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R/V MARIA S. MERIAN
Short Cruise Report
Cruise MSM101

Emden (Germany) – Emden (Germany)
12.06.2021 – 20.07.2021
Chief Scientist: Prof. Dr. Ralph Schneider
Captain: Ralf Schmidt

NOVAMAR
Paleoclimate and Biogeochemistry Nova Scotia Margin

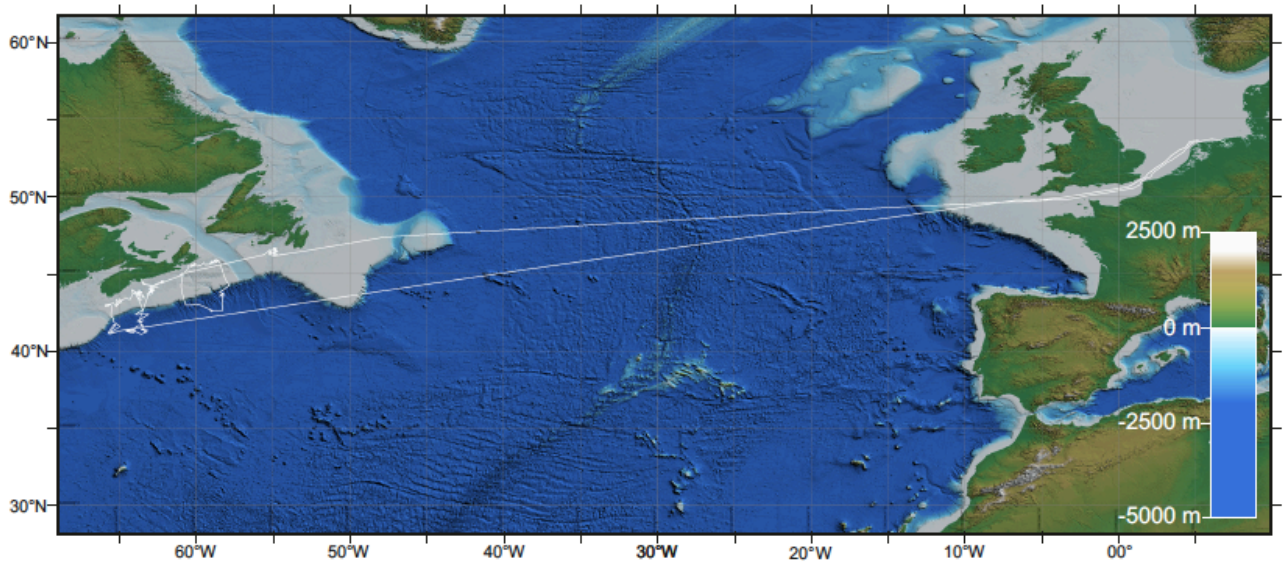

Fig. 1: Cruise track MSM101

Objectives

Cruise MSM101, on the one hand, conducted sediment coring for paleoceanographic investigations, oriented along four inner shelf basin surveys on the Scotian Shelf and one on the southern Newfoundland Shelf (see overview map above). On the other hand, three cross-shelf-slope transects were executed. This sampling setup was designed to reconstruct (i) the climatic variability of the main cold subpolar water masses originating from the Labrador Sea, (ii) directly compare it with the warm Subtropical Gyre (STG) and North Atlantic Circulation (NAC) in the Northwest Atlantic, and also (iii) link it in the same setting with subsurface water mass changes. The latter include the Scotian Slope Waters, and those related to the Deep Western Boundary Circulation (DWBC), the third major element of the Atlantic Meridional Overturning Circulation (AMOC). Since all important oceanic surface and subsurface water masses are merging along the Scotian Margin, this region is pivotal to directly disentangle climate changes in the cold Labrador Current (LC) from those in the warm STG circulation of the North Atlantic, that is much less affected by meltwater than the LC and generally much warmer due to the northward heat transport by the Gulf Stream. At intermediate and deeper water depths, the target will be the reconstruction of the formation and variability in Scotian Slope Waters, a mixture of subsurface NAC and LC / Gulf of St. Lawrence waters, which are important for biogeochemical cycling of, e.g. carbon, oxygen, and trace element and nutrient fluxes, thus controlling offshore planktonic and benthic ecosystems.

