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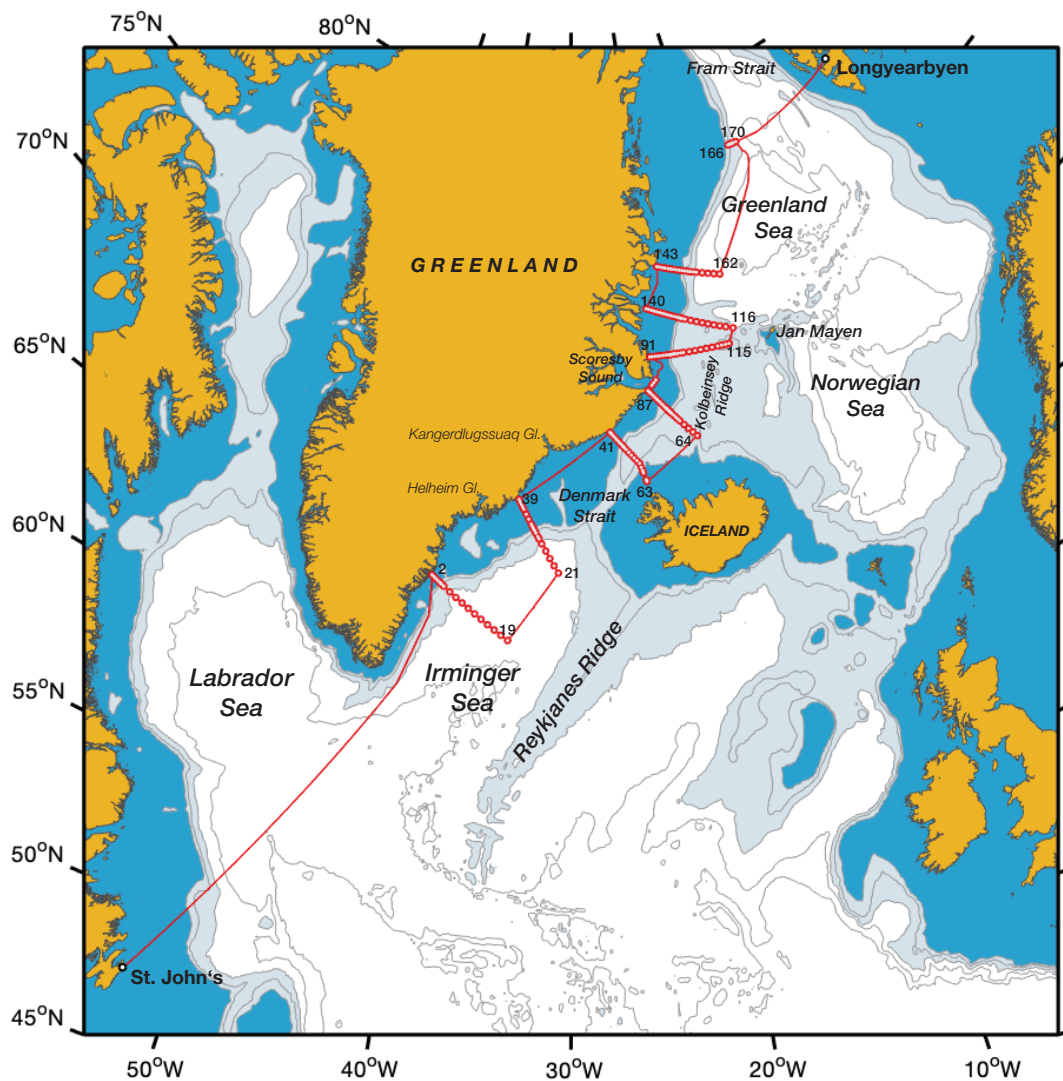
Short Cruise Report MARIA S. MERIAN MSM 85

St. John's - Longyearbyen

23.07.2019 - 13.08.2019

Chief Scientist: Christian Mertens

Captain: Ralf Schmidt



Objectives

Melting of the Greenland Ice Sheet is one of the main sources for the global sea level rise. The accelerated melting in the last two decades is mainly attributed to the inflow of warmer water into the fjords of the outlet glaciers. Rates of surface and basal melting are not sufficiently known, also it is unclear how much of the melt water leaves the fjords and enters the East Greenland Current or the western Nordic Seas.

