# Cruise Report

## F.S. ALKOR Cruise No. 247

## Dates of Cruise: 11.10. to 14.10.2004

## Projects:
## BASEWECS
## and
## Student course in phys. oceanogr.

Areas of Research: Physical oceanography

Port Call: Warnemünde (11.10.)

Institute: IFM-GEOMAR Leibniz-Institut für Meereswissenschaften an der Universität Kiel

Chief Scientist: Dr. Johannes Karstensen

Number of Scientists: 10

# Contents

# Chapter 1

# Scientific peronal

Cruise code: AL247
Cruise dates: 11.10. – 13.10.2004
Port calls: Kiel - Warnemünde - Kiel

Table 1.1: Scientific personal on AL247: IFM-GEOMAR: Leibniz-Institut für Meereswissenschaften an der Universität Kiel, Kiel, Germany; CAU: Cristian Albrechts Universität Kiel, Kiel, Germany

| Name | Institute | Function |
|---|---|---|
| Karstensen, Johannes | IFM-GEOMAR | Chief scientist |
| Schmidt, Sunke | IFM-GEOMAR | Phys. Ocean. |
| Blöhdorn, Björn | IFM-GEOMAR | Phys. Ocean. |
| Smarz, Christopher | IFM-GEOMAR | CTD lab. |
| Phillipp Weddige | CAU | student |
| Jianwei Zhang | CAU | student |
| Rebecca Hummels | CAU | student |
| Astrid Dispert | CAU | student |
| Jens Fischer | CAU | student |
| Fritz Krabe | CAU | student |

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# Chapter 2

# Scientific Background

ALKOR cruise AL247 was three day cruise. It was the third of three cruises in 2004 in the framework of the BMBF project Baltic Sea Water and Energy Cycle Study (BASEWECS), subproject C (grant#. 01LD0025). The purpose of the cruises was to obtain a rather synoptic picture of the property distribution and velocities in the western Baltic and to maintain a mooring site at the southeastern opening of the Fehmarn Belt.

In general two section are occupied: one section crossing the Fehmarnbelt (section 'C') and one section following the deepest topography from about 10°40 E to 14°21 E (section 'L'). Along both sections CTD/rosette sampling is performed as well as continuously recording of current velocities using a vessel mounted ADCP.

Mooring site (V431) is maintained, located at the southeastern opening of the Fehmarn Belt. The mooring consists of a Workhorse-ADCP (300 kHz), and a self containing CTD (Type MicoCat) mounted in a commercial shield (Flotation Technology).

Besides the scientific motivation, the cruises are utilized for educational purposes. Undergraduate students are introduced into modern observational techniques of physical oceanography, basics in instrument calibration and interpretation of the observations. In addition it should give the students to experience the work and life at sea in general and last but not least to explore/investigate the Baltic Sea, the 'ocean' at their back-yard.

# Chapter 3

# Cruise Narrative

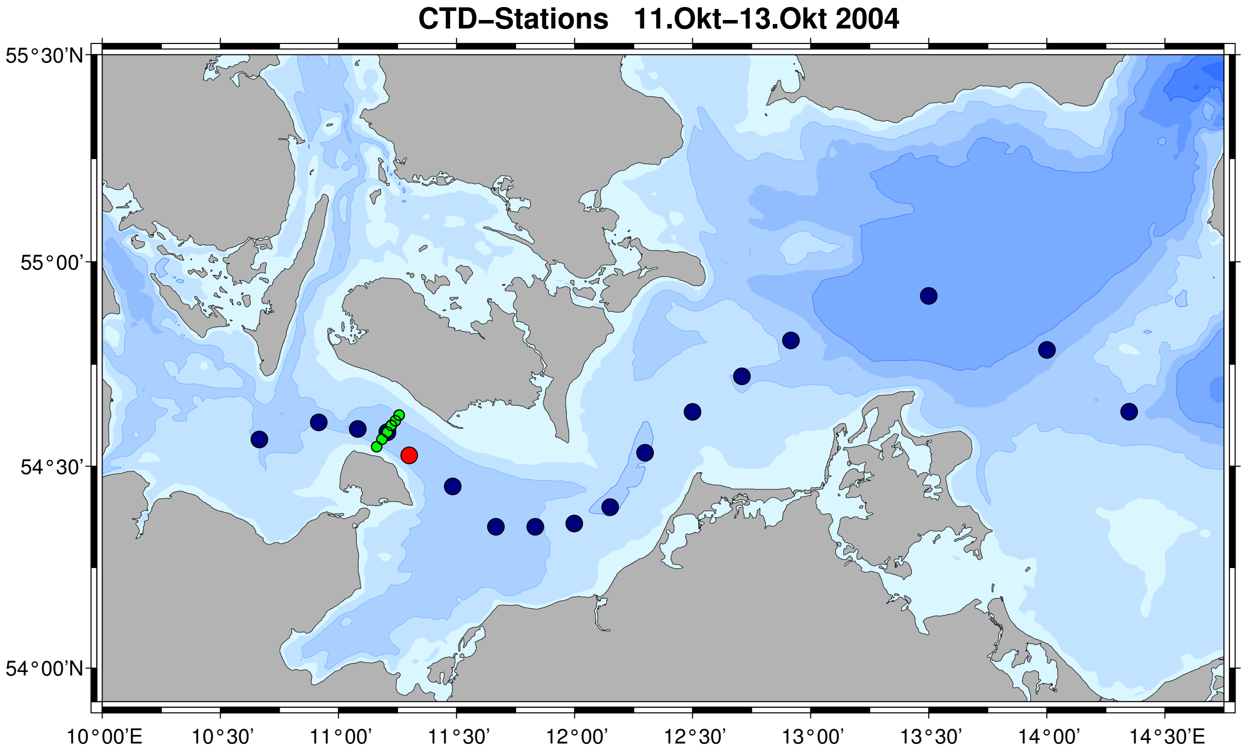


Figure 3.1: ALKOR 247 cruise track (black line, based on DATADIS recordings). Red dots are the CTD stations, black star is the location of the V431 mooring. AL247 had one port call for Warnemünde (11.10.2004)

DAY 1 (Monday, 11.10.2004):
We left IfM-GEOMAR pier (Westufer) at 08:00 (all times given in the narrative are ALKOR local time; MESZ) with 10 'scientists' on board, 6 of them were students in physical oceanography. The equipment was set-up on Friday day before the cruise (hull mounting of ADCP, installation of computers). Unfortunately, the main server for the cruises, the 'praksrv' had a hard disk failure

on Thursday (07.10.2004) and all data is apparently lost. Although the important cruise data was saved on CD Roms we did not had backups of some of the auxiliary data (capture files, matlab codes, photos, etc.). Tiberiu Csernock was fortunately able to install most of the system.

The first officer (Andreas Pooker) introduced the 6 students into the safety-on-board procedures. Then a brief introduction into the program for the next 3 days was given. A test station was performed and we collected the 'substandard' for calibrating the salinometer. This was our first cruise with the HydroBios CTD sonde. A problem occurred during the hiev-profile when the pressure sensor did not show to recorded values. This was a problem with the wire and we changed 'wire block 1' to the 'wire block 3'. At 12:00 we started sampling the first two CTD stations for the zonal section ('L'). Then the Fehmarn Belt section ('C') was sampled with a northward CTD section and a southward ADCP section. After finishing the section, we headed for the V431 mooring at the southeastern opening of the Fehmarnbelt. At 17:50 order 20 m away from the nominal position of the mooring the release code was transmitted. About 10 minutes, and an number of release code transmissions, later the floatation part of the mooring was spotted. The floatation part was on deck 10 minutes later. When hieving the rest of the shield the 'METEOR-rope' broke off. As no floatation was attached to the rope it sunk to the ground and no further attempt to recover the shield could be performed. Fortunately, a number of research ships from the 'Bundesamt für Seeschifffahrt und Hydrographie' were around and our master, capitain Jan Lass immediately contacted the RV GAUSS to ask for assistance (diver). RV GAUSS was not only busy with other duties but did not had a diver on board. However, the RV WEGA was contacted and they offered a possibility to recover the mooring with a diver mid next week. After a CTD cast at the mooring site, which is also part of the L-section, we headed straight on for Warnemünde Passagierkai. Warnemünde Passagierkai was reached at 22:30.

