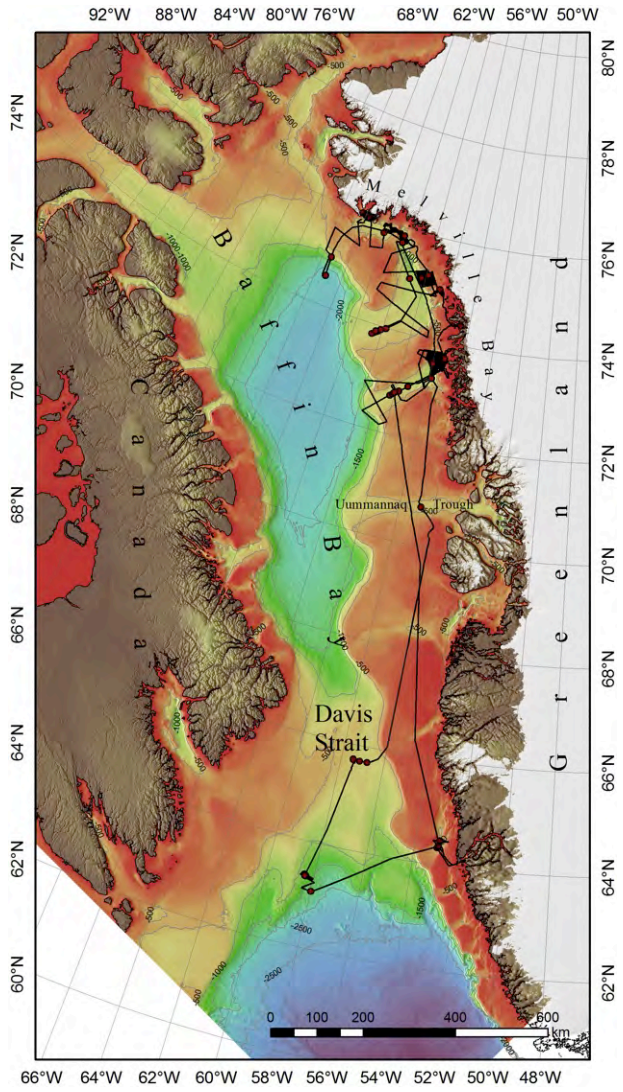
Name Dr. Boris Dorschel
Institute Alfred Wegener Institute
Address Bathymetry Building
Van-Ronzelen-Str. 2
D-27568 Bremerhaven
Germany

Tel.: +49-471-48311222
Fax: +49-471-48311977
email: Boris.Dorschel@AWI.de

Short Cruise Report
MARIA S. MERIAN – MSM44

Nuuk - Nuuk
30.06.2015 – 30.07.2015
Chief Scientist: Boris Dorschel
Captain: Björn Maaß



Objectives

In order to investigate the deglaciation history of the GIS, the involved ocean, cryosphere and climate processes and feedbacks and to address the complex spatial and temporal distribution patterns of the marine GIS terminations in the northeast Baffin Bay, RV Maria S. Merian visited sites in the Davis Strait, the Uumannaq Trough, and the Melville Bay during expedition MSM 44. The objectives were to systematically search for and map glacigenic seafloor features providing information on the maximum extend and retreat histories of ice sheets during the last glacial and Holocene. We particularly searched for grounding lines of ice shelves, terminal moraines, mega-scale glacial lineations and drumlins in glacier-troughs, shelf-troughs, fjords and on inter-trough banks.

To correlate the development of the west GIS to changes in oceanographic conditions in the Baffin Bay, palaeoceanographic records were collected from key sites in the Melville Bay thus potentially providing time-series covering the time span from the beginning of the deglaciation to the Holocene. The objective is to better understand the oceanographic processes that were responsible for deglaciation and retreat of the GIS, and the influence of freshwater outflow from the GIS on the oceanography both during glacial and interglacial times.

Plankton samples were collected to validate, improve and calibrate the existing proxies and potentially develop new proxies. Therefore, an objective was to study the potential of planktonic foraminifera to serve as proxies for past ocean circulation in the Baffin Bay, their behaviour under the unique oceanographic conditions in the Bay and their pattern of calcite delivery to the sea floor. To this end, no data exist to our knowledge on the habitat and flux of shells associated with the phytoplankton bloom after sea ice melting in the region. This is significant, because the population densities of planktonic foraminifera during the bloom could be large and dominate the sediment signal. The same applies to all other biogenic constituents of the sediment that are used as proxies, including dinoflagellate cysts, diatoms and phytoplankton biomarkers.

Narrative

The scientific party of the expedition MSM44 arrived in Nuuk and signed in on RV Maria S. Merian on Sunday the 28th of June in the afternoon. The remaining time of the 28th and 29th of June was used to unload the containers, assemble the sampling equipment, check the hydroacoustic systems on board and to set up the laboratories. Also on the 29th of June, in the afternoon, the ship's pods were tested. After some final preparation, RV Maria S. Merian left Nuuk on the 30th of June at 14:00 to commence expedition MSM44 – BAFFEAST to the northeast Baffin Bay. Due to the ice conditions in the main study area and calibrations of the shallow- and deep-water multibeam echosounders, first sites were visited in a glacial trough just north of Nuuk (study area 1) and in the Davies Strait (study area 2) from the 30th of June until the 2nd of July. In the Nuuk trough, the EM1002 shallow water multibeam echosounder was calibrated at the required water depth of 500 m. A CTD cast provided water samples and a sound velocity profile through the water column for correcting the bathymetric measurements. At two geological sampling stations, a gravity corer and multicorer were deployed to collect sediment samples for palaeoceanographic analyses. In the Davis Strait study area, the EM122 was calibrated in the required water depth deeper than 1000 m. Seismic records from this area (C. Campbell, Natural Resources Canada, pers. comm.) indicated the possible occurrence of cold-water coral carbonate mounds. Therefore, the calibration of the deep-water echosounder was combined with a short reconnaissance survey and a small geological sampling campaign. However, the structures visible on the seismic profiles however turned out to be of geological and not biological origin. They most likely represent slumped blocks. Located at the entrance of the Baffin Bay, the recovered sediment cores from study area 2 represented the southernmost end member for palaeoceanographic studies in the Baffin Bay. From the Davis Strait, we transited to the Melville Bay, our main study area. The transit was only interrupted for a plankton survey with the MultiNet at the ice edge (3rd and 4th of July) and a geology station in the Uummannaq Trough (study area 3, 5th of July).

After arrival in the Melville Bay in the night from the 5th to the 6th of July, a hydroacoustic reconnaissance survey was performed crossing the southernmost shelf-trough and the adjacent banks (study area 4). Based on the hydroacoustic data, two geological sampling sites were chosen. In this area, a second plankton survey was performed at the ice edge. With an additional CTD cast, water samples were collected for stable isotope studies. The CTD data were furthermore used to correct the bathymetric data for changes in the sound velocity in the water column. At the time of the survey, the ice edge was located above the shelf and it was impossible to reach the shelf edge and the continental slope. The first phase of work in study area 4 was finished during the night from the 8th to the 9th of July.

It was followed by a survey across the central Melville Bay (study area 5), the north-eastern Melville Bay (study area 6), the north-western Melville Bay (study area 7) and into the northern Baffin Bay basin (study area 8). The reconnaissance survey in study area 4 was completed during the morning of the 10th of July. Following this initial survey, detailed hydroacoustic surveys and sampling campaigns were performed in the reversed order of survey areas.

Due to the ice conditions in the Baffin Bay, it was possible to reach the shelf edge and slope of the Baffin Bay only in study area 8. On the slope in study area 8, one geology station, one CTD cast and one plankton trawl were conducted. The subsequent hydroacoustic survey followed the shelf edge. Work in study area 8 was completed in the evening of the 10th of July.

