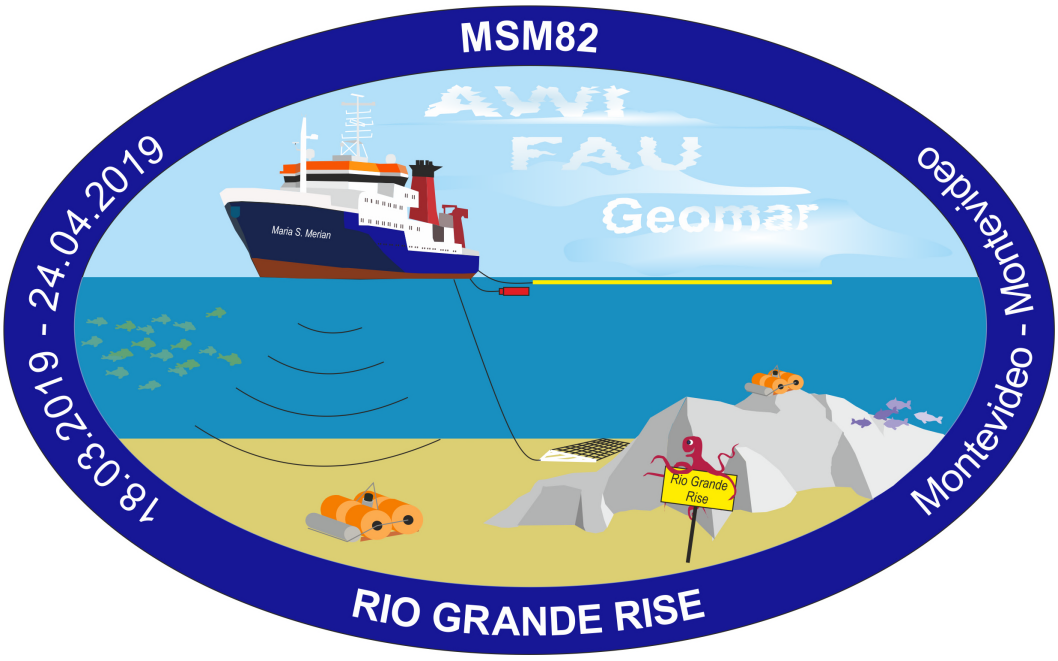
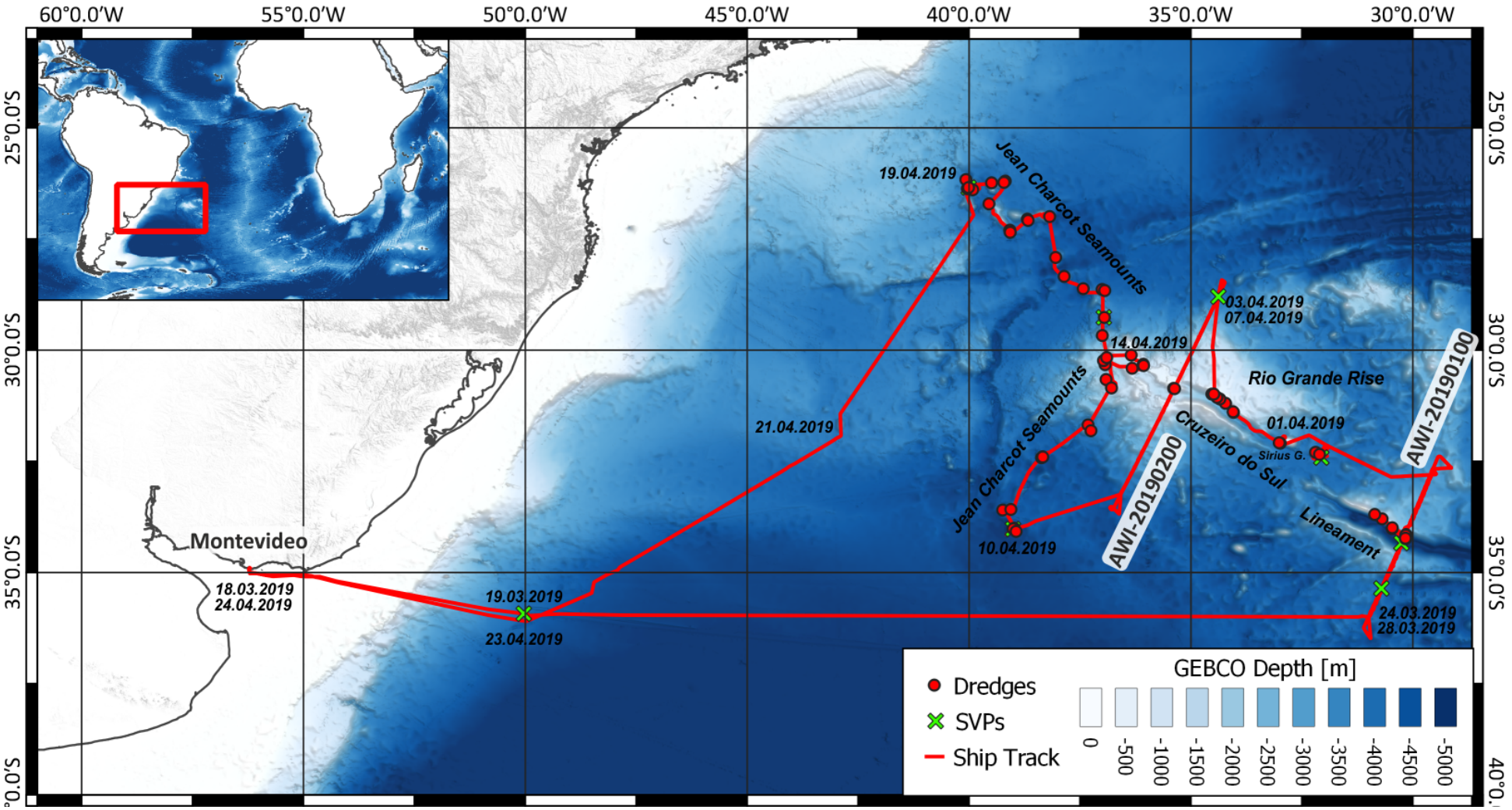
Dr. Wolfram Geissler
Alfred-Wegener-Institut Helmholtz-Zentrum
für Polar- und Meeresforschung
Am Alten Hafen 26
27568 Bremerhaven, Germany

Tel.: +49 471 4831 1550
Fax: +49 471 4831 1926
email: wolfram.geissler@awi.de

Short Cruise Report
MARIA S. MERIAN MSM82

Montevideo - Montevideo
18.03.2019 – 24.04.2019
Chief Scientist: Wolfram Geissler
Captain: Ralf Schmidt




60°0.0'W
55°0.0'W
50°0.0'W
45°0.0'W
40°0.0'W
35°0.0'W
30°0.0'W
25°0.0'S
30°0.0'S
35°0.0'S
40°0.0'S
Montevideo
18.03.2019
24.04.2019
19.03.2019
23.04.2019
21.04.2019
19.04.2019
Jean Charcot Seamounts
14.04.2019
Jean Charcot Seamounts
10.04.2019
03.04.2019
07.04.2019
Rio Grande Rise
01.04.2019
Sirius G.
Cruzeiro do Sul
Lineament
AWI-20190200
AWI-20190100
24.03.2019
28.03.2019
Dredges
SVPs
Ship Track
GEBCO Depth [m]
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
-4500
-5000

Objectives

Significant doubts have arisen about a mantle plume origin for the Rio Grande Rise (RGR), because of recent evidence that it is a fragment of Gondwanaland (Roberto Ventura Santos, Geological Survey of Brazil, personal communication) and the discovery of continental fragments in hotspot trails in the Indian Ocean. In 2012 and 2013 Japanese and Brazilian researchers using the manned submersible Shinkai 6500 found a slab of granite and gneisses around 100 m^2 at a depth of roughly 1000 meters, together with silica-rich metamorphic rocks and a large expanse of quartz sand. The size of the granite slab, its thick alteration, and the presence of quartz sand, unknown on the seafloor, indicates that it is highly unlikely to be ballast jettisoned from a ship. The negative Bouguer anomaly especially under the western RGR implies that it is underlain by continental crust, captured during rifting of South America from Africa.