During the cruise MSM 85 water samples were collected for helium and neon isotope analysis along hydrographic sections across the shelf of East Greenland and across the East Greenland Current. Helium and neon are uniquely suited as tracers of glacial meltwater in the ocean. Parallel sampling of transient tracers (CFCs, SF₆) provide an estimate of the ventilation time and an integral melting rate when combined with the melt water fractions. This distribution of melt water is of more than local interest. The additional freshwater in the key regions of the formation of North Atlantic Deep Water could alter the vertical density stratification, modify the amount of deep water formed, and have consequences for the strength of the climate relevant Atlantic meridional overturning circulation. This cruise is part of the BMBF program GROCE (Greenland Ice Sheet – Ocean Interaction, www.groce.de).

The objective of the trace chemistry group on the cruise was to determine how the ratio of different nutrients (principally organic carbon, NO₃ and Fe) affect the community structure. In the context of the changing Arctic, freshening of the East-Greenland shelf region is expected in the coming decades which may increase organic carbon and Fe supply, but decrease summertime NO₃ supply due to enhanced stratification. A key research question is therefore how such shifts in the ratios of nutrient availability will affect primary producers. This was addressed by the deployment of a towfish to collect samples for organic carbon species (DOC, CDOM, FDOM), community structure (flow cytometry), nutrient concentrations (nitrate, phosphate and silicic acid) and micronutrient concentrations (trace elements including Fe, Co and Mn). In addition to the underway sample collection, a number of incubation experiments were performed to test the biological response to different combinations of nutrient spikes.

Underway measurements of dissolved N₂O and CO in seawater were carried out with the goals to: Decipher the water column distribution of N₂O and CH₄, infer their main formation mechanisms, and investigate the air-sea dynamics of N₂O, CH₄ and CO.

Narrative

MARIA S. MERIAN left the port of St. John's, Canada on July 23 at 16:00 (local time, LT) with a scientific party of 21 people. Shipboard ADCP and thermosalinography measurements were started shortly after leaving the three-mile zone, at about 16:45 (LT). Also deployed was the tow fish used for trace metal sampling. Data acquisition of the multibeam echo sounder was started von July 24. A test of the CTD/rosette was made in the afternoon of July 24. The instrument was lowered to a depth of 100 m and all bottles were closed.

After a transit of 3.5 days, the ship arrived at the first CTD station in the Irminger Sea on July 27 at 05:30 (LT). The station was located close to the coast of Greenland at a water depth of about 180 m. On the following two days 18 CTD stations were made along a section in southeast direction toward the center of the Irminger Sea. The section was completed on July 29 at 03:00 (LT). The second CTD section started after a transit of 176nm on July 29 at 19:45 (LT). This section was oriented in northwest direction back to the Greenland coast and 19 CTD stations were made until July 31, 09:45 (LT).

The transit along the coast to the third CTD section was 236 nm and took until August 1, 08:00 (LT). This section went across Denmark Strait, 23 CTD stations were made along the track. The fourth stations started after a transit of 142 nm on August 3 at 01:30 (LT). This section again crossed the Denmark Strait, now in northwest direction toward Greenland. It was completed on August 4 at 08:15 (LT), after 24 CTD casts.

