

Prof. Dr. Michal Kucera
MARUM / Universität Bremen
Leobener Strasse 8
28359 Bremen
Germany

Tel: +49-421-218-65970
Fax: +49-421-218-9865974
Email: mkucera@marum.de



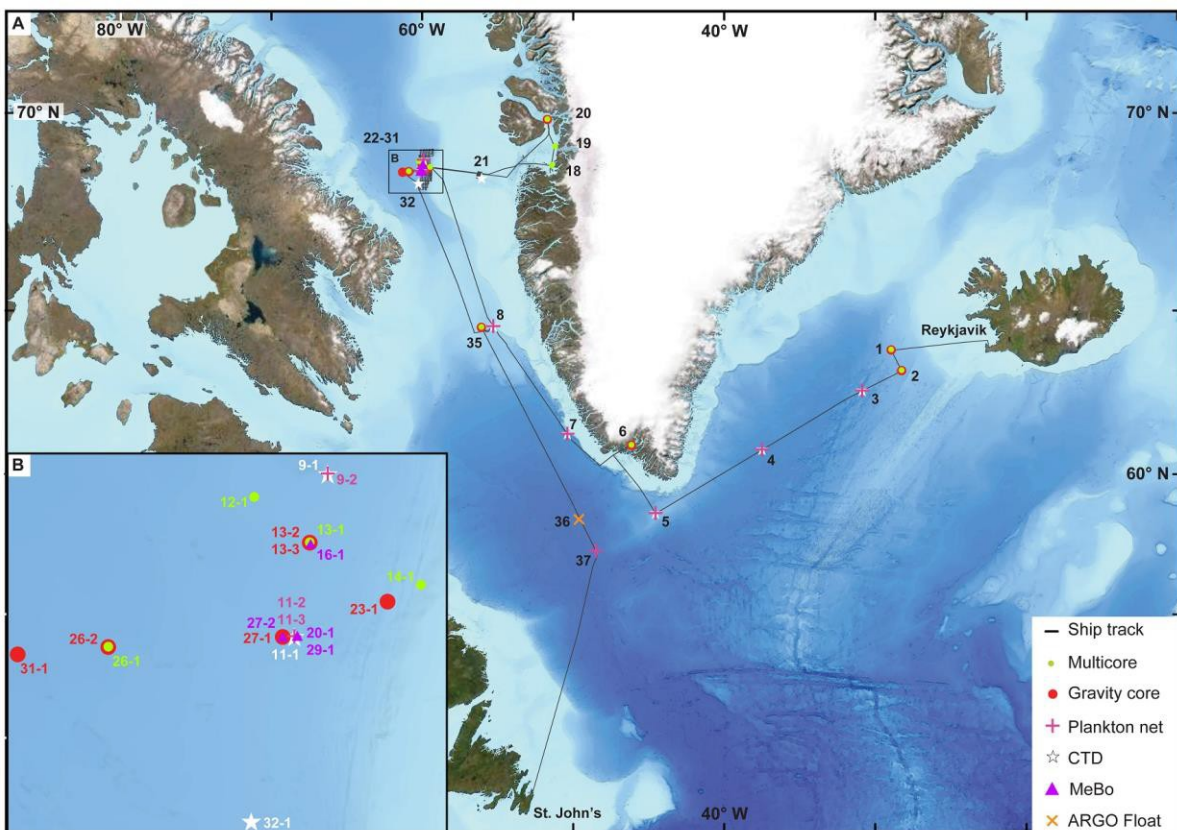
Short Cruise Report RV MARIA S MERIAN MSM111 „BAFFDEEP“

Reykjavik, Iceland – St. John's, Canada

02.09. – 04.10.2022

Chief Scientist: Michal Kucera

Captain: Ralf Schmidt



Ship track of RV MARIA S. MERIAN Cruise MSM111 from Reykjavik to St. John's

Objectives

The ongoing accelerated melting of Greenland Ice Sheet (GIS) raises concerns about the future of this large meltwater source and unique natural environment under further global warming. Indirect evidence from the magnitude of past sea-level high stands and numerical modelling suggests that the GIS was significantly reduced during MIS5 and largely collapsed during MIS11, and earlier warm interglacials. It is particularly the large-scale collapse during MIS11 that is a source for concern, due to the introduction of large amounts of meltwater to the North Atlantic and the establishment of fundamentally different landscape on Greenland at that time.

