

# SHORT CRUISE REPORT

RV METEOR: Cruise M68/2

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IFM-GEOMAR  
Leibniz Institute for Ocean Sciences  
Ocean Circulation and Climate Dynamics

M68/2 from Recife, Brazil to Mindelo, Cape Verde Islands  
June 6 to July 9, 2006

## Participants M68/2

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5	Fischer, Tim	ADCP, shipboard sampling	IFM-GEOMAR
6	Funk, Andreas, Dr.	CTD, ADCP, radiosondes	IFM-GEOMAR
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8	Gülzow, Niels	H <sub>2</sub> O <sub>2</sub>	IFM-GEOMAR
9	Hormann, Verena	Salinometry, radiosondes	IFM-GEOMAR
10	Koy, Uwe	Microstructure	IFM-GEOMAR
11	Malien, Frank	O <sub>2</sub> , nutrients	IFM-GEOMAR
12	Müller, Mario	LADCP, computers	IFM-GEOMAR
13	Niehus, Gerd	Moorings, CTD	IFM-GEOMAR
14	Ochsenhirt, Wolf-Thilo	Meteorological technology	DWD
15	Papenburg, Uwe	Moorings, technology	IFM-GEOMAR
16	Rabe, Benjamin, Dr.	APEX, CTD, shipboard sampling	IFM-GEOMAR
17	Schafstall, Jens	Microstructure	IFM-GEOMAR
18	Schneider, Anke	CFC, SF <sub>6</sub>	IFM-GEOMAR
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20	Stramma, Lothar, Dr.	Salinometry, CTD	IFM-GEOMAR
21	Tanhua, Toste, Dr.	CFC, SF <sub>6</sub>	IFM-GEOMAR
22	Veleda, Doris	CTD	UFPE
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24	Winkelmann, Claudia	Helium	UBU
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## Research Program

The measurement program of M68/2 consists of station hydrographic observations with a CTD/O<sub>2</sub> rosette including water sampling for tracer, oxygen and nutrient probing. Of particular importance are underway current measurements with both shipboard ADCPs (Ocean Surveyor, 38 kHz und 75 kHz). In addition to horizontal advection by different zonal current bands, diapycnal mixing plays an important role for the heat budget of the mixed layer. In the region between 23°W and 10°W specifically, diapycnal mixing processes will be measured on station using a loosely tethered, free-falling microstructure probe and a high-frequency (1200 kHz) LADCP, lowered with the CTD/O<sub>2</sub> rosette at the same station.

During M68/2 an intensive mooring program will be carried out. This program consists of the recovery of two equatorial current meter moorings at 35°W and 23°W, and of two sound source moorings at 5°N, 35°W and ~3°S, 28°W. To record changes in the equatorial currents on intraseasonal to interannual time scales, a mooring array will be installed at 23°W (Fig. 5). This array consists of four current meter moorings and is aimed at quantifying the variability of the thermocline water supply toward the equatorial cold tongue. Another equatorial current meter mooring will be installed at 10°W in cooperation with the multi-national PIRATA program. In preparation of a planned new Sonderforschungsbereich [German Special Research Program], a profiling CTD/O<sub>2</sub> will be moored at 5°N, 23°W. The goal of this mooring is to observe the transport of oxygen-rich waters toward the oxygen minimum zone in the tropical North Atlantic. The final mooring of M68/2 will be deployed near the Cape Verde Islands shortly before arrival at the port of Mindelo.

Helium probes will mainly be taken along the meridional sections (35°W, 23°W and 10°W) in the upper 500m of the water column. It is planned to achieve high vertical and horizontal resolution with about 5-7 probes at each CTD/O<sub>2</sub> station. Biogeochemical water sampling, including O<sub>2</sub>, nutrients, CO<sub>2</sub>, CFC, and SF<sub>6</sub> measurements, will be carried out during regular CTD/O<sub>2</sub> stations.

In support of the international AMMA program, twice daily radio soundings will be taken during M68/2.

## Cruise Narrative

RV METEOR departed from Recife on June 6 at 1000L. At that time, some of the instruments (two moored CTD profilers) shipped from Woods Hole, Massachusetts, to Recife should have been delivered to METEOR. Unfortunately, the customs strike in Brazil put a severe damper on these plans, and on-time delivery did not take place. It was decided to ask for permission to take delivery of the instruments when the ship arrives at the island of Fernando de Noronha, where the Brazilian observer is scheduled to disembark from METEOR.

RV METEOR headed north toward the Brazilian shelf along 35°W where scientific work started with the first CTD/O<sub>2</sub> station early in the morning of June 7. The measurements along this section concentrate on the upper ocean so that the CTD/O<sub>2</sub> profiles were taken to a depth of 1300m only, or near bottom in the shallower waters

near the shelf. The CTD/O<sub>2</sub> measurements were accompanied by current measurements with two workhorse ADCPs attached to the CTD/O<sub>2</sub> rosette, as well as by two shipboard ADCPs, so-called Ocean Surveyors of 38 kHz and 75 kHz, respectively. Both instruments obtain their heading input from the 3D-Ashtech GPS receiver as well as from METEOR's Fiber Optic Compass (FOG).

Water samples are taken using the water bottles of the CTD/O<sub>2</sub> rosette as part of the intense biogeochemical program during M68/2. During most of the stations, water samples are analyzed with respect to their contents of chlorofluorocarbons (CFC), sulfur hexafluoride (SF<sub>6</sub>), helium, oxygen, nutrients (nitrate, nitrite, phosphate, silicate), dissolved inorganic carbon (DIC), total alkalinity (Alk), and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>).

Along the northward cruise track, CTD stations were spaced apart by about 20' – 30' of latitude, somewhat denser near the shelf and near the equator. On June 9, 0900L, METEOR approached the position of our current meter mooring. The mooring was deployed in August 2004 and contains four current meters, three CTD sensors, two ADCPs, and one RAFOS sound source. The releases were contacted using the hydrophone board unit, and the release command was sent at 0910L, with the top element surfacing only a few minutes later. The mooring was then recovered without any problems. A first view of the obtained data showed that all instruments worked well, yielding an instrument and data recovery rate of 100%.

At the mooring position, a first test station with our microstructure profiler (MSS) was carried out with the profiler winch attached at the port side stern rail. The ship's course and speed (max of 1 to 1.5 kn suggested) were adjusted in accordance with wind and surface current to ensure that the microstructure profiler would fall free and clear astern on the port side. The ship steamed south and steamed with 1 kn through the water while drifting southwestward. After adjusting the profiler sink velocity by changing the weights of the MSS, the first data set was obtained. At this position, the strong eastward velocity of the Equatorial Undercurrent advected the profiler eastward, away from the ship. Thus there was no risk of losing the profiler by cutting the cable with the ship's propeller.

After the MSS test station, the first APEX float was deployed successfully, and the CTD/O<sub>2</sub> section along 35°W was continued. Water samples were taken at every other station for the full set of biogeochemical analysis. The stations in between were used instead for the calibration of Microcats to be deployed within the mooring array along 23°W.

On June 10, we received information from Mr. Marcos Fonseca (Windrose Serv. Mar.), the ship's agent in Brazil, that the moored profilers are onboard the 53ft sail boat AUSSTEIGER, arriving at Fernando de Noronha in the morning of June 13. The same day, Mr. Fonseca and two customs officers will take an airplane to Fernando de Noronha to facilitate customs clearance and delivery of the moored profilers to METEOR on June 14 at 0800L.

On June 11, the CTD/O<sub>2</sub> section along 35°W was completed with the last station at 5°N. At this position a sound source mooring had been deployed during METEOR

cruise M62/2, however, from the received RAFOS float data we knew that the sound source did not work from the very beginning. After approaching the mooring position at 09:20L, the release responded to the signal from the board unit via hydrophone, and about 10 min after sending the release command, the top element was observed at the sea surface. Recovery went smoothly and was completed at 10:00L. Following the mooring recovery another MSS test station was taken. Due to weak winds and currents, there was no problem in obtaining almost constant sink velocities of 0.6 or 0.7 m/s down to 350m depending on the number of ballasting rings attached to the profiler. The last activity at the 35°W section was a CTD/O<sub>2</sub> test station. During the previous CTD/O<sub>2</sub> casts we observed too strong a tilt of the ADCPs attached to the CTD rosette. We changed the ballast at the CTD rosette, which significantly improved the tilt with smaller pitch and roll angles throughout the CTD test cast. At 13:00L, METEOR began an ADCP section from 35°W, 5°N to 32°30'W, 2°30'N and further to 32°30'W, 3°50'S, the location of the island of Fernando de Noronha. One ARGO float each was deployed at two degrees north and south of the equator, and two CTD stations were carried out to test the performance of our releases to be used for the mooring deployments later during the cruise.

