MOVE

(Meridional Overturning Variability Experiment)

l'ATALANTE cruise (28.04. to 16.05.2005)

Fort-de-France Fort-de-France

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1 Scientific peronal

Table 1: Scientific personal on N/O l'ATALANTE cruise. IFM-GEOMAR: Leibniz-Institut für Meereswissenschaften an der Universität Kiel, Kiel, Germany. SIO: Scripps Institution for Oceanography, San Diego, USA.

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Acknowledgement

The thank the Captain and crew of N/O l'ATALANTE, for their great assistance and their hospitality on board. The cruise was financed through the Deutsche Forschungsgemeinschaft (DFG) SE815/3-1.

2 Scientific Background

The MOVE cruise of the research vessel N/O l'ATALANTE served the equally-called project MOVE (Meridional Overturning Variability Experiment) which had started in January 2000 and is part of the German CLIVAR programme.

The goal was to continue the long-term observations of fluctuations in the thermohaline circulation of the western Atlantic Ocean with a moored array. This array is situated on a zonal section along 16°N between the Antilles Arc in the west and the outskirts of the Middle Atlantic Ridge in the east. Last time prior, the array was serviced from F/S METEOR in February/March 2004. It comprises moored instruments for recording currents, density, bottom pressure and acoustic tomography signals. The long-term goal is to observe interannual fluctuations of the thermohaline circulation with integral methods. Results will be intercompared with boundary conditions at higher latitudes. Field observations such as this one in the tropical / subtropical North Atlantic Ocean in the framework of the German climate variability (CLIVAR) projects B1-4 are accompanied by modeling studies of the structure and the variability of the current system and its relation to atmospheric forcing (http://www.awibremerhaven.de/Research/IntCoop/Oce/clivar/projects /projects-index.html).

In co-operation with American agencies another objective is to collect calibration data for the GRACE (Gravity Recovery and Climate Experiment) satellite mission, using high precision bottom pressure recorders. The goal of the satellite mission is to provide estimates of the earth's gravity field with extraordinary precision which is closely related, among other things, to ocean bottom pressure.

The prime objective of the cruise was maintenance work at the mooring sites along 16°N and data recovery of the bottom pressure array along and perpendicular to the section. In addition the re-occupation of this section allowed collection of hydrographic (CTD) data and the instantaneous structure of horizontal currents with the ship-mounted ADCP system.

3 Cruise Narrative

After being delayed by a 24 hr strike of GENAVIR personnel supporting a national seaman labour action, the ship finally left Fort-de-France (Martinique) at 09:00 local time on 29 April 2005. After 11 hours, the first site (M3) was reached, and acoustic telemetry of the data (collected during the previous year) from a bottom pressure sensor (PIES) was initiated. After various tests and adjustments this worked well and the data could be retrieved without recovering the instrument. The next day two moorings were recovered successfully (M3, M4) including acoustic transponders for the tomography source in M4. After an ADCP section towards Guadeloupe, on 1 May a different bottom pressure sensor (from US partners at WHOI/SIO) was recovered and the ship left for site M2.

All the work at site M2 took place during 2 May, including acoustic data recovery of a bottom pressure sensor, recovery of mooring M2 and transponders around it, and unsuccessful attempts to release a WHOI/SIO bottom pressure sensor. After one day of steaming, recovery work at mooring site M1 took place on 4 May. The mooring and the WHOI/SIO pressure sensor were retrieved successfully, and the data from the PIES on the bottom could be recorded acoustically. The following day, 5 May, was spent with CTD casts for calibrating the MicroCat instruments, acoustic releaser tests, and service work on the recovered instruments, while much of the day after that was used for in-water tests of the tomography receiver which had trouble with the acoustic navigator, and for re-deployment of the acoustic transponders for this. On 7 May, the new mooring M1 with the tomography receiver was finally deployed.

The subsequent three days were used to steam to M7 and M7.5 for checking on the bottom pressure instruments there and then to return to mooring site M2. One WHOI/SIO pressure sensor could be recovered, the other one failed. Acoustic telemetry of the other sensor worked fine. Several problems occurred with the CTD and the winch which were fixed. On 11 May the ship arrived at site M6 where data were recovered acoustically from a PIES, while the recovery of another SIO/WHOI sensor failed. The next two days were spent steaming south and west again, carrying out CTD casts and in-water tests of the tomography sound source. After several tries and repairs the source was finally heard transmitting at full power in 20 m depth. By the evening of 13 May, all instruments for the remaining two mooring deployments were serviced, tested, and ready.

In the night then, the acoustic transponders for mooring M4 were dropped and surveyed, and early on 14 May mooring M4 itself was deployed in strong 1kn currents. While getting ready for another mooring later in the day, tests of the echosounders revealed that with the multibeam system it makes a difference whether the correct sound speed profile is entered or a fixed speed of 1500m/s is used and then corrected with the harmonic mean speed (latter gives depths too large by 20-30m). Later in the day, the last mooring M3 then was deployed successfully. On 15 May last CTD stations took place, and the ship passed by Guadeloupe to drop the chief scientist off, where the stop was used for visiting the islands. The cruise ended as foreseen on the morning of 16 May in Fort-de-France.

4 Mooring work

During 2005 N/O l'ATALANTE 4 moorings have been recovered: M1 (v404), M2 (v405), M3 (v406), M4 (v407) and 3 moorings deployed: M1, M3, and M4. The M2 was not redeployed. All mooring have been recovered and deployed over the stern. For recovery and deployment the IFM-GEOMAR winch was used which has been modified to larger friction drums just before the cruise. Larger friction drums were needed to allow for a smoother work with the fitting system used. The winch worked reliable but not perfect e.g. it could not be operated by a single person as one other person was needed to guide the wire through the carriage drum. In addition, the cooling system was not adequate and additional water cooling using a hose was needed. All deployment drums needed to be re-spooled as the original (Niemeyer) spooling was too loose to allow for a deployment directly from the drum without using a capstan (spillkopf).

Table 2: *Mooring M1 to M5 deployments between 2002 and 2005.*

mooring	deployment	latitude	longitude	water depth	deployed	recovered
M1	2002-2003	15°N 27.00	52°W 31.50	4984m	2002/02/01	2003/06/19
M1	2003-2004	15°N 27.00	51°W 31.50	4984m	2003/06/23	2004/02/22
M1	2004-2005	15°N 27.00	51°W 31.30	4970m	2004/02/24	2005/05/04
M1	2005-2007	15°N 26.98	51°W 31.42	4980m	2005/05/07	in water
M2	2002-2003	15°N 59.20	56°W 55.60	4985m	2002/02/04	2003/06/17
M2	2003-2004	15°N 59.20	56°W 55.60	4985m	2003/06/25	2004/02/20
M2	2004-2005	15°N 59.05	56°W 55.50	4985m	2004/02/28	2005/05/02
Not redeployed						
M3	2002-2003	16°N 20.30	60°W 30.30	4960m	2002/02/08	2003/06/15
M3	2003-2004	16°N 20.30	60°W 30.30	4960m	2003/06/27	2004/02/18
M3	2004-2005	16°N 20.34	60°W 30.51	4929m	2004/03/01	2005/04/30
M3	2005-2007	16°N 20.30	60°W 30.30	4960m	2005/05/14	in water
M4	2002-2003	16°N 20.00	60°W 36.45	3030m	2002/02/05	2003/06/15
M4	2003-2004	16°N 20.00	60°W 36.45	3010m	2003/06/27	2004/02/17
M4	2004-2005	16°N 20.00	60°W 36.51	3010m	2004/03/02	2005/04/03
M4	2005-2007	16°N 20.60	60°W 36.90	3000m	2005/05/14	in water
M5	2002-2003	16°N 19.94	60°W 42.17	1600m	2002/02/05	2003/06/16
M5	2003-2004	16°N 20.01	60°W 41.75	1600m	2003/06/28	2004/02/17
Not redeployed						

4.1 Recovery

Recovery started with the western most mooring M3 on 30. April 09:04 (local time, LT) followed by M4 on the same day at 18:36 LT. Releaser (Oceano) communication worked for M3 and M4. No problems occured and the collaboration with the experienced crew worked very well. The telemetry unit on M3 stopped sending about a week after deployment in 2004 and it became clear after recovery that this was due to vandalism. Obviously the head buoy, hosting the telemetry, was removed and replaced with some old oil canisters. M2 was recovered on the 2. May starting a 10:17 LT again without particular problems. Finally M1 was recovered on the 4. May 11:41 LT. Except for wire turnings in

the bottom part (maybe too much buoyancy) no problems need to be reported here in respect to the mooring work. For M1 again the telemetry buoy did not survive the whole deployment period. The wire clear showed signatures of mechanical stress. However, this could be either vandalism, fish, or ship collusion. However, the abrupt disappearance of the telemetry from one day to the other suggest vandalism or ship accident to be a more likely reason for its loss.

4.2 Deployment

As the new deployment will be in the water for about 2 years, not only the instruments sampling intervals needed to be adjusted. The mooring components exposed to seawater corrosion were exchanged (shekels, rings, chains) and fittings where conserved with grease to prevent corrosion. Deployment of M1 was done on the 7. May starting at 07:30 LT, ending at 17:07 LT. This mooring contains telemetry down to 1000 m and a tomography-receiver at that depth. Hitherto this receiver had been a component of the M2 mooring. The telemetry unit is working well until now. M4 was launched on 14. May at 08:52 LT. For the first time the tomography sweep source was embedded in an aluminium-frame. This was very helpful for the mooring work, it made it easier to handle the instrument on deck and bring it into water. At the same day the M3 had been deployed as well. The anchor was launched at 20:46 LT. Due to darkness it was not possible to watch the head buoy going down. Instead the disappearing was checked via the Argos of the head bouy. During all deployments no problems occurred.

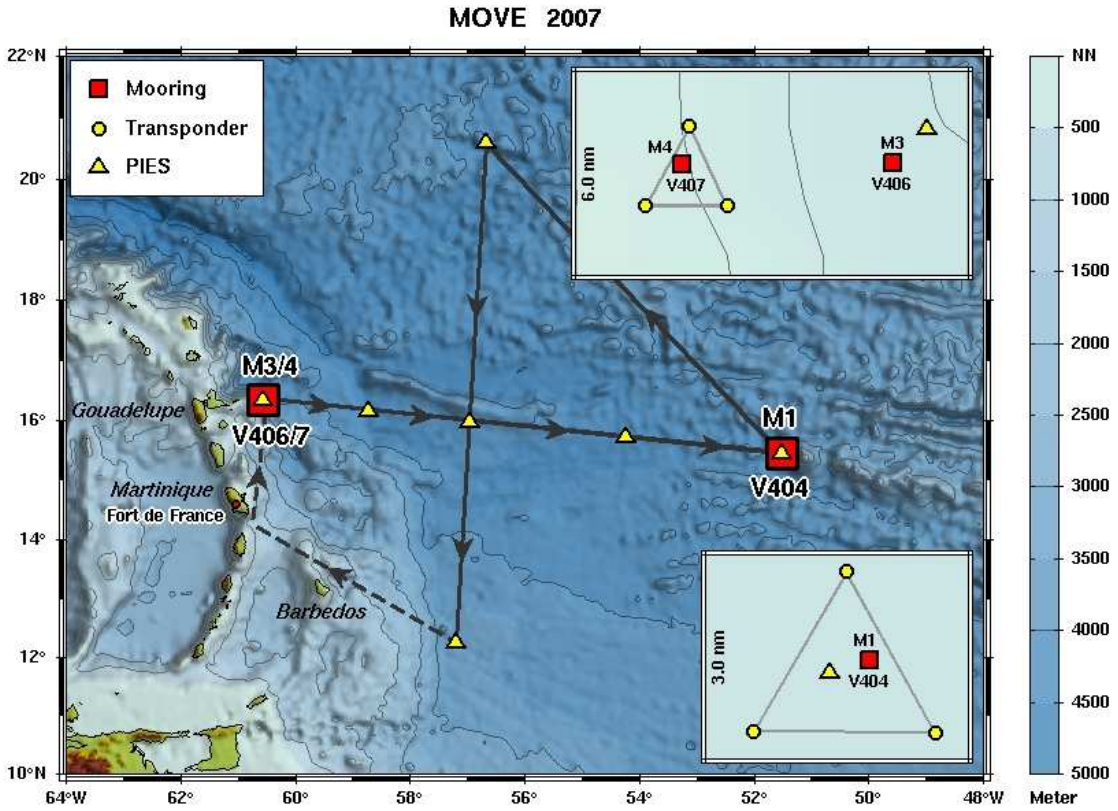

Figure 1: *Mooring and bottom sensor stations N/O l'ATALANTE 2005 cruise.*

Table 3: *Mooring v404_5 configuration.*

v404_5	15° 27.00' N, 51° 31.50' W, 4970 m 24-Feb-2004 – 04-May-2005			
Depth	Instrument	S/N	Variables	Comment
10 m	MicroCAT IM	944	T,C	lost
32 m	MicroCAT IM	1717	T,C,P	
72 m	MicroCAT IM	962	T,C	
135 m	MicroCAT IM	3411	T,C,P	
250 m	MicroCAT IM	960	T,C	
420 m	MicroCAT IM	1718	T,C	
640 m	MicroCAT IM	1721	T,C	
845 m	MicroCAT IM	945	T,C	
1095 m	Aanderaa RCM-9	51	U,V,P,T	defect
1105 m	Mini-TD	055	P,T	
1105 m	MicroCAT	1550	T,C	
1365 m	MicroCAT IM	953	T,C	
1617 m	MicroCAT	1276	T,C	
1907 m	MicroCAT	949	T,C	
2129 m	Aanderaa RCM-11	293	U,V,P,T	
2180 m	MicroCAT	941	T,C	
2492 m	Mini-TD	047	P,T	
2492 m	MicroCAT	1722	T,C	
2812 m	MicroCAT	910	T,C	
3004 m	Aanderaa RCM-11	292	U,V,P,T	
3133 m	MicroCAT	1720	T,C	
3456 m	MicroCAT	1280	T,C	
3776 m	Mini-TD	048	P,T	
3776 m	MicroCAT	1723	T,C	
3877 m	Aanderaa RCM-8	9727	U,V,P,T	
4097 m	MicroCAT	1268	T,C	
4383 m	MicroCAT	1269	T,C	
4654 m	MicroCAT	1279	T,C	
4889 m	Aanderaa RCM-8	9344	U,V,P,T	
4920 m	Mini-TD	059	P,T	
4920 m	MicroCAT	1277	T,C	
4934 m	Oceano AR	659		
4934 m	Oceano AR	633		

Table 4: *Mooring v405_5 configuration.*

v405_5	15° 59.00' N, 56° 56.00' W, 4955 m 28-Feb-2004 – 02-May-2005			
Depth	Instrument	S/N	Variables	Comment
805 m	Aanderaa RCM-8	10075	U,V,P,T	
870 m	Mini-TD	019	P,T	
1127 m	MicroCAT	935	T,C	
1199 m	TOMO Receiver	001	P,T	
1383 m	MicroCAT	937	T,C	
1447 m	Aanderaa RCM-8	9345	U,V,P,T	
1637 m	MicroCAT	1162	T,C	
1927 m	MicroCAT	1319	T,C	
2147 m	Aanderaa RCM-8	9728	U,V,P,T	
2198 m	Mini-TD	020	P,T	
2198 m	MicroCAT	1275	T,C	
2510 m	MicroCAT	1273	T,C	
2831 m	MicroCAT	1321	T,C	
2897 m	Aanderaa RCM-8	9732	U,V,P,T	
3151 m	MicroCAT	1271	T,C	
3477 m	MicroCAT	1278	T,C	
3797 m	Mini-TD	022	P,T	
3797 m	MicroCAT	1288	T,C	
3997 m	Aanderaa RCM-8	094	U,V,P,T	
4117 m	MicroCAT	958	T,C	
4402 m	MicroCAT	957	T,C	
4553 m	Aanderaa RCM-8	10662	U,V,P,T	
4674 m	MicroCAT	942	T,C	
4904 m	Aanderaa RCM-8	11618	U,V,P,T	
4935 m	Mini-TD	057	P,T	
4936 m	MicroCAT	952	T,C	
4959 m	Oceano AR	029		
4959 m	Oceano AR	642		

Table 5: *Mooring v406_5 configuration.*

v406_5	16° 20.00' N, 60° 31.00' W, 4929 m 01-Mar-2004 – 30-Apr-2005			
Depth	Instrument	S/N	Variables	Comment
13 m	MicroCAT	948	T,C	lost
40 m	MicroCAT	3412	T,C	lost
43 m	MicroCAT	3413	T,C,P	
93 m	MicroCAT	959	T,C	
141 m	MicroCAT	1719	T,C	
256 m	Mini-TD	023	P,T	
256 m	MicroCAT	934	T,C	
425 m	MicroCAT	939	T,C	
626 m	MicroCAT	929	T,C	
788 m	Aanderaa RCM-9	054	U,V,P,T	
858 m	Mini-TD	029	P,T	
858 m	MicroCAT	946	T,C	
1113 m	MicroCAT	1318	T,C	
1373 m	MicroCAT	940	T,C	
1437 m	Aanderaa RCM-8	10077	U,V,P,T	
1627 m	Mini-TD	030	P,T	
1627 m	MicroCAT	1323	T,C	
1919 m	MicroCAT	1320	T,C	
2138 m	Aanderaa RCM-8	10663	U,V,P,T	leakage after 1 month
2187 m	MicroCAT	1317	T,C	
2502 m	MicroCAT	1322	T,C	
2825 m	Mini-TD	052	P,T	
2825 m	MicroCAT	1270	T,C	
2890 m	Aanderaa RCM-8	4562	U,V,P,T	
3145 m	MicroCAT	1316	T,C	
3472 m	MicroCAT	1272	T,C	
3790 m	Mini-TD	056	P,T	
3790 m	MicroCAT	1274	T,C	
3890 m	Aanderaa RCM-8	8365	U,V,P,T	
4110 m	MicroCAT	933	T,C	
4396 m	MicroCAT	938	T,C	
4553 m	Aanderaa RCM-8	10502	U,V,P,T	
4668 m	MicroCAT	2048	T,C	
4877 m	Aanderaa RCM-8	10664	U,V,P,T	Rotor defect
4917 m	Mini-TD	058	P,T	
4917 m	MicroCAT	2279	T,C	
4922 m	Oceano AR	643		
4922 m	Oceano AR	126		

Table 6: *Mooring v407_5 configuration.*

v407_5	16° 20.00' N, 60° 36.45' W, 3000 m 02-Mar-2004 – 30-Apr-2005			
Depth	Instrument	S/N	Variables	Comment
824 m	Aanderaa RCM-8	6160	U,V,P,T	
843 m	Mini-TD	033	P,T	
1206 m	Webb SWEEP Source	001	P,T	
1231 m	Navigator	004		
1231 m	Navigator	006		
1436 m	Aanderaa RCM-8	10659	U,V,P,T	
2242 m	Aanderaa RCM-8	11441	U,V,P,T	
2919 m	Aanderaa RCM-8	11617	U,V,P,T	
2944 m	Oceano AR	641		
2944 m	Oceano AR	110		

5 Bottom pressure sensors

The bottom pressure measurements were not only conducted in the framework of the MOVE experiment but the GRACE experiment and place on the track of some of the GRACE mission satellites.

Two different types of bottom pressure sensors have been used during the last deployment period: (1) the PIES (Pressure inverted echo sounder) from Rhode Island, NARRAGANSETT RI, USA (R. Watts) based on piezo-quartz sensor technique and (2) a Bourdon-tube based pressure sensor from Scripps Institute of Oceanography.

5.1 Bourdon type ("SIO") bottom pressure sensors

The SIO sensors did not have a telemetry option and needed to be recovered. Unfortunately, from the six deployed sensors only three could be recovered. The others need to be regarded as lost, while the reason is unclear. The configuration is summarized in Table 8.

The data was stored on PCMCIA card and unfortunately only a very slow readout procedure was available (a year of data took order 16 hours). After read out, the data was low pass filer (2 day cut off) to remove the tidal signal. Next, the filtered data was fitted with a creep function fit ($y = c1 + c2 * t^{c3}$) to remove the hysteresis. The coefficients $c1$ to $c3$ were derived utilizing the MATLAB's fminsearch.m routine. The following fits were obtained (t is record length in days):

SIO-BPS#2:

$$creep_{effect} = -3.5084 + 6.9891 * t^{0.0426}$$

SIO-BPS#3:

$$creep_{effect} = -0.7281 + 3.8013 * t^{0.0891}$$

SIO-BPS#4:

$$creep_{effect} = -0.9600 + 1.0091 * t^{0.0088}$$

Table 7: *SIO bourdon type pressure summary.*

#	mooring	latitude	longitude	deployed	starttime	recovered	data amount
1	M2	16°N 00.17	56°W 56.53	2004/02/20	2004/02/20 11:20	failed	
2	M7	12°N 15.58	57°W 11.99	2004/03/05	2004/03/06 03:00	2005/05/09 12:07	10568120
3	M1	15°N 27.98	51°W 31.51	2004/02/23	2004/02/23 08:53	2005/05/04 21:53	10723264
4	M3	16°N 21.43	60°W 30.39	2004/02/18	2004/02/18 11:30	2005/05/01 13:36	10759376
7	M7.5	14°N 23.41	56°W 40.78	2004/03/05	2004/03/05 22:35	failed	
10	M6	20°N 36.00	56°W 59.41	2004/02/26	2004/02/27 00:05	failed	

5.2 PIES (pressure inverted echo sounder)

The deployed PIES have a telemetry option implemented, in fact in two versions. This allowed to read out the data without recovering the sensor and is not only convenient but reduces the uncertainty

in the records based on the readjustment of the sensors (hysteresis). The configuration is summarized in Table 8.

Table 8: *PIES positions and configuration.*

PIES #	site	latitude	longitude	depth	starttime	deployed	Autorelease	Telemetry
005	M2.5	16°N 10.00	58°W 43.00	5688 m	2004/07/08	2005/07/25	2008/03/02	no
012	M1.5	15°N 43.10	54°W 13.50	5450 m	2004/02/25	2004/02/25	2009/02/21	no
057-Tele	M7	12°N 15.03	57°W 12.04	4450 m	2004/03/05	2004/03/05	2009/02/09	once 24h
123-Tele	M3	16°N 21.30	60°W 29.27	4960 m	2004/07/06	2004/07/06	2009/02/21	multiple
127-Tele	M1	15°N 27.01	51°W 31.59	4965 m	2004/07/03	2004/07/03	2009/02/09	multiple
128-Tele	M6	20°N 35.51	56°W 40.78	5093 m	2004/02/26	2004/02/26	2009/02/28	once 24h
165-Tele	M2	15°N 59.20	56°W 57.00	4978 m	2004/07/07	2004/07/26	2009/02/16	multiple

The telemetry PIES data transmission use the delay in arrival time between two acoustic pulses to encode the data. A data block starts with a 11.0 kHz pulse, followed by 3 pulses for the parameter pressure, tau and yearday with 11.5, 12.0 and 12.5 kHz (Figure 2).

Each datablock stands for 1 day measurement.

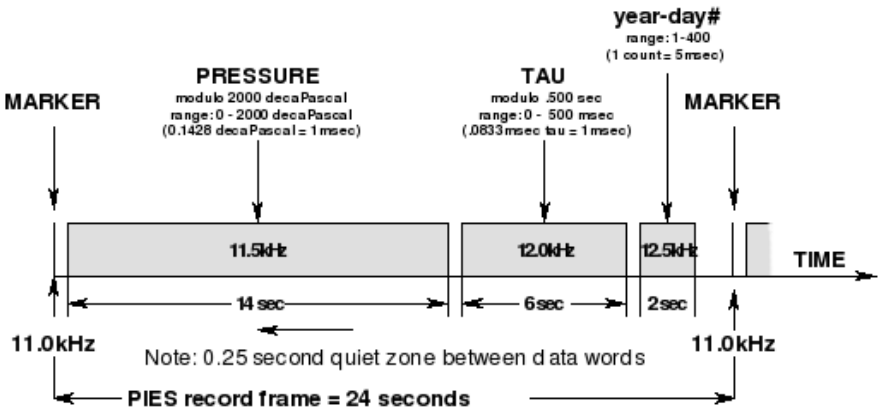

Figure 2: *Structure of a PIES telemetry data block.*

The instruments 123, 127 and 165 were read out multiple times to check the quality of the telemetry data transmission. Figure 3 shows for corresponding data (same yearday) the deviations in the arrival times of the 11.5, 12.0 and 12.5 kHz pulses after the 11.0 kHz marker pulse. About 90 percent of available pairs have a deviation of less then 3 msec. The deviations inside this interval have an RMS-value of 1.05 msec. That means, except for spikes the probability of deviation inside 1 msec is 68 percent.

A reason for this deviation can be expected from movements of the vessel in the swell of the sea. A vertical deflection of 1.5 meter is equal to 1 msec variation in travel-time of a pulse.

With the ranges for the variables as shown in Figure 2 1 msec are 0.14 mbar in pressure, 0.083 msec in tau and 5 hour in yearday.

The measured data as shown in Figure 4 shows a range in pressure of 0.15 dbar for our experiment area. The range of the telemetry data is actually 2 dbar (Figure 2). It would be good to be able to adjust the telemetry range by software control to increase the accuracy of the data.

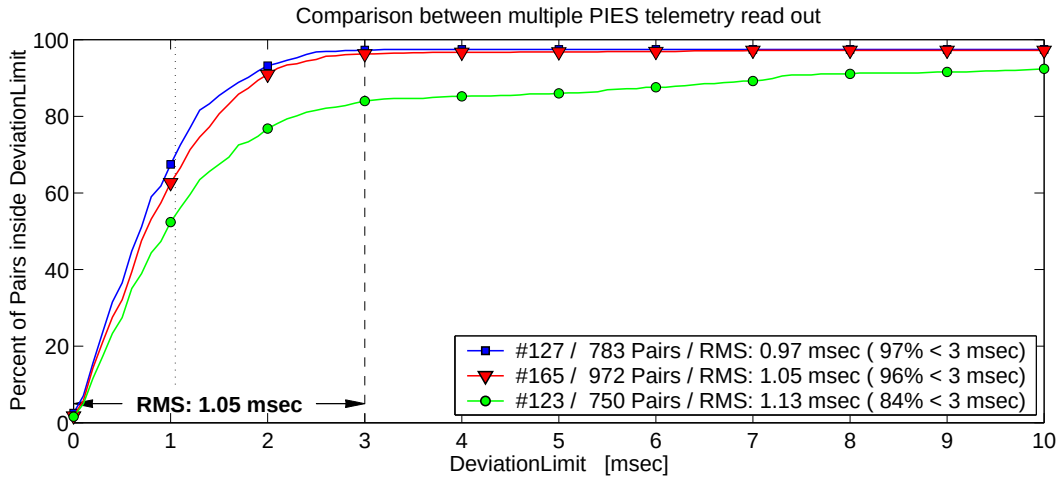

Figure 3: *Deviations in arrival time of corresponding data pairs by multiple PIES telemetry read out.*

The telemetry PIES were read out at least two times for redundancy as it allowed to check the data for self-consistence. In addition the data could be compared with the Bourdon type SIO sensors. A very good agreement was found between the instruments record (Figure 4). The difference can not be directly related to temperature variabilities which has been shown in the past (Figure 5).