The most dynamic portions of the GIS discharge into the Baffin Bay, but so far, no record has been recovered from this region, allowing a reconstruction of the history of the Greenland Ice Sheet collapse, which was presumably mainly channeled into the Baffin Bay, during late Pleistocene warm interglacials. Such records from the marine setting of the Baffin Bay would also allow investigating phase relationships between ice sheet collapse, local oceanic conditions, and the associated changes to the marine environment, which appear to have played a role during GIS response to climatic forcing during the last deglaciation.

The only investigations of paleoenvironmental change in the Baffin Bay prior to 100 ka are based on micropaleontological studies from ODP Site 645. However, core recovery was poor, providing only a punctuated record across the target interval. Based on biostratigraphic data, the base of the Quaternary could nevertheless be positioned relatively safely at about 150 m depth and an investigation of the microfossil content and stable isotopes provided evidence for the presence of interpretable isotopic stratigraphy, at least during the last glacial cycle. These results indicate that it should be possible to obtain a continuous sediment sequence from the Baffin Bay since MIS11 by drilling to a depth of 100 m using the unique capacity of the MeBo-200 drill rig.

Thus, the principle aim of the MSM111 expedition was to recover a continuous sediment sequence from the central Baffin Bay, allowing a reconstruction of the chronology of changing oceanic conditions and terrigenous sediment supply from Greenland and Arctic ice sheets during MIS5 and MIS11. Specifically, with first priority, we aimed to drill an at least 100 m sediment sequence on Greenland margin to recover a proximal record of Greenland Ice Sheet partial collapse during the MIS5 and MIS11 sea level high stands or alternatively, to drill a 100 m sediment sequence on Baffin Island margin to recover a combined record of Arctic Ice Sheet collapse and Greenland Ice Sheet partial collapse.

The ancillary aim of the cruise, which we intend to follow to avoid idle time during MeBo-200 maintenance between deployments, or due to unfavorable weather conditions, was to obtain plankton and sediment material for calibration of palaeoceanographic proxies in the region. Specifically, using plankton net we aimed to obtain plankton samples for eDNA analyses and individuals of planktonic foraminifera for cultivation experiments. Next, we aimed to obtain by multicorer deployments a depth transect of surface sediments for calibration of organic and inorganic geochemical proxies and micropaleontological proxies and environmental DNA for sea-ice extent, productivity, and water mass distribution. Finally, we aimed to obtain by gravity coring longer sediment records of environmental conditions since the last ice age and throughout the Holocene, allowing reconstruction of the interaction between the ice-sheet, sea-ice and marine environment.

Narrative

After intensive work with preparing laboratories and instruments, and especially setting up the MeBo-200 drill rig, we were able to leave the port of Reykjavik on 2.9.2022 at 5pm local time. The intense rain of the last days had calmed down so that we could enjoy a beautiful view of the dramatic landscape of Iceland with blue skies. Hydroacoustic data collection started already in the evening, after leaving the 12 nm zone, and remained active throughout the cruise, with the exception of two visits in the 12 nm of Greenland, where we had no permission to collect data. After completion of the obligatory safety drill on the next day, the scientific program of the cruise started with sediment sampling on the NW flank of the Mid-Atlantic ridge. Here, still within the EEZ of Iceland, we collected surface sediments and gravity cores at two positions where our colleagues from the GLOBE Institute in Copenhagen expect to recover suitable sediments to reconstruct the marine environment and ecosystems during the last interglacial. Having collected two multicorers and three gravity cores, recovering up to 10 m of sediment, we set sail towards Cape Farewell, enjoying spectacular auroras at night and collecting planktonic foraminifera from multinet samples for cultivation experiments underway.