Inner shelf basin hydroacoustic surveys and cross-shelf-slope transects assisted to identify the best locations of thickest young mud deposits most suited for our aim to reconstruct Postglacial to Latest Holocene time-transgressive gradients of changes in water mass variability, benthic nutrient, freshwater and terrigenous material fluxes by paleoceanographic proxy records. The retrieved sediments are characterized by an enhanced continental material supply from the Gulf of St. Lawrence and Gulf of Maine, trapped as thick Deglacial to Holocene sediment sequences in the inner shelf basins and in morphological depressions or channel-levee systems on the upper slope, mainly forming terrigenous to hemipelagic muds, silty sands, or sands with a pelagic component from marine biological productivity. Based on about 250 m of new gravity corer sediment sequences and more than 5500 1cm thick sediment slices from Multicorer deployments at the interface of bottom waters and surface sediments, we have gained an unprecedented archive to address certain research questions formulated for MSM101. The first is if water mass changes off Nova Scotia support the hypothesis of diminished LC and stronger NAC influence associated with weakening of the AMOC during very warm climate intervals during the Holocene and parallel to Postglacial warming? This relates to the second question whether Holocene climate variability at decadal to centennial time scales off Nova Scotia was similar to changes in the western Labrador Sea and to those documented for the STG in the western North Atlantic or not? If yes, can we detect leads and lags in the evolution between Nova Scotia slope waters and the source regions of the different water masses? For example, did cooling in the Labrador Sea during the last 2-3 millennia contrast with subsurface warming in the SPG and STG that should be detected in the Gulf Stream offshore Nova Scotia?

In contrast to this success for paleoceanographic purposes, due to a shortage in working days for MSM101, because of the 10 days quarantine and long transits from Germany to Canada and back, we could not execute the intended water chemistry and sediment biogeochemical work program, since Canadian scientists and many of the experienced scientists from Germany were not able to participate in MSM101. However, we will aim for second shorter cruise to also achieve these other objectives in the near future.

Narrative

After ten days in hotel quarantine for all new crew members and researchers, cruise MSM101 started as planned on Saturday, June 12th, 2021, departing from Emden Harbor. Having uploaded the scientific equipment and embarked the vessel with 18 scientific participants from Kiel University the day before, the expedition headed towards the Nova Scotia Margin. The first day on the North Sea was spent preparing the laboratories for the hydroacoustic surveys and for geological sampling. On Sunday, June 13th, we passed the chalk cliffs of Dover, navigating on a westerly course for the approximately 2,800 nautical mile transit towards the Canadian east coast. On Tuesday, June 15th, after leaving the Exclusive Economic Zone (EEZ) of Ireland, we started the "underway data" survey using the shipboard ADCP (Acoustic Doppler Current Profiler), seafloor multibeam swath bathymetry, and sediment echosounder systems. These survey data have been transferred and stored directly into the data archive of the German Alliance for Marine Research (DAM) on PANGAEA.

In the morning of Sunday, June 20th, after nine days of transit, we reached the continental margin off Newfoundland within the planned time window. The change from the warm water masses of the Gulf Stream to the colder outflow from the Labrador Sea was clearly noticeable by a temperature drop of more than 10° Celsius in the air and surface waters. The first detailed hydroacoustic survey work began in the evening of Tuesday, June 22nd, in the southwestern corner of the working area off Nova Scotia in water depths around 3,000 m. Suitable locations for geological sampling were identified on the upper continental slope using the shipboard multi-beam and sediment echosounders. Afterwards, one sampling station with CTD, multicorer and gravity corer was carried out in 2,750 m water depth on Wednesday, June 23rd. Here, we sampled hemipelagic clayey muds of the last Glacial, the following deglaciation phase (Deglacial) and the Holocene. On Thursday, June 24th, we continued surveying, sampling the water column, and recovering Holocene sediments on the shelf east of the Northeast Channel. In water depths between 150 and 170 m, LaHave clay, the youngest Holocene deposits on the shelf, was recovered at two stations. With CTD profiles we identified water masses from the Labrador Current, mixed with those from the Gulf of St. Lawrence. With hydroacoustic surveys at night, sediment sampling of the LaHave clay, and CTD profiling work continued at another eight stations in the Roseway and LaHave shelf basins from Friday, June 24th to Sunday, June 26th. From Monday morning, June 28th, until the evening of Tuesday, June 29th, we conducted detailed hydroacoustic surveying and core stations on the continental slope in water depths between 2,700 and 3,700 m, in the depth range of the so-called Nova Scotia Slope Water, a mixture of water masses from the Labrador Sea and the western North Atlantic intermediate and deeper water masses. Identification of undisturbed sediment sampling sites was difficult at the continental margin dominated by landslides and turbidites, and because the planned survey lines had to be altered quickly to avoid fishing boats with longline deployments. Nevertheless, three sampling stations with CTD, MUC and gravity corer were successful. On Wednesday and Thursday, June 30th and July 1st, the Emerald Basin, the largest shelf basin off Nova Scotia was mapped densely with multibeam and sediment echosounders. Locations with the thickest Holocene deposits, the LaHave Clay, were sampled at 5 stations in water depths between 200 and 300 m, including CTD profiling. These clays turned out to be strongly consolidated by diagenetic remineralization, so that, despite the use of 20 m long gravity core barrels, sediment core recovery of only about 9 m was achieved at all coring stations.