However, assuming that the RGR is exclusively the result of microcontinent formation cannot explain the overlying/adjacent 1000 km-long bending Jean Charcot seamount chain, which seems to be a classic trail of a long-lived mantle plume.

In detail, we will use gravity and seismic measurements combined with geochemical data to test the following hypotheses:

Is the Rio Grande Rise a microcontinent or a hotspot track or both?

Seismic experiments across the RGR and Cruzeiro do Sul Lineament (CdSL) will provide constraints on the following questions:

- Determine areas of continental and oceanic crust by comparing velocity-depths functions.
- Termination of the RGR against oceanic crust
- Has the CdSL been modified significantly by magmatic intrusions?
- Is the CdSL an old continental rift graben or due to major plate reorganizations?

Geochemistry, geo- and thermochronology questions:

- Does the distribution of oceanic and continental crust correlate with variations in the velocity-depth function?
- Is there evidence for a mantle plume during rifting?
- Chemical evolution and composition of mantle source of oceanic crust

Is the Jean Charcot Seamount chain a hotspot trail?

Seismic experiments questions:

- Did the JCSC form where lines of weakness channeled melts?
- Does the mantle plume responsible for the JCSC significantly influence the surrounding lithosphere?
-

Geochemical, geochronological questions:

- Is the JCSC a progressive hotspot trail?
- Comparison of age and composition between JCSC, RGR and Walvis Ridge
- What does geochemical variation with time tell us about the evolution of mantle source composition, upper mantle temperature and the effects of lithosphere thickness?

Narrative

By the time the *Maria S. Merian* finished a successful expedition MSM81 to the Falkland Plateau in Montevideo, most members of the MSM82 scientific party had already arrived. As all formalities in the port had already been completed we could go onboard in the morning. We were hoping to start with our preparation work early. Unfortunately, our first day in port did not continue as expected, because the wind became so strong that the containers could not be delivered to the vessel as planned. All containers arrived finally at the pier or were already loaded on deck the next morning. It was important for us to start installing the gravity meters on schedule. These instruments for measuring the gravity of the Earth must be heated before any measurements can be taken. Sunday morning (17.3.), all members of the scientific party embarked on the vessel. The last day in port could be used to continue preparing the scientific instruments and laboratories. In the morning there was an introduction lecture about life and work at sea. In the afternoon we could finally make the tie measurements for the gravity meter.

Monday morning (18.3.) *Maria S. Merian* set sail at 8:30 o'clock as planned toward the Rio Grande Rise. It would take another four days to reach our first working area. Even though the weather was pretty nice as we left Montevideo and the waves in the estuary of the Rio de la Plata were small, there was strong wind and a rough sea state when we reached the open Atlantic. Luckily, the weather became better during the course of the first week and everyone eventually became used to life and work at sea. We used the long transit time to continue preparing for our measurements. In particular, the ocean bottom seismometers (OBS) had to be assembled and tested. The testing of the release units, essential for recovering the instruments and recorded data from the seafloor, took place as soon as we left Uruguay on Tuesday (19.3.) at 35° 56' S 050° 02' W. After a successful test we started all underway measurements and instruments such as multibeam swath bathymetry, sediment echo sounder, gravity meter, and current meters (ADCP). In addition, we carried out the first magnetic measurements that will allow us to determine the age of the oceanic crust. Heading eastward along 36° S we arrived at our first OBS deployment station at 36° 00' S 031° 00' W in the morning of Saturday (23.3.). Deploying a 450 km long profile of 27 OBS, spaced 8 nm apart, took until the early Tuesday morning (26.3.). After we had deployed 16 of the OBS the petrology group started the first of eight dredge hauls on Sunday (24.3.) and finished the last one around noon on Monday (25.3.). The first dredge haul was unexpectedly successful. It was carried out at approximately 34° 09' S 030° 09' W on the steep wall of the graben bisecting the Rio Grande Rise. The steep northern flank exposes rocks at depths that normally can only be reached by expensive deep drilling. Good weather conditions and the right wind direction resulted in seven successful dredge hauls. Only one haul came up empty.

The second week was dedicated to the first seismic refraction profile. Starting Monday afternoon (25.3.) and continuing until Tuesday early morning (26.3.) the remaining eleven ocean bottom seismometers were deployed along the first seismic profile. At about 6 o'clock we started to deploy the streamer, a 3000 m long cable with 240 hydrophones. Since it was not clear if, or how well, the streamer would function we used some time reserved for contingencies to test some of its sections and modules. Unfortunately, the test was not successful so we decided to deploy the airguns and start with the seismic measurements. The first airgun was put into operation only after we were given the "Go" from the marine mammal observers from Seiche Environmental Limited. No whales or other marine mammals were observed close to the vessel. We started the seismic profile Tuesday (26.3.) at 12:00 o'clock at 32° 23' S 029° 25' W. The airguns were operated at a pressure of 200 bar. We also deployed the towed magnetometer along the profile. Unfortunately, we could only record data with the streamer sporadically. Further testing indicated that most probably the tow cable of the streamer, the lead in, was causing the

malfunction. As we were not able to solve that issue on board we will have to rely solely on the OBS recordings.

After two days without a break we arrived at the end of the first seismic profile at 36° 15' S 031° 06' W shortly after lunch on Thursday (28.3.). The magnetometer, airguns and streamer were recovered without any problems. Then we started to recover the OBS beginning at the southwest end of the profile. The last of the 27 OBS surfaced and was successfully recovered early on Saturday morning (30.3.).

We then started our transit towards the second working area in the central Rio Grande Rise. On the way we measured with the towed magnetometer and all other onboard measurement systems such as the swath multibeam echo sounder and sediment echo sounder. We made two stops at nearby seamounts.

One was already named Sirius Guyot so we provisionally named the other Jokat seamount. During the first dredge haul Sunday morning (31.3.) on Jokat seamount (32° 18' S 032° 12' W) the dredge became stuck. But it was freed and recovered successfully thanks to the master and the crew. The dredge was empty, with the exception of some sediments. The dredge also became stuck during the second attempt but it was again freed and recovered a large sample that turned out, unfortunately, to be carbonate material rather than the expected basalt or maybe plutonic rock

At the start of week three we arrived at Sirius Guyot (32° 06' S 032° 59' W), an impressive seamount located to the southeast of the central Rio Grande Rise. Because of its location we assumed that its formation is closely related to the evolution of the deep graben structure. Therefore, we aimed to dredge samples from its flanks but because of easterly winds we had to search for a suitably steep slope in the bathymetry data. Unfortunately, we were not successful this time because the dredge became stuck during both hauls and had to be freed by the ship’s officers. When it was clear that the dredges did not contain any rock samples we decided not to try again and to continue on our way to the northwest. During the course of Monday (1.4.) and Tuesday (2.4.) we planned to dredge more samples from the flanks of the deep graben in the central Rio Grande Rise. During our transit across the northern flank of the graben we mapped the seafloor to look for a suitably steep slope we could dredge in an eastward direction. Unfortunately, the wind continued to blow from an easterly direction with 4 to 5 Bft. Northeasterly winds would have been better for dredging. The success rate of the individual dredge hauls has varied but as of Tuesday (2.4.) evening the petrologists have sampled a few good rocks from the graben at approximately 31° 12' S 034° 13' W.