Considering the weather forecast for the Baffin Bay with conditions unfavorable for MeBo deployment, we decided to extend the transit by sampling sediment in the Narsaq Sound. The southernmost tip of Greenland was reached in the early hours of 6.9.2022 and on 7.9.2022, we arrived in the Narsaq Sound via the Ikersuaq Fjord, which proved easily navigable despite numerous icebergs. In the Narsaq Sound, we were able to resample a coring position published by Norgaard-Pedersen and Mikkelsen (2009), recovering 11 m of sediment record extending the published record and likely covering the entire Holocene. The exit from Ikersuaq Fjord was used to calibrate the ship's Underwater Positioning System (USBL) on the shelf off Greenland and then the transit to the Baffin Bay was resumed, with plankton sampling and CTD profiles carried out underway. Because of the ongoing Covid-19 pandemics, the cruise participants initially had to observe mask duty and distancing regulations and were tested daily. Only after five consecutive days of negative test results, these limitations could be lifted.

We passed the Davis Strait and crossed the polar circle at 9pm local time on 9.9.2022 to arrive in the Baffin Bay on 10.9.2022. Strong southerly winds reaching Bft8 in gusts prevented sediment sampling, but we could carry out an extensive survey of the Danish and Canadian sectors of the continental slope off Disko Bay, the main target area for MeBo drilling. The survey continued until 14.9.2022 in the evening, interrupted by one day with multiple deployments of the multicorer and gravity corer at prospective MeBo locations. Evaluation of Parasound profiles indicates that the slope between 1100 and 1600 m water depth is built of two sedimentary units. The lower unit consists of parallel reflectors which appear to follow an old topography with ridges perpendicular to slope. The unit is capped by an unconformity or hiatus, still displaying the strong topography. The upper unit drapes over that topography and largely evens it out. It has some unconformities at the bottom but then the drape is remarkably uniform and covers in the same sequence but changing thickness of reflectors the entire region. Based on the Parasound data and on the recovery of a 17 m gravity core, the first MeBo site was positioned to recover a thick sequence of the upper unit and penetrate into the lower unit at about 70 m.

The sea calmed, so the MeBo operation could commence on 14.9.2022 in the evening and the drilling began at 2 am, the next day. The drilling initially appeared to proceed well and at 6pm we were closing on to 50 m. However, it transpired that the borehole was experiencing backpressure, which caused sediment to enter the drilling string, preventing the recovery of the core barrel. Despite extensive efforts, the problem could not be solved, the borehole had to be abandoned at 52.9 m bottom depth, without

the possibility to obtain a borehole log. The drill rig was recovered successfully on 16.9.2022 after 33 hours of operation and an inspection of the cores revealed variable recovery of a total of 35.2 m of sediment.

The weather forecast indicated another storm arriving, and the decision was made to carry out a supplementary sampling and survey program in the Disko Bay. Here we recovered surface sediment samples along a S-N transect towards the Vaigat Strait, where an 8 m core from a sedimentary basin with stratified deposits was obtained. Following a survey underway back to the central Baffin Bay, the geological sampling there recommenced on 19.9.2022. Another 18 m gravity corer deployment at a place with a less extensive drape of the upper unit penetrated completely, but only recovered 9 m of sediment, indicating the presence of coarser units, which are not conducive to drilling. The second MeBo site was positioned at a place with the best Parasound resolution of the lower unit, and it was decided to flush until 52 m and attempt to drill through the unconformity and reach the lower sedimentary unit. The drilling proceeded well and the coring depth of 52.5 m was reached overnight. The drilling could continue the next day without incidents, but had to be terminated at 94.5 m because the core barrel catcher exhibited a tear. The final barrel could be recovered nonetheless and the borehole could be fully logged with magnetic susceptibility and spectrum gamma ray probe.

The recovery of the drill rig was completed successfully on 21.9.2022 after 41 hours on the seafloor and the inspection of the core barrels revealed a much better recovery of almost 90%. During the day, whilst the MeBo was refitted, we continued with a survey line into the deeper part of the slope, where a gravity core, preceded by a multicorer sampling, recovered 14 m of sediments covering a substantial part of the upper unit, which was found to thin with depth. The third MeBo deployment could begin only in the evening of the same day and considering the experiences from the second deployment, we decided to occupy a position slightly downslope, with less disturbance at the base of the lower unit, this time coring already from 15 m. Whilst drilling with flushing was successful, the change to coring proved fatal and due to strong backpressure, sediment kept entering the drill string. Thus, the entire drill string had to be dismantled at 35 m, because of a stuck barrel and another attempt was carried out using the same hole. The backpressure problem remained and having three times switched from coring to flushing, the borehole had to be abandoned at 91.4 m, with a stuck core barrel and no possibility for logging.

