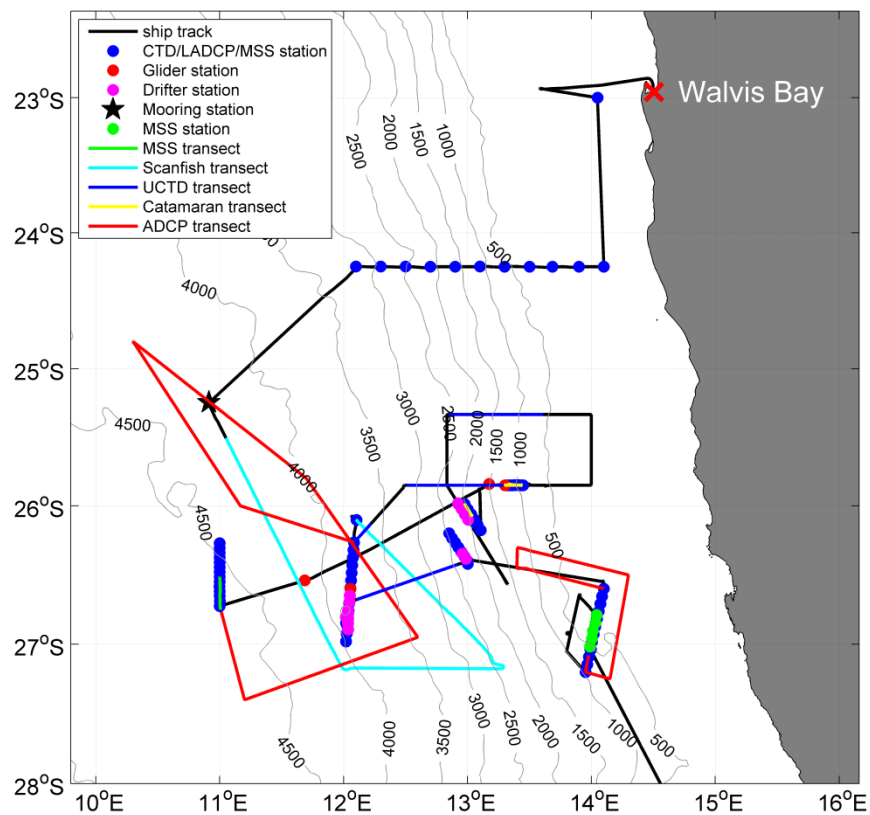


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**Short Cruise Report**  
**R/V METEOR M132 Walvis Bay – Cape Town**  
**15<sup>th</sup> November – 11<sup>th</sup> December 2016**  
**Chief Scientist: Kerstin Jochumsen**  
**Captain: Rainer Hammacher**



Cruise Track METEOR 132, Walvis Bay – Cape Town, Nov. 15 – Dec. 11 2016

## **Objectives**

Cruise R/V METEOR 132 aimed at collecting high resolution observations at the upwelling front off Namibia. The goal was to obtain a detailed understanding of the interaction between meso- and submesoscale processes occurring at the front. The cruise was fully in the focus of physical oceanography, targeting energy exchanges between scales, which contributes to the DFG project TRR 181 (*Energy transfers in Atmosphere and Ocean*) from which the cruise was funded. The major goals of the cruise were: (1) observing mixed layer eddies and instabilities at the upwelling front and assessing their horizontal and vertical structure; (2) evaluating the generation, lifetime and dissipation of submesoscale features found in the working region; (3) quantifying the lateral exchange of tracers and properties across the front.

The data collected to obtain the listed goals was obtained from a variety of instruments: The vessel's ADCP was used to derive the mesoscale current field and to compare the results to anomalies in sea surface height as seen in satellite products. In order to locate upwelling filaments, R/V METEOR's thermosalinograph measurements were monitored and combined with information from satellite sea surface temperature data. CTD (conductivity-temperature-depth-oxygen) profiles as well as horizontal current profiles were taken at 121 stations, giving high vertical resolution data within the fronts of filaments and at the upwelling region. Profiles were conducted to a maximum depth of 500 m, as the focus of the cruise was on upper ocean processes. Beyond classical CTD measurements, CTD profiles were also obtained during transits from the moving ship, either with the help of a towed and undulating CTD system (ScanFish) or with an underway CTD system. In addition, microstructure profiling (MSS) was carried out on 63 stations (800 profiles), mostly close to CTD stations at pronounced temperature fronts. To investigate the uppermost region of the water column without contamination from the wake of the ship, current and temperature measurements were conducted from a research catamaran towed 100-150 m behind the ship on selected transects. The measurement program was completed by two autonomous gliders, which passed the temperature fronts several times, thereby obtaining hydrographic and dissipation profiles.

## **Narrative**

On 15<sup>th</sup> November 2016 at 08:00 UTC R/V METEOR departed from Walvis Bay port, heading westward on the Namibian shelf. Underway measurements using the ADCP and thermosalinograph systems installed on R/V METEOR were started at 8:40 UTC. The first station at 22°55.75' S, 13°05.1' E was dedicated to a glider recovery, which was deployed during cruise M131. The operation went smoothly and the glider was on deck at 13:30 UTC. The first CTD and MSS station was carried out at 23° S, 14°02.9' E at 16:15 UTC, which is the position of a long-term mooring operated by IOW. All systems were tested, but no water samples were taken. A first CTD section was conducted during 16<sup>th</sup> November. Then, R/V METEOR headed towards

25°14.8' S, 10°54.9' E, where a deep sea mooring had been deployed during cruise M99 in August 2013. A first recovery attempt in February 2014 during cruise M104 had failed. This time (on 17<sup>th</sup> November) the mooring again did not respond to acoustic commands and a dredging attempt was unsuccessful. The mooring is therefore considered to be lost.