Friday morning, July 2nd, the work program was interrupted to upload fuel and fresh provisions at Halifax harbor, but then continued in the afternoon and on Saturday, July 3rd, with surveys and 4 geological stations in the northern Emerald Basin. Due to the difficult wind and wave conditions that hampered ship positioning, we could not execute any station work in the Canso Basin on Sunday, July 4th, and continued with further

hydroacoustic surveys to the shelf basins further east. Monday morning, July 5th, we started with three geological stations in the Scatarie Basin, the easternmost shelf basin off Nova Scotia and west of Cabot Strait, the outflow area of the Gulf of St. Lawrence. Here, sediment cores up to 10 m in length were recovered, filled with Deglacial and Holocene clayey muds. We then sailed across the shelf platform more than 150 nautical miles southward again to the upper continental slope to conduct surveys with the multibeam and sediment echosounders in water depths between 2,400 and 4,200 m to identify suitable geological stations. Until Wednesday evening, July 7th, sediment cores could be retrieved at three stations. In contrast to the gravity cores from the shelf, with Holocene sediment thicknesses of several meters, the cores from the continental slope often contain only a few decimeters of Holocene, followed by series of colorful glacial clays, often interrupted by silty-sandy debris layers. Nevertheless, these sediments provide sufficient material to reconstruct changes in the deeper water masses, including the Scotian Slope Water, from the last Glacial to the present warm period. Until Thursday morning, July 8th, we conducted further survey work across the slope back onto the shelf into the Canso Basin.

Here we revisited a geology station that could not be sampled the week before due to poor weather conditions. This allowed us to complete the planned north-south transect across all shelf basins off Nova Scotia and to start our work 260 nautical miles further east off Newfoundland, where we arrived at Friday noon, July 9th, in the Halibut Basin. After quickly surveying a sediment drift body, we conducted a geology station in 160 m water depth. Further hydroacoustic surveys went on during the night into Saturday, July 10th, when we successfully conducted three geological stations with CTD, MUC and gravity corer. Here, we sampled current-induced sediment drift bodies in water depths between 150 and 230 m on the eastern slope of a glacial channel off Placentia Bay. Again, we recovered Holocene sediments with several meters in thickness.

On Sunday, July 11th, we returned back towards the port of Emden. On the way back, the hydroacoustic systems on board were further operated with the registered data made available as "underway data" to the German Alliance for Marine Research (DAM). In addition to the underway data acquisition, three more CTD profiles were recorded on Tuesday, July 13th, and Thursday, July 15th, in large water depths west and east of the Mid-Ocean Ridge (MOR). These were used to characterize the deeper water masses in the North Atlantic, to calculate the sound velocity down to great depths for calibration of the ongoing hydroacoustic survey, as well as for sensor tests when using the CTD in water depths greater than 4,000 m. With this, the station work of cruise MSM101 was finally completed. When reaching the exclusive economic zone of Ireland on Friday evening, July 16th, the survey measurements also finished. During the transit back to Germany, a lot of preparatory work was done onboard. This included splitting of more than 250 m of sediment cores and describing them lithologically, as well as to photograph and store them all in the reefer. Also, the hydroacoustic survey data were processed, cataloged, and saved for data storage. Cruise MSM101 then ended in Emden Habor, on Tuesday, July 20th. Part of our equipment was immediately released from the vessel and that for the next cruise MSM102 uploaded. The scientific crew of MSM101 then disembarked from MARIA S. MERIAN at 3 pm and went back to Kiel by bus.

Acknowledgements

On behalf of all scientific crew members I would like to thank all the authorities and the German Research Fleet Coordination Centre at the University of Hamburg, involved in the planning and execution of the cruise, as well as the crew of RV MARIA S. MERIAN and BRIESE Research for their strong engagement and support, which has made cruise MSM101 a very successful scientific expedition.

