Cruise Report
F.S. ALKOR Cruise No. 34/14

Dates of Cruise: 15. September to 18. September 2014

Projects:
Student course in phys. oceanogr.

Areas of Research: Physical oceanography
Port Call: Warnemünde (16./17. Sept. 2014)
Institute: CAU Kiel & GEOMAR Helmholtz Zentrum für Ozeanforschung Kiel
Chief Scientist & Report responsible: Dr. J. Karstensen (GEOMAR)
Number of Scientists: 9 & 9
Master: Jan Peter Lass

Chapter 1

Scientific personal

Cruise code: AL 34/14
Cruise dates: 15.9. – 18.09.2014
Port call: Kiel – Warnemünde – Kiel

Table 1.1: *Scientific personal AL 34/14: GEOMAR: Helmholtz-Zentrum für Ozeanforschung Kiel, Kiel, Germany; CAU: Christian Albrechts Universität Kiel, Kiel, Germany*

Name	Institute	Function	leg
Johannes Karstensen	GEOMAR	Chief scientist	1, 2
Christian Begler	GEOMAR	PO	1, 2
Jan Lüdke	CAU	Master student	1, 2
Thies Thorben Rinner	CAU	student	1
Nora Fried	CAU	student	1
Jessica Kern	CAU	student	1
Jannis Langmaack	CAU	student	1
Thore Kruse	CAU	student	1
Daniel Schönbein	CAU	student	1
Jennifer Kallert	CAU	student	2
Ann Katrin Seemann	CAU	student	2
Jonas Boomers	CAU	student	2
Miriam Judith Scharnke	CAU	student	2
Nicolas Oliver Fleischmann	CAU	student	2
Imke Sievers	CAU	student	2

Chapter 2

Objective

The main purpose of the ALKOR cruise 34/14 was the training of students in observational methods of physical oceanographers. Undergraduate students in the Bachelor programm ”Physik des Erdsystems” are introduced into modern observational techniques in physical oceanography, including instrument calibration and interpretation of observations. The course (MNF-Pher-110b) is part of the ”Messmethoden” lecture. The cruise will give the students an opportunity to experience the work and life at sea and also to explore and investigate physical oceanography processes in the western Baltic Sea, the ocean at their backyard.

The scientific motivation of the cruise is to obtain a rather synoptic picture of the hydrography and water movement in the western Baltic. Hydrographic and current sections from the Fehmarn Belt (section C) and along the deepest topography from about 10°40 E to 14°21 E (section L) were done. Moreover, a long time mooring site that monitors the flow through the Fehmarn Belt is serviced.

Chapter 3

Cruise Narrative

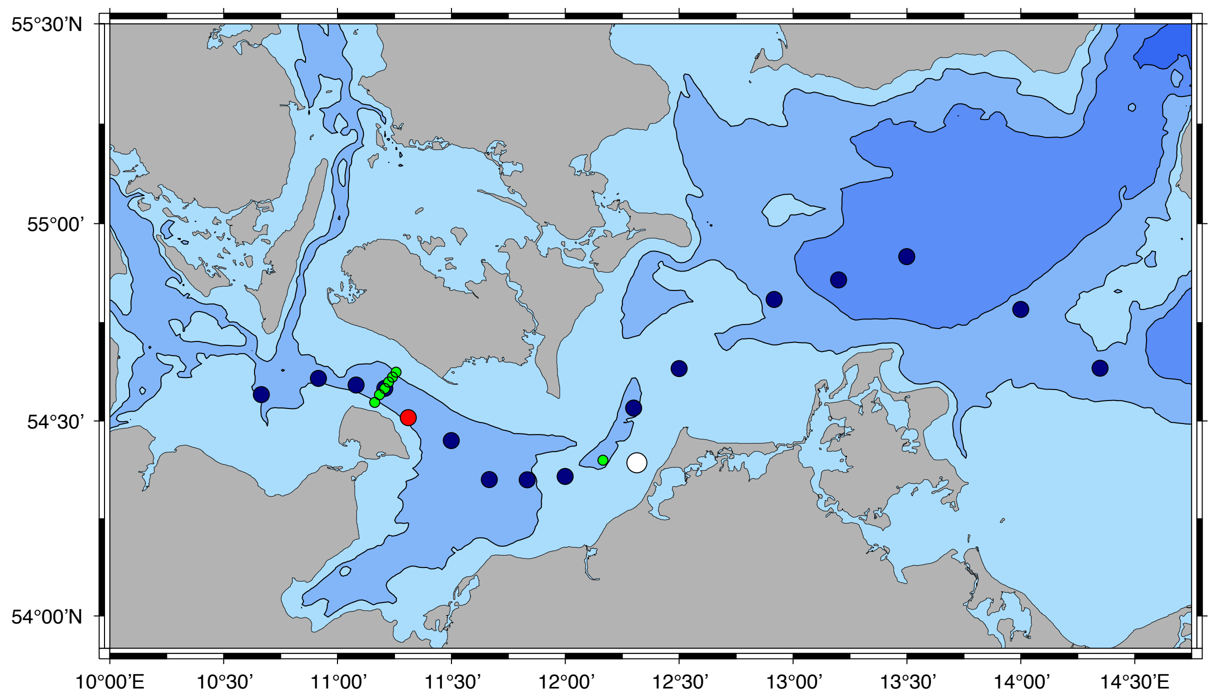

Figure 3.1: *ALKOR 34/14 cruise stations. Black (LG section)/ Green (FB section) and Red dot are the CTD stations, red dot is also location of the V431 mooring.*

Monday 15.9.2014

RV ALKOR left port on Monday 15.Sept. 2014 at 08:00 LT. We took course to the first working area, the Fehmarn Belt. The 1st officer introduced us to the ship facilities, followed by a safety-at-sea introduction. The science crew than met again in the dry lab and an introduction to science program was given. A first CTD station was performed in order to test the system. A novelty for us was the use of an underway CTD system (OCEANSCIENCE, California, USA). The system had been mounted at port side at the stern. A first test was performed, using a dummy probe. The uCTD operation in the shallow Baltic Sea with required a good knowledge about the fall speed. We expected water depth between 10 and 70m. In order to slow down the device from its normal 4m/s fall speed, a floatation cover was applied (part of the system) and fall speed tests with the dummy probe followed. Three CTDs of L-section were occupied next and the CTD along Fehmarn Belt was started. Here, we did some uCTDs in between, mainly to familiarize ourselves with the operation of the system at shallow water depth. A second time the Fehmarn Belt section was occupied, this time steaming with 7 to 8knots and doing tow-yo uCTD, resulting in about 50 profiles. In addition, the 600kHz ADCP was surveying. The uCTD operations stopped at 18m water depths at the southwest part of the section.

Next headed for mooring position at the Speergebiet Marienleuchte. A CTD was made at the position and the deployment of a rebuild shield mooring took place (at 15:19 UTC). The floatation part of the shield was recovered in 2013 but the ground weight remained at the sea floor. A few attempts in Dec. 2013 and Feb. 2014 by DENEB were not successful. We continued with the CTD stations along the L-section and tow-yo uCTDs in between. Some tow-yo cast did not record any data for unknown reasons. The last CTDs was done at 21:00 and we steamed eastward after that station to start a western survey on the next day. In general, the weather started with overcast in Kiel, while it cleared up during the day but wind increased up to 8 Bft in the evening.

