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Short Cruise Report
Maria S Merian MSM88

Mindelo (Cabo Verde) – Mindelo – Bridgetown (Barbados)
November 28, 2019 – January 14, 2020
Chief Scientist (leg 1): Prof. Dr. Colin Devey
Chief Scientist (leg 2): Dr. Anne-Cathrin Wölfl
Captain (leg 1): Björn Maaß
Captain (leg 2): Ralf Schmidt

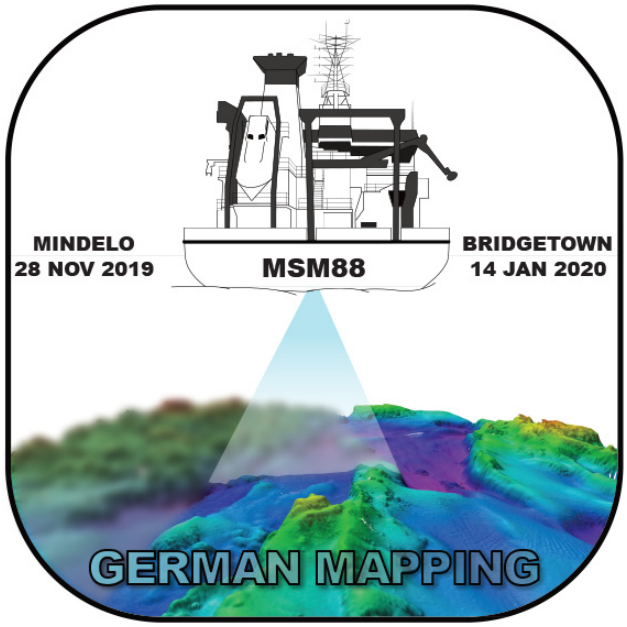
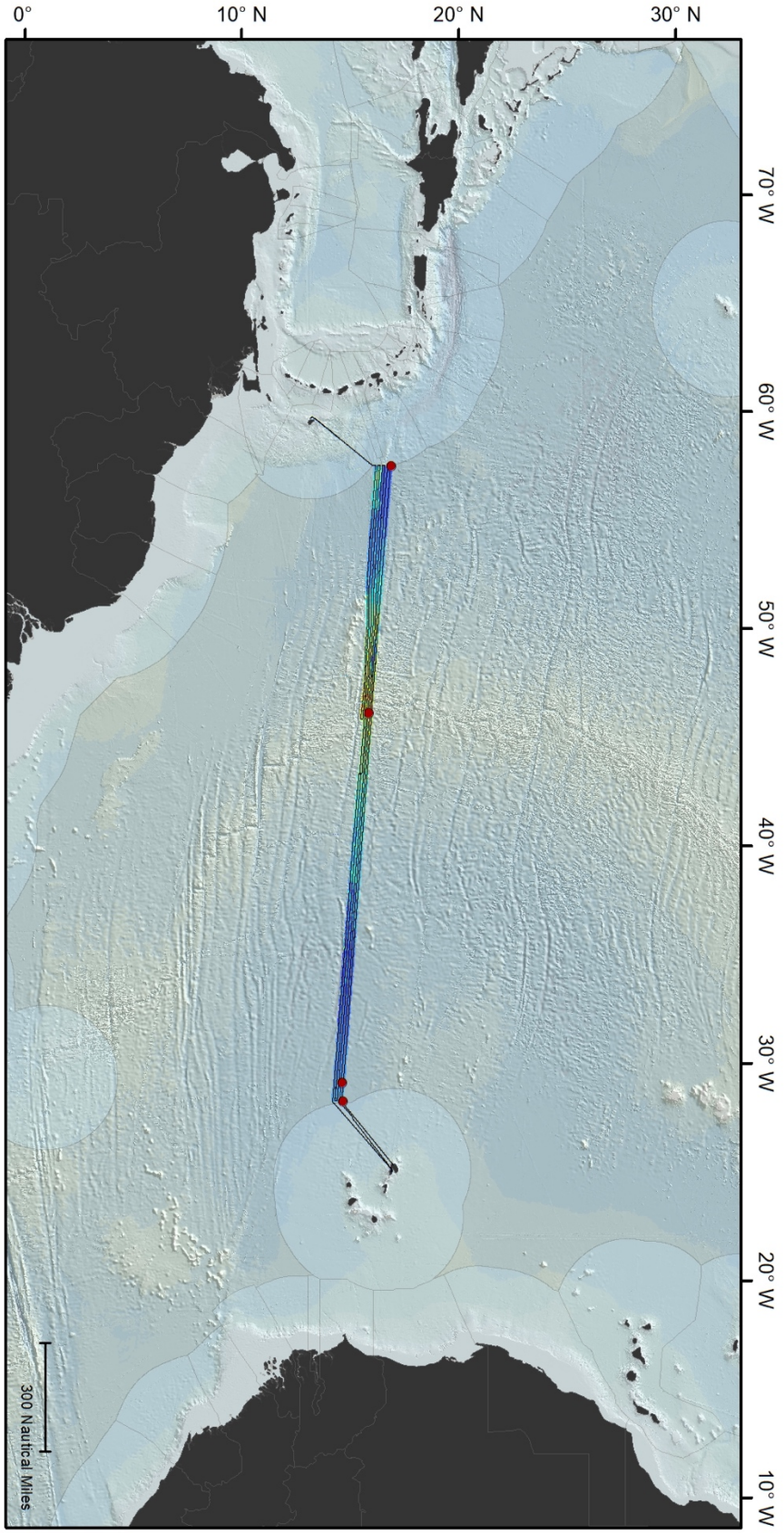