After 52 hours of operation at 1472 m, the drill rig was recovered on 24.9.2022 at 7am. After recovery, we observed that the last core barrel was not in position at the end of the drill string. It appears that after the final drill string segment was added, sediment penetrated back into the open pipe and the core barrel therefore could not reach the desired position. As a consequence, the flushing circulation likely did not establish correctly and sediment got into the pipe through the misaligned core barrel, preventing its capture. The core recovery was only 63 %. Fortunately, the drill rig itself remained fully operational throughout and could be refitted within 12 h, during which we continued with the hydroacoustic survey. The fourth and final deployment of the MeBo-200 drill rig started in the evening. We decided to reoccupy the position of the most successful second deployment, flushing to 87 m to facilitate recovery of the deeper layers of the lower unit. The final deployment proved to be the most successful. The flushing proceeded rapidly, reaching 70 m by the morning of 25.9.2022 and at midnight, the terminal depth reached, the last barrel could be recovered and the probe was deployed for logging. According to our speculative age models, based on the magnetic susceptibility log of the cores and of the second borehole, we estimated that paleomagnetically datable sediments should be recovered around 115 m. Since the drilling proceeded well and the weather conditions ahead were favorable, we decided to make the most of the available time window and the final borehole was therefore terminated at 126.3 m.

After its final deployment on our cruise, the drill rig was successfully recovered on 26.9.2022 in the morning, after less than 32 hours in operation. The core recovery was in excess of 90 %, except in last barrel, which was empty. It appears that the content of the core was lost and filled the drill pipe, such that the logging probe could not extrude from the drill string and therefore only spectrum gamma ray information could be obtained. This had to be measured through the drill string, but a comparison with the log from the second deployment showed excellent agreement in the overlapping part of the drilled sediment sequence. The rest of the day was used for a final attempt to recover the upper sediment unit downslope. Parasound survey indicated a particularly thin sequence around 1750 m and a final gravity core in the Disko Bay slope area was taken. The corer penetrated to about 16 m, but the liner contained only 8.6 m of sediment, with a conspicuous light hard layer obtained in the core catcher. We then continued with the survey to completely cover features of the upper slope and shelf break until the morning of 28.9.2022, when we departed from the Baffin Bay on the way to our destination port in St. John's.

Because of a small time reserve, on 29.9.2022 we were able to carry out an additional short survey south of the Davis Strait, at the position of the planned IOPD-962 campaign to drill the Davis Strait Drift Complex. We were able to obtain Parasound profiles across four of the planned drilling sites and sample the surface sediment with multicorer and a gravity corer. The obtained data will help our colleagues from the IODP-962 team to better understand the shallow subsurface sediment dynamics and potential sediment instability in the area. The coring was accompanied by the last snowfall of the expedition. Temperatures close to freezing and moist air resulted in sleet and snow shower almost every morning over the last week. With the geology program of the cruise completed on 5.30pm, we continued our transit to the Labrador Sea, where an ARGO float was deployed on 1.10.2022 at 7 am and on the same day in the afternoon the last plankton sampling took place at the position of the Dalhousie University long-term monitoring station GS04-244-03. The hydroacoustic data collection was finished upon reaching the 12 nm zone of Canada and after two days of rough seas with waves reaching almost 5 m, we safely arrived in St. John's in the morning of 4.10.2022. All aims of the cruise have been met. In the main target area of the cruise, we obtained a unique and extensive data set of 750 nm of surveys on the nature of the hitherto little explored continental slope outside Disko Bay, and amassed a true treasure trove of sedimentary records of Greenland's glaciation history, with 131.33 m of MeBo cores from four holes, 215 m of borehole logs from two holes, and six gravity cores containing up to 17 m of sediment.