Tuesday 16.9.2014

The work started at 07:00 LT with a CTD. Winds had calmed down. A number of CTDs followed, doing tow-you uCTD in between. The program was stopped and we entered Warnemünde harbour to exchange the student crew. We were moored at Warnemünde 11:00. In the harbour we started with the work on the salinometer, measuring the sampled that were taken on Monday. The Beckman salinometer generated some problems because of air bubbles that developed in the volume. All students from the 1st leg did analyse samples using the salinometer. The students for the 2leg arrived at 14:00 on board. A safety drill followed for them (1st officer) and two seminar talks (moorings, meteorological variables) that could not be presented during the seminar on the 11. Sept. 2014 were presented. The group of students from the 1st leg left the ship (16:00) and headed for the train to Kiel. In teh afternoon, some tests with uCTD were performed. In particular to better understand the exact timing (start sample) of the device.

Wednesday 17.9.2014

We left Warnemünde at 07:55 LT and headed for the first CTD of second leg which was performed at the southern part of the Kadett Ridge. All students participate and were introduced to the CTD operation. A new bucket of substandard seawater was collected. Christina Begler continued testing different uCTD configuration and the timing of the device. In between stations salinometer work on the samples collected during the 1st leg was done. A tow-yo uCTD/ADCP section through the Kadett Ridge as done. We headed eastward continuing the CTD / uCTD work on the L-section until east of Rügen and stopped at 22:00.

Thursday 18.9.2014

Early in the morning, at 06:30 with performed a second survey of the Fehmarn Belt. This time only a tow-yo uCTD / ADCP section. Measurements with the salinometer were done in parallel. The material was packed and labs cleaned. We moored at Kiel west-shore building pier at 11:10. The science crew left the ship at 13:00. The ALKOR AL34/14 was successfully completed.

Chapter 4

Preliminary results

4.1 Hydrographic along C and L section

CTD

Fehmarn Belt (C section)

The hydrographic section discussed below comes from six CTD profiles measured along the Fehmarnbelt on September 15, 2014.

The upper 10-15m appear to be well mixed, more so on the northern side of the section. The (potential) temperature ranges from 14°C at the bottom to 16°C near and on the surface. There is a comparatively large temperature gradient in the north at about 20m depth, coinciding with a very large salinity gradient of 10psu in less than 5m and an accordingly steep (potential) density gradient. The salinity generally covers a rather large span in less than 30m. At the surface, it ranges from 14psu in the north to approximately 15psu in the south. At the bottom it is about 24psu. This high salinity might originate from a North Sea water inflow. Since the temperature ranges is quite small, the density distribution follows the salinity distribution closely. There is a noticeably inclined pycnocline, which lies at about 12m depth in the south and 19m in the north.

To the south the water is more evenly stratified with what appears to be a labile stratification in about 12m depth. However, that is likely to be a result of the interpolation method applied here. All in all it looks very much as if there could be a geostrophic current flowing eastward in the lower southern part of the section. This could be an inflow of more dense and saltier North-Sea water between approximately 22m and the bottom.

The chlorophyll distribution is rather higher in the north than in the south with up to 2.5 μg/l at about 10m depth and 1μg/l around it. There is very little chlorophyll at the very bottom, but there is some almost everywhere else. The oxygen is quite evenly distributed. There are approximately 6 ml/l in the entire section but the bottom, where there is a small increase of oxygen at 25 m depth.

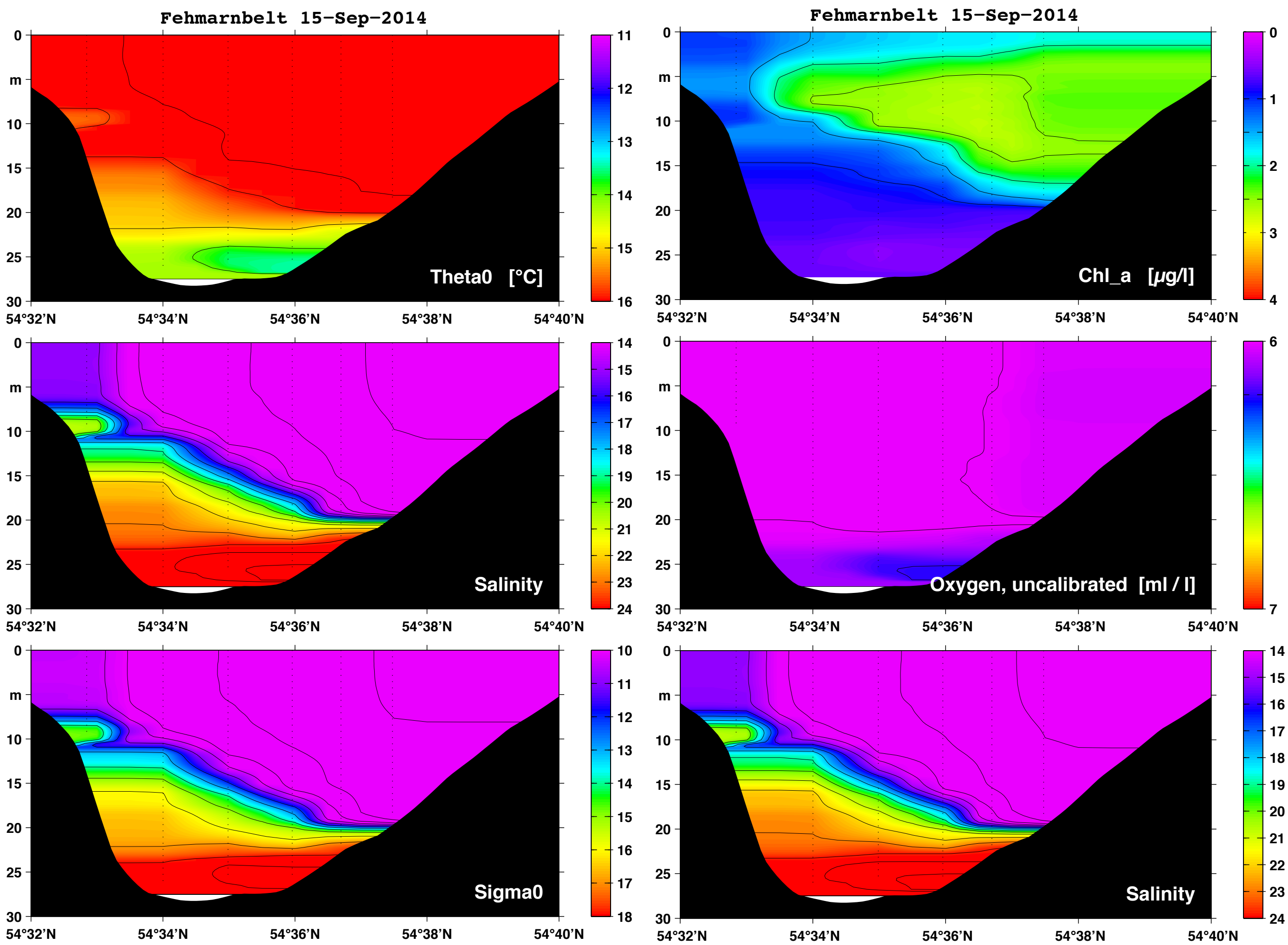

Figure 4.1: *Chlorophyll, oxygen and salinity distribution along Fehmarn Belt on 15. Sept. 2014 derived from CTD data.*

Zonal section (L Section)

During the zonal section from 10°30E to 14°30E 16 CTD stations were taken. Every CTD station was taken once.