On June 14 at 0730L we arrived at the island of Fernando de Noronha. After disembarking the Brazilian observer, we contacted the sailboat AUSSTEIGER. They arrived already one day earlier as did the two customs officer and the ship's agent, Mr. Marcos Fonseca. There were no further complications with customs clearance at the island, and all-in-all we experienced only a minor time delay. All of the shipped equipment was found in good condition, and we feel fortunate to have the profiler available for our two moorings in the central tropical Atlantic. At 1100L the ship headed toward the position of our next mooring recovery.

On June 15 at 1000L we arrived at the mooring position. After lowering the hydrophone, we were not able to obtain a clear contact with the single release on the mooring. The release code was submitted nonetheless but without success. It appeared that some noise from the ship interfered with the signal of the hydrophone board unit, and after switching off the Kongsberg EM120 multi-beam echo sounder transmitting at 12kHz, we were able to receive clear signals from the release. The release code was submitted again and we received the message "Release executed". However, the mooring did not come to the surface. Though repeatedly submitting the release code numerous times, nothing happened. As there was no additional time available because of the very tight mooring program, we had to decide to depart from the mooring position without recovering the sound source mooring. Another ARGO float was deployed at the mooring position, and METEOR headed toward the southern end of the 23°W section beginning at 4°S. Along the cruise track another two ARGO floats were deployed at 27°W and 25°W, respectively.

During the late evening of June 16, the hydrographic section along the 23°W section commenced with a first CTD/O<sub>2</sub> cast at 4°S. Several CTD/O<sub>2</sub> casts and the first set of regular microstructure stations were carried out during the following day. The depth reached by the microstructure profiler strongly depends on the strength of the vertical shear of the horizontal velocity. Near the equator in particular, only very shallow profiles could be obtained because of the very strong EUC with core

velocities above 1m/s at about 70m depth. During the night station on June 17, the acquisition computer of the microstructure profiler did not receive data from the profiler and it soon became evident that the cable was broken. We switched to a different cable, and microstructure measurements commenced after the mooring deployment on June 18.

The deployment of the first mooring of our equatorial array at 23°W began at 1015L with a drift test. The ship headed against the southeasterly winds with a velocity of about 1kn through water. A drift velocity of about 2.5kn to the south resulted due to prevailing wind and currents. After the drift test the bathymetry of the deployment area was surveyed with the multi-beam echo sounder which, during the last Meteor leg, has proven to be a highly accurate instrument. The obtained topographic data showed that the initially chosen mooring position was situated in an almost flat region of about 3680m water depth. The mooring deployment ran very smoothly, and after merely 2h 20min all instruments were in the water. We had to steam an additional hour to reach the anchor drop position. The final mooring position was determined to be at 0°44.95'S, 22°59.60'W. During the night following the mooring deployment, CTD/O<sub>2</sub> and microstructure measurements were continued.

Two mooring operations had been scheduled for the following day, June 19. Recovery of the French mooring located at 23°07.51'W, 0°00.01'N was started early in the morning. This mooring included a PIRATA workhorse ADCP, an IFM-GEOMAR Longranger ADCP and several Aanderaa current meters (LOCEAN, C. Provost). The release responded accurately, and the first flotation elements surfaced after just a short while. The ship's Zodiac was used to first recover the release and its flotation package, followed by all other instruments in short order. A first inspection of the ADCP records indicated complete data sets, although located shallower than originally planned, with the upward looking ADCP located right in the core of the EUC which resulted in strong mooring motion and vertical excursions of the top elements. The Aanderaa current meter tapes will not be read during this cruise but will be sent to LOCEAN, Paris to be read and analyzed there. Following the successful mooring recovery, we commenced with a multi-beam echo sounder survey and found the former mooring position was located amidst smooth topography. Water depths within half a mile around the chosen mooring position varied only between 3680m and 3690m. The drift test with 1.5kn through water against the southeasterly wind again yielded a southward drift because of the strong westward flowing SEC. The mooring deployment started very smoothly, all instruments including the moored profiler moved from the afterdeck into the water without any problems. At the end of the long 2.5km long wire segment for the moored profiler, the wire shifted from its straight position behind the ship and moved strongly to the port side of the ship. Severe tension was building on the mooring wire, and the captain decided to turn the ship to the port side to reduce tension on the mooring wire. However, the mooring wire shaved against the ships hull, resulting in some scuffs to its plastic jacket. As the mooring was at risk for being lost, the ship had to turn quickly to the starboard side, thereby leaving the drift track toward the planned anchor drop position. After submerging the releases into the water and after attaching the mooring wire to the anchor still firmly attached to the ship's aft deck, the ship made a wide turn for about 2.5h with about 2kn through water to reach the planned mooring position. The

anchor was dropped at the proper and intended position. We believe that this very unusual mooring deployment resulted from the fact that the long mooring line segment of the moored profiler dropped into the depth range of the very strong EUC and was advected eastward. For future applications, one must consider alternative strategies to deploy similar moorings in the equatorial region. The submerging of the mooring top was concluded from the disappearance of the ARGO signal from the transmitter at the moorings top element. The mooring position was determined as  $0^{\circ}00.0S$  and  $23^{\circ}06.8'W$ .

During the following night, we completed two CTD casts, with the second one already at the next mooring position. After the topographic survey of the mooring area in the morning of June 20, we chose a mooring position at a water depth of 4310m, about 110m deeper than suggested by the 2' Sandwell topography. The mooring deployment proceeded without any problems, and the anchor was dropped exactly at the planned position. The final mooring position was determined as  $0^{\circ}45.0'N$ ,  $22^{\circ}59.5'W$ .

Two more CTD casts were taken during the following night. A drift test at the next mooring position showed rather weak surface currents, contrary to the previous deployments. The survey using the multi-beam echo sounder revealed a depth of about 4950m at the planned mooring position, with a variation of only a few meters nearby. The mooring deployments started right after lunch on June 21. The ship drifted along the planned track, and after about 3h, all instruments had been launched from the aftdeck into the water. Meteor had to steam another 45min to reach the anchor drop position, and the final mooring position was determined as  $0^{\circ}00.0'N$ ,  $21^{\circ}29.6'W$ . This was the last mooring of our equatorial mooring array aimed at studying the role of the equatorial circulation for tropical Atlantic climate variability in the frame of the BMBF Verbundvorhaben "Nordatlantik".

After the successful installation of the mooring array, the zonal section along the equator commenced with combined microstructure und CTD/O<sub>2</sub> observations at  $21^{\circ}W$ . The distance between successive stations was chosen as  $1^{\circ}$  in longitude. We completed this section at  $12^{\circ}W$  during the night of June 24, and Meteor headed toward the southernmost point of the meridional section along  $10^{\circ}W$ .

Along the  $10^{\circ}W$  section, nine CTD casts were taken between  $1^{\circ}30'S$  and  $1^{\circ}30'N$ . In between, on June 26 at 1100L, deployment of the French mooring as part of the PIRATA program was started. Following the drift test and topographic survey, the top element, including the PIRATA workhorse ADCP, was launched smoothly into the water. At the second 2000m length of the parafil rope, the parafil slipped out of the fitting when leaving the capstan. The loose end was captured just before it went into the water (stopped by hand by the bosun and a crew member). We had to cut off about 30m of the parafil rope that were damaged during the rescue action. The 30m of parafil were replaced by 30m of 1/4" wire. At 1600L the anchor was dropped, and the final mooring position was estimated as  $0^{\circ}01.28'N$ ,  $09^{\circ}51.23'W$ . As we were not completely sure that the other fittings would withstand the launch tension, we steamed in the direction of likely drift of the top elements in case of any broken rope, but no sightings were obtained. Thus, we concluded that the mooring had been successfully deployed.

On June 27 at 1730L the zonal section along  $2^{\circ}N$  commenced with the first CTD/O<sub>2</sub> cast at  $12^{\circ}W$ . It was completed on June 30 at 1930L with the last cast at  $22^{\circ}W$ .

Along this westward cruise track, CTD stations were spaced apart by about 1° of longitude. METEOR headed toward 23°W, 1°N to continue the 23°W section that was interrupted for the eastern box limited by the section along the equator, 10°W, and 2°N. Near the equator, CTD stations were spaced apart by 20' of latitude, and by 30' of latitude starting at 3°N.

The mooring deployment at 5°N started early in the morning of July 1. This mooring contains one of the moored profilers that were delivered to Fernando de Noronha. Equipped with an oxygen sensor, it is aimed at studying the oxygen supply to the oxygen minimum zones in the eastern Tropical Atlantic. After a drift test and a survey with the multi-beam echo sounder, the top element including a Longranger ADCP was deployed at 0630L. At about 0930L the anchor was dropped exactly at the planned position, and submergence of the top element was observed about 20 min later. Following the mooring deployment, the section along 23°W was continued with CTD casts spaced apart by 30' of latitude. On July 7, 1330L the 23°W section was completed at 15°15'N, only a few miles west of the island of Maio, Cape Verde. At this location, a calibration cast for the fluorometer to be moored north of Cape Verde was taken down to 200m with water samples about every 10m.