Subsequently followed a hydroacoustic reconnaissance survey across the shelf-trough and adjacent banks and a detailed high-resolution survey in study area 7 in the northwest Melville Bay. During the detailed survey, glacigenic seafloor features (moraines, drumlinised features, and mega-scale glacial lineations) were found that provide information of past glacier advances and retreats in this area. Therefore, in addition to the geological sampling for palaeoceanographic studies, additional geological sites were cored to collect sediments for dating these glacigenic seafloor features. Sea ice

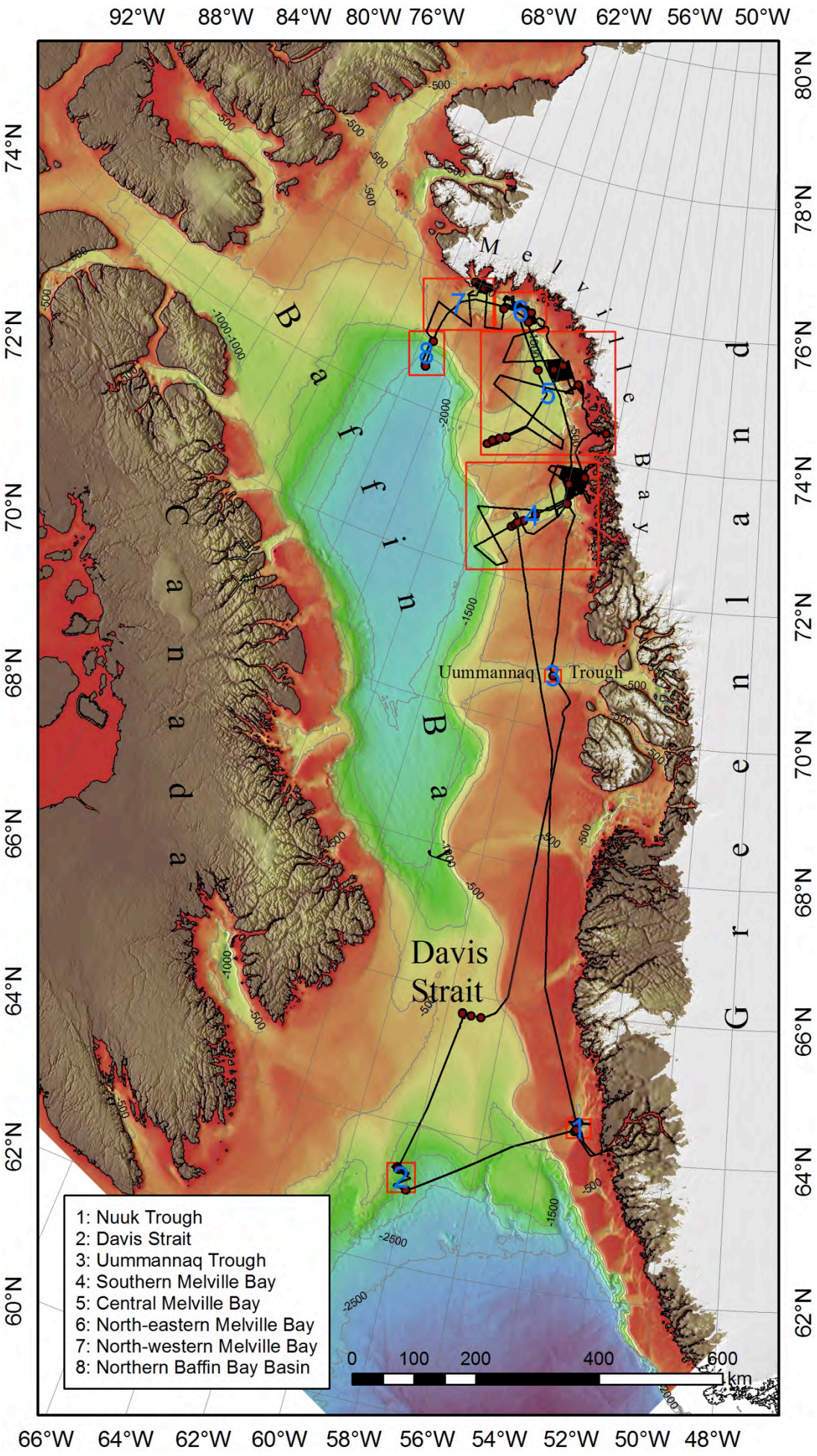
and icebergs, however, influenced the operations in this area and the coverage of the bathymetric data reflected these constraints. Still it was possible to fully map most of the glacigenic seafloor features. In the morning of the 13th of July, work in study area 7 was completed and work in study area 6 commenced.

In study area 6, sea ice and icebergs prevented any work close to the shore. Nevertheless, a detailed hydroacoustic survey and a sampling campaign were conducted in the area, were the northern and the central shelf-trough in the Melville Bay join. In this area nicely developed mega-scale glacial lineations and drumlinised seafloor features could be observed. Geologic stations in study area 6 targeted sediment deposits in the shelf-trough and in a smaller trough related to local glaciers for palaeocenographic and high-resolution Holocene climate studies. Work in study area 6 was completed on the 15th of June around noon and the work in study area 5 commenced shortly after.

In survey area 5, a hydroacoustic reconnaissance survey crossed the central shelf-trough in the central Melville Bay and the adjacent banks several times and was extended to the ice edge. At the ice edge, a third plankton survey was performed. Due to a technical problem with the winch control software, the start of this survey was delayed by three hours. In this time, hydroacoustic data were collected from the area of the plankton survey in the outer shelf-trough. Following the plankton survey, the hydroacoustic reconnaissance survey was completed. Based on the findings of the reconnaissance survey, a detailed hydroacoustic survey was conducted at the inshore of the central Melville Bay shelf-trough. This was used to identify geological sampling sites for palaeoceanographic studies. During the transfer from study area 5 to study area 4, three small glacier-related troughs were mapped for glacigenic sea floor features. They were followed as far inshore as sea ice and icebergs permitted. Four of these small troughs were also sampled for high-resolution Holocene climate studies. Work in study area 5 was completed in the evening of the 22nd of July and the work in study area 4 commenced.

With the reconnaissance survey already completed during the northward journey, the time between the evening of the 22nd and the morning of the 27th was used for a detailed bathymetric survey and two more geology stations in study area 4. Furthermore, as a test, a horizontal tow with the MultiNet was conducted. The retreat of the sea ice also allowed for a hydroacoustic survey across the shelf edge and the slope. A geology station in the outer shelf-trough was the last scientific station. In the morning of the 27th of July, the scientific programme of the expedition MSM44 – BAFFEAST was successfully completed and the transit to Nuuk commenced. As scheduled, RV Maria S. Merian arrived in Nuuk in the morning of the 30th of July.