DAY 2 (Tuesday, 12.10.2004):
We left at 07:50 Warnemünde to continue working on the L-section. It was a sunny and clear day but cold (around 2°C). At 09:30 we started CTD work on the L-section again. Measurements of the salinity samples (CTD, TSG) from the first day was planned. Samples are typically stored one day to allow for a temperature adjustment to lab temperature. A problem with the Beckman salinometer appeared as the pump did not work. It took Christopher Smarz until 17:00 to fix the pump as he had to 'renew' more or less all tubes (without having original spare-parts). Consequently, salinometer work was started late Tuesday. During the day all CTD stations of the L-section east of Warnemünde were occupied. Last station was measured at about 22:00 and we slowly headed back towards the Fehmarnbelt.

DAY 3 (Wednesday, 13.10.2004):
We started early (05:50) with the first CTD station (again part of the L-section). Today all remaining bottle samples were analyzed with the salinomter. which worked without further problems. However, the whole salinomter needs new tubes. We occupied again a CTD and an ADCP section of the Fehmarnbelt and headed for the IfM pier. The whole equipment was stored into containers during the transit. We reached IfM pier at 16:00 which was relatively early as we did not launched the V431 mooring again. The containers were unloaded, while the ADCP was unmounted on the following day.

# Chapter 4

# Preliminary results

## 4.1 Mooring V431: eighth deployment period

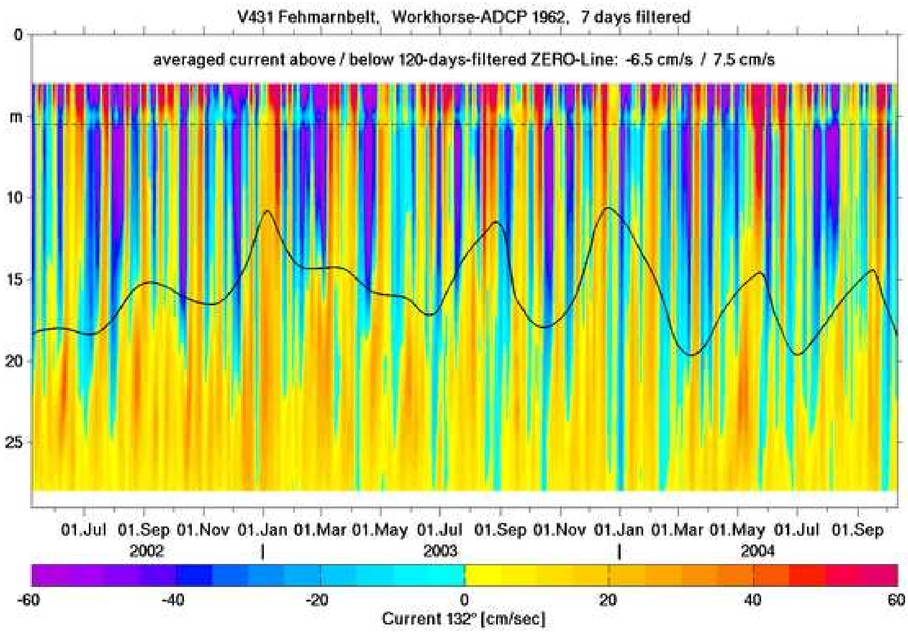


Figure 4.1: Mooring V431, upward looking Workhorse 300kHz ADCP - along bathymetry velocity (rotated to 132°) (upper), and perpendicular to bathymetry velocity (lower). Complete time series since first deployment (May 2002) is shown, values are averaged over 7 days.

Through a broken line during recovery only the floatation part of the mooring could be recovered. The floatation contains the ADCP and the releaser. The MicroCat, which is attached to the ground-weight, remained in water until recovered from a diver of the RV WEGA (BSH). The ground-weight was recovered at the 27. October 2004 at 54°N 31.378' and 11°E 18.113'. It was on deck RV WEGA at 10.52 h GMT. However, unfortunately the MicroCat had a malfunction and did not record. It is unclear if this was due to an incorrect programming or a wrong clock setup.

## 4.2 Meteorological observations

The weather situation during the three days of our cruise (figure 4.2) was dominated by a wide spread high-pressure-system all over North Europe slowly moving to Northeast. Over the western Baltic low precipitation and rather clear conditions dominated the cruise. Winds were mainly from the east/southeast with 10 to 15 $\mathrm{m^2\,s^{-1}}$(6 to 7 bft). Air temperature was not above 10°C.