Early in the morning of June 8, we arrived at the location of our last mooring. After performing microstructure measurements and a CTD cast down to near bottom, the area was surveyed with the multi-beam echo sounder revealing a flat topography at almost exactly the target depth. The mooring operations ran very smoothly, and the anchor was dropped at the planned location. As we had attached a POSIDONIA release at the top element of the mooring, we were able to track exactly the final position of the mooring. It is: 24°15.12W, 17°35.39N. After tracking the top element, the release was activated and it was recovered together with the two Benthos flotation elements. The scientific work of Meteor cruise M68/2 ended at 1630L and the ship headed toward Mindelo where the cruise ended on July 9, 0900L.



**Table 1: CTD/LADCP stations**

<b>SHIP</b>	<b>Station</b>	<b>Profile</b>	<b>DATE</b>	<b>UTC</b>	<b>POSITION</b>						<b>Uncorr.</b>	<b>MAX</b>	<b>NO. OF</b>		
<b>EXPCODE</b>	<b>No.</b>	<b>No.</b>	<b>Mmddy</b>	<b>TIME</b>	<b>CODE</b>	<b>LATITUDE</b>			<b>LONGITUDE</b>			<b>DEPTH</b>	<b>PRESS</b>	<b>BOTTLES</b>	<b>PAR.</b>
06ME68/2	130	1	060706	0722	BE	04	54,96	S	34	55,11	W	828	CTD		
06ME68/2	130	1	060706	0745	BO	04	54,65	S	34	55,17	W		832	21	Bottle test, 8
06ME68/2	130	1	060706	0805	EN	04	54,11	S	34	55,30	W				
06ME68/2	131	2	060706	0924	BE	04	48,47	S	34	52,84	W	983			
06ME68/2	131	2	060706	0953	BO	04	47,85	S	34	53,01	W	1015	1011	21	1,4,5,6,7,8,10
06ME68/2	131	2	060706	1023	EN	04	47,16	S	34	53,15	W				
06ME68/2	132	3	060706	1120	BE	04	40,35	S	34	52,81	W	2426			
06ME68/2	132	3	060706	1159	BO	04	39,69	S	34	52,92	W	?	1316	2	8
06ME68/2	132	3	060706	1231	EN	04	38,98	S	34	53,00	W	?			
06ME68/2	133	4	060706	1415	BE	04	20,65	S	34	53,16	W	3520			
06ME68/2	133	4	060706	1450	BO	04	19,95	S	34	53,32	W		1325	2	8
06ME68/2	133	4	060706	1527	EN	04	19,37	S	34	53,62	W				
06ME68/2	134	5	060706	1722	BE	04	00,17	S	34	53,03	W	3460			
06ME68/2	134	5	060706	1755	BO	03	59,78	S	34	53,13	W		1354	21	1,4,5,6,7,8
06ME68/2	134	5	060706	1830	EN	03	59,43	S	34	53,19	W				
06ME68/2	135	6	060706	2104	BE	03	30,57	S	34	52,99	W	2360			
06ME68/2	135	6	060706	2141	BO	03	30,38	S	34	53,08	W		1323	21	--
06ME68/2	135	6	060706	2209	EN	03	30,34	S	34	53,08	W				
06ME68/2	136	7	060806	0113	BE	03	00,35	S	34	53,12	W	3837			
06ME68/2	136	7	060806	0152	BO	02	59,98	S	34	53,46	W		1311	21	1,4,5,6,7,8,10
06ME68/2	136	7	060806	0229	EN	02	59,53	S	34	53,54	W				
06ME68/2	137	8	060806	0429	BE	02	40,00	S	34	56,93	W	3889			
06ME68/2	137	8	060806	0501	BO	02	39,98	S	34	56,98	W		1302	--	--
06ME68/2	137	8	060806	0527	EN	02	40,05	S	34	56,92	W				
06ME68/2	138	9	060806	0735	BE	02	19,95	S	34	59,99	W	3947			
06ME68/2	138	9	060806	0814	BO	02	19,94	S	35	00,02	W		1314	21	1,4,5,7,8
06ME68/2	138	9	060806	0847	EN	02	20,09	S	35	00,03	W				
06ME68/2	139	10	060806	1049	BE	02	00,04	S	35	00,01	W	4053			
06ME68/2	139	10	060806	1128	BO	02	00,39	S	35	00,02	W		1311		Test 2 bottles
06ME68/2	139	10	060806	1156	EN	02	00,31	S	35	00,03	W				
06ME68/2	140	11	060806	1402	BE	01	40,05	S	34	59,88	W	4080			
06ME68/2	140	11	060806	1439	BO	01	40,06	S	34	59,90	W		1319	21	1,4,5,6,7,8,10
06ME68/2	140	11	060806	1516	EN	01	40,07	S	34	59,88	W				
06ME68/2	141	12	060806	1903	BE	01	20,11	S	34	59,92	W	4345			
06ME68/2	141	12	060806	1943	BO	01	20,25	S	35	00,00	W		1316		Test 3 bottles
06ME68/2	141	12	060806	2012	EN	01	20,35	S	34	59,98	W				
06ME68/2	142	13	060806	2219	BE	00	59,97	S	34	59,95	W	4373			
06ME68/2	142	13	060806	2251	BO	01	00,00	S	34	59,74	W		1315	21	1,4,5,6,7,8,9
06ME68/2	142	13	060806	2328	EN	01	00,00	S	34	59,72	W				

06ME68/2	143	14	060906	0132	BE	00	39,98	S	34	59,99	W	4460			
06ME68/2	143	14	060906	0204	BO	00	39,97	S	34	59,93	W		1315	--	--
06ME68/2	143	14	060906	0230	EN	00	39,98	S	34	59,83	W				
06ME68/2	144	15	060906	0435	BE	00	19,98	S	34	59,92	W	4515			
06ME68/2	144	15	060906	0508	BO	00	19,96	S	34	59,74	W		1302	--	--
06ME68/2	144	15	060906	0535	EN	00	19,90	S	34	59,45	W				
06ME68/2	145	16	060906	0741	BE	00	00,06	S	34	59,95	W	4543			
06ME68/2	145	16	060906	0919	BO	00	00,43	S	34	59,35	W		4608	20	1,3,4,5,6,7,8,9,12
06ME68/2	145	16	060906	1106	EN	00	00,42	S	34	58,77	W	4543			
06ME68/2	147	17	060906	1804	BE	00	19,95	N	35	00,00	W	4541			
06ME68/2	147	17	060906	1842	BO	00	19,86	N	34	59,61	W		1302	20	1,4,5,6,7,8,9,10
06ME68/2	147	17	060906	1917	EN	00	20,06	N	34	59,224	W				
06ME68/2	148	18	060906	2120	BE	00	39,91	N	34	59,93	W	4544			
06ME68/2	148	18	060906	2156	BO	00	40,00	N	34	59,73	W		1314	4	3
06ME68/2	148	18	060906	2224	EN	00	40,26	N	34	59,70	W				
06ME68/2	149	19	061006	0013	BE	00	59,71	N	34	59,80	W	3620			
06ME68/2	149	19	061006	0102	BO	00	59,70	N	34	59,65	W		1315	20	1,3,4,5,6,7,8,9
06ME68/2	149	19	061006	0138	EN	00	59,63	N	34	59,58	W				
06ME68/2	150	20	061006	0346	BE	01	20,07	N	35	00,00	W	4062			
06ME68/2	150	20	061006	0420	BO	01	20,29	N	34	59,62	W		1303	--	--
06ME68/2	150	20	061006	0448	EN	01	20,44	N	34	59,45	W				
06ME68/2	151	21	061006	0651	BE	01	40,11	N	34	59,97	W	4043			
06ME68/2	151	21	061006	0722	BO	01	40,38	N	34	59,75	W		1320	20	1,4,7,8
06ME68/2	151	21	061006	0759	EN	01	40,61	N	34	59,42	W				
06ME68/2	152	22	061006	0952	BE	02	00,02	N	34	59,99	W	4781			
06ME68/2	152	22	061006	1027	BO	02	00,44	N	34	59,74	W		1314	8	8
06ME68/2	152	22	061006	1127	EN	02	00,63	N	34	59,49	W				
06ME68/2	153	23	061006	1247	BE	02	19,94	N	34	59,91	W				
06ME68/2	153	23	061006	1321	BO	02	20,11	N	34	59,91	W	4140	1337	21	1,4,5,6,7,8,9,10
06ME68/2	153	23	061006	1358	EN	02	20,25	N	34	59,94	W				
06ME68/2	154	24	061006	1600	BE	02	40,20	N	35	00,07	W	3391			
06ME68/2	154	24	061006	1644	BO	02	40,71	N	34	59,91	W		1312	8	--
06ME68/2	154	24	061006	1715	EN	02	40,99	N	34	59,77	W				
06ME68/2	155	25	061006	1909	BE	03	00,11	N	34	59,93	W	3816			
06ME68/2	155	25	061006	1949	BO	03	00,67	N	34	59,92	W		1314	21	1,4,5,6,7,8,9
06ME68/2	155	25	061006	2024	EN	03	00,99	N	34	59,87	W				
06ME68/2	156	26	061006	2303	BE	03	29,99	N	35	00,07	W	3958			
06ME68/2	156	26	061006	2348	BO	03	30,47	N	35	00,09	W		1313	2	calibration
06ME68/2	156	26	061106	0015	EN	03	30,64	N	35	00,14	W				
06ME68/2	157	27	061106	0254	BE	03	59,90	N	34	59,92	W	3487			
06ME68/2	157	27	061106	0325	BO	04	00,08	N	34	59,85	W		1307	21	1,4,5,6,7,8,9,10
06ME68/2	157	27	061106	0403	EN	04	00,29	N	34	59,62	W				
06ME68/2	158	28	061106	0655	BE	04	29,99	N	35	00,07	W	3882			