R/V METEOR continued the cruise southwestward. Along the 130 nm of transit towards an upwelling filament identified in a satellite sea surface temperature (SST) image, underway measurements were complemented by measurements with a Scanfish, which provided hydrographic profiles of the upper 110 m of the ocean. Upon recovery on 20<sup>th</sup> November the Scanfish data cable was found to be damaged. The instrument was therefore not used during the rest of the cruise. One CTD station was carried out for calibration purpose at the location of the Scanfish recovery. The following days (20<sup>th</sup> to 22<sup>nd</sup> November) were dedicated to detailed measurements within the upwelling filament. 37 CTD stations and 21 MSS stations were performed, crossing the filament in north-south direction several times. At the southern boundary of the filament 12 surface drifters (SVP) were deployed in groups of three instruments, arranged in a triangle of 100 m and 200 m side lengths. They will report their position and ocean surface temperature in 30 min intervals during the next several months. In addition, one glider was deployed on 22<sup>nd</sup> November 8:10 UTC at 26°36.1' S, 12°3.3' E.

Late on 22<sup>nd</sup> November (23:30 UTC) an underway-CTD section was started towards east, where the upwelling front was located. The section was interrupted after only 3 profiles due to a malfunction of the winch. Repair was finished at 4:30 UTC on 23<sup>rd</sup> November and the measurements continued until 11:10 UTC. Three hours later a glider was deployed at 25°50.4' S, 13°18.7' E after two test dives for optimizing the ballast within the device. In the following the research catamaran was deployed and towed behind R/V METEOR with a speed of approx. 2kn. Simultaneously MSS profiles were conducted. The track was crossing the front back and forth during the night until the catamaran was recovered on 24<sup>th</sup> November 9:10 UTC. The rest of the day was spent with a CTD section in very high horizontal resolution (distance between stations 0.55 nm, 15 stations). Due to strong winds and waves only underway measurements were performed on 25<sup>th</sup> November, where the temperature distribution further offshore was investigated.

During the morning of 26<sup>th</sup> November another 12 drifters were deployed at the northern boundary of the filament. In the following, a track across the temperature front was sampled repeatedly with CTD and MSS stations, and later on using the catamaran. Profiling was stopped at 00:40 UTC on 27<sup>th</sup> November when R/V METEOR headed to the northeast to recover one glider at 25°50.2' S, 13°10.8' E. The device was on board at 04:10 UTC. The calm weather conditions were used to recover the second glider as well. After a transit of 9 hrs the glider position at 26°32.4' S, 11°41.1' E was reached, and it was recovered at 13:50 UTC. Station work

with CTD/MSS was continued on 27<sup>th</sup> and 28<sup>th</sup> November across the western extension of the filament, a location where the drifters had passed a few days before.

Due to severe weather conditions station work was stopped on 28<sup>th</sup> November 18:15 UTC and a large scale survey of the mesoscale eddy field was started. Using the ADCP mounted in the hull of the ship, R/V METEOR mapped the currents around the filament for about 2 days. On 30<sup>th</sup> November a new CTD/MSS section was started at 21:10 UTC at the filament in meridional direction, close to the location of the first drifter deployments. The section was completed on 2<sup>nd</sup> December, when another 6 drifters were deployed. The transit to the eastern edge of the filament was complemented with underway-CTD measurements. Due to the loss of one probe data acquisition only resumed to 18 UTC. At 22:00 UTC a new CTD/MSS section was started, crossing the northern boundary of the filament. One station was used as a calibration station for the MSS. Along the section the last 7 drifters were deployed on 3<sup>rd</sup> December from 10:20 UTC to 11:20 UTC.

The voyage continued with a transit to the upwelling front, where satellite images indicated the formation of a new filament. At 17:30 UTC on 3<sup>rd</sup> December the catamaran was deployed and towed across the front during the night. The device was recovered at 7:00 UTC on 4<sup>th</sup> December. The following CTD/MSS section had to be canceled after the first station due to strong winds and waves, only MSS measurements continued until the evening (18:15 UTC). The following 19 hours were again used for a detailed survey of the currents and temperature distribution in the region, using R/V METEOR's underway systems. Station work was resumed on 5<sup>th</sup> December 13:30 UTC at the upwelling front off Lüderitz. After the section had been completed on 6<sup>th</sup> December the catamaran was deployed at 15:10 UTC at the front and towed across the location of strongest temperature gradient. Meanwhile, MSS profiles were taken. The final CTD/MSS section of cruise M132 was conducted on 7<sup>th</sup> December at the same locations of the previous section to cover temporal variability of the upwelling front. At 5:00 UTC on 8<sup>th</sup> December station work was finished and R/V METEOR headed towards Cape Town. Underway measurements were stopped on 8<sup>th</sup> December 20:15 UTC, when the vessel reached the EEZ of South Africa. Finally, R/V METEOR arrived at the port of Cape Town on 11<sup>th</sup> December 7:45 UTC.

## **Acknowledgements**

We thank the crew, officers and Captain of R/V METEOR who created a great working atmosphere and without whom the data would not have been collected. The ship time of METEOR was provided by the German Research Foundation (DFG) through the "DFG Senatskommission für Ozeanographie". Scientific work on board was a contribution to the projects L3 (*Diagnosing and parameterizing the effects of eddies*) and T2 (*Energy budget of the ocean surface mixed layer*) of the Collaborative Research Centre TRR 181 "Energy Transfer in Atmosphere and Ocean" funded by the German Research Foundation.

## Participants

1.	Jochumsen, Dr. Kerstin	Chief scientist	IfM HH
2.	Carpenter, Dr. Jeffrey	Glider	HZG
3.	Dräger-Dietel, Dr. Julia	Drifter data analysis	IfM HH
4.	Gillner, Christiane	MSS watch	IOW
5.	Hainbucher, Dagmar	CTD/UCTD processing	IfM HH
6.	Heene, Toralf	Technician, MSS, Catamaran	IOW
7.	Holtermann, Dr. Peter	MSS/Catamaran data analysis	IOW
8.	North, Dr. Ryan	ADCP processing	IfM HH
9.	Mashayekh Poul, Dr. Hossein	Oxygen titration	IfM HH
10.	Raeke, Andreas	Meteorology	DWD
11.	Rochner, Andrea	CTD/LADCP watch	IfM HH
12.	Rotermund, Meike	CTD/LADCP watch	IfM HH
13.	Sass, Martin	MSS watch	IOW
14.	Schultze, Larissa	Glider	HZG
15.	Shilongo, Secilia	observer	MFMR
16.	Siemssen, Jens-Erwin	Artist	Freelance
17.	Specht, Mia	CTD/LADCP watch	IfM HH
18.	Umlauf, Dr. Lars	MSS/Catamaran data analysis	IOW
19.	Wasilewski, Thomas	LADCP processing	IfM HH
20.	Welsch, Andreas	Technician, salinometer	IfM HH
21.	Wett, Simon	CTD/LADCP watch	IfM HH
22.	Wünsche, Anna	CTD/LADCP watch	IfM HH
23.	Zeigermann, Luise	CTD/LADCP watch	IfM HH