On the transit to the next section three CTD stations were made across the entrance of Scoresby Sound. In the afternoon of August 4 *MARIA S. MERIAN* reached the marginal ice zone and the speed needed to be reduced to proceed safely through the ice flows, also the tow fish needed to be recovered. The ship arrived at the first station of section five, that was located close to the coast at a depth of 80 m, on August 4 at 22:30 (LT). Due to the ice situation the original plan had to be changed. Instead of completing the section near Jan Mayen, it was terminated after 24 CTD casts and after a short transit in northward direction the next section was started on August 6 at 18:00 (LT). This new section had 24 CTD casts and went back to the Greenland coast. It was finished on August 8 at 10:30 (LT). After a transit along the coast, section six started on August 8 at 21:30 (LT). 19 CTD casts were made along this section which was completed on August 10 at 11:00 (LT). The transit to the last section at 77° 30' N took about 14 hours and the ship arrived at the first CTD station of this section on August 11 at 13:00 (LT). The most western station on this section was reached at about 5° 2.4' W at a water depth of about 1150 m. From there on four more CTD stations were made in east direction before the work program ended on August 12 at about 05:00 (LT). On August 13 *MARIA S. MERIAN* arrived in Longyearbyen at 08:30 (LT).

Acknowledgements

We thank Captain Ralf Schmidt and the entire crew of *MARIA S. MERIAN* for the friendly and cooperative atmosphere and their professional technical assistance. We are grateful to the Canadian, Danish, Icelandic, and Norwegian authorities for the permission to conduct scientific research in the respective exclusive economic zones. The German Research Fleet Coordination Centre (Leitstelle Deutsche Forschungsschiffe), Klaus Bohn (LPL Projects + Logistics GmbH), and Barbara Kozak (University of Bremen) provided logistical and administrative support. Financial support came from the German Ministry of Education and Research (BMBF) as part of the joint project GROCE (Greenland Ice Sheet Ocean Interaction).

List of Participants

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2. BÖKE, Wolfgang	Technician	IUPHB
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9. PURCEL, Karl	Trace Chemistry	UQAM
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List of Stations