Figure 1: Cruise track during cruise MSM88 (black lines) and sound velocity measurements (red dots).



Objectives

Despite over 100 years of acoustic seabed mapping, only around 15% of the seafloor has ever been directly mapped and little of the mapping performed has been systematic or over larger areas. The result is that our knowledge of seafloor structure is rudimentary and our understanding of the processes which form them has, in principle, advanced little since the advent of plate tectonics. Societally, the seafloor plays a vital role in humanity´s "life support system", for example providing habitat for marine organisms, stimulating mixing of ocean water as part of the overturning circulation system and increasingly being the site of industrial installations. It is scientifically and societally imperative that we bring the level of knowledge of the surface of our planet up to that of bodies like Moon and Mars that are mapped with a resolution better than 100 m per pixel. It is also essential that the data are made freely available to all to support research and conservation.
The aim of this cruise is to map previously uncharted part of the tropical Atlantic using the ship´s multibeam system and to provide the data to global open databases as well as to acquire magnetic gradient data along the same tracks. Magnetic anomalies from so-called Oceanic Core Complexes challenged the conventional view that marine magnetic anomalies arose in the upper, extrusive layer of the oceanic crust, because the crust has been stripped away at these complexes. We therefore intend to collect magnetic data simultaneously to the multibeam data in order to constrain the interpretation of the observed seabed morphology.

Narrative

Leg 1

(C. Devey)

RV MARIA S. MERIAN left the port of Mindelo punctually at 09:00 (UTC) on 28.11.19 and took a south-westerly course to reach the edge of the Cape Verdean Exclusive Economic Zone where the "German Mapping" work was to begin. We arrived in the working area at 04:00 on 29.11.19 and began our mapping work. At 09:00 on the same day we interrupted our profile to perform a sound-velocity profile (SVP). As the cruise is part of the DAM (Deutsche Allianz Meeresforschung) pilot project underway research data, we began running not only the EM122 multibeam echosounder, but also the acoustic doppler current profiler (ADCP) and the thermosalinograph. In addition, we were also collecting subsidiary data using a sub-bottom profiler and a magnetometer. The first of our 4 profiles was ca. 1140 nautical miles long and was completed on 03.12.19 at 01:00. Profile 2 began at 02:00 on the same day after a large-radius turn and continued until 13:00, when the magnetometer was recovered for a weekly check and the chance was used to perform a SVP to 3000m water depth. With the SVP completed we recommenced the bathymetry/magnetic profile 2 at 16:00 on 03.12.19. Profile 2 ended on 8.12.19 at 22:00, another large-radius turn took us on to profile 3, which we ended at 17:00 on 12.12.19. Once more we returned to an easterly course and began profile 4. This profile was completed on 16.12.19 at 11:00, at which point we were on the Cape Verde EEZ boundary, recovered the magnetometer and stopped pinging and recording multibeam data and began the transit back to Mindelo. We arrived alongside in Mindelo on 17.12.19 at 08:00.