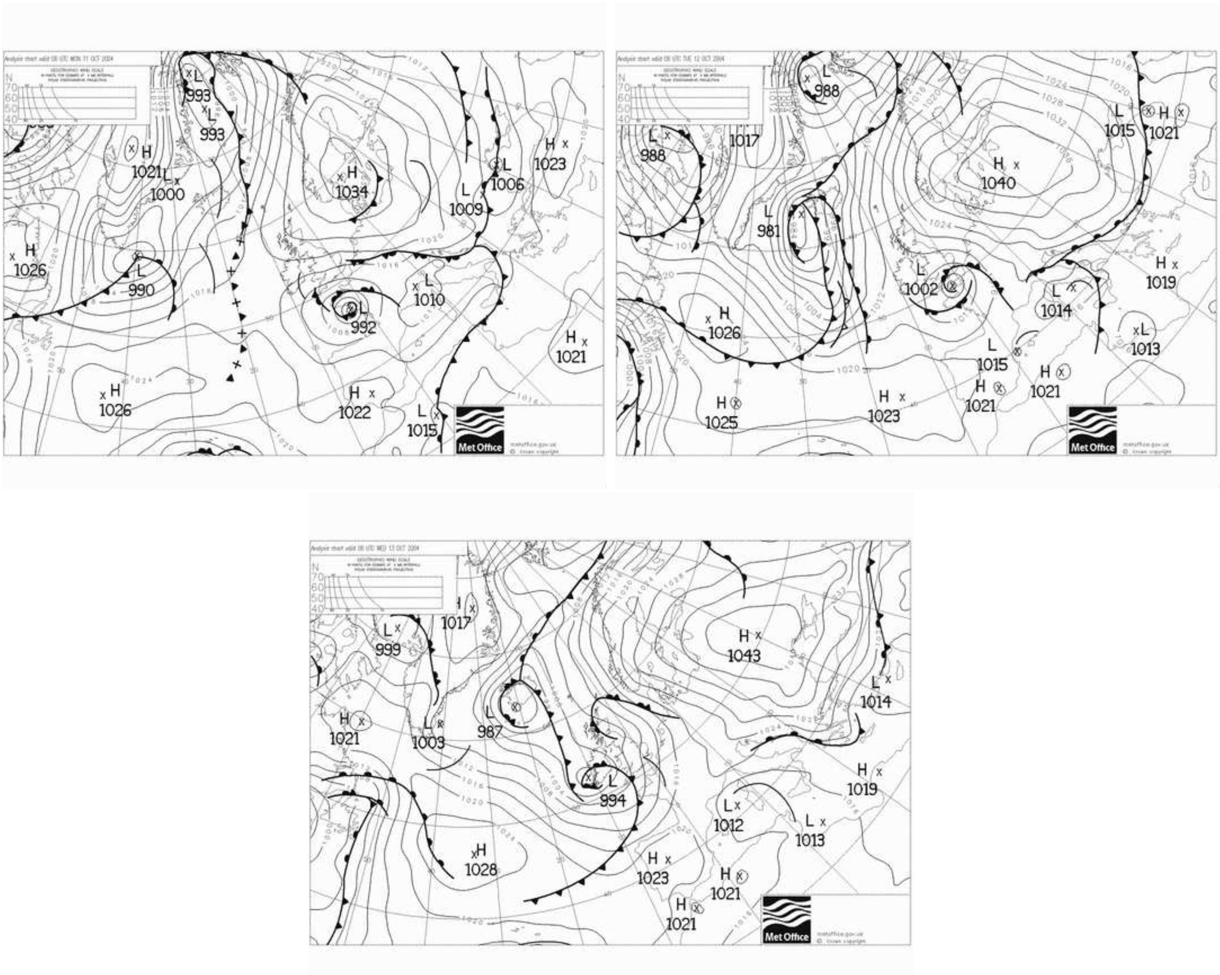


Figure 4.2: Air pressure distribution over Europe from 11- tp 13 Oktober 2004 (figures from UK Met Office).

Time series of meteorological parameters of interest measured during our cruise are shown in figure 4.3 and 4.4. Time axis is given UTC, in the night from the first to the second day of the cruise we had a port call at Warnemünde.

The air temperature (Figure 4.3) shows a typical daily cycle warmer during the day. Maximum air temperature where around 10°C and at midday. The first days minimum of about 2°C was reached in the night during port call. The second night minimum was a little bit higher than 4.5°C as we were at sea and the surface water was still much warmer than the air. The wet-

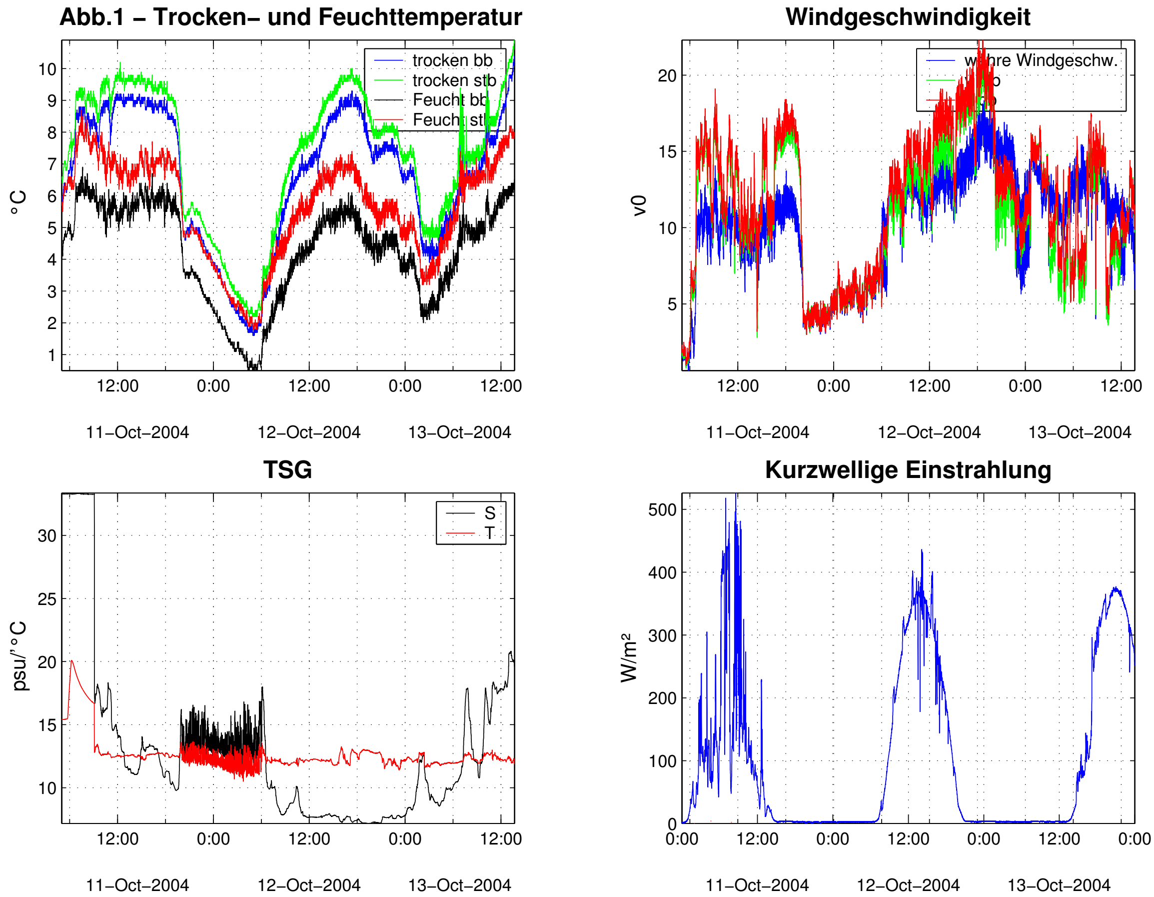


Figure 4.3: (from upper left to lower right) Air temperature, wind speed, thermosalinograph temperature and salinity, and short wave radiation.

bulb temperature, measured with a psychrometer, was always smaller than actual air temperature through the effect of evaporative.

The air pressure increased from 1027 hPa leaving Kiel to 1030 hPa at midday on Monday, following the afternoon and the night it further increased up to 1032.3 hPa late Tuesday morning. Until the second night and Wednesday morning the air pressure decreased down to 1022 hPa while arriving Kiel. Those changes where the result of the high-pressure-system moving southeast to Northeast Europe.

The Thermosalinograph, which is mounted in a certain depth in the bow of RV ALKOR, measures Sea Surface Temperature (referred to as SST) and Salinity by pumping water through the measurement system. The first meaningful SST values for Monday where at late morning and are varying from 12.2°C to 12.8°C. During harbor time in the first night the SST data was rather constant as expected. For the next days of the cruise the values vary between 11.7°C and 13° with the SST Maximum at Tuesday afternoon with 13.25°C. Salinities were generally higher in the west and decreased to about 7.

The wind direction and speed on RV ALKOR is measured with to pairs of anemometer and