During the entire cruise the weather conditions were excellent with hardly any wind or swell. Only on rare occasions, dense fog limited operations at the ice edge and required a reduction in speed. Furthermore, the ice conditions required some adjustments to the initial work programme of the expedition. Because of sea ice, except for survey areas 8 and 4, working on the outer shelf and on the slopes was limited. It was, for example, not possible to sample a palaeoceanographic transect along the 1000 m water depth contour line. These adjustments, however, only had a minor effect on the working programme of the expedition.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66°W 64°W 62°W 60°W 58°W 56°W 54°W 52°W 50°W 48°W
Baffin Bay
Canada
Melville Bay
Greenland
Uummannaq Trough
Davis Strait
1: Nuuk Trough
2: Davis Strait
3: Uummannaq Trough
4: Southern Melville Bay
5: Central Melville Bay
6: North-eastern Melville Bay
7: North-western Melville Bay
8: Northern Baffin Bay Basin
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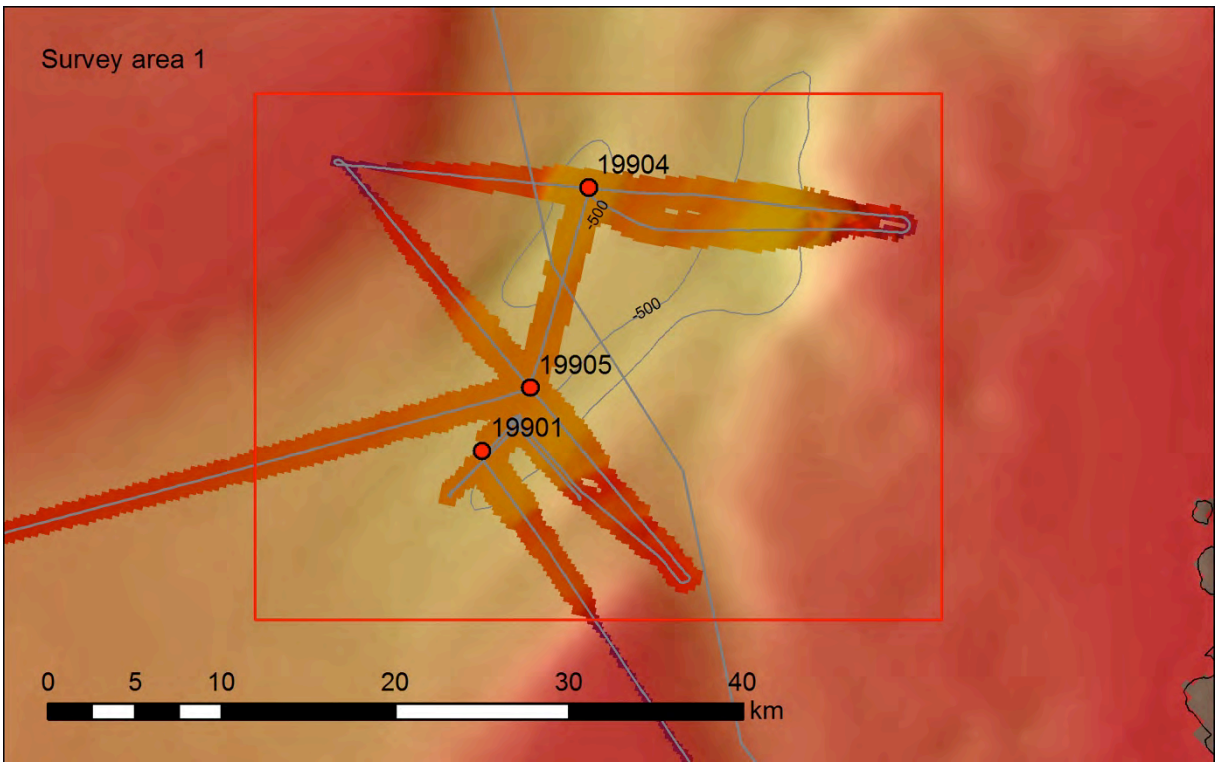
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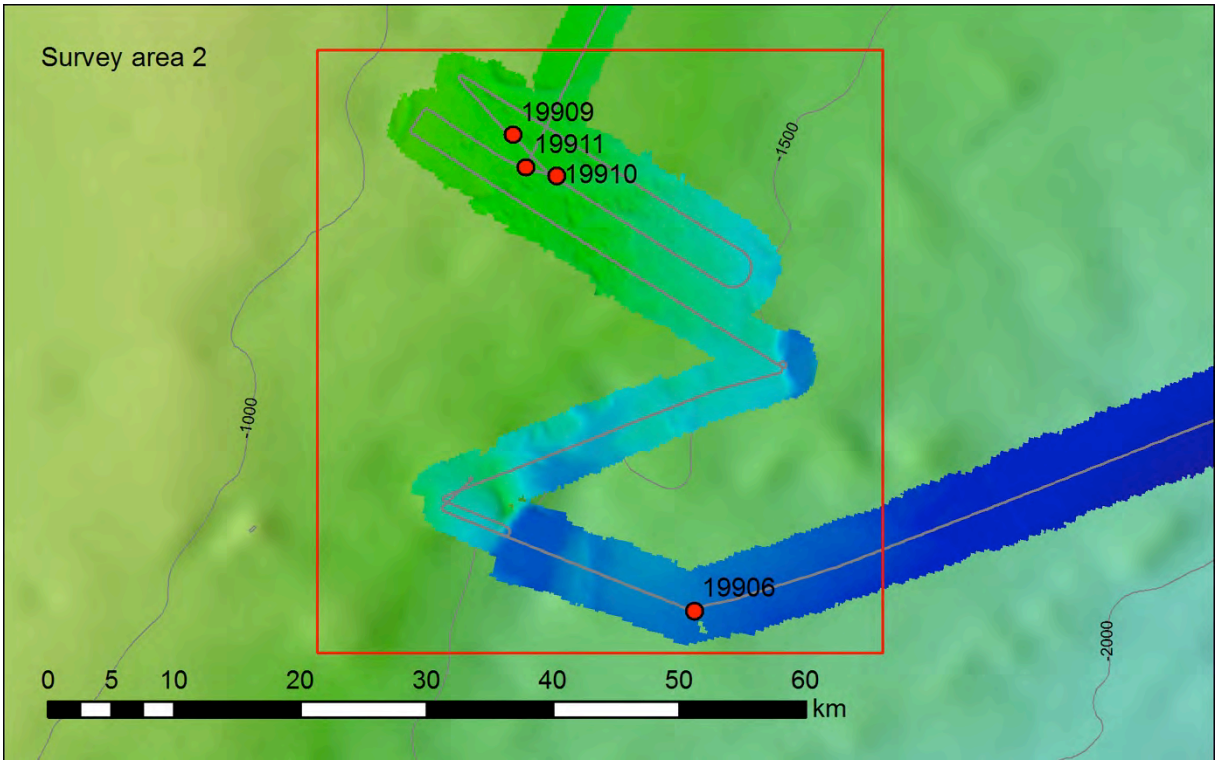
-500
19905
19901
0
5
10
20
30
40
km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19911
19910
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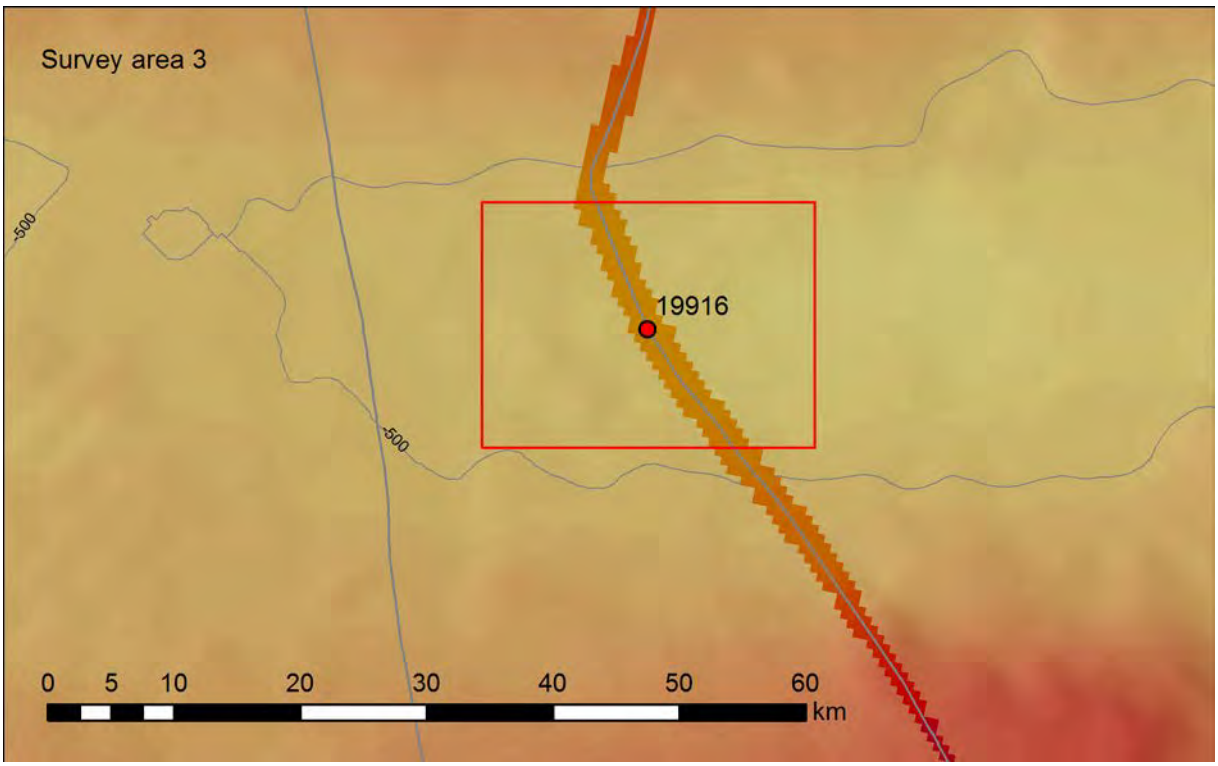
-1000
19906
-2000
0
5
10
20
30
40
50
60
km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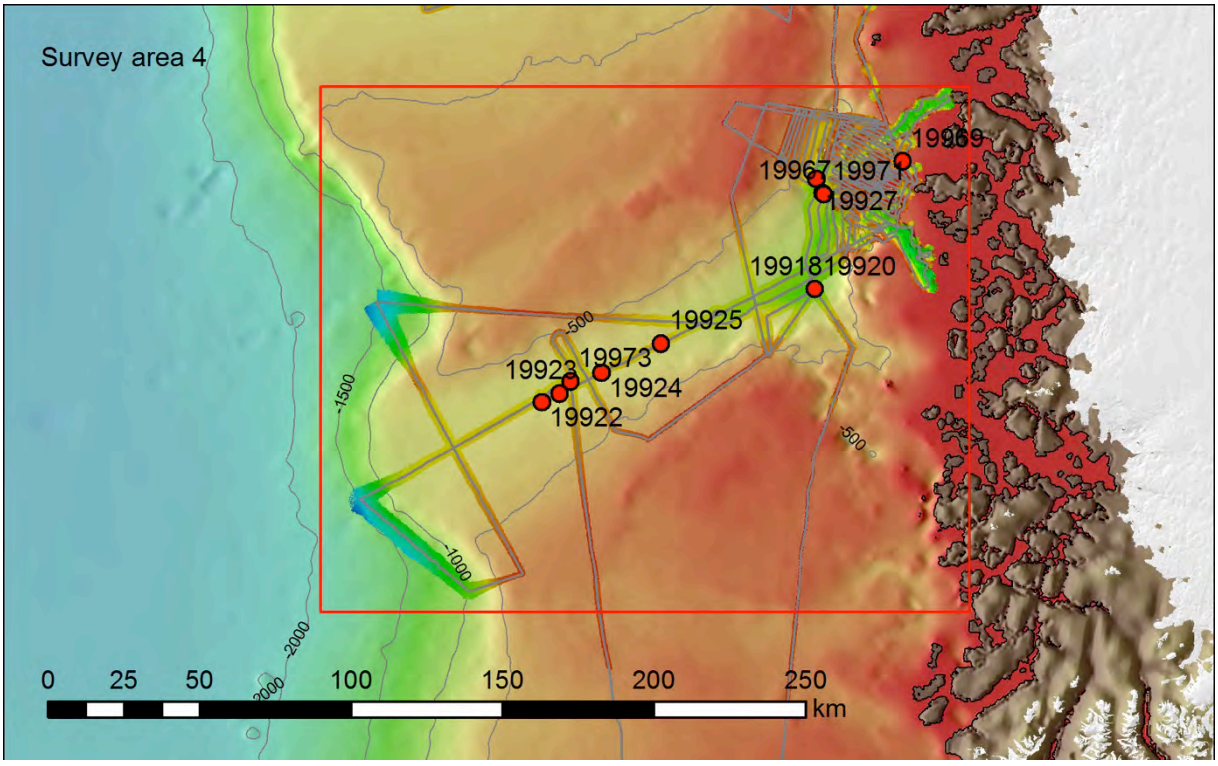
-500
-500