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**HZG** Helmholtz Zentrum Geesthacht, Max-Planck-Str. 1, 21502 Geesthacht, Germany, <http://www.hzg.de>

**IOW** Leibniz-Institut für Ostseeforschung, Warnemünde Seestraße 15, 18119 Rostock, Germany, <http://www.io-warnemuende.de/>

**MFMR** Ministry of Fisheries and Marine Resources, National Marine Information and Research Center (NatMIRC), Strand Street, Swakopmund, Namibia, <http://www.mfmr.gov.na/>

## Station list

EXPO CODE	Statn- No.	Cast	Type	Date	Time (UTC)	Code	POSITION				Bottom depth [m]	max. pres. [dbar]	Comments
							Latitude		Longitude				
M132	1449	1	CTD / LADCP	15.11.2016	16:25:00	BE	22° 59.990	S	14° 02.972	E	137		no LADCP, #1
M132	1450		MSS	15.11.2016	16:53:00	BE	23° 00.01	S	14° 02.88	E			MSS Teststation
M132	1451	1	CTD / LADCP	16.11.2016	1:13:16	BE	24° 14.990	S	14° 06.016	E	152	144	#2
M132	1452	1	CTD / LADCP	16.11.2016	2:52:08	BE	24° 15.012	S	13° 54.001	E	260.9	253	#3
M132	1453	1	CTD / LADCP	16.11.2016	4:53:30	BE	24° 15.016	S	13° 41.099	E	300	294	#4
M132	1454	1	CTD / LADCP	16.11.2016	6:24:00	BE	24° 14.99	S	13° 30.034	E	316.7	310	#5
M132	1455	1	CTD / LADCP	16.11.2016	8:18:23	BE	24° 14.993	S	13° 17.954	E	557.2	503	#6
M132	1456	1	CTD / LADCP	16.11.2016	10:15:01	BE	24°14.98	S	13° 06.00	E	1011.9	505	#7
M132	1457	1	CTD / LADCP	16.11.2016	12:03:14	BE	24° 14.988	S	12° 54.034	E	1540	497	#8
M132	1458	1	CTD / LADCP	16.11.2016	13:57:15	BE	24° 14.994	S	12° 41.992	E	2061.3	498	#9
M132	1459	1	CTD / LADCP	16.11.2016	15:49:40	BE	24° 14.979	S	12° 29.982	E	2463	498	#10
M132	1460	1	CTD / LADCP	16.11.2016	17:31:47	BE	24° 14.975	S	12° 17.965	E	2859	497	#11
M132	1461	1	CTD / LADCP	16.11.2016	19:19:02	BE	24° 14.954	S	12° 05.985	E	3140.7	504	#12
M132	1462	-	Mooring	17.11.2016	5:12:00	BE	25° 14.77	S	10° 54.84	E	-	-	no contact via hydrophon
M132	1462	-	Mooring	17.11.2016	7:00:00	BE	25° 14.37	S	10° 54.54	E	4255	-	begin dredging
M132	1462	-	Mooring	17.11.2016	17:25:00	EN	25° 14.92	S	10° 54.39	E	4263.7	-	end dredging
M132	1463	-	Scanfish	17.11.2016	20:49:00	BE	25° 30.35	S	11° 02.97	E	4164.9	-	
M132	1463	-	Scanfish	20.11.2016	5:50:00	EN	26° 05.87	S	12° 05.90	E	-	-	
M132	1464	1	CTD / LADCP	20.11.2016	7:00:42	BE	26° 06.158	S	12° 06.254	E	3661	502.1	#13
M132	1465	1	CTD / LADCP	20.11.2016	10:43:11	BE	26° 15. 92	S	12° 05.075	E	3746.4	497.4	#14
M132	1466	1	CTD / LADCP	20.11.2016	11:51:00	BE	26° 19.202	S	12° 04.799	E	3753.3	496.7	#15
M132	1467	1	CTD / LADCP	20.11.2016	12:54:35	BE	26° 22.518	S	12° 04.477	E	3771	498.5	#16
M132	1468	1	CTD / LADCP	20.11.2016	13:54:16	BE	26° 25.817	S	12° 04.175	E	3784	497.4	#17
M132	1469	1	CTD / LADCP	20.11.2016	14:55:14	BE	26° 29. 08	S	12° 03.889	E	3814	497.3	#18
M132	1470	1	CTD / LADCP	20.11.2016	15:55:40	BE	26° 32.384	S	12° 03.569	E	3836	446.7	#19
M132	1471	1	CTD / LADCP	20.11.2016	15:54:13	BE	26° 35.702	S	12° 03.264	E	3854	496.4	#20
M132	1472	1	CTD / LADCP	20.11.2016	18:02:00	BE	26° 38.995	S	12° 02.97	E	3893.3	503.8	#21