The zonal section (Fig. 4.2) shows the temperature, salinity, density, chlorophyll and oxygen distribution between Fehmarnbelt and Arkona Basin from September 23 to September 26 2012. The temperature in the upper 15 m is near 16°C along the whole section. In the Fehmarnbelt

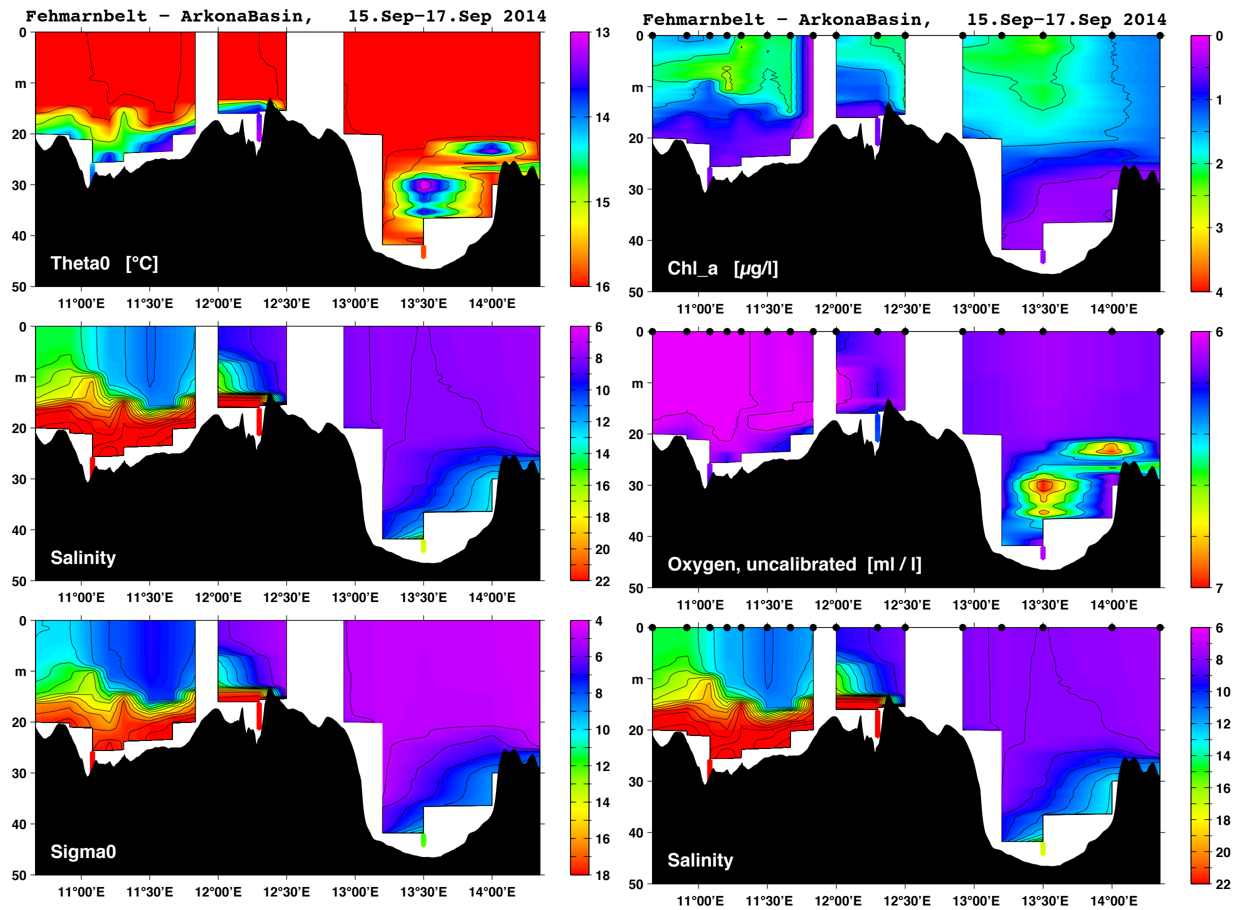

Figure 4.2: *Potential temperature, salinity and potential density distribution along zonal section between 15. and 19. Sept. 2014.*

the lowest temperatures can be found at ca. 12°16E in 20 m depth with 13°C and in the Arkona Basin 13°30 in 30 m depth with 13°C as well but in interesting shapes, like water cells with a cold water core. These might indicate currents or inflows from the North Sea. Salinity is generally decreasing with increasing latitude. The water in the Fehnmarnbelt is noticeably saltier with maximum salinities of 22psu near the bottom, while the salinity maxima in the Arkona Basin do not exceed 14psu. It is can be seen in the density distribution that the lightest water can be found in the upper Arkona Basin and the densest water in the Fehmarnbelt between 15m to 20m depth. That is closely related with the salinity difference since the temperature range is only about 3°C.

The salinity, temperature and density distributions show that most of the saline and cold North Sea water is found in the Fehmarnbelt and trapped by the topographical boundary at 12°30E.

The chlorophyll distribution is similar to the one seen in the section across Fehmarnbelt. It is close to zero at the bottom and goes up to 2 μg/l near the surface. There is an interesting horizontal structure all over the eastern end of the Fehmarnbelt, but again that might be due to interpolation. There is a little more oxygen in the Arcona basin than at Fehmarnbelt (6.2 ml/l against 6ml/l). The most noticeable features of the Arcona basin oxygen distribution coincide with the cold water cell- like structure and might be characteristic of the same [hypothetical] flow. These are centers of oxygen-richer water (7ml/l).

Underway CTD (uCTD)

Description of the uCTD itself and our measurements

The UnderwayCTD (uCTD) equipped with Sea-Bird Electronics measures conductivity, temperature and pressure like a CTD, but without having to stop the ship or reducing the ships speed. Another advantage is that unlike expendables it has no environmental impact and has a higher accuracy. Its sampling frequency is 16 Hz, so the vertical resolution is below 25 cm (all the data for the plots below are based on 10cm vertical grid spacing). The ship speed where we used the uCTD the most were 8kts and 12kts (Fig. 4.3, left), but it is possible to use the uCTD up to 20 kts.

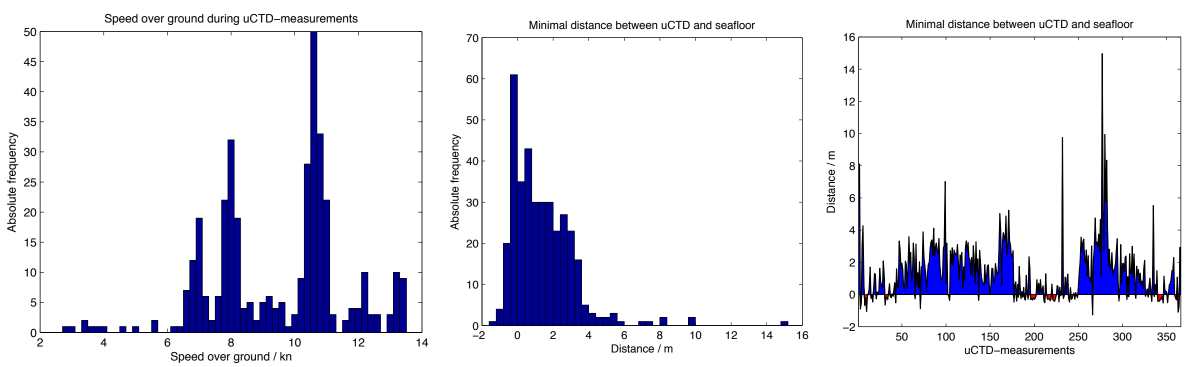

Figure 4.3: *Histogram of (left) ships speed over ground while uCTD was deployed. Distance above seafloor when we stopped the uCTD falling down: histogramm (middle) and according to cast (right). The highest peaks of up to 15m occurred at Arcona Basin and can also be seen below in the Temp and Sal. sections.*

Before deploying the uCTD we got the depth over radio from the echo sounding and took half of the depth as the falling time for the device. Due to the high variability of the echo sounding (caused by swell) and sometimes rapidly changing topography we always took the lowest value of depth while looking at it to prevent hitting the bottom. The winch is installed on a rail at stern, when the uCTD is deployed it is descending with 1 to 4 m/s. To turn the tester on you need to pull out a magnet before deployment, after the uCTD is back on deck you need to push the magnet in to turn it off. Unfortunately this did not always work on our voyage; sometimes it had not recorded any data. So when we tried to get the vertical profiles via Bluetooth, the memory was empty. The problem was that between turning on and turning off there has to be a rest time of 2 min we did not know about in the beginning and therefore lost some sections.