0 5 10 20 30 40 50 60
km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19967
19971
19927
19918
19920
19925
19973
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19924
19922
-500
-1500
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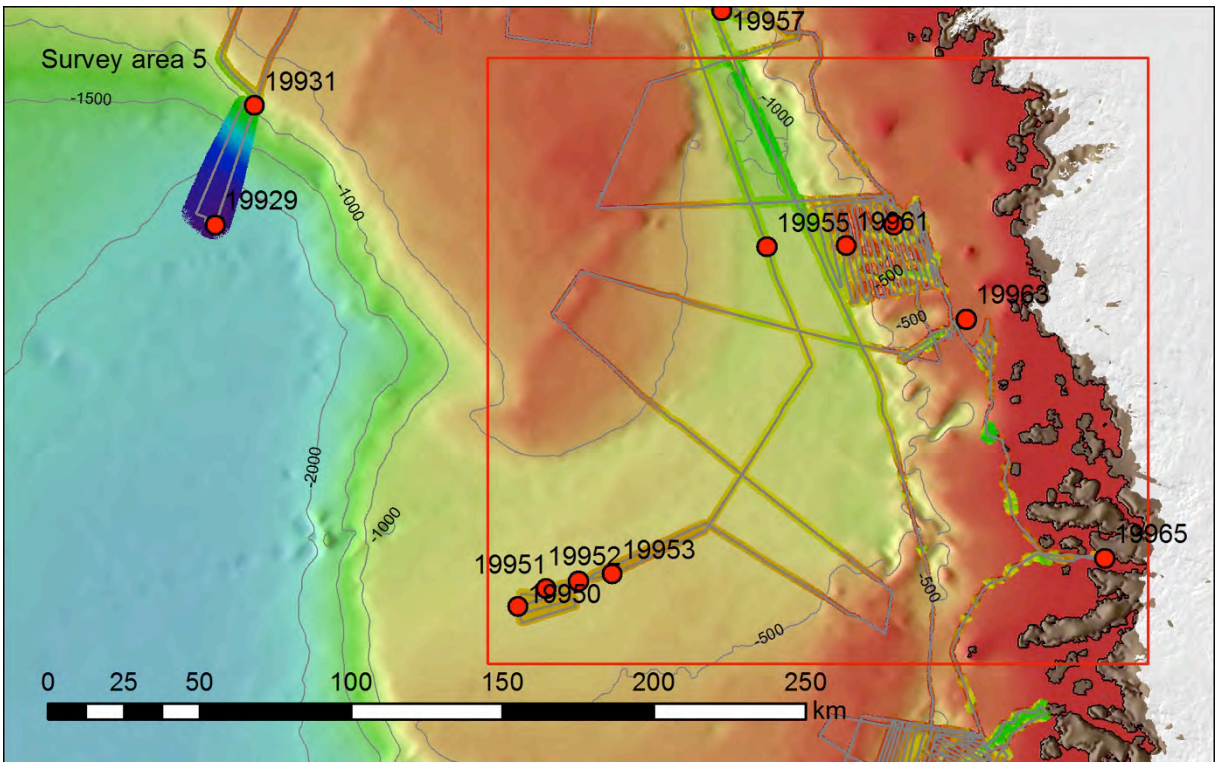
-2000
0 25 50 100 150 200 250
km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19929
19955
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19965
19951
19952
19953
19950
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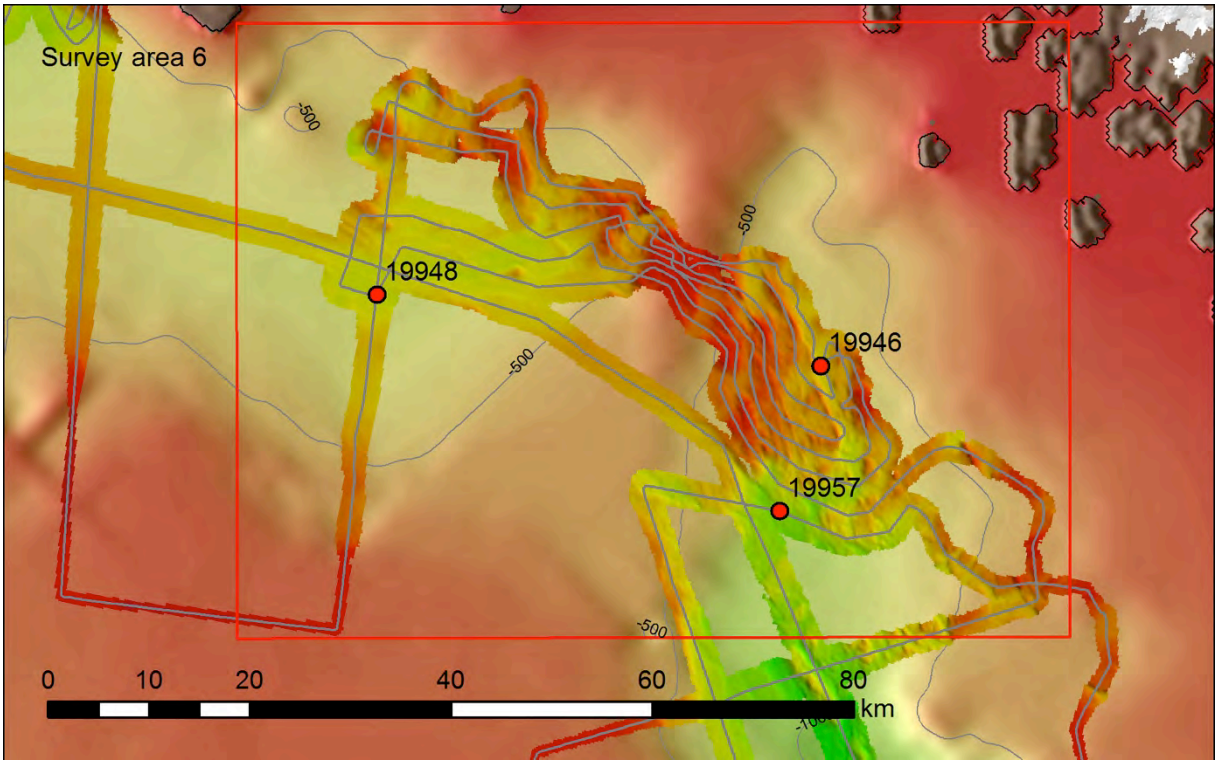
km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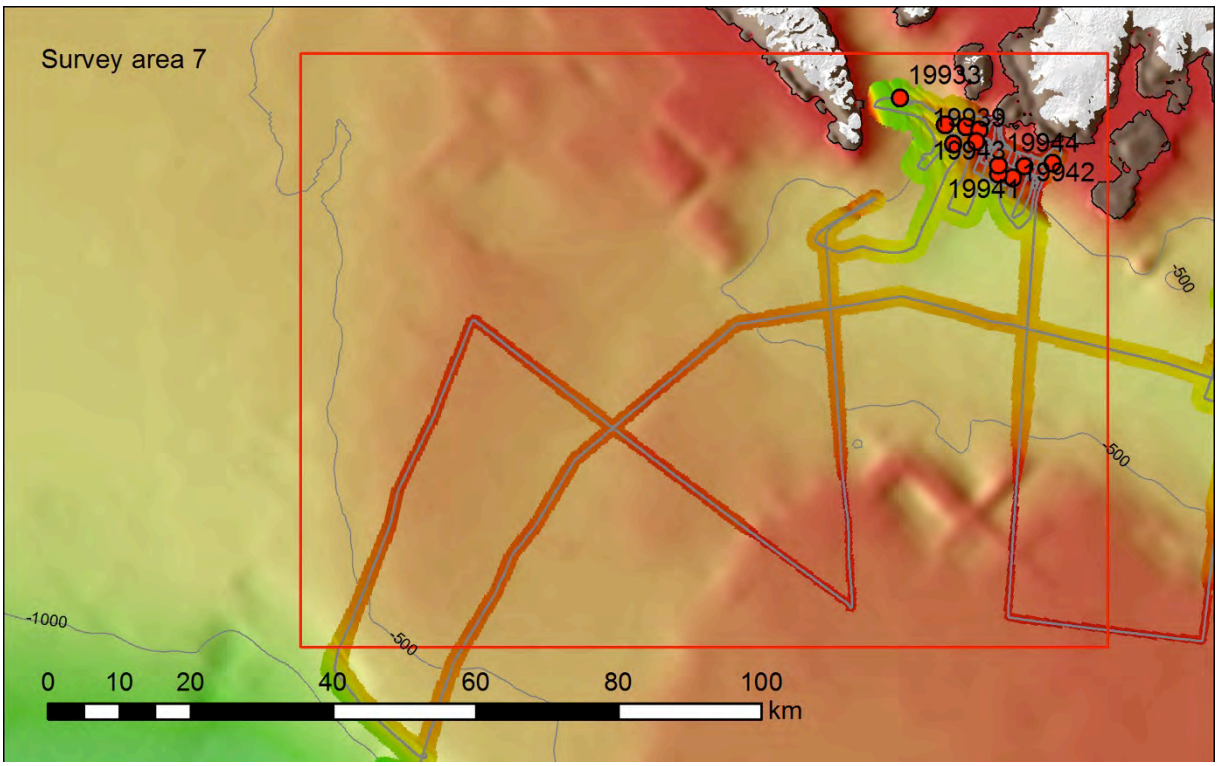
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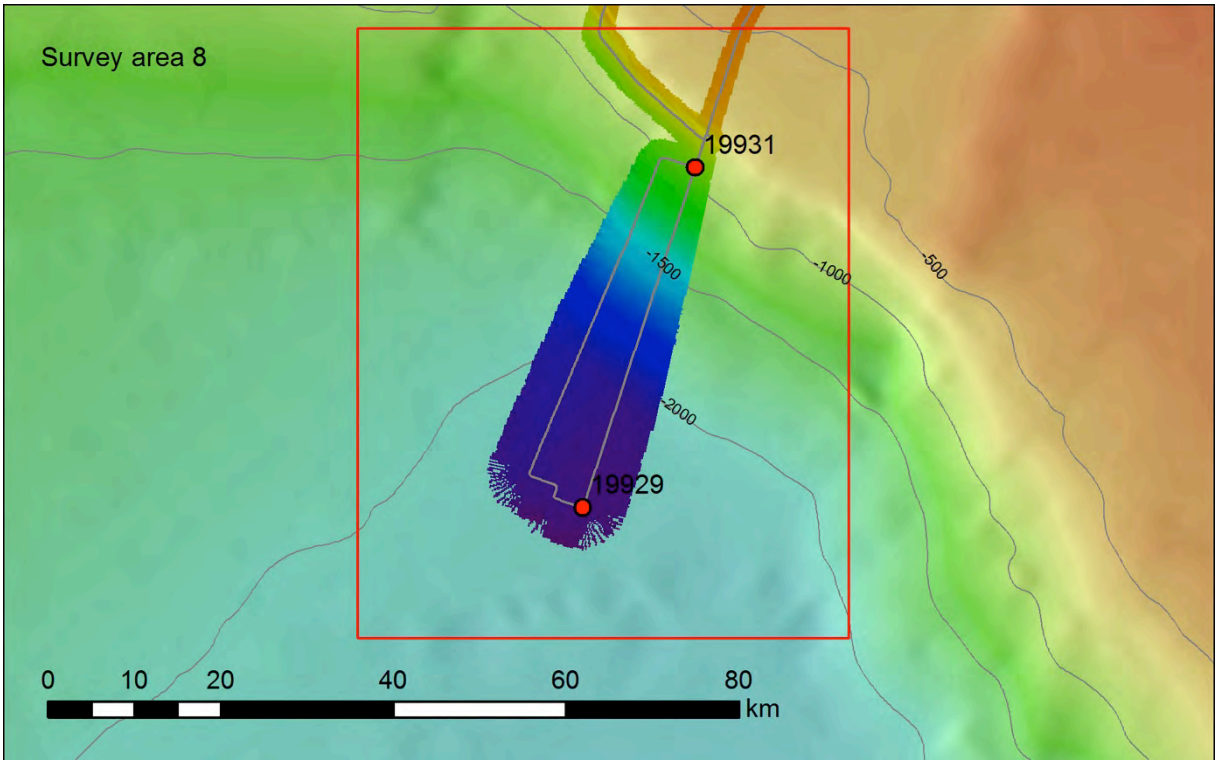
km