Participant List, MSM101

1. Schneider, Ralph	*Chief Scientist*	CAU
2. Brembach, Kerstin	Hydroacoustics	CAU
3. Gößling, Paula	CTD, oceanography	CAU
4. Groß, Felix	Hydroacoustics	CAU
5. Günther, Leonard	Sediment sampling	CAU
6. Heinrich, Sven	Geology, gear deployment	CAU
7. Huygen, Finn	Sediment sampling	CAU
8. Kallinich, Nina	Hydroacoustics	CAU
9. Kolling, Henriette	Paleoceanography	CAU
10. Lange, Dorothea	Hydroacoustics	CAU
11. Lindner, Marie	Sediment sampling	CAU
12. Matzerath, Peter	CTD, oceanography	CAU
13. Martinez-Bautista, Orlando	Hydroacoustics	CAU
14. Morgenweck,Lea	Sedimentology	CAU
15. Sulaiman, Hanif	Sedimenntology	CAU
16. Supka, Ruth	Hydroacoustics	CAU
17. Vesely, Nele	Hydroacoustics	CAU
18. Wolf, Josephin	Sediment sampling	CAU

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Station List

Station List MARIA S. MERIAN, Cruise MSM101:

Hydroacoustics: ESV: Expendable Sound Velocimeter, EM122: Multibeam / P70: PARASOUND / ADCP
Geological sampling, CTD: Conductivity, Temperatur, and Depth Sonde, Multicorer, Giant Box, and Gravity core