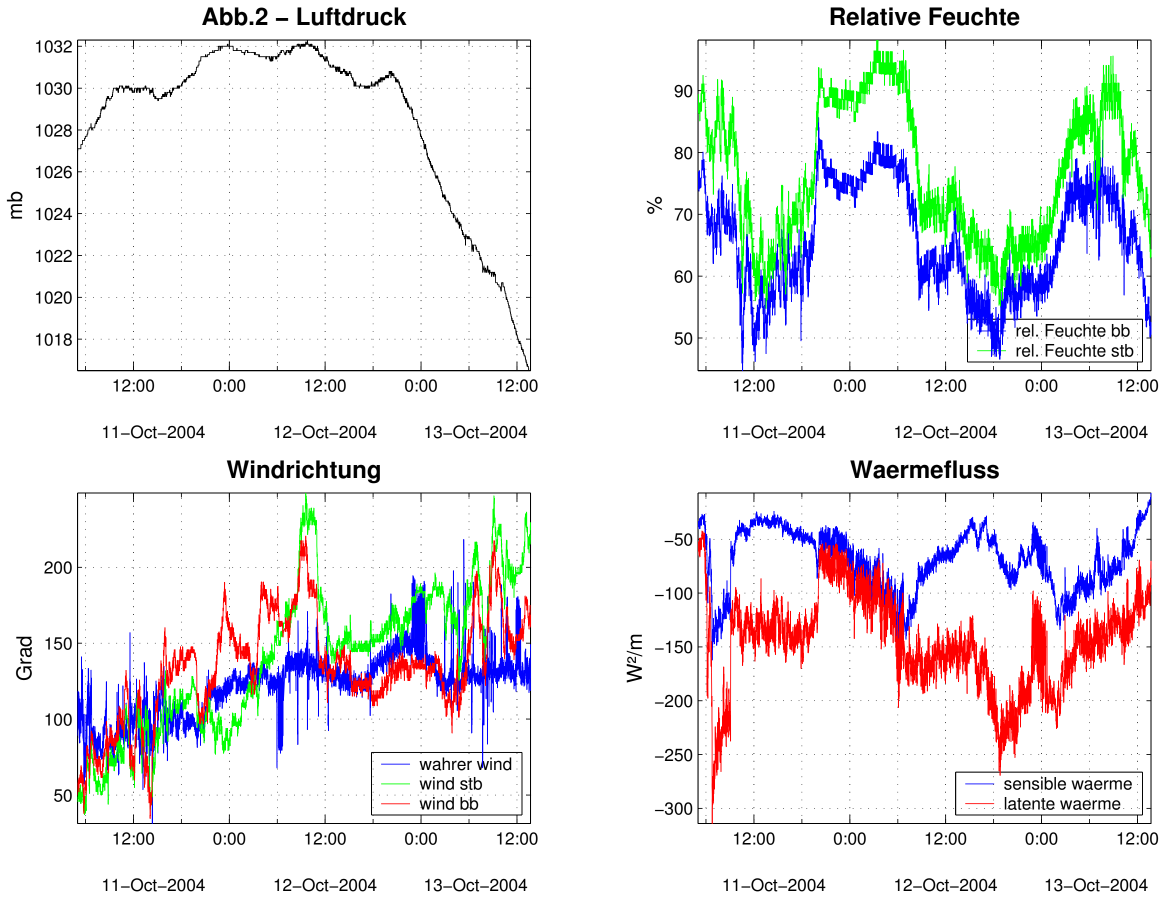


Figure 4.4: (from upper left to lower right) Air pressure, humidity, wind direction, and sensible and latent heat fluxes wave radiation.

flag, one pair on starboard and one port. Measured values are influenced by the ships movement and this effect has to be considered to derive the 'true wind'. Wind direction shows mainly East to South-Easterly winds. Wind speeds ranged on Monday between 7 up to 13 m/s, weakening down to 5 m/s during the first night at Warnemünde. On Tuesday wind speeds between 12 and 18 m/s having max values in the evening, followed by lower northeast winds with speeds about 10 m/s through the night. On Wednesday then wind speed increases from 9 to 15 m/s.

Relative humidity on one hand can be calculated from the psychrometer measurements by the difference between air and wet-bulb temperature. On the other hand the RV ALKOR's Datadis System is collecting relative humidity data from starboard and port sensors. Relative humidity provides information about the relation between vapor pressure and saturated vapor pressure, which strongly depends on air temperature. Relative humidity varies from 55 up to 85 during the whole cruise. Because of the temperature difference dependence values of relative humidity are much higher at night, so the Maxima are found short after midnight between 80% and 90%, on daytime values vary around 60.

The incoming shortwave radiation is the sum of direct and diffuse solar radiation. Diffusion occurs through scattering at clouds. The incoming shortwave radiation depends on the angle of entry changing with latitude and daytime and on cloudiness. A strong and clear daily cycle is visible as expected with highest values at noon. On Monday the maximal incoming shortwave radiation is about $520\,\mathrm{W\,m^{-2}}$, on Tuesday it is only about $430\,\mathrm{W\,m^{-2}}$.

The sensible and latent heat fluxes are calculated from Bulk formulas and are shown in figure 4.4. During the whole cruise both fluxes where negative (ocean loses heat). The sensible heat flux which is a result of the air/sea temperature difference was always negative as the surface water were still much warmer than the air temperature. Maximum losses where around 140 to $110\,\mathrm{W\,m^{-2}}$at night while lowest values (about 40 and $30\,\mathrm{W\,m^{-2}}$) are found in the afternoon when air temperatures were highest. The latent heat flux is driven from the evaporation and precipitation. It bulk parametrization depends on temperature and relative humidity as well as on wind speed. Latent heat fluxes varied between 300 and $50\,\mathrm{W\,m^{-2}}$while maximum losses occurred just before midday, minimal losses were at night.

## 4.3 Hydrographic and currents along C and L section

### 4.3.1 Fehmarnbelt (C section)

A typical upper water outflow/deeper water inflow was found during both occupation of the C section (figure 4.5). At the upper outflowing layer the current is strongest (maximum speed 0.8 m/s) between 54.56°N and 54.62°N. At about 20m depth changes the current sign and the inflowing waters have an maximum speed of order 0.7 m/s. The current speed (in and outflow) increased between first and second occupation as the easterly wind increased. The easterly winds already prevailed a few days before the cruise.

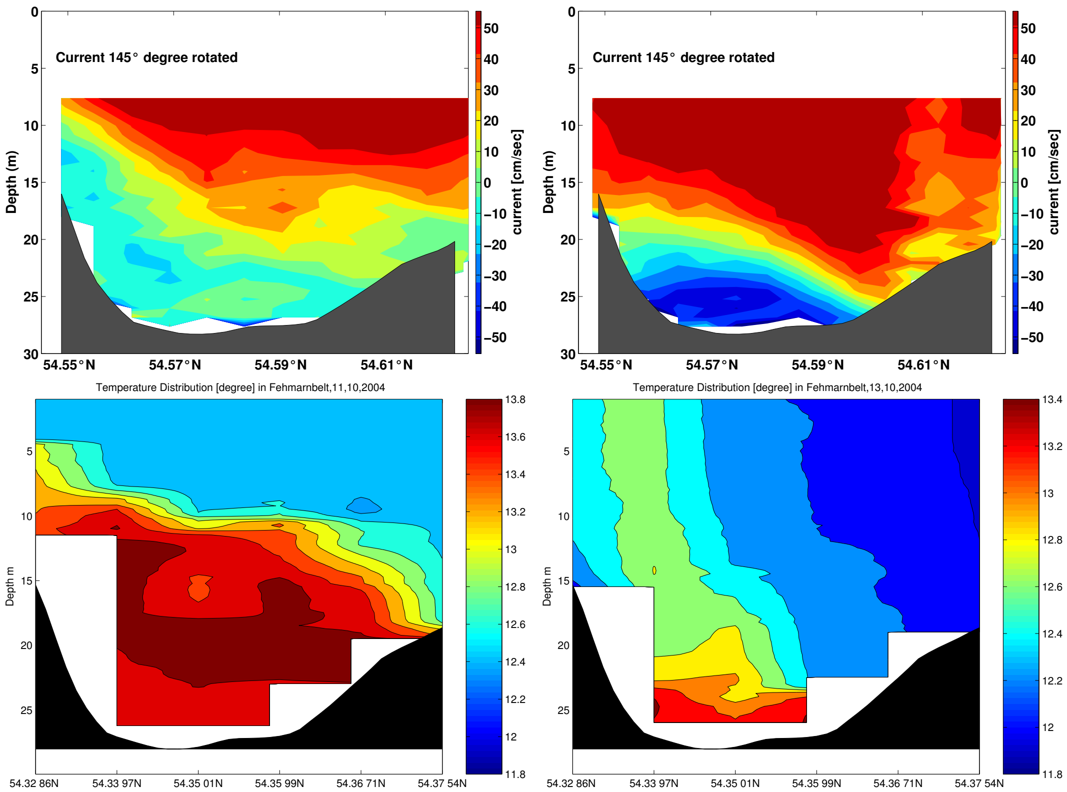


Figure 4.5: First (left) and second (right)occupation of the Fehmarnbelt section (C- section) in October 2004. See line text of figures for parameters shown.