Survey area 8
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-500
-2000
19929
0 10 20 40 60 80
km

Acknowledgements

The Scientific Shipboard Party during expedition MSM44 is very grateful to Captain Björn Maaß and his officers and crew for the excellent cooperation, the very professional and efficient technical assistance and the very good working atmosphere on board RV MARIA S. MERIA. They all contributed substantially to the overall scientific success of this cruise. Also acknowledged are the Geological Survey of Denmark and Greenland (GEUS), and the ArcticNet programme for providing data and information for cruise planning. Finally we thank the German Science Foundation (DFG) for providing ship time on R/V MARIA S. MERIAN to investigate the late Glacial and Holocene development of the northwest Greenland ice sheets and the palaoceanography of the northeast Baffin Bay.

Participants list

Name	Discipline	Institution
Boris Dorschel, Dr.	Chief Scientist	AWI
Victoria Afanasyeva	Geology	AWI
Maren Bender	Geology	MARUM
Simon Dreutter	Bathymetry	AWI
Hannes Eisermann	Sediment acoustic	AWI
A. Catalina Gebhardt, Dr.	Sediment acoustic	AWI
Katrine Hansen	Geology	GEO AU
Dierk Hebbeln, Prof.	Geology	MARUM
Rebecca Jackson	Plankton	MARUM
Aurich Jeltsch-Thömmes	Sediment acoustic	AWI
Laura Jensen	Bathymetry	AWI
Henriette Kolling	Geology	AWI
Cynthia Le Duc	Geology	UQAM
Kai-Frederik Lenz	Physical properties	AWI
Birgit Lübben	Plankton	MARUM
Lina Madaj	Geology	AWI
Gema Martínez Méndez, Dr.	Geology / Water column	MARUM
Birgit Meyer-Schack	Geology	MARUM
Tobias Schade	Geology	MARUM
Michael Siccha, Dr.	Plankton	MARUM
Patricia Slabon	Bathymetry	AWI
David J. Wangner	Geology	GEUS

AWI	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung
GEO AU	Institute for Geoscience Aarhus University
GEUS	Geological Survey of Denmark and Greenland
MARUM	Zentrum für Marine Umweltwissenschaften, Universität Bremen
UQAM	Département des sciences de la Terre et de l'Atmosphère Université du Québec à Montréal

Station list

Station No.			Gear	Date	Time	Latitude	Longitude	Depth	Recovery	Remarks
GeoB		MSM44/		in 2015	(UTC)	(°N)	(°W)	(m)	(cm)	
19901	-1	327-1	CTD/RO	30.06.	20:59	64°19,59’	53°00,41’	491		
19902	-1	328-1	MB+PS	30.06.	22:13	64°20,53’	52°58,18’	503		start
				01.07.	00:58	64°18,86’	52°53,37’	320		end
19903	-1	329-1	MB+PS	01.07.	01:33	64°16,78’	52°45,26’	271		start
				01.07.	05:42	64°28,31’	52°35,22’	208		end
19904	-1	330-1	MUC	01.07.	07:17	64°27,94’	52°55,62’	536	32-45	
	-2	330-2	GC 12	01.07.	07:58	64°27,94’	52°55,62’	533	821	
19905	-1	331-1	GC 12	01.07.	09:19	64°21,68’	52°57,70’	485	1045	
	-2	331-2	MUC	01.07.	09:58	64°21,68’	52°57,70’	480	33-45	
19906	-1	332-1	CTD/RO	02.07.	03:19	63°04,43’	57°58,89’	1657		
	-2	332-2	MN	02.07.	04:26	63°04,43’	57°58,90’	1656		
19907	-1	333-1	MB+PS	02.07.	06:03	63°05,80’	58°18,91’	1507		start
				02.07.	08:13	63°06,51’	58°23,34’	1415		end
19908	-1	334-1	MB+PS	02.07.	09:58	63°15,19’	57°56,18’	1501		start
				02.07.	16:15	63°23,85’	58°30,46’	1101		end
19909	-1	335-1	VGRAB	02.07.	17:50	63°22,02’	58°25,22’	1084		
	-2	335-2	BC	02.07.	19:13	63°22,02’	58°25,22’	1087	28	
19910	-1	336-1	BC	02.07.	20:52	63°20,80’	58°20,43’	1160	37	
19911	-1	337-1	BC	02.07.	22:17	63°20,84’	58°23,39’	1177	37	
	-2	337-2	GC 6	02.07.	23:20	63°20,84’	58°23,39’	1178	545	over penetration
19912	-1	338-1	CTD/RO	03.07.	16:02	65°43,13’	57°26,87’	618		
	-2	338-2	MN	03.07.	16:40	65°43,18’	57°27,02’	617		
19913	-1	339-1	MN	03.07.	19:30	65°42,29’	57°07,62’	652		
	-2	339-2	MN	03.07.	20:06	65°42,29’	57°07,62’	652		
	-3	339-3	MN	03.07.	20:40	65°42,29’	57°07,63’	654		
19914	-1	340-1	MN	03.07.	23:11	65°42,73’	57°26,70’	621		
	-2	340-2	MN	03.07.	23:48	65°42,88’	57°26,51’	620		
	-3	340-3	MN	04.07.	00:22	65°42,97’	57°26,22’	621		
19915	-1	341-1	MN	04.07.	05:52	65°42,42’	56°46,98’	656		