Wednesday morning (3.4.) we arrived at the northern end of the second seismic refraction profile. On our way we mapped the seafloor and measured magnetic data. Before we deployed the first OBS we again measured the water sound velocity to calibrate the multibeam swath echo sounder to establish the water conditions in our new study area.

Deployments of the OBS, spaced 10 nm apart, proceeded quickly. But suddenly there was an interruption. Close to the eight deployment position, some unknown obstacle was observed right in front of the vessel. On reaching the obstacle, it became clear that it was an old buoy from a harbor. This obstacle could have represented a serious danger especially at night, because we might have collided with it during our measurement along the profile. The master decided to return to the buoy after we had deployed the eight OBS. In the meantime, the buoy had drifted slightly southwards, but more or less along our track. Therefore, the decision was made to flag the obstacle. Within minutes, a daughter buoy was manufactured in the deck workshop. It was equipped with a flag, a radio beacon and a flashlight, all the things that we normally use to identify the OBS when they surface. Our hope is to identify the buoy easily in case it is still close to our track during seismic profiling. Around the buoy we observed different kinds of fish. Even if the buoy represents just a piece of garbage, it is like a little oasis in the wide ocean.

Thursday at noon (4.4.) we deployed the last of the 30 OBS. We moved some miles

further south to reach the start point of the seismic profile and started to deploy the airguns. Our marine mammal observers were already on watch taking care that no whales or other marine mammals would be too close to the vessel when we started our measurements. Indeed, they observed a sperm whale, but a long way from the vessel. After all our preparations were finished and we were sure that no marine mammals were close to the vessel we could start with the seismic measurements in the late afternoon. The profile runs from 33° 35' S 036° 47' W to 28° 29' S 034° 14' W and is about 600 km long.

The weather conditions were fine over the course of the third week, with the exception of the unfavorable wind directions during the dredge operations at the start of the week. So, on Friday (5.4.) our marine mammal observers were able to spot a female together with a young fin whale crossing our track a large distance from the vessel. Due to problems with the pressure hoses we could operate the airguns at a pressure of only 170-180 bar. However, everything went well, and we have been able to measure without any breaks. We finished measuring the second profile on Sunday afternoon (7.4.) and started to recover the OBS.

The fourth week started with dredging in the western part of the graben structure where it is crossed by the seismic profile. The forecast of bad weather and high swell forced us to make only a short stop for dredging. We decided to continue with the recovery of the remaining OBS. Luckily all the OBS's were recovered by Tuesday evening (9.4.) without any problems or damage even though the weather and sea state was bad due to a low-pressure system crossing our track.

We continued to the southwest and started sampling southern end of the Jean Charcot Seamount Chain on Wednesday (10.4.). Attempts to dredge two seamounts (at 34° 00' S 038° 59' W and 33° 36' S 039° 15' W) were unsuccessful due to unfavorable wind and wave direction and because the seamounts are small and offer few steep slopes suitable for dredging. Although weather conditions had become better by Thursday (11.4.) dredging a third seamount at 32° 24' S 038° 21' W also proved unsuccessful. Fortunately, on Friday (12.4.) we were very successful in sampling the first large seamount we encountered at 31° 41' S 037° 19' W, which is located just south of the RGR. During longer transits between the seamounts we again collected magnetic data.

Saturday (13.4.) we tried to sample two shallow seamounts on the western Rio Grande Rise (30° 40' S 036° 55' W and 30° 19' S 036° 56' W). We mapped for long distances along their flanks to find suitable sites for dredging depending on the wind and swell directions. But no volcanic or plutonic rocks we recovered Sunday (14.4.) we returned one last time to the deep graben structure and recovered samples along its southern and northern flanks (30° 24' S 036° 20' W and 30° 21' S 036° 04' W). During the night to Monday we returned once more to one of the seamounts on the western Rio Grande Rise at 30° 10' S 036° 54' W but the dredge became stuck once again and we recovered only carbonate crust.

By the beginning of the fifth week it was time to make a final decision about the third originally planned seismic refraction profile. With only 5 working days left before we would have to start the transit back to Montevideo and the experience of many unsuccessful dredge hauls we decided to cancel the seismic profile and invest all remaining time into sampling the crucially important unsampled part of the Jean Charcot Seamount Chain.

While this was a difficult decision it was made somewhat easier by the knowledge that since Klingelhoefer et al. (2015) have published results from a nearby seismic refraction study. Thus, we can use this published information in our interpretation about the nature of the Jean Charcot Seamount Chain.

The sampling of the Jean Charcot Seamount Chain north of the Rio Grande Rise and the western end of the graben was just as challenging as before. We had to map and find suitable steep slopes with wind and swell directions often severely limiting our options. We

were successful at some seamounts, and failed at others (empty dredges or only carbonate crusts). But overall, we recovered a fascinating and scientifically very important collection of rocks distributed along the seamount chain and graben. Weather conditions varied over the course of the week, but were generally good. We encountered a southwesterly swell almost all time during the cruise.

We finished dredging between Friday and Saturday (19./20.4.) on the large seamount at the northwestern end of the seamount chain, not far from the Brazilian Economic Zone (EEZ). After three unsuccessful hauls we recovered a large piece of basalt. Before heading back to Montevideo, we measured the water sound velocity using a mobile XSV probe. Afterwards we deployed the towed magnetometer and set sail southwards. Going south we stayed outside the Brazilian EEZ so that new could continue with the underway measurements and magnetic profiling. Magnetic measurements finished Monday (22.4.) at noon. Underway measurements (multibeam bathymetry, sediment echo sounder, gravity, ADCP) continued until Monday evening, shortly before we reached the Uruguayan EEZ. Weather conditions were fine during our transit. The time on transit was used to pack all scientific freight and samples and stow the containers, to have almost everything done before we arrive to port.

We reached the port of Montevideo Wednesday morning (24.4.) at 8:30 o'clock. Shortly after we measured gravity at the tie stations in the harbor. The last of the scientific equipment was stowed into the containers. By the evening all members of the scientific party had left the vessel marking the end of MSM82.

Klingelhoefer, F., et al., 2015. Imaging proto-oceanic crust off the Brazilian Continental Margin. Geophysical Journal International 200(1), 471-488, doi:10.1093/gji/ggu387.

Acknowledgements

We thank the Captain Ralf Schmidt and the crew of R/V MARIA S. MERIAN for their professional and friendly support of the scientific work at sea. Their hard work, high level of experience, great flexibility and willingness to help, as well as the pleasant working atmosphere on board, contributed directly to the success of expedition MSM82. We are also grateful to the German Federal Ministry of Education and Research and the German Research Foundation (DFG) for continuing support of marine research. Much appreciated support has been given by Briese Schiffahrts GmbH & Co. KG and LPL Projects + Logistics GmbH. Furthermore, we thank the German instrument pool for amphibian seismology (DEPAS) for providing instruments and technical support. We thank all unnamed people in our institutes and somewhere else that made this cruise to a successful expedition.