The outflowing water is, as it is of Baltic origin, colder and fresher (and less dense) than the inflowing water which is of North Sea origin (figure 4.5 and figure 4.6). Most likely through the increase in the wind driven vertical shear between the first and second occupation an increase in vertical mixing changed the magnitude and hydrographic characteristic of the inflowing warm and saline water. This vertical mixing brings up the warmer and saltier waters. The vertical mixing changes the upper waters stronger over the core of the inflowing warm and saline waters and a horizontal gradient is established.

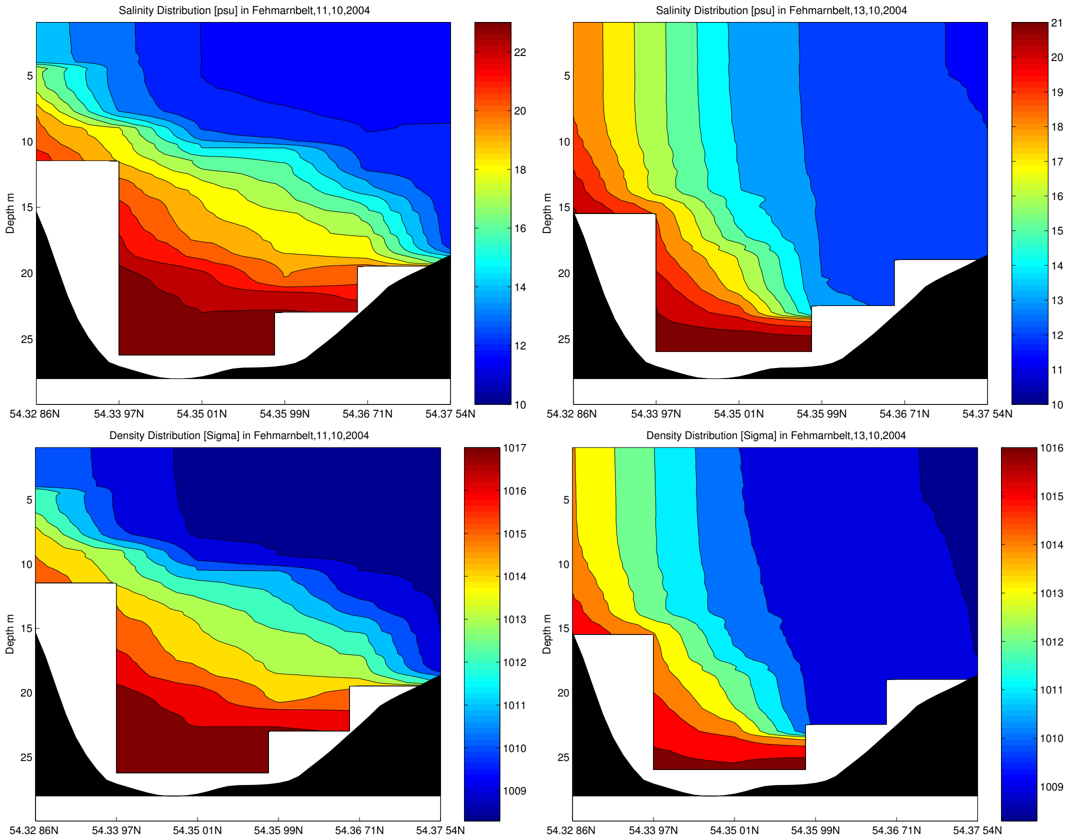


Figure 4.6: First (left) and second (right)occupation of the Fehmarnbelt section (C- section) in October 2004. See line text of figures for parameters shown.

The oxygen and fluorescence (figure 4.7) are affected by the vertical mixing and the deeper waters are getting higher in oxygen and a weak chlorophyll maximum that appeared in the middle of the Belt in about 10m depth during the first occupation is eroded. However, no calibration was done with the oxygen and fluorescence sensors and the data should be viewed with caution.

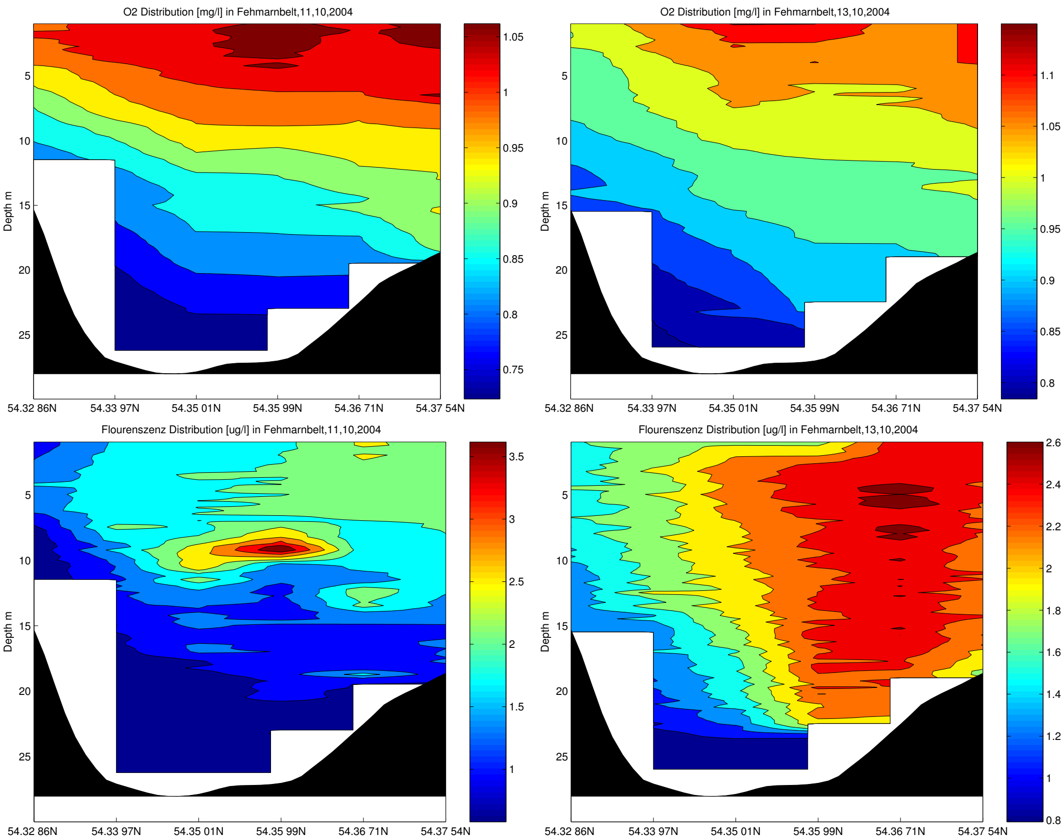


Figure 4.7: First (left) and second (right)occupation of the Fehmarnbelt section (C- section) in October 2004. See line text of figures for parameters shown.

## 4.3.2 Zonal section in the western Baltic (L-section)

Along the zonal section (L-section) the west to east decrease of the North Sea water, advected in the lower layer, is visible (Figure 4.8). The upper layer salinity is getting, as expected, fresher towards the east. The upper layer temperature does not show as strong gradients as the salinity. Oxygen is probably saturated at the surface and decreases to values around 0.6 at depth.