06ME68/2	158	28	061106	0729	BO	04	30,47	N	34	59,99	W	3896	1318	7	8
06ME68/2	158	28	061106	0758	EN	04	30,75	N	34	59,81	W				
06ME68/2	159	29	061106	1028	BE	04	57,12	N	35	00,02	W	4054			
06ME68/2	159	29	061106	1100	BO	04	57,32	N	34	59,99	W	3997	1315	21	1,4,5,6,7,8,9
06ME68/2	159	29	061106	1140	EN	04	57,68	N	35	00,06	W	3955			
06ME68/2	160	30	061106	1458	BE	04	58,94	N	35	00,13	W	3774			
06ME68/2	160	30	061106	1529	BO	04	59,07	N	35	00,15	W		1308	--	Test
06ME68/2	160	30	061106	1557	EN	04	59,11	N	35	00,09	W				
06ME68/2	163	31	061306	0914	BE	00	39,87	S	32	29,87	W	4559			
06ME68/2	163	31	061306	0947	BO	00	39,48	S	32	29,71	W	4496	1316	21	1,3,4,5,6,7,8
06ME68/2	163	31	061306	1043	EN	00	39,38	S	32	29,26	W				
06ME68/2	164	32	061306	1526	BE	01	19,98	S	32	30,00	W	4360			
06ME68/2	164	32	061306	1555	BO	01	19,97	S	32	29,64	W		1303	21	Test, 9
06ME68/2	164	32	061306	1637	EN	01	15,80	S	32	29,22	W				
06ME68/2	170	33	061606	2255	BE	04	00,01	S	23	00,23	W	5930			
06ME68/2	170	33	061606	2327	BO	03	59,99	S	23	00,30	W	5945	1320	21	1,4,5,6,7,8,9
06ME68/2	170	33	061706	0004	EN	03	59,87	S	23	00,30	W				
06ME68/2	171	34	061706	0256	BE	03	30,14	S	23	00,05	W	5493			
06ME68/2	171	34	061706	0325	BO	03	30,20	S	23	00,06	W		1312	7	9
06ME68/2	171	34	061706	0359	EN	03	30,19	S	23	00,01	W				
06ME68/2	172	35	061706	0706	BE	03	00,02	S	23	00,04	W	5491			
06ME68/2	172	35	061706	0738	BO	03	00,02	S	23	00,07	W		1313	21	1,4,5,6,7,8
06ME68/2	172	35	061706	0815	EN	03	00,09	S	23	00,08	W				
06ME68/2	173	36	061706	1109	BE	02	41,20	S	23	01,00	W				
06ME68/2	173	36	061706	1138	BO	02	41,34	S	23	00,93	W	5577	1316	--	--
06ME68/2	173	36	061706	1209	EN	02	41,31	S	23	00,91	W	5575			
06ME68/2	174	37	061706	1425	BE	02	19,99	S	23	00,03	W	5138			
06ME68/2	174	37	061706	1454	BO	02	00,97	S	23	00,02	W		1303	21	1,4,5,6,7,8,9,10
06ME68/2	174	37	061706	1528	EN	02	19,87	S	22	59,92	W				
06ME68/2	175	38	061706	1836	BE	02	00,64	S	23	01,64	W	5205			
06ME68/2	175	38	061706	1905	BO	02	00,67	S	23	01,60	W	5219	1313	5	8,3
06ME68/2	175	38	061706	1935	EN	02	00,57	S	23	01,52	W	5228			
06ME68/2	176	39	061706	2150	BE	01	40,08	S	23	00,52	W	4949			
06ME68/2	176	39	061706	2219	BO	01	40,11	S	23	00,07	W	4936	1314	21	1,3,4,5,6,7,8,10
06ME68/2	176	39	061706	2257	EN	01	40,07	S	23	00,11	W	4939			
06ME68/2	177	40	061806	0149	BE	01	20,83	S	23	01,21	W	4963			
06ME68/2	177	40	061806	0220	BO	01	20,92	S	23	01,16	W	4966	1312	5	3
06ME68/2	177	40	061806	0248	EN	01	20,80	S	23	01,03	W	4960			
06ME68/2	178	41	061806	0529	BE	01	00,39	S	23	00,60	W	4179			
06ME68/2	178	41	061806	0600	BO	01	00,47	S	23	00,62	W	4186	1315	21	1,3,4,5,6,7,8
06ME68/2	178	41	061806	0637	EN	01	00,57	S	23	00,34	W	4156			
06ME68/2	179	42	061806	0822	BE	00	45,03	S	23	00,00	W	3669			
06ME68/2	179	42	061806	0942	BO	00	44,98	S	22	59,70	W	3680	3654	21	1,3,4,5,6,7,8

06ME68/2	179	42	061806	1106	EN	00	44,99	S	22	59,56	W	3685				
06ME68/2	181	43	061806	2119	BE	00	30,07	S	23	00,06	W	4624				
06ME68/2	181	43	061806	2148	BO	00	30,19	S	22	59,95	W	4622	1313	21		1,3,4,5,6,7,8,9
06ME68/2	181	43	061806	2224	EN	00	30,13	S	22	59,72	W	4628				
06ME68/2	182	44	061906	0004	BE	00	15,22	S	23	00,01	W	4153				
06ME68/2	182	44	061906	0035	BO	00	15,32	S	23	00,00	W	4196	1313	5		3
06ME68/2	182	44	061906	0105	EN	00	15,14	S	22	59,95	W	4147				
06ME68/2	183	45	061906	0330	BE	00	03,33	S	23	09,13	W	3735				
06ME68/2	183	45	061906		BO								1959	--		--
06ME68/2	183	45	061906	0501	EN	00	03,08	S	23	08,72	W	3785				
06ME68/2	185	46	061906	1348	BE	00	07,27	N	23	06,97	W	3792				
06ME68/2	185	46	061906	1411	BO	00	07,30	N	23	06,93	W	3792	701	21		1,3,4,5,6,7,8,9,10
06ME68/2	185	46	061906	1432	EN	00	07,43	N	23	06,75	W	3734				
06ME68/2	186	47	062006	0101	BE	00	24,96	N	23	00,06	W	3868				
06ME68/2	186	47	062006	0133	BO	00	25,06	N	23	00,11	W	3862	1314	21		1,3,4,5,6,7,8,9,10
06ME68/2	186	47	062006	0210	EN	00	25,11	N	23	00,10	W					
06ME68/2	187	48	062006	0418	BE	00	45,07	N	22	59,64	W	4309				
06ME68/2	187	48	062006	0544	BO	00	45,03	N	22	59,50	W	4311	4266	21		1,3,4,5,6,7,8,9
06ME68/2	187	48	062006	0719	EN	00	45,04	N	22	59,49	W	4311				
06ME68/2	189	49	062006	1742	BE	01	00,00	N	23	00,08	W	3239				
06ME68/2	189	49	062006	1812	BO	01	00,06	N	23	00,09	W	3227	1314	21		1,2,3,4,5,6,7,8,9
06ME68/2	189	49	062006	1848	EN	01	00,09	N	23	00,08	W	3227				
06ME68/2	190	50	062106	0756	BE	00	00,01	N	21	30,09	W	4950				
06ME68/2	190	50	062106	0939	BO	00	00,11	N	21	29,44	W	4949	4931	21		1,3,4,5,6,7,8
06ME68/2	190	50	062106	1130	EN	00	00,24	N	21	29,11	W	4950				
06ME68/2	192	51	062106	2239	BE	00	00,45	N	21	00,71	W	5124				
06ME68/2	192	51	062106	2318	BO	00	00,51	N	21	00,62	W	5125	1313	21		1,3,4,5,6,7,8,9,10
06ME68/2	192	51	062106	2356	EN	00	00,69	N	21	00,29	W	5128				
06ME68/2	193	52	062206	0719	BE	00	00,00	N	19	59,98	W	2585				
06ME68/2	193	52	062206	0751	BO	00	00,20	N	19	59,66	W	2543	1314	21		1,3,4,5,6,7
06ME68/2	193	52	062206	0832	EN	00	00,32	N	19	59,20	W	2594				
06ME68/2	194	53	062206	1537	BE	00	00,64	S	19	00,62	W	4163				
06ME68/2	194	53	062206	1608	BO	00	00,36	S	19	00,29	W	4163	1308	21		1,3,4,5,6,7,8,10
06ME68/2	194	53	062206	1715	EN	00	00,18	N	18	59,55	W	4163				
06ME68/2	195	54	062306	0023	BE	00	00,55	S	18	00,78	W	6475				
06ME68/2	195	54	062306	0056	BO	00	00,55	S	18	00,69	W	6467	1312	21		1,3,4,5,6,7,8,10
06ME68/2	195	54	062306	0131	EN	00	00,51	S	18	00,64	W	6468				
06ME68/2	196	55	062306	0853	BE	00	00,21	S	17	01,30	W	4956				
06ME68/2	196	55	062306	0924	BO	00	00,16	S	17	01,16	W	4972	1314	21		1,3,4,5,6,7,8
06ME68/2	196	55	062306	1001	EN	00	00,16	S	17	00,87	W	5041				
06ME68/2	197	56	062306	1725	BE	00	00,11	S	16	01,84	W	3176				
06ME68/2	197	56	062306	1757	BO	00	00,01	S	16	01,91	W	3170	1314	21		1,3,4,5,6,7,8
06ME68/2	197	56	062306	1835	EN	00	00,10	S	16	01,51	W	3217				