Acknowledgements

We thank Captain Schmidt and the entire crew of RV MARIA S MERIAN for their excellent support during the cruise. The professional working environment and supportive atmosphere on the MERIAN are greatly appreciated. The expedition took place as part of the research program of the Cluster of Excellence "The Ocean Floor—Earth's Uncharted Interface" (EXC-2077) funded by the Germany's Excellence Strategy through the Deutsche Forschungsgemeinschaft (DFG). Further funding for the participants was provided by MARUM, University of Bremen, by the Danish Council for Independent Research 0135-00165B (GreenShelf), and by the European Union's Horizon 2020 research and innovation program under Grant Agreement No. 869383 (ECOTIP).

Cruise participants

1.	Michal Kucera	Chief Scientist	MARUM
2.	Johan Faust	Sediment sampling	MARUM
3.	Michael Siccha	Hydrography	MARUM
4.	Julie Meilland	Plankton sampling	MARUM
5.	Raphaël Morard	Plankton sampling	MARUM
6.	Hartmut Schulz	Sediment sampling	Universität Tübingen
7.	Tilo von Dobeneck	Core logging	MARUM
8.	Anne de Vernal	Biostratigraphy	GEOTOP
9.	Henrieka Detlef	Sediment sampling	Aarhus University
10.	Anjuly Janßen	Sediment sampling	MARUM
11.	Katharina Streuff	Hydroacoustics	MARUM
12.	Gavin DMello	Hydroacoustics	AWI
13.	Volker Diekamp	Sediment sampling	MARUM
14.	Markus Bergenthal	MeBo team leader	MARUM
15.	Ralf Düßmann	MeBo team	MARUM
16.	Erik Linowski	MeBo team	MARUM
17.	Siefke Fröhlich	MeBo team	MARUM
18.	Frauke Ahrlich	MeBo team	MARUM
19.	Sophia Schillai	MeBo team	MARUM
20.	Kai Kaszemeik	MeBo team	MARUM
21.	Werner Schmidt	MeBo team	MARUM
22.	Dennis Haider	MeBo team	MARUM/Bauer

Institutes

MARUM

Universität Bremen
Leobener Straße 8
28359 Bremen, Germany

Aarhus University

Department of Geoscience
Hoegh-Guldbergs Gade 2
8000 Aarhus C, Denmark

GEOTOP

Université du Québec à Montréal
P.O. Box 8888
Montréal, Québec
H3C 3P8, Canada

Universität Tübingen

Fachbereich Geowissenschaften
Schnarrenbergstr. 94-96
72076 Tübingen, Germany

AWI

Alfred-Wegener-Institut
Helmholtz-Zentrum für Polar- und
Meeresforschung
Van Ronzelen Straße 2
27568 Bremerhaven, Germany

Station list

Device key: CTD = sihpboard CTD with rosette water sampler, EM122 = deep sea multibeam echosounder, EM712 = shallow water multibeam echosounder, FLOAT = ARGO float deployment, GC = gravity corer, MSN = multiple closing plankton net with own CTD and water sampler, MUC = multicorer, PS = Parasound, SVP = sound velocity profiler AML PlusX. For all devices, the position and time of deployment from ship is recorded.