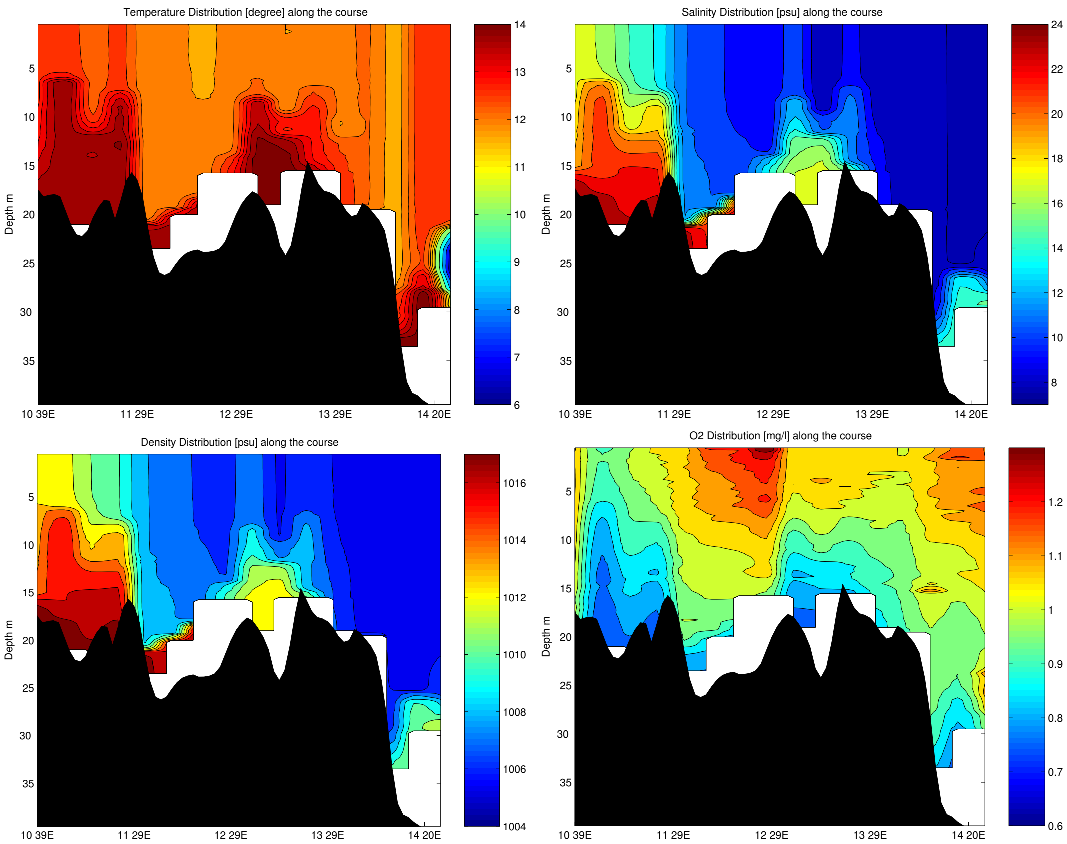


Figure 4.8: Hydrographic and biogeochemical parameters along the L-section (zonal section) in the western Baltic in October 2004. See line text of figures for parameters shown.

The currents along the L-section are surface intensified (Figure 4.8). However, associated with the deeper layer inflowing North Sea Water is a second current speed maximum, in particular in the eastward component visible.

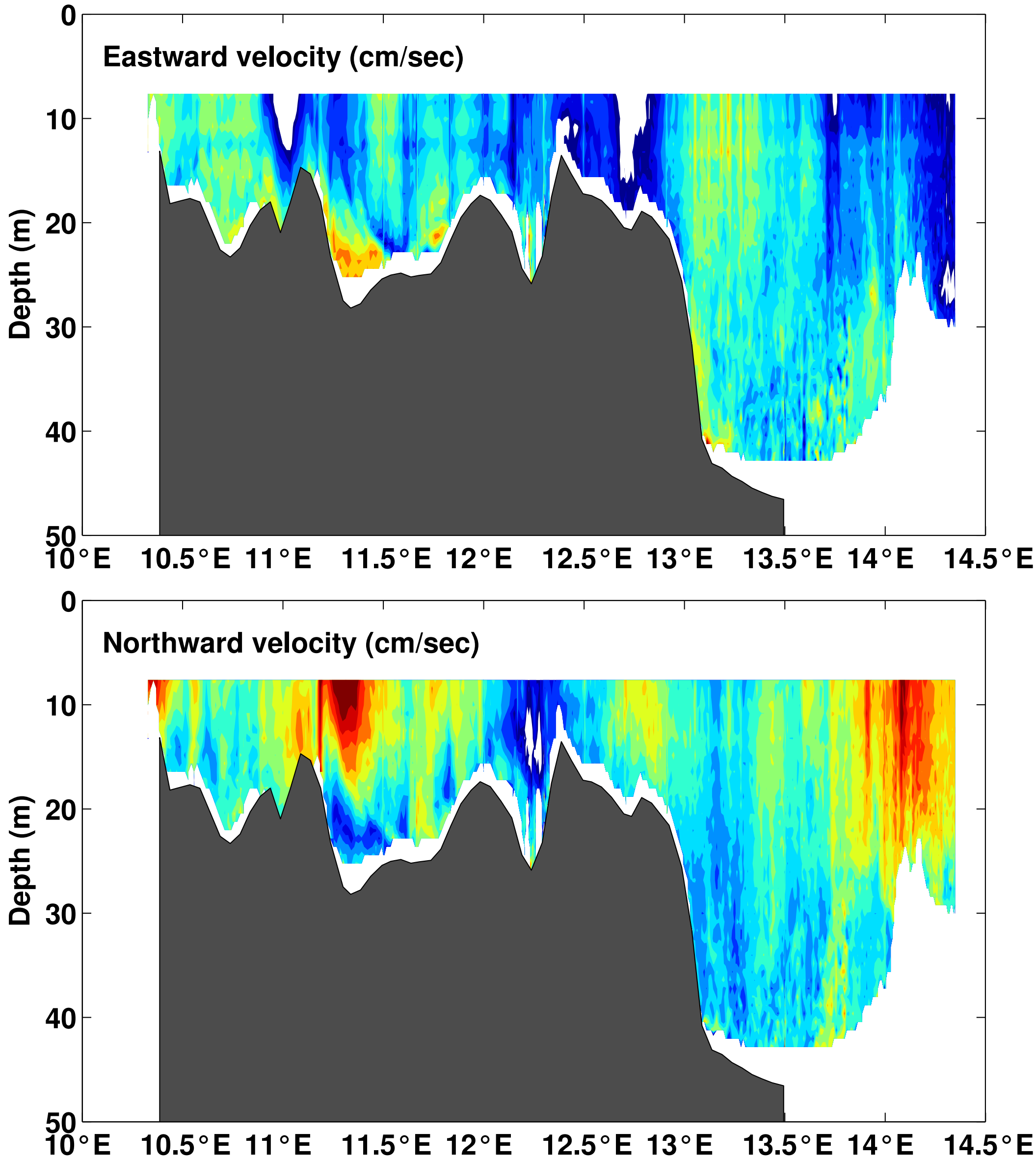


Figure 4.9: Currents: (upper) eastward; (lower) northward as recorded with the vmADCP along the L section in the western Baltic. For color scale see figure 4.5

# Chapter 5

# Equipment/instruments

## 5.1 Mooring V431

Mooring deployment site V431 is located in the military zone of Marienleuchte at the southeastern opening of the Fehmarnbelt. Water depth is about 29m. V431 consists of a Workhorse ADCP (300kHz) and a self containing T/S recorder of type SBE-MicroCat.

Table 5.1: V431: Summary on 8th recovery of trawl resistant bottom mooring V431.

| year; time (UTC) | latitude | longitude | depth | comment |
|---|---|---|---|---|
| 11.10.2004; 17:00 | 54°31.31'N | 11°18.23'E | 29 m | Recovery of floatation part. Ground weight (with MicroCat) still at ground |

As the mooring was detached during the recovery only the ADCP could be recovered. The MircoCat was recovered by the RV Wega on 27. October 2004, however, due to a malfunction (programming error, clock problem) the device did not recorded data. The mooring was redeployed on the 30.11.2004 from abord RC Littorina.