M132	1473	5	MSS	20.11.2016	19:04:00	BE	26°39.0198	S	12° 02.9400	E	4570.2	-	
M132	1474	1	CTD / LADCP	20.11.2016	20:23:29	BE	26° 42.294	S	12° 02.668	E	3861.7	504.7	#22
M132	1475	5	MSS	20.11.2016	21:21:00	BE	26°42.2598	S	12° 02.6502	E	4992.1	-	
M132	1476	1	CTD / LADCP	20.11.2016	22:57:43	BE	26° 45.590	S	12° 02.378	E	3875.9	493.9	#23
M132	1477	5	MSS	20.11.2016	23:24:00	BE	26°45.600	S	12° 02.3802	E	3867.0	-	
M132	1478	1	CTD / LADCP	21.11.2016	0:40:18	BE	26° 48.866	S	12° 02.066	E	4579	493.9	#24
M132	1479	5	MSS	21.11.2016	1:20:00	BE	26° 48.8802	S	12° 02.07	E	3871.6	-	
M132	1480	1	CTD / LADCP	21.11.2016	2:37:44	BE	26° 52.160	S	12° 01.794	E	3891	494.3	#25
M132	1481	5	MSS	21.11.2016	3:14:00	BE	26°52.1598	S	12° 01.7802	E	3894.3	-	
M132	1482	1	CTD / LADCP	21.11.2016	4:20:57	BE	26° 55.456	S	12° 01.503	E	3920.1	496.2	#26
M132	1483	5	MSS	21.11.2016	5:01:00	BE	26°55.4598	S	12° 01.500	E	3921.3	-	
M132	1484	1	CTD / LADCP	21.11.2016	6:09:26	BE	26° 58.768	S	12° 01.181	E	3965	502	#27
M132	1485	5	MSS	21.11.2016	6:58:00	BE	26° 58.780	S	12°01.1802	E	3952.9	-	
M132	1486	-	Drifter	21.11.2016	9:31:00	BE	26° 46.55	S	12° 2.32	E	3867.5	-	3x SVP
M132	1487	-	Drifter	21.11.2016	10:36:00	BE	26° 48.19	S	12° 01.06	E	3875.2	-	3x SVP
M132	1488	-	Drifter	21.11.2016	11:31:00	BE	26° 50.87	S	12° 02.06	E	3891.1	-	3x SVP
M132	1489	-	Drifter	21.11.2016	12:19:00	BE	26° 53.57	S	12° 02.06	E	4998.8	-	3x SVP
M132	1490	1	CTD / LADCP	21.11.2016	14:38:10	BE	26° 58.816	S	12° 01.150	E	3953.9	398.6	#28
M132	1491	8	MSS	21.11.2016	15:12:00	BE	26° 58.7802	S	12°01.1202	E	3957.7	-	
M132	1492	1	CTD / LADCP	21.11.2016	16:41:24	BE	26° 55.501	S	12° 01.485	E	3920	455.1	#29
M132	1493	8	MSS	21.11.2016	17:15:00	BE	26°55.470	S	12°01.4898	E	5393.5	-	
M132	1494	1	CTD / LADCP	21.11.2016	18:55:00	BE	26° 52.171	S	12° 01.775	E	3898.6	503.2	#30
M132	1495	8	MSS	21.11.2016	19:40:00	BE	26°52.170	S	12°01.7802	E	3895.7	-	
M132	1496	1	CTD / LADCP	21.11.2016	21:30:31	BE	26° 48.889	S	12° 02.106	E	3872.8	500.1	#31
M132	1497	8	MSS	21.11.2016	22:06:00	BE	26°48.8898	S	12°02.1102	E	3871.5	-	
M132	1498	1	CTD / LADCP	21.11.2016	23:36:15	BE	26° 45.577	S	12°02.403	E	3864.9	495.3	#32
M132	1499	8	MSS	22.11.2016	0:28:00	BE	26°45.5802	S	12°02.430	E	3864.8	-	
M132	1500	1	CTD / LADCP	22.11.2016	1:49:08	BE	26° 42.290	S	12° 02.715	E	3860.1	497.2	#33
M132	1501	8	MSS	22.11.2016	2:24:00	BE	26°42.2298	S	12°02.6598	E	3859.3	-	
M132	1502	1	CTD / LADCP	22.11.2016	3:47:17	BE	26° 38.999	S	12° 03.023	E	3851.6	406.9	#34
M132	1503	8	MSS	22.11.2016	4:21:00	BE	26°38.970	S	12°03.0102	E	3854.8	-	
M132	1504	1	CTD / LADCP	22.11.2016	5:46:50	BE	26° 35.710	S	12° 03.282	E	3866.4	496.2	#35
M132	1505	8	MSS	22.11.2016	6:37:00	BE	26°35.7102	S	12°03.2802	E	3858.1	-	