Teilnehmerliste

Dr. Geissler, Wolfram	Geophysics / Chief Scientist	AWI
Dr. Krumm, Stefan	Petrology / Co-Chief Scientist	FAU
Dr. Geldmacher, Jörg	Petrology	GEOMAR
Dr. O'Connor, John	Petrology	FAU
Dr. Altenbernd, Tabea	Geophysics	AWI
Dr. Homrighausen, Stephan	Petrology	GEOMAR
Dr. Hackspacher, Peter, Prof.	Petrology	UNESP
Dr. Funck, Thomas	Geophysics	GEUS
Kirk, Henning	Geophysics	AWI
Pfeiffer, Adalbert	Geophysics	AWI
Geils, Jonah	Hydroacoustics	AWI
Mossad, Abdelrahman	Hydroacoustics / Geophysics	AWI
Unger-Moreno, Katharina Anna	Hydroacoustics / Petrology	AWI
Schlager, Ursula	Geophysics	AWI
Lehmann, Carsten	Geophysics	AWI
Korsch, Karsten	Geophysics	AWI
Hättig, Katrin	Geophysics	AWI
Nöbel, Kristina	Petrology	FAU
Hoyer, Patrick	Petrology	FAU
Falkenberg, Jan	Petrology	FAU
Shearing, Jennifer	Marine Mammal Observer	Seiche
Purdon, Jean	Marine Mammal Observer	Seiche

AWI	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung Bremerhaven
FAU	GeoZentrum Nordbayern, Friedrich-Alexander-Universität Erlangen-Nürnberg
GEOMAR	Helmholtz-Zentrum für Ozeanforschung Kiel
UNESP	Department of Petrology and Metalogeny, Institut of Geocience and Exact Sciences, São Paulo State University- UNESP, São Paulo, Brazil
GEUS	Geological Survey of Denmark and Greenland, Copenhagen, Denmark
Seiche	Seiche Environmental Limited, Holsworthy, Devon/UK

Stationsliste

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_1-1	19.03.19 15:31	Releaser Test	in the water	*35° 55.511' S*	*050° 02.117' W*	4171	0	61	201	30
MSM82_1-2	19.03.19 18:14	Releaser Test	in the water	35° 55.730' S	050° 01.542' W	4212	0	297	191	30
MSM82_1-3	19.03.19 20:54	Releaser Test	in the water	35° 55.318' S	049° 58.236' W	4229	1	120	178	29
MSM82_2-1	19.03.19 23:38	Magnetometer	profile start	35° 58.428' S	049° 56.206' W	4261	12	92	185	30
MSM82_2-1	23.03.19 06:11	Magnetometer	profile end	35° 59.964' S	031° 14.738' W	4020	12	93	129	13
MSM82_3-1	23.03.19 07:37	Seismic Ocean Bottom Receiver	OBS deployed	35° 59.824' S	030° 59.674' W	3877	0	317	130	13
MSM82_3-2	23.03.19 08:35	Seismic Ocean Bottom Receiver	OBS deployed	35° 52.172' S	030° 56.199' W	4247	1	3	139	14
MSM82_3-3	23.03.19 09:33	Seismic Ocean Bottom Receiver	OBS deployed	35° 44.518' S	030° 52.734' W	4285	1	319	145	16
MSM82_3-4	23.03.19 10:28	Seismic Ocean Bottom Receiver	OBS deployed	35° 36.872' S	030° 49.270' W	4396	1	279	100	8
MSM82_3-5	23.03.19 11:22	Seismic Ocean Bottom Receiver	OBS deployed	35° 29.174' S	030° 45.868' W	4254	1	22	138	17
MSM82_4-1	23.03.19 12:23	CTD	in the water	35° 21.553' S	030° 42.419' W	4255	0	13	119	14
MSM82_3-6	23.03.19 14:14	Seismic Ocean Bottom Receiver	OBS deployed	35° 21.563' S	030° 42.407' W	4256	0	248	103	11
MSM82_3-7	23.03.19 15:16	Seismic Ocean Bottom Receiver	OBS deployed	35° 13.776' S	030° 38.976' W	4296	2	28	121	14
MSM82_3-8	23.03.19 16:09	Seismic Ocean Bottom Receiver	OBS deployed	35° 06.218' S	030° 35.542' W	4200	2	359	122	15
MSM82_3-9	23.03.19 17:03	Seismic Ocean Bottom Receiver	OBS deployed	34° 58.562' S	030° 32.221' W	3049	2	329	118	14
MSM82_3-10	23.03.19 18:03	Seismic Ocean Bottom Receiver	OBS deployed	34° 50.921' S	030° 28.792' W	2611	2	340	116	17
MSM82_3-11	23.03.19 19:02	Seismic Ocean Bottom Receiver	OBS deployed	34° 43.268' S	030° 25.408' W	2551	1	339	97	16
MSM82_3-12	23.03.19 20:01	Seismic Ocean Bottom Receiver	OBS deployed	34° 35.621' S	030° 22.084' W	2621	1	345	110	19
MSM82_3-13	23.03.19 21:00	Seismic Ocean Bottom Receiver	OBS deployed	34° 27.929' S	030° 18.703' W	3105	1	321	111	19
MSM82_5-1	23.03.19 22:13	CTD	in the water	34° 20.265' S	030° 15.389' W	5218	0	207	108	15

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_3-14	24.03.19 01:10	Seismic Ocean Bottom Receiver	OBS deployed	34° 20.272' S	030° 15.342' W	5189	0	167	107	14
MSM82_3-15	24.03.19 02:23	Seismic Ocean Bottom Receiver	OBS deployed	34° 11.317' S	030° 11.419' W	3893	1	332	117	11
MSM82_3-16	24.03.19 03:23	Seismic Ocean Bottom Receiver	OBS deployed	34° 04.944' S	030° 08.658' W	2319	1	330	124	13
MSM82_6-1	24.03.19 04:13	Dredge	in the water	34° 08.822' S	030° 09.100' W	3311	0	178	131	15
MSM82_7-1	24.03.19 07:30	Dredge	in the water	34° 09.569' S	030° 09.486' W	3870	0	150	118	16
MSM82_8-1	24.03.19 11:41	Dredge	in the water	34° 14.407' S	030° 09.881' W	5283	0	216	125	18
MSM82_9-1	24.03.19 15:54	Dredge	in the water	34° 13.690' S	030° 09.972' W	4628	0	105	134	11
MSM82_10-1	25.03.19 00:14	Dredge	in the water	33° 47.658' S	030° 41.501' W	2109	0	93	124	7
MSM82_11-1	25.03.19 05:15	Dredge	in the water	33° 41.650' S	030° 51.492' W	1341	0	169	63	6
MSM82_12-1	25.03.19 09:39	Dredge	in the water	34° 00.793' S	030° 27.847' W	4686	0	165	37	6
MSM82_13-1	25.03.19 13:05	Dredge	in the water	33° 59.598' S	030° 27.767' W	3706	0	84	5	14
MSM82_3-17	25.03.19 19:12	Seismic Ocean Bottom Receiver	OBS deployed	33° 57.301' S	030° 05.392' W	2402	1	236	349	19
MSM82_3-18	25.03.19 20:17	Seismic Ocean Bottom Receiver	OBS deployed	33° 49.613' S	030° 02.061' W	2466	1	248	336	21
MSM82_3-19	25.03.19 21:19	Seismic Ocean Bottom Receiver	OBS deployed	33° 41.921' S	029° 58.776' W	2475	1	228	336	20
MSM82_3-20	25.03.19 22:20	Seismic Ocean Bottom Receiver	OBS deployed	33° 34.252' S	029° 55.493' W	2598	1	245	334	20
MSM82_3-21	25.03.19 23:23	Seismic Ocean Bottom Receiver	OBS deployed	33° 26.608' S	029° 52.191' W	2748	1	215	345	21
MSM82_3-22	26.03.19 00:35	Seismic Ocean Bottom Receiver	OBS deployed	33° 18.881' S	029° 48.940' W	2756	1	335	339	25
MSM82_3-23	26.03.19 01:46	Seismic Ocean Bottom Receiver	OBS deployed	33° 11.234' S	029° 45.723' W	3137	1	275	332	23
MSM82_3-24	26.03.19 02:49	Seismic Ocean Bottom Receiver	OBS deployed	33° 03.526' S	029° 42.464' W	3296	1	228	339	24
MSM82_3-25	26.03.19 03:50	Seismic Ocean Bottom Receiver	OBS deployed	32° 55.846' S	029° 39.204' W	3347	1	279	331	25
MSM82_3-26	26.03.19 04:55	Seismic Ocean Bottom Receiver	OBS deployed	32° 48.160' S	029° 35.989' W	3268	1	332	322	21