Station No.			Gear	Date	Time	Latitude	Longitude	Depth	Recovery	Remarks
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	-3	341-3	MN	04.07.	07:00	65°42,42’	56°46,98’	657		
	-4	341-4	CTD/RO	04.07.	07:57	65°42,42’	56°46,23’	657		
19916	-1	342-1	MN	05.07.	10:23	70°45,60’	56°45,27’	552		
	-2	342-2	MN	05.07.	11:05	70°45,61’	56°45,26’	552		
	-3	342-3	MN	05.07.	11:44	70°45,61’	56°45,26’	553		
	-4	342-4	MUC	05.07.	12:22	70°45,61’	56°45,26’	552	-/-	not released
	-5	342-5	MUC	05.07.	13:00	70°45,61’	56°45,26’	555	43-51	
	-6	342-6	GC 12	05.07.	13:32	70°45,61’	56°45,26’	562	949	
19917	-1	343-1	MB+PS	06.07.	01:37	73°07,23’	57°19,89’	478		start
				06.07.	03:16	73°15,90’	57°50,89’	995		end
19918	-1	344-1	CTD/RO	06.07.	03:42	73°15,90’	57°50,89’	993		
19919	-1	345-1	MB+PS	06.07.	04:04	73°15,90’	57°50,89’	1003		start
				06.07.	20:00	73°15,92’	57°50,99’	993		end
19920	-1	346-1	GC 12	06.07.	20:44	73°15,92’	57°50,95’	998	1108	
	-2	346-2	MUC	06.07.	21:40	73°15,92’	57°50,95’	998	-/-	not released
	-3	346-3	GC 12	06.07.	22:32	73°15,92’	57°50,95’	998	1064	
	-4	346-4	BC	06.07.	23:31	73°15,92’	57°50,95’	1003	57	
19921	-1	347-1	MB+PS	07.07.	00:00	73°15,92’	57°50,95’	1000		start
				07.07.	12:15	72°44,42’	60°16,21’	707		end
19922	-1	348-1	CTD/RO	07.07.	12:52	72°44,31’	60°16,34’	708		
	-2	348-2	MN	07.07.	13:34	72°44,17’	60°16,78’	707		
	-3	348-3	MN	07.07.	14:09	72°44,14’	60°17,16’	707		
	-4	348-4	MN	07.07.	14:40	72°44,15’	60°17,26’	708		
19923	-1	349-1	MN	07.07.	16:17	72°46,76’	60°07,18’	724		
	-2	349-2	MN	07.07.	16:48	72°46,76’	60°07,20’	723		
	-3	349-3	MN	07.07.	17:21	72°46,76’	60°07,20’	724		
19924	-1	350-1	MN	07.07.	19:14	72°52,18’	59°46,08’	684		
	-2	350-2	MN	07.07.	19:48	72°52,18’	59°46,08’	684		
	-3	350-3	MN	07.07.	20:21	72°52,18’	59°46,08’	684		
19925	-1	351-1	MN	07.07.	22:45	73°00,00’	59°15,15’	685		

Station No.			Gear	Date	Time	Latitude	Longitude	Depth	Recovery	Remarks
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	-3	351-3	MN	07.07.	23:47	72°59,99’	59°15,15’	685		
	-4	351-4	CTD/RO	08.07.	00:28	73°00,00’	59°15,15’	685		
19926	-1	352-1	MB+PS	08.07.	00:56	73°00,00’	59°15,15’	685		start
				08.07.	16:13	73°35,27’	58°05,67’	931		end
19927	-1	353-1	GC 12	08.07.	16:30	73°35,26’	58°05,65’	932	1009	
	-2	353-2	BC	08.07.	17:25	73°35,26’	58°05,65’	931	52 & 58	
	-3	353-3	GC 18	08.07.	18:20	73°35,26’	58°05,66’	932	1147	
19928	-1	354-1	MB+PS	08.07.	18:50	73°35,25’	58°05,74’	932		start
				10.07.	08:09	74°34,49’	67°13,10’	2118		end
19929	-1	355-1	CTD/RO	10.07.	08:54	74°34,49’	67°13,10’	2120		
	-2	355-2	MN	10.07.	09:56	74°34,49’	67°13,10’	2120		
	-3	355-3	MN	10.07.	10:23	74°34,49’	67°13,10’	2107		
	-4	355-4	MN	10.07.	10:54	74°34,49’	67°13,10’	2158		
19930	-1	356-1	MB+PS	10.07.	11:21	74°34,47’	67°13,07’	2110		start
				10.07.	14:52	74°57,00’	67°22,29’	983		end
19931	-1	357-1	GC 6	10.07.	15:26	74°57,06’	67°19,09’	980	127	
	-2	357-2	BC	10.07.	16:16	74°57,06’	67°19,10’	980	36 & 37	
19932	-1	358-1	MB+PS	10.07.	16:49	74°57,04’	67°19,30’	950		start
				11.07.	16:22	75°58,35’	66°25,65’	765		end
19933	-1	359-1	GC 12	11.07.	17:38	75°59,40’	66°19,09’	951	1147	over penetration
	-2	359-2	BC	11.07.	18:36	75°59,40’	66°19,09’	951	54 & 55	
	-3	359-3	GC 18	11.07.	19:37	75°59,37’	66°19,06’	950	1044	
	-4	359-4	CTD/RO	11.07.	20:33	75°59,36’	66°18,83’	951		
19934	-1	360-1	MB+PS	11.07.	20:53	75°59,31’	66°18,79’	951		start
				12.07.	13:55	75°57,71’	65°55,35’	595		end
19935	-1	361-1	GC 3	12.07.	14:23	75°57,61’	65°58,14’	685	141	
19936	-1	362-1	GC 3	12.07.	15:22	75°58,75’	66°02,83’	705	179	
19937	-1	363-1	GC 3	12.07.	16:32	75°59,18’	65°56,35’	616	62	
19938	-1	364-1	GC 3	12.07.	17:34	75°59,31’	65°52,02’	337	78	tube bent, banana
19939	-1	365-1	GC 3	12.07.	18:45	75°58,42’	65°51,58’	243	93	

Station No.			Gear	Date	Time	Latitude	Longitude	Depth	Recovery	Remarks
GeoB		MSM44/		in 2015	(UTC)	(°N)	(°W)	(m)	(cm)	
19940	-1	366-1	CTD/RO	12.07.	20:16	75°58,90’	65°26,67’	501		
	-2	366-2	GC 12	12.07.	20:43	75°58,90’	65°26,67’	501	864	
	-3	366-3	BC	12.07.	21:22	75°58,90’	65°26,67’	501	48 & 50	
	-4	366-4	GC 12	12.07.	21:57	75°58,90’	65°26,67’	501	734	
19941	-1	367-1	GC 3	12.07.	23:02	75°57,90’	65°34,56’	178	~15	
19942	-1	368-1	GC 3	12.07.	23:39	75°56,80’	65°36,71’	182	~5	
19943	-1	369-1	GC 3	13.07.	00:20	75°56,66’	65°41,54’	346	104	
19944	-1	370-1	GC 3	13.07.	01:09	75°57,24’	65°42,47’	387	122	
19945	-1	371-1	MB+PS	13.07.	01:26	75°57,24’	65°42,47’	386		start
				14.07.	14:31	75°51,02’	62°30,91’	690		end
19946	-1	372-1	CTD/RO	14.07.	15:18	75°49,99’	62°30,98’	719		
	-2	372-2	GC 12	14.07.	16:02	75°49,99’	62°30,99’	719	1134	over penetration
	-3	372-3	BC	14.07.	17:11	75°49,99’	62°30,99’	718		
	-4	372-4	GC 18	14.07.	18:01	75°49,99’	62°30,98’	718	1372	
19947	-1	373-1	MB+PS	15.07.	00:20	75°46,11’	64°08,61’	779		start
				14.07.	18:24	75°49,99’	62°30,99’	718		end
19948	-1	374-1	GC 12	15.07.	00:34	75°46,10’	64°08,57’	778	1003	
	-2	374-2	BC	15.07.	01:21	75°46,10’	64°08,57’	776		
	-3	374-3	GC 12	15.07.	02:06	75°46,10’	64°08,57’	778	1018	
19949	-1	375-1	MB+PS	15.07.	02:29	75°46,10’	64°08,57’	782		start
	-1	375-1	MB+PS	17.07.	10:55	73°49,04’	62°37,57’	648		end
	-2	375-2	MB+PS	17.07.	11:00	73°49,03’	62°37,56’	648		start
				17.07.	16:38	73°46,61’	62°35,92’	647		end
19950	-1	376-1	CTD/RO	17.07.	17:21	73°48,50’	62°39,49’	643		
	-2	376-2	MN	17.07.	17:57	73°48,50’	62°39,49’	643		
	-3	376-3	MN	17.07.	18:27	73°48,50’	62°39,49’	642		
	-4	376-4	MN	17.07.	19:03	73°48,54’	62°38,90’	643		
19951	-1	377-1	MN	17.07.	21:36	73°53,02’	62°25,88’	660		
	-2	377-2	MN	17.07.	22:05	73°53,02’	62°25,88’	660		
	-3	377-3	MN	17.07.	22:33	73°53,02’	62°25,88’	660		
19952	-1	378-1	MN	18.07.	00:07	73°56,15’	62°07,46’	635		