M132	1506	-	Glider	22.11.2016	8:05:00	BE	26° 36.06	S	12° 03.34	E	4984	-	deployment
M132	1506	-	Glider	22.11.2016	9:35:59	EN	26° 36.06	S	12° 03.34	E	5057	-	
M132	1507	1	CTD / LADCP	22.11.2016	10:20:06	BE	26° 32.386	S	12° 03.6	E	3836	498.1	#36
M132	1508	8	MSS	22.11.2016	10:59:00	BE	26°32.4198	S	12°03.6102	E	3808.9	-	
M132	1509	1	CTD / LADCP	22.11.2016	12:36:59	BE	26° 29.121	S	12° 03.889	E	3809.7	498.7	#37
M132	1510	8	MSS	22.11.2016	13:04:00	BE	26°29.130	S	12°03.90	E	3808.9	-	
M132	1511	1	CTD / LADCP	22.11.2016	14:33:07	BE	26° 25.796	S	12° 04.176	E	3775.7	457.8	#38
M132	1512	8	MSS	22.11.2016	15:08:00	BE	26°25.80	S	12°04.1802	E	5531.3	-	
M132	1513	1	U-CTD	22.11.2016	16:18:00	BE	26° 24.67	S	12° 04.29	E	3770	-	Test station
M132	1514	1	CTD / LADCP	22.11.2016	15:45:50	BE	26° 22.467	S	12° 489	E	3771.4	447.1	#39
M132	1515	8	MSS	22.11.2016	17:20:00	BE	26°22.4898	S	12°04.4898	E	5484.5	-	
M132	1516	1	CTD / LADCP	22.11.2016	19:00:03	BE	26° 19.183	S	12° 04.775	E	3747.1	505.7	#40, PC crash
M132	1517	8	MSS	22.11.2016	19:51:00	BE	26°19.1898	S	12°04.780	E	3750.7	-	
M132	1518	1	CTD / LADCP	22.11.2016	21:39:19	BE	26° 15.942	S	12° 5.052	E	3897.3	497.2	#41
M132	1519	8	MSS	22.11.2016	22:22:00	BE	26°15.900	S	12°05.110	E	3736.3	-	
M132	1520	3	U-CTD	22.11.2016	23:30:00	BE	26° 15.24	S	12° 05.76	E	3755	-	
M132	1520	-	U-CTD	23.11.2016	0:53:59	EN	26° 07.70	S	12° 13.31	E	3542	-	abortion, technical problems
M132	1521	11	U-CTD	23.11.2016	4:38:00	BE	25° 51.01	S	12° 33.09	E	3187.2	-	
M132	1521	-	U-CTD	23.11.2016	11:11:59	EN	25° 51.00	S	13° 29.48	E	825.1	-	
M132	1522	-	Glider	23.11.2016	12:42:00	BE	25° 51.00	S	13° 18.15	E	1263.6	-	
M132	1522	-	Glider	23.11.2016	13:10:00	EN	25° 51.00	S	13° 18.16	E	1268.1	-	
M132	1523	27	CAT + MSS	23.11.2016	15:15:00	BE	25° 50.96	S	13° 24.88	E	1001.2	-	
M132	1523	-	CAT + MSS	23.11.2016	19:13:59	EN	25° 50.95	S	13° 19.28	E	1219.1	-	
M132	1524	-	CAT	23.11.2016	19:32:00	BE	25° 50.46	S	13° 19.69	E	3147.5	-	
M132	1524	-	CAT	23.11.2016	21:21:59	EN	25° 50.95	S	13° 19.28	E	945.1	-	
M132	1525	30	CAT + MSS	23.11.2016	21:33:00	BE	25° 50.95	S	13° 26.24	E	942.9	-	
M132	1525	-	CAT + MSS	23.11.2016	1:28:59	EN	25° 50.94	S	13° 18.51	E	942.9	-	
M132	1526	-	CAT	24.11.2016	1:42:00	BE	25° 50.75	S	13° 18.51	E	1247.3	-	
M132	1526	-	CAT	24.11.2016	4:29:59	EN	25° 50.88	S	13° 26.6	E	923.9	-	
M132	1527	22	CAT + MSS	24.11.2016	4:42:00	BE	25° 51.26	S	13° 26.64	E	3434.2	-	
M132	1527	-	MSS	24.11.2016	8:42:00	EN	25° 50.89	S	13° 17.63	E	2028.6	-	
M132	1527	-	CAT	24.11.2016	9:09:59	EN	25° 50.89	S	13° 16.94	E	1572.7	-	Catamaran on deck



M132	1528	1	CTD / LADCP	24.11.2016	10:33:37	BE	25° 50.998	S	13° 18.273	E	1260	994.2	#42, PC crash
M132	1529	1	CTD / LADCP	24.11.2016	11:31:00	BE	25° 51.000	S	13° 18.947	E	1230.8	496.7	#43
M132	1530	1	CTD / LADCP	24.11.2016	12:26:12	BE	25° 51.004	S	13° 19.568	E	1211	496.7	#44
M132	1531	1	CTD / LADCP	24.11.2016	13:08:00	BE	25° 50.987	S	13° 20.151	E	1184.7		#45
M132	1532	1	CTD / LADCP	24.11.2016	15:01:28	BE	25° 50.998	S	13° 20.759	E	1159.9	249.9	#46
M132	1533	1	CTD / LADCP	24.11.2016	15:49:15	BE	25° 50.985	S	13° 21.432	E	1130.5		#47
M132	1534	1	CTD / LADCP	24.11.2016	16:41:05	BE	25° 50.993	S	13° 21.989	E	1108	457.8	#48
M132	1535	1	CTD / LADCP	24.11.2016	17:57:00	BE	25° 50.975	S	13° 22.595	E	1086		#49
M132	1536	1	CTD / LADCP	24.11.2016	18:55:00	BE	25° 50.958	S	13° 23.168	E	1062.7		#50
M132	1537	1	CTD / LADCP	24.11.2016	19:43:00	BE	25° 50.972	S	13° 23.848	E	1037.6	219.5	#51
M132	1538	1	CTD / LADCP	24.11.2016	20:35:11	BE	25° 50.955	S	13° 24.453	E	1880.5	179.4	#52
M132	1539	1	CTD / LADCP	24.11.2016	21:22:00	BE	25° 50.946	S	13° 25.048	E	988.4		#53
M132	1540	1	CTD / LADCP	24.11.2016	22:05:00	BE	25° 50.979	S	13° 25.696	E	961.3	497.2	#54
M132	1541	1	CTD / LADCP	24.11.2016	22:45:00	BE	25° 50.990	S	13° 26.295	E	937.9	497.7	#55
M132	1542	1	CTD / LADCP	24.11.2016	23:27:00	BE	25° 50.978	S	13° 26.907	E	911.9		#56
M132	1543	13	U-CTD	25.11.2016	8:52:00	BE	25° 20.00	S	13° 36.60	E	494.8		
M132	1543	-	U-CTD	25.11.2016	13:57:59	EN	25° 20.01	S	12° 51.04	E	2465.6		
M132	1544	1	U-CTD	25.11.2016	14:12:00	BE	25° 20.78	S	12° 50.00	E	2465.6		
M132	1544	1	U-CTD	25.11.2016	14:20:59	EN	25° 21.54	S	12° 50.00	E	2473.7		
M132	1545	-	Drifter	26.11.2016	5:55:00	BE	26° 06.00	S	13° 00.29	E	1964.0		3x SVP
M132	1546	-	Drifter	26.11.2016	6:44:00	BE	26° 03.71	S	12° 58.71	E	2096.4		3x SVP
M132	1547	-	Drifter	26.11.2016	7:24:00	BE	26° 01.32	S	12° 57.09	E	2424.6		3x SVP
M132	1548	-	Drifter	26.11.2016	8:04:00	BE	25° 58.88	S	12° 55.41	E	2245.4		3x SVP
M132	1549	1	CTD / LADCP	26.11.2016	8:31:00	BE	25° 59.181	S	12° 55.603	E	2215		#57
M132	1550	7	MSS	26.11.2016	9:01:00	BE	25° 59.18	S	12° 55.60	E	2212.3		
M132	1551	1	CTD / LADCP	26.11.2016	10:30:45	BE	25° 59.176	S	12° 58.632	E	2095	497.8	#58
M132	1552	26	MSS+THERM	26.11.2016	11:07:00	BE	25° 59.24	S	12° 58.69	E	2086.9		
M132	1552	-	MSS	26.11.2016	13:25:00	EN	26° 02.13	S	13° 00.69	E	1994.6		
M132	1553	1	CTD / LADCP	26.11.2016	13:55:40	BE	26° 01.482	S	13° 00.136	E	2030	498.5	#59
M132	1554	32	MSS	26.11.2016	15:07:00	BE	25° 58.93	S	12° 58.43	E	2090.3		
M132	1554	-	MSS	26.11.2016	18:00:00	EN	25° 58.93	S	12° 58.43	E	1873.1		
M132	1554	-	CAT	26.11.2016	15:01:00	BE	25° 58.93	S	12° 58.43	E	2088.2		
M132	1554	-	CAT	26.11.2016	18:24:59	EN	26° 04.62	S	13° 2.35	E	1873.1		