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_3-27	26.03.19 06:00	Seismic Ocean Bottom Receiver	OBS deployed	32° 40.485' S	029° 32.767' W	3320	1	280	330	23
MSM82_3-28	26.03.19 09:43	Seismic Towed Receiver	information	32° 37.010' S	029° 09.525' W	2680	4	319	315	21
MSM82_3-29	26.03.19 14:32	Seismic Source	information	32° 23.904' S	029° 22.239' W	3291	6	318	296	17
MSM82_14-1	26.03.19 15:00	Magnetometer	profile start	32° 23.340' S	029° 24.837' W	3309	5	248	310	19
MSM82_3-29	26.03.19 15:00	Seismic Source	profile start	32° 23.342' S	029° 24.843' W	3308	5	254	311	20
MSM82_14-1	28.03.19 15:32	Magnetometer	profile end	36° 11.519' S	031° 05.007' W	4460	5	202	143	13
MSM82_3-29	28.03.19 16:13	Seismic Source	profile end	36° 14.699' S	031° 06.277' W	4436	4	178	164	10
MSM82_3-28	28.03.19 17:08	Seismic Towed Receiver	information	36° 17.694' S	031° 04.806' W	4340	4	160	127	13
MSM82_3-1	29.03.19 00:25	Seismic Ocean Bottom Receiver	OBS on deck	36° 00.083' S	030° 59.618' W	0	1	245	128	11
MSM82_3-2	29.03.19 01:47	Seismic Ocean Bottom Receiver	OBS on deck	35° 52.470' S	030° 55.912' W	0	0	172	141	9
MSM82_3-3	29.03.19 04:14	Seismic Ocean Bottom Receiver	OBS on deck	35° 44.645' S	030° 52.280' W	0	1	91	160	9
MSM82_3-4	29.03.19 06:07	Seismic Ocean Bottom Receiver	OBS on deck	35° 36.901' S	030° 48.967' W	0	0	9	157	8
MSM82_3-5	29.03.19 08:02	Seismic Ocean Bottom Receiver	recovered	35° 29.208' S	030° 45.511' W	0	0	290	151	9
MSM82_3-6	29.03.19 09:42	Seismic Ocean Bottom Receiver	OBS on deck	35° 21.341' S	030° 42.175' W	0	0	166	148	10
MSM82_3-7	29.03.19 11:20	Seismic Ocean Bottom Receiver	OBS on deck	35° 13.477' S	030° 38.936' W	0	0	354	145	9
MSM82_3-8	29.03.19 13:07	Seismic Ocean Bottom Receiver	OBS on deck	35° 06.045' S	030° 35.548' W	0	1	229	148	10
MSM82_3-9	29.03.19 14:22	Seismic Ocean Bottom Receiver	OBS on deck	34° 58.452' S	030° 32.315' W	0	1	221	150	12
MSM82_3-10	29.03.19 15:56	Seismic Ocean Bottom Receiver	OBS on deck	34° 50.912' S	030° 28.892' W	2609	1	205	127	13
MSM82_3-11	29.03.19 17:44	Seismic Ocean Bottom Receiver	OBS on deck	34° 43.334' S	030° 25.494' W	0	1	256	116	14
MSM82_3-12	29.03.19 19:12	Seismic Ocean Bottom Receiver	OBS on deck	34° 35.684' S	030° 22.166' W	0	1	184	105	12
MSM82_3-13	29.03.19 20:35	Seismic Ocean Bottom Receiver	OBS on deck	34° 27.967' S	030° 18.780' W	0	1	186	122	18

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_3-14	29.03.19 22:45	Seismic Ocean Bottom Receiver	OBS on deck	34° 20.196' S	030° 15.307' W	0	0	174	113	16
MSM82_3-15	30.03.19 00:29	Seismic Ocean Bottom Receiver	OBS on deck	34° 11.299' S	030° 11.489' W	0	1	316	123	17
MSM82_3-16	30.03.19 01:38	Seismic Ocean Bottom Receiver	OBS on deck	34° 04.910' S	030° 08.742' W	2319	1	285	120	17
MSM82_3-17	30.03.19 02:55	Seismic Ocean Bottom Receiver	OBS on deck	33° 57.307' S	030° 05.411' W	0	0	203	117	16
MSM82_3-18	30.03.19 04:20	Seismic Ocean Bottom Receiver	OBS on deck	33° 49.629' S	030° 02.063' W	0	0	247	127	18
MSM82_3-19	30.03.19 05:45	Seismic Ocean Bottom Receiver	OBS on deck	33° 42.007' S	029° 58.874' W	0	1	182	135	19
MSM82_3-20	30.03.19 07:09	Seismic Ocean Bottom Receiver	OBS on deck	33° 34.286' S	029° 55.659' W	2534	1	259	120	16
MSM82_3-21	30.03.19 08:33	Seismic Ocean Bottom Receiver	OBS on deck	33° 26.688' S	029° 52.254' W	0	1	215	131	19
MSM82_3-22	30.03.19 09:49	Seismic Ocean Bottom Receiver	OBS on deck	33° 18.969' S	029° 49.047' W	2751	2	240	122	21
MSM82_3-23	30.03.19 11:16	Seismic Ocean Bottom Receiver	OBS on deck	33° 11.162' S	029° 45.830' W	3131	2	272	107	23
MSM82_3-24	30.03.19 12:43	Seismic Ocean Bottom Receiver	OBS on deck	33° 03.436' S	029° 42.657' W	0	0	283	123	17
MSM82_3-25	30.03.19 14:11	Seismic Ocean Bottom Receiver	OBS on deck	32° 55.789' S	029° 39.416' W	3347	1	293	118	20
MSM82_3-26	30.03.19 15:45	Seismic Ocean Bottom Receiver	OBS on deck	32° 48.088' S	029° 36.149' W	0	1	128	123	19
MSM82_3-27	30.03.19 17:18	Seismic Ocean Bottom Receiver	OBS on deck	32° 40.518' S	029° 33.069' W	0	1	245	134	20
MSM82_15-1	30.03.19 17:56	Magnetometer	profile start	32° 44.266' S	029° 30.066' W	3282	9	148	119	20
MSM82_15-1	31.03.19 07:21	Magnetometer	profile end	32° 22.688' S	032° 09.459' W	3801	12	213	119	17
MSM82_16-1	31.03.19 09:49	Dredge	in the water	32° 17.821' S	032° 11.538' W	2877	0	193	110	16
MSM82_17-1	31.03.19 15:07	Dredge	in the water	32° 20.610' S	032° 06.118' W	2776	0	345	91	17
MSM82_18-1	31.03.19 19:32	Expandedable Sound Velocimeter	in the water	32° 24.982' S	032° 03.643' W	4010	5	25	106	15
MSM82_19-1	31.03.19 20:08	Magnetometer	profile start	32° 21.987' S	032° 01.691' W	2710	8	32	103	15
MSM82_19-1	01.04.19 02:57	Magnetometer	profile end	32° 08.438' S	033° 01.516' W	3956	6	4	115	14

