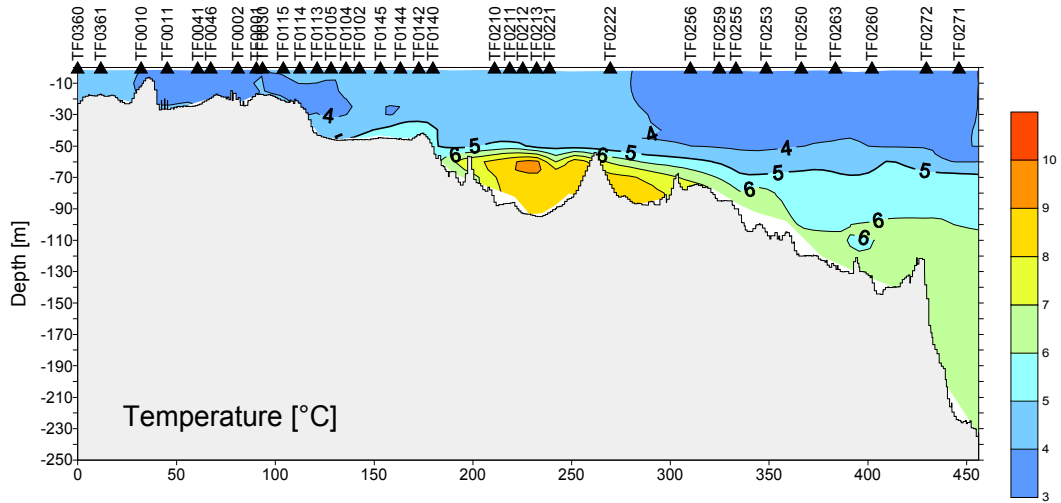
**) : H₂S was converted to negative O₂ equivalents

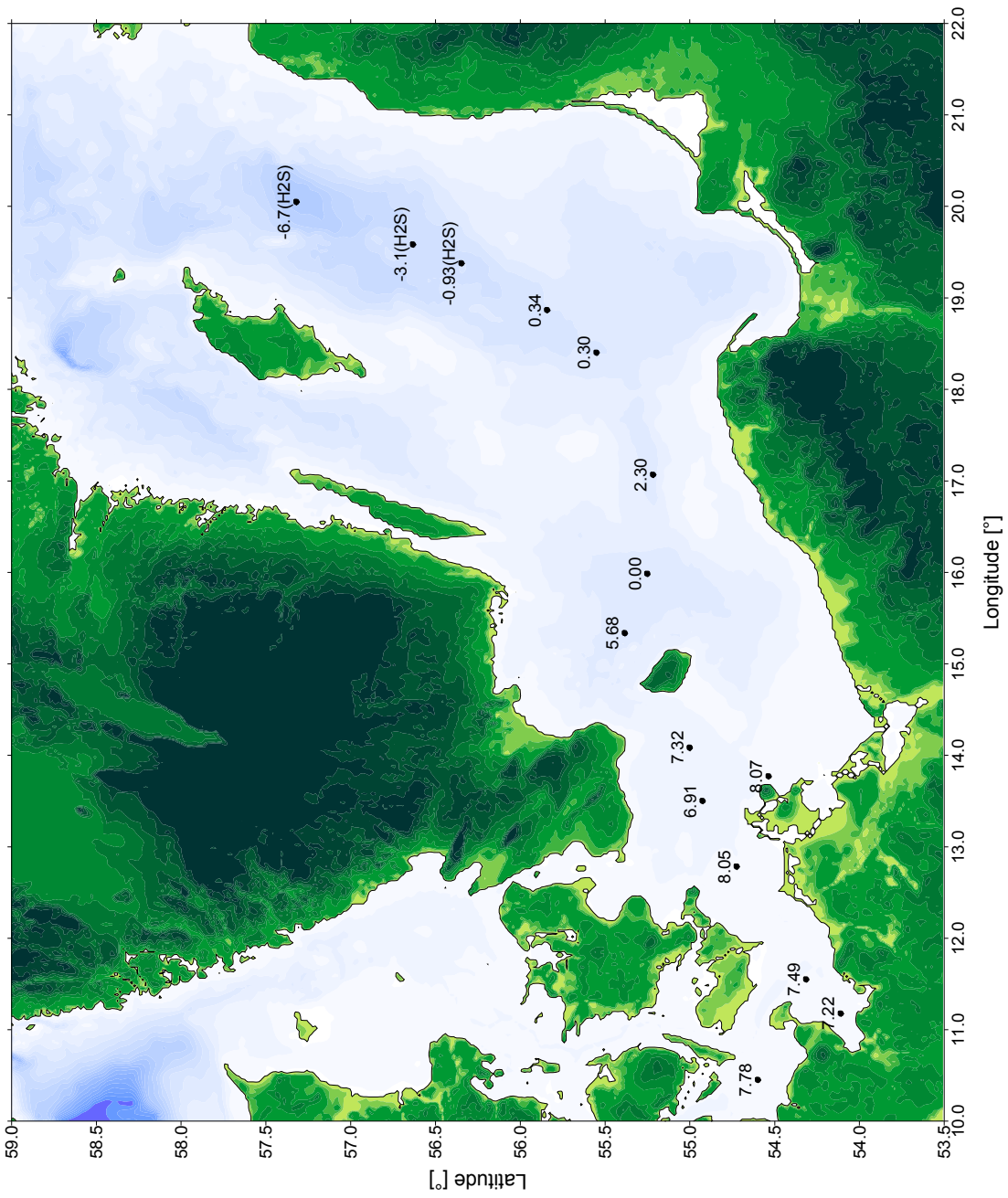


K. Nagel \ st_0802b \ 19/02/2008

Kiel Bight - Gotland Sea

monitoring 06AK0802





Oxygen Bottom
concentration [ml/l]
monitoring 06AK0802

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