Date/Time (UCT)	Station Number	Sounding/Gear	Latitude	Longitude	Depth (m)	Course (°)	Remark
15.06.21 12:25	MSM101_1-1	ESV	48° 22.475' N	016° 30.565' W	4794	262	station end
20.06.21 11:07	MSM101_2-1	ESV	43° 46.939' N	048° 22.291' W	3292.3	257	station end
23.06.21 02:20	MSM101_3-1	EM122/P70/ADCP	41° 17.768' N	064° 53.669' W	3198.2	252	profile start
23.06.21 11:51	MSM101_3-1	EM122/P70/ADCP	41° 41.281' N	065° 12.035' W	2303.1	29	profile end
23.06.21 17:16	MSM101_4-1	CTD	41° 06.303' N	065° 36.656' W	2738.6	36	max depth/on ground
23.06.21 18:51	MSM101_4-2	Multi Corer	41° 06.308' N	065° 36.645' W	2735.3	186	max depth/on ground
23.06.21 20:22	MSM101_4-3	Gravity Corer. 10 m	41° 06.308' N	065° 36.644' W	2736.2	166	max depth/on ground
24.06.21 00:21	MSM101_5-1	EM122/P70/ADCP	41° 35.039' N	064° 55.601' W	2813.1	331	profile start
24.06.21 11:47	MSM101_5-1	EM122/P70/ADCP	42° 55.183' N	065° 29.280' W	135.1	2	profile end
24.06.21 12:36	MSM101_6-1	EM122/P70/ADCP	42° 59.552' N	065° 36.475' W	138.4	203	profile start
24.06.21 17:55	MSM101_6-1	EM122/P70/ADCP	42° 51.425' N	065° 53.229' W	96.7	187	profile end
24.06.21 19:09	MSM101_7-1	CTD	42° 57.480' N	065° 46.009' W	167	4	max depth/on ground
24.06.21 19:23	MSM101_7-2	Multi Corer	42° 57.478' N	065° 46.018' W	165	196	max depth/on ground
24.06.21 19:56	MSM101_8-1	Multi Corer	42° 57.118' N	065° 46.085' W	170.4	15	max depth/on ground
24.06.21 20:14	MSM101_8-2	Gravity Corer	42° 57.118' N	065° 46.085' W	170.4	90	max depth/on ground
24.06.21 22:30	MSM101_9-1	EM122/P70/ADCP	43° 04.378' N	065° 21.456' W	121.8	123	profile start
25.06.21 10:50	MSM101_9-1	EM122/P70/ADCP	43° 10.566' N	064° 49.157' W	150	149	profile end
25.06.21 13:28	MSM101_10-1	CTD	42° 53.655' N	065° 09.890' W	160.2	160	max depth/on ground
25.06.21 13:42	MSM101_10-2	Multi Corer	42° 53.653' N	065° 09.880' W	160.3	13	max depth/on ground
25.06.21 15:01	MSM101_11-1	CTD	43° 01.504' N	065° 09.535' W	169.1	25	max depth/on ground
25.06.21 15:16	MSM101_11-2	Multi Corer	43° 01.501' N	065° 09.522' W	169.3	344	max depth/on ground
25.06.21 17:18	MSM101_12-1	CTD	43° 03.880' N	065° 01.136' W	162.1	29	max depth/on ground
25.06.21 17:32	MSM101_12-2	Multi Corer	43° 03.873' N	065° 01.155' W	162.3	342	max depth/on ground
25.06.21 17:57	MSM101_12-3	Gravity Corer. 10 m	43° 03.871' N	065° 01.155' W	162	347	max depth/on ground
25.06.21 19:31	MSM101_13-1	CTD	43° 12.352' N	064° 57.946' W	162	132	max depth/on ground
25.06.21 19:43	MSM101_13-2	Multi Corer	43° 12.352' N	064° 57.946' W	161.4	161	max depth/on ground
25.06.21 19:59	MSM101_13-3	Gravity Corer. 10 m	43° 12.352' N	064° 57.947' W	161.5	9	max depth/on ground
25.06.21 22:05	MSM101_14-1	EM122/P70/ADCP	43° 22.942' N	064° 32.488' W	107.4	100	profile start
26.06.21 14:32	MSM101_14-1	EM122/P70/ADCP	43° 53.630' N	063° 38.863' W	236	335	profile end
26.06.21 15:30	MSM101_15-1	CTD	43° 47.940' N	063° 35.261' W	243.9	307	max depth/on ground
26.06.21 15:47	MSM101_15-2	Multi Corer	43° 47.934' N	063° 35.260' W	244.6	7	max depth/on ground
26.06.21 16:19	MSM101_15-3	Gravity Corer. 15 m	43° 47.934' N	063° 35.260' W	255	207	max depth/on ground
26.06.21 17:48	MSM101_16-1	CTD	43° 37.577' N	063° 40.293' W	233.6	66	max depth/on ground
26.06.21 18:03	MSM101_16-2	Multi Corer	43° 37.578' N	063° 40.297' W	250.6	89	max depth/on ground
26.06.21 18:24	MSM101_16-3	Gravity Corer. 15 m	43° 37.578' N	063° 40.297' W	250.4	228	max depth/on ground
26.06.21 20:42	MSM101_17-1	CTD	43° 44.366' N	064° 06.302' W	220.2	203	max depth/on ground
26.06.21 20:58	MSM101_17-2	Multi Corer	43° 44.366' N	064° 06.302' W	226.4	250	max depth/on ground
26.06.21 21:16	MSM101_17-3	Gravity Corer. 10 m	43° 44.366' N	064° 06.302' W	219.4	343	max depth/on ground
26.06.21 21:32	MSM101_18-1	EM122/P70	43° 44.371' N	064° 06.258' W	226.8	73	profile start
27.06.21 11:30	MSM101_18-1	EM122/P70	43° 52.231' N	063° 43.956' W	240.5	349	profile end
27.06.21 12:27	MSM101_19-1	CTD	43° 46.784' N	063° 42.392' W	250.5	179	max depth/on ground
27.06.21 12:42	MSM101_19-2	Multi Corer	43° 46.782' N	063° 42.393' W	251.6	316	max depth/on ground
27.06.21 13:01	MSM101_19-3	Gravity Corer. 15 m	43° 46.782' N	063° 42.393' W	250.5	106	max depth/on ground
27.06.21 15:11	MSM101_20-1	CTD	43° 28.050' N	063° 46.948' W	234.4	226	max depth/on ground
27.06.21 15:24	MSM101_20-2	Multi Corer	43° 28.048' N	063° 46.949' W	230.5	277	max depth/on ground
27.06.21 15:44	MSM101_20-3	Gravity Corer. 10 m	43° 28.048' N	063° 46.950' W	235.4	339	max depth/on ground
27.06.21 20:54	MSM101_21-1	CTD	42° 38.544' N	063° 26.994' W	1239.8	12	max depth/on ground
27.06.21 21:20	MSM101_22-1	EM122/P70/ADCP	42° 38.544' N	063° 26.995' W	1240.1	225	profile start
28.06.21 16:00	MSM101_22-1	EM122/P70/ADCP	41° 55.075' N	063° 23.544' W	2804.1	85	profile end
28.06.21 17:16	MSM101_23-1	Multi Corer	41° 54.687' N	063° 28.905' W	2647.5	186	max depth/on ground
28.06.21 18:46	MSM101_23-2	Gravity Corer. 10 m	41° 54.688' N	063° 28.906' W	2653.5	245	max depth/on ground
28.06.21 20:29	MSM101_23-3	CTD	41° 54.433' N	063° 29.100' W	2662.1	178	max depth/on ground
28.06.21 21:15	MSM101_23-3	CTD	41° 54.184' N	063° 29.041' W	2682.3	186	on deck
28.06.21 21:59	MSM101_24-1	EM122/P70/ADCP	41° 48.439' N	063° 37.571' W	2983.1	226	profile start
28.06.21 23:43	MSM101_24-1	EM122/P70/ADCP	41° 37.698' N	063° 25.936' W	3302.4	143	profile end. fisheries
29.06.21 01:37	MSM101_25-1	EM122/P70/ADCP	41° 32.893' N	063° 53.148' W	3332.1	236	profile start
29.06.21 11:46	MSM101_25-1	EM122/P70/ADCP	41° 10.441' N	064° 11.099' W	3762.7	269	profile end
29.06.21 14:12	MSM101_26-1	Multi Corer	41° 15.647' N	064° 32.276' W	3511.6	188	max depth/on ground
29.06.21 16:04	MSM101_26-2	Gravity Corer. 10 m	41° 15.646' N	064° 32.275' W	3513.3	341	max depth/on ground
29.06.21 20:12	MSM101_27-1	Multi Corer	41° 17.000' N	063° 58.668' W	3686.4	49	max depth/on ground