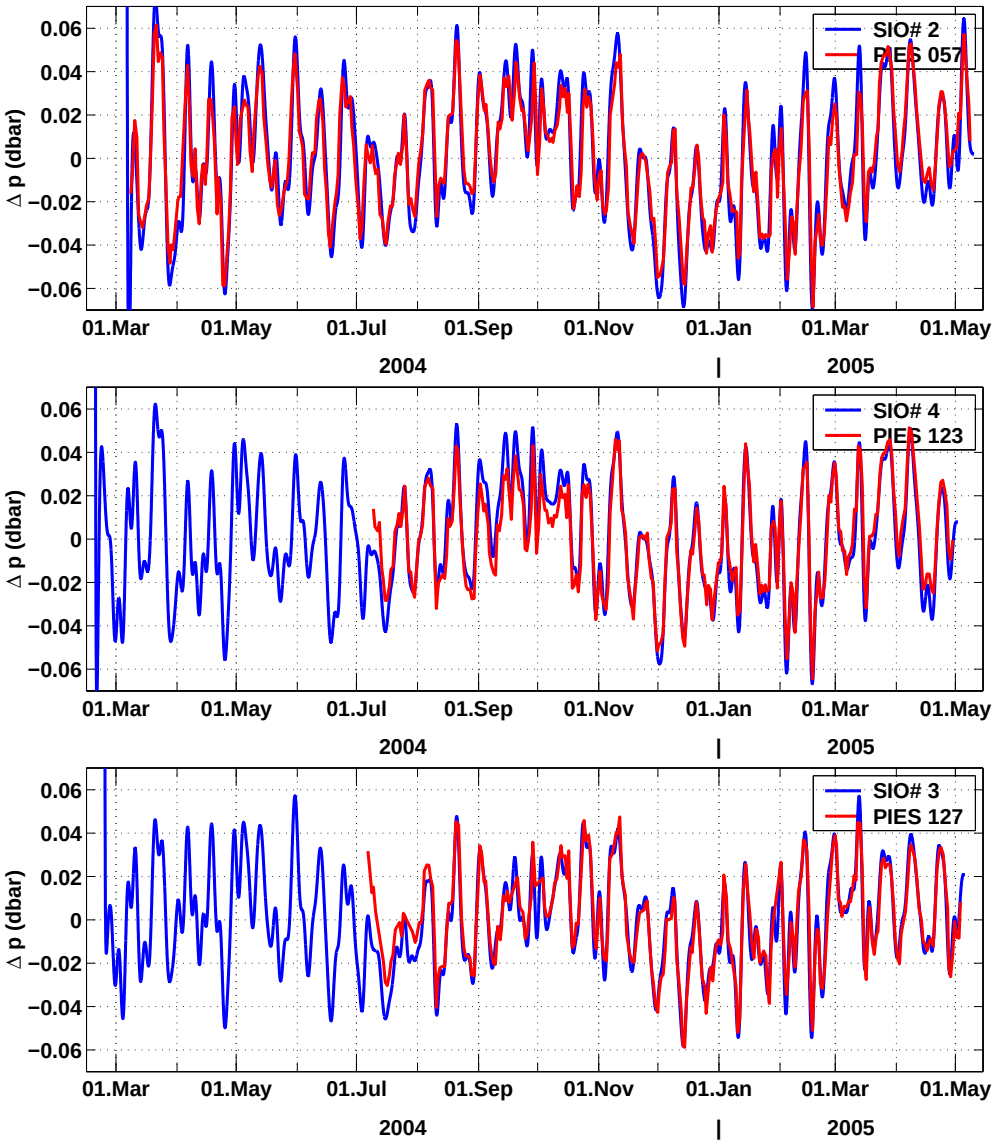

Figure 4: *Comparison between PIES and SIO bottom pressure records.*

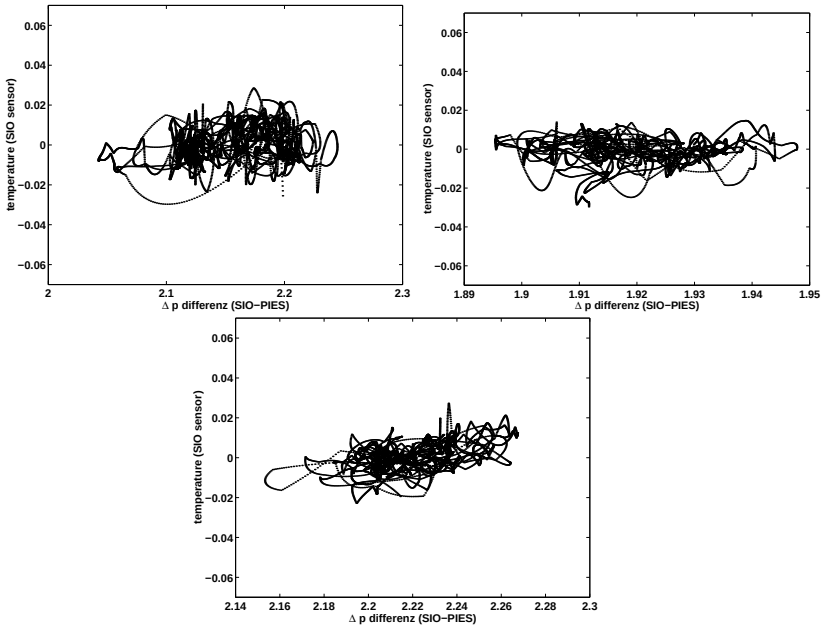

Figure 5: *Comparison between PIES and SIO bottom pressure records.*

6 Aanderaa current meter data

From the 22 current meters deployed (17 RCM-8; 9 2 RCM-9; 2 RCM-11) 18 instruments recorded good data. One instrument (RCM-8 #11618 in mooring 405-5 in 4905m) had a rotor loss directly after deployment and presumably through the implosion of neighbouring Benthos. One instrument had a leakage after one month (RCM-8 #10663 in mooring 406-5 in 2140m) for unknown reasons, the deepest RCM-8 #10664 in mooring 406-5 did not record any currents due to a blocked rotor, but the temperature sensor worked well, and finally one instrument was completely eroded for unknown reasons (RCM-9 #51 in mooring 404-5 in 1095m). Tables 3 to 6 give details on deployment depth and parameters recorded.

The time series of current are shown in Figures 7 to 10. Episodic events with pronpunced rotation of the current direction can be identified which have over large parts of the water column a rather strong barotropic component. Of particular interest is the strong current event in v406_5 at the end of the time series as it continued through the recovery cruise and was visible in the ADCP data as well. The ADCP data allowed to get further inside into the spatial structure of the current. Apparently this event is related to the passage of a Brazil Current rings which have been observed here during previous cruises. This suggestion is manifested by the CTD measurements as they ring carries 'older' (lower oxygen and different T/S) water from the southern hemisphere northward.

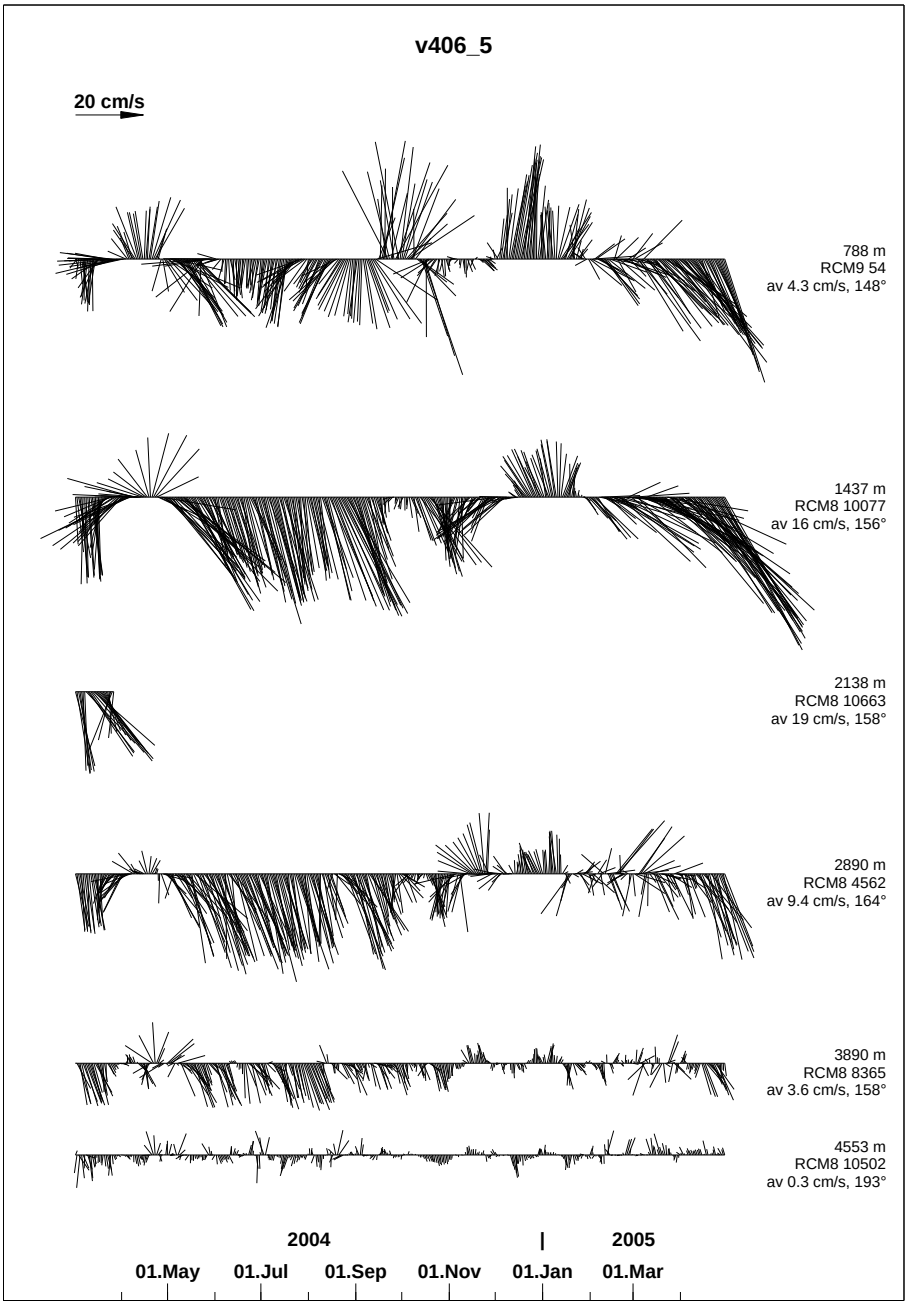

Figure 6: Stickplots of recovered current meter data from mooring 406-5

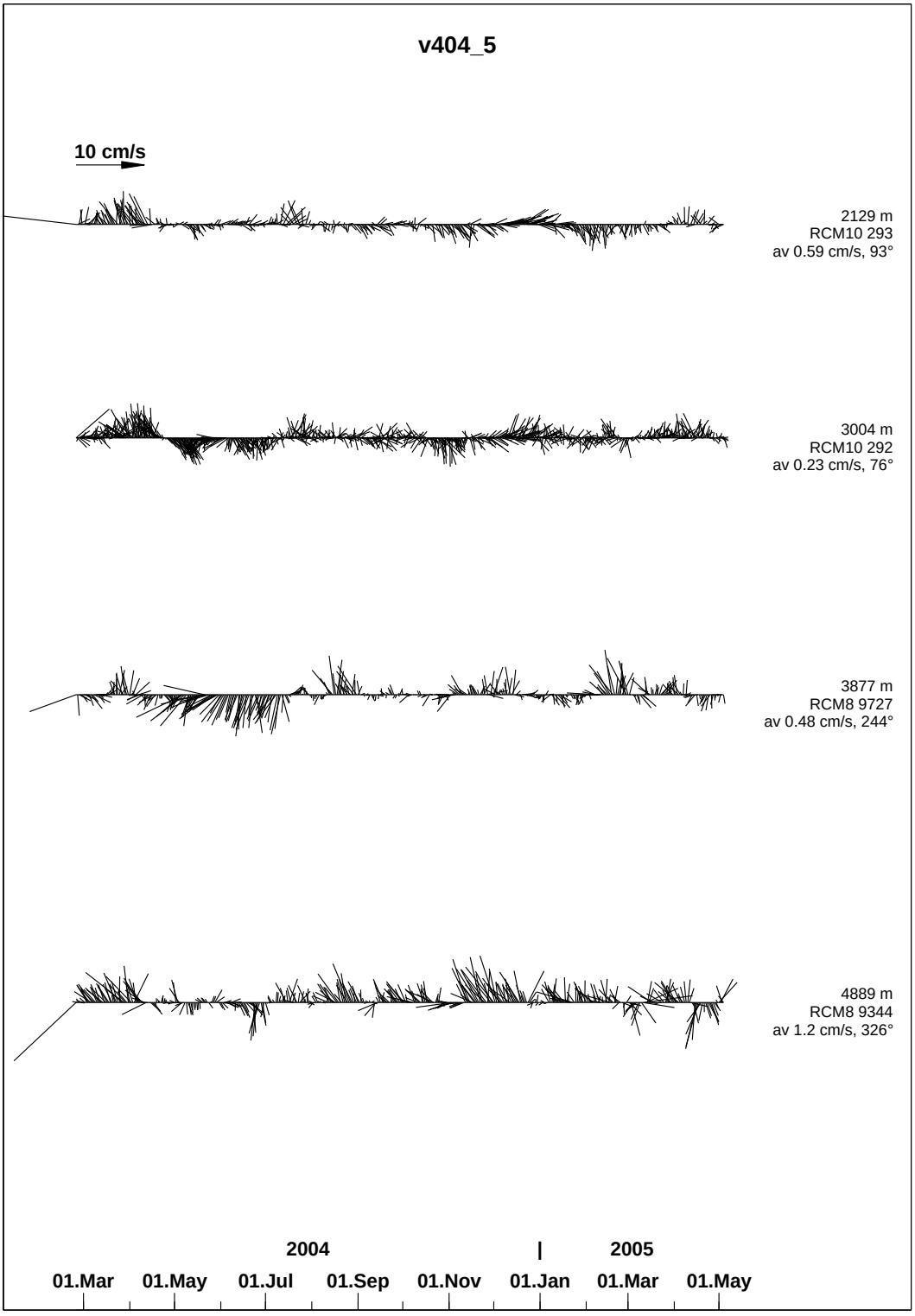

Figure 7: *RCM current meter recordings in mooring M1 (V404_5). Average speed and direction are given for each instrument.*

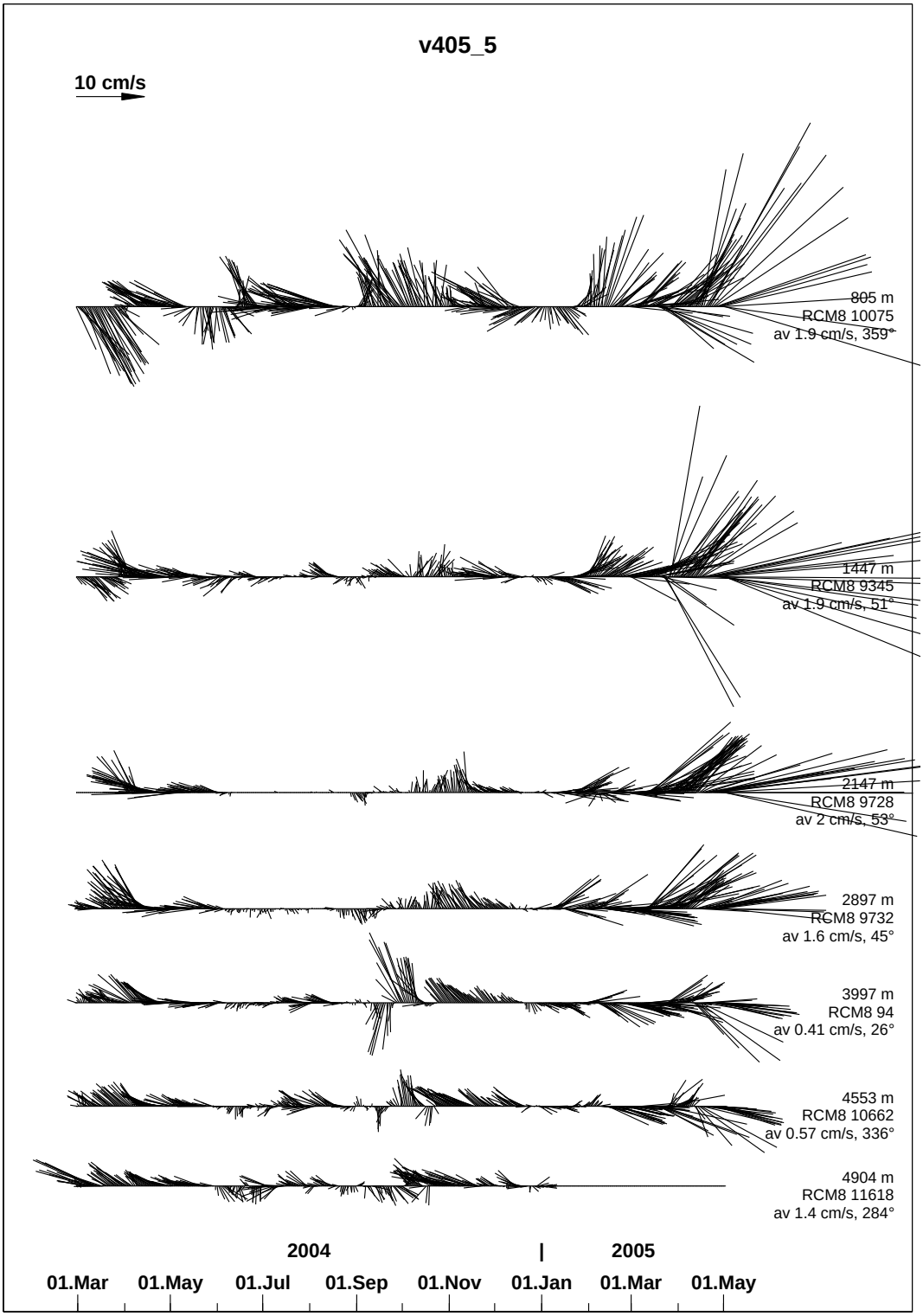

Figure 8: *RCM current meter recordings in mooring M2 (V405_5).*

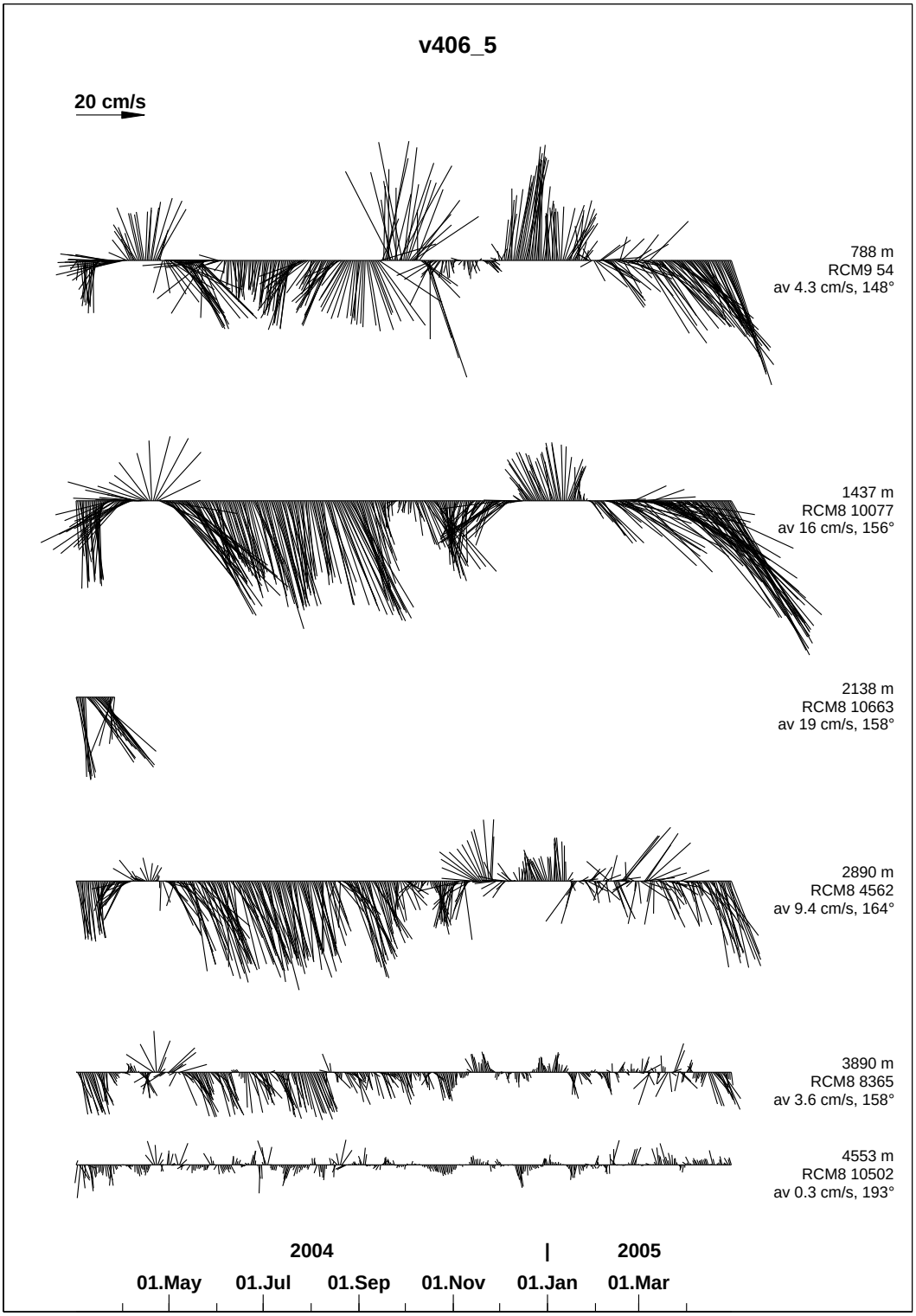

Figure 9: *RCM current meter recordings in mooring M3 (V406_5).*

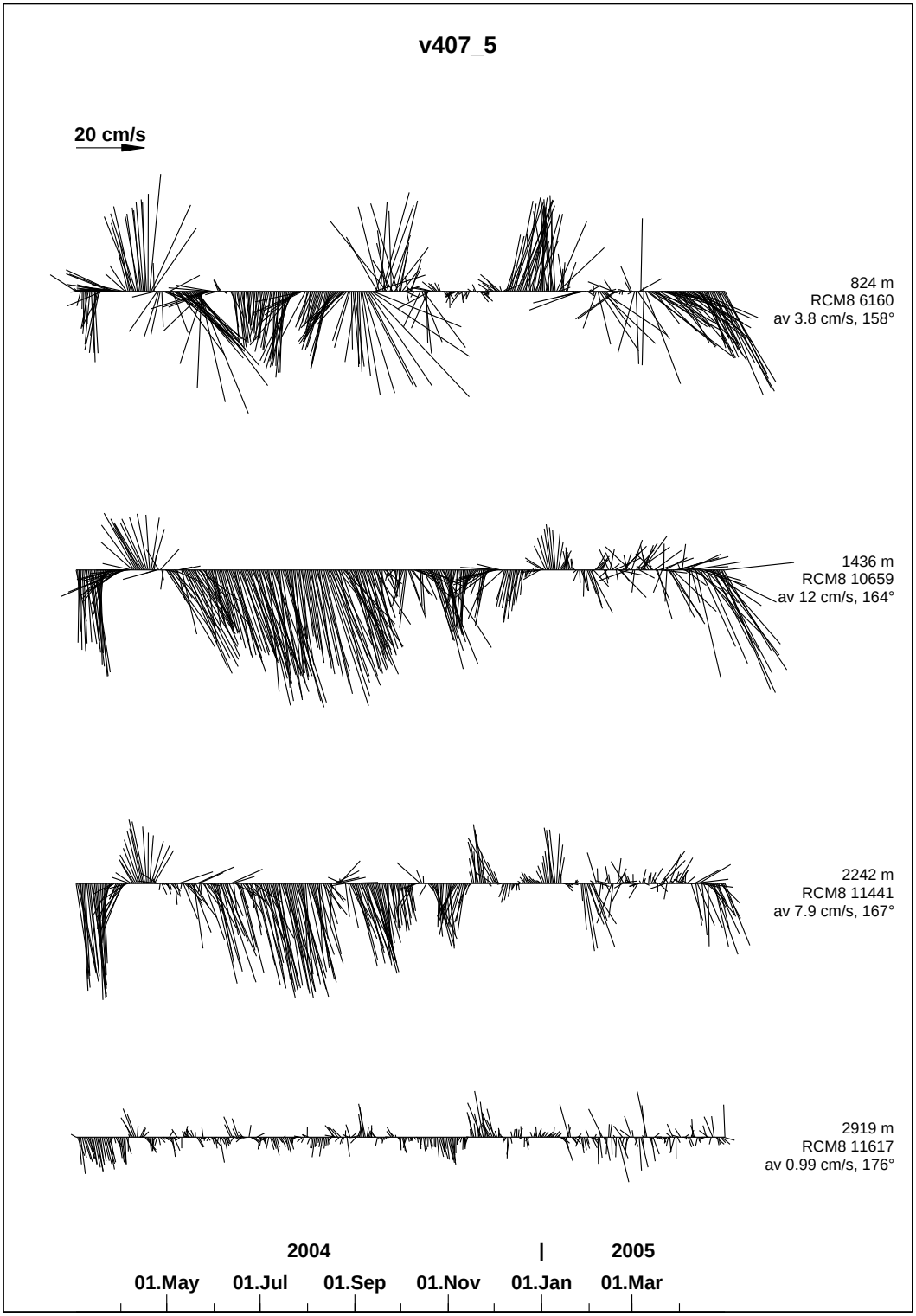

Figure 10: *RCM current meter recordings in mooring M4 (V407_5).*

7 Tomography

For acoustic tomography measurements 2 instruments, one in mooring V407/5 (M4) and one in V405/5 (M2), were deployed during the RV Meteor cruise 60/4 in February 2004.
A sweep sound source was deployed in mooring V407, the receiver in mooring V405.

7.1 Sound source

The sound source was recovered on 30.04.2005. The system parameters (Figure 11) show a nearly continuously work of the instrument during the deployment period. There were 2 breaks in sending the sweep signal in the middle of April and begin of May 2004 (Figure 11, days between sweep, and Figure 13). That could be caused by contact problems of the electrical plug at the cap of the instrument, which were found later during in-situ and on board tests.

