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Short Cruise Report RV Maria S. Merian MSM130

Reykjavik-Reykjavik 09.07.2024 – 14.08.2024 Chief Scientist: Eric P. Achterberg Captain: Sören Janssen



## Objectives

The high latitude North Atlantic and Arctic Oceans are visibly affected by anthropogenic climate change through ocean warming, freshening, acidification, increased cryosphere and river discharge, and rapid acceleration of sea ice loss. The changing dynamics at polar ice-ocean-atmosphere interfaces have far-reaching implications for Earth's climate on diverse timescales through feedbacks on atmospheric circulation, oceanic mixing, circulation and carbon sequestration, and greenhouse gas sources and sinks.

We will investigate the key physical, chemical and biological factors determining salinity distribution, ocean productivity, sediment carbon and greenhouse gas exchange. The cruise will sail along the East Greenland coast and into fjord systems to capture land-ocean exchange, gradients in salinity, primary production and historical carbon export (from cores), with observations of water column biogeochemistry, ocean physics, in combination with satellite observations.

The specific objectives of the POLAR BEAST cruise are:

1. Conduct a census of low salinity waters across the East Greenland Current system (including the East Iceland Current) focusing on near-surface waters and inner-shelf waters, which are poorly captured in existing mooring and cruise work.

2. Determine the effects of shelf freshening on ocean biogeochemistry including climatically-active trace gases, carbonate chemistry, and nutrient availability.

3. Contribute to seasonal studies of physical/biogeochemical dynamics in Greenland fjord systems complimenting earlier and later season work conducted by WHOI, NIOZ and SCRIPPS partners.

4. Quantify past variations in blue carbon storage resulting from changing ocean properties at the ice-ocean interface in the East Greenland system by proxy reconstructions over the past 2000 years.

## Narrative

Loading in Reykjavik and departure for east Greenland: The cruise participants arrived in Reykjavik (Iceland) on July 6 and 7, and mobilized the cruise MSM130. There were a total of 22 scientists participating in the cruise on RV Merian, with 11 different nationalities. We departed on Tuesday July 9th and set sail for the Lindenow Fjord which is the most southerly fjord in southeast Greenland that was studied on this expedition. The sea conditions during our transit from Reykjavik through the Irminger Basin to southeast Greenland were fine. We started sampling on the shelf on Thursday night (July 11) and conducted a detailed sampling campaign that reached the inner regions of Lindenow Fiord. The ice conditions in the Lindenow Fiord were fine with a relatively small amount of ice. The work included more than 20 stations and 2 short sampling expeditions with our Zodiac. At the stations we sampled for biological and chemical variables using the standard stainless steel CTD rosette, which also has a UVP camera system and a range of biogeochemical sensors. In addition, we conducted casts for trace metal sampling using trace metal clean Niskin bottles on a plastic wire with the bottles being closed by deploying messengers. Then at a couple of the stations we deployed a mini MUC (multi corer) for collection short (ca. 30 cm) sediment cores. A gravity corer was also deployed at 3 to 4 stations in the fjord and on the shelf, to collect sediment cores of up to 5 m length. The further we moved into Lindenow Fjord, the more difficult the ice conditions became, and the vessel slowed down to about 2 knots to find a way through the ice. The work in Lindenow Fjord was finalised on Monday July 15 and we made our way towards Mogens Heinesens Fiord. The ice conditions on the shelf were favourable, but just before entering the fjord on July 18, we experienced difficult dense ice in front of the fjord. The next morning we managed to move through the ice and into the fjord, where the ice conditions

were favourable. We managed to get a good distance into the fjord until the ice blocked us. We were able to successfully complete 8 stations with CTDs, MUC and gravity corer deployments, also very close to the glaciers. We had daily sightings of polar bears, even as far south as below 62°N.

We had an eventful week with cross-shelf sections in the region between Mogens Heinesens and Sermilik Fjords, and a lot of dense ice and thick fog which delayed our progress. The shelf work included more than 20 stations and additional geophysical surveys.

Upon arrival in the shelf waters outside Sermilik Fjord on July 23, a wide and dense ice cover blocked our entry into the fjord. The ice situation this year were very difficult for the late July period. A French yacht of 22 m length had attempted to cross the dense ice region and reach Sermilik Fjord, but got stuck in the ice in thick fog. The skipper had no up to date ice charts and got into difficulties and had to send out a Mayday call. Maria S. Merian moved to the area and positioned itself next to the dense ice region. The visibility and ice conditions were treacherous and prevented us from sailing into the ice. Fortunately, the ice broke up sufficiently to allow our vessel to escort the yacht out of the ice and into safety. They continued their voyage to Reykjavik, and we continued our shelf work until ice conditions improved later in the week.

On July 28th the ice conditions had improved sufficiently and we could sail into Sermilik Fjord and start operations with the CTD, trace metal clean Niskins on the Kevlar wire, multi-corer and gravity corer.

We had a very successful week in Sermilik Fjord and conducted in-depth surveys in the fjord on physics, particle transport and biogeochemistry. We were able to sample right at the glacier edge, allowing us to collect valuable samples on particle release from glaciers. We endured a strong storm on July 30 whilst in the fjord (windforce 8 and above) which moved the ice and iceberg around the fjord and made operations difficult. We managed to sail from the northern part of the fjord towards the open waters of the outer fjord and occupied numerous stations for CTDs, trace metal sampling, MUCs and gravity cores. On August 3 we moved into the shelf waters outside of Sermilik Fjord to investigate the present and past transfer of material from Sermilik Fjord into the North Atlantic Ocean



through CTD and coring operations. We also assessed the southward movement of polar waters in the East Greenland Current through cross shelf sections in the area. The difficult wind, ice and fog conditions over the previous 2 weeks have slowed down our progress. We therefore made the decision to use our remaining ship-time to study the region outside the Sermilik Fjord in more detail, and not move north to Kajser Franz Josef Fjord. We subsequently had a very successful week on the shelf near Sermilik Fjord and conducted indepth surveys on the waters flowing in and out of Sermilik Fjord through different channel systems. The work involved detailed measurements of physics, particle transport and biogeochemistry. We had clear weather most of the week, but also periods with dense fog and moving ice fields, which made transits between the stations more difficult.

