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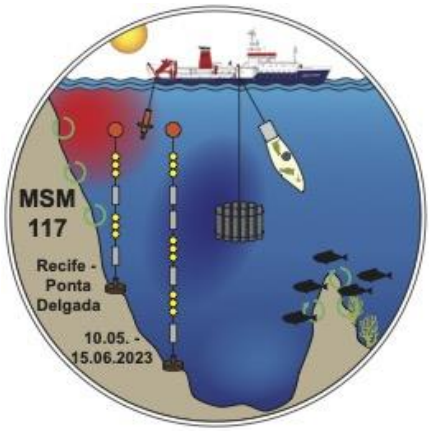

Short Cruise Report
RV MARIA S. MERIAN cruise MSM117

Recife, Brazil – Ponta Delgada, Azores
10.05.2023 – 15.06.2023
Chief Scientist: Rebecca Hummels
Captain: Ralf Schmidt

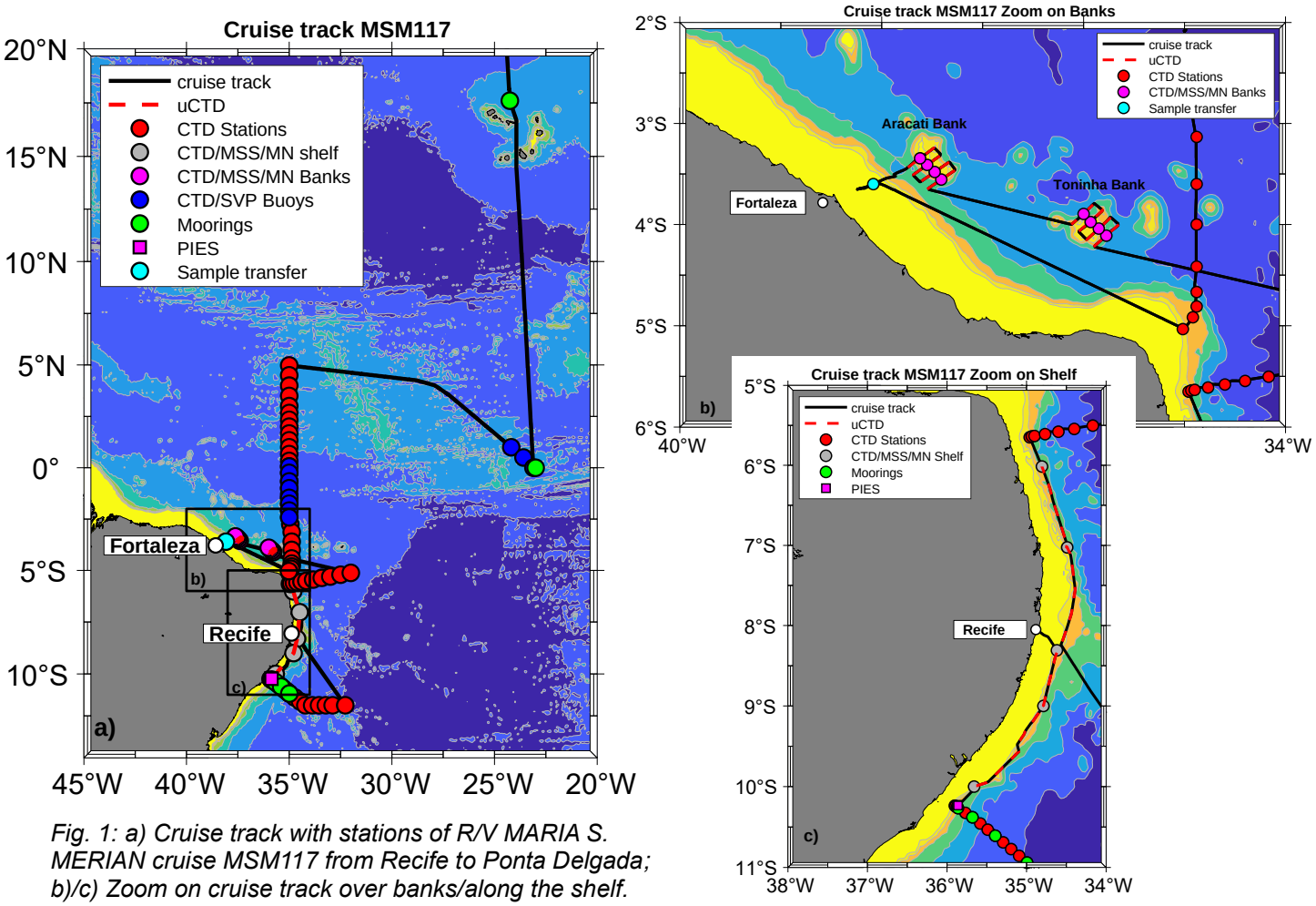

Fig. 1: a) Cruise track with stations of R/V MARIA S. MERIAN cruise MSM117 from Recife to Ponta Delgada; b)/c) Zoom on cruise track over banks/along the shelf.