Station	GeoB No.	Date and Time [UTC]	Latitude	Longitude	Depth [m]	Device	Comment
MSM111_1-1	25201-1	03.09.2022 11:03	63° 52,048' N	028° 56,819' W	1607	MUC + SVP	
MSM111_1-2	25201-2	03.09.2022 12:22	63° 52,055' N	028° 56,790' W	1607	GC	Core barrel: 12m
MSM111_1-3	25201-3	03.09.2022 16:22	63° 52,060' N	028° 56,784' W	1617	GC	Core barrel: 18m
MSM111_2-1	25202-1	03.09.2022 21:38	63° 15,497' N	028° 15,042' W	1722	MUC + SVP	
MSM111_2-2	25202-2	03.09.2022 22:55	63° 15,507' N	028° 15,063' W	1721	GC	Core barrel: 12m
MSM111_3-1	25203-1	04.09.2022 08:02	62° 39,294' N	030° 52,302' W	2590	CTD	
MSM111_3-2	25203-2	04.09.2022 10:01	62° 39,294' N	030° 52,301' W	2586	MSN	
MSM111_3-3	25203-3	04.09.2022 10:27	62° 39,294' N	030° 52,301' W	2587	MSN	
MSM111_4-1	25204-1	05.09.2022 08:02	60° 48,128' N	037° 30,180' W	2956	CTD	
MSM111_4-2	25204-2	05.09.2022 10:13	60° 48,128' N	037° 30,181' W	2957	MSN	
MSM111_4-3	25204-3	05.09.2022 10:32	60° 48,129' N	037° 30,180' W	2957	MSN	
MSM111_5-1	25205-1	06.09.2022 11:36	58° 40,246' N	044° 33,092' W	1845	CTD	
MSM111_5-2	25205-2	06.09.2022 13:02	58° 40,246' N	044° 33,093' W	1845	MSN	
MSM111_5-3	25205-3	06.09.2022 13:24	58° 40,246' N	044° 33,092' W	1844	MSN	
MSM111_6-1	25206-1	07.09.2022 10:51	60° 56,191' N	046° 09,248' W	275	MUC	
MSM111_6-2	25206-2	07.09.2022 11:16	60° 56,206' N	046° 09,290' W	274	GC	Core barrel: 12m
MSM111_7-1	25207-1	08.09.2022 09:03	61° 18,353' N	050° 23,227' W	2804	CTD	
MSM111_7-2	25207-2	08.09.2022 11:02	61° 18,353' N	050° 23,227' W	2804	MSN	
MSM111_7-3	25207-3	08.09.2022 11:22	61° 18,379' N	050° 23,188' W	2801	MSN	
MSM111_8-1	25208-1	09.09.2022 09:01	64° 33,439' N	055° 17,858' W	768	CTD	
MSM111_8-2	25208-2	09.09.2022 09:49	64° 33,439' N	055° 17,859' W	767	MSN	
MSM111_8-3	25208-3	09.09.2022 10:08	64° 33,439' N	055° 17,860' W	765	MSN	
MSM111_9-1	25209-1	10.09.2022 12:52	68° 54,357' N	059° 54,559' W	1541	CTD	
MSM111_9-2	25209-2	10.09.2022 14:10	68° 54,360' N	059° 54,560' W	1541	MSN	
MSM111_10-2	NA	10.09.2022 14:41	68° 54,416' N	059° 54,352' W	1527	PS	profile start
MSM111_10-1	NA	10.09.2022 14:41	68° 54,416' N	059° 54,352' W	1527	EM122	profile start
MSM111_10-1	NA	12.09.2022 15:44	68° 38,437' N	060° 02,381' W	1442	EM122	profile interrupted
MSM111_10-2	NA	12.09.2022 15:44	68° 38,437' N	060° 02,381' W	1442	PS	profile interrupted
MSM111_10-2	NA	12.09.2022 17:40	68° 38,442' N	060° 03,294' W	1457	PS	profile resumed
MSM111_10-1	NA	12.09.2022 17:40	68° 38,442' N	060° 03,294' W	1457	EM122	profile resumed
MSM111_10-1	NA	13.09.2022 10:48	68° 52,062' N	060° 14,438' W	1625	EM122	profile end
MSM111_10-2	NA	13.09.2022 10:48	68° 52,062' N	060° 14,438' W	1627	PS	profile end
MSM111_11-1	25210-1	12.09.2022 15:57	68° 38,402' N	060° 03,584' W	1458	CTD	
MSM111_11-2	25210-2	12.09.2022 17:06	68° 38,401' N	060° 03,583' W	1453	MSN	
MSM111_11-3	25210-3	12.09.2022 17:21	68° 38,402' N	060° 03,583' W	1457	MSN	
MSM111_12-1	25211-1	13.09.2022 10:54	68° 52,063' N	060° 14,435' W	1628	MUC	
MSM111_13-1	25212-1	13.09.2022 13:05	68° 47,616' N	059° 59,433' W	1505	MUC	
MSM111_13-2	25212-2	13.09.2022 14:19	68° 47,620' N	059° 59,429' W	1505	GC	Core barrel: 12m
MSM111_13-3	25212-3	13.09.2022 17:18	68° 47,621' N	059° 59,424' W	1504	GC	Core barrel: 18m