M132	1555	1	CTD / LADCP	26.11.2016	18:53:51	BE	26° 03.675	S	13° 01.785	E	1910		#60
M132	1556	5	MSS	26.11.2016	19:38:00	BE	26° 03.74	S	13° 01.83	E	1905.6		
M132	1557	1	CTD / LADCP	26.11.2016	20:31:43	BE	26° 05.983	S	13° 03.359	E	1820		#61
M132	1558	5	MSS	26.11.2016	21:00:00	BE	26° 05.99	S	13° 03.37	E	1818.8		
M132	1559	1	CTD / LADCP	26.11.2016	22:05:57	BE	26° 08.282	S	13° 04.902	E	1775	497	#62
M132	1560	5	MSS	26.11.2016	22:41:00	BE	26° 08.32	S	13° 04.94	E	1771.9		
M132	1561	1	CTD / LADCP	26.11.2016	23:33:00	BE	26° 10.559	S	13° 06.424	E	1740	497.2	#63
M132	1562	5	MSS	27.11.2016	0:14:00	BE	26° 10.56	S	13° 06.43	E	1742.8		
M132	1563	-	Glider	27.11.2016	3:45:00	BE	25° 50.40	S	13° 10.40	E	1568.7		
M132	1564	-	Glider	27.11.2016	13:44:00	EN	26° 32.40	S	11° 41.14	E	-		
M132	1565	1	CTD / LADCP	27.11.2016	17:44:13	BE	26° 43.493	S	10° 59.997	E	4550		#64
M132	1566	1	CTD / LADCP	27.11.2016	18:57:30	BE	26° 41.376	S	11° 00.034	E	4540		#65
M132	1567	1	CTD / LADCP	27.11.2016	20:17:09	BE	26° 39.087	S	10° 59.978	E	4540		#66
M132	1568	1	CTD / LADCP	27.11.2016	21:12:46	BE	26° 37.178	S	10° 59.967	E	4540		#67
M132	1569	1	CTD / LADCP	27.11.2016	22:12:15	BE	26° 35.087	S	10° 59.930	E	4530	493.5	#68
M132	1570	1	CTD / LADCP	27.11.2016	23:05:42	BE	26° 32.982	S	10° 59.964	E	4520	494	#69
M132	1571	1	CTD / LADCP	28.11.2016	0:00:42	BE	26° 30.895	S	10° 59.956	E	4510	495	#70
M132	1572	1	CTD / LADCP	28.11.2016	0:53:00	BE	26° 28.793	S	10° 59.965	E	4490		#71
M132	1573	1	CTD / LADCP	28.11.2016	1:47:00	BE	26° 26.682	S	10° 59.951	E	4480		#72
M132	1574	1	CTD / LADCP	28.11.2016	2:39:30	BE	26° 24.577	S	10° 59.976	E	4465		#73
M132	1575	1	CTD / LADCP	28.11.2016	3:35:24	BE	26° 22.489	S	10° 59.969	E	4450	496.5	#74
M132	1576	1	CTD / LADCP	28.11.2016	4:30:07	BE	26° 20.387	S	11° 00.002	E	4430		#75
M132	1577	1	CTD / LADCP	28.11.2016	5:26:18	BE	26° 18.301	S	10° 59.980	E	4413		#76
M132	1578	1	CTD / LADCP	28.11.2016	6:40:39	BE	26° 16.188	S	10° 59.959	E	4410		#77
M132	1579	49	MSS+THERM	28.11.2016	9:13:00	BE	26° 30.95	S	10° 59.85	E	5298.6		
M132	1579	-	MSS+THERM	28.11.2016	17:57:59	EN	26° 44.79	S	11° 0.37	E	4553.6		
M132	1580	-	ADCP-Fahrt	28.11.2016	18:14:00	BE	26° 45.95	S	011° 00.70	E	4556.8		
M132	1581	1	CTD / LADCP	30.11.2016	21:06:00	BE	26° 15.850	S	12° 05.035	E	3720		#78
M132	1582	5	MSS	30.11.2016	21:51:00	BE	26° 15.89	S	12° 05.10	E	3717.5		
M132	1583	1	CTD / LADCP	30.11.2016	23:02:26	BE	26° 19.180	S	12° 04.818	E	3740	497.8	#79
M132	1584	3	MSS	30.11.2016	23:30:00	BE	26° 19.22	S	12° 04.84	E	3739.5		
M132	1585	1	CTD / LADCP	01.12.2016	0:42:50	BE	26° 22.471	S	12° 04.535	E	3760	497.6	#80
M132	1586	5	MSS	01.12.2016	1:19:00	BE	26° 22.49	S	12° 04.55	E	3756.0		