## 5.2 CTD/Rosette and Salinometer

During the AL247 cruise in the western Baltic a new Hydro Bios CTD was used. In addition to the 'basic' CTD variables (pressure, in situ temperature and conductivity) the Hydro Bios probe was equipped with an oxygen sensor and a chlorophyll sensor. During the first two days we collected bottle samples to allow for a calibration of the CTD derived salinity in comparison with a direct estimate using a salinometer (Beckman).

As the CTD sensors were rather new we expected accurate measurements from them. Besides taking bottle samples from the CTD rosette bottles samples were taken from a tab at the thermosalinograph (TSG) tube system. Again the TSG samples where analyzed with the salinometer and compared with the instruments records. The TSG is known from earlier cruise to have an offset order 0.2 in salinity (too low). Lab calibration of instrument will be performed end 2004/early 2005 but for the temperature sensor only (conductivity is not possible at the IFM-GEOMAR).

About a month after the cruise (between the 15.11.2004 and 18.11.2004) a lab calibration of the temperature sensors was undertaken using two high precision thermistors: a SIS (Sensoren Instrumente Systeme GmbH, Klausdorf, Germany) - PTM (Präzisions Labor Temperatur Messplatz) equipped with a platinum resistance thermometer. The SIS-PTM has a resolution of 0.1 mK with a consistency of 0.3 mK. The other instrument was an ISOTECH TTI-2. Both instruments differ by about 1.3 mK and rather randomly (figure 5.1, left). In reference to the SIS-PTM thermometer the HydroBios thermistor measures on average 9 mK too high temperature while in addition a linear temperature dependency of the error can be seen (figure 5.1, right). However, overall the temperature sensor of the HydroBios sonde is very accurate and no correction have been applied to the data of the AL247 cruise.

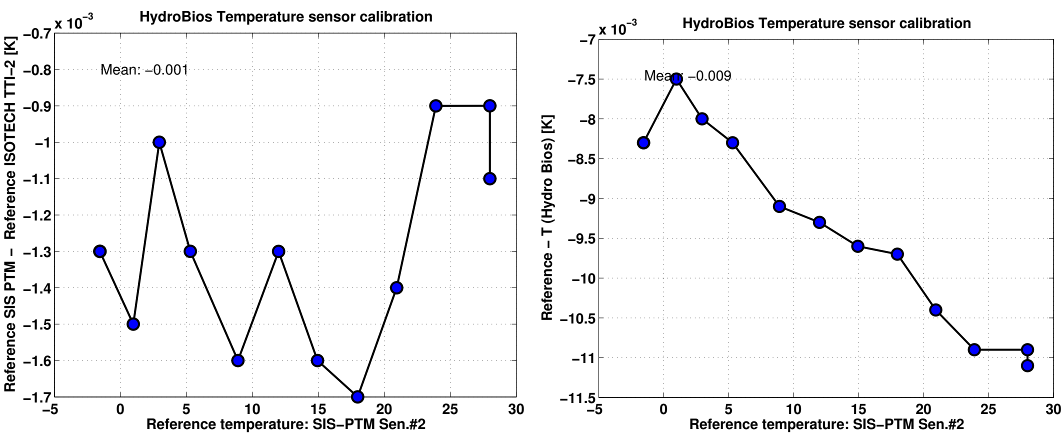


Figure 5.1: (left) Difference between two reference instruments used for a lab calibration of the Hydro Bios temperature sensor. (right) Difference between the SIS-PTM sensor#2 and the Hydro Bios temperature sensor. Calibration was done between 15.11.2004 and 18.11.2004 by Hans-Jürgen Langhof, IFM-GEOMAR.

To ensure high precision salinometer measurements first the instruments was calibrated using a commercially available 'Standard Sea Water' (IAPSO Standard Water; Batch#: P125). However, this was done only once at the beginning of the salinometer work (12.11.2004). To check the consistency of the salinomter during the analysis a so called *substandard* was measured every 5 measurements. The substandard was Baltic Sea water collected at the first station and stored in a 10 l plastic container. Using a substandard instead of the certified Standard Sea Water is suitable for the accuracies required here. The normal measurement procedure was to repeat the measurement until a pair of measured salinities did not differ more than 0.01 in salinity.

Plotting the substandard salinity versus the time of the measurement (Figure 5.2, left) reveals a 'jump' in the salinity between the two days of the measurements. Considering the temperature of the samples a clear linear dependency between the samples temperature and the measured salinity can be seen(Figure 5.2, right). Unfortunately the correct salinity of the Substandard is unknown and we can therefore not derive a 'sample temperature' dependent correction to

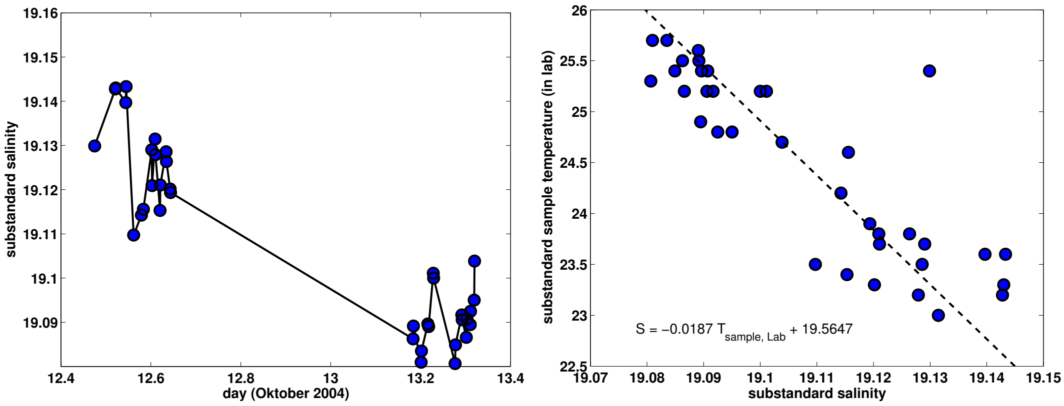


Figure 5.2: (left) Substandard salinities versus time of measurement in lab. (right) Substandard salinity versus temperature of the sample in lab. A best linear fit (broken line) and the regression equation is given.

apply to all the TSG and CTD sample analysis. The overall average value for the substandard was 19.1085±0.0200 (median 19.1097) and we have to take the 0.0200 as the uncertainty in the salinities measure with the salinometer. The median is the number that separates a row of elements into half, leaving the same number of elements on each side of this number.

The difference between CTD and bottle samples is shown versus depth in figure 5.3 (left). In general very large difference, up to -5 (CTD is 5 higher than bottle sample salinity), occur. These difference can be explained by the difference in sampling depth between CTD (lower) and bottles (rosette is higher up in the water column). The CTD sensor is deeper in the water column and samples the typical more saline water at greater depth (see figure 5.3, right, for a typical profile). We decided not to apply any corrections from the comparison between CTD and bottle samples as only a few value can be assumed to sample the same body of water.