Yesterday a strong storm developed (windforce 8

and above) on the shelf which moved the ice and iceberg at great speeds (more than 2 knots) and made our sampling challenging. We followed a deep channel in an off-shelf direction and reached the deep waters of the open North Atlantic on August 12. We finished our last station August 12 and transited to Reykjavik and arrived in port on Wednesday morning at 0800 h (August 14).

The cruise has been very successful, and we have been able to achieve our objectives, despite challenging ice, fog and wind conditions. The Maria S. Merian encountered ice over 31 days of the cruise. The crew and captain of RV Maria S Merian have been wonderful in facilitating our research activities. The ice, fog and wind conditions required frequent changes to the cruise programme, which resulted in a very dynamic cruise. The multi-national and multi-disciplinary science team has done a wonderful job on this cruise. We managed to occupy 172 stations and take about 3500 samples for nutrients and more than 500 samples for trace elements, carbonate chemistry, POC, DOC ammonium etc. This is strongly changing the data paucity for the waters off southeast Greenland.



**Figure 3.** Sampling in fog and ice on the shelf near Sermilik Fjord (photo Eric Achterberg).

## Acknowledgements

All the members of the MSM130 POLAR BEAST team are very grateful to the DFG, the German Research Fleet Coordination Centre at the Universität Hamburg, GEOMAR, the shipping company BRIESE RESEARCH and LPL Projects + Logistics GmbH for providing their outstanding support to science and ship logistics, which made this cruise possible. We would also like to sincerely thank the captain, officers and crew on the RV Maria S. Merian who did a fantastic job at facilitating our research and making our life as pleasant as possible on board.

## Participants list

Surname	First name	Function	Institute
ACHTERBERG	Eric Pieter	Chief Scientist. Lead scientific operations on cruise. Liaise with captain and officers. Chemical Oceanography.	GEOMAR, Germany
HOPWOOD	Mark James	Scientist. Co-lead scientific operations on cruise. Will lead trace element sampling. Chemical Oceanography.	SUSTECH, China
BOGNER	Boie	Nutrient and oxygen analysis. Chemical Oceanography.	GEOMAR, Germany
WILSTERMANN	Carmen	Sediment sampling, collection and preservation of porewater samples. Chemical Oceanography.	GEOMAR, Germany
SCHREIBER	Lennart	Sediment sampling, collection and cores. Paleo Oceanography.	GEUS, Denmark
JIN	Xuewei	Sinking Particle characterisation Biogeochemical Oceanography.	Shanghai Jiao Tongi University China
HUANG	Xin	Biogenic silica, Chemical Oceanography.	SUSTECH, China
CLOETE	Ryan	TEI analysis. Will undertake sampling and analysis of particulate elements. Chemical Oceanography.	LEMAR, France
BURMESTER	Anne	Geophysics work; Paleo Oceanography.	MARUM, Germany
FRANKHOLZ	Lisa Marleen	TEI. Will undertake TEI and POC sampling. Chemical Oceanography.	GEOMAR, Germany
TRUDNOWSKA	Emilia Małgorzata	Will undertake underwater camera observations. Biological Oceanography.	IOPAN, Poland
CAMIN	Capucine	TEI sampling. Will organise and undertake sampling and analysis of trace elements. Chemical Oceanography.	LEGOS, France
PATTERI VIJAYAN	Apsara	TEI sampling. Will organise and undertake sampling and analysis of trace elements. Chemical Oceanography.	SUSTECH, China
BRINKMANN	Inda	Sediment sampling, collection and cores. Paleo Oceanography.	GEUS, Denmark
ESPOSITO	Mario	Will undertake sampling of DIC, sensor work. Chemical Oceanography.	GEOMAR, Germany
ZIMMERMANN	Heike Hildegard	Sediment sampling, collection and cores. Paleo Oceanography.	GEUS, Denmark
GUO	Yuping	TEI sampling. Will conduct sampling and analysis of trace elements. Chemical Oceanography.	GEOMAR, Germany
MARÍN ARIAS	Camila Antonia	Productivity rate measurements. Biological Oceanography.	Valparaiso, Chile
STRYJ	Malte	Sediment sampling, collection and preservation of porewater samples. Chemical Oceanography.	GEOMAR, Germany
STREUFF	Katharina Teresa	Geophysics work; Paleo Oceanography.	MARUM, Germany
TAENZLER	Lukas	CTD work; sensor handling Physical Oceanography.	WHOI, USA
OLIVER	Hilde	CTD work; sensor handling Physical Oceanography.	WHOI, USA

Stations list

EM122: Deep-Sea	Multibeam Ecł	nosounder; ]	EM712; Shallo	w-water Mu	ltibeam Echo	osounder