Station No.			Gear	Date	Time	Latitude	Longitude	Depth	Recovery	Remarks
GeoB		MSM44/		in 2015	(UTC)	(°N)	(°W)	(m)	(cm)	
	-2	378-2	MN	18.07.	00:34	73°56,15’	62°07,46’	633		
	-3	378-3	MN	18.07.	01:04	73°56,15’	62°07,46’	635		
19953	-1	379-1	MN	18.07.	02:40	73°59,05’	61°47,65’	596		malfunction
	-2	379-2	MN	18.07.	03:11	73°59,05’	61°47,65’	596		
	-3	379-3	MN	18.07.	03:41	73°59,05’	61°47,65’	595		
	-4	379-4	CTD/RO	18.07.	04:23	73°59,05’	61°47,65’	596		
	-5	379-5	BC	18.07.	05:08	73°59,05’	61°47,65’	595	48 &50	
	-6	379-6	GC 3	18.07.	05:45	73°59,05’	61°47,65’	594	225	
19954	-1	380-1	MB+PS	18.07.	06:06	73°59,05’	61°47,65’	594		start
				18.07.	15:43	75°03,39’	61°10,36’	837		end
19955	-1	381-1	CTD/RO	18.07.	16:13	75°03,40’	61°10,39’	836		
19956	-1	382-1	MB+PS	18.07.	16:31	75°03,40’	61°10,39’	837		start
				18.07.	23:27	75°41,81’	62°29,90’	904		end
19957	-1	383-1	CTD/RO	18.07.	23:51	75°41,82’	62°29,99’	904		
	-2	383-2	MN	19.07.	00:32	75°41,82’	62°29,99’	904		
	-3	383-3	MN	19.07.	01:02	75°41,82’	62°29,99’	904		
	-4	383-4	MN	19.07.	01:32	75°41,82’	62°29,99’	904		
19958	-1	384-1	MB+PS	19.07.	01:54	75°41,83’	62°29,88’	903		start
				19.07.	14:26	75°13,42’	59°49,94’	744		end
19959	-1	385-1	CTD/RO	19.07.	15:02	75°13,41’	59°49,06’	755		
	-2	385-2	GC 12	19.07.	15:38	75°13,42’	59°49,32’	754	1133	over penetration
	-3	385-3	BC	19.07.	16:29	75°13,42’	59°49,32’	755	67 & 71	
	-4	385-4	GC 18	19.07.	17:13	75°13,43’	59°49,33’	755	490	tube bent, banana
19960	-1	386-1	MB+PS	19.07.	18:05	75°12,88’	59°51,28’	767		start
				20.07.	13:03	75°07,59’	60°17,32’	677		end
19961	-1	387-1	GC 12	20.07.	13:20	75°07,49’	60°17,22’	699	1060	
	-2	387-2	BC	20.07.	14:07	75°07,49’	60°17,22’	700	51 & 53	
	-3	387-3	GC 12	20.07.	14:47	75°07,49’	60°17,22’	700	1082	
19962	-1	388-1	MB+PS	20.07.	15:13	75°07,50’	60°17,26’	702		start
				21.07.	18:47	75°00,12’	58°43,39’	448		end
19963	-1	389-1	GC 12	21.07.	19:04	75°00,12’	58°43,40’	447	1022	

Station No.			Gear	Date	Time	Latitude	Longitude	Depth	Recovery	Remarks
GeoB		MSM44/		in 2015	(UTC)	(°N)	(°W)	(m)	(cm)	
	-2	389-2	BC	21.07.	19:42	75°00,13’	58°43,35’	449	43 & 46	
	-3	389-3	GC 12	21.07.	20:15	75°00,13’	58°43,28’	449	1019	
19964	-1	390-1	MB+PS	21.07.	20:36	75°00,13’	58°43,28’	449		start
				22.07.	10:56	74°23,51’	56°35,70’	640		end
19965	-1	391-1	GC 12	22.07.	11:16	74°23,51’	56°35,70’	640	1146	over penetration
	-2	391-2	BC	22.07.	11:59	74°23,51’	56°35,70’	640	63 & 66	over penetration, no surface
	-3	391-3	GC 12	22.07.	12:41	74°23,51’	56°35,70’	640	1129	over penetration
	-4	391-4	CTD/RO	22.07.	13:22	74°23,52’	56°35,78’	640		
19966	-1	392-1	MB+PS	22.07.	13:40	74°23,52’	56°35,78’	640		start
				24.07.	13:00	73°32,97’	57°59,82’	746		end
19967	-1	393-1	CTD/RO	24.07.	13:22	73°32,97’	57°59,83’	747		
	-2	393-2	MN	24.07.	14:01	73°32,97’	57°59,83’	745		
	-3	393-3	MN	24.07.	14:32	73°32,97’	57°59,83’	745		
	-4	393-4	MN	24.07.	15:03	73°32,97’	57°59,83’	748		
19968	-1	394-1	MB+PS	24.07.	15:32	73°32,96’	57°59,60’	761		start
				24.07.	19:56	73°41,73’	57°14,51’	720		end
19969	-1	395-1	GC 12	24.07.	20:19	73°41,74’	57°14,44’	720	936	
	-2	395-2	BC	24.07.	21:13	73°41,74’	57°14,44’	717	42 & 44	
	-3	395-3	GC 12	24.07.	21:54	73°41,74’	57°14,44’	717	904	
19970	-1	396-1	MB+PS	24.07.	22:38	73°42,48’	57°11,89’	261		start
	-1			25.07.	12:54	73°32.89'	57°58.70'	788		end
19971	-1	397-1	MN	25.07.	12:58	73°32.89'	57°58.70'	788		MN trawl start
				25.07.	13:57	73°31.28'	57°59.49'	764		end
19972	-1	398-1	MB+PS	25.07.	13:59	73°31.28'	57°59.49'	763		start
				27.07.	08:58	72°49.37'	60°02.71'	754		end
19973	-1	399-1	CTD/RO	27.07.	09:22	72°49.39'	60°02.80'	752		
19973	-2	399-2	GC 12	27.07.	10:02	72°49.41'	60°02.83'	754	817	
19973	-3	399-3	BC	27.07.	10:46	72°49.41'	60°02.83'	754	52 & 53	
19973	-4	399-4	GC 12	27.07.	11:28	72°49.41'	60°02.83'	754	798	

CTD/RO	CTD & Rosette water sampler
MN	Multinet
MB+PS	Multibean & Parasound survey
GC x	Gravity corer with x m core barrel
BC	Box corer
MUC	Multi-corer
VGRAB	Van Veen grab sampler