Leg 2

(A.-C. Wölfl)

The second leg of the cruise started on 19.12.19 at 09:00 (UTC), when RV MARIA S. MERIAN left Mindelo harbour and arrived at the first working station in international waters early on 20.12.19. This station was located just outside the Cape Verdean Exclusive Economic Zone and north of the first profile from the previous leg. We measured a sound-velocity profile (SVP) and subsequently started at 10:35 to run the EM122 multibeam echosounder on our first 1700 nautical miles long profile, with a speed of 10 knots, heading towards the northwest. Similar to the previous leg, we were also collecting subsidiary data including magnetic field characteristics of the oceanic crust using a magnetometer, sub-bottom characteristics using a sub-bottom profiler as well as temperature and conductivity using a thermosalinograph and current velocities using an acoustic doppler current profiler (ADCP). On 27.12.19 at 04:20, at the end of profile 1, close to the Guadeloupean EEZ, another SVP was taken. After turning we started recording profile 2 at 07:30 with a length of approximately 600 nautical miles. At the end of this profile, we closed the gap to the MSM88/1 data on 30.12.19 at 04:35 and turned again westwards to finish profile 3. Profile 4 starting on 01.01.20 at 01:35 and profile 5 starting on 05.01.20 at 00:50, were approximately 800 nautical miles long and crossed the ridge axis again two more times. Profile 6 started on 08.01.20 at 11:50 and crossed the ridge axis again, before we had to turn and started our last profile 7 on 11.01.20 at 09:45, increasing the speed to 12.5 knots in order to arrive on time to the port of Bridgetown. We arrived to Bridgetown on 14.01.20 at 12:00.

Acknowledgements

We thank Captain Björn Maaß and Captain Ralf Schmidt and the crew of MARIA S. MERIAN for their great support and the excellent working atmosphere on board. This cruise was financed by the Helmholtz Association via base funding to GEOMAR.