06ME68/2	198	57	062406	0159	BE	00	00,03	S	15	01,16	W	3602			
06ME68/2	198	57	062406	0230	BO	00	00,17	N	15	00,85	W	3752	1313	21	1,3,4,5,6,7,8
06ME68/2	198	57	062406	0307	EN	00	00,31	N	15	00,49	W	3775			
06ME68/2	199	58	062406	1018	BE	00	00,03	N	14	00,77	W	3906			
06ME68/2	199	58	062406	1051	BO	00	00,19	N	14	00,68	W	3971	1312	21	1,3,4,5,6,7,8
06ME68/2	199	58	062406		EN										
06ME68/2	200	59	062406	1655	BE	00	00,06	S	13	08,20	W	4457			
06ME68/2	200	59	062406	1726	BO	00	00,02	N	13	07,97	W	4457	1301	21	1,2,3,4,5,6,7,8,10
06ME68/2	200	59	062406	1802	EN	00	00,07	N	13	07,69	W	4423			
06ME68/2	201	60	062506	0240	BE	00	00,18	S	12	00,09	W	3828			
06ME68/2	201	60	062506	0312	BO	00	00,01	N	11	59,72	W	4069	1304	21	1,3,4,5,6,7,8,10
06ME68/2	201	60	062506	0351	EN	00	00,02	N	11	59,45	W	4371			
06ME68/2	202	61	062506	1818	BE	01	29,93	S	10	00,08	W	4808			
06ME68/2	202	61	062506	1848	BO	01	29,92	S	10	00,01	W	4799	1313	21	1,3,4,5,6,7,8,9
06ME68/2	202	61	062506	1923	EN	01	29,99	S	09	59,87	W	4800			
06ME68/2	203	62	062506	2213	BE	01	00,01	S	10	00,00	W	4272			
06ME68/2	203	62	062506	2244	BO	00	59,99	S	09	59,90	W	4275	1314	5	3
06ME68/2	203	62	062506	2315	EN	00	59,99	S	09	59,71	W	4268			
06ME68/2	204	63	062606	0220	BE	00	40,33	S	10	00,44	W	4060			
06ME68/2	204	63	062606	0254	BO	00	40,23	S	10	00,01	W	4031	1307	21	1,3,4,5,6,7,8,9
06ME68/2	204	63	062606	0331	EN	00	40,07	S	09	59,53	W	4042			
06ME68/2	205	64	062606	0630	BE	00	21,18	S	10	00,75	W	4337			
06ME68/2	205	64	062606	0701	BO	00	21,27	S	10	00,64	W	4369	1314	5	3,8
06ME68/2	205	64	062606	0732	EN	00	21,40	S	10	00,38	W	4303			
06ME68/2	206	65	062606	0958	BE	00	00,97	N	09	50,04	W	5203			
06ME68/2	206	65	062606	1120	BO	00	00,89	N	09	49,84	W	5206	4026	21	1,2,3,4,5,6,7,8,9,12
06ME68/2	206	65	062606	1248	EN	00	01,00	N	09	49,53	W	5202			
06ME68/2	207	66	062706	0125	BE	00	20,08	N	10	00,90	W	4745			
06ME68/2	207	66	062706	0157	BO	00	20,13	N	10	00,96	W	4749	1313	21	1,2,3,4,5,6,7,8,9
06ME68/2	207	66	062706	0233	EN	00	20,15	N	10	00,82	W	4750			
06ME68/2	208	67	062706	0533	BE	00	38,76	N	10	02,36	W	4569			
06ME68/2	208	67	062706	0605	BO	00	38,82	N	10	02,29	W	4570	1315	21	3,8
06ME68/2	208	67	062706	0643	EN	00	39,00	N	10	02,18	W	4552			
06ME68/2	209	68	062706	0850	BE	01	00,03	N	10	00,13	W	4667			
06ME68/2	209	68	062706	0922	BO	00	59,98	N	10	00,29	W	4665	1315	21	1,2,3,4,5,6,7,8
06ME68/2	209	68	062706	0958	EN	00	59,98	N	10	00,15	W	4664			
06ME68/2	210	69	062706	1323	BE	01	30,04	N	10	00,22	W	5242			
06ME68/2	210	69	062706	1357	BO	01	30,14	N	10	00,25	W	5241	1301	21	1,3,4,5,6,7,8,9,11
06ME68/2	210	69	062706	1430	EN	01	30,16	N	10	00,33	W	5234			
06ME68/2	211	70	062706	2019	BE	01	59,63	N	11	01,70	W	4420			
06ME68/2	211	70	062706	2059	BO	01	59,61	N	11	02,03	W	4420	1314	21	1,3,4,5,6,7,8,9
06ME68/2	211	70	062706	2133	EN	01	59,51	N	11	02,00	W	4420			
06ME68/2	212	71	062806	0253	BE	02	00,01	N	12	01,54	W	4838			

06ME68/2	212	71	062806	0324	BO	02	00,25	N	12	01,49	W	4841	1307	21	1,3,4,7,8,9,11
06ME68/2	212	71	062806	0404	EN	02	00,44	N	12	01,42	W	4840			
06ME68/2	213	72	062806	0929	BE	01	59,78	N	13	01,04	W	4981			
06ME68/2	213	72	062806	1006	BO	01	59,92	N	13	00,95	W	4984	1312	21	1,2,3,4,5,6,7,8
06ME68/2	213	72	062806	1041	EN	02	00,06	N	13	00,87	W	4991			
06ME68/2	214	73	062806	1615	BE	01	59,26	N	14	01,26	W	5140			
06ME68/2	214	73	062806	1648	BO	01	59,38	N	14	01,16	W	5149	1301	18	1,3,4,5,6,7,8
06ME68/2	214	73	062806	1741	EN	01	59,41	N	14	00,87	W	5149			
06ME68/2	215	74	062806	2308	BE	01	58,92	N	15	00,82	W	5340			
06ME68/2	215	74	062806	2340	BO	01	58,82	N	15	00,89	W	5347	1314	18	1,3,4,5,6,7,8,9,11
06ME68/2	215	74	062906	0036	EN	01	58,82	N	15	00,90	W	5347			
06ME68/2	216	75	062906	0600	BE	01	59,19	N	16	01,82	W	5137			
06ME68/2	216	75	062906	0632	BO	01	59,14	N	16	02,10	W	5159	1313	21	1,3,4,5,6,7,8
06ME68/2	216	75	062906	0709	EN	01	59,14	N	16	02,14	W	5153			
06ME68/2	217	76	062906	1214	BE	02	00,13	N	17	00,51	W	5276			
06ME68/2	217	76	062906	1248	BO	02	00,18	N	17	00,63	W	5284	1314	21	2,3,5,6,8,9,10
06ME68/2	217	76	062906	1325	EN	02	00,23	N	17	00,69	W	5294			
06ME68/2	218	77	062906	1832	BE	01	59,83	N	18	02,04	W	5090			
06ME68/2	218	77	062906	1902	BO	01	59,73	N	18	02,43	W	5162	1314	21	1,3,4,5,6,7,8,9
06ME68/2	218	77	062906	1939	EN	01	59,59	N	18	02,65	W	5179			
06ME68/2	219	78	063006	0048	BE	01	59,91	N	19	00,31	W	5112			
06ME68/2	219	78	063006	0118	BO	01	59,97	N	19	00,44	W	5112	1313	8	3,8,9
06ME68/2	219	78	063006	0152	EN	02	00,00	N	19	00,49	W	5117			
06ME68/2	220	79	063006	0716	BE	01	59,59	N	20	02,43	W	4909			
06ME68/2	220	79	063006	0749	BO	01	59,61	N	20	02,75	W	4947	1314	21	1,2,3,4,5,6,7,8
06ME68/2	220	79	063006	0825	EN	01	59,66	N	20	02,73	W	4934			
06ME68/2	221	80	063006	1333	BE	01	59,94	N	21	00,31	W	4934			
06ME68/2	221	80	063006	1412	BO	02	00,03	N	21	00,00	W	4934	1301	21	3,8,9
06ME68/2	221	80	063006	1441	EN	01	59,93	N	20	59,83	W	4934			
06ME68/2	222	81	063006	2022	BE	01	59,23	N	22	00,82	W	4013			
06ME68/2	222	81	063006	2052	BO	01	59,09	N	22	00,76	W	4024	1313	20	1,3,4,5,6,7,8,9
06ME68/2	222	81	063006	2119	EN	01	59,07	N	22	00,51	W	4055			
06ME68/2	223	82	070106	0520	BE	00	59,02	N	23	01,38	W	3472			
06ME68/2	223	82	070106	0552	BO	00	58,95	N	23	01,33	W	3493	1312	21	1,2,3,4,5,6,7,8
06ME68/2	223	82	070106	0633	EN	00	58,87	N	23	01,05	W	3529			
06ME68/2	224	83	070106	0920	BE	01	19,56	N	23	01,06	W	4571			
06ME68/2	224	83	070106	0952	BO	01	19,46	N	23	01,06	W	4534	1313	21	3,8,11
06ME68/2	224	83	070106	1033	EN	01	19,43	N	23	00,80	W	4600			
06ME68/2	225	84	070106	1314	BE	01	38,80	N	23	00,50	W	4134			
06ME68/2	225	84	070106	1346	BO	01	38,86	N	23	00,39	W	4132	1304	5	3,11
06ME68/2	225	84	070106	1415	EN	01	39,00	N	23	00,25	W	4132			
06ME68/2	226	85	070106	1707	BE	01	59,18	N	23	01,01	W	4324			
06ME68/2	226	85	070106	1739	BO	01	59,29	N	23	00,80	W	4323	1301	21	1,3,4,5,6,7,8