Station No.	[UTC]	Gear	Activity	Latitude N	Longitude W	Water depth [m]
MSM130_1-1	10/07/2024 13:25	CTD	max depth/on ground	62° 22,107	031° 19,694	2638
MSM130_2-!	11/07/2024 13:07	CTD	max depth/on ground	60° 50,511	038° 38,153	2813
MSM130_2-2	11/07/2024 14:17	Go-Flo Sampler	max depth/on ground	60° 50,510	038° 38,153	2809
MSM130_3-1	12/07/2024 05:18	CTD	max depth/on ground	60° 21,105	041° 15,392	1728
MSM130_3-2	12/07/2024 06:25	Go-Flo Sampler	max depth/on ground	60° 21,106	041° 15,392	1731
MSM130_4-1	12/07/2024 09:45	CTD	max depth/on ground	60° 21,077	041° 45,215	1528
MSM130_5-1	12/07/2024 13:06	CTD	max depth/on ground	60° 17,647	042° 04,428	420
MSM130_5-2	12/07/2024 13:59	Go-Flo Sampler	max depth/on ground	60° 17,083	042° 05,025	485
MSM130_6-1	12/07/2024 17:37	CTD	max depth/on ground	60° 21,232	042° 22,247	432
MSM130_6-2	12/07/2024 18:25	Multi Corer	max depth/on ground	60° 21,233	042° 22,247	431
MSM130_7-1	12/07/2024 20:48	CTD	max depth/on ground	60° 21,112	042° 40,135	574
MSM130_8-1	13/07/2024 00:03	CTD	max depth/on ground	60° 23,197	042° 56,781	565
MSM130_8-2	13/07/2024 00:57	Go-Flo Sampler	max depth/on ground	60° 23,198	042° 56,782	577
MSM130_8-3	13/07/2024 01:24	Parasoun d P70	profile start	60° 23,199	042° 56,855	562
MSM130_8-4	13/07/2024 01:24	EM122	profile start	60° 23,199	042° 56,855	564
MSM130_8-3	13/07/2024	Parasoun	profile end	60°	043°	672

	09:37	d P70		26,127	12,697	
MSM130_8-4	13/07/2024 09:37	EM122	profile end	60° 26,127	043° 12,697	672
MSM130_9-1	13/07/2024 09:59	CTD	max depth/on ground	60° 26,127	043° 12,699	674
MSM130_9-2	13/07/2024 10:58	Go-Flo Sampler	max depth/on ground	60° 26,128	043° 12,697	675
MSM130_10-1	13/07/2024 12:57	CTD	max depth/on ground	60° 27,858	043° 20,356	787
MSM130_10-2	13/07/2024 13:52	Go-Flo Sampler	max depth/on ground	60° 27,858	043° 20,355	786
MSM130_10-3	13/07/2024 14:54	Multi Corer	max depth/on ground	60° 27,888	043° 20,287	785
MSM130_11-1	13/07/2024 16:49	CTD	max depth/on ground	60° 29,266	043° 26,863	841
MSM130_12-1	13/07/2024 18:31	CTD	max depth/on ground	60° 30,494	043° 33,273	879
MSM130_13-1	13/07/2024 20:23	CTD	max depth/on ground	60° 31,686	043° 41,444	725
MSM130_13-2	13/07/2024 21:33	Go-Flo Sampler	max depth/on ground	60° 31,687	043° 41,443	727
MSM130_13-3	13/07/2024 22:26	Multi Corer	max depth/on ground	60° 31,687	043° 41,442	728
MSM130_14-1	14/07/2024 00:33	CTD	max depth/on ground	60° 32,885	043° 51,018	570
MSM130_15-1	14/07/2024 02:04	CTD	max depth/on ground	60° 33,906	043° 56,968	503
MSM130_15-3	14/07/2024 02:17	EM122	profile start	60° 33,893	043° 57,003	500
MSM130_15-2	14/07/2024 02:17	Parasoun d P70	profile start	60° 33,893	043° 57,004	502
MSM130_15-4	14/07/2024 04:54	EM712	profile start	60° 37,194	044° 09,137	240
MSM130_15-2	14/07/2024 04:54	Parasoun d P70	profile end	60° 37,193	044° 09,133	233
MSM130_15-3	14/07/2024 04:54	EM122	profile end	60° 37,193	044° 09,130	232
MSM130_15-4	14/07/2024 08:40	EM712	profile end	60° 34,472	044° 04,660	416

MSM130_16-1	14/07/2024 08:57	CTD	max depth/on ground	60° 34,472	044° 04,660	417
MSM130_16-2	14/07/2024 09:50	Go-Flo Sampler	max depth/on ground	60° 34,473	044° 04,659	418
MSM130_16-3	14/07/2024 10:41	Multi Corer	max depth/on ground	60° 34,467	044° 04,671	418
MSM130_17-1	14/07/2024 12:02	CTD	max depth/on ground	60° 34,974	044° 07,807	367
MSM130_18-1	14/07/2024 13:19	CTD	max depth/on ground	60° 35,756	044° 08,299	346
MSM130_18-2	14/07/2024 14:03	Go-Flo Sampler	max depth/on ground	60° 35,755	044° 08,300	346
MSM130_19-1	14/07/2024 15:16	CTD	max depth/on ground	60° 37,105	044° 09,562	218
MSM130_20-1	14/07/2024 16:59	Water Sampler	information	60° 34,437	044° 04,398	426
MSM130_20-2	14/07/2024 17:10	Gravity Corer	max depth/on ground	60° 34,448	044° 04,382	426
MSM130_21-1	14/07/2024 20:25	Gravity Corer	max depth/on ground	60° 31,229	043° 37,991	816
MSM130_21-2	14/07/2024 21:09	EM712	profile start	60° 31,284	043° 38,490	788
MSM130_21-2	15/07/2024 05:35	EM712	profile end	60° 31,904	043° 35,750	484
MSM130_21-3	15/07/2024 05:35	EM122	profile start	60° 31,912	043° 35,752	480
MSM130_21-4	15/07/2024 05:35	Parasoun d P70	profile start	60° 31,913	043° 35,753	480
MSM130_21-3	15/07/2024 06:28	EM122	profile end	60° 35,158	043° 37,682	482
MSM130_21-4	15/07/2024 06:28	Parasoun d P70	profile end	60° 35,157	043° 37,681	482
MSM130_22-4	15/07/2024 06:53	CTD	max depth/on ground	60° 35,148	043° 37,670	482
MSM130_23-1	15/07/2024 08:40	CTD	max depth/on ground	60° 37,533	043° 40,248	433
MSM130_23-2	15/07/2024 09:32	Go-Flo Sampler	max depth/on ground	60° 37,533	043° 40,248	434
MSM130_24-1	15/07/2024 11:38	CTD	max depth/on	60° 41,644	043° 41,422	361