Most times we stopped the uCTD at a range from 0 to 4m before hitting the bottom (visualized in Fig. 4.3), so our method to reach as high depths as possible worked quite well, although it is non-automatic and we didn't have an electronic bottom-alarm as in a CTD. In just a few cases we hit the sea floor (< 10 %), which mostly happened due to a strong gradient in bathymetry during those cases. This easily happens in those shallow waters we measured at, usually hitting the bottom is no such a big issue in deeper oceans, where you have much longer falling times and can't predict the depth that well, wherefore you will have to use the device with a larger tolerance range and stop it more earlier.

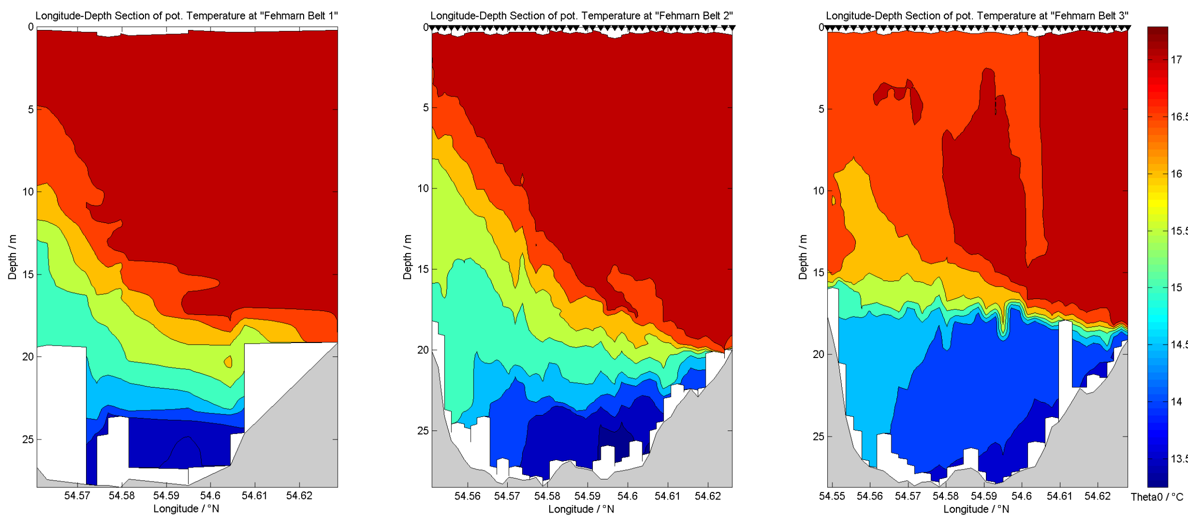

Figure 4.4: *Longitude-depth sections of potential temperature at the Fehmarn Belt, where Fehmarn Belt 1 stands for data collected during a south-to-north-cruise on the 15.08.2014 and Fehmarn Belt 2 for the opposite direction about an hour later. The last section was measured on the 18.08.2014 from north to south. The locations of individual uCTD-casts are shown by black triangles at the top of each figure.*

Comparing panels in Figure 4.4) you see the much lower horizontal resolution during the first section. This happened because at the same time we also had CTD-measurements that caused the ship to stop a few times, whereas on the cruise back it was possible to get continuous data. Besides of this, both plots barely differ at all, thus we can ignore section Fehmarn Belt 1 from now on. Temperature varies between 13.2°C and 17.4°C with higher values towards sea surface. Especially at the second section the temperature is homogenous in the upper few meters, below that it decreases quite continuously. In the north this homogenous part is much deeper than in the south, so the boundary layer declines. Two days later in section 3 (Fig. 4.3) this declination is much weaker, but a stronger temperature gradient in the boundary layer exists. Also the upper high-temperature region is less homogenous than before. The slope in section 2 can be explained by an inward flow of cold water from the North Sea, which then is been pushed towards the south coast of Fehmarn Belt by Coriolis force.

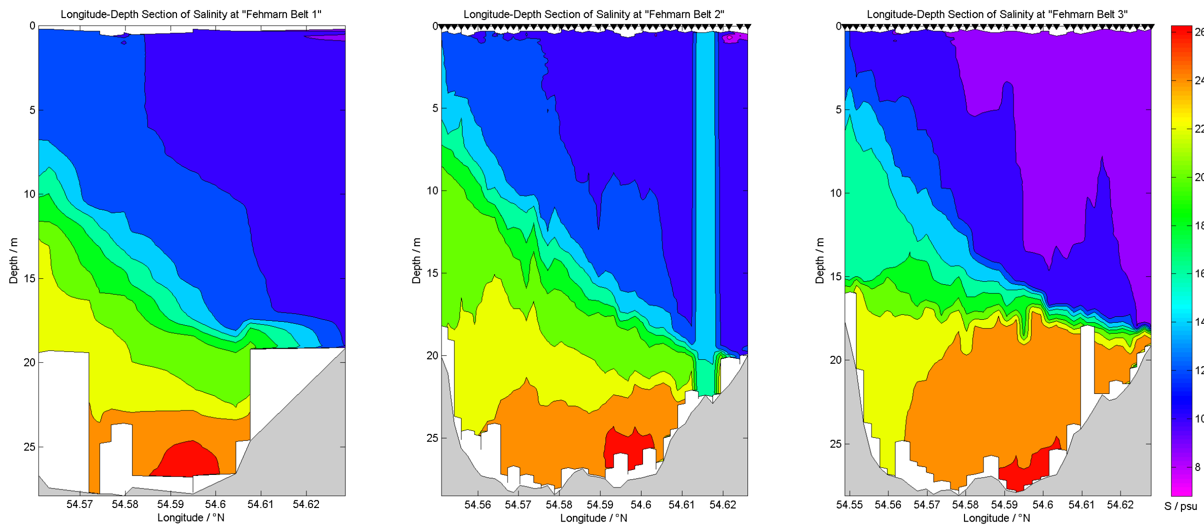

Figure 4.5: *Longitude-depth sections of salinity at the same sections as before*

Looking at Salinity, again sections 1 and 2 show no huge differences, besides an extreme peak at 54.615°N in Fig. 4.5. This might have happened because of another ship crossing our path and upwelling deep and salty water masses (this isn't visible in the temperature data because it would have all the same value anyways). Apart from that the shape of this salinity section is similar to the temperature data. At section 3 there still is the dominant northward declining slope as seen at the section 2 (in contrast to the temperature plot before), but now again with a stronger gradient in the boundary layer. The change in salinity between section 2 and 3 is much less than in temperature which is caused by different diffusion coefficients for T and S.

Both of the T/S diagrams in Fig. 4.6 show a very stable stratification through the whole section, besides one cast (pink, section 2) at the northern coast where only salinity is changing a bit and temperature stays the same, which leads to an almost constant density in deeper regions and therefore good mixing conditions. The low-density-peak at the very deep end of the cast at 54.6071°N (turquoise, section 2) is probably due to a data error, because during this cast the device might have made contact with the seafloor leading to abnormal values in either temperature or salinity.