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_20-1	01.04.19 06:11	Dredge	in the water	32° 05.573' S	032° 59.193' W	3536	0	171	112	15
MSM82_21-1	01.04.19 09:47	Dredge	in the water	32° 04.972' S	033° 00.590' W	3733	0	197	105	16
MSM82_22-1	01.04.19 13:14	Magnetometer	profile start	32° 02.542' S	033° 03.660' W	3909	8	299	93	9
MSM82_22-1	01.04.19 18:33	Magnetometer	profile end	31° 27.077' S	033° 59.021' W	2053	10	312	84	7
MSM82_23-1	01.04.19 19:50	Dredge	in the water	31° 23.962' S	034° 02.441' W	2194	0	195	109	20
MSM82_24-1	01.04.19 23:13	Dredge	in the water	31° 23.156' S	034° 02.918' W	2223	0	90	105	18
MSM82_25-1	02.04.19 04:09	Dredge	in the water	31° 11.582' S	034° 13.268' W	1997	0	145	107	17
MSM82_26-1	02.04.19 08:29	Dredge	in the water	31° 05.853' S	034° 20.861' W	1155	0	196	92	16
MSM82_27-1	02.04.19 12:16	Dredge	in the water	31° 03.678' S	034° 24.836' W	1412	0	30	92	13
MSM82_28-1	02.04.19 15:21	Dredge	in the water	30° 59.298' S	034° 31.656' W	1796	0	58	60	13
MSM82_29-1	02.04.19 17:20	Dredge	in the water	30° 59.314' S	034° 29.123' W	1343	0	334	78	15
MSM82_30-1	02.04.19 19:47	Magnetometer	profile start	30° 55.042' S	034° 28.238' W	699	8	3	73	15
MSM82_30-1	03.04.19 05:54	Magnetometer	profile end	28° 53.358' S	034° 23.567' W	3782	12	6	84	21
MSM82_31-1	03.04.19 06:56	CTD	in the water	28° 47.727' S	034° 22.916' W	3894	0	286	83	20
MSM82_32-1	03.04.19 08:29	Seismic Ocean Bottom Receiver	OBS deployed	28° 47.719' S	034° 22.918' W	3895	1	315	85	18
MSM82_32-2	03.04.19 09:32	Seismic Ocean Bottom Receiver	OBS deployed	28° 56.952' S	034° 27.288' W	3790	0	14	86	19
MSM82_32-3	03.04.19 10:33	Seismic Ocean Bottom Receiver	OBS deployed	29° 06.179' S	034° 31.647' W	3251	0	280	75	19
MSM82_32-4	03.04.19 11:36	Seismic Ocean Bottom Receiver	OBS deployed	29° 15.403' S	034° 36.041' W	2751	1	309	83	16
MSM82_32-5	03.04.19 12:38	Seismic Ocean Bottom Receiver	OBS deployed	29° 24.645' S	034° 40.438' W	2699	0	332	73	19
MSM82_32-6	03.04.19 13:40	Seismic Ocean Bottom Receiver	OBS deployed	29° 33.866' S	034° 44.822' W	2264	1	298	76	17
MSM82_32-7	03.04.19 15:22	Seismic Ocean Bottom Receiver	OBS deployed	29° 43.092' S	034° 49.243' W	1969	2	89	64	17

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_32-8	03.04.19 17:41	Seismic Ocean Bottom Receiver	OBS deployed	29° 52.300' S	034° 53.672' W	1927	1	66	63	17
MSM82_32-9	03.04.19 18:40	Seismic Ocean Bottom Receiver	OBS deployed	30° 01.515' S	034° 58.126' W	1993	1	79	45	16
MSM82_32-10	03.04.19 19:37	Seismic Ocean Bottom Receiver	OBS deployed	30° 10.747' S	035° 02.574' W	2084	1	248	333	8
MSM82_32-11	03.04.19 20:32	Seismic Ocean Bottom Receiver	OBS deployed	30° 19.937' S	035° 07.043' W	1396	1	174	23	8
MSM82_32-12	03.04.19 21:27	Seismic Ocean Bottom Receiver	OBS deployed	30° 29.176' S	035° 11.549' W	1488	1	203	320	7
MSM82_32-13	03.04.19 22:31	Seismic Ocean Bottom Receiver	OBS deployed	30° 40.864' S	035° 17.312' W	639	1	214	347	9
MSM82_32-14	03.04.19 23:15	Seismic Ocean Bottom Receiver	OBS deployed	30° 47.541' S	035° 20.583' W	633	1	149	316	12
MSM82_32-15	04.04.19 00:19	Seismic Ocean Bottom Receiver	OBS deployed	30° 56.742' S	035° 25.117' W	1474	1	205	318	13
MSM82_32-16	04.04.19 01:10	Seismic Ocean Bottom Receiver	OBS deployed	31° 04.530' S	035° 28.947' W	1546	1	264	336	11
MSM82_32-17	04.04.19 02:11	Seismic Ocean Bottom Receiver	OBS deployed	31° 15.153' S	035° 34.209' W	845	1	237	360	15
MSM82_32-18	04.04.19 03:07	Seismic Ocean Bottom Receiver	OBS deployed	31° 24.386' S	035° 38.875' W	1250	2	280	12	11
MSM82_32-19	04.04.19 04:08	Seismic Ocean Bottom Receiver	OBS deployed	31° 35.025' S	035° 44.125' W	2041	1	237	338	13
MSM82_32-20	04.04.19 04:54	Seismic Ocean Bottom Receiver	OBS deployed	31° 42.722' S	035° 48.024' W	2021	1	216	307	9
MSM82_32-21	04.04.19 05:49	Seismic Ocean Bottom Receiver	OBS deployed	31° 51.900' S	035° 52.635' W	2405	2	201	257	9
MSM82_32-22	04.04.19 06:41	Seismic Ocean Bottom Receiver	OBS deployed	32° 01.080' S	035° 57.250' W	2549	1	206	293	10
MSM82_32-23	04.04.19 07:34	Seismic Ocean Bottom Receiver	OBS deployed	32° 10.245' S	036° 01.926' W	2664	0	94	243	10
MSM82_32-24	04.04.19 08:28	Seismic Ocean Bottom Receiver	OBS deployed	32° 19.399' S	036° 06.584' W	2746	0	97	258	7
MSM82_32-25	04.04.19 09:20	Seismic Ocean Bottom Receiver	OBS deployed	32° 28.590' S	036° 11.251' W	3094	1	103	251	12
MSM82_32-26	04.04.19 10:13	Seismic Ocean Bottom Receiver	OBS deployed	32° 37.791' S	036° 15.941' W	3288	1	174	298	17
MSM82_32-27	04.04.19 11:08	Seismic Ocean Bottom Receiver	OBS deployed	32° 46.922' S	036° 20.663' W	3736	1	87	240	14
MSM82_32-28	04.04.19 12:06	Seismic Ocean Bottom Receiver	OBS deployed	32° 56.089' S	036° 25.416' W	3974	1	106	251	13