Unfortunately the clock CK04 had a delay of more then 2.24 seconds compared to GPS. That drift is not reproduceable by the self calibration of the clock, the coefficients looks erroneous (Figure 11, Clock-Coeff).

After a night-long repair of the defect pins at the plug the sound source was deployed in mooring V407/6 on 14.05.2005.

In view of the power consumption during the deployment of 2 years the sound source was programmed to transmit once per day the 200-300 kHz sweep signal at 11:55:00 UTC.
The clock calibrations were set to 00:00:00 UTC with a period of two days.

20 meters below the sound source 2 navigators were deployed. The period is 4 hours, started at 03:46:00 and 04:06:00 UTC on 14.05.2005 to measure in an interval of 10 minutes before and after the transmission of the sweep signal.

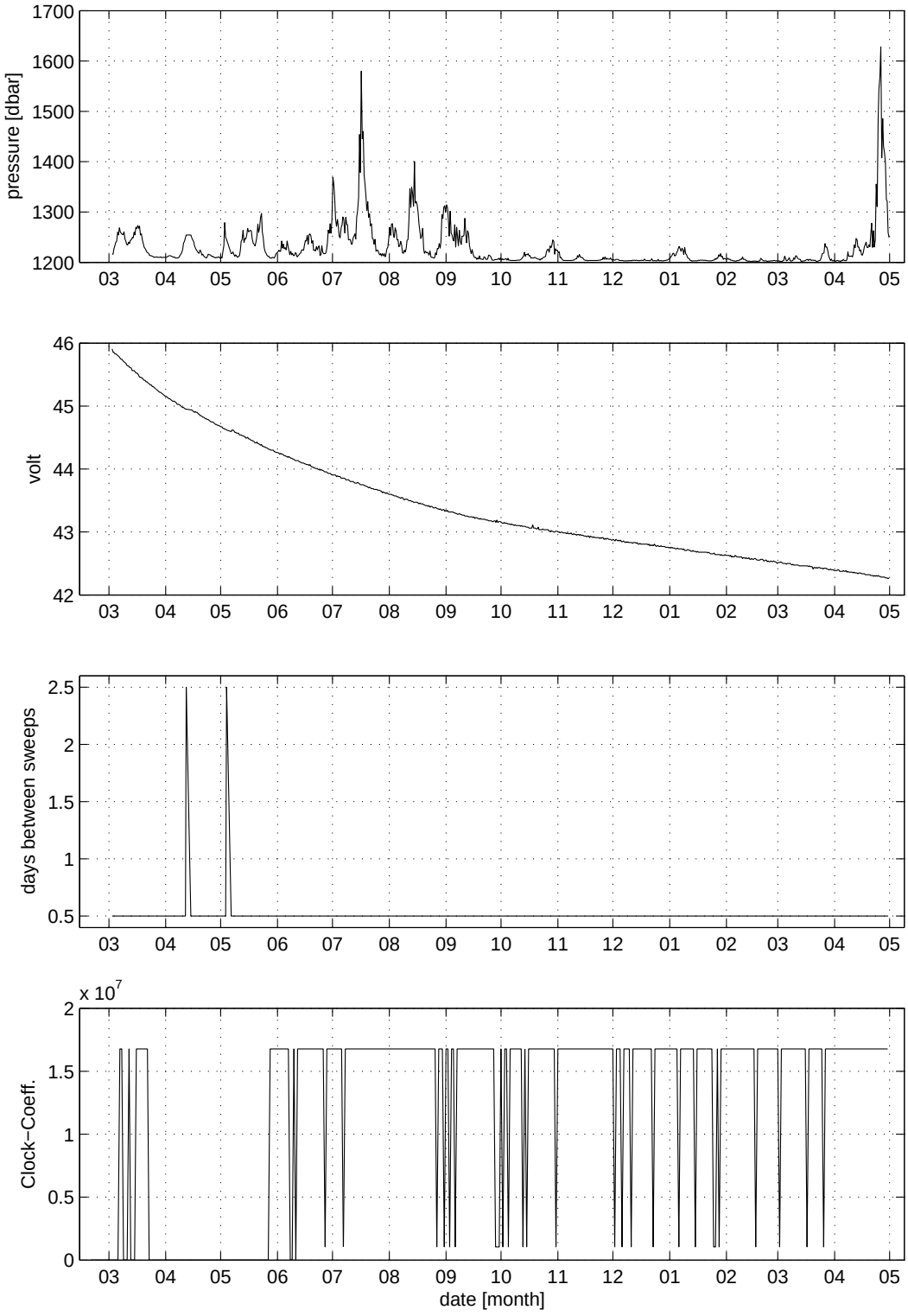

Figure 11: *System parameter of the sound source in V407/5. From top to bottom: External pressure, System voltage, Days between sweep signal, Clock coefficients of calibration.*

7.2 Receiver

The Receiver was recovered on 04.05.2004. The instrument did not woken up through the SAIL interface and it turned out, that it had no battery power. Powering the system up with external power supply allowed us to communicate with the system.
The battery voltage had a strong decreasing since middle of July 2004 (Figure 12, Vbat). The decreasing of the battery voltage is correlated with an increasing of the internal temperature and pressure of the instrument (Figure 12, Tint and Pint), caused by high currents. Since the voltage was below 28 Volts in beginning of August the system didn't work. In the laboratory the instrument clock CK07 has shown an abnormal high power consumption from time to time. It was replaced by clock CK10. Additional the internal navigator INT13 had no valid receives from the transponders during the deployment period. A in-situ test approved its faulty behavior, the navigator was replaced by INT16.

During the working period from March 2004 until August 2004 the sweep signal was received well. The pattern of the correlation of the receptions with the sweep signal (Figure 13) corresponds well with a theoretical prediction using a typical sound speed profile (Figure 14). The 2 breaks in transmission of the sweep signal are clear visible. The early receptions at the beginning of the time series results from a short deployment of the sweep source in mooring M3.5 on cruise RV Meteor 60/4 which was located some miles closer to V405/5.

A in-situ pressure calibration were done for the receiver against a Mini-TD Logger to use the external pressure measurement of the instrument for further data processing. The sensor of the receiver had a deviation of 11 dbar to the Mini-TD Logger at 1100 dbar: $P_{MTD} - P_{Tomo} = 11dbar$.
The Mini-TD-Logger has a deviation to the CTD of less then 1dbar at 1000 dbar.

The eigenrays have an estimated travel time between 651 and 657 seconds in the new deployment of the receiver in mooring V404/6 (M1) (Figure 15). With a daily transmission of the sweep signal at 11:55:00 UTC the task of the receiver was programmed as follows:

```
On Deck Navigation Task (Clock Calibration at 00:00:00)

0858:09:00:00          StartTime
0858:21:00:00          StopTime
0000:00:05:00          Periodicity

  300 Nav 4            00:05:00

Receive Task, M1 Move Experiment

0859:12:00:00          StartTime
1859:00:00:00          StopTime
0000:24:00:00          Periodicity

   60 Par              12:01:00
  120 Nav 4            12:02:00
  346 Rx  0 0 18750    12:05:46 SS@ (11:55:00; tt = 651s)
  600 Nav 4            12:10:00
  750 Par              12:12:30
  900 Nav 4            12:15:00
```

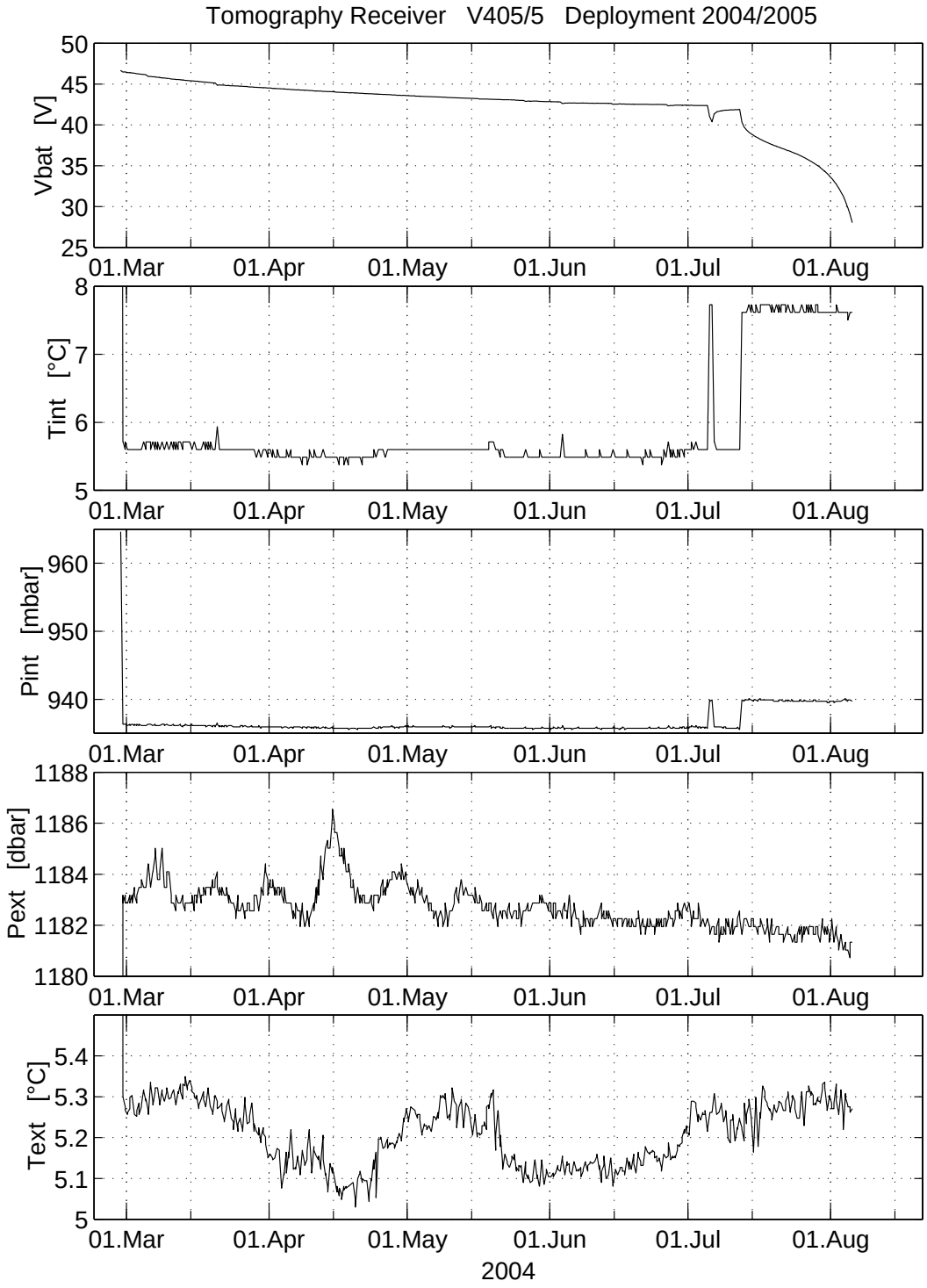

Figure 12: *System parameter of the receiver in V405/5. From top to bottom: Battery voltage, Internal temperature, Internal pressure, External pressure, External temperature.*

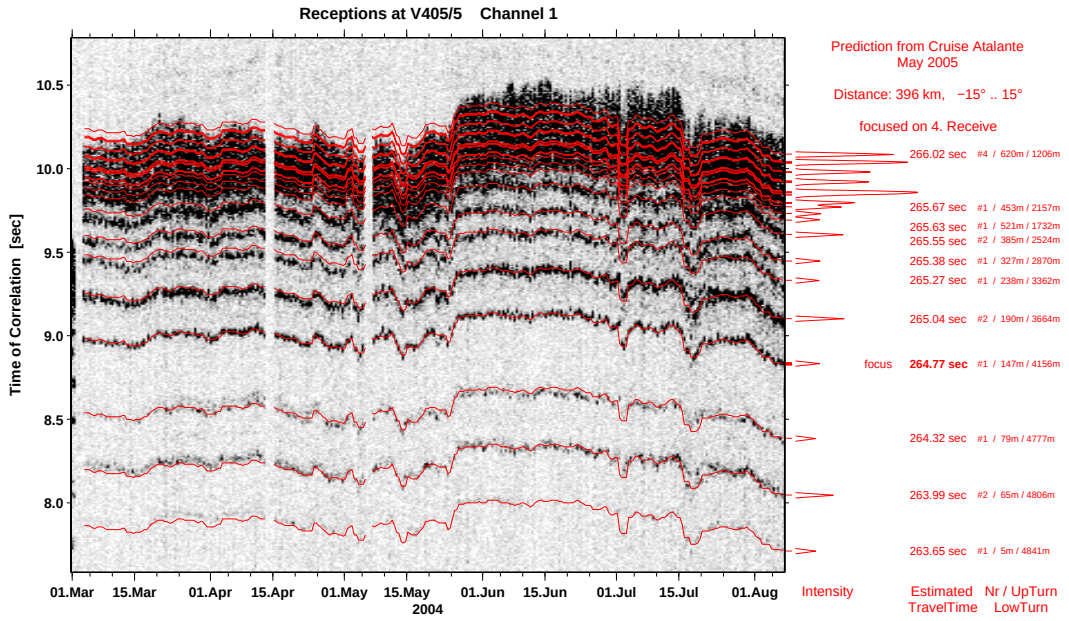

Figure 13: *Correlation of the receptions with the sweep signal, red overlayed with theoretical prediction, focused on 4. Receive.*

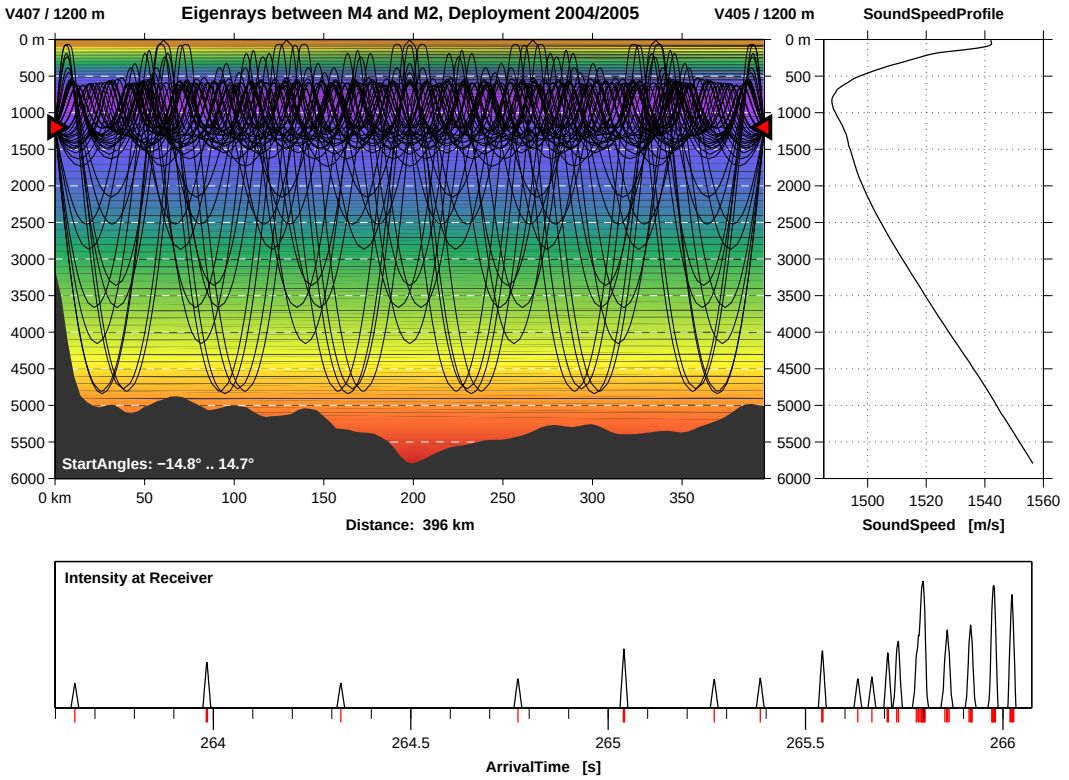

Figure 14: *Eigenrays between mooring V407/5 and V405/5 with instruments in 1200 meter.*

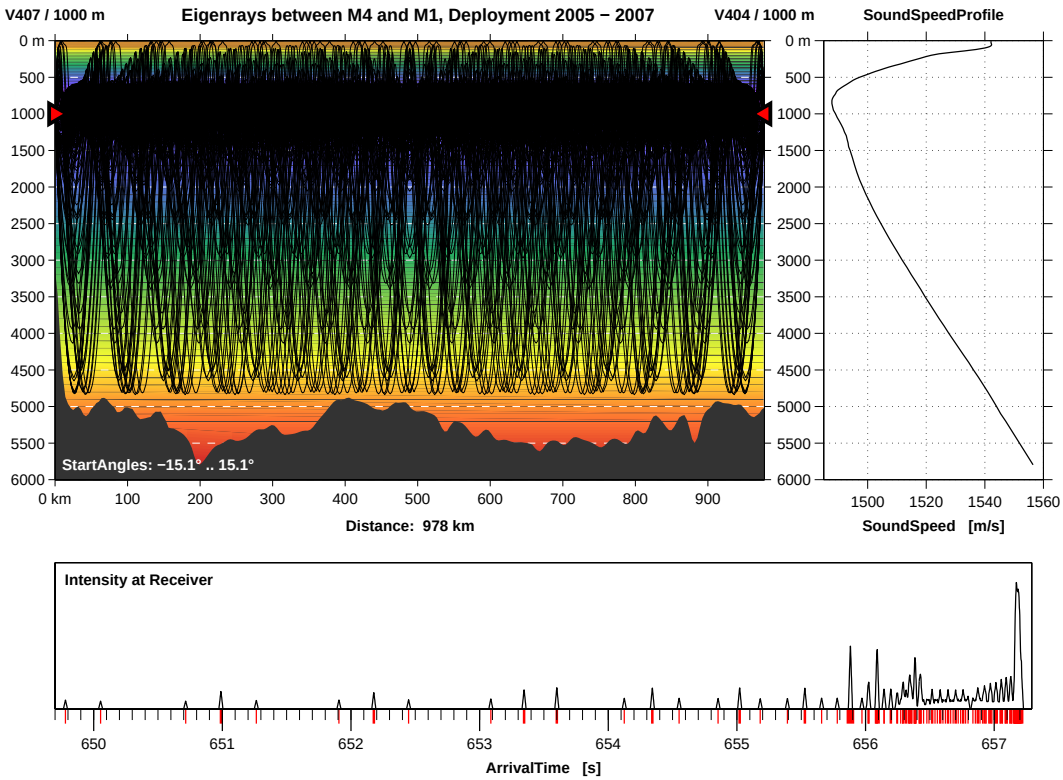

Figure 15: *Eigenrays between mooring V407/6 and V404/6 with instruments in 1000 meter.*

7.3 Transponder

All 6 transponders around mooring V407/5 and V405/5 were recovered successfully. The ascending time was between 60min and 75min. One of the deployed transponder at mooring V404/6 was lost about half an hour after the instrument arrived at the bottom. A new one was deployed. The following table and figures shows the locations of the transponders, determined by acoustical survey.

Table 9: *Positions of deployed transponders of type TR-6000, the transponders 2 and 3 of V407 are a small version (TR-6000-13).*

		rx [kHz]	tx [kHz]	rel.code	latitude	longitude	depth	error
V404/6	XP-1	10.0	11.5	A	15°N 26.1595	051°W 32.7664	4983m	± 6.2m
V404/6	XP-2	10.0	12.0	D	15°N 26.1346	051°W 30.0030	4975m	± 6.1m
V404/6	XP-3	10.0	12.5	F	15°N 28.5018	051°W 31.3554	4973m	± 5.8m
V407/6	XP-1	10.0	11.5	A	16°N 19.0356	060°W 37.8559	2484m	± 3.7m
V407/6	XP-2	10.0	12.0	B	16°N 19.0398	060°W 35.3782	3338m	± 4.2m
V407/6	XP-3	10.0	12.5	F	16°N 21.3707	060°W 36.5187	2955m	± 4.5m

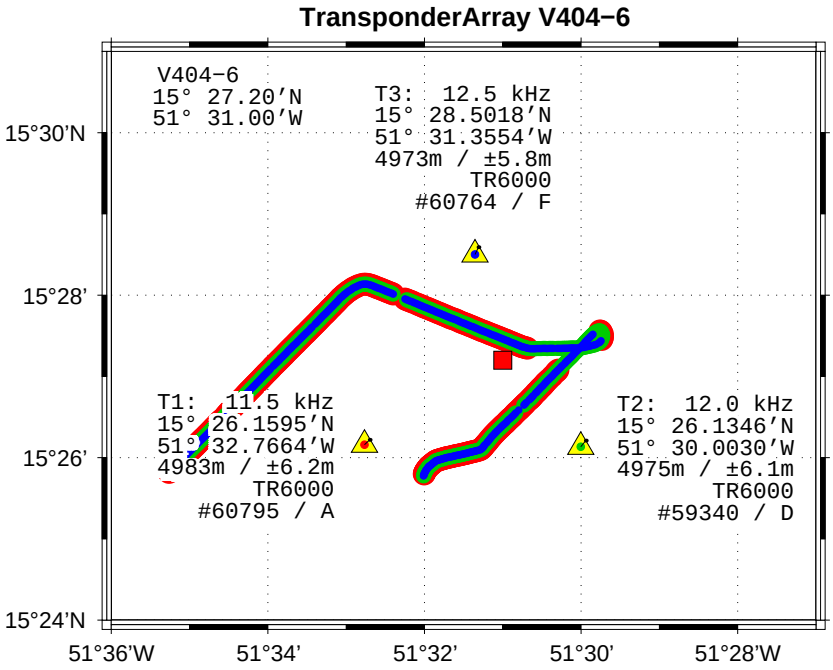

Figure 16: *Transponder array around mooring V404/6. The yellow triangles shows the transponders, the red square the mooring. The coloured track are the positions which were used for the inversion.*

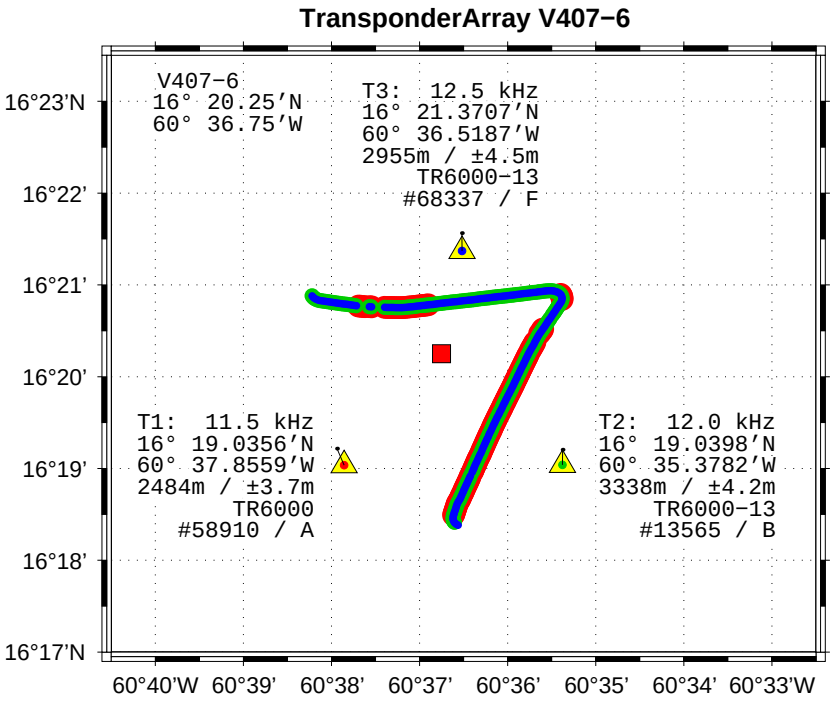

Figure 17: *Transponder array around mooring V407/6. The yellow triangles shows the transponders, the red square the mooring. The coloured track are the positions which were used for the inversion.*

8 CTD data

8.1 CTD instrument

The CTD-system used during the cruise Atalante 2005 was a Seabird Electronics Inc. of Bellevue, Washington, USA (SBE) 9 plus. It is the IfM-GEOMAR SBE No.1 with serial number 09p22348-0572. Connected were a pressure sensor (ser. no. 80024, last laboratory calibration February 2003), a temperature sensor (ser. no. 2920, last laboratory calibration February 2003) and a conductivity sensor (ser. no. 2452). The oxygen sensor used is a Seabird SBE-43 sensor (430215).

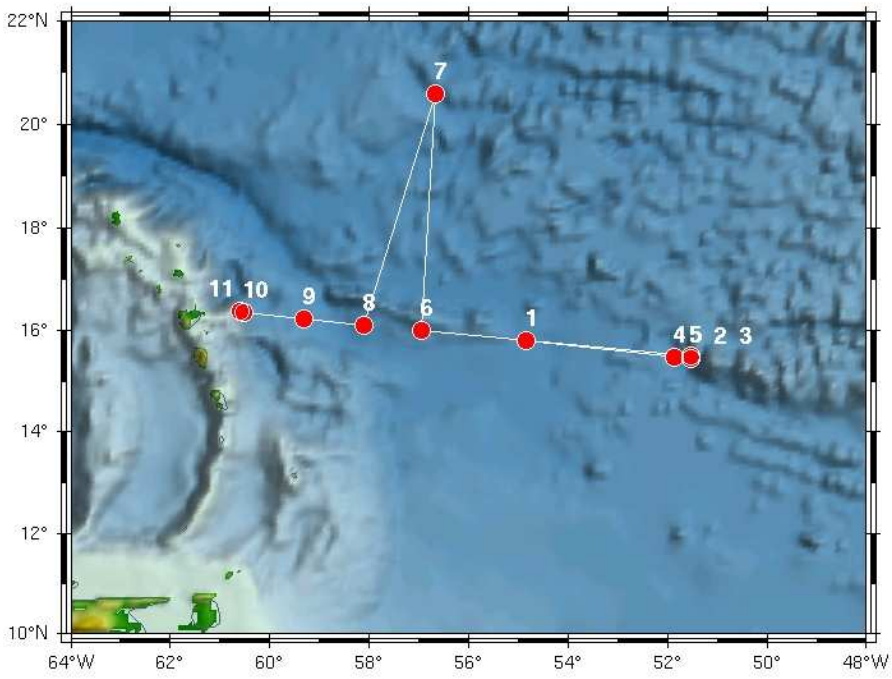

Figure 18: *Locations of CTD casts during N/O l'ATALANTE cruise.*

8.2 Data quality of CTD measurements

There were some malfunctions of CTD, CTD carousel and CTD-PC during the cruise. It was possible to resolve all problems to a degree that the quality of the profiles taken did not get harmed. Only one profile (profile 5) has to be regarded as not usable, not passing the quality check.