Participants

Leg 1		
Devey, Colin, Prof. Dr.	Bathymetry / Chief Scientist	GEOMAR
Augustin, Nico, Dr.	Bathymetry	GEOMAR
Évora, Dario	Bathymetry	IMar
Gray, Alexandra	Bathymetry	uOttawa
Sobolewski, Linda	Bathymetry	RUB
Leg 2		
Wölfl, Anne-Cathrin, Dr.	Bathymetry / Chief Scientist	GEOMAR
Besaw, Mary	Bathymetry	uOttawa
Damaske, Daniel	Bathymetry	MARUM
Le Saout, Morgane, Dr.	Bathymetry	GEOMAR
Lux, Thorsten	Bathymetry	GEOMAR
Schade, Martin	Bathymetry	GEOMAR
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Activity	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Comment
No.	[UTC]			Lat	Lon	[m]	kn	[°]	
MSM88/1_1-1 EM122	16.12.19 11:02	Deep-sea Multibeam Echosounder	profile end	14° 10,732' N	028° 11,823' W	5527	10	95	
MSM88/1_1-1 EM122	13.12.19 21:48	Deep-sea Multibeam Echosounder	alter course	15° 00,830' N	038° 41,657' W	4833,6	9	91,7	rwk= 095°
MSM88/1_1-1 EM122	13.12.19 21:22	Deep-sea Multibeam Echosounder	alter course	15° 00,443' N	038° 46,139' W	4564,7	10	85,6	rwk= 084°
MSM88/1_1-1 EM122	13.12.19 10:48	Deep-sea Multibeam Echosounder	alter course	15° 08,931' N	040° 32,956' W	4861,2	10	101,8	rwk= 095°
MSM88/1_1-1 EM122	13.12.19 10:23	Deep-sea Multibeam Echosounder	alter course	15° 10,208' N	040° 36,918' W	5350,3	10	99,7	rwk= 108°
MSM88/1_1-1 EM122	12.12.19 18:07	Deep-sea Multibeam Echosounder	alter course	15° 29,007' N	043° 18,245' W	4494,6	10	266,2	rwk = 095°
MSM88/1_1-1 EM122	09.12.19 05:38	Deep-sea Multibeam Echosounder	information	14° 19,979' N	028° 49,274' W	5346,9	10	272	Fortsetzung Profil
MSM88/1_1-1 EM122	09.12.19 04:47	Deep-sea Multibeam Echosounder	information	14° 20,218' N	028° 52,244' W	5345	7	269,9	Profilunterbrechung aufgrund technischer Probleme
MSM88/1_1-1 EM122	09.12.19 00:32	Deep-sea Multibeam Echosounder	alter course	14° 22,855' N	028° 14,907' W	5271,5	10	166,6	rwk= 275°
MSM88/1_1-1 EM122	04.12.19 16:30	Deep-sea Multibeam Echosounder	information	15° 49,630' N	046° 08,890' W	3879,6	10	92,9	Fortsetzung Profil
MSM88/1_1-1 EM122	04.12.19 14:01	Deep-sea Multibeam Echosounder	information	15° 49,479' N	046° 06,661' W	3741,5	0	45,6	Unterbrechung Profil
MSM88/1_1-1 EM122	04.12.19 02:36	Deep-sea Multibeam Echosounder	alter course	16° 02,024' N	047° 48,167' W	3510,2	10	280,1	rwk= 095°
MSM88/1_1-1 EM122	29.11.19 13:02	Deep-sea Multibeam Echosounder	information	14° 34,192' N	029° 04,897' W	5387,9	0	124,7	Fortsetzung Profil
MSM88/1_1-1 EM122	29.11.19 10:15	Deep-sea Multibeam Echosounder	information	14° 34,190' N	029° 04,896' W	5390,7	0	299,8	Unterbrechung Profil
MSM88/1_1-1 EM122	29.11.19 05:00	Deep-sea Multibeam Echosounder	profile start	14° 30,038' N	028° 12,298' W	5259	7	278,8	v = 10 kn; rwk= 275°
MSM88/1_1-2 MAG	16.12.19 11:33	Magnetometer	on deck	14° 12,671' N	028° 09,373' W	5274,2	5	25,9	
MSM88/1_1-2 MAG	16.12.19 11:16	Magnetometer	information	14° 11,472' N	028° 10,052' W	5276,9	5	43,4	Beginn Einholen
MSM88/1_1-2 MAG	16.12.19 11:02	Magnetometer	profile end	14° 10,732' N	028° 11,823' W	5527	10	95	
MSM88/1_1-2 MAG	13.12.19 21:48	Magnetometer	alter course	15° 00,830' N	038° 41,657' W	4833,6	9	91,7	rwk= 095°
MSM88/1_1-2 MAG	13.12.19 21:22	Magnetometer	alter course	15° 00,443' N	038° 46,139' W	4564,7	10	85,6	rwk= 084°