Station	Gear	Time (UTC)	Latitude	Longitude	Depth	Remarks
MSM85_1-1	Towfish	2019-07-23 19:18	47° 37,914' N	052° 34,558' W	178.3	in the water
MSM85_2-1	CTD	2019-07-27 08:32	63° 21,996' N	040° 49,020' W	175.1	
MSM85_3-1	CTD	2019-07-27 10:06	63° 18,747' N	040° 38,669' W	200.1	
MSM85_4-1	CTD	2019-07-27 11:14	63° 15,464' N	040° 28,381' W	307.4	
MSM85_5-1	CTD	2019-07-27 12:26	63° 12,245' N	040° 17,926' W	426.2	
MSM85_6-1	CTD	2019-07-27 13:36	63° 08,976' N	040° 07,558' W	391.9	
MSM85_7-1	CTD	2019-07-27 15:00	63° 07,590' N	040° 03,010' W	1095.8	
MSM85_8-1	CTD	2019-07-27 16:29	63° 05,740' N	039° 57,205' W	1286.4	
MSM85_9-1	CTD	2019-07-27 18:31	63° 02,484' N	039° 46,864' W	1572.0	
MSM85_10-1	CTD	2019-07-27 21:13	62° 52,741' N	039° 15,797' W	1735.0	
MSM85_11-1	CTD	2019-07-28 00:04	62° 42,995' N	038° 44,667' W	2110.7	
MSM85_12-1	CTD	2019-07-28 03:15	62° 33,251' N	038° 13,578' W	2326.4	
MSM85_13-1	CTD	2019-07-28 06:30	62° 23,481' N	037° 42,527' W	2360.4	
MSM85_14-1	CTD	2019-07-28 09:42	62° 13,731' N	037° 11,416' W	2455	
MSM85_15-1	CTD	2019-07-28 12:57	62° 03,961' N	036° 40,357' W	2626.1	
MSM85_16-1	CTD	2019-07-28 16:19	61° 54,232' N	036° 09,244' W	2762.7	
MSM85_17-1	CTD	2019-07-28 19:41	61° 44,497' N	035° 38,198' W	2872.1	
MSM85_18-1	CTD	2019-07-28 23:18	61° 34,771' N	035° 07,176' W	2928.0	
MSM85_19-1	CTD	2019-07-29 03:03	61° 24,986' N	034° 35,950' W	2951.7	
MSM85_1-1	Towfish	2019-07-29 05:16	61° 25,549' N	034° 33,229' W	2949.7	on deck
MSM85_20-1	Towfish	2019-07-29 13:05	62° 33,405' N	032° 54,826' W	2903.6	in the water
MSM85_21-1	CTD	2019-07-29 21:44	63° 49,973' N	031° 00,006' W	2690.3	
MSM85_22-1	CTD	2019-07-30 01:09	64° 04,976' N	031° 21,087' W	2683.4	
MSM85_23-1	CTD	2019-07-30 04:34	64° 19,986' N	031° 42,041' W	2579.5	
MSM85_20-1	Towfish	2019-07-30 07:46	64° 32,452' N	031° 57,401' W	2429.6	on deck
MSM85_24-1	CTD	2019-07-30 08:15	64° 34,976' N	032° 03,053' W	2378.5	
MSM85_25-1	CTD	2019-07-30 12:37	64° 49,988' N	032° 24,055' W	2045.9	
MSM85_26-1	CTD	2019-07-30 15:44	64° 59,985' N	032° 38,086' W	1791.1	
MSM85_27-1	CTD	2019-07-30 17:46	65° 05,000' N	032° 45,090' W	1632.9	
MSM85_28-1	CTD	2019-07-30 19:56	65° 11,976' N	032° 54,866' W	1322.4	
MSM85_29-1	CTD	2019-07-30 21:40	65° 16,907' N	033° 01,932' W	1008.1	
MSM85_30-1	CTD	2019-07-30 23:08	65° 20,977' N	033° 07,420' W	625.1	
MSM85_31-1	CTD	2019-07-31 00:28	65° 25,473' N	033° 13,750' W	270.0	
MSM85_32-1	CTD	2019-07-31 01:40	65° 29,989' N	033° 20,003' W	256.0	
MSM85_33-1	CTD	2019-07-31 03:30	65° 39,991' N	033° 34,010' W	305.7	
MSM85_34-1	CTD	2019-07-31 05:19	65° 49,997' N	033° 48,096' W	328.1	
MSM85_35-1	CTD	2019-07-31 06:55	65° 59,991' N	034° 02,047' W	256.5	
MSM85_36-1	CTD	2019-07-31 07:54	66° 04,988' N	034° 09,071' W	269.1	
MSM85_37-1	CTD	2019-07-31 08:56	66° 09,980' N	034° 16,066' W	274.7	
MSM85_38-1	CTD	2019-07-31 10:05	66° 14,986' N	034° 23,102' W	254.4	
MSM85_39-1	CTD	2019-07-31 11:23	66° 20,002' N	034° 30,118' W	309.8	
MSM85_40-1	Towfish	2019-08-01 07:56	68° 34,268' N	026° 41,676' W	198.9	in the water