Date/Time (UCT)	Station Number	Sounding/Gear	Latitude	Longitude	Depth (m)	Course (°)	Remark
29.06.21 22:07	MSM101_27-2	Gravity Corer. 10 m	41° 17.000' N	063° 58.667' W	3685.2	230	max depth/on ground
30.06.21 00:13	MSM101_27-3	CTD	41° 16.951' N	063° 58.907' W	3682.7	137	max depth/on ground
30.06.21 03:10	MSM101_28-1	EM122/P70/ADCP	41° 04.685' N	063° 34.030' W	4080.4	124	profile start
30.06.21 12:01	MSM101_28-1	EM122/P70/ADCP	41° 23.956' N	063° 22.410' W	3656.1	75	profile end
30.06.21 15:29	MSM101_29-1	Multi Corer	41° 53.805' N	063° 41.592' W	2698.3	111	max depth/on ground
30.06.21 17:01	MSM101_29-2	Gravity Corer. 10 m	41° 53.805' N	063° 41.591' W	2698.2	266	max depth/on ground
30.06.21 18:41	MSM101_29-3	CTD	41° 53.805' N	063° 41.593' W	2697	310	max depth/on ground
30.06.21 20:15	MSM101_29-4	Gravity Corer. 10 m	41° 53.805' N	063° 41.592' W	2696.9	54	max depth/on ground
01.07.21 04:30	MSM101_30-1	EM122/P70/ADCP	43° 29.858' N	063° 07.673' W	216.6	12	profile start
01.07.21 14:22	MSM101_30-1	EM122/P70/ADCP	43° 51.958' N	062° 40.840' W	205.4	102	profile end
01.07.21 15:30	MSM101_31-1	CTD	43° 53.503' N	062° 50.404' W	267.4	290	max depth/on ground
01.07.21 15:49	MSM101_31-2	Multi Corer	43° 53.495' N	062° 50.409' W	262.6	3	max depth/on ground
01.07.21 16:12	MSM101_31-3	Gravity Corer. 20 m	43° 53.494' N	062° 50.408' W	263.7	341	max depth/on ground
01.07.21 17:18	MSM101_32-1	CTD	43° 51.874' N	062° 56.559' W	270.9	247	max depth/on ground
01.07.21 17:35	MSM101_32-2	Multi Corer	43° 51.873' N	062° 56.560' W	271.2	169	max depth/on ground
01.07.21 17:57	MSM101_32-3	Gravity Corer. 20 m	43° 51.873' N	062° 56.560' W	272.9	12	max depth/on ground
01.07.21 19:24	MSM101_33-1	CTD	43° 43.552' N	063° 02.314' W	275.6	79	max depth/on ground
01.07.21 19:41	MSM101_33-2	Multi Corer	43° 43.552' N	063° 02.315' W	276	132	max depth/on ground
01.07.21 20:02	MSM101_33-3	Gravity Corer. 20 m	43° 43.552' N	063° 02.314' W	276.3	215	max depth/on ground
01.07.21 21:40	MSM101_34-1	EM122/P70/ADCP	43° 52.485' N	062° 43.051' W	215.2	20	profile start
02.07.21 06:17	MSM101_34-1	EM122/P70/ADCP	44° 06.730' N	062° 26.796' W	162.5	89	profile end
02.07.21 19:32	MSM101_35-1	CTD	44° 17.357' N	063° 15.099' W	165.4	331	max depth/on ground
02.07.21 19:43	MSM101_35-2	Multi Corer	44° 17.358' N	063° 15.099' W	173.8	314	max depth/on ground
02.07.21 20:12	MSM101_35-3	Gravity Corer. 15 m	44° 17.358' N	063° 15.098' W	163.4	229	max depth/on ground
02.07.21 22:33	MSM101_36-1	CTD	44° 09.840' N	062° 50.792' W	228.7	56	max depth/on ground
02.07.21 22:48	MSM101_36-2	Multi Corer	44° 09.839' N	062° 50.792' W	229.7	237	max depth/on ground
02.07.21 23:06	MSM101_36-3	Gravity Corer. 15 m	44° 09.841' N	062° 50.791' W	230.6	18	max depth/on ground
03.07.21 00:42	MSM101_37-1	EM122/P70	44° 17.709' N	062° 34.774' W	213.8	46	profile start
03.07.21 13:07	MSM101_37-1	EM122/P70	44° 24.036' N	062° 13.259' W	231.3	158	profile end
03.07.21 13:30	MSM101_38-1	CTD	44° 24.030' N	062° 12.574' W	229.8	60	max depth/on ground
03.07.21 13:46	MSM101_38-2	Multi Corer	44° 24.031' N	062° 12.575' W	231.1	9	max depth/on ground
03.07.21 14:08	MSM101_38-3	Gravity Corer. 20 m	44° 24.029' N	062° 12.577' W	230.2	99	max depth/on ground