06ME68/2	226	85	070106	1817	EN	01	59,53	N	23	00,66	W	4323				
06ME68/2	227	86	070106	2059	BE	02	19,65	N	23	00,97	W	4270				
06ME68/2	227	86	070106	2130	BO	02	19,52	N	23	01,00	W	4258	1315	8		3,10
06ME68/2	227	86	070106	2204	EN	02	19,54	N	23	00,82	W	4237				
06ME68/2	228	87	070206	0048	BE	02	38,92	N	23	00,75	W	4823				
06ME68/2	228	87	070206	0120	BO	02	38,96	N	23	00,47	W	4819	1315	5		3
06ME68/2	228	87	070206	0152	EN	02	39,04	N	23	00,14	W	4798				
06ME68/2	229	88	070206	0425	BE	02	59,61	N	23	00,06	W	4642				
06ME68/2	229	88	070206	0500	BO	02	59,53	N	22	59,75	W	4642	1312	21		1,3,4,5,6,7,8,9
06ME68/2	229	88	070206	0540	EN	02	59,38	N	22	59,55	W	4647				
06ME68/2	230	89	070206	0906	BE	03	29,85	N	23	00,26	W	4379				
06ME68/2	230	89	070206	0938	BO	03	29,61	N	23	00,02	W	4371	1316	10		3,8
06ME68/2	230	89	070206	1012	EN	03	29,40	N	22	59,82	W	4369				
06ME68/2	231	90	070206	1335	BE	03	57,49	N	22	59,93	W	4217				
06ME68/2	231	90	070206	1404	BO	03	57,35	N	22	59,77	W	4217	1302	21		1,3,4,5,6,7,8
06ME68/2	231	90	070206	1438	EN	03	57,26	N	22	59,59	W	4219				
06ME68/2	232	91	070206	2234	BE	04	30,38	N	22	59,97	W	4115				
06ME68/2	232	91	070306	0000	BO	04	30,22	N	22	59,43	W	4105	4063	18		1,4,5,6,7,8,9,10
06ME68/2	232	91	070306	0151	EN	04	29,60	N	22	59,60	W	4134				
06ME68/2	233	92	070306	0517	BE	05	00,59	N	23	00,34	W	4214				
06ME68/2	233	92	070306	0549	BO	05	00,79	N	22	59,95	W	4208	1313	21		3,8,9
06ME68/2	233	92	070306	0628	EN	05	01,26	N	22	59,34	W	4210				
06ME68/2	234	93	070306	1455	BE	05	29,95	N	23	00,02	W	4231				
06ME68/2	234	93	070306	1525	BO	05	29,94	N	22	59,70	W	4231	1303	7		9,11
06ME68/2	234	93	070306	1556	EN	05	29,86	N	22	59,62	W	4231				
06ME68/2	235	94	070306	2002	BE	06	00,06	N	23	00,01	W	4092				
06ME68/2	235	94	070306	2033	BO	05	59,92	N	22	59,78	W	4099	1315	21		1,4,5,6,7,8,9
06ME68/2	235	94	070306	2110	EN	05	59,74	N	22	59,57	W	4101				
06ME68/2	236	95	070406	0035	BE	06	30,07	N	23	00,12	W	2935				
06ME68/2	236	95	070406	0106	BO	06	29,96	N	22	59,90	W	3119	1314	7		9
06ME68/2	236	95	070406	0138	EN	06	29,71	N	22	59,63	W	2940				
06ME68/2	237	96	070406	0458	BE	06	59,77	N	23	00,08	W	1516				
06ME68/2	237	96	070406	0530	BO	06	59,62	N	22	59,86	W	1452	1316	21		1,4,5,6,7,8
06ME68/2	237	96	070406	0609	EN	06	59,45	N	22	59,94	W	1497				
06ME68/2	238	97	070406	0945	BE	07	29,60	N	23	00,11	W	4390				
06ME68/2	238	97	070406	1017	BO	07	29,41	N	22	59,97	W	4385	1315	6		--
06ME68/2	238	97	070406	1045	EN	07	29,33	N	22	59,68	W	4367				
06ME68/2	239	98	070406	1420	BE	07	59,12	N	23	00,40	W	4422				
06ME68/2	239	98	070406	1450	BO	07	58,91	N	23	00,15	W	4417	1303	21		1,4,5,6,7,8,9,10
06ME68/2	239	98	070406	1527	EN	07	58,59	N	22	59,99	W	4407				
06ME68/2	240	99	070406	2135	BE	08	30,91	N	22	58,98	W	4776				
06ME68/2	240	99	070406	2208	BO	08	30,81	N	22	58,58	W	4777	1314	13		9
06ME68/2	240	99	070406	2238	EN	08	30,82	N	22	58,27	W	4778				