MSM85_41-1	CTD	2019-08-01 09:06	68° 40,988' N	026° 17,539' W	96.5	
MSM85_42-1	CTD	2019-08-01 10:03	68° 38,786' N	026° 12,672' W	164.5	
MSM85_43-1	CTD	2019-08-01 10:46	68° 36,734' N	026° 08,083' W	145.9	
MSM85_44-1	CTD	2019-08-01 11:40	68° 32,532' N	025° 58,892' W	293.3	
MSM85_45-1	CTD	2019-08-01 12:40	68° 28,324' N	025° 49,453' W	324.8	
MSM85_46-1	CTD	2019-08-01 13:41	68° 24,134' N	025° 40,199' W	296.5	
MSM85_47-1	CTD	2019-08-01 14:45	68° 19,981' N	025° 30,967' W	287.0	
MSM85_48-1	CTD	2019-08-01 15:48	68° 15,733' N	025° 21,674' W	343.9	
MSM85_49-1	CTD	2019-08-01 17:12	68° 11,527' N	025° 12,576' W	646.6	
MSM85_50-1	CTD	2019-08-01 18:21	68° 09,517' N	025° 08,081' W	882.6	
MSM85_51-1	CTD	2019-08-01 19:36	68° 07,340' N	025° 03,530' W	1049.8	
MSM85_52-1	CTD	2019-08-01 21:03	68° 03,228' N	024° 54,588' W	1250.3	
MSM85_53-1	CTD	2019-08-01 22:48	67° 56,900' N	024° 40,866' W	1415.9	
MSM85_54-1	CTD	2019-08-02 00:37	67° 50,557' N	024° 27,269' W	1463.0	
MSM85_55-1	CTD	2019-08-02 02:58	67° 44,385' N	024° 13,855' W	1331.3	
MSM85_56-1	CTD	2019-08-02 04:46	67° 38,033' N	024° 00,409' W	1080.2	
MSM85_57-1	CTD	2019-08-02 06:25	67° 31,746' N	023° 46,691' W	829.9	
MSM85_58-1	CTD	2019-08-02 07:55	67° 23,490' N	023° 40,380' W	583.1	
MSM85_59-1	CTD	2019-08-02 09:14	67° 16,235' N	023° 34,759' W	399.2	
MSM85_60-1	CTD	2019-08-02 10:16	67° 11,037' N	023° 30,596' W	262.6	
MSM85_61-1	CTD	2019-08-02 11:25	67° 04,339' N	023° 25,520' W	245.4	
MSM85_62-1	CTD	2019-08-02 12:37	66° 56,599' N	023° 19,733' W	239.2	
MSM85_63-1	CTD	2019-08-02 13:29	66° 52,504' N	023° 17,016' W	236.4	
MSM85_64-1	CTD	2019-08-03 01:30	68° 12,014' N	018° 09,954' W	571.8	
MSM85_65-1	CTD	2019-08-03 03:10	68° 21,201' N	018° 30,612' W	1478.7	
MSM85_66-1	CTD	2019-08-03 05:19	68° 30,382' N	018° 51,143' W	826.4	
MSM85_67-1	CTD	2019-08-03 07:07	68° 39,599' N	019° 11,719' W	1100.0	
MSM85_68-1	CTD	2019-08-03 09:18	68° 48,685' N	019° 32,308' W	1300.1	
MSM85_69-1	CTD	2019-08-03 10:52	68° 53,341' N	019° 42,606' W	1456.9	
MSM85_70-1	CTD	2019-08-03 12:32	68° 57,980' N	019° 52,934' W	1548.1	
MSM85_71-1	CTD	2019-08-03 14:13	69° 02,550' N	020° 03,236' W	1506.9	
MSM85_72-1	CTD	2019-08-03 15:50	69° 07,077' N	020° 13,510' W	1275.4	
MSM85_73-1	CTD	2019-08-03 17:20	69° 09,282' N	020° 18,639' W	1082.0	
MSM85_74-1	CTD	2019-08-03 18:39	69° 11,520' N	020° 23,758' W	810.0	
MSM85_75-1	CTD	2019-08-03 19:39	69° 13,155' N	020° 27,125' W	580.0	
MSM85_76-1	CTD	2019-08-03 20:44	69° 16,377' N	020° 34,045' W	373.3	
MSM85_77-1	CTD	2019-08-03 21:34	69° 18,608' N	020° 39,145' W	369.6	
MSM85_78-1	CTD	2019-08-03 22:24	69° 20,913' N	020° 44,339' W	370.0	
MSM85_79-1	CTD	2019-08-03 23:29	69° 25,473' N	020° 54,635' W	404.7	
MSM85_80-1	CTD	2019-08-04 00:35	69° 30,148' N	021° 05,105' W	401.2	
MSM85_81-1	CTD	2019-08-04 01:40	69° 34,758' N	021° 15,298' W	429.2	
MSM85_82-1	CTD	2019-08-04 02:48	69° 39,298' N	021° 25,535' W	463.9	
MSM85_83-1	CTD	2019-08-04 03:55	69° 43,876' N	021° 35,888' W	456.9	
MSM85_84-1	CTD	2019-08-04 05:02	69° 48,496' N	021° 46,140' W	439.2	
MSM85_85-1	CTD	2019-08-04 06:08	69° 53,082' N	021° 56,516' W	444.4	
MSM85_86-1	CTD	2019-08-04 07:04	69° 56,598' N	022° 05,090' W	441.5	
MSM85_87-1	CTD	2019-08-04 07:59	69° 59,991' N	022° 13,037' W	150.8	