			ground			
MSM130_25-1	15/07/2024 13:39	CTD	max depth/on ground	60° 42,815	043° 43,362	172
MSM130_26-1	15/07/2024 15:13	CTD	max depth/on ground	60° 41,839	043° 37,923	222
MSM130_27-1	15/07/2024 19:00	Water Sampler	station start	60° 27,916	043° 20,558	786
MSM130_27-2	15/07/2024 19:19	Multi Corer	max depth/on ground	60° 27,916	043° 20,550	787
MSM130_28-1	15/07/2024 20:51	Gravity Corer	max depth/on ground	60° 27,047	043° 16,595	791
MSM130_29-1	16/07/2024 02:25	Multi Corer	max depth/on ground	60° 23,211	042° 56,606	557
MSM130_30-1	17/07/2024 06:29	CTD	max depth/on ground	61° 25,860	042° 20,306	136
MSM130_31-1	17/07/2024 08:45	CTD	max depth/on ground	61° 25,275	042° 14,335	212
MSM130_32-1	17/07/2024 12:55	CTD	max depth/on ground	61° 23,765	042° 03,621	225
MSM130_33-1	17/07/2024 16:19	CTD	max depth/on ground	61° 22,591	041° 52,789	312
MSM130_33-2	17/07/2024 17:01	Go-Flo Sampler	max depth/on ground	61° 22,137	041° 53,060	362
MSM130_34-1	17/07/2024 18:24	CTD	max depth/on ground	61° 20,673	041° 41,112	192
MSM130_35-1	17/07/2024 19:48	CTD	max depth/on ground	61° 19,489	041° 30,120	204
MSM130_36-1	17/07/2024 21:21	CTD	max depth/on ground	61° 18,358	041° 18,310	1209
MSM130_37-1	18/07/2024 06:38	CTD	max depth/on ground	62° 20,525	040° 23,116	802
MSM130_38-1	18/07/2024 08:28	CTD	max depth/on ground	62° 20,564	040° 40,252	508
MSM130_38-2	18/07/2024 09:18	Go-Flo Sampler	max depth/on ground	62° 20,565	040° 40,251	504
MSM130_39-1	18/07/2024	CTD	max	62°	040°	669

	11:29		depth/on ground	20,565	58,663	
MSM130_40-1	18/07/2024 13:16	CTD	max depth/on ground	62° 20,583	041° 16,548	503
MSM130_40-2	18/07/2024 14:06	Go-Flo Sampler	max depth/on ground	62° 20,583	041° 16,550	501
MSM130_41-1	18/07/2024 16:21	CTD	max depth/on ground	62° 22,483	041° 34,686	454
MSM130_42-1	18/07/2024 20:36	CTD	max depth/on ground	62° 22,314	041° 50,684	697
MSM130_43-1	18/07/2024 22:11	CTD	max depth/on ground	62° 23,055	041° 52,464	216
MSM130_43-2	18/07/2024 22:53	Go-Flo Sampler	max depth/on ground	62° 23,004	041° 52,451	219
MSM130_43-3	18/07/2024 23:31	Multi Corer	max depth/on ground	62° 22,923	041° 52,328	228
MSM130_43-4	18/07/2024 23:54	Multi Corer	max depth/on ground	62° 22,892	041° 52,232	229
MSM130_44-1	19/07/2024 15:37	CTD	max depth/on ground	62° 19,924	042° 18,975	816
MSM130_45-1	19/07/2024 18:41	CTD	max depth/on ground	62° 21,578	042° 26,116	810
MSM130_45-2	19/07/2024 19:35	Go-Flo Sampler	max depth/on ground	62° 21,636	042° 26,113	809
MSM130_45-3	19/07/2024 20:30	Multi Corer	max depth/on ground	62° 21,708	042° 26,071	809
MSM130_45-4	19/07/2024 21:20	Multi Corer	max depth/on ground	62° 21,705	042° 26,097	808
MSM130_46-1	20/07/2024 01:03	CTD	max depth/on ground	62° 24,222	042° 35,746	766
MSM130_47-1	20/07/2024 03:37	CTD	max depth/on ground	62° 25,453	042° 38,004	743
MSM130_47-2	20/07/2024 04:46	Go-Flo Sampler	max depth/on ground	62° 25,496	042° 38,059	743
MSM130_47-3	20/07/2024 05:42	Multi Corer	max depth/on	62° 25,496	042° 38,058	740