Objectives

The objectives of R/V MARIA S. MERIAN cruise MSM117 were to investigate the variability of the western boundary current circulation off South America and to estimate the strength and variability of the Atlantic meridional overturning circulation (AMOC) at 11°S. A specific focus is on the transport variability of the North Brazilian Undercurrent (NBUC) as part of the AMOC and the Subtropical Cells (STCs) and the Deep Western Boundary Current (DWBC) on intraseasonal to decadal time scales. The meridional section along 35°W as well as the mooring maintenance at 23°W at the equator provides additional information with respect to signal propagation along and across the equator. These investigations also contribute to the EU project TRIATLAS („Tropical and South Atlantic climate-based marine ecosystem predictions for sustainable management“), for which also additional measurements along the Brazilian shelf and over two submarine mountains were performed. Along the shelf and above the seamounts the focus was more on the interaction of the currents with the topography, the resulting biogeochemical conditions and ultimately the impact on the local ecosystem. The mooring of the Cape Verde Ocean Observatory (CVOO) is a central part of the cooperation between GEOMAR and Cape Verde within the activities around the Ocean Science Centre Mindelo (OSCM). A general goal of this observatory is a better understanding of the role of eddies in the ocean, especially with respect to the CO_2 source/sink function and biological carbon pump in coastal upwelling areas.

The main work during MSM117 was the recovery and deployment of four full-depth moorings at the Brazilian shelf, one mooring at 23°W at the equator and the CVOO mooring, CTD station work along the sections at 11°S, 5°S and 35°W, and the recovery and deployment of two inverted bottom echo sounders (PIES). For the station work, mainly the combination of CTD, Lowered ADCP and Underwater Vision Profiler (UVP) was used accompanied with water samples analyzed for various parameters. In addition, currents and water mass properties were continuously measured with the shipboard ADCPs and the thermosalinograph. Along the Brazilian shelf and over the submarine mountains, the station work was complemented by microstructure and multinet measurements, the continuous underway measurements by a uCTD system.

Narrative

Most part of the science team of the cruise MSM117 met on the morning of the 8th of May for a bilateral German-Brazilian Workshop at the Federal University of Pernambuco (UFPE) in Recife, Brazil for a first scientific exchange. In the afternoon, a large fraction of the scientific team went onboard of MARIA S. MERIAN hoping to start with the setup of the scientific equipment. Unfortunately, delays in the harbor logistics of Recife led to delays in the setup. However, everyone was pleased that in the evening finally all containers with the scientific equipment could be taken on board. This demanded a very quick setup on the 9th and the 10th of May, on which MARIA S. MERIAN could leave the port in the late afternoon only a few hours later than originally scheduled.

Only two hours after leaving the port we arrived at the first station on the Brazilian shelf, where most of the equipment had to be ready to start the interdisciplinary part of the program. The shelf stations included a full depth CTD profile for hydrographic properties, where the rosette was mounted with an LADCP system observing a full depth current profile and a UVP monitoring the particle distribution in different size classes and an OPUS sensor measuring nitrate throughout the water column. The rosette was equipped with 22 Niskin bottles for water samples used for salinity and oxygen sensor calibration, but also for nutrients and several phytoplankton relevant parameters. After the CTD cast, we collected three microstructure (MSS) profiles to observe the small-scale turbulence in the water column at least within the upper 200-300m depth. This was followed by a multinet haul for zooplankton samples. Between the three shelf stations on our way southward towards the 11°S section we did nearly continuous profiling with the underway CTD (uCTD) probe at a speed of about 10 knots. The winch of the uCTD needed a small repair in between, but besides that all systems ran smoothly despite the very short preparation time for everyone.