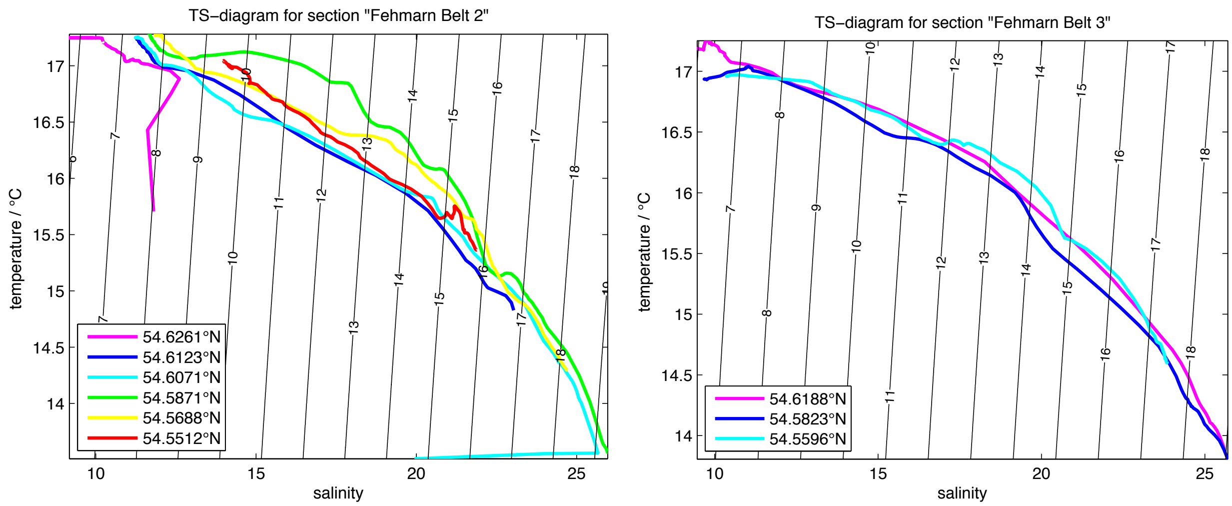

Figure 4.6: *TS-diagrams for the second and third section at Fehmarn Belt with six respectively three individual uCTD-casts to cover most of the variation in T and S through each section.*

Depth sections at Arcona Basin

At Arcona Basin there is a roughly homogenous temperature (see Fig. 4.7) of 17.0°C up to a depth of 25m, below there are cold cores at 13.3°E and 13.9°E with minimal values of 11.2°C.

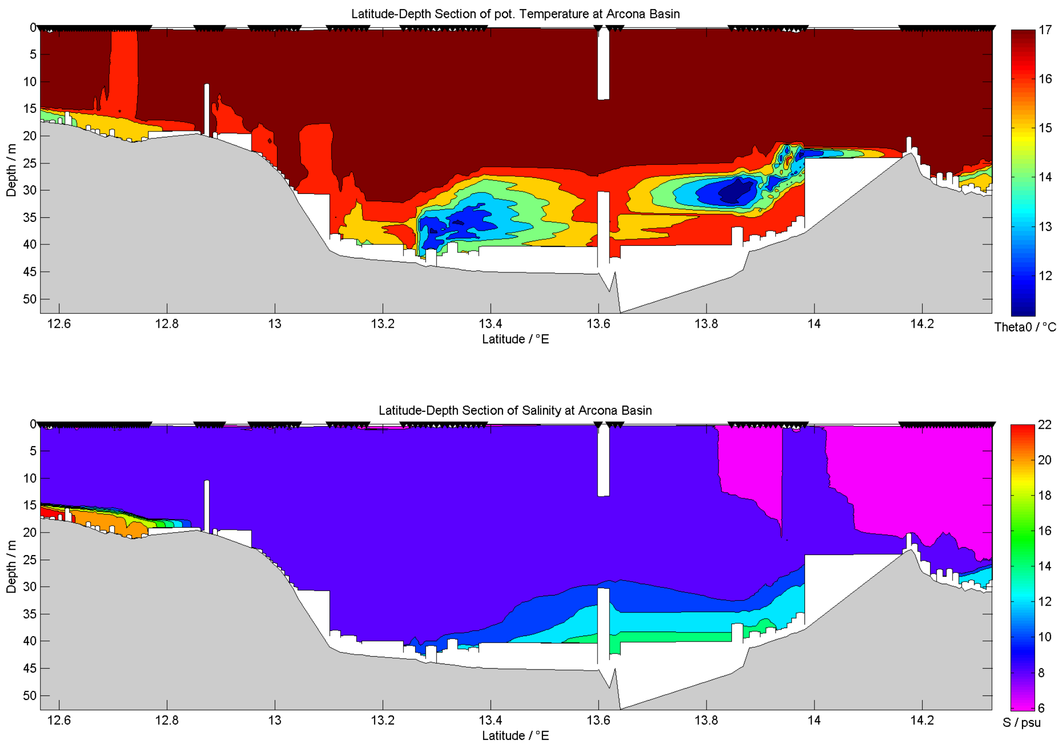

Figure 4.7: *L- section with uCTD.*

Besides of high salinity until 18.8°E (Fig. 4.7) near the sea floor which shows the last influences of inflowing salt water, the overall salinity is quite low with just 8psu, towards the east even lover. Near the bottom (at 13.7°E) there might be some saltier water (but nowhere near as dominant as the temperature anomalies), but its potential maximum is not shown in the plots because the uCTD-measurements have stopped too early above the highest possible depth, indicated by the large white areas in the depth sections and already shown in Fig. 4.3 earlier.

The casts at 12.9829°E, 13.6197°E and 14.3184°E (pink, turquoise and yellow) as seen in the TS-diagram (Fig. 4.7) for this section show a mostly stabile stratification that fits well to the temperature and salinity sections from Fig. 4.7 we discussed before. In the other areas there are just very little changes in T and S right above the already mentioned cold cores, so here the water seems to be quite well mixed. Same goes for depths right below right below the minimal temperatures of these casts, where the water masses at the green and yellow cast are quite unstable and heavily differ from the other profiles that do not cover one of the cold water layers.

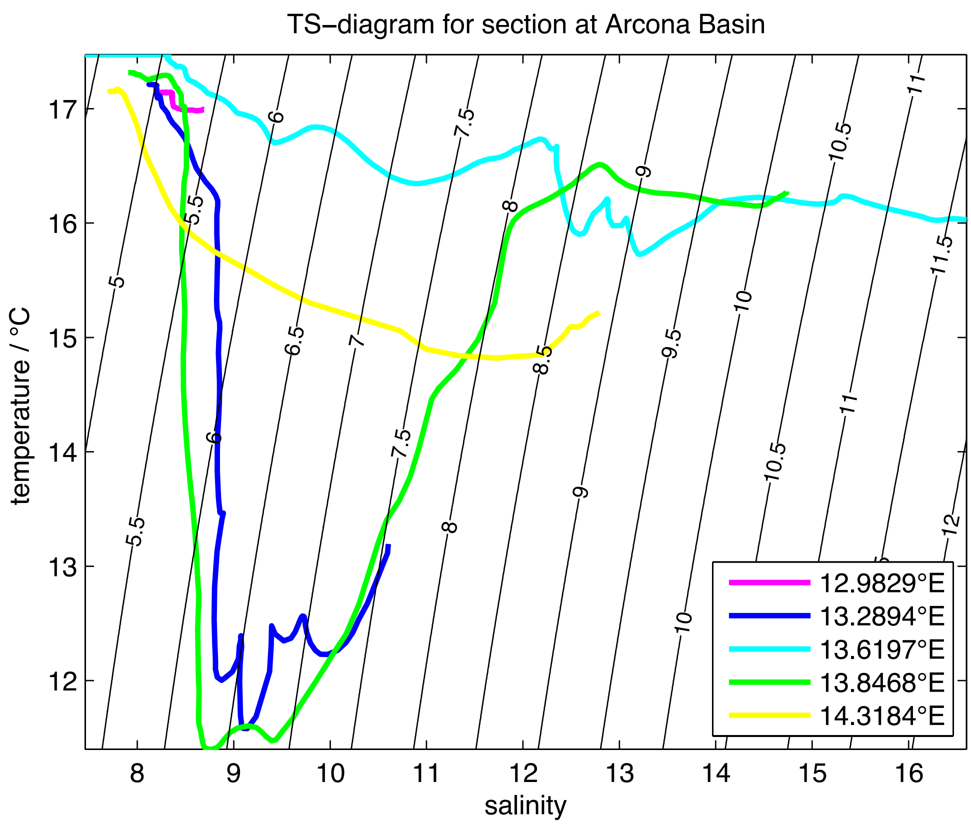

Figure 4.8: *TS-diagrams for the second and third section at Fehmarn Belt with six respectively three individual uCTD-casts to cover most of the variation in T and S through each section.*

4.2 Meteorological observations

4.3 Meteorological Observations

Evaluating oceanographic data requires detailed knowledge about the meteorological conditions prevailing at the time of the respective oceanographic measurements.