MSM111_14-1	25213-1	13.09.2022 19:54	68° 43,453' N	059° 29,394' W	868	MUC	
MSM111_15-1	NA	13.09.2022 20:39	68° 43,387' N	059° 29,368' W	868	EM122	profile start
MSM111_15-2	NA	13.09.2022 20:39	68° 43,386' N	059° 29,367' W	870	PS	profile start
MSM111_15-1	NA	14.09.2022 21:26	68° 38,531' N	060° 05,009' W	1468	EM122	profile end
MSM111_15-2	NA	14.09.2022 21:26	68° 38,531' N	060° 05,009' W	1468	PS	profile end
MSM111_16-1	25214-1	14.09.2022 22:54	68° 47,513' N	059° 59,186' W	1506	MEBO	
MSM111_17-2	NA	16.09.2022 17:00	68° 42,798' N	059° 13,108' W	510	PS	profile start
MSM111_17-1	NA	16.09.2022 17:00	68° 42,798' N	059° 13,108' W	510	EM122	profile start
MSM111_17-1	NA	17.09.2022 03:45	68° 29,829' N	054° 24,736' W	319	EM122	profile end
MSM111_17-2	NA	17.09.2022 03:45	68° 29,829' N	054° 24,736' W	319	PS	profile end
MSM111_17-3	NA	16.09.2022 20:09	68° 39,104' N	057° 51,020' W	290	EM712	profile start
MSM111_17-3	NA	16.09.2022 20:54	68° 38,174' N	057° 30,289' W	325	EM712	profile end
MSM111_18-1	25215-1	17.09.2022 10:48	68° 46,201' N	051° 24,599' W	366	MUC	
MSM111_19-1	25216-1	17.09.2022 16:30	69° 13,143' N	051° 12,168' W	303	MUC	
MSM111_20-1	25217-1	17.09.2022 21:53	69° 50,993' N	051° 43,198' W	625	MUC	
MSM111_20-2	25217-2	17.09.2022 22:35	69° 50,990' N	051° 43,198' W	303	GC	Core barrel: 12m
MSM111_21-1	NA	18.09.2022 11:35	68° 33,790' N	055° 38,207' W	347	EM122	profile start
MSM111_21-2	NA	18.09.2022 11:35	68° 33,790' N	055° 38,207' W	347	PS	profile start
MSM111_21-1	NA	18.09.2022 13:14	68° 27,788' N	056° 04,156' W	487	EM122	profile interrupted
MSM111_21-2	NA	18.09.2022 13:15	68° 27,788' N	056° 04,156' W	485	PS	profile interrupted
MSM111_21-1	NA	18.09.2022 13:56	68° 27,789' N	056° 04,158' W	483	EM122	profile resumed
MSM111_21-2	NA	18.09.2022 13:56	68° 27,789' N	056° 04,159' W	486	PS	profile resumed
MSM111_21-2	NA	18.09.2022 23:36	68° 35,607' N	056° 23,407' W	357	PS	profile end
MSM111_21-1	NA	18.09.2022 23:36	68° 35,639' N	056° 23,424' W	355	EM122	profile end
MSM111_22-1	25218-1	18.09.2022 13:20	68° 27,787' N	056° 04,158' W	483	CTD	
MSM111_23-1	25219-1	19.09.2022 08:49	68° 41,819' N	059° 38,404' W	1101	GC	Core barrel: 18m
MSM111_24-1	25220-1	19.09.2022 11:12	68° 38,489' N	060° 02,774' W	1459	MEBO	
MSM111_25-2	NA	21.09.2022 10:27	68° 38,494' N	059° 59,661' W	1421	PS	profile start
MSM111_25-1	NA	21.09.2022 10:27	68° 38,494' N	059° 59,661' W	1421	EM122	profile start
MSM111_25-1	NA	21.09.2022 14:03	68° 37,361' N	060° 53,710' W	1729	EM122	profile interrupted
MSM111_25-2	NA	21.09.2022 14:03	68° 37,361' N	060° 53,710' W	1729	PS	profile interrupted
MSM111_25-2	NA	21.09.2022 16:58	68° 37,390' N	060° 53,722' W	1732	PS	profile resumed
MSM111_25-1	NA	21.09.2022 16:58	68° 37,390' N	060° 53,722' W	1732	EM122	profile resumed
MSM111_25-2	NA	21.09.2022 21:00	68° 38,451' N	060° 03,486' W	1465	PS	profile end
MSM111_25-1	NA	21.09.2022 21:19	68° 38,236' N	060° 11,929' W	1521	EM122	profile end
MSM111_26-1	25221-1	21.09.2022 14:14	68° 37,353' N	060° 53,874' W	1732	MUC	
MSM111_26-2	25221-2	21.09.2022 15:34	68° 37,355' N	060° 53,872' W	1728	GC	Core barrel: 18m
MSM111_27-1	25222-1	21.09.2022 21:51	68° 38,345' N	060° 06,714' W	1486	GC	Core barrel: 18m
MSM111_27-2	25222-2	21.09.2022 23:12	68° 38,366' N	060° 06,743' W	1492	MEBO	
MSM111_28-2	NA	24.09.2022 09:53	68° 38,213' N	060° 12,969' W	1530	PS	profile start
MSM111_28-1	NA	24.09.2022 09:53	68° 38,213' N	060° 12,969' W	1530	EM122	profile start
MSM111_28-1	NA	24.09.2022 22:23	68° 40,280' N	059° 59,645' W	1434	EM122	profile end
MSM111_28-2	NA	24.09.2022 22:23	68° 40,269' N	059° 59,760' W	1436	PS	profile end
MSM111_29-1	25223-1	24.09.2022 22:59	68° 38,434' N	060° 02,758' W	1449	MEBO	
MSM111_30-2	NA	26.09.2022 14:34	68° 38,391' N	060° 02,898' W	1449	PS	profile start
MSM111_30-1	NA	26.09.2022 14:34	68° 38,391' N	060° 02,898' W	1449	EM122	profile start
MSM111_30-2	NA	26.09.2022 19:45	68° 36,447' N	061° 20,349' W	1769	PS	profile end