We began the 11°S section with the recovery of one and the re-deployment of two PIES on the Brazilian shelf in shallow depths of 300m and 500m. The recovery during the night went smoothly as the flashing light on the device could easily be detected. We continued the night with full-depth CTD profiles along the section and started the recovery of the first mooring along the section on the morning of May 12th, only 1.5 days after leaving the port. The next three days were very busy with recovery or deployment of moorings during daytime and CTDs at night. This way we managed to recover and redeploy the full array consisting of four full-depth moorings until mid-day of May 15th. We further continued the CTD section towards the east beyond the extent of the mooring array after that. Most of the instruments worked very well and we are really pleased with the data retrieval.

Unfortunately, just after we had finished the mooring work, we had some issues with the LADCP system mounted on the rosette providing the full-depth current profiles. Several options were tested and we ended up using the old battery case, which was used some years ago as we finally managed to pin down the failure to the new system of power supply for the instruments. In total, we collected 24 CTD stations (21 full-depth) from the Brazilian shelf at 10°14.2’S,35°54.2’W until 11°30’S, 32°W, whereas two of these do not have the full depth velocity profiles at all and another four have patchy data with less quality due to the power supply issues. However, we managed to set up a running system again towards the end of the 11°S section.

The ship then headed northward in the night of the 17th of May on our transit back to the Brazilian shelf, where we continued with the shelf stations to the north of Recife. After performing two more of these shelf stations there with the combined CTD/MSS/Multinet sampling and uCTD profiling in between, we began the 5°S section at 5°39.0'S and 34°57.6’W in the evening of May 18th. Along this section until 5°07.0’S and 32°00’W we performed 12 full depth CTD stations, where the spacing in between stations varied from 10nm close to the Brazilian shelf to 30nm further offshore.

On the afternoon of May 20th, we started the transit to the seamount chain in front of the

Brazilian coast to the northeast of Fortaleza. Over two seamounts, where one is part of the Aracati bank and one of the Toninha bank, we performed four interdisciplinary stations per seamount, which were fitted into underway mapping of the seamounts including uCTD for hydrography, shipboard ADCP for the current field and echo sounder for bathymetry. The measurements above each of the seamounts took about 24 hours per seamount.

After the completion of the seamount program in the evening of May 23rd, we headed towards the sample transfer location close to Fortaleza. At this point most of the biological samples and equipment were handed over to a chartered fishing boat with scientists from UFPE, Recife and Labomar, Fortaleza onboard. They safely transferred these samples and equipment back to UFPE, Recife for further analysis thereby avoiding the complicated air freight transport back from MARIA S. MERIAN's end port in Ponta Delgada, Azores.

The meridional section along 35°W crossing the equator began on May 25th in the morning and lasted until the night of May 31st. We started on the Brazilian shelf break at 5°02'S and 35°01'W and performed 32 full depth CTD stations until the northernmost station at 5°00'N, 35°W. Between 2°30'S and the equator we also deployed 8 SVP surface drifters after the CTD casts.

After finalizing the 35°W section in the night of May 31st, MARIA S. MERIAN turned southeast towards the equator at 23°W, the next mooring location.

We deployed the last three drifters during our approach of the equator between 1°N and the equator and arrived at the mooring position on the morning of June 3rd. The recovery of the mooring went really smoothly and after the lunch-break we directly had an efficient re-deployment. After the mooring work we did a few microstructure profiles and a full-depth CTD, followed by a few more microstructure profiles. After that we directly headed northward towards our next and final mooring position at the Cape Verde Ocean Observatory (CVOO) at 17°36.4'N, 24°15'W, where we arrived in the morning of June 8th. Despite searching for a while for the telemetry buoy, it could not be found. However, it also did not send any data since November 2022. As several times before at CVOO, some of the wire was somehow tangled up in knots and had to be disentangled. However, the recovery was still comparably fast. As expected, due to the lack of data sent from the buoy since November 2022, the telemetry buoy and the two uppermost instruments were ripped off and lost. After two calibration CTD casts during the night, we re-deployed the mooring on the morning of June 9th and started the last transit to Ponta Delgada, Azores. On the morning of June 12th, a sailing boat was sighted drifting with a ripped off front sail. As no one responded via radio four crew members checked out the situation with the fast rescue boat. As the weather conditions were very calm, it was decided to tow the boat to Ponta Delgada.

MARIA S. MERIAN then reached the port of Ponta Delgada, Azores in the morning of June, 15th 2023.

Acknowledgements

We thank Captain Schmidt and the entire crew of RV MARIA S MERIAN for their excellent and kind support during the whole cruise. The professional working environment and supportive atmosphere on the MERIAN are greatly appreciated. The expedition took place as part of the research program of the EU Horizon2020 project TRIATLAS under grant number 817578 and GEOMAR's Program-Oriented Research (POF).