We had some problems automatic firing the bottles with the SBE-Win32 CTD software. During some casts no water could be collected due to this failure. The Seabird bottle release unit used with the rosette and the Seabird instrument worked well when fired manually. The latter casts were all fired manually to bypass this problem, caused by a partly broken RS232 port in the recording PC unit (corrupt TX channel, while RX channel worked fine). Water samples from Niskin bottles were only taken for salinity calibration of the SBE No.1 CTD. No oxygen bottle data did get collected, thus no past cruise oxygen calibration can be made. Oxygen data has to be regarded as final.

For most of the CTD profiles MicroCats and/or T/P-recorders were attached to the rosette for calibration purposes. This reduced the possible amount of water samples per calibration profile to maximum of eight and the maximum CTD depth sometimes to as low as 3500 dbar.

At all stations water samples were taken in different depths from the rosette bottles. Because of limitation to eight water samples, the depths were chosen mainly in homogeneous layers to get most possible accuracy for salinity calibration.

Bottle salinities will be determined past cruise, because no salinometer was on board. Thus a post cruise calibration of CTD-data will be carried out and will give further information about the data quality of the carried out CTD measurements.

8.3 CTD stations and hydrography

A total of eleven CTD stations were carried out (figure 18). One CTD cast was taken at each mooring cite, and a couple on the between the moorings along the connecting section. One CTD station (cast 4) only went down to 1000m, since T/P recorders with shallow pressure sensors had to be calibrated. The maximum depth of each CTD cast can be seen in the list of all CTD stations in table 10. A flat and a deep salinity section can be seen in figure 19 and temperature CTD section can be seen in figure 20.

The temperature and salinity section resembles the main features of the hydrography in the area. A surface fresher layer influenced by tropical rainfall and a North Brazil Current ring with a very fresh top. In about 125m the saline core of the Subtropical Underwater is visible. The salinity minimum of the Antarctic Intermediate Water is located at about 800 m to 900 m depth. In the largest part of the water column, approximately 1200 m–4500 m, the various species of North Atlantic Deep Water (NADW) are the main feature, which is the main interest of study in the MOVE project. Minimal variations in the NADW are found in about 3000m depth as seen in figure 21. Below this near the bottom, remainders of Antarctic Bottom Water can be found, which has, as also seen in figure 21, much larger horizontal and annual variations as the overlying NADW.

Table 10: *Summary for CTD stations.*

Atalante MOVE 2005			**CTD Stations**			
Profile	Date	Time	Latitude	Longitude	Uncorrected Depth	Maximum Pressure
1	2005/05/03	13:11	15° 47.07’ N	54° 51.07’ W	5475	5330
2	2005/05/05	00:06	15° 26.74’ N	51° 31.95’ W	4958	4831
3	2005/05/05	14:30	15° 27.13’ N	51° 31.18’ W	4979	4935
4	2005/05/05	19:50	15° 27.95’ N	51° 51.26’ W	4972	1000
5	2005/05/05	23:06	15° 28.90’ N	51° 31.25’ W	4963	3475
6	2005/05/10	14:55	16° 00.08’ N	56° 56.27’ W	5003	4908
7	2005/05/11	22:27	20° 35.44’ N	56° 40.82’ W	5217	3505
8	2005/05/13	07:28	16° 06.07’ N	58° 06.97’ W	-	4003
9	2005/05/13	17:43	16° 13.91’ N	59° 18.96’ W	5053	5130
10	2005/05/14	13:34	16° 20.30’ N	60° 30.46’ W	4955	4969
11	2005/05/15	02:16	16° 22.10’ N	60° 36.51’ W	3077	3003

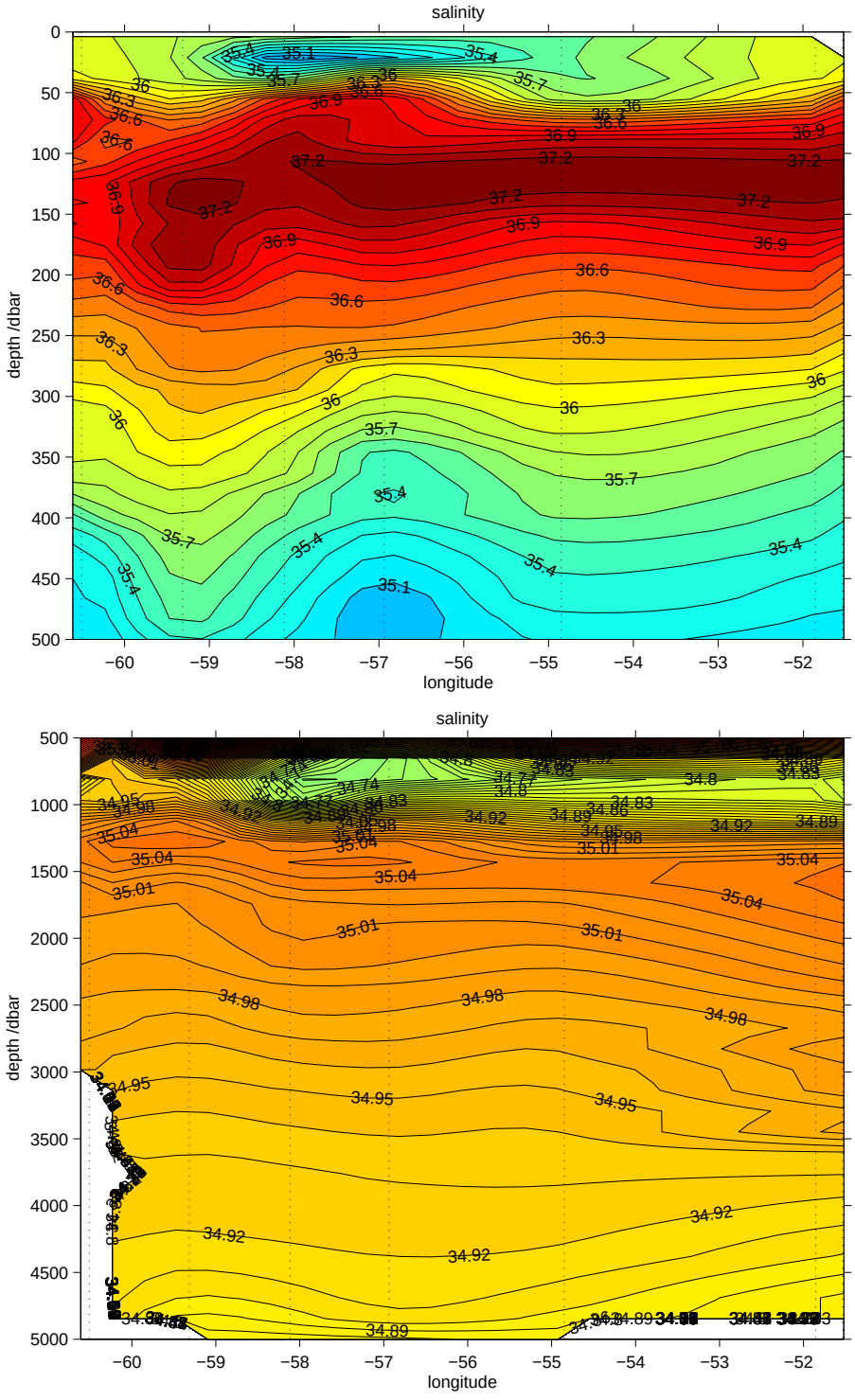

Figure 19: Salinity CTD section. The dotted lines indicate the position of stations. The section is divided in an upper part and a lower part.

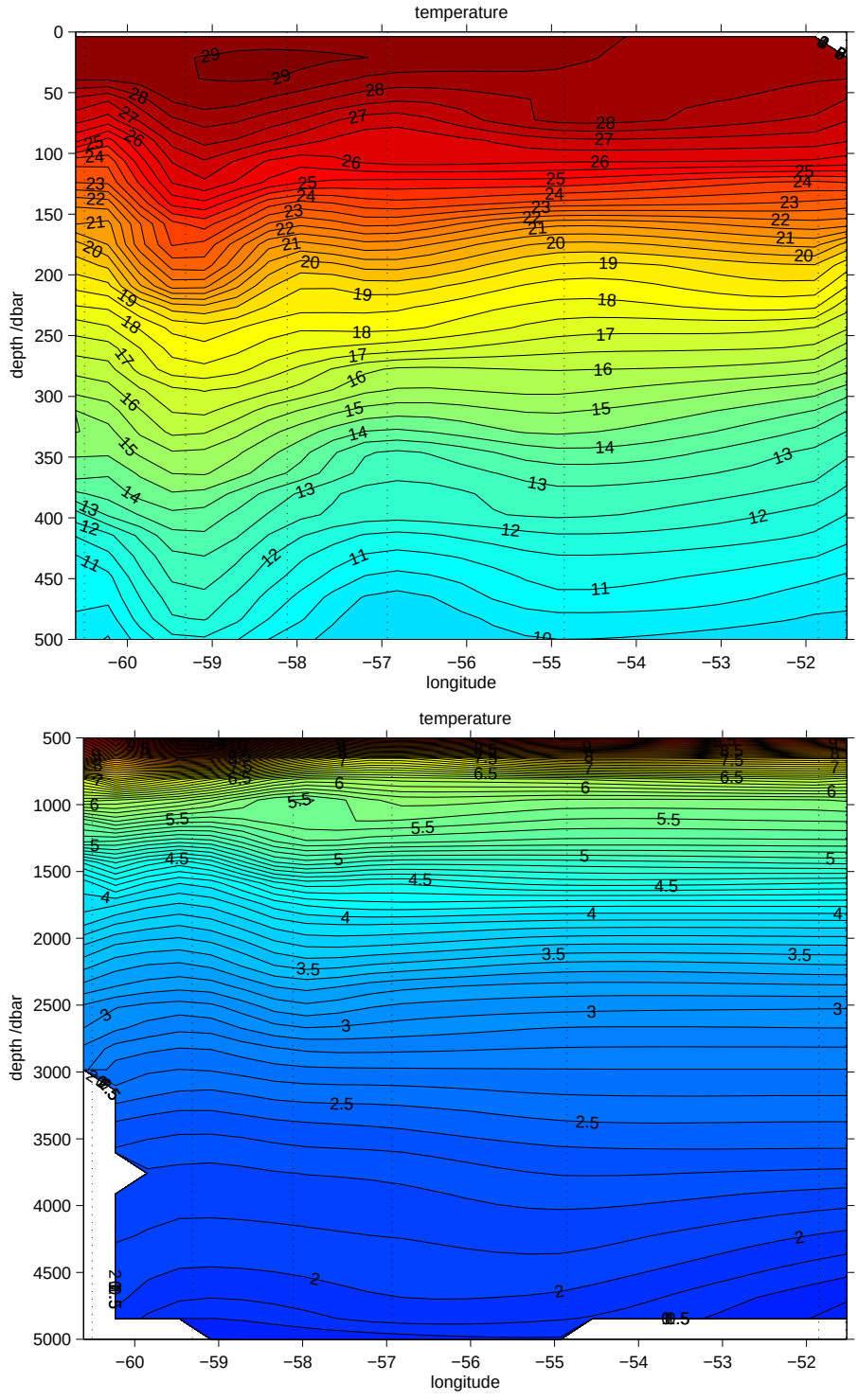

Figure 20: Temperature CTD section. The dotted lines indicate the position of stations. The section is divided in an upper part and a lower part.

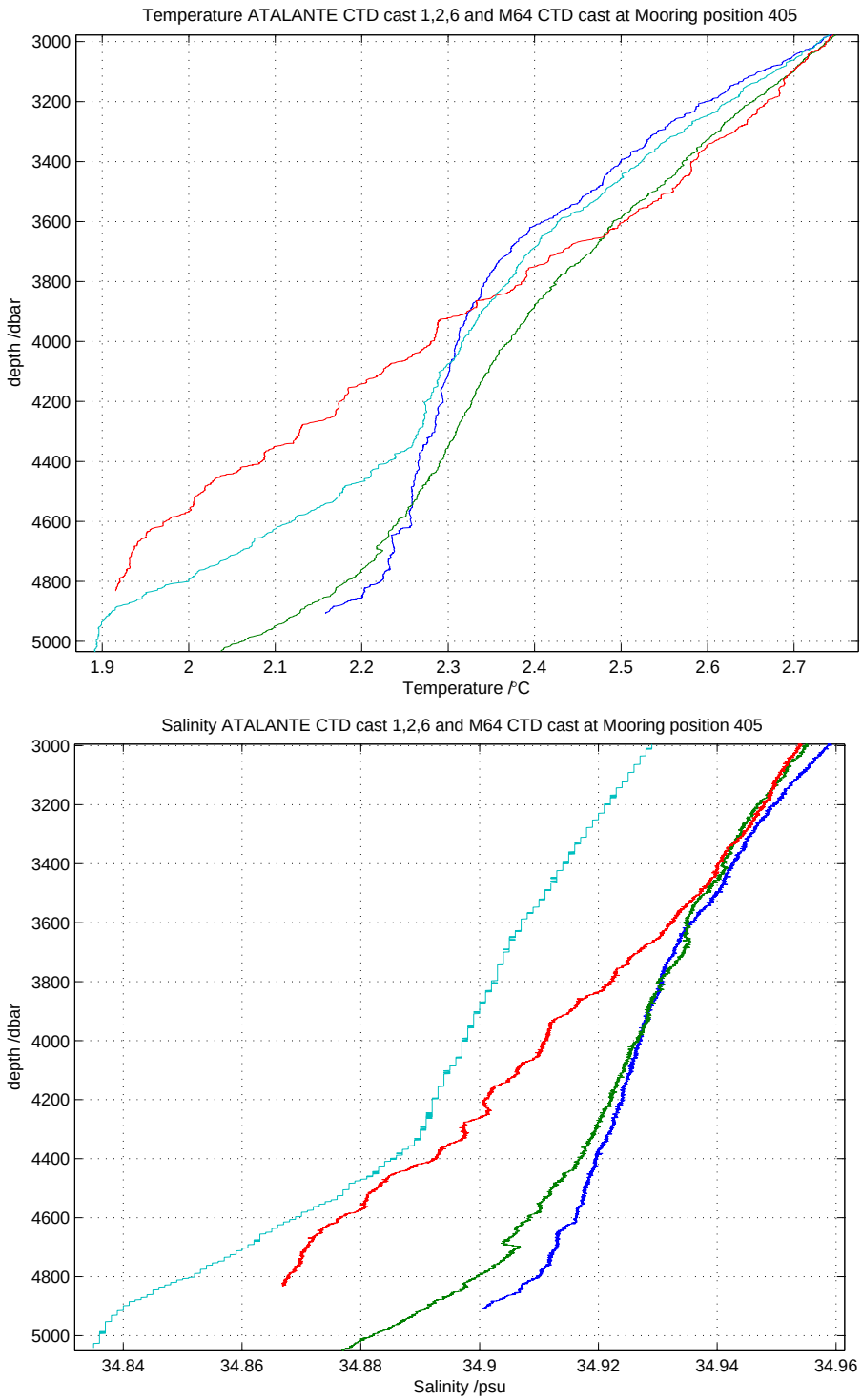

Figure 21: Temperature (upper figure) and salinity (lower figure) variations below 3000m.

9 ADCP Data

N/O l'ATALANTE has two narrow band RD Instruments ADCP systems, a 300kHz and a 75kHz. General information about the system and the configuration are provided at the N/O l'ATALANTE website (in French only). Fortunately the system administrators, as all the others on board, are very friendly and very helpful.

9.1 Data acquisition

The ADCP data is recorded using the TRANSECT program (at our cruise the version 1.85 was used). The system administrators mentioned that GENOVIR plans to maybe move to VMDAS in the future.

TRANSECTcreates three types of files:

- Navigation files (MOVE00*N.???)
- Raw Data files (MOVE00*R.???)
- Processed files (MOVE00*P.???).

9.1.1 Navigation files

The Navigation files have the following structure:

```
ENSEMBLE    35   PCTIME 6223085
$CADCP,30/04/05,17:16:57.065,N,16,17.90544,W,060,35.93999,209.60,+06.20,
N,16,17.90558,W,060,35.93961,000.00,208.95,HDM,209.85,+00.43,-00.16,+00.18
```

Essentially there are 2 information blocks:
(1) rows starting with ENSEMBLE, give the ensemble number (here: 35) of the ADCP followed by the associated PCTIME in 1/100 sec reference to the actual day (here: 6223085).
(2) The next block is composed from a number of rows (typically 3 to 4, depending on ensemble length) with contain the navigation data associated with the ADCP ensemble. Theses rows start with $CADCP followed by:

- 'Board time' (dd/mm/yy,hh:mm:ss.sss; here: 30/04/05,17:16:57.065), which is the time/date in UTC as used on board the vessel. This time is not exactly but rather similar to GPS time. The associated time drift is in the order 2 seconds per year but as it is always synchronized with GPS during each port call of the vessel we treat it as 'real' GPS time.
- Latitudinal position (hemisphere, degree, minute; here: N,16,17.90544) as obtained from GPS associated with the respective board time.
- Longitudinal position (hemisphere, degree, minute; here: W,060,35.93999) as obtained from GPS associated with the respective board time.
- Course over ground (route fond) in degree (here: 209.60)
- Speed over ground (vitesse fond) in knots (here: +06.20)

- Latitudinal position (hemisphere, degree, minute; here: N,16,17.90558) from the board navigation system. Although based on GPS, this is a tricky one as it is integrated over a certain time (in our case they used 1 minute!!) and therefore often not useful for ADCP ship speed estimates. It can be configured to give instantaneous values - the position should be similar to GPS in that case.
- Same as Latitudinal but for Longitude (hemisphere, degree, minute; here: W,060,35.93961). Note again: time integrated (in our case they used 1 minute).
- Gyrocompass 1 ships heading (degree, here: 000.00 - not included in data). An IXSEA fiber-optical gyro. Instantaneous value at board time stamp.
- Gyrocompass 2 ships heading (degree, here: 208.95). An IXSEA fiber-optical gyro. Instantaneous value at board time stamp.
- Source for attitude data (here: HDM, central heading system based on the two gyros and a pitch/roll sensor). The HDM is a combination from the fibre-optical heading sensors and a tilt sensor mounted between them.
- Instantaneous heading (in degree) based on source. The sources was in our case HDM (here: 209.85).
- Roll (*french: roulis*; degree) based on source. The sources was in our case HDM (here: +00.43). Positive if vessel lowers on starboard side (*french: le roulis est positif lorsque le naivre gite sur tribord*).
- Pitch (*french: tangage*; degree) based on source. The sources was in our case HDM (here: -00.16). Positive if vessel heaves the bow (*french: le tangage est positif lorsque le navire leve le nez*).
- Height of center? (*french: pilonnement instante*) (in meter) based on source. The sources was in our case HDM (here: +00.18).

9.1.2 Raw data files

These files contain all raw (beam coordinate) data from the ADCP during its operation. The files were not used for processing here.

9.1.3 Processed files

These files contain 'processed' ADCP data that is averaged (over 2 seconds) and corrected for a predefined misalignment angle (here: -45 degree). Although we used a 2 second averaging, the bin length (2 seconds) and the ensemble length (2 seconds) give data approximately every 3 to 4 seconds. Therefore we consider this files to be rather 'raw' data files and useful for further processing.

9.2 Data processing

The binary data was read out with 'rdpadcp.m' (Rich Pawlowicz - rich@ocgy.ubc.ca) using the 'raw' mode, hence no navigational information was integrated into the data but internal heading was used to convert the beam into earth coordinates. Essentially this was done as the navigational data recorded

in the ADCP which can be merged with the ADCP recorded data to give the water velocity was not adequate as it showed a time delay order 5' (reason unkown) and it was strongly smoothed (compare Figure 23).

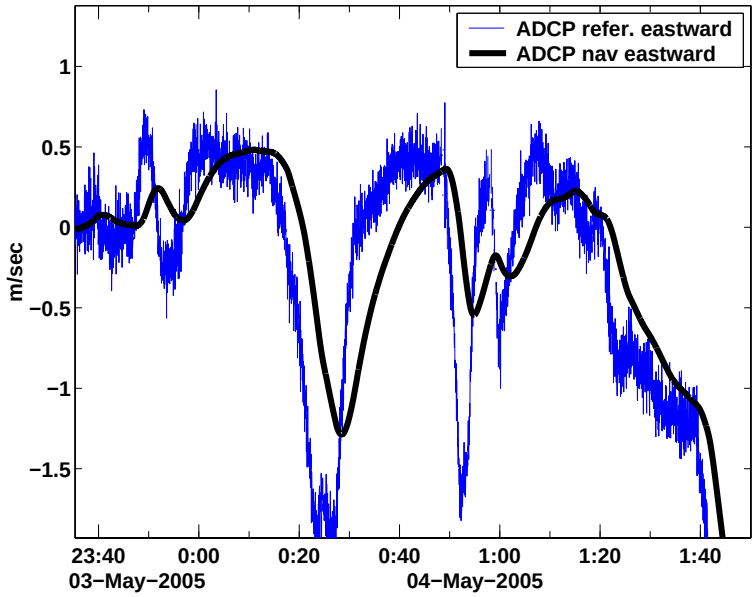

Figure 22: *Example the reference velocity (blue) and the TRANSECT derived ship velocity (thick black line).*

To avoid using the TRANSECT derived navigation we did an own ship speed and heading calculations. The GPS/CINNA navigational data files were used to derive a true ship speed and heading. The navigation data needed to be interpolated to the respective time of the ADCP ensemble. However, timing is critical, to assicate the right navigation data with the ADCP ensemble. A 2 second delay between ensemble and navigation data gives order 10 m position difference when the ship steams with 10kn. The ensemble number not the PCTIME was used for interpolation.

Heading correction was applied to the ADCP velocities. The correction was calculated as the difference between internal ADCP recorded heading (adcp.heading) and the CINNA and gyro heading (which are rather similar) and was in the order of 2°.

The heading corrected data was finally averaged over 10 minute intervals and written into a MATLAB file (MOVE0??_av.mat). Variables are:

```
    Us - eastward velocity (m/s)
    Vs - northward velocity (m/s)
  spds - ship speed (m/s)
  sogs - ship speed over ground (m/s)
  dirs - ship heading (\deg)
  ti_s - matlab day number (day)
 lat_s - decimal latitude
long_s - decimal longitude
```

9.3 Scientific evaluation

A pronounced feature of the velocity field during the N/O l'ATALANTE cruise was the existence of intense eddy between 57°W and 59°W. Although it had a strong barotropic character surface current were strongest. The eddy was slanted somehow from upper more west that lower part separated by a minimum in current at about 200 m depth (see Figure 23).

As our cruise track crossed the eddy regions three times we have a number of realizations of the feature and in addition we have some hydrographic informations from CTD casts in the feature. As in an earlier cruise (SO 172, year 2002) this type of eddy is very likely a Brazil Current ring which are known to propagate as far north as 16°N. Support comes from the hydrography which indicates the water to be of rather different characteristic in salinity and being much more depleted in oxygen than the surroundings. The strong current events which are related to the propagation of the eddy is very good visible in the RCM records (Figures 8 and 9). The eddy move order 2°westward in about two weeks while surface currents increased and deeper currents decreased. Likely it will decay at the coast.