MSM85_88-1	CTD	2019-08-04 09:43	70° 10,026' N	021° 45,594' W	424.4	
MSM85_89-1	CTD	2019-08-04 11:02	70° 14,990' N	021° 31,788' W	471.5	
MSM85_90-1	CTD	2019-08-04 12:12	70° 19,996' N	021° 17,881' W	427.3	
MSM85_40-1	Towfish	2019-08-04 15:37	70° 43,993' N	020° 22,151' W	273.7	on deck
MSM85_91-1	CTD	2019-08-04 22:17	71° 08,983' N	021° 36,255' W	81.4	
MSM85_92-1	CTD	2019-08-04 23:33	71° 08,841' N	021° 21,988' W	207.2	
MSM85_93-1	CTD	2019-08-05 01:56	71° 08,698' N	021° 02,892' W	247.4	
MSM85_94-1	CTD	2019-08-05 03:32	71° 08,461' N	020° 44,431' W	315.5	
MSM85_95-1	CTD	2019-08-05 04:39	71° 08,281' N	020° 25,990' W	379.5	
MSM85_96-1	CTD	2019-08-05 06:21	71° 08,104' N	020° 07,513' W	334.3	
MSM85_97-1	CTD	2019-08-05 07:24	71° 07,915' N	019° 49,026' W	352.2	
MSM85_98-1	CTD	2019-08-05 08:32	71° 07,746' N	019° 30,564' W	437.7	
MSM85_99-1	CTD	2019-08-05 09:28	71° 07,660' N	019° 21,275' W	460.3	
MSM85_100-1	CTD	2019-08-05 10:41	71° 07,529' N	019° 12,041' W	643.1	
MSM85_101-1	CTD	2019-08-05 12:26	71° 07,438' N	019° 02,781' W	953.7	
MSM85_102-1	CTD	2019-08-05 14:10	71° 07,320' N	018° 53,618' W	1237.4	
MSM85_103-1	CTD	2019-08-05 16:17	71° 07,212' N	018° 35,061' W	1559.6	
MSM85_104-1	CTD	2019-08-05 18:59	71° 07,032' N	018° 16,470' W	1675.5	
MSM85_105-1	Towfish	2019-08-05 20:17	71° 06,640' N	018° 13,905' W	1680.8	in the water
MSM85_106-1	CTD	2019-08-05 20:56	71° 06,831' N	017° 58,043' W	1695.6	
MSM85_107-1	CTD	2019-08-05 23:18	71° 06,422' N	017° 21,005' W	1683.3	
MSM85_108-1	CTD	2019-08-06 01:40	71° 06,126' N	016° 44,104' W	1300.7	
MSM85_109-1	CTD	2019-08-06 03:46	71° 05,788' N	016° 07,027' W	1848.9	
MSM85_110-1	CTD	2019-08-06 06:07	71° 05,383' N	015° 30,049' W	1047.7	