Participants List

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5. Anna Christina Hans	Salinometer, uCTD	GEOMAR
6. Joke Lübbecke	MicroCats	GEOMAR
7. Marisa Roch	MicroCats	GEOMAR
8. Daniel Rudloff	Oxygen	GEOMAR
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10. Wiebke Martens	Technician	GEOMAR
11. Hannah Olbricht	Technician	GEOMAR
12. René Witt	Technician	GEOMAR
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15. Nathalia Lins Silva	Zooplankton	UFPE
16. Richard Wonder	Zooplankton	UFPE
17. Claudeilton Santana	Zooplankton, UVP	GEOMAR
18. Mikaelle Santos da Silva	Phytoplankton	UFPE
19. Pedro Melo	Phytoplankton	UFPE
20. Mayza Pompeu	Nutrients	USP
21. Lais Baroni Villet	Brazilian observer	Brazilian Navy

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Station List

Station No.		Date	Gear	Time	Latitude	Longitude	Water Depth	Remarks/Recovery
METEOR	GEOMAR	2023		[UTC]	[°N]	[°W]	[m]	
MSM117_1-1	CTD01	10.05.	CTD	22:04	8°18.375'S	34°37.090'W	447	dur. 0.5h
MSM117_1-2	MSS01	10.05.	MSS	22:43	8°18.107'S	34°36.951'W	453	dur. 0.8h
MSM117_1-3	MSN1	11.05.	MSN	00:02	8°17.991'S	34°36.650'W	494	dur. 0.4h
MSM117_1-4	Start uCTD	11.05.	UCTD	00:28	8°17.780'S	34°36.084'W	543	dur. 3.1h
MSM117_2-1	CTD02	11.05.	CTD	05:44	8°59.688'S	34°47.197'W	921	dur. 0.9h
MSM117_2-2	MSS02	11.05.	MSS	06:37	8°58.871'S	34°46.939'W	906	dur. 0.8h
MSM117_2-3	MSN02	11.05.	MSN	07:43	8°58.545'S	34°46.875'W	790	dur. 0.5h
MSM117_2-4	Start uCTD	11.05.	UCTD	12:24	9°33.524'S	35°05.809'W	856	dur. 5.0h
MSM117_3-1	CTD03	11.05.	CTD	18:30	9°59.996'S	35°39.584'W	1081	dur. 1.0h
MSM117_3-2	MSS03	11.05.	MSS	19:16	9°59.995'S	35°39.583'W	1082	dur. 0.7h
MSM117_3-3	MSN03	11.05.	MSN	20:16	10°00.443'S	35°39.586'W	1089	dur. 0.5h
MSM117_3-4	MSN04	11.05.	MSN	21:06	10°01.491'S	35°39.778'W	823	dur. 0.8h
MSM117_4-1	KPO_1244	11.05.	PIES	23:37	10°14.075'S	35°51.916'W	487	dur. 0.8h; recovery
MSM117_4-2	KPO_1265	12.05.	PIES	00:32	10°14.011'S	35°51.690'W	531	Deployment
MSM117_5-1	KPO_1264	12.05.	PIES	00:45	10°13.611'S	35°52.404'W	318	Deployment
MSM117_6-1	CTD04	12.05.	CTD	04:11	10°27.155'S	35°34.562'W	2891	dur. 2.5h
MSM117_7-1	CTD05	12.05.	CTD	08:12	10°15.290'S	35°52.582'W	519	dur. 0.5h
MSM117_8-1	KPO_1238	12.05.	MOOR	08:57	10°16.091'S	35°52.077'W	802	dur. 0.9h; recovery
MSM117_9-1	KPO_1239	12.05.	MOOR	11:18	10°23.020'S	35°41.274'W	2288	dur. 1.6h; recovery