The data discussed in the following has been automatically recorded nonstop by DAVIS-SHIP system as well as data that has been derived thereof. These have a temporal resolution of one minute each. Additionally, direct observations onboard once an hour during daylight and surface pressure charts obtained from the german weather service DWD plus 500hPa geopotential charts published on *wetter3.de* are used to investigate the predominant weather conditions during our cruise.

When casting off from port of Kiel in the morning of September 15^{th}, sky was painted grey and a gentle moist breeze blew from east, south east, finding its origin in a well developed high pressure system centered over scandinavia as depicted in Figure **??**. A warm front propagating from east and being placed slightly more eastern than the ship's position causes the above mentionend dull weather. Once reaching the *open ocean* about noon that day, cloud cover broke, weather improved with only few clouds and temperatures around 17°C the entire further cruise. The warm front had dissipated and the high pressure system over central scandinavia has expanded across the week while its center moved southeastward reaching west central Russia on September 19^{th} (Figures **??** to 4.9). A low pressure system located off the coast of France remained almost stationary in position. Fronts generated there did not reach our baltic sea area and thereby did not affect weather conditions except wind that is induced in interplay with the moving high pressure system discussed previously. Troughs and ridges are obvious on 500hPa geopotential charts but far more in the north than our ship route in the southern Baltic Sea.

During the cruise to Warnemünde (September 15^{th} and September 16^{th}, morning) air temperature stayed relatively constant with values between 17°C and 19°C, so the dewpoint with values between 16°C and 18°C and subsequently the humidity with a percentage of about $>$90% (all shown in Figure 4.10). Moreover, air pressure only changed within a range of about $\pm$1hPa around a value of 1020hPa. Moderate winds ($\approx 8ms^{-1}$) blew from east and northeast with an increase in velocity during night ($\approx 16ms^{-1}$), though neither fronts nor a strong pressure gradient existed. Long- and shortwave radiation increased until noon of September 15^{th}. Since the cloudiness fell to $\frac{4}{8}$ and below plus sun reaching the peak, the shortwave radiation maximum is found at this point in time with an irradiance of about $700Wm^{-2}$. The graph smoothens and follows the daylight cycle during the further,

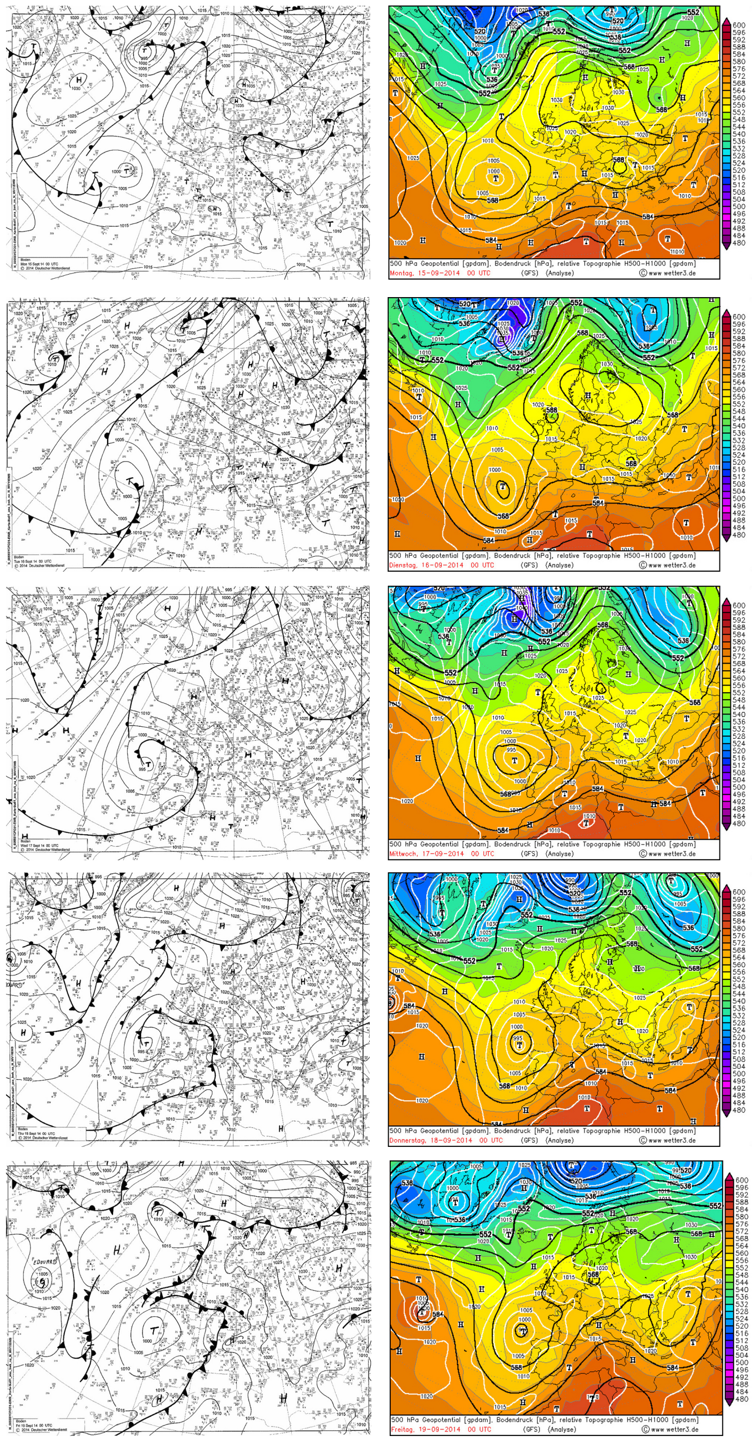

Figure 4.9: Surface pressure analysis charts from DWD (left) and geopotential heights from WETTER3 (right) for the period September 15^{th} to September 19^{th}, 2014, for 00:00 UTC each.