			ground			
MSM130_47-4	20/07/2024 06:37	Multi Corer	max depth/on ground	62° 25,483	042° 38,007	741
MSM130_47-5	20/07/2024 08:36	Gravity Corer	max depth/on ground	62° 25,456	042° 37,926	742
MSM130_48-1	20/07/2024 11:06	CTD	max depth/on ground	62° 23,111	042° 30,580	794
MSM130_48-2	20/07/2024 11:50	Go-Flo Sampler	max depth/on ground	62° 23,111	042° 30,581	794
MSM130_49-1	20/07/2024 13:22	Gravity Corer	max depth/on ground	62° 22,465	042° 28,852	799
MSM130_49-2	20/07/2024 14:25	Gravity Corer	max depth/on ground	62° 22,436	042° 28,950	800
MSM130_50-1	20/07/2024 16:30	CTD	max depth/on ground	62° 20,884	042° 29,560	402
MSM130_51-1	20/07/2024 18:48	CTD	max depth/on ground	62° 20,704	042° 23,085	812
MSM130_51-2	20/07/2024 19:29	Go-Flo Sampler	max depth/on ground	62° 20,735	042° 23,082	812
MSM130_52-1	20/07/2024 22:07	CTD	max depth/on ground	62° 19,223	042° 11,190	815
MSM130_52-2	20/07/2024 22:54	Multi Corer	max depth/on ground	62° 19,222	042° 11,182	816
MSM130_52-3	20/07/2024 23:40	Gravity Corer	max depth/on ground	62° 19,231	042° 11,222	815
MSM130_52-4	21/07/2024 00:35	Multi Corer	max depth/on ground	62° 19,242	042° 11,105	816
MSM130_53-1	22/07/2024 06:49	CTD	max depth/on ground	63° 11,994	039° 36,284	1328
MSM130_54-1	22/07/2024 08:52	CTD	max depth/on ground	63° 15,490	039° 49,686	315
MSM130_55-1	22/07/2024 10:35	CTD	max depth/on ground	63° 18,600	040° 03,153	229
MSM130_56-1	22/07/2024 13:12	CTD	max depth/on ground	63° 21,684	040° 16,182	259

MSM130_56-2	22/07/2024 13:53	Go-Flo Sampler	max depth/on ground	63° 21,335	040° 16,332	255
MSM130_57-1	22/07/2024 17:16	CTD	max depth/on ground	63° 24,976	040° 27,443	238
MSM130_58-1	24/07/2024 13:31	CTD	max depth/on ground	65° 17,166	037° 51,179	666
MSM130_58-2	24/07/2024 14:31	Go-Flo Sampler	max depth/on ground	65° 16,853	037° 51,396	668
MSM130_58-3	24/07/2024 15:26	Multi Corer	max depth/on ground	65° 16,853	037° 51,396	668
MSM130_58-4	24/07/2024 16:03	Multi Corer	max depth/on ground	65° 16,854	037° 51,395	668
MSM130_59-1	24/07/2024 17:57	CTD	max depth/on ground	65° 11,862	037° 53,687	708
MSM130_60-1	24/07/2024 19:29	CTD	max depth/on ground	65° 06,588	037° 51,241	622
MSM130_61-1	24/07/2024 21:58	CTD	max depth/on ground	65° 00,427	038° 17,491	813
MSM130_62-1	25/07/2024 00:40	CTD	max depth/on ground	64° 48,062	038° 06,475	645
MSM130_63-1	25/07/2024 03:40	CTD	max depth/on ground	64° 32,374	038° 04,108	706
MSM130_64-1	25/07/2024 05:52	CTD	max depth/on ground	64° 24,049	037° 49,226	926
MSM130_65-1	25/07/2024 07:48	CTD	max depth/on ground	64° 19,699	037° 34,620	797
MSM130_65-2	25/07/2024 08:52	Go-Flo Sampler	max depth/on ground	64° 19,699	037° 34,620	797
MSM130_66-1	25/07/2024 10:44	CTD	max depth/on ground	64° 19,038	037° 18,508	601
MSM130_67-1	25/07/2024 12:29	CTD	max depth/on ground	64° 17,226	037° 01,098	464
MSM130_68-1	25/07/2024 14:11	CTD	max depth/on ground	64° 16,779	036° 41,862	415
MSM130_69-1	25/07/2024	CTD	max	64°	036°	384

	16:34		depth/on ground	14,973	12,343	
MSM130_70-1	25/07/2024 18:16	CTD	max depth/on ground	64° 13,256	035° 56,668	380
MSM130_71-1	25/07/2024 19:35	CTD	max depth/on ground	64° 12,778	035° 48,819	785
MSM130_71-2	25/07/2024 20:30	Go-Flo Sampler	max depth/on ground	64° 12,668	035° 49,730	783
MSM130_72-1	25/07/2024 22:35	CTD	max depth/on ground	64° 10,441	035° 36,789	1483
MSM130_73-1	26/07/2024 02:07	CTD	max depth/on ground	64° 24,020	036° 17,729	291
MSM130_74-1	26/07/2024 04:06	CTD	max depth/on ground	64° 33,584	036° 11,869	485
MSM130_75-1	26/07/2024 09:29	CTD	max depth/on ground	64° 38,437	035° 01,867	656
MSM130_76-1	26/07/2024 15:33	CTD	max depth/on ground	64° 43,071	036° 06,009	573
MSM130_76-2	26/07/2024 16:22	Go-Flo Sampler	max depth/on ground	64° 43,070	036° 06,010	573
MSM130_77-1	26/07/2024 18:26	CTD	max depth/on ground	64° 52,737	036° 00,407	191
MSM130_78-1	26/07/2024 20:45	CTD	max depth/on ground	65° 04,363	036° 09,543	205
MSM130_79-1	26/07/2024 23:25	CTD	max depth/on ground	65° 14,178	036° 25,802	203
MSM130_79-2	26/07/2024 23:58	Go-Flo Sampler	max depth/on ground	65° 14,174	036° 25,981	201
MSM130_80-1	27/07/2024 02:44	CTD	max depth/on ground	65° 20,286	036° 38,861	192
MSM130_81-1	28/07/2024 04:33	Multi Corer	max depth/on ground	65° 38,073	038° 03,142	917
MSM130_81-2	28/07/2024 05:25	Multi Corer	max depth/on ground	65° 38,073	038° 03,180	917
MSM130_81-3	28/07/2024 06:29	CTD	max depth/on	65° 38,129	038° 02,734	917