MSM117_10-1	KPO_1240	12.05.	MOOR	15:09	10°36.210'S	35°23.319'W	3533	dur. 2.6h; recovery
MSM117_10-2	CTD06	12.05.	CTD	19:15	10°36.451'S	35°23.579'W	3533	dur. 2.2h
MSM117_11-1	CTD07	12.05.	CTD	22:27	10°41.399'S	35°17.600'W	3683	dur. 2.9h
MSM117_12-1	CTD08	13.05.	CTD	02:27	10°46.399'S	35°11.604'W	3877	dur. 2.4h
MSM117_13-1	CTD09	13.05.	CTD	05:51	10°51.267'S	35°05.710'W	3972	dur. 2.6h
MSM117_14-1	KPO_1241	13.05.	MOOR	08:52	10°56.425'S	35°00.009'W	4117	dur. 3.8h; recovery
MSM117_14-2	CTD10	13.05.	CTD	14:27	10°56.304'S	34°59.660'W	4124	dur. 3.6h
MSM117_15-1	CTD11	13.05.	CTD	21:43	10°31.909'S	35°29.262'W	3209	dur. 2.7h
MSM117_16-1	CTD12	14.05.	CTD	01:51	10°22.592'S	35°40.666'W	2305	dur. 1.5h
MSM117_17-1	CTD13	14.05.	CTD	03:59	10°19.063'S	35°45.796'W	1785	dur. 1.4h
MSM117_18-1	CTD14	14.05.	CTD	05:57	10°15.812'S	35°51.475'W	859	dur. 0.7h
MSM117_19-1	CTD15	14.05.	CTD	06:59	10°14.604'S	35°53.554'W	236	dur. 0.4h
MSM117_20-1	CTD16	14.05.	CTD	07:35	10°14.200'S	35°54.200'W	83	dur. 0.2h
MSM117_21-1	KPO_1260	14.05.	MOOR	09:24	10°14.866'S	35°50.740'W	877	dur. 1.0h; deployment
MSM117_22-1	KPO_1261	14.05.	MOOR	12:02	10°20.203'S	35°39.286'W	2386	dur. 1.9h; deployment
MSM117_23-1	KPO_1262	14.05.	MOOR	16:08	10°34.068'S	35°21.876'W	3482	dur. 2.2h; deployment
MSM117_24-1	CTD17	15.05.	CTD	00:30	11°07.471'S	34°44.027'W	4259	dur. 3.1h
MSM117_25-1	CTD18	15.05.	CTD	05:55	11°18.645'S	34°28.285'W	4644	dur. 2.9h
MSM117_26-1	KPO_1263	15.05.	MOOR	11:46	10°55.017'S	35°03.437'W	4047	dur. 3.0h; deployment
MSM117_27-1	CTD19	15.05.	CTD	23:56	11°29.997'S	34°13.008'W	4584	dur. 2.7h
MSM117_28-1	CTD20	16.05.	CTD	04:00	11°29.996'S	33°53.009'W	4631	dur. 0.2h
MSM117_28-2	CTD21	16.05.	CTD	06:43	11°30.005'S	33°53.016'W	4622	dur. 2.8h
MSM117_29-1	CTD22	16.05.	CTD	11:46	11°29.994'S	33°33.011'W	4959	dur. 3.0h
MSM117_30-1	CTD23	16.05.	CTD	17:45	11°30.001'S	33°13.012'W	4271	dur. 2.8h
MSM117_31-1	CTD24	16.05.	CTD	21:38	11°30.006'S	32°52.968'W	3562	dur. 0.2h
MSM117_31-2	CTD25	16.05.	CTD	22:59	11°30.007'S	32°52.968'W	3572	dur. 2.1h
MSM117_32-1	CTD26	17.05.	CTD	02:58	11°29.957'S	32°27.037'W	4792	dur. 0.2h
MSM117_32-2	CTD27	17.05.	CTD	04:46	11°29.957'S	32°27.036'W	4800	dur. 3.0h
MSM117_33-1	Start uCTD	18.05.	UCTD	03:48	8°13.319'S	34°33.759'W	542	dur. 6.6h
MSM117_34-1	CTD28	18.05.	CTD	11:11	7°01.391'S	34°29.377'W	480	dur. 0.4h