MSM111_30-1	NA	26.09.2022 19:45	68° 36,447' N	061° 20,349' W	1769	EM122	profile end
MSM111_31-1	25224-1	26.09.2022 20:02	68° 36,629' N	061° 18,352' W	1768	GC	Core barrel: 18m
MSM111_32-1	25225-1	27.09.2022 00:12	68° 20,055' N	060° 15,211' W	1513	CTD	
MSM111_33-1	NA	27.09.2022 01:23	68° 20,057' N	060° 15,210' W	1513	EM122	profile start
MSM111_33-1	NA	28.09.2022 06:48	68° 14,978' N	060° 16,112' W	1533	EM122	profile end
MSM111_33-2	NA	27.09.2022 01:24	68° 20,061' N	060° 15,208' W	1512	PS	profile start
MSM111_33-2	NA	28.09.2022 06:48	68° 14,978' N	060° 16,112' W	1533	PS	profile end
MSM111_34-1	NA	29.09.2022 05:46	64° 22,264' N	056° 33,745' W	727	EM122	profile start
MSM111_34-2	NA	29.09.2022 05:46	64° 22,264' N	056° 33,745' W	727	PS	profile start
MSM111_34-2	NA	29.09.2022 16:54	64° 27,876' N	055° 50,272' W	989	PS	profile end
MSM111_34-1	NA	29.09.2022 16:54	64° 27,876' N	055° 50,272' W	989	EM122	profile end
MSM111_35-1	25226-1	29.09.2022 17:52	64° 31,250' N	056° 05,137' W	905	MUC	
MSM111_35-2	25226-2	29.09.2022 18:42	64° 31,249' N	056° 05,144' W	905	GC	Core barrel: 12m
MSM111_36-1	NA	01.10.2022 10:16	58° 26,425' N	049° 33,088' W	3522	FLOAT	P43244-22DE001
MSM111_37-1	25227-1	01.10.2022 17:09	57° 20,416' N	048° 29,987' W	3421	MSN	
MSM111_37-2	25227-2	01.10.2022 18:18	57° 20,417' N	048° 29,988' W	3423	MSN	
MSM111_37-3	25227-3	01.10.2022 18:45	57° 20,416' N	048° 29,987' W	3423	MSN	