03.07.21 15:38	MSM101_39-1	CTD	44° 26.384' N	062° 05.973' W	231.4	156	max depth/on ground
03.07.21 15:58	MSM101_39-2	Multi Corer	44° 26.386' N	062° 05.971' W	243	63	max depth/on ground
03.07.21 16:18	MSM101_39-3	Gravity Corer. 20 m	44° 26.386' N	062° 05.972' W	229.2	83	max depth/on ground
03.07.21 23:53	MSM101_40-1	EM122/P70	44° 50.886' N	060° 59.269' W	82.5	64	profile start
04.07.21 00:53	MSM101_40-1	EM122/P70	44° 54.605' N	060° 50.261' W	176.4	58	profile end
04.07.21 04:03	MSM101_41-1	EM122/P70	45° 21.140' N	060° 28.273' W	121.3	26	profile start
04.07.21 16:31	MSM101_41-1	EM122/P70	45° 34.063' N	060° 18.078' W	205.3	331	profile end
05.07.21 00:03	MSM101_42-1	EM122/P70	45° 35.324' N	059° 04.061' W	164.5	9	profile start
05.07.21 13:06	MSM101_42-1	EM122/P70	45° 52.874' N	058° 30.531' W	218.7	355	profile end
05.07.21 14:09	MSM101_43-1	CTD	45° 46.651' N	058° 31.965' W	272.2	251	max depth/on ground
05.07.21 14:30	MSM101_43-2	Multi Corer	45° 46.651' N	058° 31.966' W	271.4	111	max depth/on ground
05.07.21 15:07	MSM101_43-3	Gravity Corer. 20 m	45° 46.651' N	058° 31.967' W	271.1	182	max depth/on ground
05.07.21 16:34	MSM101_44-1	CTD	45° 48.206' N	058° 39.700' W	275.3	311	max depth/on ground
05.07.21 16:52	MSM101_44-2	Multi Corer	45° 48.207' N	058° 39.702' W	275.1	128	max depth/on ground
05.07.21 17:16	MSM101_44-3	Gravity Corer. 15 m	45° 48.206' N	058° 39.701' W	274.2	219	max depth/on ground
05.07.21 19:24	MSM101_45-1	CTD	45° 42.909' N	058° 57.264' W	270.5	174	max depth/on ground
05.07.21 19:43	MSM101_45-2	Multi Corer	45° 42.910' N	058° 57.263' W	269.2	205	max depth/on ground
05.07.21 20:04	MSM101_45-3	Gravity Corer. 15 m	45° 42.910' N	058° 57.263' W	268.8	3	max depth/on ground
05.07.21 22:11	MSM101_43-4	Gravity Corer. 15 m	45° 46.651' N	058° 31.973' W	272.9	62	max depth/on ground
06.07.21 09:16	MSM101_46-1	EM122/P70	43° 52.220' N	058° 17.986' W	2385.9	224	profile start
06.07.21 15:51	MSM101_46-1	EM122/P70	43° 32.504' N	058° 08.384' W	3107.3	87	profile end
06.07.21 17:36	MSM101_47-1	CTD	43° 32.131' N	058° 17.514' W	2829.6	333	max depth/on ground
06.07.21 19:03	MSM101_47-2	Multi Corer	43° 32.130' N	058° 17.513' W	2836.7	193	max depth/on ground
06.07.21 20:38	MSM101_47-3	Gravity Corer. 10 m	43° 32.130' N	058° 17.513' W	2834.9	337	max depth/on ground
06.07.21 22:44	MSM101_48-1	Multi Corer	43° 38.686' N	058° 16.882' W	2423.5	194	max depth/on ground
07.07.21 00:00	MSM101_48-2	Gravity Corer. 10 m	43° 38.686' N	058° 16.881' W	2425.3	125	max depth/on ground
07.07.21 05:44	MSM101_49-1	EM122/P70	42° 34.915' N	058° 17.297' W	4295.3	180	profile start
07.07.21 09:55	MSM101_49-1	EM122/P70	42° 35.782' N	059° 02.491' W	4233.6	275	profile end
07.07.21 12:08	MSM101_50-1	Multi Corer	42° 35.568' N	058° 55.216' W	4194.6	269	max depth/on ground
07.07.21 14:22	MSM101_50-2	Gravity Corer. 10 m	42° 35.568' N	058° 55.217' W	4189	334	max depth/on ground
07.07.21 17:01	MSM101_50-3	CTD	42° 35.646' N	058° 55.314' W	4187.3	143	max depth/on ground
07.07.21 22:06	MSM101_51-1	EM122/P70	42° 58.213' N	059° 45.571' W	2829.5	302	profile start
08.07.21 02:58	MSM101_51-1	EM122/P70	42° 56.373' N	060° 38.860' W	2258.2	267	profile end