MSM88/1_1-2 MAG	13.12.19 10:48	Magnetometer	alter course	15° 08,931' N	040° 32,956' W	4861,2	10	101,8	rwk= 095°
MSM88/1_1-2 MAG	13.12.19 10:23	Magnetometer	alter course	15° 10,208' N	040° 36,918' W	5350,3	10	99,7	rwk= 108°
MSM88/1_1-2 MAG	12.12.19 18:07	Magnetometer	alter course	15° 29,007' N	043° 18,245' W	4494,6	10	266,2	rwk = 095°
MSM88/1_1-2 MAG	09.12.19 00:32	Magnetometer	alter course	14° 22,855' N	028° 14,907' W	5271,5	10	166,6	rwk= 275°
MSM88/1_1-2 MAG	04.12.19 16:30	Magnetometer	information	15° 49,630' N	046° 08,890' W	3879,6	10	92,9	c
MSM88/1_1-2 MAG	04.12.19 15:27	Magnetometer	in the water	15° 49,480' N	046° 06,597' W	3985,3	4	87,7	Ausgesteckte Länge 350m
MSM88/1_1-2 MAG	04.12.19 13:51	Magnetometer	on deck	15° 49,484' N	046° 06,723' W	3986,6	3	88,5	
MSM88/1_1-2 MAG	04.12.19 13:29	Magnetometer	information	15° 49,556' N	046° 07,899' W	3882	3	88,6	Beginn einholen
MSM88/1_1-2 MAG	04.12.19 13:22	Magnetometer	information	15° 49,605' N	046° 08,492' W	3885,3	10	93,5	Unterbrechung Profil
MSM88/1_1-2 MAG	04.12.19 02:36	Magnetometer	alter course	16° 02,024' N	047° 48,167' W	3510,2	10	280,1	rwk= 095°
MSM88/1_1-2 MAG	29.11.19 12:42	Magnetometer	profile start	14° 34,191' N	029° 04,897' W	5389,9	0	16,5	v = 10 kn; rwk= 275°
MSM88/1_1-2 MAG	29.11.19 12:16	Magnetometer	in the water	14° 34,192' N	029° 04,896' W	5388,2	0	311,7	Ausgesteckte Länge 350m
MSM88/1_1-3 P70	16.12.19 11:02	Parasound	profile end	14° 10,732' N	028° 11,823' W	5527	10	95	
MSM88/1_1-3 P70	13.12.19 21:48	Parasound	alter course	15° 00,830' N	038° 41,657' W	4833,6	9	91,7	rwk= 095°
MSM88/1_1-3 P70	13.12.19 21:22	Parasound	alter course	15° 00,443' N	038° 46,139' W	4564,7	10	85,6	rwk= 084°
MSM88/1_1-3 P70	13.12.19 10:48	Parasound	alter course	15° 08,931' N	040° 32,956' W	4861,2	10	101,8	rwk= 095°
MSM88/1_1-3 P70	13.12.19 10:23	Parasound	alter course	15° 10,208' N	040° 36,918' W	5350,3	10	99,7	rwk= 108°
MSM88/1_1-3 P70	12.12.19 18:07	Parasound	alter course	15° 29,007' N	043° 18,245' W	4494,6	10	266,2	rwk = 095°
MSM88/1_1-3 P70	09.12.19 00:32	Parasound	alter course	14° 22,855' N	028° 14,907' W	5271,5	10	166,6	rwk= 275°
MSM88/1_1-3 P70	04.12.19 16:30	Parasound	information	15° 49,630' N	046° 08,890' W	3879,6	10	92,9	Fortsetzung Profil
MSM88/1_1-3 P70	04.12.19 14:02	Parasound	information	15° 49,479' N	046° 06,661' W	3738,9	0	270,6	Unterbrechung Profil
MSM88/1_1-3 P70	04.12.19 02:36	Parasound	alter course	16° 02,024' N	047° 48,167' W	3510,2	10	280,1	rwk= 095°
MSM88/1_1-3 P70	29.11.19 17:06	Parasound	profile start	14° 36,927' N	029° 40,905' W	5490,4	10	273,5	
MSM88/1_2-1 CTD	29.11.19 12:59	CTD	on deck	14° 34,192' N	029° 04,896' W	5388,3	0	183,9	
MSM88/1_2-1 CTD	29.11.19 11:46	CTD	max depth/on ground	14° 34,191' N	029° 04,897' W	5388	0	159	
MSM88/1_2-1 CTD	29.11.19 10:18	CTD	in the water	14° 34,189' N	029° 04,895' W	5391	0	292,8	SVP bei SL 15m
MSM88/1_3-1 CTD	04.12.19 15:23	CTD	on deck	15° 49,480' N	046° 06,661' W	3741,6	0	195,7	
MSM88/1_3-1 CTD	04.12.19 14:50	CTD	max depth/on ground	15° 49,479' N	046° 06,661' W	3743	0	207,9	SL max. 2000 m
MSM88/1_3-1 CTD	04.12.19 14:12	CTD	in the water	15° 49,480' N	046° 06,663' W	3737,5	0	23,4	SVP bei SL 15m