MSM85_111-1	CTD	2019-08-06 08:09	71° 04,984' N	014° 53,042' W	754.3	
MSM85_112-1	CTD	2019-08-06 10:03	71° 04,620' N	014° 16,058' W	975.5	
MSM85_113-1	CTD	2019-08-06 11:43	71° 04,378' N	013° 51,031' W	500.3	
MSM85_114-1	CTD	2019-08-06 13:00	71° 04,154' N	013° 26,007' W	808.1	
MSM85_115-1	CTD	2019-08-06 14:29	71° 03,931' N	013° 01,988' W	657.3	
MSM85_116-1	CTD	2019-08-06 17:57	71° 32,972' N	012° 10,059' W	2590.4	
MSM85_116-2	Float	2019-08-06 19:35	71° 33,010' N	012° 10,013' W	2594.4	WMO 7900537
MSM85_117-1	CTD	2019-08-06 21:02	71° 39,091' N	012° 54,043' W	1934.5	
MSM85_118-1	CTD	2019-08-06 23:32	71° 44,088' N	013° 30,052' W	1480.9	
MSM85_119-1	CTD	2019-08-07 01:44	71° 49,086' N	014° 05,996' W	1501.0	
MSM85_120-1	CTD	2019-08-07 03:55	71° 54,072' N	014° 42,048' W	1162.1	
MSM85_121-1	CTD	2019-08-07 05:56	71° 59,069' N	015° 18,020' W	1302.3	
MSM85_122-1	CTD	2019-08-07 07:58	72° 04,049' N	015° 54,059' W	1384.1	
MSM85_123-1	CTD	2019-08-07 10:09	72° 09,061' N	016° 30,031' W	1698.6	
MSM85_124-1	CTD	2019-08-07 12:29	72° 14,065' N	017° 06,047' W	1581.9	
MSM85_125-1	CTD	2019-08-07 14:14	72° 16,568' N	017° 24,034' W	1021.6	
MSM85_126-1	CTD	2019-08-07 15:22	72° 17,826' N	017° 33,003' W	908.2	
MSM85_127-1	CTD	2019-08-07 16:24	72° 18,628' N	017° 39,040' W	834.4	
MSM85_128-1	CTD	2019-08-07 17:48	72° 19,886' N	017° 48,047' W	703.9	
MSM85_129-1	CTD	2019-08-07 19:00	72° 21,563' N	018° 00,037' W	478.7	
MSM85_130-1	CTD	2019-08-07 20:07	72° 24,074' N	018° 17,939' W	242.0	
MSM85_131-1	CTD	2019-08-07 21:09	72° 26,583' N	018° 35,978' W	267.9	
MSM85_132-1	CTD	2019-08-07 22:25	72° 29,060' N	018° 53,898' W	259.6	