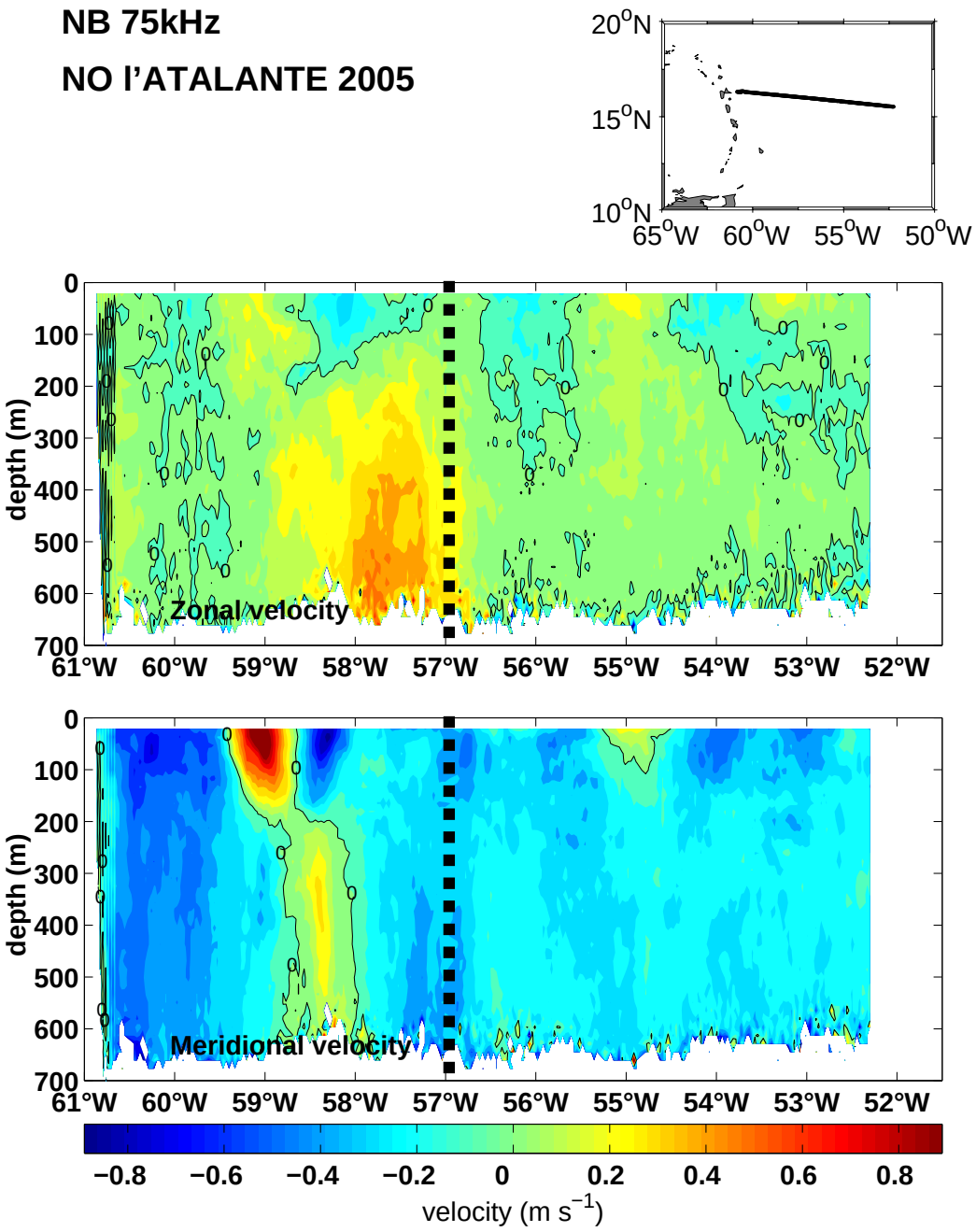

Figure 23: *Zonal (eastward) section ADCP 75 kHz. Broken line indicates section crossing with meridional section (figure 25).*

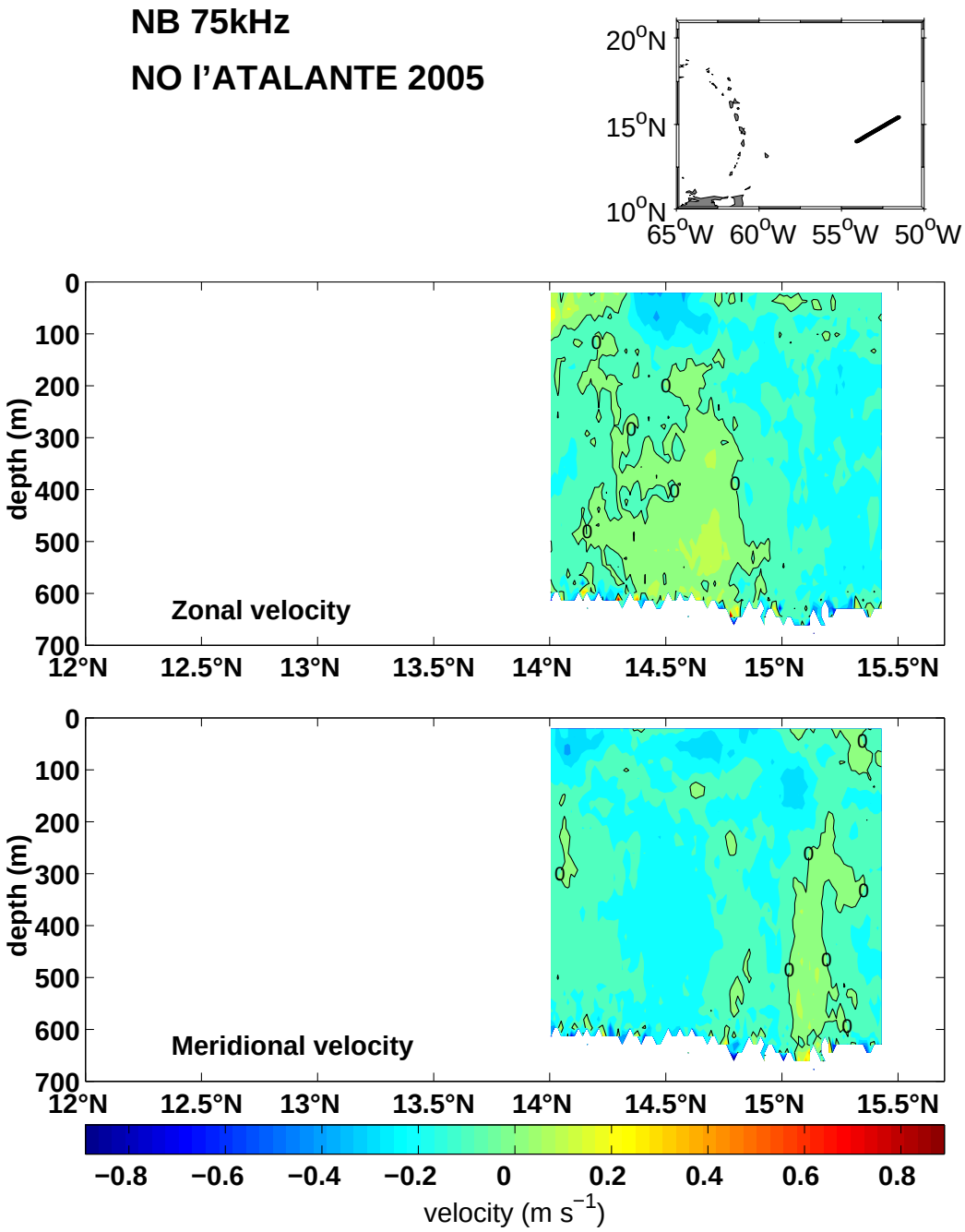

Figure 24: *Meridional (southwestward) section ADCP 75 kHz.*

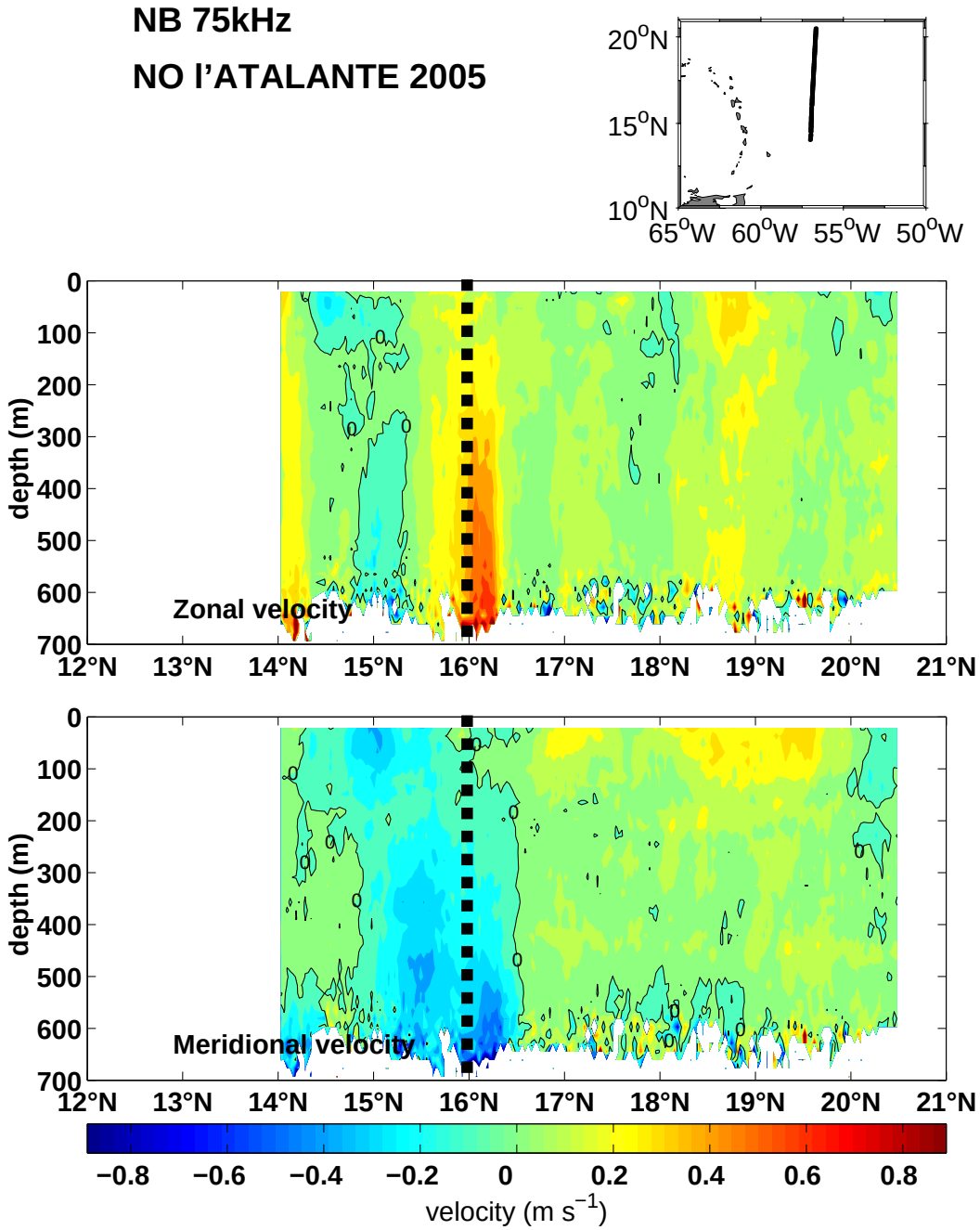

Figure 25: *Meridional (northward) section ADCP 75 kHz. Broken line indicates section crossing with zonal section (figure 23).*

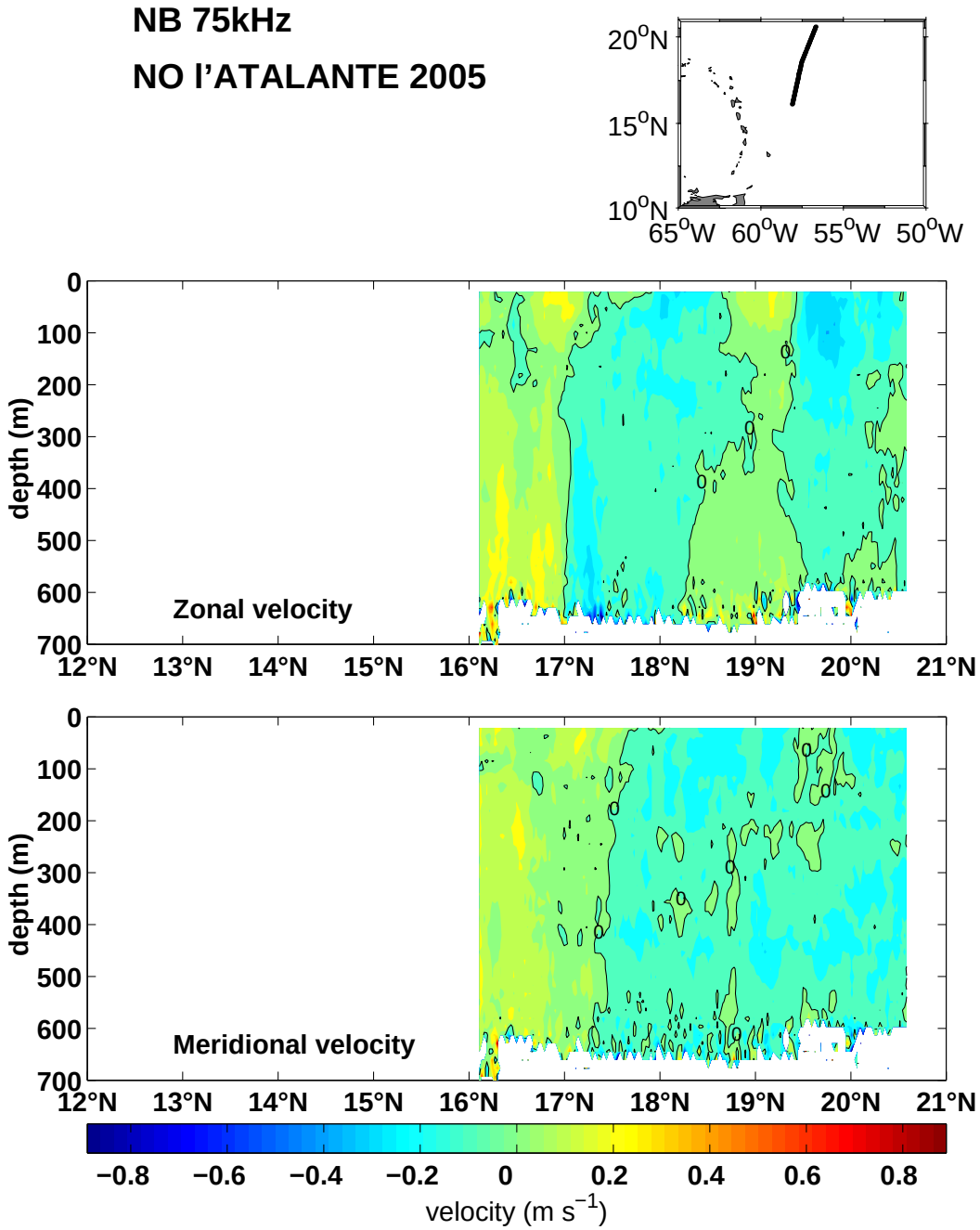

Figure 26: *Meridional (northward) section ADCP 75 kHz. Broken line indicates section crossing with zonal section (figure 23).*

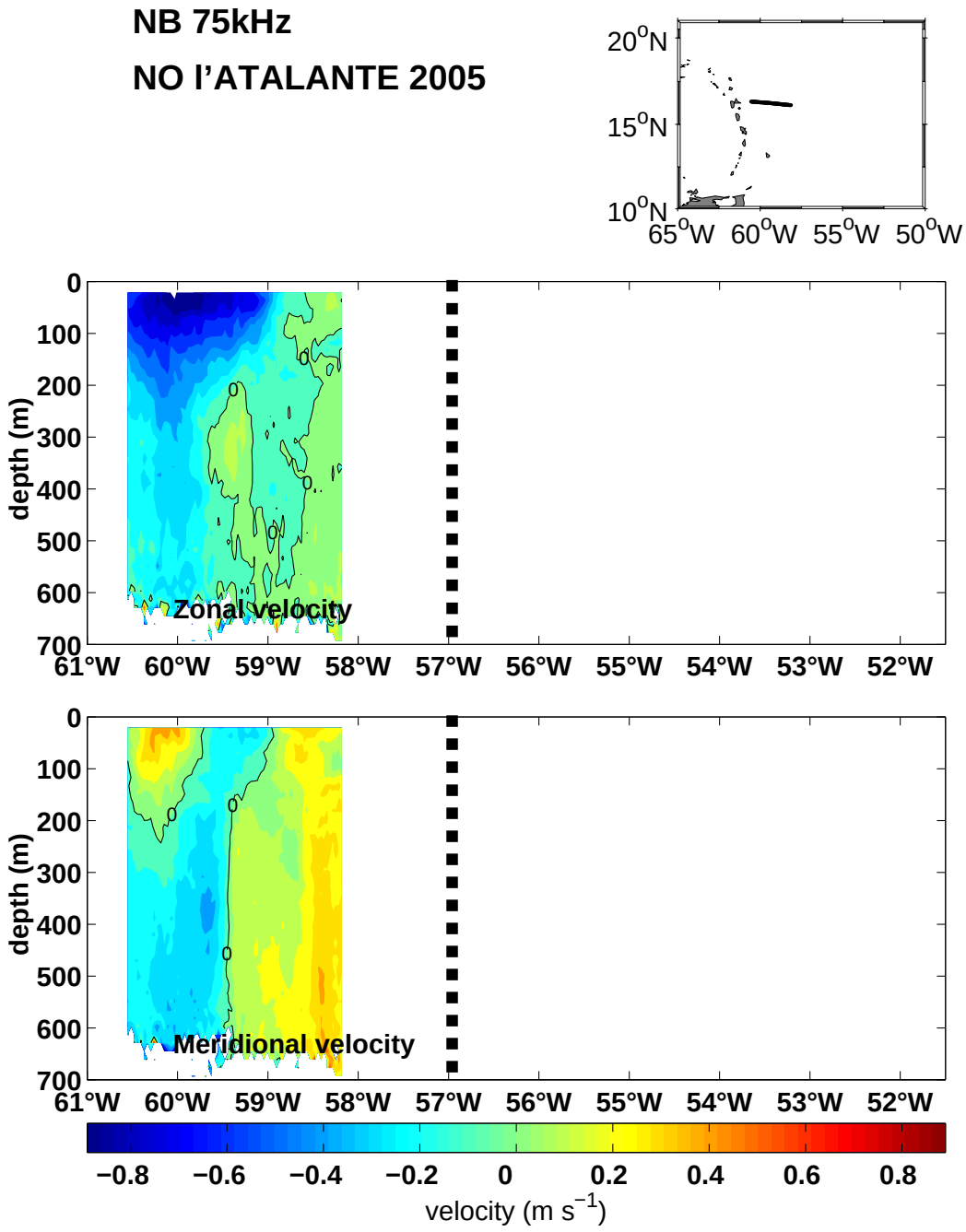

Figure 27: *Meridional (northward) section ADCP 75 kHz. Broken line indicates section crossing with zonal section (figure 23).*

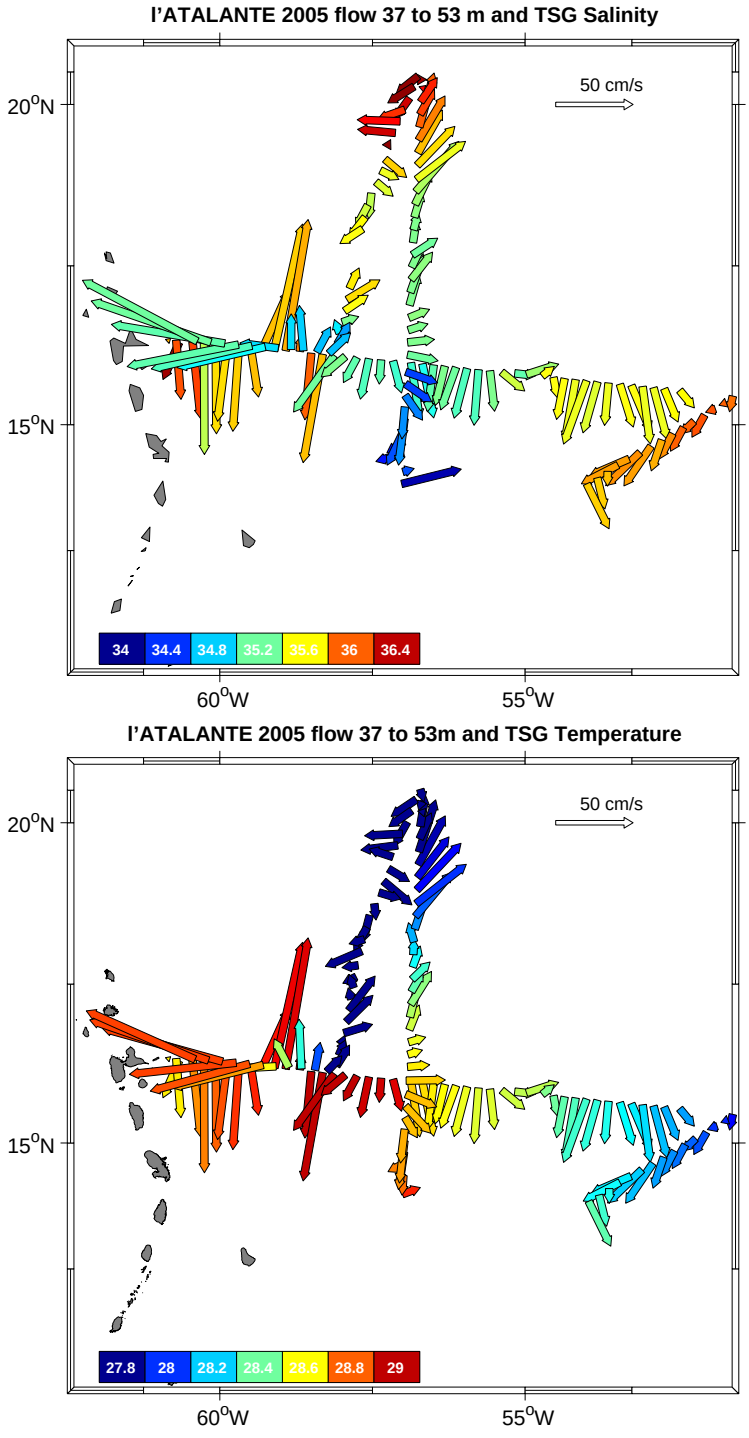

Figure 28: *(upper) TSG Salinity and (lower) TSG temperature relative to ocean currents in the upper 45m on N/O l'ATALANTE2005 cruise.*

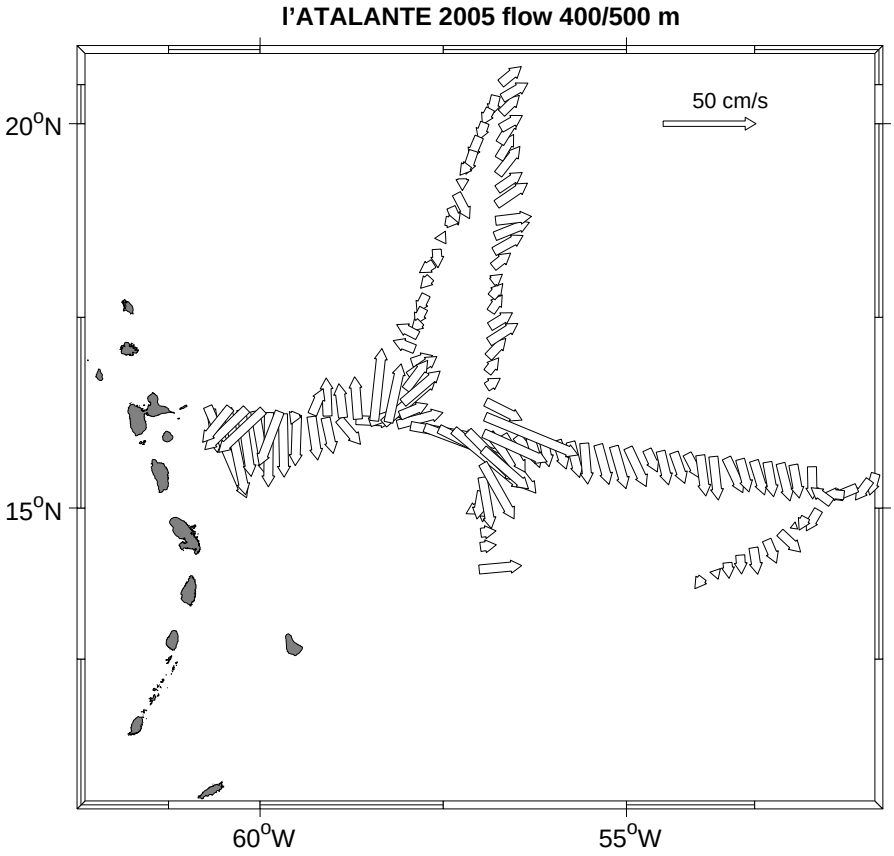

Figure 29: *N/O l'ATALANTE2005 cruise - 75kHz ADCP currents between 400 to 500m depth.*

10 Underway data

Underway data was collected in different netCDF files with different temporal resolution (navigation, meteorology, thermosalinograph). All data was merged and interpolated to a common time axis (1 minute) and stored in a MatLab structure `dvs`. The following variables are available:

```
dvs.mti     Matlab Days [days] (1 corresponds to 1-Jan-0000)
dvs.lat     Latitude    [decimal degrees]
dvs.lon     Longitude   [decimal degrees]
dvs.cog     Course over Ground [degrees]
dvs.sog     Speed over Ground  [m/s]
dvs.dep     Hydrosweep Depth   [m]
dvs.tws     True Wind Speed    [m/s]
dvs.twd     True Wind Direction [degrees]
dvs.rws     Relative Wind Speed [m/s]
dvs.rwd     Relative Wind Direction [degrees]
dvs.ate     Air Temperature  [degrees C]
dvs.hum     Humidity  [%]
dvs.apr     Air Pressure  [hPa]
dvs.tem     Temperature [\deg C]
dvs.sal     Salinity
dvs.con     Conductivity
dvs.swr     Shortwave radiation [W m^2]
dvs.dpt     Dew point [\deg C]
dvs.dco     Drfit cousre [\deg]
dvs.dsp     Drift speed [m\,s$^{-1}$]
```

10.1 Parameters

10.1.1 Measured

The meteorological sensors sensors on board are well maintained. They are all installed in about 18 meters high on a mast on the stern. The meteorological system was serviced by the technical staff on board.

Surface temperature and salinity data (thermosalinograph (TSG)) was collected with an SBE-21 device mounted at about 4m depth at the stern (Bugwulst). The data was send to the CORIOLIS data centre ever day by the N/O l'ATALANTE technical personal and they were also responsible for collecting bottle samples. TSG was switched off on the 12 May for a few hours during a tomography test.

TSG samples have been taken and will be used to calibrate the instruments after analysis on land.

Meteorological conditions reflect the western Atlantic trade wind situation (Figure 31 to 33). Wind were moderate and of east to north-east direction increasing towards the east. During some days there were exceptional low wind speeds even far off-shore. Air and sea-surface temperature showed a pronounced diurnal cycle and a decreased towards the open Atlantic. During some days we had rain and the relative humidity changed accordingly. Air pressure was rather constant high pressure with diurnal modulations. Sea surface salinity was higher at the coast and towards the west. However, a drop in salinity occurred towards the south with exceptional low salinities around 31. Short wave radiation showed typical diurnal variations and the effect of cloud cover.

10.1.2 Derived

Another set of variables was derived from the aforementioned: surface density, sensible and latent heat flux, wind stress. The heat fluxes are derived using the Fairall et al. (1996) parametrizations, the wind stress is based on the Smith (1988) algorithm.

Surface density was higher near the coast and towards the west (water was more saline and colder). The very low salinity in the south provoked a drop in density.

Dewpoint is essentially similar to relative humidity. With increasing wind speed (stress) the latent heat flux increased (humidity decreased), on average the ocean lost heat in the order 280W/m2. Sensible heat flux was less than 20W/m2 as expected from low contrast between sea-surface and air temperatures.

10.1.3 EM12 echo sounder

The N/O l'ATALANTE is equipped with a multibeam EM-12 echo sounder. As some of the moorings were to be deployed just a few tens of meters beneath the surface we were pretty concerned about knowing the exact depth. From the recovered mooring we knew that the M3 mooring was 10 shallower in the water than anticipated (Figure 30).

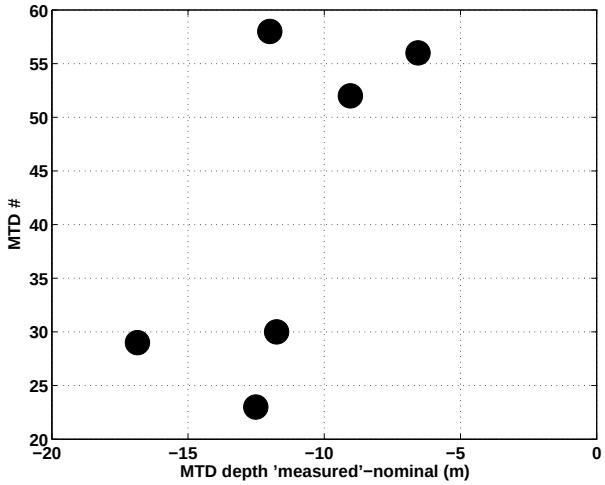

Figure 30: *V406 (M3) depth difference (m) minimum measured depth - nominal depth.*

Practise in earlier cruise was to rather define a constant sound velocity (1500m/s was our choice) for the sounding instrument and do a depth correction for the exact c-profile later. However, it turned out that this wasn't a good strategy for the EM-12 multibeam instrument. Here. the depth with a 1500m/s c-profile was always too shallow, compared to soundings of earlier cruises (hence the mooring design wouldn't be appropriate). Feeding the c-profile from an CTD cast resulted in similar depth than earlier soundings. A possible explanation could be that the multibeam averages between neighbouring beams to obtain the 'most vertical beam'. With a constant sound speed but lower than the real harmonic mean sound speed the topography is 'bent', forming artificial 'hills' to the sides. These hills may be incorporated in the determination of the 'most vertical beam' and cause an unpredictable change in depth.