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_32-29	04.04.19 13:02	Seismic Ocean Bottom Receiver	OBS deployed	33° 05.252' S	036° 30.131' W	4135	1	122	266	16
MSM82_32-30	04.04.19 13:57	Seismic Ocean Bottom Receiver	OBS deployed	33° 14.421' S	036° 34.911' W	4341	1	132	279	17
MSM82_32-31	04.04.19 16:20	Seismic Towed Receiver	information	33° 40.647' S	036° 37.461' W	4625	3	322	214	11
MSM82_32-32	04.04.19 20:21	Seismic Source	information	33° 32.839' S	036° 49.465' W	4656	5	170	208	5
MSM82_33-1	04.04.19 20:53	Magnetometer	profile start	33° 35.124' S	036° 47.357' W	4667	6	111	189	4
MSM82_32-32	04.04.19 20:53	Seismic Source	profile start	33° 35.131' S	036° 47.336' W	4667	6	107	190	4
MSM82_33-1	04.04.19 22:55	Magnetometer	profile end	33° 26.666' S	036° 41.178' W	4680	5	24	78	3
MSM82_32-32	07.04.19 15:18	Seismic Source	profile end	28° 29.137' S	034° 14.182' W	4195	5	24	297	14
MSM82_32-31	07.04.19 16:30	Seismic Towed Receiver	MCS on deck	28° 25.657' S	034° 17.524' W	4257	5	308	297	12
MSM82_32-1	07.04.19 19:31	Seismic Ocean Bottom Receiver	OBS on deck	28° 47.639' S	034° 23.032' W	0	1	238	267	11
MSM82_32-2	07.04.19 21:15	Seismic Ocean Bottom Receiver	OBS on deck	28° 56.877' S	034° 27.339' W	0	1	347	324	14
MSM82_32-3	07.04.19 22:57	Seismic Ocean Bottom Receiver	OBS on deck	29° 05.984' S	034° 31.718' W	0	1	281	233	4
MSM82_32-4	08.04.19 01:13	Seismic Ocean Bottom Receiver	OBS on deck	29° 15.188' S	034° 36.252' W	0	1	308	292	1
MSM82_32-5	08.04.19 02:51	Seismic Ocean Bottom Receiver	OBS on deck	29° 24.432' S	034° 40.603' W	0	1	350	95	4
MSM82_32-6	08.04.19 04:31	Seismic Ocean Bottom Receiver	OBS on deck	29° 33.807' S	034° 45.052' W	2286	1	215	344	2
MSM82_32-7	08.04.19 05:59	Seismic Ocean Bottom Receiver	OBS on deck	29° 43.094' S	034° 49.393' W	1969	0	174	330	2
MSM82_32-8	08.04.19 07:22	Seismic Ocean Bottom Receiver	OBS on deck	29° 52.369' S	034° 53.806' W	1934	1	245	55	1
MSM82_32-9	08.04.19 08:51	Seismic Ocean Bottom Receiver	OBS on deck	30° 01.839' S	034° 58.066' W	1905	3	172	137	7
MSM82_32-10	08.04.19 10:10	Seismic Ocean Bottom Receiver	OBS on deck	30° 10.789' S	035° 02.339' W	0	1	164	113	9
MSM82_32-11	08.04.19 11:31	Seismic Ocean Bottom Receiver	OBS on deck	30° 20.063' S	035° 06.900' W	0	1	244	123	10
MSM82_32-12	08.04.19 12:51	Seismic Ocean Bottom Receiver	OBS on deck	30° 29.255' S	035° 11.266' W	1486	0	25	94	8

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_32-13	08.04.19 14:24	Seismic Ocean Bottom Receiver	OBS on deck	30° 40.824' S	035° 17.173' W	639	1	28	129	7
MSM82_32-14	08.04.19 15:37	Seismic Ocean Bottom Receiver	OBS on deck	30° 47.512' S	035° 20.377' W	633	1	328	144	12
MSM82_34-1	08.04.19 16:21	Dredge	in the water	30° 51.536' S	035° 23.340' W	1095	0	353	121	13
MSM82_35-1	08.04.19 18:26	Dredge	in the water	30° 51.927' S	035° 22.151' W	1322	0	280	101	17
MSM82_32-15	08.04.19 20:55	Seismic Ocean Bottom Receiver	OBS on deck	30° 56.772' S	035° 25.087' W	1475	1	198	97	15
MSM82_32-16	08.04.19 22:15	Seismic Ocean Bottom Receiver	OBS on deck	31° 04.710' S	035° 28.995' W	0	3	197	109	21
MSM82_32-17	08.04.19 23:37	Seismic Ocean Bottom Receiver	OBS on deck	31° 15.202' S	035° 34.421' W	845	2	243	84	23
MSM82_32-18	09.04.19 00:56	Seismic Ocean Bottom Receiver	OBS on deck	31° 24.335' S	035° 38.769' W	1243	1	350	88	14
MSM82_32-19	09.04.19 02:50	Seismic Ocean Bottom Receiver	OBS on deck	31° 35.231' S	035° 44.239' W	2047	3	198	116	18
MSM82_32-20	09.04.19 04:20	Seismic Ocean Bottom Receiver	OBS on deck	31° 42.755' S	035° 48.278' W	2017	2	225	111	17
MSM82_32-21	09.04.19 05:58	Seismic Ocean Bottom Receiver	OBS on deck	31° 51.957' S	035° 53.020' W	2412	2	225	113	16
MSM82_32-22	09.04.19 07:27	Seismic Ocean Bottom Receiver	OBS on deck	32° 01.139' S	035° 57.679' W	2561	2	252	118	20
MSM82_32-23	09.04.19 09:04	Seismic Ocean Bottom Receiver	OBS on deck	32° 10.294' S	036° 02.412' W	2667	2	280	132	28
MSM82_32-24	09.04.19 10:40	Seismic Ocean Bottom Receiver	OBS on deck	32° 19.476' S	036° 06.891' W	2757	1	201	130	23
MSM82_32-25	09.04.19 12:26	Seismic Ocean Bottom Receiver	OBS on deck	32° 28.636' S	036° 11.465' W	0	1	277	137	22
MSM82_32-26	09.04.19 14:39	Seismic Ocean Bottom Receiver	OBS on deck	32° 37.854' S	036° 16.115' W	3296	1	263	134	20
MSM82_32-27	09.04.19 16:26	Seismic Ocean Bottom Receiver	OBS on deck	32° 46.910' S	036° 20.697' W	3731	1	211	143	23
MSM82_32-28	09.04.19 18:13	Seismic Ocean Bottom Receiver	OBS on deck	32° 56.191' S	036° 25.551' W	3983	2	233	144	24
MSM82_32-29	09.04.19 20:01	Seismic Ocean Bottom Receiver	OBS on deck	33° 05.225' S	036° 30.356' W	4109	2	239	141	30
MSM82_32-30	09.04.19 21:59	Seismic Ocean Bottom Receiver	OBS on deck	33° 14.446' S	036° 35.122' W	4342	1	279	144	26
MSM82_36-1	09.04.19 22:47	Magnetometer	profile start	33° 16.179' S	036° 40.555' W	4605	8	243	135	23