Activity	Date / Time	Device	Action	Position	Position	Depth	Speed	Course	Comment
No.	[UTC]			Lat	Lon	[m]	kn	[°]	
MSM88/2_1-1 SVP	20.12.19 08:54	Sound Velocity Profiler	in the water	14° 36,236' N	028° 13,793' W	5244,3	0	161,1	
MSM88/2_1-1 SVP	20.12.19 09:27	Sound Velocity Profiler	max depth/on ground	14° 36,235' N	028° 13,794' W	5246	0	216,9	
MSM88/2_1-1 SVP	20.12.19 10:10	Sound Velocity Profiler	on deck	14° 36,235' N	028° 13,793' W	5244,7	0	274,9	
MSM88/2_2-1 EM122	20.12.19 10:34	Deep-sea Multibeam Echosounder	profile start	14° 36,425' N	028° 14,093' W	5225,1	10	265,4	v= 10 kn; rwk= 275°
MSM88/2_2-1 EM122	20.12.19 16:30	Deep-sea Multibeam Echosounder	information	14° 41,225' N	029° 15,070' W	5409,7	10	278,7	Unterbrechung Profil, Aussetzen Magnetometer
MSM88/2_2-1 EM122	20.12.19 18:28	Deep-sea Multibeam Echosounder	information	14° 41,228' N	029° 14,904' W	5407,1	10	271,5	Fortsetzung Profil
MSM88/2_2-1 EM122	25.12.19 10:17	Deep-sea Multibeam Echosounder	information	16° 08,925' N	048° 28,445' W	3106	10	282,9	Unterbrechung Profil
MSM88/2_2-1 EM122	25.12.19 11:25	Deep-sea Multibeam Echosounder	information	16° 08,486' N	048° 22,658' W	3055,4	10	280,1	Fortsetzung Profil
MSM88/2_2-1 EM122	27.12.19 16:22	Deep-sea Multibeam Echosounder	profile end	16° 50,502' N	057° 29,179' W	5841,7	10	273,2	
MSM88/2_2-2 P70	20.12.19 11:36	Parasound	profile start	14° 37,226' N	028° 24,772' W	5271,2	10	273,2	v= 10 kn; rwk= 275°
MSM88/2_2-2 P70	20.12.19 16:30	Parasound	information	14° 41,229' N	029° 15,124' W	5410,7	10	277,4	Unterbrechung Profil, Aussetzen Magnetometer
MSM88/2_2-2 P70	20.12.19 18:28	Parasound	information	14° 41,228' N	029° 14,904' W	5407,1	10	271,5	Fortsetzung Profil
MSM88/2_2-2 P70	27.12.19 16:16	Parasound	profile end	16° 50,424' N	057° 28,167' W	5837,5	11	273,7	
MSM88/2_2-3 MAG	20.12.19 16:35	Magnetometer	in the water	14° 41,482' N	029° 15,276' W	5412,7	3	20	Ausgesteckte Länge: 307 m
MSM88/2_2-3 MAG	20.12.19 18:28	Magnetometer	profile start	14° 41,228' N	029° 14,904' W	5407,1	10	271,5	v= 10 kn; rwk= 275°
MSM88/2_2-3 MAG	27.12.19 15:32	Magnetometer	profile end	16° 50,001' N	057° 22,661' W	5842,9	10	275,1	
MSM88/2_2-3 MAG	27.12.19 15:59	Magnetometer	on deck	16° 50,194' N	057° 25,342' W	5838	5	275,9	
MSM88/2_3-1 SVP	27.12.19 16:36	Sound Velocity Profiler	in the water	16° 50,489' N	057° 30,080' W	5839,5	0	300,2	
MSM88/2_3-1 SVP	27.12.19 17:19	Sound Velocity Profiler	max depth/on ground	16° 50,488' N	057° 30,081' W	5846	0	335,1	
MSM88/2_3-1 SVP	27.12.19 18:02	Sound Velocity Profiler	on deck	16° 50,488' N	057° 30,080' W	5839,2	0	298,2	
MSM88/2_4-1 EM122	27.12.19 19:37	Deep-sea Multibeam Echosounder	profile start	16° 43,094' N	057° 29,868' W	5845,2	5	100,7	v= 10 kn; rwk= 095°
MSM88/2_4-1 EM122	30.12.19 03:52	Deep-sea Multibeam Echosounder	profile end	16° 01,635' N	047° 50,324' W	4093,4	10	92,2	
MSM88/2_4-2 P70	27.12.19 19:37	Parasound	profile start	16° 43,094' N	057° 29,868' W	5845,2	5	100,7	v= 10 kn; rwk= 095°
MSM88/2_4-2 P70	30.12.19 03:52	Parasound	profile end	16° 01,635' N	047° 50,324' W	4093,4	10	92,2	