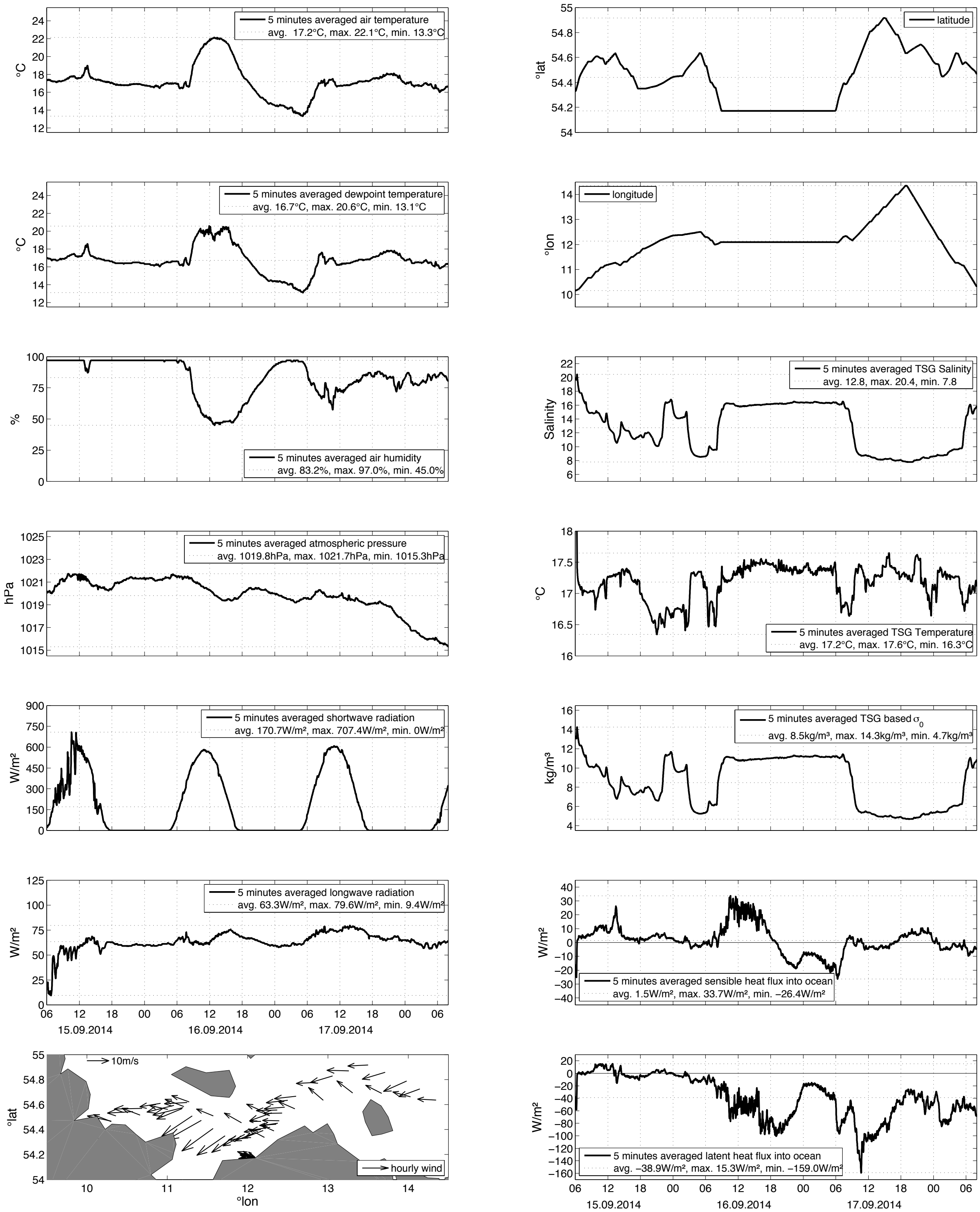

Figure 4.10: Various meteorological parameters, observed and derived from DAVIS-SHIP.

while longwave radiation in contrast varies little ($\pm 10 Wm^{-2}$) around a value of $60 Wm^{-2}$. Furthermore, a positive sensible heat flux into the ocean occurs whereas the curve of the latent heat flux runs close to zero. In late morning of September 16^{th} FS ALKOR arrived at the harbour of Warnemünde and stayed until the next morning. Absolute maximum and minimum values in air temperature occur due to the proximity to landarea, leading to greater heat fluxes. Since the center of the high pressure system moves southeastward, air pressure starts to decrease. After casting off from Warnemünde again on September 17^{th}, weather conditions are pretty similar to those during the first half of the cruise. Air temperature is slightly lower but nearly constant with values between 16°C and 18°C and humidity around 80%. Pressure stays relatively constant at first, then decreases continously down to 1015hPa until September 19^{th}. Winds still blow from east with velocities about $8 ms^{-1}$. Sensible heat flux is balanced and evaporation causes negative values in latent heat flux. Overall, weather conditions were nice late summer.

4.4 Mooring

During Al34-14 only a deplyoment of the mooring took place. The system was in Kiel, as the ground weight could not be recovered in Sept. 2013 and no new ground weight was available until recently.

Chapter 5

Equipment/instruments

5.1 Technical: Mooring V431

Mooring deployment site V431 is located in the military zone of Marienleuchte at the south-eastern opening of the Fehmarn Belt. Water depth is about 28m. V431 consists of a Aanderaa RDCP600, serial 227 with temperature (serial 2639, type:3621), conductivity (serial 85, type: 4019A), oxygen Optode (3830) and a self containing T/S recorder of type SBE-MicroCat (serial number 2936). The ADCP and all other parameter logging was programmed for every hour, the MicroCat (not recovered yet) record every 15 minutes.

The Aanderaa RDCP600 is configured for current recordings in 1.5m depth cells covering the whole water column. So far no 100% successful deployment can be reported, and agin we had a problem with the battery power during the deployment - as the battery seem to be not able to last long enough (1 year) although the battery calculator indicates. This could be due to the lower power availability of the lithium batteries in cold waters (nominal energy density is calculated against 20°C).

5.2 Salinometer Measurements

The salinity measurements were made with a Beckmann Salinometer. At the beginning of measurements the Beckmann Salinometer was calibrated against IAPSO standard water, a water with a well known salinity. After that it was calibrated with sub-standards close to ever three samples. The advantage of using sub-standards to monitor the drift of the salinometer is, not having to use expensive IAPSO-water compared to samples that have been taken from CTD-bottles. With using a substandard it is assumed that a taken volume of water does have the same salinity when gently shaking before usage with the salinometer. To get convincing results the samples had to stay several hours at the laboratory to adapt to room temperature. Each sample was measured until values with a difference of less than 0.01 were recorded or until the sample was empty. At the end, the mean value of salinity of those two measurements was considered as the total value ($S_{Salinometer}$).

5.2.1 Substandard

As mentioned earlier the sub-standard water was measured regularly to see a potential drift of the salinometer. All measurements are displayed in the figure 1. The first substandard was measured directly after calibration with the standard water. The mean salinity of the first (second) substandard is 18.40 (9.15) psu, the standard deviation is 0.099 (0.014). In both cases there is a trend to lower salinities visible. This trend is somehow compensated after the 12th measurement.

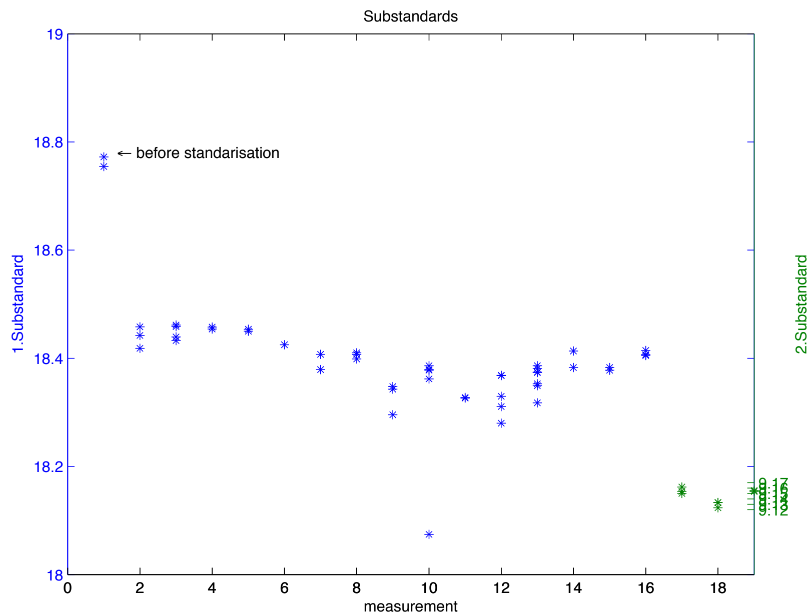

Figure 5.1: *Substandard Measurements against time.*

5.2.2 Calibration of CTD

The difference between the actual salinity measurements with the Beckmann Salinometer and the CTD-salinity measurements is shown in figure 2. Except from a few samples that have been tossed out (30 %) the difference of the measured values lays between ±0.5. A comparison with time (cast number), pressure, temperature and conductivity has been done. Apparently, there is no drift detectable, neither in time nor in pressure nor temperature nor conductivity as all values are equally spread around zero. The standard deviation of all measurements is 0.72 and one magnitude higher than the standard deviation of the salinometer.