MSM117_34-2	MSS04	18.05.	MSS	11:44	7°01.129'S	34°29.506'W	470	dur. 0.8h
MSM117_34-3	MSN05	18.05.	MSN	13:45	7°01.122'S	34°29.742'W	429	dur. 0.5h
MSM117_34-4	Start uCTD	18.05.	UCTD	14:13	7°00.266'S	34°30.063'W	422	dur. 5.5h
MSM117_35-1	CTD29	18.05.	CTD	20:21	6°00.625'S	34°48.502'W	806	dur. 0.6h
MSM117_35-2	MSS05	18.05.	MSS	20:51	6°00.168'S	34°48.724'W	821	dur. 0.7h
MSM117_35-3	MSN06	18.05.	MSN	22:04	6°00.528'S	34°48.382'W	832	dur. 1.0h
MSM117_36-1	CTD30	19.05.	CTD	01:13	5°38.887'S	34°57.738'W	256	dur. 0.3h
MSM117_37-1	CTD31	19.05.	CTD	02:10	5°38.052'S	34°55.987'W	703	dur. 0.7h
MSM117_38-1	CTD32	19.05.	CTD	03:38	5°37.292'S	34°54.252'W	1605	dur. 1.3h
MSM117_39-1	CTD33	19.05.	CTD	06:26	5°35.549'S	34°46.314'W	2799	dur. 1.8h
MSM117_40-1	CTD34	19.05.	CTD	09:44	5°34.150'S	34°36.243'W	3427	dur. 2.3h
MSM117_41-1	CTD35	19.05.	CTD	13:38	5°32.318'S	34°24.215'W	3770	dur. 2.4h
MSM117_42-1	CTD36	19.05.	CTD	17:48	5°30.092'S	34°10.128'W	4124	dur. 2.7h
MSM117_43-1	CTD37	19.05.	CTD	22:52	5°26.594'S	33°50.035'W	4324	dur. 2.7h
MSM117_44-1	CTD38	20.05.	CTD	04:35	5°21.695'S	33°25.048'W	4486	dur. 2.9h
MSM117_45-1	CTD39	20.05.	CTD	10:21	5°17.730'S	33°00.003'W	4565	dur. 2.8h
MSM117_46-1	CTD40	20.05.	CTD	16:29	5°12.393'S	32°29.933'W	4600	dur. 2.9h
MSM117_47-1	CTD41	20.05.	CTD	22:46	5°07.027'S	32°00.046'W	4616	dur. 2.8h
MSM117_48-1	Start uCTD	21.05.	UCTD	20:50	4°12.363'S	35°53.041'W	1518	dur. 0.9h
MSM117_49-1	CTD42	21.05.	CTD	22:34	4°06.387'S	35°46.869'W	1645	dur. 2.1h
MSM117_49-2	MSS06	22.05.	MSS	00:35	4°06.575'S	35°46.556'W	1715	dur. 1.0h
MSM117_49-3	MSN07	22.05.	MSN	02:16	4°06.288'S	35°46.935'W	1634	dur. 0.6h
MSM117_49-4	Start uCTD	22.05.	UCTD	02:50	4°05.384'S	35°45.924'W	1743	dur. 2.0h
MSM117_50-1	CTD43	22.05.	CTD	05:28	4°02.183'S	35°51.430'W	74	dur. 0.4h
MSM117_50-2	MSS07	22.05.	MSS	05:56	4°01.749'S	35°51.893'W	72	dur. 0.8h
MSM117_50-3	MSN08	22.05.	MSN	07:12	4°02.260'S	35°51.196'W	75	dur. 0.3h
MSM117_50-4	Start uCTD	22.05.	UCTD	07:39	4°02.876'S	35°51.447'W	155	dur. 2.2h