			ground			
MSM130_81-4	28/07/2024 07:36	Go-Flo Sampler	max depth/on ground	65° 38,127	038° 02,856	917
MSM130_81-5	28/07/2024 09:02	Gravity Corer	max depth/on ground	65° 38,028	038° 03,092	918
MSM130_82-1	28/07/2024 11:31	CTD	max depth/on ground	65° 40,062	038° 02,613	918
MSM130_83-1	28/07/2024 13:44	CTD	max depth/on ground	65° 42,971	038° 00,192	915
MSM130_84-1	28/07/2024 16:25	CTD	max depth/on ground	65° 46,862	037° 59,013	909
MSM130_85-1	28/07/2024 18:57	CTD	max depth/on ground	65° 50,814	037° 56,091	892
MSM130_85-2	28/07/2024 19:54	Go-Flo Sampler	max depth/on ground	65° 50,859	037° 55,969	894
MSM130_85-3	28/07/2024 20:47	Multi Corer	max depth/on ground	65° 50,887	037° 56,057	874
MSM130_85-4	28/07/2024 21:34	Multi Corer	max depth/on ground	65° 50,890	037° 56,109	873
MSM130_86-1	28/07/2024 23:42	Gravity Corer	max depth/on ground	65° 55,311	037° 51,086	610
MSM130_86-2	29/07/2024 00:36	CTD	max depth/on ground	65° 55,265	037° 51,098	604
MSM130_87-1	29/07/2024 02:23	CTD	max depth/on ground	65° 57,491	037° 48,901	816
MSM130_88-1	29/07/2024 03:50	CTD	max depth/on ground	65° 57,393	037° 52,290	675
MSM130_89-1	29/07/2024 05:06	CTD	max depth/on ground	65° 57,673	037° 54,724	566
MSM130_90-1	29/07/2024 07:53	CTD	max depth/on ground	66° 01,210	037° 51,210	702
MSM130_90-2	29/07/2024 09:11	Go-Flo Sampler	max depth/on ground	66° 01,095	037° 51,125	611
MSM130_90-3	29/07/2024 10:18	Gravity Corer	max depth/on ground	66° 01,040	037° 50,669	512

MSM130_91-1	29/07/2024 12:15	CTD	max depth/on ground	66° 03,775	037° 49,686	684
MSM130_92-1	29/07/2024 15:51	CTD	max depth/on ground	66° 08,416	037° 46,753	632
MSM130_93-1	29/07/2024 19:28	CTD	max depth/on ground	66° 13,201	037° 39,814	588
MSM130_93-2	29/07/2024 20:23	Go-Flo Sampler	max depth/on ground	66° 13,218	037° 39,832	586
MSM130_94-1	30/07/2024 06:10	CTD	max depth/on ground	66° 18,168	037° 40,442	657
MSM130_95-1	30/07/2024 07:46	CTD	max depth/on ground	66° 18,188	037° 42,557	652
MSM130_95-2	30/07/2024 08:36	Go-Flo Sampler	max depth/on ground	66° 18,204	037° 42,615	665
MSM130_95-3	30/07/2024 09:32	Multi Corer	max depth/on ground	66° 18,189	037° 42,582	658
MSM130_95-4	30/07/2024 10:15	Multi Corer	max depth/on ground	66° 18,159	037° 42,469	656
MSM130_96-1	30/07/2024 12:55	CTD	max depth/on ground	66° 18,846	037° 29,352	293
MSM130_97-1	30/07/2024 14:20	CTD	max depth/on ground	66° 19,439	037° 28,623	229
MSM130_97-2	30/07/2024 15:02	Go-Flo Sampler	max depth/on ground	66° 19,381	037° 28,620	230
MSM130_98-1	30/07/2024 18:27	CTD	max depth/on ground	66° 17,216	037° 23,980	402
MSM130_99-1	01/08/2024 09:51	CTD	max depth/on ground	66° 14,165	037° 31,491	507
MSM130_99-2	01/08/2024 10:35	Go-Flo Sampler	max depth/on ground	66° 14,193	037° 31,629	511
MSM130_99-3	01/08/2024 11:20	Multi Corer	max depth/on ground	66° 14,199	037° 31,536	512
MSM130_99-4	01/08/2024 11:54	Multi Corer	max depth/on ground	66° 14,520	037° 31,140	500
MSM130_100-1	02/08/2024	CTD	max	65°	037°	485