M132	1587	1	CTD / LADCP	01.12.2016	2:29:47	BE	26° 25.813	S	12° 04.141	E	3760		#81
M132	1588	5	MSS	01.12.2016	3:05:00	BE	26° 25.83	S	12° 04.19	E	3768.1		
M132	1589	1	CTD / LADCP	01.12.2016	4:16:53	BE	26° 29.086	S	12° 03.889	E	3800	495.4	#82
M132	1590	5	MSS	01.12.2016	5:00:00	BE	26° 29.16	S	12° 03.92	E	4391.6		
M132	1591	1	CTD / LADCP	01.12.2016	6:04:02	BE	26° 32.397	S	12° 03.581	E	3820		#83
M132	1592	5	MSS	01.12.2016	6:48:00	BE	26° 32.40	S	12° 03.58	E	4672.5		
M132	1593	1	CTD / LADCP	01.12.2016	8:04:44	BE	26° 35.676	S	12° 03.267	E	3840		#84
M132	1594	5	MSS	01.12.2016	8:46:00	BE	26° 35.70	S	12° 03.29	E	3838		
M132	1595	1	CTD / LADCP	01.12.2016	10:01:40	BE	26° 38.992	S	12° 02.981	E	3880	496.2	#85
M132	1596	5	MSS	01.12.2016	10:46:00	BE	26° 39.00	S	12° 03.00	E	3843.4		
M132	1597	1	CTD / LADCP	01.12.2016	12:07:55	BE	26° 42.320	S	12° 02.688	E	3850	496.8	#86
M132	1598	5	MSS	01.12.2016	12:47:00	BE	26° 42.34	S	12° 2.7	E	3850.3		
M132	1599	1	CTD / LADCP	01.12.2016	13:58:40	BE	26° 45.603	S	12° 02.393	E	3850		#87
M132	1600	5	MSS	01.12.2016	14:34:00	BE	26° 45.63	S	12° 02.39	E	4193.9		
M132	1601	1	CTD / LADCP	01.12.2016	15:44:10	BE	26° 48.845	S	12° 02.087	E	3890		#88
M132	1602	5	MSS	01.12.2016	16:19:00	BE	26° 48.87	S	12° 02.09	E	3864.8		
M132	1603	1	CTD / LADCP	01.12.2016	17:23:55	BE	26° 52.195	S	12° 01.804	E	3880		#89
M132	1604	5	MSS	01.12.2016	18:07:00	BE	26° 52.23	S	12° 01.81	E	3884.1		
M132	1605	1	CTD / LADCP	01.12.2016	19:27:30	BE	26° 55.468	S	12° 01.483	E	3910		#90
M132	1606	4	MSS	01.12.2016	20:15:00	BE	26° 55.49	S	12° 01.50	E	4620.4		
M132	1607	1	CTD / LADCP	01.12.2016	21:32:41	BE	26° 50.793	S	12° 01.193	E	3940	497	#91
M132	1608	5	MSS	01.12.2016	22:14:00	BE	26° 58.82	S	12° 01.22	E	4718.4		
M132	1609	8	MSS+THERM	02.12.2016	1:52:00	BE	26° 32.47	S	12° 03.63	E	4990.0		
M132	1610	-	Drifter	02.12.2016	11:49:00	BE	26° 38.99	S	12° 02.96	E	3846.0		3x SVP
M132	1611	-	Drifter	02.12.2016	12:32:00	BE	26° 41.73	S	12° 02.77	E	3845.5		3x SVP
M132	1612	17	U-CTD	02.12.2016	13:16:00	BE	26° 40.68	S	12° 06.37	E	3836.4		
M132	1612	-	U-CTD	02.12.2016	19:54:00	EN	26° 25.46	S	12° 55.31	E	2256.9		Probe lost
M132	1613	1	CTD / LADCP	02.12.2016	21:57:00	BE	26° 11.960	S	12° 51.072	E	2348	497.3	#92
M132	1614	5	MSS	02.12.2016	22:32:00	BE	26° 12.03	S	12° 51.02	E	2345.4		
M132	1615	1	CTD / LADCP	02.12.2016	23:34:37	BE	26° 14.012	S	12° 52.499	E	2320	497.7	#93
M132	1616	5	MSS	03.12.2016	0:09:00	BE	26° 14.04	S	12° 52.50	E	2323.2		
M132	1617	1	CTD / LADCP	03.12.2016	1:10:18	BE	26° 15.983	S	12° 54.014	E	2305	497.8	#94
M132	1618	5	MSS	03.12.2016	1:43:00	BE	26° 16.02	S	12° 54.01	E	2305.1		