MSM117_51-1	CTD44	22.05.	CTD	10:21	3°58.460'S	35°56.021'W	70	dur. 0.3h
MSM117_51-2	MSS08	22.05.	MSS	10:50	3°58.504'S	35°55.841'W	71	dur. 1.1h
MSM117_51-3	MSN09	22.05.	MSN	12:11	3°58.431'S	35°55.895'W	70	dur. 0.4h
MSM117_51-4	Start uCTD	22.05.	UCTD	12:44	3°57.949'S	35°55.646'W	73	dur. 2.4h
MSM117_52-1	CTD45	22.05.	CTD	15:59	3°53.565'S	36°00.652'W	1463	dur. 1.1h
MSM117_52-2	MSS09	22.05.	MSS	17:07	3°53.720'S	36°00.058'W	1604	dur. 0.9h
MSM117_52-3	MSN10	22.05.	MSN	18:24	3°53.199'S	36°01.353'W	2130	dur. 0.6h
MSM117_52-4	Start uCTD	22.05.	UCTD	18:55	3°53.419'S	36°01.160'W	2038	dur. 1.0h
MSM117_53-1	Start uCTD	23.05.	UCTD	02:51	3°38.454'S	37°32.051'W	1654	dur. 1.2h
MSM117_54-1	CTD46	23.05.	CTD	04:43	3°33.178'S	37°24.983'W	256	dur. 0.5h
MSM117_54-2	MSS10	23.05.	MSS	05:22	3°32.964'S	37°25.445'W	254	dur. 1.0h
MSM117_54-3	MSN11	23.05.	MSN	06:48	3°32.379'S	37°26.319'W	253	dur. 0.6h
MSM117_54-4	Start uCTD	23.05.	UCTD	07:21	3°32.623'S	37°25.927'W	252	dur. 3.3h
MSM117_55-1	CTD47	23.05.	CTD	11:15	3°28.670'S	37°28.699'W	244	dur. 0.4h
MSM117_55-2	MSS11	23.05.	MSS	11:41	3°28.458'S	37°29.055'W	245	dur. 1.0h
MSM117_55-3	MSN12	23.05.	MSN	13:26	3°28.664'S	37°28.574'W	245	dur. 0.5h
MSM117_55-4	Start uCTD	23.05.	UCTD	13:56	3°28.854'S	37°28.846'W	241	dur. 3.1h
MSM117_56-1	CTD48	23.05.	CTD	17:31	3°24.359'S	37°33.498'W	270	dur. 0.5h
MSM117_56-2	MSS12	23.05.	MSS	18:14	3°24.550'S	37°33.058'W	263	dur. 1.0h
MSM117_56-3	MSN13	23.05.	MSN	19:32	3°23.597'S	37°34.284'W	268	dur. 0.5h
MSM117_56-4	Start uCTD	23.05.	UCTD	20:00	3°23.566'S	37°34.124'W	266	dur. 3.6h
MSM117_57-1	CTD49	24.05.	CTD	00:03	3°20.546'S	37°37.504'W	313	dur. 0.4h
MSM117_57-2	MSS13	24.05.	MSS	00:28	3°20.363'S	37°37.801'W	311	dur. 0.8h
MSM117_57-3	MSN14	24.05.	MSN	01:58	3°20.509'S	37°37.265'W	302	dur. 0.7h
MSM117_57-4	Start uCTD	24.05.	UCTD	02:31	3°20.767'S	37°38.203'W	311	dur. 1.1h
MSM117_58-1	CTD50	25.05.	CTD	10:10	5°01.741'S	35°00.247'W	524	dur. 0.5h
MSM117_59-1	CTD51	25.05.	CTD	11:50	4°54.426'S	34°55.377'W	827	dur. 0.8h