06ME68/2	241	100	070506	0123	BE	09	00,07	N	22	59,74	W	4898			
06ME68/2	241	100	070506	0154	BO	09	00,12	N	22	59,31	W	4894	1313	21	1,2,4,5,6,7,8,9
06ME68/2	241	100	070506	0234	EN	09	00,32	N	22	58,90	W	4898			
06ME68/2	242	101	070506	0601	BE	09	29,65	N	23	00,51	W	4623			
06ME68/2	242	101	070506	0632	BO	09	29,51	N	23	00,07	W	4658	1314	4	8
06ME68/2	242	101	070506	0700	EN	09	29,50	N	22	59,83	W	4673			
06ME68/2	243	102	070506	0958	BE	09	59,95	N	23	00,30	W	5069			
06ME68/2	243	102	070506	1141	BO	09	59,28	N	22	59,73	W	5113	5007	21	1,4,5,6,7,8,9,10
06ME68/2	243	102	070506	1355	EN	09	58,88	N	23	00,80	W	5145			
06ME68/2	244	103	070506	1736	BE	10	29,78	N	22	58,92	W	5186			
06ME68/2	244	103	070506	1807	BO	10	29,98	N	22	59,34	W	5187	1313	7	9
06ME68/2	244	103	070506	1837	EN	10	30,26	N	22	59,47	W	5187			
06ME68/2	245	104	070506	2125	BE	10	59,88	N	22	59,89	W	5146			
06ME68/2	245	104	070506	2157	BO	10	59,96	N	22	59,85	W	5149	1314	21	1,4,5,6,7,8,9,10,11
06ME68/2	245	104	070506	2235	EN	11	00,14	N	23	00,38	W	5149			
06ME68/2	246	105	070606	0205	BE	11	30,08	N	22	59,56	W	5114			
06ME68/2	246	105	070606	0237	BO	11	29,87	N	23	00,02	W	5114	1313	7	9
06ME68/2	246	105	070606	0312	EN	11	29,47	N	23	00,18	W	5115			
06ME68/2	247	106	070606	0603	BE	12	00,08	N	23	00,08	W	5046			
06ME68/2	247	106	070606	0635	BO	12	00,34	N	23	00,23	W	5047	1314	21	1,4,5,6,7,8
06ME68/2	247	106	070606	0711	EN	12	00,56	N	23	00,19	W	5044			
06ME68/2	248	107	070606	1040	BE	12	29,47	N	22	59,86	W	4920			
06ME68/2	248	107	070606	1112	BO	12	29,71	N	23	00,04	W	4917	1312	8	--
06ME68/2	248	107	070606	1145	EN	12	29,98	N	23	00,24	W	4916			
06ME68/2	249	108	070606	1442	BE	12	59,96	N	23	00,05	W	4741			
06ME68/2	249	108	070606	1515	BO	12	59,91	N	23	00,29	W	4739	1302	21	1,4,5,6,7,8,9,11
06ME68/2	249	108	070606	1555	EN	13	00,00	N	23	00,50	W	4737			
06ME68/2	250	109	070606	1941	BE	13	29,21	N	22	59,27	W	4541			
06ME68/2	250	109	070606	2011	BO	13	29,10	N	22	59,27	W	4539	1316	7	9,11
06ME68/2	250	109	070606	2041	EN	13	29,16	N	22	59,16	W	4539			
06ME68/2	251	110	070706	0103	BE	14	00,02	N	22	59,88	W	4322			
06ME68/2	251	110	070706	0135	BO	14	00,08	N	22	59,79	W	4322	1317	21	1,4,5,6,7,9,11
06ME68/2	251	110	070706	0216	EN	14	00,04	N	22	59,75	W	4317			
06ME68/2	252	111	070706	0513	BE	14	29,98	N	23	00,56	W	4088			
06ME68/2	252	111	070706	0545	BO	14	30,09	N	23	00,19	W	4087	1315	--	--
06ME68/2	252	111	070706	0611	EN	14	30,27	N	23	00,25	W	4085			
06ME68/2	253	112	070706	0915	BE	14	59,88	N	23	00,03	W	2672			
06ME68/2	253	112	070706	0948	BO	15	00,09	N	23	00,18	W	2709	1314	21	1,4,5,6,7
06ME68/2	253	112	070706	1027	EN	15	00,43	N	23	00,28	W	2759			
06ME68/2	254	113	070706	1215	BE	15	14,95	N	22	59,59	W	1334			
06ME68/2	254	113	070706	1241	BO	15	15,13	N	22	59,69	W	1315	1013	--	--
06ME68/2	254	113	070706	1302	EN	15	15,20	N	22	59,92	W	1209			
06ME68/2	254	114	070706	1308	BE	15	15,20	N	22	59,92	W	1172			



06ME68/2	254	114	070706	1328	BO	15	15,19	N	23	00,12	W	202	12	Fluorometer	
06ME68/2	254	114	070706	1343	EN	15	15,22	N	23	00,19	W			calibration	
06ME68/2	255	115	070806	0542	BE	17	35,45	N	24	14,63	W	3592			
06ME68/2	255	115	070806	0655	BO	17	35,97	N	24	14,92	W	3597	3553	21	1,2,4,5,6,7
06ME68/2	255	115	070806	0818	EN	17	36,74	N	24	15,10	W				

Code: BE = begin, BO = bottom, EN = end

Parameters (Par.): 1= CFC, 2=SF<sub>6</sub>, 3=He, 4=Oxy, 5=DIC, 6=Alk, 7=Nuts, 8=Sal, 9=H<sub>2</sub>O<sub>2</sub>,  
10=Filtr, 11=Microbiology, 12=PFOS

**Table 2: Microstructure stations**

MSS Station	Meteor Station	CTD Cast	Profiles	max. pressure
Test 01	146	16	1-4	175
Test 02	161	30	5-8	412
1	173	36	9-11	248
2	175	38	12-14	227
3	177	40	15-17	126
4	178	41	18	10
5	180	42	19-21	58
6	183	45	22-24	66
7	183	45	25-39	76
8	187	48	40-42	65
9	189	49	43-45	85
10	192	51	46-48	94
11	193	52	49-51	202
12	194	53	52-54	195
13	195	54	55-57	156
14	196	55	58-60	142
15	197	56	61-63	122
16	198	57	64-66	163
17	199	58	67-69	223
18	200	59	70-72	242
19	201	60	73-75	222
20	204	63	76-78	193
21	205	64	79-81	230
22	206	65	82-84	192
23	207	66	85-87	162
24	208	67	88-90	153
25	210	69	91-93	240
26	211	70	94-96	181
27	212	71	97-99	177
28	213	72	100-102	251
29	214	73	103-105	214
30	215	74	106-108	216
31	216	75	109-111	216
32	217	76	112-114	181
33	218	77	115-117	162
34	219	78	118-120	197
35	220	79	121-124	103
36	221	80	125-127	273
37	222	81	128-130	248
38	223	82	131-133	154
39	224	83	134-136	243
40	225	84	137-139	211
41	226	85	140-142	260
42	227	86	143-145	280
43	228	87	146-148	225
44	229	88	149-151	224
45	230	89	152-154	283

46	231	90	155-157	278
47	232	91	158-160	296
48	233	92	161-163	265
49	234	93	164-166	277
50	235	94	167-169	230
51	236	95	170-172	249
52	237	96	173-175	244
53	238	97	176-178	274
54	239	98	179-181	234
55	240	99	182-184	205
56	242	101	185-187	236
57	244	103	188-190	214
58	246	105	191-193	222
59	248	107	194-196	273
60	250	109	195-199	272
61	255	115	200-202	

**Table 3:** ARGO float deployments

Float S/N	WMO	ID (DEC)	Date	Time UTC	Longitude	Latitude	Sensors	Depth	
								Park	Profile
2472	1900653	60444	09.06.06	15:56	35 ° 01,24 ' W	0 ° 03,44 ' N	T/S/P	200	2000
579	WHOI SOLO --		10.06.06	20:30	34 ° 59,38 ' W	3 ° 01,19 ' N	T/S/P	1000	1100
2484	1900650	56542	11.06.06	14:09	35 ° 00,26 ' W	4 ° 59,24 ' N	T/S/P/O2	200	2000
2477	1900658	60449	12.06.06	17:24	32 ° 30,03 ' W	1 ° 59,99 ' N	T/S/P	1500	2000
2478	1900659	60450	13.06.06	22:25	32 ° 29,96 ' W	2 ° 00,06 ' S	T/S/P	1500	2000
2479	1900660	60451	15.06.06	13:22	28 ° 30,88 ' W	3 ° 14,73 ' S	T/S/P	1500	2000
2473	1900654	60445	15.06.06	22:42	27 ° 00,15 ' W	3 ° 27,80 ' S	T/S/P	200	2000
599	WHOI SOLO --		16.06.06	09:07	24 ° 59,52 ' W	3 ° 44,53 ' S	T/S/P	1000	1100
2480	1900661	60452	17.06.06	08:20	22 ° 59,97 ' W	3 ° 00,09 ' S	T/S/P	1500	2000
2485	1900651	56543	19.06.06	11:15	23 ° 10,94 ' W	0 ° 01,42 ' S	T/S/P/O2	200	2000
2483	1900664	60455	23.06.06	00:18	18 ° 00,78 ' W	0 ° 00,53 ' S	T/S/P	1500	2000
2481	1900662	60453	24.06.06	11:34	14 ° 00,52 ' W	0 ° 00,21 ' N	T/S/P	1500	2000
2475	1900656	60447	25.06.06	19:25	10 ° 00,00 ' W	1 ° 30,00 ' S	T/S/P	200	2000
2482	1900663	60454	26.06.06	22:32	9 ° 58,57 ' W	0 ° 01,53 ' N	T/S/P	1500	2000
2476	1900657	60448	02.07.06	05:45	22 ° 59,55 ' W	2 ° 59,38 ' N	T/S/P	1500	2000
2486	1900652	60443	03.07.06	12:05	22 ° 59,60 ' W	5 ° 02,20 ' N	T/S/P/O2	200	2000
PROVOR	1900120	52551	05.07.06	14:06	23 ° 00,85 ' W	9 ° 59,09 ' N	T/S/P/O2	500	2000
2474	1900655	60446	06.07.06	16:00	23 ° 00,49 ' W	13 ° 00,07 ' N	T/S/P	200	2000

**Table 4: Mooring and Instrument Recovery**

<b>Mooring KR4</b>				<b>Notes</b>
Latitude	0	5.76	N	Combined current meter and sound source mooring north of 35W PIRATA mooring.
Longitude	35	1.19	W	
Water depth	4540			
Mag. Var.	-19.5			100% data recovery!
Deployment	8/13/2004	15:10		
Recovery	6/9/2006	13:10		
Item	Depth	Instr.	s/n	
KR4_01	146	Mini TD	41	good data
	146	RDI-SC	267	
KR4_02		150		good data
KR4_03	149	MicroCat	2249	good data
	151	RDI-SC	393	
KR4_04		150		good data
KR4_05	294	MicroCat	2251	good data
KR4_06	499	Argonaut	D294	good data
KR4_07	650	Mini TD	42	good data
KR4_08	652	Argonaut	D299	good data
	750	RAFOS	22	
KR4_09	809	Argonaut	D304	good data
KR4_10	962	MicroCat	3144	good data
KR4_11	1107	Argonaut	D329	good data