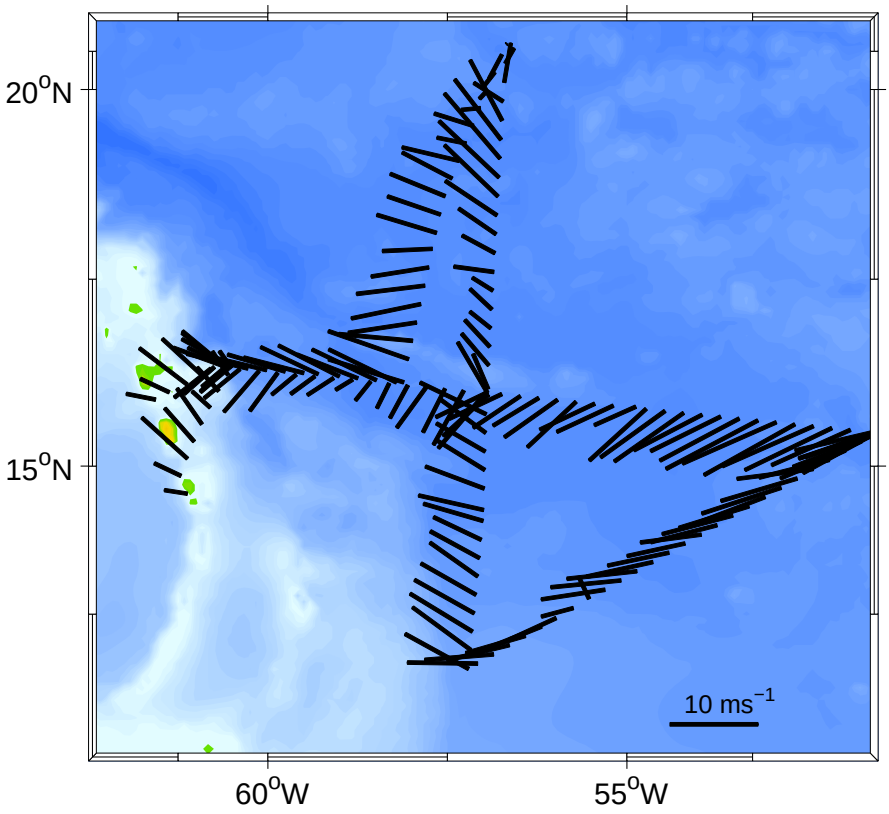

Figure 31: *Wind vectors during N/O l'ATALANTE2005 cruise.*

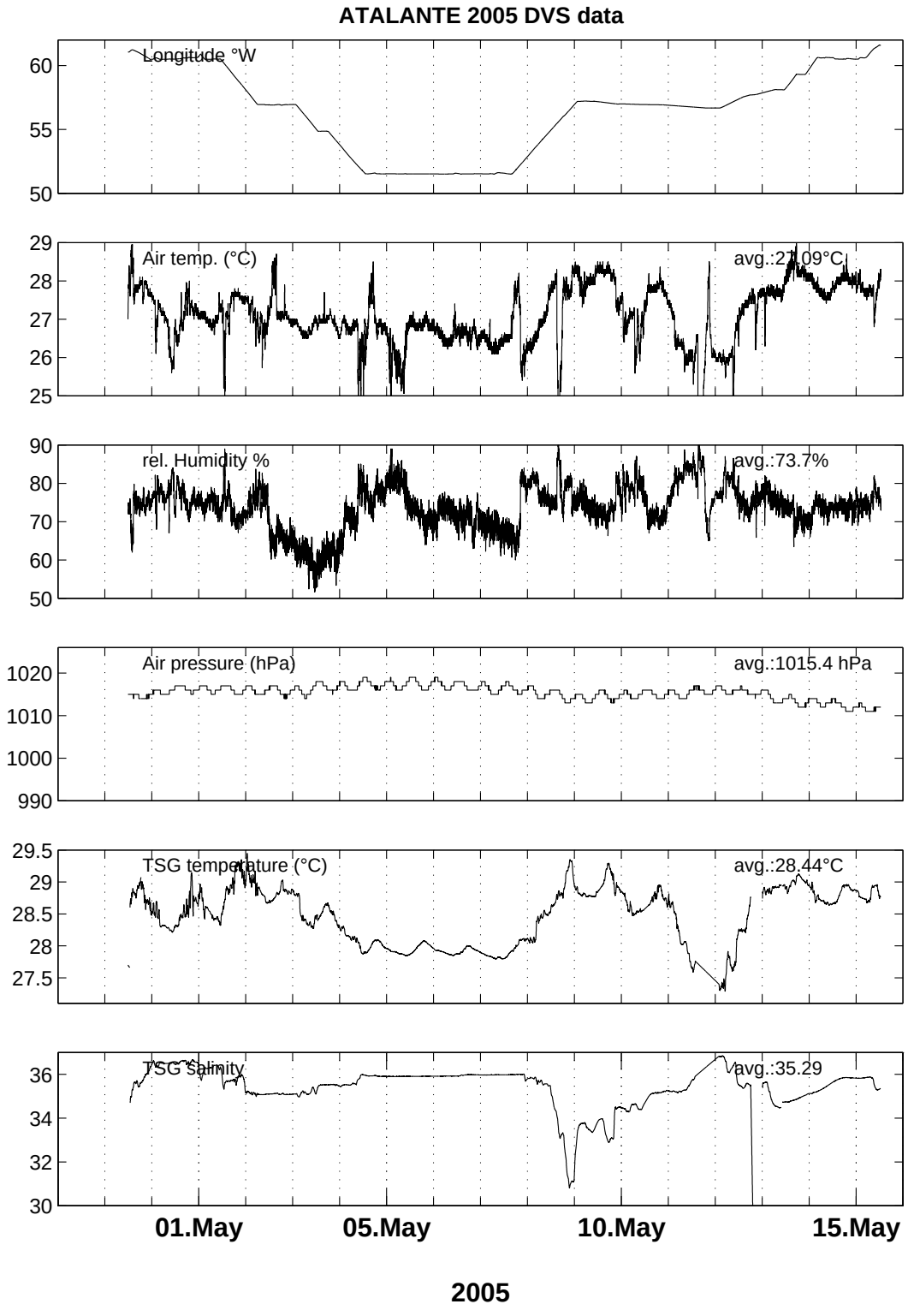

Figure 32: *Underway measurements interpolated to 10 Minute interval. From top to bottom: Longitude, Air temperature, humidity, air pressure, TSG temperature, TSG salinity (uncorrected).*

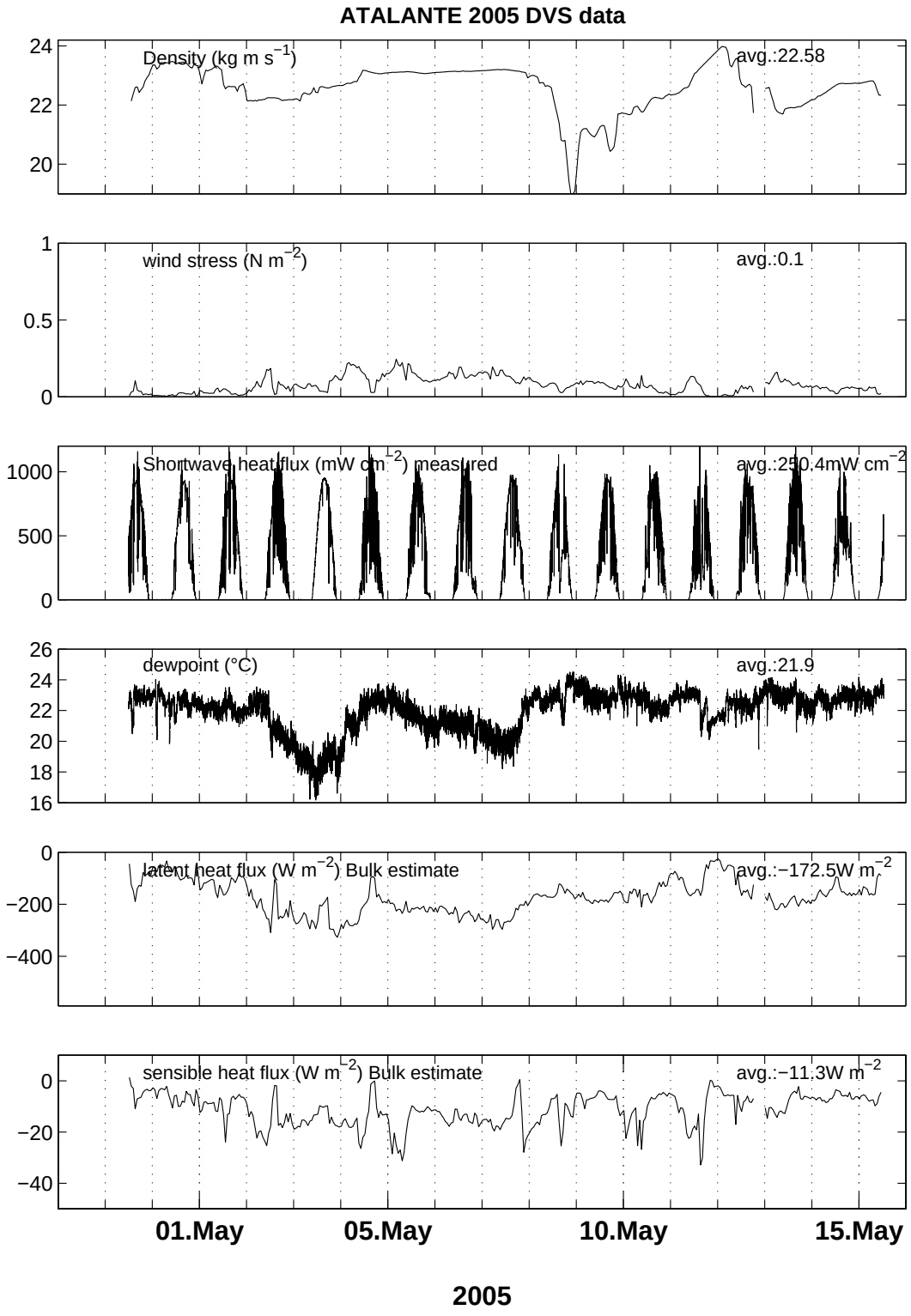

Figure 33: *Underway measurements and derived variables (10 Minute interval). From top to bottom: TSG based surface density, wind stress, short wave radiation, dew point, latent and sensible heat fluxes.*

11 MircoCat and Mini-TD calibration

11.1 MircoCat

From the 59 MicroCATs that had been deployed on the FS METEOR cruise 60-4 in February 2004, 56 instruments were recovered. MicroCAT (MC) #948 and #3412 were lost through vandalism in mooring M3 and MC #944 was lost in mooring M1 through lost of the top telemetry. The rest of the instruments acquired data of good quality throughout their deployment in M1, M2 and M3.

Overall the MircoCat's did agree well with the CTD measurements during the calibration casts (compare Table 11 to 16 and Figures 35 and 36. However, there is on average an apparent systematic deviation between MircoCat and CTD conductivity of about 0.02mS/cm which might be through a calibration problem of the CTD. This has to be sorted out after the salinity samples have been analysed on shore. However, the internal consistency of all MircoCat's suggest the envisaged accuracy of the data of 0.002°C and 0.002mS/cm could still be reached (as in the years before).

The telemetry of mooring M1 now reaches down to 840 m, as the tomography receiver is now implemented in this mooring at a depth of about 1000m. This is considerable shallower than during the last deployment period where telemetry was implemented at mooring M1 to about 4000m depth. In total, 8 inductive MircoCat's transmitting real time data by now.

Through the continued vandalism at morring site M3 it was decided to omit the telemetry option at this site. M3 is now carrying 3 inductive MircoCat's (#3413#959 #1719) while #3413 is equipped with a pressure sensor. Overall 44 MircoCat's were redeployed during the N/O l'ATALANTE cruise 2005.

The characteristics of the data from the recovered deployment correspond very well to the preceding data segments at each of the moorings M1, M2 and M3.

11.2 Mini-TD

All of the 14 Mini-Temperature-Depth Logger (Mini-TD) were recovered and all Mini-TD had acquired good data throughout the deployment period. The pressure time series of the Mini-TD's are used to determine the time-varying depth of the high precision MircoCat's in the moorings. During the CTD calibration all instruments worked very well, except of Mini-TD #30 and #33, which collected a constant pressure and completely wrong pressure, respectively. Mini-TD #22 acquired no data during the calibration. So it was calibrated again, starting it immediately, instead of giving it time to start later. The second calibration indicated good quality data.
As M2 was not redeployed at all, the Mini-TDś between the sites were interchanged and the corrupt devices (Mini-TD #33, #30 and #22) send home for maintenance. A number of Mini-TD's from mooring M1 were equipped with plastic screws to avoid rust to fall in from RCM current meters. In mooring M3 all Mini-TD's were changed to plastic screws.
As in the last deployment periods deep subduction of several hundred meters were observed in mooring M3. 20 days later than in M3 a deep subduction started in mooring M2 about 380 km further east (Fig. 34).

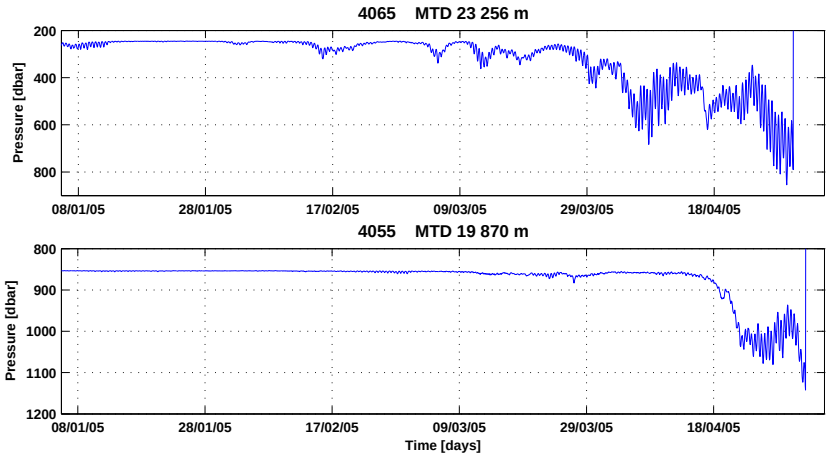

Figure 34: *Examples of two Mini-TD pressure time series. The upper panel shows Mini-TD #23 (246 m depth) from mooring M3, the lower panel Mini-TD #19 (854 m depth) from mooring M2, 380km apart. Note the pronounced subduction during a strong flow event starting on day 390 and day 415, respectively.*

Table 11: *MircoCatoffset from calibration cast1 (Instruments from 406_5) - see next table for continuation. Δparameter is based on MircoCatdata minus CTD data, 'n.a.' is not available.*

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st1	1	0929	5332	03-May-2005	n.a.	-0.001±0.000	-0.0171±0.0004
MOVE st1	1	0934	5332	03-May-2005	n.a.	0.001±0.000	-0.0096±0.0004
MOVE st1	1	0939	5332	03-May-2005	n.a.	0.001±0.000	-0.0141±0.0004
MOVE st1	1	0940	5332	03-May-2005	n.a.	-0.000±0.000	-0.0155±0.0004
MOVE st1	1	0946	5332	03-May-2005	n.a.	0.002±0.000	-0.0181±0.0004
MOVE st1	1	0959	5332	03-May-2005	n.a.	-0.001±0.000	-0.0130±0.0004
MOVE st1	1	1270	5332	03-May-2005	n.a.	-0.001±0.000	-0.0193±0.0004
MOVE st1	1	1272	5332	03-May-2005	n.a.	-0.000±0.000	-0.0199±0.0004
MOVE st1	1	1274	5332	03-May-2005	n.a.	0.002±0.000	-0.0165±0.0004
MOVE st1	1	1316	5332	03-May-2005	n.a.	-0.001±0.000	-0.0174±0.0004
MOVE st1	1	1318	5332	03-May-2005	n.a.	0.000±0.000	-0.0156±0.0004
MOVE st1	1	1320	5332	03-May-2005	n.a.	-0.000±0.000	-0.0243±0.0004
MOVE st1	1	1322	5332	03-May-2005	n.a.	-0.000±0.000	-0.0173±0.0004
MOVE st1	1	1323	5332	03-May-2005	n.a.	0.000±0.000	-0.0278±0.0004
MOVE st1	1	1719	5332	03-May-2005	n.a.	-0.003±0.000	-0.0078±0.0004
MOVE st1	1	0929	4531	03-May-2005	n.a.	-0.001±0.001	-0.0201±0.0011
MOVE st1	1	0934	4531	03-May-2005	n.a.	0.002±0.001	-0.0127±0.0011
MOVE st1	1	0939	4531	03-May-2005	n.a.	0.002±0.001	-0.0171±0.0012
MOVE st1	1	0940	4531	03-May-2005	n.a.	-0.000±0.001	-0.0186±0.0011
MOVE st1	1	0946	4531	03-May-2005	n.a.	0.002±0.001	-0.0212±0.0012
MOVE st1	1	0959	4531	03-May-2005	n.a.	-0.001±0.001	-0.0162±0.0010
MOVE st1	1	1270	4531	03-May-2005	n.a.	-0.001±0.001	-0.0225±0.0011
MOVE st1	1	1272	4531	03-May-2005	n.a.	0.000±0.001	-0.0232±0.0011
MOVE st1	1	1274	4531	03-May-2005	n.a.	0.002±0.001	-0.0197±0.0011
MOVE st1	1	1316	4531	03-May-2005	n.a.	-0.001±0.001	-0.0205±0.0011
MOVE st1	1	1318	4531	03-May-2005	n.a.	0.001±0.001	-0.0188±0.0011
MOVE st1	1	1320	4531	03-May-2005	n.a.	0.000±0.001	-0.0272±0.0011
MOVE st1	1	1322	4531	03-May-2005	n.a.	0.000±0.001	-0.0204±0.0011
MOVE st1	1	1323	4531	03-May-2005	n.a.	0.001±0.001	-0.0308±0.0011
MOVE st1	1	1719	4531	03-May-2005	n.a.	-0.002±0.001	-0.0098±0.0007
MOVE st1	1	0929	3807	03-May-2005	n.a.	-0.001±0.000	-0.0206±0.0010
MOVE st1	1	0934	3807	03-May-2005	n.a.	0.001±0.000	-0.0135±0.0012
MOVE st1	1	0939	3807	03-May-2005	n.a.	0.001±0.000	-0.0182±0.0012
MOVE st1	1	0940	3807	03-May-2005	n.a.	-0.000±0.000	-0.0194±0.0012
MOVE st1	1	0946	3807	03-May-2005	n.a.	0.001±0.000	-0.0220±0.0012
MOVE st1	1	0959	3807	03-May-2005	n.a.	-0.002±0.000	-0.0166±0.0008
MOVE st1	1	1270	3807	03-May-2005	n.a.	-0.001±0.000	-0.0233±0.0012
MOVE st1	1	1272	3807	03-May-2005	n.a.	-0.000±0.000	-0.0240±0.0011
MOVE st1	1	1274	3807	03-May-2005	n.a.	0.001±0.000	-0.0205±0.0012
MOVE st1	1	1316	3807	03-May-2005	n.a.	-0.001±0.000	-0.0212±0.0011
MOVE st1	1	1318	3807	03-May-2005	n.a.	0.000±0.000	-0.0196±0.0012
MOVE st1	1	1320	3807	03-May-2005	n.a.	-0.000±0.000	-0.0280±0.0011
MOVE st1	1	1322	3807	03-May-2005	n.a.	-0.000±0.000	-0.0212±0.0010
MOVE st1	1	1323	3807	03-May-2005	n.a.	0.000±0.000	-0.0316±0.0011
MOVE st1	1	1719	3807	03-May-2005	n.a.	-0.003±0.000	-0.0100±0.0004
MOVE st1	1	0929	3103	03-May-2005	n.a.	-0.001±0.000	-0.0212±0.0009
MOVE st1	1	0934	3103	03-May-2005	n.a.	0.001±0.000	-0.0141±0.0010
MOVE st1	1	0939	3103	03-May-2005	n.a.	0.001±0.000	-0.0187±0.0008
MOVE st1	1	0940	3103	03-May-2005	n.a.	-0.000±0.000	-0.0201±0.0009
MOVE st1	1	0946	3103	03-May-2005	n.a.	0.001±0.000	-0.0225±0.0009
MOVE st1	1	0959	3103	03-May-2005	n.a.	-0.002±0.000	-0.0174±0.0009
MOVE st1	1	1270	3103	03-May-2005	n.a.	-0.001±0.000	-0.0241±0.0009
MOVE st1	1	1272	3103	03-May-2005	n.a.	-0.000±0.000	-0.0249±0.0010

Table 11 continued.

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st1	1	1274	3103	03-May-2005	n.a.	0.001±0.000	-0.0213±0.0010
MOVE st1	1	1316	3103	03-May-2005	n.a.	-0.001±0.000	-0.0220±0.0009
MOVE st1	1	1318	3103	03-May-2005	n.a.	0.000±0.000	-0.0202±0.0008
MOVE st1	1	1320	3103	03-May-2005	n.a.	-0.000±0.000	-0.0286±0.0007
MOVE st1	1	1322	3103	03-May-2005	n.a.	-0.000±0.000	-0.0220±0.0010
MOVE st1	1	1323	3103	03-May-2005	n.a.	0.000±0.000	-0.0322±0.0007
MOVE st1	1	1719	3103	03-May-2005	n.a.	-0.002±0.000	-0.0103±0.0003
MOVE st1	1	0929	2392	03-May-2005	n.a.	-0.001±0.001	-0.0210±0.0009
MOVE st1	1	0934	2392	03-May-2005	n.a.	0.001±0.001	-0.0140±0.0010
MOVE st1	1	0939	2392	03-May-2005	n.a.	0.001±0.001	-0.0186±0.0010
MOVE st1	1	0940	2392	03-May-2005	n.a.	-0.000±0.001	-0.0201±0.0010
MOVE st1	1	0946	2392	03-May-2005	n.a.	0.001±0.001	-0.0225±0.0010
MOVE st1	1	0959	2392	03-May-2005	n.a.	-0.002±0.001	-0.0173±0.0008
MOVE st1	1	1270	2392	03-May-2005	n.a.	-0.001±0.001	-0.0241±0.0010
MOVE st1	1	1272	2392	03-May-2005	n.a.	-0.000±0.001	-0.0249±0.0010
MOVE st1	1	1274	2392	03-May-2005	n.a.	0.001±0.001	-0.0214±0.0010
MOVE st1	1	1316	2392	03-May-2005	n.a.	-0.001±0.001	-0.0220±0.0010
MOVE st1	1	1318	2392	03-May-2005	n.a.	0.000±0.001	-0.0201±0.0010
MOVE st1	1	1320	2392	03-May-2005	n.a.	-0.000±0.001	-0.0285±0.0009
MOVE st1	1	1322	2392	03-May-2005	n.a.	-0.000±0.001	-0.0219±0.0010
MOVE st1	1	1323	2392	03-May-2005	n.a.	0.000±0.001	-0.0322±0.0010
MOVE st1	1	1719	2392	03-May-2005	n.a.	-0.002±0.001	-0.0100±0.0004
MOVE st1	1	0929	1701	03-May-2005	n.a.	-0.001±0.001	-0.0217±0.0015
MOVE st1	1	0934	1701	03-May-2005	n.a.	-0.000±0.001	-0.0150±0.0018
MOVE st1	1	0939	1701	03-May-2005	n.a.	0.001±0.001	-0.0199±0.0019
MOVE st1	1	0940	1701	03-May-2005	n.a.	-0.001±0.001	-0.0210±0.0015
MOVE st1	1	0946	1701	03-May-2005	n.a.	-0.000±0.001	-0.0235±0.0019
MOVE st1	1	0959	1701	03-May-2005	n.a.	-0.002±0.001	-0.0185±0.0017
MOVE st1	1	1270	1701	03-May-2005	n.a.	-0.001±0.001	-0.0254±0.0018
MOVE st1	1	1272	1701	03-May-2005	n.a.	-0.000±0.001	-0.0259±0.0015
MOVE st1	1	1274	1701	03-May-2005	n.a.	0.001±0.001	-0.0223±0.0017
MOVE st1	1	1316	1701	03-May-2005	n.a.	-0.002±0.001	-0.0229±0.0016
MOVE st1	1	1318	1701	03-May-2005	n.a.	-0.000±0.001	-0.0213±0.0019
MOVE st1	1	1320	1701	03-May-2005	n.a.	-0.001±0.001	-0.0295±0.0017
MOVE st1	1	1322	1701	03-May-2005	n.a.	-0.000±0.001	-0.0230±0.0017
MOVE st1	1	1323	1701	03-May-2005	n.a.	-0.000±0.001	-0.0334±0.0017
MOVE st1	1	1719	1701	03-May-2005	n.a.	-0.002±0.001	-0.0103±0.0006
MOVE st1	1	0929	800	03-May-2005	n.a.	-0.002±0.001	-0.0263±0.0020
MOVE st1	1	0934	800	03-May-2005	n.a.	-0.002±0.001	-0.0201±0.0022
MOVE st1	1	0939	800	03-May-2005	n.a.	-0.001±0.001	-0.0250±0.0021
MOVE st1	1	0940	800	03-May-2005	n.a.	-0.002±0.001	-0.0263±0.0021
MOVE st1	1	0946	800	03-May-2005	n.a.	-0.002±0.001	-0.0290±0.0022
MOVE st1	1	0959	800	03-May-2005	n.a.	-0.003±0.001	-0.0234±0.0020
MOVE st1	1	1270	800	03-May-2005	n.a.	-0.002±0.001	-0.0310±0.0023
MOVE st1	1	1272	800	03-May-2005	n.a.	-0.001±0.001	-0.0313±0.0021
MOVE st1	1	1274	800	03-May-2005	n.a.	-0.000±0.001	-0.0277±0.0022
MOVE st1	1	1316	800	03-May-2005	n.a.	-0.003±0.001	-0.0282±0.0022
MOVE st1	1	1318	800	03-May-2005	n.a.	-0.002±0.001	-0.0270±0.0022
MOVE st1	1	1320	800	03-May-2005	n.a.	-0.002±0.001	-0.0351±0.0016
MOVE st1	1	1322	800	03-May-2005	n.a.	-0.001±0.001	-0.0284±0.0020
MOVE st1	1	1323	800	03-May-2005	n.a.	-0.002±0.001	-0.0394±0.0018
MOVE st1	1	1719	800	03-May-2005	n.a.	-0.003±0.001	-0.0125±0.0006

Table 12: *MircoCatoffset from calibration cast#2 (Instruments from 405_5 and 406_6).*