MSM88/2_4-3 MAG	27.12.19 19:37	Magnetometer	in the water	16° 43,090' N	057° 29,846' W	5849,3	4	101,8	Ausgesteckte Länge: 350 m
MSM88/2_4-3 MAG	27.12.19 19:54	Magnetometer	profile start	16° 42,935' N	057° 28,372' W	5847,2	8	95,3	v= 10 kn; rwk= 095°
MSM88/2_4-3 MAG	30.12.19 03:52	Magnetometer	profile end	16° 01,635' N	047° 50,324' W	4093,4	10	92,2	
MSM88/2_5-1 EM122	30.12.19 04:36	Deep-sea Multibeam Echosounder	profile start	15° 57,228' N	047° 50,237' W	4060,3	10	272,7	v= 10 kn; rwk= 275°
MSM88/2_5-1 EM122	01.01.20 12:49	Deep-sea Multibeam Echosounder	profile end	16° 35,125' N	057° 31,478' W	6100,2	10	276,7	
MSM88/2_5-2 P70	30.12.19 04:36	Parasound	profile start	15° 57,228' N	047° 50,237' W	4060,3	10	272,7	v= 10 kn; rwk= 275°
MSM88/2_5-2 P70	01.01.20 12:49	Parasound	profile end	16° 35,125' N	057° 31,478' W	6100,2	10	276,7	
MSM88/2_5-3 MAG	30.12.19 04:36	Magnetometer	profile start	15° 57,228' N	047° 50,237' W	4060,3	10	272,7	v= 10 kn; rwk= 275°
MSM88/2_5-3 MAG	30.12.19 04:36	Magnetometer	information	15° 57,228' N	047° 50,240' W	4060,3	10	270	Gerät von MSM88/2_4-3 noch im Wasser
MSM88/2_5-3 MAG	01.01.20 12:49	Magnetometer	profile end	16° 35,125' N	057° 31,478' W	6100,2	10	276,7	
MSM88/2_6-1 EM122	01.01.20 13:36	Deep-sea Multibeam Echosounder	profile start	16° 28,649' N	057° 30,554' W	4959,3	10	95,3	v= 10 kn; rwk= 095°
MSM88/2_6-1 EM122	04.01.20 23:43	Deep-sea Multibeam Echosounder	profile end	15° 31,838' N	043° 22,459' W	4636,3	5	99,3	
MSM88/2_6-2 P70	01.01.20 13:36	Parasound	profile start	16° 28,649' N	057° 30,554' W	4959,3	10	95,3	v= 10 kn; rwk= 095°
MSM88/2_6-2 P70	04.01.20 23:43	Parasound	profile end	15° 31,838' N	043° 22,459' W	4636,3	5	99,3	
MSM88/2_6-3 MAG	01.01.20 13:36	Magnetometer	profile start	16° 28,649' N	057° 30,554' W	4959,3	10	95,3	v= 10 kn; rwk= 095°
MSM88/2_6-3 MAG	01.01.20 13:36	Magnetometer	information	16° 28,649' N	057° 30,554' W	4959,3	10	95,3	Gerät von MSM88/2_4-3 noch im Wasser
MSM88/2_6-3 MAG	04.01.20 23:33	Magnetometer	profile end	15° 31,924' N	043° 23,356' W	4572,6	7	98,3	
MSM88/2_6-3 MAG	04.01.20 23:35	Magnetometer	information	15° 31,912' N	043° 23,217' W	4599,1	6	96,4	Beginn Einholen
MSM88/2_6-3 MAG	04.01.20 23:52	Magnetometer	on deck	15° 31,883' N	043° 21,698' W	4705,2	5	69,6	
MSM88/2_7-1 EM122	05.01.20 00:53	Deep-sea Multibeam Echosounder	profile start	15° 25,913' N	043° 20,485' W	4222,1	10	273,1	v= 10 kn; rwk= 275°
MSM88/2_7-1 EM122	06.01.20 16:58	Deep-sea Multibeam Echosounder	alter course	15° 57,137' N	050° 13,917' W	4283,7	10	277,4	rwk= 270°
MSM88/2_7-1 EM122	07.01.20 01:02	Deep-sea Multibeam Echosounder	alter course	15° 57,293' N	051° 37,692' W	4824,7	10	274,1	rwk= 275°
MSM88/2_7-1 EM122	08.01.20 11:09	Deep-sea Multibeam Echosounder	profile end	16° 22,207' N	057° 30,815' W	4718,3	10	275,5	
MSM88/2_7-2 P70	05.01.20 00:53	Parasound	profile start	15° 25,913' N	043° 20,485' W	4222,1	10	273,1	v= 10 kn; rwk= 275°
MSM88/2_7-2 P70	06.01.20 16:58	Parasound	alter course	15° 57,137' N	050° 13,917' W	4283,7	10	277,4	rwk= 270°