M132	1619	1	CTD / LADCP	03.12.2016	2:41:09	BE	26° 18.025	S	12° 55.514	E	2265		#95
M132	1620	5	MSS	03.12.2016	3:18:00	BE	26° 18.08	S	12° 55.55	E	2265.7		
M132	1621	1	CTD / LADCP	03.12.2016	4:14:42	BE	26° 19.999	S	12° 57.026	E	2212		#96
M132	1622	5	MSS	03.12.2016	4:51:00	BE	26° 20.00	S	12° 57.03	E	2213.2		
M132	1623	1	CTD / LADCP	03.12.2016	5:47:50	BE	26° 21.997	S	12° 58.508	E	2165		#97
M132	1624	5	MSS	03.12.2016	6:29:00	BE	26° 22.02	S	12° 58.52	E	2164.9		
M132	1625	1	CTD / LADCP	03.12.2016	7:29:51	BE	26° 23.988	S	12° 59.996	E	2125		#98, uCTD Calibration
M132	1626	5	MSS	03.12.2016	8:25:00	BE	26° 24.01	S	13° 00.00	E	2125.6		
M132	1627	1	CTD/MSS-Calib	03.12.2016	9:19:00	BE	26° 25.24	S	13° 00.15	E	2135.9		#99 MSS calibration
M132	1628	-	Drifter	03.12.2016	10:20:00	BE	26° 20.81	S	12° 57.62	E	2194.4		4x SVP
M132	1629	-	Drifter	03.12.2016	11:12:00	BE	26° 23.08	S	12° 59.3	E	2145.9		3x SVP
M132	1630	-	CAT	03.12.2016	17:42:00	BE	26° 32.63	S	14° 06.06	E	384.0		
M132	1630	-	CAT	03.12.2016	7:04:59	EN	26° 54.91	S	13° 48.98	E	586.0		
M132	1631	1	CTD / LADCP	04.12.2016	11:25:42	BE	26° 47.339	S	14° 02.624	E	410	394.2	#100
M132	1632	5	MSS	04.12.2016	12:06:00	BE	26° 47.40	S	14° 02.55	E	404.1		
M132	1633	5	MSS	04.12.2016	13:22:00	BE	26° 50.70	S	14° 01.95	E	407.1		
M132	1634	5	MSS	04.12.2016	14:50:00	BE	26° 54.15	S	14° 00.78	E	413.4		
M132	1635	5	MSS	04.12.2016	16:15:00	BE	26° 57.55	S	14° 00.31	E	426.3		
M132	1636	5	MSS	04.12.2016	17:34:00	BE	27° 01.05	S	13° 59.37	E	456.0		
M132	1637	-	ADCP-Fahrt	04.12.2016	19:01:00	BE	27° 04.75	S	13° 58.69	E	748.8		
M132	1637	-	ADCP-Fahrt	05.12.2016	13:30:59	EN	26° 35.93	S	14° 05.99	E	393.6		
M132	1638	1	CTD / LADCP	05.12.2016	13:33:15	BE	26° 36.013	S	14° 06.015	E	395	380.6	#101
M132	1639	5	MSS	05.12.2016	14:06:00	BE	26° 36.13	S	14° 06.02	E	395.6		
M132	1640	1	CTD / LADCP	05.12.2016	15:12:03	BE	26° 39.345	S	14° 05.110	E	400		#102
M132	1641	5	MSS	05.12.2016	15:46:00	BE	26° 39.47	S	14° 05.03	E	391.1		
M132	1642	1	CTD / LADCP	05.12.2016	16:47:22	BE	26° 42.530	S	14° 04.286	E	397	391.3	#103
M132	1643	5	MSS	05.12.2016	17:17:00	BE	26° 42.56	S	14° 04.27	E	398.5		
M132	1644	1	CTD / LADCP	05.12.2016	18:29:01	BE	26° 45.791	S	14° 03.527	E	403		#104
M132	1645	5	MSS	05.12.2016	19:10:00	BE	26° 45.81	S	14° 03.49	E	406.2		
M132	1646	1	CTD / LADCP	05.12.2016	20:30:00	BE	26° 49.055	S	14° 02.631	E	405		#105
M132	1647	5	MSS	05.12.2016	21:05:00	BE	26° 49.05	S	14° 02.63	E	405.3		
M132	1648	1	CTD / LADCP	05.12.2016	22:19:54	BE	26° 52.354	S	14° 01.886	E	410	403.2	#106

M132	1649	5	MSS	05.12.2016	22:51:00	BE	26° 52.37	S	14° 01.82	E	408.9		
M132	1650	1	CTD / LADCP	06.12.2016	0:05:48	BE	26° 55.609	S	14° 01.032	E	417	410.0	#107
M132	1651	5	MSS	06.12.2016	0:39:00	BE	26° 55.58	S	14° 00.87	E	417.0		
M132	1652	1	CTD / LADCP	06.12.2016	2:02:40	BE	26° 58.933	S	14° 00.310	E	431		#108
M132	1653	5	MSS	06.12.2016	2:37:00	BE	26° 58.86	S	13° 59.94	E	433.9		
M132	1654	1	CTD / LADCP	06.12.2016	3:50:10	BE	27° 02.291	S	13° 59.766	E	467	462.3	#109
M132	1655	5	MSS	06.12.2016	4:29:00	BE	27° 02.23	S	13° 59.31	E	471.5		
M132	1656	1	CTD / LADCP	06.12.2016	5:42:00	BE	27° 05.48	S	13° 58.80	E	568.1	348.5	#110
M132	1657	5	MSS	06.12.2016	6:26:00	BE	27° 05.40	S	13° 58.53	E	578.5		
M132	1658	1	CTD / LADCP	06.12.2016	8:05:00	BE	27° 08.73	S	13° 58.03	E	698.8	288.1	#111
M132	1659	5	MSS	06.12.2016	8:51:00	BE	27° 08.75	S	13° 57.68	E	712.5		
M132	1660	1	CTD / LADCP	06.12.2016	10:19:00	BE	27° 12.09	S	13° 57.21	E	823	495.0	#112
M132	1661	5	MSS	06.12.2016	10:54:00	BE	27° 12.08	S	13° 56.95	E	834.4		
M132	1662	5	MSS	06.12.2016	15:10:00	BE	26° 41.06	S	14° 04.63	E	834.4		
M132	1662	-	CAT	06.12.2016	15:10:00	BE	26° 41.26	S	14° 04.57	E	394.4		
M132	1662	-	CAT	06.12.2016	15:10:00	EN	26° 41.06	S	14° 04.63	E	719.7		
M132	1663	1	CTD / LADCP	07.12.2016	10:07:18	BE	26° 35.966	S	14° 06.019	E	394.5	381.1	#113
M132	1664	1	CTD / LADCP	07.12.2016	11:09:25	BE	26° 39.278	S	14° 05.181	E	391.2	387.4	#114
M132	1665	1	CTD / LADCP	07.12.2016	12:10:00	BE	26° 42.540	S	14° 04.369	E	401.6	399.7	#115
M132	1666	1	CTD / LADCP	07.12.2016	13:10:37	BE	26° 45.822	S	14° 03.537	E	160.6	395.1	#116
M132	1667	1	CTD / LADCP	07.12.2016	14:13:50	BE	26° 49.074	S	14° 02.708	E	404.9	358.2	#117
M132	1668	75	MSS	07.12.2016	14:48:00	BE	26° 49.18	S	14° 02.66	E	405.2		
M132	1668	-	MSS	07.12.2016	22:02:59	EN	27° 02.61	S	13° 59.34	E	475.0		
M132	1669	1	CTD / LADCP	07.12.2016	23:16:30	BE	26° 52.372	S	14° 01.850	E	916.4	403.5	#118
M132	1670	1	CTD / LADCP	08.12.2016	0:22:13	BE	26° 55.645	S	14° 01.106	E	416	411.8	#119
M132	1671	1	CTD / LADCP	08.12.2016	1:28:37	BE	26° 58.882	S	14° 00.305	E	430.7	427.9	#120
M132	1672	1	CTD / LADCP	08.12.2016	2:33:39	BE	27° 02.145	S	13° 59.431	E	466.4	462.9	#121