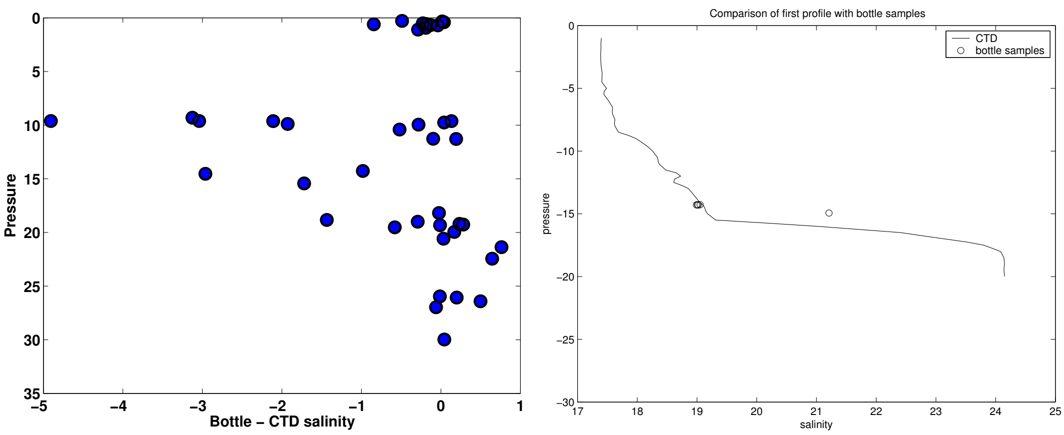


Figure 5.3: (left) Difference between bottle sample salinity and CTD salinity versus depth (pressure), (right) CTD profile and bottle salinities, note the strong gradient at mid depth.

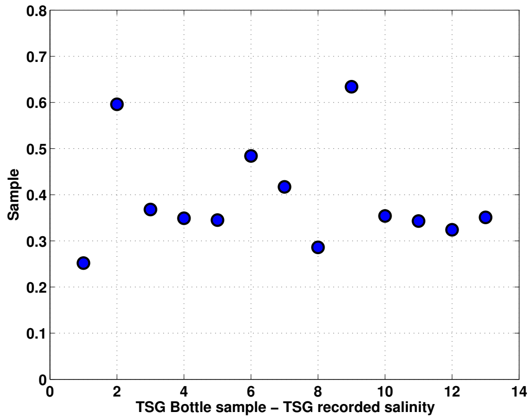


Figure 5.4: Difference between TSG sample salinity and TSG reading.

The difference between salinity samples from the TSG and the records are shown in figure 5.4. The mean difference is 0.3925±0.1136 (median: 0.3510) and somehow confirms the trend found during earlier cruises. The TSG salinities can be corrected as (using the median):

$$S_{corr} = S_{TSG,original} + 0.3510$$

## 5.3 Underway Measurements

### 5.3.1 Datadis

ALKOR has a central data collection system, called DATADIS. Here data from a number of sources (sensors) is merged into a single file which can be used from other devices or/and stored for later processing. Recently there was an 'update' of the DATADIS system by Maritec Engeneering. Apparently, the old BW monitors in the labs were removed but unfortunately not replaced and currently there is only one monitor in the 'dry lab'. In addition a number of shortcoming mentioned earlier are still persistent:

- There is no UTC (e.g. from the GPS system) available at the output (screen/file).
- No depth sounding (SIMRAD) at the output (screen/file).

### 5.3.2 Navigation

ALKOR has a GPS navigational system as well as a gyro compass available. Data is fed into DATADIS and from their available for other devices. For the use with the ADCP system a converter is needed that 'translates' the DATADIS string into a ADCP readable string.

### 5.3.3 Meteorological Data

ALKOR is equipped with meteorological sensors measuring air temperature, wind (speed and direction), wet-temperature, air-pressure, long and shortwave radiation. The long-wave radiation sensor does not deliver any data at all. Radiation sensors are cleaned at the beginning of the cruise.

### 5.3.4 Echo sounder

During AL 240 ER 60 SIMRAD echo sounder measured the depth. Unfortunately the instrument is yet not implemented into the DATADIS system. The data is only stored at an instrument own hard disc. Measured depth are based on the sound speed of 1453 $m^2 s^{-1}$as calculated from a temperature (8°C) and salinity (11)

### 5.3.5 Thermosalinograph

The thermosalinograph (TSG) on ALKOR is permanently installed at about 4m depth and a S/MT 148 type of Salzgitter Elektronik GmbH. TSG data is directly fed into the DATADIS. Calibration was done after the cruise after analysis of bottle samples.

### 5.3.6 Vessel mounted ADCP

A 300 kHz workhorse ADCP from RD Instruments was mounted in the ships hull. The vmADCP is used with bottom tracking mode. Navigational data comes from the DATADIS system of ALKOR, hence GPS positions and gyro compass heading. Absolute (earth coordinate) velocities are calculated using the vmDAS software provided through RD Instruments. The instrument delivered good data.

# Chapter 6

# Acknowledgment

Herzlichen Dank an Kapitän Jan Lass und die Offiziere Andreas Pooker, Rainer Nannen und Peter Strehlow sowie der gesamten Besatzung der ALKOR für ihre professionelle Unterstützung und die nette Atmosphäre an Bord. BASEWECS ist ein BMBF Projekt das zum DEKLIM Programm gehört und die Fördernummer 01LD0025 besitzt.

# Chapter 7

# Appendix

```
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Cruise     = HF SS 2004
Instrument = OTS
StartDate  = 2004/10/11
EndDate    = 2004/10/13
Columns    = NR:LAT:LON:D:YY:MM:DD:HH:lg:fb:mr:rg:kd
 1  54.5655 10.6650  21  2004 10 11   8.75  1 0 0 0 0
 2  54.6077 10.9165  23  2004 10 11  10.48  1 0 0 0 0
 3  54.5913 11.0823  32  2004 10 11  11.42  1 0 0 0 0
 4  54.5477 11.1622  12  2004 10 11  12.22  0 1 0 0 0
 5  54.5662 11.1843  29  2004 10 11  12.60  0 1 0 0 0
 6  54.5835 11.2078  28  2004 10 11  13.02  1 1 0 0 0
 7  54.5998 11.2243  28  2004 10 11  13.43  0 1 0 0 0
 8  54.6118 11.2413  24  2004 10 11  13.78  0 1 0 0 0
 9  54.6257 11.2570  21  2004 10 11  14.17  0 1 0 0 0
10  54.5268 11.2998  28  2004 10 11  16.42  0 0 1 0 0
11  54.3993 12.1512  21  2004 10 12   7.43  1 0 0 0 0
12  54.5328 12.2988  24  2004 10 12   8.62  1 0 0 0 0
13  54.6333 12.4997  18  2004 10 12   9.83  1 0 0 0 0
14  54.7205 12.7087  22  2004 10 12  11.02  1 0 0 0 0
15  54.8083 12.9163  22  2004 10 12  12.22  1 0 0 0 0
16  54.9168 13.4995  47  2004 10 12  15.08  1 0 0 0 0
17  54.7850 14.0003  40  2004 10 12  17.67  1 0 0 0 0
18  54.6340 14.3485  32  2004 10 12  20.10  1 0 0 0 0
19  54.3587 11.9992  18  2004 10 13   3.83  1 0 0 0 0
20  54.3508 11.8333  22  2004 10 13   4.63  1 0 0 0 0
21  54.3505 11.6670  26  2004 10 13   5.37  1 0 0 0 0
22  54.4503 11.4845  27  2004 10 13   6.40  1 0 0 0 0
23  54.5478 11.1620  17  2004 10 13   7.73  0 1 0 0 0
24  54.5662 11.1847  28  2004 10 13   8.02  0 1 0 0 0
25  54.5840 11.2073  28  2004 10 13   8.35  1 1 0 0 0
26  54.6005 11.2233  28  2004 10 13   8.65  0 1 0 0 0
```

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 54.6115 | 11.2412 | 25 | 2004 | 10 | 13 | 8.92 | 0 | 1 | 0 | 0 | 0 |
| 28 | 54.6248 | 11.2577 | 21 | 2004 | 10 | 13 | 9.18 | 0 | 1 | 0 | 0 | 0 |