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_36-1	10.04.19 10:18	Magnetometer	profile end	34° 06.066' S	039° 06.855' W	4929	6	215	103	17
MSM82_37-1	10.04.19 13:45	Dredge	in the water	34° 00.143' S	038° 59.071' W	5057	0	319	106	16
MSM82_38-1	10.04.19 17:02	Dredge	in the water	34° 01.095' S	039° 00.445' W	3573	0	181	96	17
MSM82_39-1	10.04.19 19:58	CTD	in the water	34° 01.412' S	039° 00.687' W	3604	0	8	88	18
MSM82_40-1	10.04.19 22:08	Dredge	in the water	34° 04.530' S	038° 56.416' W	5093	0	115	90	16
MSM82_41-1	11.04.19 05:48	Dredge	in the water	33° 35.740' S	039° 14.533' W	4106	0	208	52	14
MSM82_42-1	11.04.19 10:50	Dredge	max depth/on ground	33° 34.929' S	039° 03.470' W	3680	0	27	46	16
MSM82_43-1	11.04.19 13:34	Magnetometer	profile start	33° 32.549' S	038° 59.467' W	3903	11	13	41	20
MSM82_43-1	11.04.19 21:18	Magnetometer	profile end	32° 18.926' S	038° 16.665' W	3768	5	68	86	14
MSM82_44-1	11.04.19 23:04	Dredge	in the water	32° 23.875' S	038° 20.554' W	4280	0	251	84	20
MSM82_45-1	12.04.19 02:03	Dredge	in the water	32° 25.212' S	038° 22.030' W	3977	0	19	66	17
MSM82_46-1	12.04.19 05:31	Dredge	in the water	32° 24.139' S	038° 20.361' W	3304	0	46	42	16
MSM82_47-1	12.04.19 08:51	Magnetometer	profile start	32° 21.897' S	038° 17.195' W	2822	8	55	54	11
MSM82_47-1	12.04.19 14:51	Magnetometer	profile end	31° 38.966' S	037° 18.812' W	3547	7	46	272	8
MSM82_48-1	12.04.19 16:06	Dredge	in the water	31° 40.773' S	037° 19.137' W	2751	0	266	257	7
MSM82_49-1	12.04.19 20:52	Dredge	in the water	31° 48.714' S	037° 15.174' W	3356	0	346	120	10
MSM82_50-1	13.04.19 00:26	Magnetometer	profile start	31° 49.468' S	037° 16.744' W	3256	6	234	200	14
MSM82_50-1	13.04.19 08:10	Magnetometer	profile end	30° 36.265' S	036° 48.852' W	1628	10	4	172	8
MSM82_51-1	13.04.19 10:13	Dredge	in the water	30° 39.564' S	036° 54.804' W	1528	0	122	153	8
MSM82_52-1	13.04.19 15:17	Dredge	in the water	30° 50.997' S	036° 47.377' W	1343	0	321	149	5
MSM82_53-1	13.04.19 22:29	Dredge	in the water	30° 19.516' S	036° 56.078' W	2008	0	117	131	5

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_54-1	14.04.19 02:12	Dredge	in the water	30° 14.021' S	036° 58.245' W	1821	0	66	133	7
MSM82_55-1	14.04.19 09:01	Dredge	in the water	30° 24.412' S	036° 19.586' W	1287	0	153	144	14
MSM82_56-1	14.04.19 14:06	Dredge	in the water	30° 19.924' S	036° 04.465' W	1124	0	54	135	15
MSM82_57-1	14.04.19 16:25	Dredge	in the water	30° 20.781' S	036° 03.976' W	1116	0	151	121	12
MSM82_58-1	14.04.19 21:16	Dredge	in the water	30° 06.575' S	036° 20.724' W	1505	0	222	139	11
MSM82_59-1	15.04.19 02:56	Dredge	in the water	30° 10.017' S	036° 53.979' W	1290	0	146	104	11
MSM82_60-1	15.04.19 08:46	Dredge	in the water	29° 40.254' S	036° 59.821' W	1952	0	20	66	8
MSM82_61-1	15.04.19 14:23	CTD	in the water	29° 15.755' S	036° 57.778' W	2876	0	283	152	7
MSM82_62-1	15.04.19 16:10	Dredge	in the water	29° 15.852' S	036° 57.065' W	3363	0	165	125	5
MSM82_63-1	15.04.19 23:22	Dredge	in the water	28° 38.092' S	037° 00.126' W	2092	0	200	135	7
MSM82_64-1	16.04.19 03:08	Dredge	in the water	28° 39.537' S	036° 56.574' W	2613	0	203	125	6
MSM82_65-1	16.04.19 09:13	Dredge	in the water	28° 37.025' S	037° 25.619' W	3193	0	57	117	5
MSM82_66-1	16.04.19 16:31	Dredge	in the water	28° 20.432' S	037° 51.402' W	3710	0	136	109	6
MSM82_67-1	16.04.19 22:51	Dredge	in the water	27° 54.881' S	038° 02.926' W	3967	0	311	86	19
MSM82_68-1	17.04.19 09:12	Dredge	in the water	26° 59.722' S	038° 11.045' W	4559	0	77	60	26
MSM82_69-1	17.04.19 15:40	Dredge	in the water	27° 03.198' S	038° 41.186' W	2318	0	68	52	21
MSM82_70-1	17.04.19 18:31	Dredge	in the water	27° 04.997' S	038° 40.240' W	3262	0	347	59	35
MSM82_71-1	18.04.19 00:55	Dredge	in the water	27° 18.159' S	039° 04.903' W	722	0	218	25	21
MSM82_72-1	18.04.19 03:49	Dredge	in the water	27° 21.013' S	039° 04.375' W	2260	0	141	26	23
MSM82_73-1	18.04.19 13:41	Dredge	in the water	26° 42.583' S	039° 33.119' W	3045	0	41	22	25
MSM82_74-1	18.04.19 21:30	Dredge	in the water	26° 11.840' S	039° 11.110' W	2722	0	112	46	19

Station	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Wind Direction	Wind Velocity
No.	[UTC]			Lat	Lon	[m]	kn	[°]	[°]	m/s
MSM82_75-1	19.04.19 00:43	Dredge	in the water	26° 13.641' S	039° 12.806' W	2511	0	162	98	21
MSM82_76-1	19.04.19 05:21	Dredge	in the water	26° 14.225' S	039° 29.591' W	2894	0	185	113	18
MSM82_77-1	19.04.19 12:05	Dredge	in the water	26° 23.577' S	039° 55.035' W	3075	0	274	124	12
MSM82_78-1	19.04.19 17:02	Dredge	in the water	26° 22.117' S	040° 02.408' W	3538	0	97	169	11
MSM82_79-1	19.04.19 21:56	Dredge	in the water	26° 09.827' S	040° 04.394' W	2449	0	238	126	8
MSM82_80-1	20.04.19 01:21	Dredge	in the water	26° 20.514' S	040° 00.674' W	2671	0	102	100	5
MSM82_81-1	20.04.19 04:19	Expandedable Sound Velocimeter	in the water	26° 20.566' S	040° 00.681' W	2635	2	185	34	2
MSM82_82-1	20.04.19 04:58	Magnetometer	profile start	26° 23.964' S	040° 01.680' W	3719	7	197	42	4
MSM82_82-1	22.04.19 16:00	Magnetometer	profile end	34° 52.877' S	047° 52.191' W	4680	8	217	205	14