	00:58		depth/on ground	53,691	48,126	
MSM130_101-1	02/08/2024 02:30	CTD	max depth/on ground	65° 53,770	037° 52,419	857
MSM130_102-1	02/08/2024 04:07	CTD	max depth/on ground	65° 53,675	037° 56,857	753
MSM130_103-1	02/08/2024 06:24	CTD	max depth/on ground	65° 50,858	037° 56,108	874
MSM130_103-2	02/08/2024 07:22	Go-Flo Sampler	max depth/on ground	65° 50,803	037° 56,152	873
MSM130_103-3	02/08/2024 08:49	Gravity Corer	max depth/on ground	65° 50,806	037° 56,220	873
MSM130_103-4	02/08/2024 09:30	Gravity Corer	max depth/on ground	65° 50,812	037° 56,230	873
MSM130_104-1	02/08/2024 11:38	CTD	max depth/on ground	65° 48,978	038° 02,051	478
MSM130_105-1	02/08/2024 14:43	CTD	max depth/on ground	65° 49,339	038° 04,290	575
MSM130_105-2	02/08/2024 15:31	Go-Flo Sampler	max depth/on ground	65° 49,502	038° 04,133	576
MSM130_105-3	02/08/2024 16:17	Multi Corer	max depth/on ground	65° 49,590	038° 03,878	542
MSM130_105-4	02/08/2024 16:52	Multi Corer	max depth/on ground	65° 49,610	038° 03,921	530
MSM130_106-1	02/08/2024 21:06	CTD	max depth/on ground	65° 39,562	038° 03,247	898
MSM130_107-1	02/08/2024 22:37	CTD	max depth/on ground	65° 38,278	038° 01,780	897
MSM130_108-1	03/08/2024 00:16	CTD	max depth/on ground	65° 38,269	038° 03,916	829
MSM130_109-1	03/08/2024 01:33	CTD	max depth/on ground	65° 38,343	038° 05,946	442
MSM130_110-1	03/08/2024 03:09	CTD	max depth/on ground	65° 37,077	038° 10,480	118
MSM130_111-1	03/08/2024 04:19	CTD	max depth/on	65° 36,078	038° 08,993	610

			ground			
MSM130_112-1	03/08/2024 05:28	CTD	max depth/on ground	65° 35,078	038° 07,483	674
MSM130_113-1	03/08/2024 06:34	CTD	max depth/on ground	65° 34,055	038° 05,294	373
MSM130_114-1	03/08/2024 09:20	CTD	max depth/on ground	65° 37,620	038° 02,749	905
MSM130_114-2	03/08/2024 10:33	Go-Flo Sampler	max depth/on ground	65° 37,549	038° 02,918	909
MSM130_115-1	03/08/2024 12:08	CTD	max depth/on ground	65° 36,979	037° 59,328	128
MSM130_116-1	03/08/2024 13:24	CTD	max depth/on ground	65° 35,876	038° 00,866	758
MSM130_117-1	03/08/2024 14:57	CTD	max depth/on ground	65° 34,762	038° 02,895	565
MSM130_118-1	03/08/2024 16:05	CTD	max depth/on ground	65° 33,179	038° 03,767	268
MSM130_119-1	04/08/2024 07:22	CTD	max depth/on ground	65° 31,079	038° 21,556	540
MSM130_120-1	04/08/2024 09:47	CTD	max depth/on ground	65° 32,367	038° 15,578	563
MSM130_120-2	04/08/2024 10:37	Go-Flo Sampler	max depth/on ground	65° 32,343	038° 15,611	561
MSM130_121-1	04/08/2024 12:13	CTD	max depth/on ground	65° 33,708	038° 11,376	633
MSM130_122-1	04/08/2024 14:40	Multi Corer	max depth/on ground	65° 36,973	038° 05,879	780
MSM130_122-2	04/08/2024 15:30	Multi Corer	max depth/on ground	65° 37,007	038° 05,686	782
MSM130_122-3	04/08/2024 16:19	Gravity Corer	max depth/on ground	65° 36,950	038° 05,731	783
MSM130_123-1	04/08/2024 18:07	Multi Corer	max depth/on ground	65° 36,640	038° 01,237	902
MSM130_123-2	04/08/2024 18:57	Multi Corer	max depth/on ground	65° 36,639	038° 01,235	904

MSM130_123-3	04/08/2024 19:48	Gravity Corer	max depth/on ground	65° 36,639	038° 01,236	904
MSM130_124-1	04/08/2024 22:45	CTD	max depth/on ground	65° 32,414	037° 54,026	588
MSM130_125-1	05/08/2024 00:10	CTD	max depth/on ground	65° 30,766	037° 50,670	727
MSM130_125-2	05/08/2024 01:08	Go-Flo Sampler	max depth/on ground	65° 30,711	037° 51,543	630
MSM130_126-1	05/08/2024 03:28	CTD	max depth/on ground	65° 29,357	037° 47,730	650
MSM130_127-1	05/08/2024 05:30	CTD	max depth/on ground	65° 28,192	037° 43,842	529
MSM130_128-1	05/08/2024 07:48	CTD	max depth/on ground	65° 32,504	037° 42,032	162
MSM130_129-1	05/08/2024 09:16	CTD	max depth/on ground	65° 30,702	037° 45,391	395
MSM130_130-1	05/08/2024 10:39	CTD	max depth/on ground	65° 27,868	037° 50,051	279
MSM130_131-1	05/08/2024 17:09	CTD	max depth/on ground	65° 33,684	036° 49,457	117
MSM130_132-1	05/08/2024 18:21	CTD	max depth/on ground	65° 32,208	036° 44,680	205
MSM130_132-2	05/08/2024 18:56	Go-Flo Sampler	max depth/on ground	65° 32,209	036° 44,680	206
MSM130_133-1	05/08/2024 20:17	CTD	max depth/on ground	65° 30,126	036° 37,848	167
MSM130_134-1	05/08/2024 22:33	CTD	max depth/on ground	65° 25,840	036° 24,038	247
MSM130_135-1	06/08/2024 00:40	CTD	max depth/on ground	65° 21,868	036° 10,316	207
MSM130_136-1	06/08/2024 02:47	CTD	max depth/on ground	65° 17,346	035° 57,253	215
MSM130_136-2	06/08/2024 03:28	Go-Flo Sampler	max depth/on ground	65° 16,962	035° 58,566	200
MSM130_137-1	06/08/2024	CTD	max	65°	035°	217