<b>Mooring KR3</b>				<b>Notes</b>
Latitude	5	0.00	N	Sound source mooring
Longitude	35	0.00	W	
Water depth	3753			
Mag. Var.	-19			
Deployment	8/11/2004	16:58		
Recovery	6/11/2006	13:20		
Item	Depth	Instr.	s/n	
	804	RAFOS	23	did not work

<b>Mooring KR2</b>				<b>Notes</b>
Latitude	3	14.03	S	Sound source mooring
Longitude	28	31.42	W	
Water depth	5100			
Mag. Var.	-19			
Deployment	5/17/2003	19:02		
Recovery	6/11/2006	13:20		Recovery failed
Item	Depth	Instr.	s/n	
	795	RAFOS	13	

<b>French Mooring 23W Equ.</b>				<b>Notes</b>
Latitude	0	0.01	S	
Longitude	23	7.51	W	
Water depth	3930			
Mag. Var.	-19.5			
Deployment	5/29/2005	16:55		
Recovery	6/19/2006	8:09		
Item	Depth	Instr.	s/n	
	49	ADCP WH	509	
F2_01		300		
F2_02	60	Mini TD	68	good data
	60	ADCP LR	2290	
F2_03		75		good data
F2_04	605	RCM-4	5486	data not read
F2_05	755	RCM-4	4445	data not read
F2_06	905	RCM-4	4587	data not read
F2_07	1055	RCM-4	5891	data not read
F2_08	1205	RCM-4	4588	data not read
F2_09	1355	RCM-4	5897	data not read
F2_10	1505	RCM-4	5899	data not read

**Table 5: Mooring and Instrument Deployment**

<b>Mooring Deployment Equatorial Atlantic AO_01</b>					<b>Notes:</b>		
Vessel:	Meteor						
Deployed:	19-Jun	2006	19:53				
Vessel:							
Recovered:							
Latitude:	0	0.001	S				
Longitude:	23	6.800	W				
Water depth:	3931	Mag Var:	-16.3				
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>			
		Argos WD	11278				
	126	ADCP WH dn	508	x			
	126	Mini-TD	24				
	130	Microcat	52	x			
	234	Microcat	55	x			
	399	Microcat	278	x			
	621	ADCP LR up	2395	x			
	687	RCM-8	9930	x			
	842	Argonaut	D182	x			
	998	RCM-8	9964	x			
	2264	M-CTD MMP	120	x			
	3573	Release	174	Code:	9337	<b>9339</b>	<b>A</b>
	3573	Release	110	Code:	E972	<b>E974</b>	<b>A</b>
				Interrogate	Release	Release	Mode

<b>Mooring Deployment Equatorial Atlantic AO_02</b>					<b>Notes:</b>		
Vessel:	Meteor						
Deployed:	20-Jun	2006	15:25				
Vessel:							
Recovered:							
Latitude:	0	45.000	N				
Longitude:	22	59.500	W				
Water depth:	4310	Mag Var:	-16.0				
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>			
		Argos WD	15172				
	51	Mini-TD	24				
	87	Microcat	381	x			
	138	Microcat	780	x			
	200	Microcat	921	x			
	301	ADCP 300 up	589	x			
	301	Mini-TD	11				
	397	RCM-8	9346	x			
	552	RCM-8	9932	x			
	697	RCM-8	9964	x			
	697	RCM-8	5881	x			
	851	RCM-8	D143	x			
	1007	RCM-8	8412	x			
	3632	Release	188	Code:	8181	<b>8182</b>	<b>B</b>
	3632	Release	189	Code:	8183	<b>8184</b>	<b>B</b>
				Interrogate	Release	Release	Mode

<b>Mooring Deployment Equatorial Atlantic AO_03</b>				<b>Notes:</b>			
Vessel:	Meteor						
Deployed:	17-Jun	2006	18:21				
Vessel:							
Recovered:							
Latitude:	0	44.950	S				
Longitude:	22	59.710	W				
Water depth:	3700	Mag Var:	-16.5				
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>			
		Argos WD	15173				
	47	Mini-TD	22				
	83	Microcat	922	x			
	144	Microcat	925	x			
	205	Microcat	936	x			
	307	ADCP 150 up	267	x			
	307	Mini-TD	27				
	403	RCM-8	9816	x			
	558	RCM-8	9349	x			
	702	RCM-8	9819	x			
	857	Argonaut	D145	x			
	1013	RCM-8	9820	x			
	3132	Release	190	Code:	8185	<b>8186</b>	<b>B</b>
	3132	Release	220	Code:	9151	<b>9152</b>	<b>B</b>
				Interrogate	Release		Mode

<b>Mooring Deployment Equatorial Atlantic AO_04</b>				<b>Notes:</b>			
Vessel:	Meteor						
Deployed:	21-Jun	2006	18:00				
Vessel:							
Recovered:							
Latitude:	0	0.000	S				
Longitude:	21	29.600	W				
Water depth:	4950	Mag Var:	-15.8				
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>			
		Argos WD	2254				
	48	Mini-TD	73				
	81	Microcat	1281	x			
	142	Microcat	1282	x			
	204	Microcat	1583	x			
	455	ADCP LR up	2627	x			
	455	Mini-TD	61				
	459	Microcat	1599	x			
	553	RCM-8	10501	x			
	708	RCM-8	11621	x			
	852	RCM-8	9818	x			
	1007	Argonaut	D184	x			
	4291	Release	428	Code:	2457	<b>2459</b>	<b>B</b>
	4291	Release	635	Code:	3A95	<b>3A96</b>	<b>A</b>
				Interrogate	Release		Mode



<b>Mooring Deployment Equatorial Atlantic AO_05</b>				<b>Notes:</b>		
Vessel:	Meteor					
Deployed:	3-Jul	2006	11:36			
Vessel:						
Recovered:						
Latitude:	5	0.900	N			
Longitude:	23	0.000	W			
Water depth:	4210	Mag Var:	-14.5			
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>		
		Argos WD	5461			
	57	ADCP LR dn	3173	x		
	57	Mini-TD	62			
	103	Microcat	1682	x		
	616	M-CTD MMP	11617	x		
	1044	Microcat	2478	x		
	1045	RCM-8	10779	x		
	3513	Release	441	Code:	8A03	<b>8A04</b>
	3513	Release	633	Code:	3A91	<b>3A92</b>
				Interrogate	Release	Mode

<b>Mooring Deployment Equatorial Atlantic FR_10W</b>				<b>Notes:</b>		
Vessel:	Meteor					
Deployed:	26-Jun	2006	1:57			
Vessel:						
Recovered:						
Latitude:	0	1.280	S			
Longitude:	9	51.230	W			
Water depth:	5205	Mag Var:	-10.2			
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>		
		Argos WD	66366			
	140	ADCP WH up	509	x		
	200	Mors MC3X0	129/92			
	5150	Release	113	Code:	<b>see file mors113.jpg</b>	
				Interrogate	Release	Mode

<b>Mooring Deployment Cape Verde V440-01</b>				<b>Notes:</b>		
Vessel:	Meteor					
Deployed:	8-Jul	2006	15:56			
Vessel:						
Recovered:						
Latitude:	17	35.390	N			
Longitude:	24	15.120	W			
Water depth:	3601	Mag Var:	-11.2			
<b>ID</b>	<b>Depth</b>	<b>Instr. type</b>	<b>s/n</b>	<b>Startup log</b>		
		Argos WD	5510			
	40	Microcat	3753			
	40	Fluorometer	269			
	62	Microcat	3752			
	81	Microcat	1162			
	103	ADCP WH up	1522	x		
	103	Microcat	3755			

127	RCM-11	325	x			
127	Optode	349				
129	Microcat	2252				
200	RCM-8	10810	x			
202	Microcat	2255				
302	Microcat	3754				
400	Microcat	2256				
500	Microcat	2254				
602	RCM-8	11622	x			
603	Microcat	3415				
753	Microcat	2257				
899	Watchdog	2265				
899	Watchdog	11307				
900	RCM-8	11265	x			
902	Microcat	2279				
999	Sediment Trap	97150				
1002	Microcat	3757				
1151	Microcat	1550				
1299	RCM-8	11267	x			
1301	Microcat	1269				
1498	Microcat	2717				
1749	Mini-TD	63				
2001	RCM-8	10818	x			
2003	Microcat	1268				
2249	Mini-TD	64				
2500	Microcat	2933				
2748	Mini-TD	65				
3003	RCM-8	10776	x			
3005	Microcat	2617				
3250	Mini-TD	72				
3511	Microcat	2618				
3563	Microcat	2472				
3565	Release	108	Code:	E962	<b>E964</b>	<b>A</b>
3565	Release	821	Code:	4AA7	<b>4AA8</b>	<b>A</b>
				Interrogate	Release	Mode