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st2	2	0935	800	05-May-2005	n.a.	0.004±0.003	-0.0161±0.0051
MOVE st2	2	0937	800	05-May-2005	n.a.	0.003±0.002	-0.0195±0.0054
MOVE st2	2	0958	800	05-May-2005	n.a.	0.003±0.003	-0.0136±0.0043
MOVE st2	2	1162	800	05-May-2005	n.a.	0.002±0.002	-0.0114±0.0024
MOVE st2	2	1271	800	05-May-2005	n.a.	0.001±0.002	-0.0236±0.0057
MOVE st2	2	1273	800	05-May-2005	n.a.	0.003±0.003	-0.0267±0.0051
MOVE st2	2	1275	800	05-May-2005	n.a.	0.003±0.002	-0.0320±0.0046
MOVE st2	2	1278	800	05-May-2005	n.a.	0.003±0.003	-0.0407±0.0059
MOVE st2	2	1288	800	05-May-2005	n.a.	0.002±0.002	-0.0275±0.0046
MOVE st2	2	1319	800	05-May-2005	n.a.	0.003±0.002	-0.0308±0.0050
MOVE st2	2	1321	800	05-May-2005	n.a.	0.003±0.003	-0.0286±0.0049
MOVE st2	2	0933	800	05-May-2005	n.a.	0.002±0.002	-0.0270±0.0050
MOVE st2	2	0938	800	05-May-2005	n.a.	0.003±0.003	-0.0237±0.0050
MOVE st2	2	1317	800	05-May-2005	n.a.	0.001±0.002	-0.0253±0.0048
MOVE st2	2	2048	800	05-May-2005	n.a.	0.001±0.003	-0.0191±0.0028
MOVE st2	2	2279	800	05-May-2005	n.a.	0.001±0.003	-0.0294±0.0028
MOVE st2	2	0935	1708	05-May-2005	n.a.	0.002±0.001	-0.0146±0.0016
MOVE st2	2	0937	1708	05-May-2005	n.a.	0.001±0.001	-0.0168±0.0017
MOVE st2	2	0958	1708	05-May-2005	n.a.	0.001±0.001	-0.0128±0.0013
MOVE st2	2	1162	1708	05-May-2005	n.a.	-0.002±0.001	-0.0130±0.0008
MOVE st2	2	1271	1708	05-May-2005	n.a.	-0.001±0.001	-0.0210±0.0017
MOVE st2	2	1273	1708	05-May-2005	n.a.	-0.001±0.001	-0.0250±0.0015
MOVE st2	2	1275	1708	05-May-2005	n.a.	-0.001±0.001	-0.0301±0.0016
MOVE st2	2	1278	1708	05-May-2005	n.a.	0.000±0.001	-0.0373±0.0018
MOVE st2	2	1288	1708	05-May-2005	n.a.	-0.001±0.001	-0.0258±0.0014
MOVE st2	2	1319	1708	05-May-2005	n.a.	-0.001±0.001	-0.0287±0.0018
MOVE st2	2	1321	1708	05-May-2005	n.a.	-0.000±0.001	-0.0264±0.0018
MOVE st2	2	0933	1708	05-May-2005	n.a.	-0.001±0.001	-0.0251±0.0018
MOVE st2	2	0938	1708	05-May-2005	n.a.	-0.001±0.001	-0.0224±0.0015
MOVE st2	2	1317	1708	05-May-2005	n.a.	-0.003±0.001	-0.0236±0.0015
MOVE st2	2	2048	1708	05-May-2005	n.a.	-0.003±0.001	-0.0204±0.0008
MOVE st2	2	2279	1708	05-May-2005	n.a.	-0.002±0.001	-0.0300±0.0008
MOVE st2	2	0935	2410	05-May-2005	n.a.	0.002±0.001	-0.0127±0.0006
MOVE st2	2	0937	2410	05-May-2005	n.a.	0.001±0.001	-0.0154±0.0005
MOVE st2	2	0958	2410	05-May-2005	n.a.	0.002±0.001	-0.0110±0.0005
MOVE st2	2	1162	2410	05-May-2005	n.a.	-0.002±0.001	-0.0124±0.0005
MOVE st2	2	1271	2410	05-May-2005	n.a.	-0.001±0.001	-0.0196±0.0005
MOVE st2	2	1273	2410	05-May-2005	n.a.	-0.000±0.001	-0.0227±0.0006
MOVE st2	2	1275	2410	05-May-2005	n.a.	-0.001±0.001	-0.0279±0.0005
MOVE st2	2	1278	2410	05-May-2005	n.a.	0.000±0.001	-0.0354±0.0005
MOVE st2	2	1288	2410	05-May-2005	n.a.	-0.001±0.001	-0.0236±0.0005
MOVE st2	2	1319	2410	05-May-2005	n.a.	-0.000±0.001	-0.0265±0.0006
MOVE st2	2	1321	2410	05-May-2005	n.a.	-0.000±0.001	-0.0243±0.0006
MOVE st2	2	0933	2410	05-May-2005	n.a.	-0.000±0.001	-0.0230±0.0006
MOVE st2	2	0938	2410	05-May-2005	n.a.	-0.000±0.001	-0.0207±0.0006
MOVE st2	2	1317	2410	05-May-2005	n.a.	-0.002±0.001	-0.0216±0.0005
MOVE st2	2	2048	2410	05-May-2005	n.a.	-0.003±0.001	-0.0198±0.0005
MOVE st2	2	2279	2410	05-May-2005	n.a.	-0.002±0.001	-0.0290±0.0005
MOVE st2	2	0935	3100	05-May-2005	n.a.	0.003±0.001	-0.0120±0.0006
MOVE st2	2	0937	3100	05-May-2005	n.a.	0.002±0.001	-0.0146±0.0005
MOVE st2	2	0958	3100	05-May-2005	n.a.	0.003±0.001	-0.0104±0.0006
MOVE st2	2	1162	3100	05-May-2005	n.a.	-0.001±0.001	-0.0121±0.0006
MOVE st2	2	1271	3100	05-May-2005	n.a.	-0.001±0.001	-0.0187±0.0005
MOVE st2	2	1273	3100	05-May-2005	n.a.	0.000±0.001	-0.0218±0.0006
MOVE st2	2	1275	3100	05-May-2005	n.a.	-0.000±0.001	-0.0271±0.0006
MOVE st2	2	1278	3100	05-May-2005	n.a.	0.001±0.001	-0.0344±0.0005

Table 12 continued.

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st2	2	1288	3100	05-May-2005	n.a.	-0.000±0.001	-0.0229±0.0006
MOVE st2	2	1319	3100	05-May-2005	n.a.	0.000±0.001	-0.0257±0.0006
MOVE st2	2	1321	3100	05-May-2005	n.a.	0.000±0.001	-0.0235±0.0006
MOVE st2	2	0933	3100	05-May-2005	n.a.	0.000±0.001	-0.0222±0.0006
MOVE st2	2	0938	3100	05-May-2005	n.a.	0.001±0.001	-0.0199±0.0006
MOVE st2	2	1317	3100	05-May-2005	n.a.	-0.002±0.001	-0.0208±0.0005
MOVE st2	2	2048	3100	05-May-2005	n.a.	-0.003±0.001	-0.0194±0.0006
MOVE st2	2	2279	3100	05-May-2005	n.a.	-0.002±0.001	-0.0280±0.0005
MOVE st2	2	0935	3798	05-May-2005	n.a.	0.003±0.001	-0.0122±0.0007
MOVE st2	2	0937	3798	05-May-2005	n.a.	0.002±0.001	-0.0150±0.0005
MOVE st2	2	0958	3798	05-May-2005	n.a.	0.004±0.001	-0.0104±0.0008
MOVE st2	2	1162	3798	05-May-2005	n.a.	-0.001±0.001	-0.0122±0.0008
MOVE st2	2	1271	3798	05-May-2005	n.a.	-0.001±0.001	-0.0192±0.0004
MOVE st2	2	1273	3798	05-May-2005	n.a.	0.001±0.001	-0.0218±0.0008
MOVE st2	2	1275	3798	05-May-2005	n.a.	0.000±0.001	-0.0273±0.0007
MOVE st2	2	1278	3798	05-May-2005	n.a.	0.001±0.001	-0.0347±0.0007
MOVE st2	2	1288	3798	05-May-2005	n.a.	0.000±0.001	-0.0229±0.0007
MOVE st2	2	1319	3798	05-May-2005	n.a.	0.001±0.001	-0.0258±0.0007
MOVE st2	2	1321	3798	05-May-2005	n.a.	0.001±0.001	-0.0237±0.0006
MOVE st2	2	0933	3798	05-May-2005	n.a.	0.001±0.001	-0.0224±0.0006
MOVE st2	2	0938	3798	05-May-2005	n.a.	0.001±0.001	-0.0199±0.0007
MOVE st2	2	1317	3798	05-May-2005	n.a.	-0.001±0.001	-0.0210±0.0007
MOVE st2	2	2048	3798	05-May-2005	n.a.	-0.002±0.001	-0.0194±0.0008
MOVE st2	2	2279	3798	05-May-2005	n.a.	-0.001±0.001	-0.0279±0.0006
MOVE st2	2	0935	4497	05-May-2005	n.a.	0.003±0.001	-0.0120±0.0009
MOVE st2	2	0937	4496	05-May-2005	n.a.	0.002±0.000	-0.0146±0.0009
MOVE st2	2	0958	4497	05-May-2005	n.a.	0.004±0.000	-0.0103±0.0007
MOVE st2	2	1162	4497	05-May-2005	n.a.	-0.002±0.001	-0.0124±0.0005
MOVE st2	2	1271	4496	05-May-2005	n.a.	-0.001±0.000	-0.0186±0.0009
MOVE st2	2	1273	4497	05-May-2005	n.a.	0.000±0.000	-0.0215±0.0009
MOVE st2	2	1275	4496	05-May-2005	n.a.	-0.000±0.000	-0.0269±0.0007
MOVE st2	2	1278	4497	05-May-2005	n.a.	0.001±0.001	-0.0341±0.0010
MOVE st2	2	1288	4497	05-May-2005	n.a.	-0.000±0.001	-0.0227±0.0008
MOVE st2	2	1319	4496	05-May-2005	n.a.	0.000±0.000	-0.0256±0.0009
MOVE st2	2	1321	4496	05-May-2005	n.a.	0.000±0.000	-0.0232±0.0009
MOVE st2	2	0933	4497	05-May-2005	n.a.	0.000±0.001	-0.0221±0.0010
MOVE st2	2	0938	4497	05-May-2005	n.a.	0.000±0.001	-0.0196±0.0008
MOVE st2	2	1317	4496	05-May-2005	n.a.	-0.002±0.000	-0.0206±0.0009
MOVE st2	2	2048	4497	05-May-2005	n.a.	-0.003±0.001	-0.0194±0.0006
MOVE st2	2	2279	4496	05-May-2005	n.a.	-0.002±0.000	-0.0281±0.0006
MOVE st2	2	0935	4821	05-May-2005	n.a.	0.003±0.000	-0.0114±0.0003
MOVE st2	2	0937	4821	05-May-2005	n.a.	0.002±0.000	-0.0140±0.0004
MOVE st2	2	0958	4820	05-May-2005	n.a.	0.004±0.000	-0.0097±0.0002
MOVE st2	2	1162	4820	05-May-2005	n.a.	-0.002±0.000	-0.0124±0.0002
MOVE st2	2	1271	4821	05-May-2005	n.a.	-0.001±0.000	-0.0181±0.0003
MOVE st2	2	1273	4820	05-May-2005	n.a.	0.000±0.000	-0.0207±0.0003
MOVE st2	2	1275	4821	05-May-2005	n.a.	-0.000±0.000	-0.0262±0.0003
MOVE st2	2	1278	4820	05-May-2005	n.a.	0.001±0.000	-0.0335±0.0003
MOVE st2	2	1288	4820	05-May-2005	n.a.	-0.001±0.000	-0.0220±0.0002
MOVE st2	2	1319	4821	05-May-2005	n.a.	0.000±0.000	-0.0249±0.0003
MOVE st2	2	1321	4821	05-May-2005	n.a.	0.000±0.000	-0.0226±0.0003
MOVE st2	2	0933	4821	05-May-2005	n.a.	0.001±0.000	-0.0216±0.0003
MOVE st2	2	0938	4820	05-May-2005	n.a.	0.000±0.000	-0.0190±0.0002
MOVE st2	2	1317	4821	05-May-2005	n.a.	-0.002±0.000	-0.0200±0.0003
MOVE st2	2	2048	4820	05-May-2005	n.a.	-0.003±0.000	-0.0195±0.0003
MOVE st2	2	2279	4821	05-May-2005	n.a.	-0.002±0.000	-0.0284±0.0003

Table 13: *MircoCatoffset from calibration cast#3 (Instruments from 404_5). Δparameter is based on MircoCatdata minus CTD data, 'n.a.' is not available.*

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st3	3	0945	448	05-May-2005	n.a.	0.003±0.006	-0.0413±0.0128
MOVE st3	3	0949	448	05-May-2005	n.a.	0.005±0.007	-0.0357±0.0131
MOVE st3	3	0953	448	05-May-2005	n.a.	0.013±0.007	-0.0338±0.0129
MOVE st3	3	0960	448	05-May-2005	n.a.	0.008±0.007	-0.0272±0.0141
MOVE st3	3	1718	448	05-May-2005	n.a.	0.006±0.007	-0.0281±0.0084
MOVE st3	3	1720	448	05-May-2005	n.a.	0.005±0.007	0.0313±0.0077
MOVE st3	3	1721	448	05-May-2005	n.a.	0.002±0.006	-0.0367±0.0075
MOVE st3	3	1722	448	05-May-2005	n.a.	0.004±0.006	-0.0196±0.0077
MOVE st3	3	1723	448	05-May-2005	n.a.	0.004±0.007	-0.0214±0.0081
MOVE st3	3	0945	799	05-May-2005	n.a.	0.000±0.002	-0.0388±0.0061
MOVE st3	3	0949	799	05-May-2005	n.a.	-0.002±0.002	-0.0390±0.0071
MOVE st3	3	0953	799	05-May-2005	n.a.	0.005±0.003	-0.0388±0.0074
MOVE st3	3	0960	799	05-May-2005	n.a.	0.004±0.002	-0.0262±0.0062
MOVE st3	3	1718	799	05-May-2005	n.a.	-0.001±0.002	-0.0332±0.0019
MOVE st3	3	1720	799	05-May-2005	n.a.	0.000±0.002	0.0239±0.0019
MOVE st3	3	1721	799	05-May-2005	n.a.	-0.002±0.002	-0.0377±0.0018
MOVE st3	3	1722	799	05-May-2005	n.a.	-0.000±0.002	-0.0215±0.0019
MOVE st3	3	1723	799	05-May-2005	n.a.	-0.000±0.002	-0.0229±0.0020
MOVE st3	3	0945	2401	05-May-2005	n.a.	-0.001±0.000	-0.0272±0.0009
MOVE st3	3	0949	2401	05-May-2005	n.a.	-0.002±0.001	-0.0260±0.0010
MOVE st3	3	0953	2401	05-May-2005	n.a.	0.005±0.001	-0.0263±0.0010
MOVE st3	3	0960	2401	05-May-2005	n.a.	0.002±0.001	-0.0149±0.0009
MOVE st3	3	1718	2401	05-May-2005	n.a.	-0.003±0.001	-0.0266±0.0007
MOVE st3	3	1720	2401	05-May-2005	n.a.	-0.003±0.001	0.0261±0.0005
MOVE st3	3	1721	2401	05-May-2005	n.a.	-0.005±0.001	-0.0315±0.0005
MOVE st3	3	1722	2401	05-May-2005	n.a.	-0.003±0.001	-0.0160±0.0005
MOVE st3	3	1723	2401	05-May-2005	n.a.	-0.003±0.000	-0.0169±0.0005
MOVE st3	3	0945	1699	05-May-2005	n.a.	-0.002±0.000	-0.0311±0.0015
MOVE st3	3	0949	1699	05-May-2005	n.a.	-0.003±0.000	-0.0302±0.0014
MOVE st3	3	0953	1699	05-May-2005	n.a.	0.004±0.000	-0.0303±0.0013
MOVE st3	3	0960	1699	05-May-2005	n.a.	0.002±0.000	-0.0186±0.0015
MOVE st3	3	1718	1699	05-May-2005	n.a.	-0.003±0.000	-0.0291±0.0003
MOVE st3	3	1720	1699	05-May-2005	n.a.	-0.003±0.000	0.0251±0.0003
MOVE st3	3	1721	1699	05-May-2005	n.a.	-0.005±0.000	-0.0340±0.0003
MOVE st3	3	1722	1699	05-May-2005	n.a.	-0.003±0.000	-0.0181±0.0003
MOVE st3	3	1723	1699	05-May-2005	n.a.	-0.003±0.000	-0.0195±0.0003
MOVE st3	3	0945	3100	05-May-2005	n.a.	-0.001±0.000	-0.0258±0.0005
MOVE st3	3	0949	3100	05-May-2005	n.a.	-0.002±0.000	-0.0249±0.0005
MOVE st3	3	0953	3100	05-May-2005	n.a.	0.006±0.000	-0.0253±0.0005
MOVE st3	3	0960	3100	05-May-2005	n.a.	0.002±0.000	-0.0135±0.0006
MOVE st3	3	1718	3100	05-May-2005	n.a.	-0.003±0.000	-0.0257±0.0003
MOVE st3	3	1720	3100	05-May-2005	n.a.	-0.002±0.000	0.0271±0.0003
MOVE st3	3	1721	3100	05-May-2005	n.a.	-0.005±0.000	-0.0302±0.0003
MOVE st3	3	1722	3100	05-May-2005	n.a.	-0.003±0.000	-0.0146±0.0003
MOVE st3	3	1723	3100	05-May-2005	n.a.	-0.003±0.000	-0.0156±0.0003
MOVE st3	3	0945	3800	05-May-2005	n.a.	-0.000±0.001	-0.0242±0.0009
MOVE st3	3	0949	3800	05-May-2005	n.a.	-0.001±0.001	-0.0229±0.0010
MOVE st3	3	0953	3800	05-May-2005	n.a.	0.007±0.001	-0.0233±0.0010
MOVE st3	3	0960	3800	05-May-2005	n.a.	0.003±0.001	-0.0119±0.0009
MOVE st3	3	1718	3800	05-May-2005	n.a.	-0.003±0.001	-0.0240±0.0009
MOVE st3	3	1720	3800	05-May-2005	n.a.	-0.002±0.001	0.0283±0.0009
MOVE st3	3	1721	3800	05-May-2005	n.a.	-0.005±0.001	-0.0289±0.0008
MOVE st3	3	1722	3800	05-May-2005	n.a.	-0.003±0.001	-0.0133±0.0009
MOVE st3	3	1723	3800	05-May-2005	n.a.	-0.002±0.001	-0.0142±0.0009

Table 13 continued.

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st3	3	0945	4936	05-May-2005	n.a.	-0.000±0.000	-0.0224±0.0004
MOVE st3	3	0949	4936	05-May-2005	n.a.	-0.002±0.000	-0.0214±0.0004
MOVE st3	3	0953	4936	05-May-2005	n.a.	0.007±0.000	-0.0219±0.0004
MOVE st3	3	0960	4936	05-May-2005	n.a.	0.002±0.000	-0.0100±0.0004
MOVE st3	3	1718	4936	05-May-2005	n.a.	-0.003±0.000	-0.0237±0.0003
MOVE st3	3	1720	4936	05-May-2005	n.a.	-0.003±0.000	0.0287±0.0003
MOVE st3	3	1721	4936	05-May-2005	n.a.	-0.005±0.000	-0.0282±0.0003
MOVE st3	3	1722	4936	05-May-2005	n.a.	-0.003±0.000	-0.0126±0.0003
MOVE st3	3	1723	4936	05-May-2005	n.a.	-0.003±0.000	-0.0135±0.0003

Table 14: *MircoCatand Mini-TDoffset from calibration cast#5 (Instruments from 404_5 & 406_5).*

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st5	5	3411	454	06-May-2005	-2.4±0.4	0.016±0.014	-0.1267±0.0199
MOVE st5	5	3414	454	06-May-2005	-1.3±0.4	0.015±0.014	-0.1622±0.0204
MOVE st5	5	3413	454	06-May-2005	-3.0±0.4	0.016±0.014	-0.1082±0.0203
MOVE st5	5	3411	746	06-May-2005	-3.1±0.3	-0.003±0.001	-0.1768±0.0164
MOVE st5	5	3414	746	06-May-2005	-2.1±0.5	-0.003±0.001	-0.2046±0.0167
MOVE st5	5	3413	746	06-May-2005	-3.8±0.5	-0.003±0.001	-0.1570±0.0167
MOVE st5	5	3411	1699	06-May-2005	-6.8±0.4	-0.001±0.001	-0.1231±0.0030
MOVE st5	5	3414	1699	06-May-2005	-5.3±0.7	-0.001±0.002	-0.1490±0.0031
MOVE st5	5	3413	1699	06-May-2005	-7.7±0.6	-0.000±0.001	-0.1036±0.0031
MOVE st5	5	3411	2255	06-May-2005	-8.3±0.5	-0.003±0.000	-0.0856±0.0145
MOVE st5	5	3414	2255	06-May-2005	-6.4±0.7	-0.004±0.000	-0.1106±0.0142
MOVE st5	5	3413	2255	06-May-2005	-9.2±0.6	-0.003±0.000	-0.0663±0.0142
MOVE st5	5	3411	2999	06-May-2005	-10.2±0.4	-0.003±0.000	-0.0766±0.0154
MOVE st5	5	3414	2999	06-May-2005	-7.8±0.5	-0.004±0.000	-0.1012±0.0154
MOVE st5	5	3413	2999	06-May-2005	-11.4±0.4	-0.003±0.000	-0.0573±0.0154
MOVE st5	5	3411	3456	06-May-2005	-10.4±0.4	-0.003±0.000	-0.0696±0.0121
MOVE st5	5	3414	3456	06-May-2005	-7.8±0.5	-0.004±0.000	-0.0944±0.0121
MOVE st5	5	3413	3456	06-May-2005	-11.8±0.4	-0.003±0.000	-0.0506±0.0121
MOVE st5	5	47	3456	06-May-2005	-1.1±0.3	-0.015±0.000	NaN±NaN
MOVE st5	5	47	2999	06-May-2005	-2.4±0.3	-0.015±0.000	NaN±NaN
MOVE st5	5	47	2254	06-May-2005	-3.3±0.3	-0.015±0.000	NaN±NaN
MOVE st5	5	47	1698	06-May-2005	-3.7±0.3	-0.013±0.001	NaN±NaN
MOVE st5	5	47	746	06-May-2005	-2.5±0.3	-0.014±0.001	NaN±NaN
MOVE st5	5	47	454	06-May-2005	-2.1±0.3	0.004±0.010	NaN±NaN
MOVE st5	5	48	3456	06-May-2005	8.0±0.3	-0.015±0.000	NaN±NaN
MOVE st5	5	48	2999	06-May-2005	6.5±0.3	-0.016±0.000	NaN±NaN
MOVE st5	5	48	2254	06-May-2005	4.4±0.3	-0.016±0.000	NaN±NaN
MOVE st5	5	48	1698	06-May-2005	2.3±0.3	-0.014±0.001	NaN±NaN
MOVE st5	5	48	746	06-May-2005	0.1±0.2	-0.015±0.001	NaN±NaN
MOVE st5	5	48	454	06-May-2005	-1.0±0.3	0.000±0.009	NaN±NaN
MOVE st5	5	55	3456	06-May-2005	1.5±0.3	-0.012±0.000	NaN±NaN
MOVE st5	5	55	2999	06-May-2005	0.2±0.3	-0.012±0.000	NaN±NaN
MOVE st5	5	55	2254	06-May-2005	-1.0±0.3	-0.013±0.000	NaN±NaN
MOVE st5	5	55	1698	06-May-2005	-1.9±0.3	-0.010±0.001	NaN±NaN
MOVE st5	5	55	746	06-May-2005	-1.7±0.2	-0.012±0.001	NaN±NaN
MOVE st5	5	55	454	06-May-2005	-1.4±0.3	0.005±0.010	NaN±NaN

Table 15: *MircoCatoffset from calibration cast#6 (Instruments from 406_5). Δparameter is based on MircoCatdata minus CTD data, 'n.a.' is not available.*

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st6	6	0953	4906	10-May-2005	n.a.	0.007±0.000	-0.0185±0.0007
MOVE st6	6	0953	4494	10-May-2005	n.a.	0.007±0.000	-0.0198±0.0005
MOVE st6	6	0953	3798	10-May-2005	n.a.	0.006±0.000	-0.0209±0.0007
MOVE st6	6	0953	3099	10-May-2005	n.a.	0.006±0.001	-0.0208±0.0005
MOVE st6	6	0953	2404	10-May-2005	n.a.	0.006±0.001	-0.0218±0.0017
MOVE st6	6	0953	1701	10-May-2005	n.a.	0.005±0.001	-0.0239±0.0013
MOVE st6	6	0953	763	10-May-2005	n.a.	0.014±0.006	-0.0143±0.0049
MOVE st6	6	0962	4906	10-May-2005	n.a.	0.003±0.000	0.0155±0.0007
MOVE st6	6	0962	4494	10-May-2005	n.a.	0.003±0.000	0.0142±0.0005
MOVE st6	6	0962	3798	10-May-2005	n.a.	0.002±0.000	0.0130±0.0007
MOVE st6	6	0962	3099	10-May-2005	n.a.	0.003±0.001	0.0131±0.0006
MOVE st6	6	0962	2404	10-May-2005	n.a.	0.003±0.001	0.0124±0.0016
MOVE st6	6	0962	1701	10-May-2005	n.a.	0.002±0.001	0.0108±0.0014
MOVE st6	6	0962	763	10-May-2005	n.a.	0.011±0.006	0.0217±0.0056
MOVE st6	6	1269	4906	10-May-2005	n.a.	-0.001±0.000	-0.0263±0.0010
MOVE st6	6	1269	4494	10-May-2005	n.a.	-0.001±0.000	-0.0280±0.0005
MOVE st6	6	1269	3798	10-May-2005	n.a.	-0.001±0.000	-0.0291±0.0009
MOVE st6	6	1269	3099	10-May-2005	n.a.	-0.000±0.001	-0.0290±0.0006
MOVE st6	6	1269	2404	10-May-2005	n.a.	0.000±0.001	-0.0301±0.0018
MOVE st6	6	1269	1701	10-May-2005	n.a.	-0.001±0.001	-0.0327±0.0014
MOVE st6	6	1269	763	10-May-2005	n.a.	0.010±0.007	-0.0220±0.0066
MOVE st6	6	1277	4906	10-May-2005	n.a.	-0.000±0.000	-0.0216±0.0008
MOVE st6	6	1277	4494	10-May-2005	n.a.	0.000±0.000	-0.0231±0.0005
MOVE st6	6	1277	3798	10-May-2005	n.a.	-0.000±0.000	-0.0242±0.0008
MOVE st6	6	1277	3099	10-May-2005	n.a.	0.000±0.001	-0.0241±0.0006
MOVE st6	6	1277	2404	10-May-2005	n.a.	0.001±0.001	-0.0252±0.0019
MOVE st6	6	1277	1701	10-May-2005	n.a.	-0.000±0.001	-0.0275±0.0014
MOVE st6	6	1277	763	10-May-2005	n.a.	0.009±0.007	-0.0173±0.0066
MOVE st6	6	1279	4906	10-May-2005	n.a.	0.030±0.000	-0.0251±0.0007
MOVE st6	6	1279	4494	10-May-2005	n.a.	0.029±0.001	-0.0264±0.0005
MOVE st6	6	1279	3798	10-May-2005	n.a.	0.029±0.000	-0.0275±0.0006
MOVE st6	6	1279	3099	10-May-2005	n.a.	0.029±0.001	-0.0273±0.0006
MOVE st6	6	1279	2404	10-May-2005	n.a.	0.029±0.001	-0.0285±0.0016
MOVE st6	6	1279	1701	10-May-2005	n.a.	0.028±0.001	-0.0313±0.0018
MOVE st6	6	1279	763	10-May-2005	n.a.	0.038±0.006	-0.0204±0.0061
MOVE st6	6	1550	4906	10-May-2005	n.a.	-0.002±0.000	-0.0269±0.0005
MOVE st6	6	1550	4494	10-May-2005	n.a.	-0.002±0.000	-0.0271±0.0004
MOVE st6	6	1550	3798	10-May-2005	n.a.	-0.002±0.000	-0.0278±0.0003
MOVE st6	6	1550	3099	10-May-2005	n.a.	-0.001±0.001	-0.0276±0.0004
MOVE st6	6	1550	2404	10-May-2005	n.a.	-0.001±0.001	-0.0278±0.0009
MOVE st6	6	1550	1701	10-May-2005	n.a.	-0.002±0.001	-0.0296±0.0006
MOVE st6	6	1550	763	10-May-2005	n.a.	0.008±0.005	-0.0213±0.0056
MOVE st6	6	0942	4906	10-May-2005	n.a.	-0.000±0.000	-0.0216±0.0008
MOVE st6	6	0942	4494	10-May-2005	n.a.	-0.000±0.001	-0.0232±0.0006
MOVE st6	6	0942	3798	10-May-2005	n.a.	-0.001±0.000	-0.0247±0.0005
MOVE st6	6	0942	3099	10-May-2005	n.a.	0.000±0.001	-0.0247±0.0006
MOVE st6	6	0942	2404	10-May-2005	n.a.	-0.000±0.001	-0.0263±0.0018
MOVE st6	6	0942	1701	10-May-2005	n.a.	-0.001±0.001	-0.0284±0.0018
MOVE st6	6	0942	763	10-May-2005	n.a.	0.008±0.007	-0.0184±0.0047
MOVE st6	6	0952	4906	10-May-2005	n.a.	-0.000±0.000	-0.0299±0.0007
MOVE st6	6	0952	4494	10-May-2005	n.a.	0.000±0.000	-0.0312±0.0005
MOVE st6	6	0952	3798	10-May-2005	n.a.	-0.001±0.000	-0.0325±0.0008
MOVE st6	6	0952	3099	10-May-2005	n.a.	0.000±0.001	-0.0326±0.0006
MOVE st6	6	0952	2404	10-May-2005	n.a.	0.000±0.001	-0.0339±0.0019

Table 15 continued.