	05:29		depth/on ground	13,566	42,928	
MSM130_138-1	06/08/2024 06:49	CTD	max depth/on ground	65° 09,420	035° 29,230	248
MSM130_139-1	06/08/2024 08:08	CTD	max depth/on ground	65° 05,270	035° 15,642	257
MSM130_140-1	06/08/2024 09:39	CTD	max depth/on ground	65° 01,138	035° 01,756	312
MSM130_140-2	06/08/2024 10:16	Go-Flo Sampler	max depth/on ground	65° 01,118	035° 01,841	312
MSM130_141-1	06/08/2024 11:52	CTD	max depth/on ground	64° 56,996	034° 48,050	599
MSM130_142-1	06/08/2024 20:03	CTD	max depth/on ground	65° 13,717	037° 39,575	176
MSM130_143-1	06/08/2024 21:06	CTD	max depth/on ground	65° 13,799	037° 49,316	510
MSM130_144-1	07/08/2024 06:32	Gravity Corer	max depth/on ground	65° 13,893	038° 06,209	807
MSM130_144-2	07/08/2024 07:48	CTD	max depth/on ground	65° 13,751	038° 00,973	753
MSM130_144-3	07/08/2024 09:04	Go-Flo Sampler	max depth/on ground	65° 13,761	038° 01,781	751
MSM130_145-1	07/08/2024 10:32	CTD	max depth/on ground	65° 13,451	038° 13,876	425
MSM130_146-1	07/08/2024 11:48	CTD	max depth/on ground	65° 13,166	038° 30,855	282
MSM130_147-1	07/08/2024 13:28	CTD	max depth/on ground	65° 13,441	038° 46,432	274
MSM130_147-2	07/08/2024 14:06	Go-Flo Sampler	max depth/on ground	65° 13,365	038° 46,615	251
MSM130_148-1	07/08/2024 16:30	CTD	max depth/on ground	65° 13,709	038° 59,662	598
MSM130_149-1	07/08/2024 18:35	CTD	max depth/on ground	65° 13,868	039° 08,935	217
MSM130_150-1	07/08/2024 20:16	CTD	max depth/on	65° 14,027	039° 12,927	194

			ground			
MSM130_150-2	07/08/2024 20:52	Go-Flo Sampler	max depth/on ground	65° 13,970	039° 13,063	183
MSM130_151-1	08/08/2024 08:29	CTD	max depth/on ground	65° 29,099	039° 02,976	339
MSM130_151-2	08/08/2024 09:04	Go-Flo Sampler	max depth/on ground	65° 29,098	039° 02,977	336
MSM130_152-1	08/08/2024 11:06	CTD	max depth/on ground	65° 26,377	038° 57,279	161
MSM130_153-1	08/08/2024 14:11	CTD	max depth/on ground	65° 29,573	038° 40,555	86
MSM130_154-1	08/08/2024 15:35	CTD	max depth/on ground	65° 28,241	038° 36,565	730
MSM130_154-2	08/08/2024 16:36	Go-Flo Sampler	max depth/on ground	65° 28,240	038° 36,564	730
MSM130_155-1	08/08/2024 18:10	CTD	max depth/on ground	65° 26,527	038° 31,589	557
MSM130_156-1	08/08/2024 19:40	CTD	max depth/on ground	65° 24,433	038° 25,174	460
MSM130_157-1	10/08/2024 01:04	CTD	max depth/on ground	65° 31,976	037° 25,017	477
MSM130_157-2	10/08/2024 01:53	Go-Flo Sampler	max depth/on ground	65° 31,976	037° 25,016	476
MSM130_158-1	10/08/2024 03:37	CTD	max depth/on ground	65° 29,142	037° 29,077	479
MSM130_159-1	10/08/2024 05:24	CTD	max depth/on ground	65° 25,329	037° 37,486	605
MSM130_160-1	10/08/2024 07:08	CTD	max depth/on ground	65° 21,816	037° 45,915	582
MSM130_161-1	10/08/2024 10:36	CTD	max depth/on ground	65° 11,900	037° 53,615	704
MSM130_161-2	10/08/2024 11:39	Go-Flo Sampler	max depth/on ground	65° 12,018	037° 55,179	705
MSM130_162-1	10/08/2024 16:49	CTD	max depth/on ground	64° 47,194	038° 17,825	676

MSM130_163-1	10/08/2024 18:12	CTD	max depth/on ground	64° 48,061	038° 08,635	565
MSM130_163-2	10/08/2024 18:55	Go-Flo Sampler	max depth/on ground	64° 48,088	038° 08,670	556
MSM130_164-1	11/08/2024 07:49	CTD	max depth/on ground	64° 48,052	037° 53,537	339
MSM130_165-1	11/08/2024 09:46	CTD	max depth/on ground	64° 45,298	037° 34,089	294
MSM130_166-1	11/08/2024 11:22	CTD	max depth/on ground	64° 38,873	037° 20,650	414
MSM130_167-1	11/08/2024 12:52	CTD	max depth/on ground	64° 31,723	037° 15,951	354
MSM130_168-1	11/08/2024 14:18	CTD	max depth/on ground	64° 24,057	037° 16,150	386
MSM130_169-1	11/08/2024 15:43	CTD	max depth/on ground	64° 19,016	037° 18,527	600
MSM130_169-2	11/08/2024 16:30	Go-Flo Sampler	max depth/on ground	64° 18,998	037° 18,553	601
MSM130_170-1	11/08/2024 17:58	CTD	max depth/on ground	64° 14,500	037° 22,157	552
MSM130_171-1	12/08/2024 04:21	CTD	max depth/on ground	64° 14,966	036° 12,361	382
MSM130_172-1	12/08/2024 06:29	CTD	max depth/on ground	64° 12,787	035° 48,649	786
MSM130_172-2	12/08/2024 07:35	Go-Flo Sampler	max depth/on ground	64° 12,686	035° 49,253	788