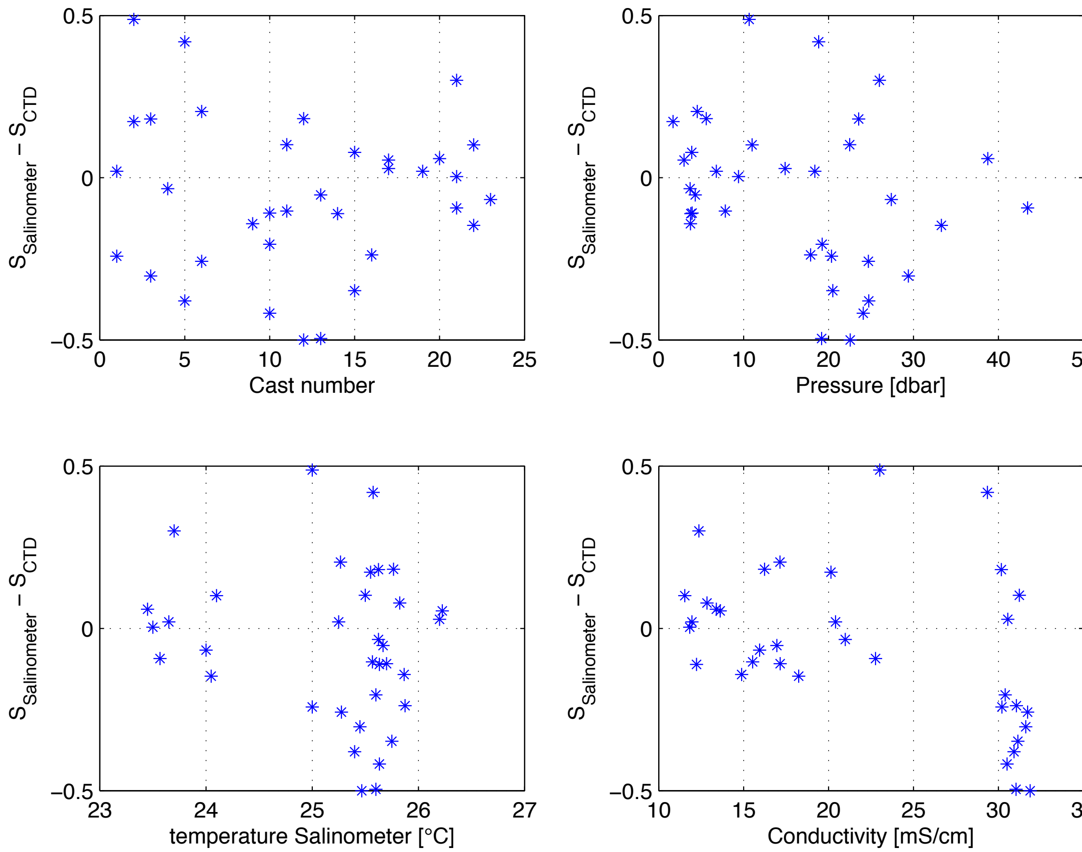

Figure 5.2: *Difference of salinity measurements with the CTD and Salinometer plotted against cast number, pressure, internal temperature of the salinometer and conductivity*

5.3 Underway Measurements

5.3.1 WERUM

ALKOR has a new central data collection system from WERUM. The system worked perfect during the cruise and facilitated our work in providing on-line cruise map, a downloadable station book as well as export of relevant data. The WERUM is a substitute for the former 'DATADIS' system that caused a lot of trouble during the last years and we are very happy that this new WERUM system was installed on ALKOR.

5.3.2 Navigation

ALKOR has a GPS navigational system as well as a gyro compass available and distributed via WERUM. The WERUM map viewer allowed to follow the cruise track online.

5.3.3 Meteorological Data

Since March 2006 ALKOR is equipped with a so called automatic weather station which should acquires the basic meteorological parameters (air temperature, wind speed and direction, wet-temperature, humidity, air-pressure). Shortwave radiation is also measured. Long wave radiation is recorded with an EPLAB (Eppley Laboratory, Inc.) Precision Infra-red Radiometer (Model PIR).

5.3.4 Echo sounder

The ER 60 SIMRAD echo sounder was activated during the cruise.

5.3.5 Thermosalinograph

The thermosalinograph (TSG) on ALKOR is permanently installed at about 4m depth,takes up about one litre per second.

5.3.6 Vessel mounted ADCP

A 600kHz workhorse ADCP from RD Instruments was mounted in the ships hull. The vmADCP is used with bottom tracking mode. Navigational data (including ships heading) is available via a THALES 3011 dGPS system. The connections have been corrupt after the last ship yard visit of the ALKOR and some recalibration had to be done during the cruise.

Chapter 6

Acknowledgement

A big thank to Jan Peter Lass (master) and all crew members of RV ALKOR for a successful and comfortable cruise.

Chapter 7

Appendix

Station table

NR	LATITUDE	LONGITUDE	Depth	YY	MM	DD	HH	lg:fb:mr:rg:kd
1	54.5673	10.6656	21	2014	09	15	8.68	1 0 0 0 0
2	54.6084	10.9163	22	2014	09	15	9.90	1 0 0 0 0
3	54.5920	11.0821	32	2014	09	15	10.83	1 0 0 0 0
4	54.5474	11.1631	12	2014	09	15	11.55	0 1 0 0 0
5	54.5667	11.1841	28	2014	09	15	11.85	0 1 0 0 0
6	54.5831	11.2073	27	2014	09	15	12.25	1 1 0 0 0
7	54.5993	11.2243	27	2014	09	15	12.57	0 1 0 0 0
8	54.6116	11.2415	24	2014	09	15	12.83	0 1 0 0 0
9	54.6246	11.2575	20	2014	09	15	13.08	0 1 0 0 0
10	54.5087	11.3108	27	2014	09	15	15.02	0 0 1 0 0
11	54.4502	11.4992	24	2014	09	15	16.42	1 0 0 0 0
12	54.3504	11.6663	25	2014	09	15	17.60	1 0 0 0 0
13	54.3498	11.8329	22	2014	09	15	18.53	1 0 0 0 0
14	54.6332	12.4997	18	2014	09	16	4.98	1 0 0 0 0
15	54.5330	12.2999	24	2014	09	16	5.98	1 0 0 0 0
16	54.3996	12.1654	21	2014	09	16	7.00	0 0 0 0 1
17	54.3583	11.9990	18	2014	09	16	7.68	1 0 0 0 0
18	54.3933	12.3143	13	2014	09	17	7.48	0 0 0 0 0
19	54.8087	12.9170	22	2014	09	17	12.37	1 0 0 0 0
20	54.8580	13.1996	43	2014	09	17	13.58	1 0 0 0 0
21	54.9169	13.4994	46	2014	09	17	14.95	1 0 0 0 0
22	54.7835	13.9996	38	2014	09	17	17.17	1 0 0 0 0
23	54.6344	14.3483	31	2014	09	17	18.88	1 0 0 0 0