MSM85_105-1	Towfish	2019-08-07 22:47	72° 29,051' N	018° 53,931' W	261.0	on deck
MSM85_133-1	CTD	2019-08-08 00:28	72° 31,578' N	019° 12,074' W	249.9	
MSM85_134-1	CTD	2019-08-08 02:12	72° 34,051' N	019° 30,029' W	260.0	
MSM85_135-1	CTD	2019-08-08 03:22	72° 36,564' N	019° 47,975' W	233.0	
MSM85_136-1	CTD	2019-08-08 04:32	72° 39,067' N	020° 05,918' W	178.4	
MSM85_137-1	CTD	2019-08-08 05:50	72° 41,604' N	020° 24,435' W	222.5	
MSM85_138-1	CTD	2019-08-08 07:40	72° 44,070' N	020° 42,073' W	289.1	
MSM85_139-1	CTD	2019-08-08 09:23	72° 46,536' N	021° 00,040' W	313.3	
MSM85_140-1	CTD	2019-08-08 10:31	72° 48,911' N	021° 17,228' W	279.3	
MSM85_141-1	Towfish	2019-08-08 11:06	72° 50,037' N	021° 14,622' W	264.9	in the water
MSM85_141-1	Towfish	2019-08-08 12:57	73° 05,732' N	020° 32,590' W	161.6	on deck
MSM85_142-1	Towfish	2019-08-08 17:28	73° 28,004' N	019° 50,279' W	174.8	in the water
MSM85_143-1	CTD	2019-08-08 21:36	74° 10,989' N	019° 15,040' W	205.5	
MSM85_144-1	CTD	2019-08-08 22:46	74° 09,009' N	018° 55,076' W	259.6	
MSM85_142-1	Towfish	2019-08-08 23:32	74° 08,587' N	018° 49,684' W	255.4	on deck
MSM85_145-1	CTD	2019-08-09 00:41	74° 06,992' N	018° 34,917' W	228.4	
MSM85_146-1	CTD	2019-08-09 02:12	74° 04,978' N	018° 14,943' W	192.4	
MSM85_147-1	CTD	2019-08-09 03:47	74° 02,960' N	017° 55,044' W	174.2	
MSM85_148-1	CTD	2019-08-09 05:55	74° 01,014' N	017° 35,009' W	166.8	
MSM85_149-1	CTD	2019-08-09 08:25	73° 59,016' N	017° 14,809' W	172.7	
MSM85_150-1	CTD	2019-08-09 11:11	73° 56,944' N	016° 54,986' W	215.6	
MSM85_151-1	CTD	2019-08-09 13:33	73° 54,986' N	016° 35,089' W	229.9	
MSM85_152-1	CTD	2019-08-09 15:37	73° 52,973' N	016° 15,046' W	213.7	
MSM85_153-1	Towfish	2019-08-09 16:22	73° 51,452' N	015° 59,963' W	261.7	in the water
MSM85_154-1	CTD	2019-08-09 16:36	73° 50,991' N	015° 55,072' W	263.6	
MSM85_155-1	CTD	2019-08-09 17:43	73° 48,993' N	015° 35,069' W	789.0	
MSM85_156-1	CTD	2019-08-09 18:57	73° 46,993' N	015° 15,091' W	1314.9	
MSM85_157-1	CTD	2019-08-09 20:36	73° 44,986' N	014° 55,042' W	1732.0	
MSM85_158-1	CTD	2019-08-09 22:25	73° 42,977' N	014° 35,060' W	2056.0	
MSM85_159-1	CTD	2019-08-10 00:54	73° 38,999' N	013° 55,003' W	2419.9	
MSM85_160-1	CTD	2019-08-10 03:32	73° 34,991' N	013° 15,098' W	2616.2	
MSM85_161-1	CTD	2019-08-10 06:15	73° 30,989' N	012° 35,078' W	2741.5	
MSM85_162-1	CTD	2019-08-10 09:10	73° 27,010' N	011° 55,094' W	2793.6	
MSM85_163-1	Float	2019-08-10 10:54	73° 27,119' N	011° 53,933' W	2795.2	WMO 7900536
MSM85_164-1	Float	2019-08-10 20:26	75° 00,000' N	007° 38,288' W	3362.8	WMO 7900535
MSM85_153-1	Towfish	2019-08-11 06:49	76° 51,983' N	002° 59,562' W	1992.8	on deck
MSM85_165-1	CTD	2019-08-11 12:48	77° 29,989' N	003° 42,875' W	2937.9	no samples
MSM85_166-1	CTD	2019-08-11 19:12	77° 29,983' N	005° 02,395' W	1142.9	
MSM85_167-1	CTD	2019-08-11 21:04	77° 29,977' N	004° 52,465' W	1283.1	
MSM85_168-1	CTD	2019-08-11 23:02	77° 29,972' N	004° 38,722' W	1443.2	
MSM85_169-1	CTD	2019-08-12 01:12	77° 29,973' N	004° 24,732' W	1812.5	
MSM85_170-1	CTD	2019-08-12 03:31	77° 29,966' N	004° 10,748' W	2639.8	