MSM88/2_7-2 P70	07.01.20 01:02	Parasound	alter course	15° 57,293' N	051° 37,692' W	4824,7	10	274,1	rwk= 275°
MSM88/2_7-2 P70	08.01.20 11:09	Parasound	profile end	16° 22,207' N	057° 30,815' W	4718,3	10	275,5	
MSM88/2_7-3 MAG	05.01.20 00:49	Magnetometer	in the water	15° 25,897' N	043° 19,922' W	4235,8	6	273,5	Ausgesteckte Länge: 350 m
MSM88/2_7-3 MAG	05.01.20 00:53	Magnetometer	profile start	15° 25,913' N	043° 20,485' W	4222,1	10	273,1	v= 10 kn; rwk= 275°
MSM88/2_7-3 MAG	06.01.20 16:58	Magnetometer	alter course	15° 57,137' N	050° 13,917' W	4283,7	10	277,4	rwk= 270°
MSM88/2_7-3 MAG	07.01.20 01:02	Magnetometer	alter course	15° 57,293' N	051° 37,692' W	4824,7	10	274,1	rwk= 275°
MSM88/2_7-3 MAG	08.01.20 11:09	Magnetometer	profile end	16° 22,207' N	057° 30,815' W	4718,3	10	275,5	
MSM88/2_8-1 EM122	08.01.20 11:54	Deep-sea Multibeam Echosounder	profile start	16° 15,994' N	057° 30,623' W	5016,8	10	98,1	
MSM88/2_8-1 EM122	09.01.20 22:38	Deep-sea Multibeam Echosounder	alter course	15° 50,825' N	051° 40,760' W	5124,3	10	91	rwk= 090°
MSM88/2_8-1 EM122	10.01.20 07:10	Deep-sea Multibeam Echosounder	alter course	15° 51,495' N	050° 14,109' W	4672,1	10	89,4	rwk= 095°
MSM88/2_8-1 EM122	11.01.20 09:10	Deep-sea Multibeam Echosounder	profile end	15° 33,742' N	045° 50,857' W	3688,1	10	93,6	
MSM88/2_8-2 P70	08.01.20 11:54	Parasound	profile start	16° 15,994' N	057° 30,623' W	5016,8	10	98,1	v= 10 kn; rwk= 095°
MSM88/2_8-2 P70	09.01.20 22:38	Parasound	alter course	15° 50,825' N	051° 40,760' W	5124,3	10	91	rwk= 090°
MSM88/2_8-2 P70	10.01.20 07:10	Parasound	alter course	15° 51,495' N	050° 14,109' W	4672,1	10	89,4	rwk= 095°
MSM88/2_8-2 P70	11.01.20 09:10	Parasound	profile end	15° 33,742' N	045° 50,857' W	3688,1	10	93,6	
MSM88/2_8-3 MAG	08.01.20 11:22	Magnetometer	profile start	16° 20,730' N	057° 31,699' W	0	10	180,7	v= 10 kn; rwk= 095°
MSM88/2_8-3 MAG	08.01.20 11:22	Magnetometer	information	16° 20,661' N	057° 31,699' W	0	10	178,3	Gerät von MSM88/2_7-3 noch im Wasser
MSM88/2_8-3 MAG	09.01.20 22:38	Magnetometer	alter course	15° 50,825' N	051° 40,760' W	5124,3	10	91	rwk= 090°
MSM88/2_8-3 MAG	10.01.20 07:10	Magnetometer	information	15° 51,495' N	050° 14,109' W	4672,1	10	89,4	rwk= 095°
MSM88/2_8-3 MAG	11.01.20 07:40	Magnetometer	profile end	15° 34,736' N	046° 03,755' W	3488	5	89,6	
MSM88/2_8-3 MAG	11.01.20 07:50	Magnetometer	information	15° 34,675' N	046° 02,901' W	3783,5	5	96,6	Beginn Einholen
MSM88/2_8-3 MAG	11.01.20 08:11	Magnetometer	on deck	15° 34,530' N	046° 01,105' W	3750,9	5	85,8	
MSM88/2_9-1 EM122	11.01.20 09:45	Deep-sea Multibeam Echosounder	profile start	15° 28,641' N	045° 51,019' W	3893,6	13	272,7	v= 12,5 kn; rwk= 275°
MSM88/2_9-1 EM122	12.01.20 05:12	Deep-sea Multibeam Echosounder	alter course	15° 46,595' N	050° 10,098' W	4672,7	12	269,5	rwk= 270°
MSM88/2_9-1 EM122	12.01.20 14:55	Deep-sea Multibeam Echosounder	alter course	15° 46,651' N	052° 18,853' W	5183,4	13	273,8	rwk= 275°
MSM88/2_9-1 EM122	12.01.20 23:40	Deep-sea Multibeam Echosounder	information	15° 54,682' N	054° 13,201' W	5662,5	13	278,5	Unterbrechung Profil, technische Probleme EM122
MSM88/2_9-1 EM122	13.01.20 00:36	Deep-sea Multibeam Echosounder	information	15° 54,540' N	054° 11,138' W	5490,7	12	268,5	Fortsetzung Profil
MSM88/2_9-1 EM122	13.01.20 15:46	Deep-sea Multibeam Echosounder	profile end	16° 09,882' N	057° 30,095' W	5261,7	12	275,1	
MSM88/2_9-2 P70	11.01.20 22:50	Parasound	profile start	15° 40,557' N	048° 45,823' W	4483,4	13	275,2	v= 12,5 kn; rwk= 275°
MSM88/2_9-2 P70	12.01.20 05:12	Parasound	alter course	15° 46,595' N	050° 10,098' W	4672,7	12	269,5	rwk= 270°
MSM88/2_9-2 P70	12.01.20 14:55	Parasound	alter course	15° 46,651' N	052° 18,853' W	5183,4	13	273,8	rwk= 275°
MSM88/2_9-2 P70	12.01.20 23:40	Parasound	information	15° 54,682' N	054° 13,201' W	5662,5	13	278,5	Unterbrechung Profil, technische Probleme EM122
MSM88/2_9-2 P70	13.01.20 00:36	Parasound	information	15° 54,540' N	054° 11,138' W	5490,7	12	268,5	Fortsetzung Profil
MSM88/2_9-2 P70	13.01.20 15:46	Parasound	profile end	16° 09,882' N	057° 30,095' W	5261,7	12	275,1	