MSM117_60-1	CTD52	25.05.	CTD	13:33	4°48.000'S	34°53.113'W	1006	dur. 0.8h
MSM117_60-2	CTD53	25.05.	CTD	14:50	4°47.979'S	34°53.085'W	1015	dur. 0.8h
MSM117_61-1	CTD54	25.05.	CTD	17:09	4°39.108'S	34°53.383'W	2594	dur. 1.9h
MSM117_62-1	CTD55	25.05.	CTD	20:47	4°24.420'S	34°53.367'W	3466	dur. 2.1h
MSM117_63-1	CTD56	26.05.	CTD	01:27	3°59.341'S	34°53.286'W	3563	dur. 2.2h
MSM117_64-1	CTD57	26.05.	CTD	05:56	3°35.890'S	34°52.909'W	3065	dur. 2.0h
MSM117_65-1	CTD58	26.05.	CTD	10:57	3°09.974'S	34°53.093'W	3819	dur. 2.5h
MSM117_66-1	CTD59	26.05.	CTD	16:04	2°44.961'S	34°57.391'W	3867	dur. 2.6h
MSM117_67-1	CTD60	26.05.	CTD	21:00	2°25.160'S	35°00.263'W	3915	dur. 2.3h
MSM117_67-2	Drifter01	26.05.	DRIFT	22:17	2°25.152'S	35°00.150'W	3920	—
MSM117_68-1	CTD61	27.05.	CTD	01:48	2°04.950'S	35°00.247'W	4052	dur. 2.5h
MSM117_68-2	Drifter02	27.05.	DRIFT	03:15	2°04.949'S	35°00.182'W	4050	—
MSM117_69-1	CTD62	27.05.	CTD	06:44	1°45.009'S	35°00.110'W	4108	dur. 2.5h
MSM117_69-2	Drifter03	27.05.	DRIFT	08:06	1°45.067'S	35°00.122'W	4106	—
MSM117_70-1	CTD63	27.05.	CTD	11:21	1°27.975'S	35°00.014'W	4318	dur. 2.6h
MSM117_70-2	Drifter04	27.05.	DRIFT	12:47	1°27.974'S	34°59.924'W	4318	—
MSM117_71-1	CTD64	27.05.	CTD	15:21	1°18.017'S	34°59.970'W	4358	dur. 2.7h
MSM117_72-1	CTD65	27.05.	CTD	20:26	1°00.107'S	34°59.977'W	4390	dur. 2.6h
MSM117_72-2	Drifter05	27.05.	DRIFT	21:49	1°00.154'S	34°59.987'W	4394	—
MSM117_73-1	CTD66	28.05.	CTD	01:33	0°40.181'S	34°59.937'W	4463	dur. 2.7h
MSM117_73-2	Drifter06	28.05.	DRIFT	03:01	0°40.243'S	34°59.912'W	4467	—
MSM117_74-1	CTD67	28.05.	CTD	07:41	0°14.806'S	34°59.992'W	4524	dur. 3.1h
MSM117_74-2	Drifter07	28.05.	DRIFT	09:04	0°14.759'S	34°59.990'W	4525	—
MSM117_75-1	CTD68	28.05.	CTD	12:31	0°03.527'N	34°59.958'W	4544	dur. 2.8h
MSM117_75-2	Drifter08	28.05.	DRIFT	13:59	0°03.464'N	34°59.900'W	4547	—
MSM117_76-1	CTD69	28.05.	CTD	17:17	0°19.871'N	34°59.873'W	4543	dur. 3.0h
MSM117_77-1	CTD70	28.05.	CTD	22:24	0°40.003'N	35°00.014'W	4551	dur. 2.7h
MSM117_78-1	CTD71	29.05.	CTD	03:00	1°00.110'N	34°59.857'W	3612	dur. 2.4h
MSM117_79-1	CTD72	29.05.	CTD	07:37	1°20.405'N	34°59.947'W	4068	dur. 2.4h
MSM117_80-1	CTD73	29.05.	CTD	12:07	1°40.150'N	34°59.900'W	4046	dur. 2.5h
MSM117_81-1	CTD74	29.05.	CTD	16:42	2°00.137'N	34°59.845'W	4182	dur. 2.6h
MSM117_82-1	CTD75	29.05.	CTD	21:31	2°20.212'N	34°59.988'W	4142	dur. 2.5h
MSM117_83-1	CTD76	30.05.	CTD	02:05	2°39.973'N	35°00.024'W	4017	dur. 2.5h
MSM117_84-1	CTD77	30.05.	CTD	06:39	3°00.034'N	35°00.143'W	3813	dur. 2.3h
MSM117_85-1	CTD78	30.05.	CTD	12:05	3°29.656'N	34°59.960'W	3964	dur. 2.5h
MSM117_86-1	CTD79	30.05.	CTD	17:26	3°59.892'N	34°59.972'W	3495	dur. 2.3h
MSM117_87-1	CTD80	30.05.	CTD	22:56	4°29.830'N	34°59.973'W	3876	dur. 2.3h
MSM117_88-1	CTD81	31.05.	CTD	04:09	4°58.786'N	34°59.924'W	3724	dur. 2.4h
MSM117_89-1	Drifter09	02.06.	DRIFT	23:01	0°59.909'N	24°11.340'W	3731	—
MSM117_90-1	Drifter10	03.06.	DRIFT	03:18	0°29.802'N	23°35.493'W	3921	—
MSM117_91-1	KPO_1237	03.06.	MOOR	08:42	0°00.112'N	23°07.222'W	3940	dur. 2.5h; recovery
MSM117_92-1	KPO_1270	03.06.	MOOR	15:09	0°01.240'N	23°02.210'W	3940	dur. 3.9h; deployment
MSM117_93-1	MSS14	03.06.	MSS	19:20	0°00.064'S	23°07.234'W	3929	dur. 1.4h
MSM117_93-2	CTD82	03.06.	CTD	22:13	0°00.424'N	23°06.564'W	3934	dur. 3.0h
MSM117_93-3	MSS15	04.06.	MSS	00:15	0°00.428'N	23°06.515'W	3931	dur. 1.4h
MSM117_93-4	Drifter11	04.06.	DRIFT	01:47	0°00.347'N	23°06.533'W	3932	—
MSM117_94-1	KPO_1242	08.06.	MOOR	08:08	17°36.050'N	24°15.046'W	3597	dur. 3.7h; recovery
MSM117_94-2	CTD83	08.06.	CTD	16:14	17°40.638'N	24°18.713'W	3619	dur. 2.3h
MSM117_94-3	CTD84	08.06.	CTD	20:10	17°40.638'N	24°18.713'W	3614	dur. 2.2h
MSM117_94-4	KPO_1271	09.06.	MOOR	08:04	17°40.606'N	24°18.668'W	3616	dur. 4.7h; deployment
MSM117_95-1	CTD85	10.06.	CTD	15:14	21°51.344'N	24°31.791'W	5053	dur. 2.9h