Date/Time (UCT)	Station Number	Sounding/Gear	Latitude	Longitude	Depth (m)	Course (°)	Remark
08.07.21 12:32	MSM101_52-1	EM122/P70	44° 53.821' N	060° 52.000' W	190.5	2	profile start
08.07.21 14:39	MSM101_52-1	EM122/P70	44° 54.265' N	061° 00.746' W	245.9	221	profile end
08.07.21 15:39	MSM101_53-1	CTD	44° 57.599' N	060° 57.018' W	193.7	356	max depth/on ground
08.07.21 15:57	MSM101_53-2	Multi Corer	44° 57.599' N	060° 57.017' W	188.2	41	max depth/on ground
08.07.21 16:16	MSM101_53-3	Gravity Corer. 15 m	44° 57.599' N	060° 57.018' W	187.8	111	max depth/on ground
09.07.21 11:03	MSM101_54-1	EM122/P70	46° 12.151' N	055° 32.935' W	108.1	50	profile start
09.07.21 18:02	MSM101_54-1	EM122/P70	46° 21.016' N	055° 04.735' W	172.2	26	profile end
09.07.21 19:11	MSM101_55-1	CTD	46° 13.259' N	055° 12.001' W	157.5	151	max depth/on ground
09.07.21 19:31	MSM101_55-2	Giant Box Corer	46° 13.259' N	055° 12.001' W	157.4	27	max depth/on ground
09.07.21 19:50	MSM101_55-3	Multi Corer	46° 13.259' N	055° 12.001' W	157.3	118	max depth/on ground
09.07.21 20:07	MSM101_55-4	Gravity Corer. 5 m	46° 13.259' N	055° 12.001' W	157.5	55	max depth/on ground
09.07.21 22:38	MSM101_56-1	EM122/P70	46° 37.979' N	054° 57.618' W	236.2	23	profile start
10.07.21 14:08	MSM101_56-1	EM122/P70	46° 17.369' N	055° 04.524' W	169.2	359	profile end
10.07.21 15:50	MSM101_57-1	CTD	46° 22.263' N	054° 46.028' W	196.2	216	max depth/on ground
10.07.21 16:05	MSM101_57-2	Multi Corer	46° 22.263' N	054° 46.028' W	195.8	105	max depth/on ground
10.07.21 16:24	MSM101_57-3	Gravity Corer. 10 m	46° 22.264' N	054° 46.028' W	196	272	max depth/on ground
10.07.21 18:10	MSM101_58-1	EM122/P70	46° 38.442' N	054° 56.719' W	242	345	profile start
10.07.21 18:39	MSM101_58-1	EM122/P70	46° 38.423' N	054° 50.304' W	232.3	89	profile end
10.07.21 19:40	MSM101_59-1	CTD	46° 34.859' N	054° 54.421' W	241.2	16	max depth/on ground
10.07.21 19:57	MSM101_59-2	Multi Corer	46° 34.860' N	054° 54.422' W	240.4	259	max depth/on ground
10.07.21 20:16	MSM101_59-3	Gravity Corer. 15 m	46° 34.858' N	054° 54.423' W	239.2	179	max depth/on ground
10.07.21 23:26	MSM101_60-1	CTD	46° 07.634' N	054° 55.271' W	143.8	197	max depth/on ground
10.07.21 23:39	MSM101_60-2	Multi Corer	46° 07.633' N	054° 55.270' W	144.7	45	max depth/on ground
10.07.21 23:54	MSM101_60-3	Gravity Corer. 5 m	46° 07.635' N	054° 55.268' W	147.1	140	max depth/on ground
11.07.21 00:26	MSM101_60-4	Gravity Corer. 10 m	46° 07.634' N	054° 55.270' W	143.5	345	max depth/on ground
13.07.21 11:56	MSM101_61-1	CTD	47° 53.678' N	038° 05.169' W	4562.4	231	max depth/on ground
15.07.21 11:47	MSM101_62-1	CTD	48° 43.505' N	023° 52.133' W	3540.8	250	max depth/on ground
15.07.21 12:55	MSM101_62-2	CTD	48° 43.505' N	023° 52.133' W	3540.1	323	max depth/on ground