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st6	6	0952	1701	10-May-2005	n.a.	-0.001±0.001	-0.0363±0.0017
MOVE st6	6	0952	763	10-May-2005	n.a.	0.008±0.006	-0.0270±0.0069
MOVE st6	6	0957	4906	10-May-2005	n.a.	0.003±0.000	-0.0226±0.0009
MOVE st6	6	0957	4494	10-May-2005	n.a.	0.003±0.000	-0.0241±0.0005
MOVE st6	6	0957	3798	10-May-2005	n.a.	0.002±0.000	-0.0252±0.0009
MOVE st6	6	0957	3099	10-May-2005	n.a.	0.002±0.001	-0.0251±0.0006
MOVE st6	6	0957	2404	10-May-2005	n.a.	0.003±0.001	-0.0262±0.0019
MOVE st6	6	0957	1701	10-May-2005	n.a.	0.001±0.001	-0.0286±0.0012
MOVE st6	6	0957	763	10-May-2005	n.a.	0.010±0.005	-0.0183±0.0058
MOVE st6	6	0933	4906	10-May-2005	n.a.	0.001±0.000	-0.0250±0.0010
MOVE st6	6	0933	4494	10-May-2005	n.a.	0.001±0.000	-0.0266±0.0005
MOVE st6	6	0933	3798	10-May-2005	n.a.	0.000±0.000	-0.0275±0.0007
MOVE st6	6	0933	3099	10-May-2005	n.a.	0.001±0.000	-0.0273±0.0006
MOVE st6	6	0933	2404	10-May-2005	n.a.	0.001±0.001	-0.0284±0.0017
MOVE st6	6	0933	1701	10-May-2005	n.a.	-0.000±0.001	-0.0308±0.0016
MOVE st6	6	0933	763	10-May-2005	n.a.	0.011±0.008	-0.0197±0.0071
MOVE st6	6	0938	4906	10-May-2005	n.a.	0.001±0.001	-0.0228±0.0010
MOVE st6	6	0938	4494	10-May-2005	n.a.	0.001±0.000	-0.0245±0.0004
MOVE st6	6	0938	3798	10-May-2005	n.a.	0.000±0.000	-0.0255±0.0007
MOVE st6	6	0938	3099	10-May-2005	n.a.	0.001±0.001	-0.0253±0.0006
MOVE st6	6	0938	2404	10-May-2005	n.a.	0.001±0.001	-0.0261±0.0015
MOVE st6	6	0938	1701	10-May-2005	n.a.	0.000±0.001	-0.0286±0.0014
MOVE st6	6	0938	763	10-May-2005	n.a.	0.012±0.008	-0.0181±0.0072
MOVE st6	6	1323	4906	10-May-2005	n.a.	0.000±0.000	-0.0324±0.0007
MOVE st6	6	1323	4494	10-May-2005	n.a.	0.001±0.000	-0.0337±0.0004
MOVE st6	6	1323	3798	10-May-2005	n.a.	0.000±0.000	-0.0348±0.0007
MOVE st6	6	1323	3099	10-May-2005	n.a.	0.001±0.001	-0.0348±0.0006
MOVE st6	6	1323	2404	10-May-2005	n.a.	0.001±0.001	-0.0360±0.0017
MOVE st6	6	1323	1701	10-May-2005	n.a.	-0.000±0.001	-0.0385±0.0016
MOVE st6	6	1323	763	10-May-2005	n.a.	0.008±0.006	-0.0300±0.0067
MOVE st6	6	1719	4906	10-May-2005	n.a.	-0.003±0.000	-0.0123±0.0004
MOVE st6	6	1719	4494	10-May-2005	n.a.	-0.002±0.000	-0.0124±0.0004
MOVE st6	6	1719	3798	10-May-2005	n.a.	-0.003±0.000	-0.0130±0.0004
MOVE st6	6	1719	3099	10-May-2005	n.a.	-0.002±0.001	-0.0127±0.0004
MOVE st6	6	1719	2404	10-May-2005	n.a.	-0.001±0.001	-0.0128±0.0008
MOVE st6	6	1719	1701	10-May-2005	n.a.	-0.002±0.001	-0.0145±0.0006
MOVE st6	6	1719	763	10-May-2005	n.a.	0.008±0.006	-0.0067±0.0050
MOVE st6	6	56	4906	10-May-2005	3.2±0.9	-0.005±0.001	NaN±NaN
MOVE st6	6	56	4494	10-May-2005	1.3±0.8	-0.005±0.001	NaN±NaN
MOVE st6	6	56	3798	10-May-2005	-0.7±0.9	-0.006±0.001	NaN±NaN
MOVE st6	6	56	3099	10-May-2005	-2.1±0.7	-0.005±0.001	NaN±NaN
MOVE st6	6	56	2404	10-May-2005	-3.7±0.6	-0.006±0.001	NaN±NaN
MOVE st6	6	56	1701	10-May-2005	-4.8±0.7	-0.007±0.001	NaN±NaN
MOVE st6	6	57	4906	10-May-2005	5.1±0.9	-0.006±0.001	NaN±NaN
MOVE st6	6	57	4494	10-May-2005	4.4±0.8	-0.006±0.001	NaN±NaN
MOVE st6	6	57	3798	10-May-2005	3.7±0.9	-0.007±0.001	NaN±NaN
MOVE st6	6	57	3099	10-May-2005	2.7±0.7	-0.006±0.001	NaN±NaN
MOVE st6	6	57	2404	10-May-2005	0.7±0.6	-0.006±0.001	NaN±NaN
MOVE st6	6	57	1701	10-May-2005	-1.2±0.7	-0.008±0.001	NaN±NaN
MOVE st6	6	58	4906	10-May-2005	-6.5±0.9	-0.007±0.001	NaN±NaN
MOVE st6	6	58	4494	10-May-2005	-5.3±0.8	-0.008±0.001	NaN±NaN
MOVE st6	6	58	3798	10-May-2005	-3.1±0.9	-0.008±0.001	NaN±NaN
MOVE st6	6	58	3099	10-May-2005	-1.4±0.7	-0.008±0.001	NaN±NaN
MOVE st6	6	58	2404	10-May-2005	-1.1±0.6	-0.009±0.001	NaN±NaN
MOVE st6	6	58	1701	10-May-2005	-1.4±0.7	-0.010±0.001	NaN±NaN

Table 16: *MircoCatoffset from calibration cast# 7 (second dive for instruments of 404 and 406).*

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st7	7	0910	3504	11-May-2005	n.a.	-0.001±0.000	-0.0225±0.0006
MOVE st7	7	0910	2999	11-May-2005	n.a.	-0.001±0.000	-0.0243±0.0008
MOVE st7	7	0910	2299	12-May-2005	n.a.	-0.002±0.000	-0.0263±0.0004
MOVE st7	7	0910	1698	12-May-2005	n.a.	0.000±0.001	-0.0289±0.0017
MOVE st7	7	0910	998	12-May-2005	n.a.	-0.002±0.000	-0.0328±0.0014
MOVE st7	7	0910	448	12-May-2005	n.a.	0.032±0.026	-0.0316±0.0200
MOVE st7	7	0941	3504	11-May-2005	n.a.	-0.002±0.000	-0.0203±0.0007
MOVE st7	7	0941	2999	11-May-2005	n.a.	-0.002±0.000	-0.0220±0.0008
MOVE st7	7	0941	2299	12-May-2005	n.a.	-0.002±0.000	-0.0239±0.0004
MOVE st7	7	0941	1698	12-May-2005	n.a.	-0.001±0.001	-0.0264±0.0017
MOVE st7	7	0941	998	12-May-2005	n.a.	-0.002±0.000	-0.0301±0.0013
MOVE st7	7	0941	448	12-May-2005	n.a.	0.034±0.030	-0.0216±0.0296
MOVE st7	7	1276	3504	11-May-2005	n.a.	-0.000±0.000	-0.0236±0.0006
MOVE st7	7	1276	2999	11-May-2005	n.a.	-0.000±0.000	-0.0254±0.0008
MOVE st7	7	1276	2299	12-May-2005	n.a.	-0.000±0.000	-0.0275±0.0004
MOVE st7	7	1276	1698	12-May-2005	n.a.	0.001±0.001	-0.0302±0.0016
MOVE st7	7	1276	998	12-May-2005	n.a.	-0.000±0.000	-0.0346±0.0013
MOVE st7	7	1276	448	12-May-2005	n.a.	0.034±0.025	-0.0314±0.0197
MOVE st7	7	1723	3504	11-May-2005	n.a.	-0.003±0.000	-0.0101±0.0003
MOVE st7	7	1723	2999	11-May-2005	n.a.	-0.003±0.000	-0.0102±0.0003
MOVE st7	7	1723	2299	12-May-2005	n.a.	-0.003±0.000	-0.0118±0.0002
MOVE st7	7	1723	1698	12-May-2005	n.a.	-0.001±0.001	-0.0135±0.0009
MOVE st7	7	1723	998	12-May-2005	n.a.	-0.002±0.001	-0.0164±0.0003
MOVE st7	7	1723	448	12-May-2005	n.a.	0.035±0.032	0.0121±0.0332
MOVE st7	7	3411	3504	11-May-2005	-11.3±0.4	-0.003±0.000	-0.0042±0.0003
MOVE st7	7	3411	2999	11-May-2005	-10.0±0.5	-0.003±0.000	-0.0044±0.0004
MOVE st7	7	3411	2299	12-May-2005	-8.3±0.5	-0.004±0.000	-0.0060±0.0003
MOVE st7	7	3411	1698	12-May-2005	-6.5±0.6	-0.002±0.001	-0.0072±0.0007
MOVE st7	7	3411	998	12-May-2005	-4.6±0.7	-0.003±0.000	-0.0094±0.0003
MOVE st7	7	3411	448	12-May-2005	-2.7±0.6	0.029±0.025	0.0186±0.0258
MOVE st7	7	3414	3504	11-May-2005	-8.9±0.4	-0.004±0.000	-0.0271±0.0003
MOVE st7	7	3414	2999	11-May-2005	-7.8±0.5	-0.004±0.000	-0.0272±0.0003
MOVE st7	7	3414	2299	12-May-2005	-6.5±0.3	-0.004±0.000	-0.0291±0.0003
MOVE st7	7	3414	1698	12-May-2005	-5.1±0.4	-0.002±0.001	-0.0309±0.0006
MOVE st7	7	3414	998	12-May-2005	-3.5±0.5	-0.003±0.000	-0.0344±0.0003
MOVE st7	7	3414	448	12-May-2005	-1.6±0.6	0.033±0.031	-0.0071±0.0327
MOVE st7	7	0940	3504	11-May-2005	n.a.	-0.001±0.000	-0.0197±0.0006
MOVE st7	7	0940	2999	11-May-2005	n.a.	-0.001±0.000	-0.0215±0.0007
MOVE st7	7	0940	2299	12-May-2005	n.a.	-0.001±0.000	-0.0234±0.0004
MOVE st7	7	0940	1698	12-May-2005	n.a.	0.000±0.002	-0.0264±0.0017
MOVE st7	7	0940	998	12-May-2005	n.a.	-0.001±0.000	-0.0300±0.0011
MOVE st7	7	0940	448	12-May-2005	n.a.	0.030±0.027	-0.0330±0.0200
MOVE st7	7	1270	3504	11-May-2005	n.a.	-0.001±0.000	-0.0233±0.0006
MOVE st7	7	1270	2999	11-May-2005	n.a.	-0.001±0.000	-0.0253±0.0008
MOVE st7	7	1270	2299	12-May-2005	n.a.	-0.002±0.000	-0.0273±0.0005
MOVE st7	7	1270	1698	12-May-2005	n.a.	-0.000±0.002	-0.0304±0.0017
MOVE st7	7	1270	998	12-May-2005	n.a.	-0.001±0.001	-0.0343±0.0014
MOVE st7	7	1270	448	12-May-2005	n.a.	0.033±0.031	-0.0354±0.0304
MOVE st7	7	1272	3504	11-May-2005	n.a.	-0.001±0.000	-0.0245±0.0006
MOVE st7	7	1272	2999	11-May-2005	n.a.	-0.001±0.000	-0.0263±0.0008
MOVE st7	7	1272	2299	12-May-2005	n.a.	-0.001±0.000	-0.0283±0.0005
MOVE st7	7	1272	1698	12-May-2005	n.a.	0.000±0.002	-0.0312±0.0016
MOVE st7	7	1272	998	12-May-2005	n.a.	-0.001±0.000	-0.0350±0.0013
MOVE st7	7	1272	448	12-May-2005	n.a.	0.035±0.031	-0.0333±0.0304

Table 16 continued.

Site/deploy.	cast	MC#	depth	date	Δ Press.	Δ Temp.	Δ Cond.
MOVE st7	7	1274	3504	11-May-2005	n.a.	0.001±0.000	-0.0207±0.0006
MOVE st7	7	1274	2999	11-May-2005	n.a.	0.001±0.000	-0.0224±0.0008
MOVE st7	7	1274	2299	12-May-2005	n.a.	0.001±0.000	-0.0245±0.0005
MOVE st7	7	1274	1698	12-May-2005	n.a.	0.002±0.001	-0.0273±0.0017
MOVE st7	7	1274	998	12-May-2005	n.a.	0.000±0.000	-0.0314±0.0014
MOVE st7	7	1274	448	12-May-2005	n.a.	0.033±0.027	-0.0333±0.0198
MOVE st7	7	1316	3504	11-May-2005	n.a.	-0.002±0.000	-0.0215±0.0006
MOVE st7	7	1316	2999	11-May-2005	n.a.	-0.002±0.000	-0.0231±0.0008
MOVE st7	7	1316	2299	12-May-2005	n.a.	-0.002±0.000	-0.0252±0.0005
MOVE st7	7	1316	1698	12-May-2005	n.a.	-0.001±0.002	-0.0280±0.0017
MOVE st7	7	1316	998	12-May-2005	n.a.	-0.002±0.000	-0.0315±0.0011
MOVE st7	7	1316	448	12-May-2005	n.a.	0.033±0.031	-0.0282±0.0293
MOVE st7	7	1317	3504	11-May-2005	n.a.	-0.002±0.000	-0.0231±0.0006
MOVE st7	7	1317	2999	11-May-2005	n.a.	-0.002±0.000	-0.0248±0.0007
MOVE st7	7	1317	2299	12-May-2005	n.a.	-0.002±0.000	-0.0268±0.0004
MOVE st7	7	1317	1698	12-May-2005	n.a.	-0.001±0.001	-0.0300±0.0016
MOVE st7	7	1317	998	12-May-2005	n.a.	-0.002±0.000	-0.0336±0.0012
MOVE st7	7	1317	448	12-May-2005	n.a.	0.028±0.027	-0.0362±0.0196
MOVE st7	7	1318	3504	11-May-2005	n.a.	-0.000±0.000	-0.0199±0.0007
MOVE st7	7	1318	2999	11-May-2005	n.a.	-0.000±0.000	-0.0218±0.0008
MOVE st7	7	1318	2299	12-May-2005	n.a.	-0.001±0.000	-0.0238±0.0005
MOVE st7	7	1318	1698	12-May-2005	n.a.	0.000±0.002	-0.0271±0.0018
MOVE st7	7	1318	998	12-May-2005	n.a.	-0.001±0.000	-0.0307±0.0014
MOVE st7	7	1318	448	12-May-2005	n.a.	0.032±0.031	-0.0309±0.0304
MOVE st7	7	1320	3504	11-May-2005	n.a.	-0.001±0.000	-0.0285±0.0005
MOVE st7	7	1320	2999	11-May-2005	n.a.	-0.001±0.000	-0.0301±0.0007
MOVE st7	7	1320	2299	12-May-2005	n.a.	-0.001±0.000	-0.0321±0.0005
MOVE st7	7	1320	1698	12-May-2005	n.a.	0.000±0.001	-0.0348±0.0018
MOVE st7	7	1320	998	12-May-2005	n.a.	-0.001±0.000	-0.0388±0.0010
MOVE st7	7	1320	448	12-May-2005	n.a.	0.036±0.030	-0.0286±0.0286
MOVE st7	7	1322	3504	11-May-2005	n.a.	-0.000±0.000	-0.0209±0.0008
MOVE st7	7	1322	2999	11-May-2005	n.a.	-0.001±0.000	-0.0229±0.0005
MOVE st7	7	1322	2299	12-May-2005	n.a.	-0.001±0.000	-0.0249±0.0005
MOVE st7	7	1322	1698	12-May-2005	n.a.	0.002±0.002	-0.0265±0.0018
MOVE st7	7	1322	998	12-May-2005	n.a.	-0.001±0.001	-0.0312±0.0009
MOVE st7	7	1322	448	12-May-2005	n.a.	0.039±0.031	-0.0139±0.0313
MOVE st7	7	3413	3504	11-May-2005	-12.7±0.5	-0.003±0.000	0.0171±0.0004
MOVE st7	7	3413	2999	11-May-2005	-11.2±0.5	-0.003±0.000	0.0172±0.0004
MOVE st7	7	3413	2299	12-May-2005	-9.4±0.5	-0.003±0.000	0.0157±0.0003
MOVE st7	7	3413	1698	12-May-2005	-7.4±0.5	-0.002±0.001	0.0148±0.0006
MOVE st7	7	3413	998	12-May-2005	-5.4±0.5	-0.003±0.001	0.0130±0.0004
MOVE st7	7	3413	448	12-May-2005	-3.1±0.6	0.033±0.029	0.0523±0.0320

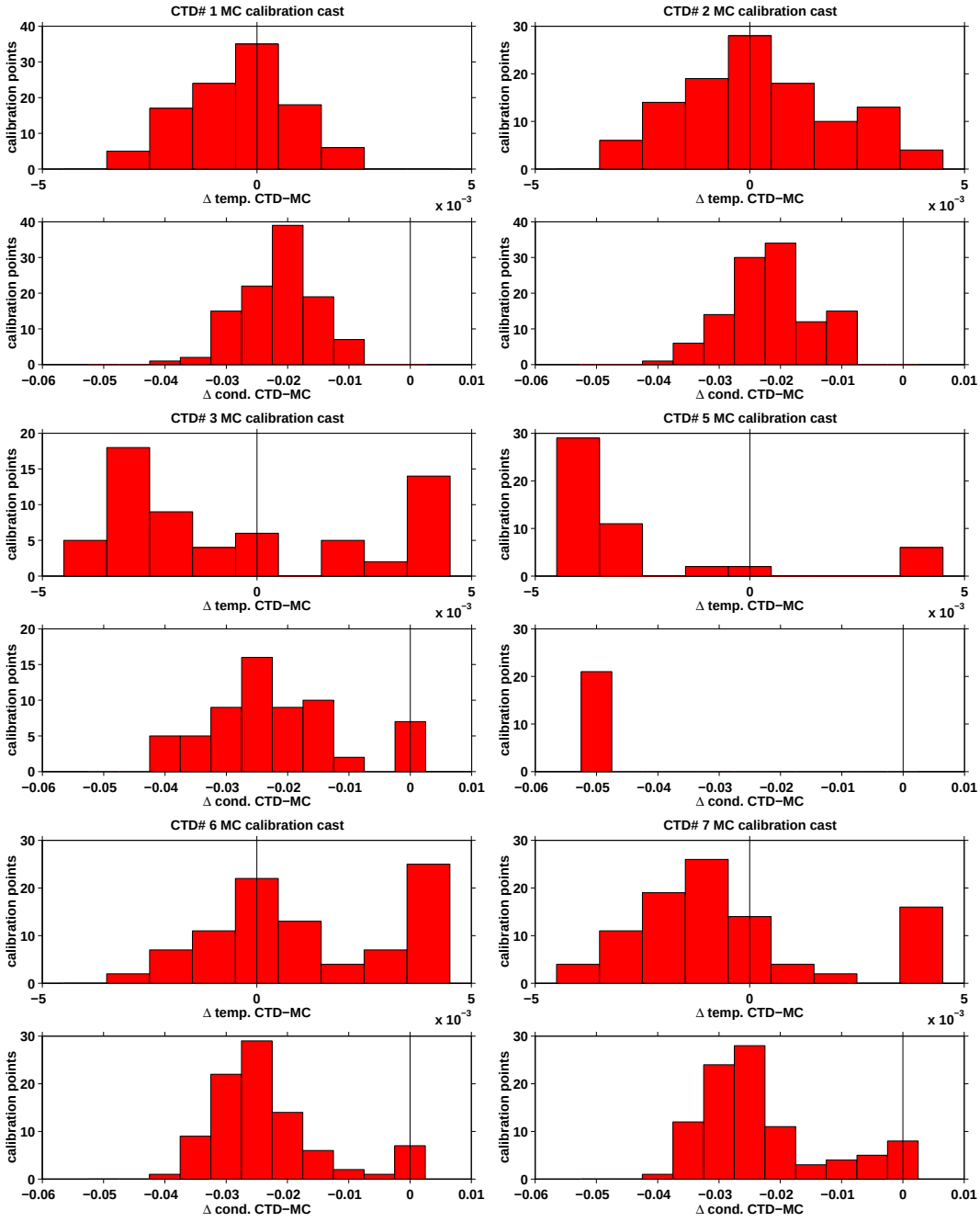

Figure 35: *Calibration cast: uncalibrated CTD - MircoCat/Mini-TD stations 1 to 7.*

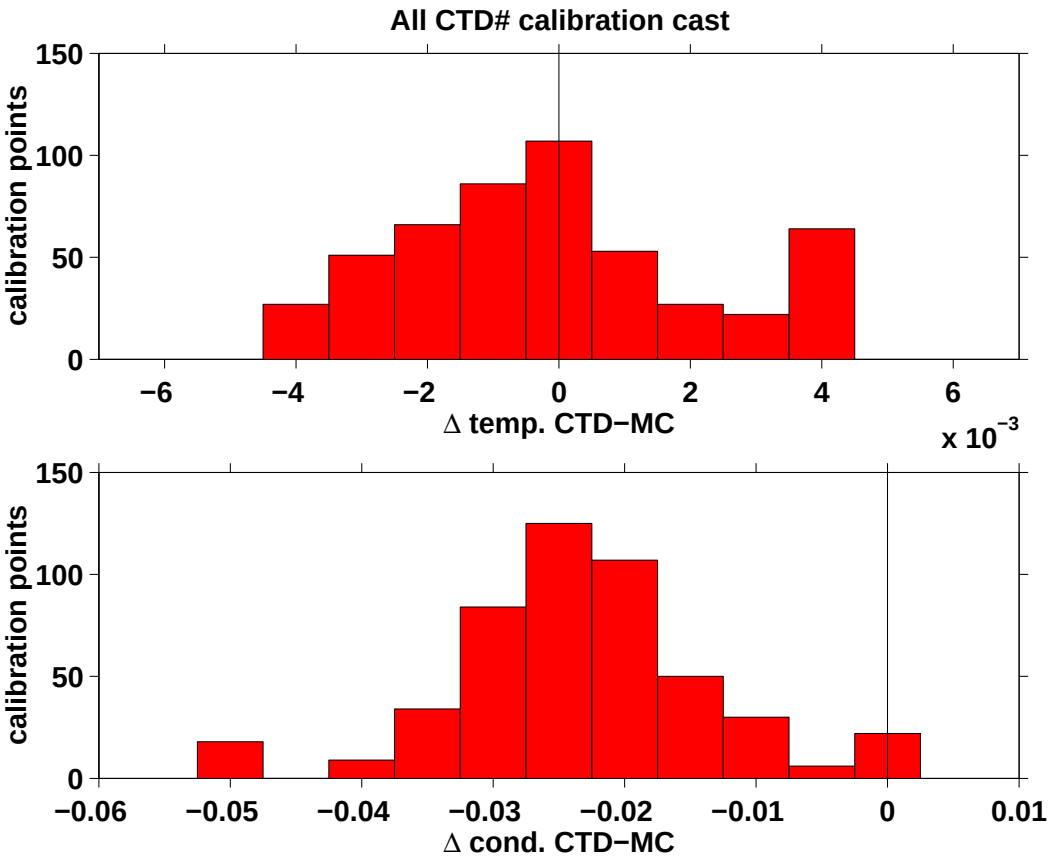

Figure 36: *Calibration cast: uncalibrated CTD - MircoCat/Mini-TD all stations* .

References

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