

# Godthåbsfjord system and the West Greenland shelf with ‘R/V Sanna’, 11.-16. August 2013

## *Cruise report*



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and the shipboard and on-shore parties*

## Introduction and aim

From August 11.-16. 2013, the research vessel ‘*Sanna*’ (Nuuk, Greenland) from Greenland Institute of Natural Resources (Pinnngortitaleriffik) served as a platform for a successful Danish-Greenlandic-Canadian research cruise in the Godthåbsfjord complex and on the West Greenland shelf. In total 12 scientists and students from the participating countries partook in the cruise, divided into a shipboard (8 persons) and an on-shore (4 persons) party. The cruise was organised by the Arctic Research Centre of Aarhus University and Greenland Institute of Natural Resources as part of a larger field campaign. The Arctic Research Centre funded the cruise by defraying the cost of ship charter.

The aim of the cruise was to obtain high-resolution marine sediment records from the Holocene for three overall scientific purposes:

- 1) *Geology and palaeoclimate*: The interaction of the comparatively warm West Greenland Current (WGC) and the melting of Greenland inland ice play a major role not only for regional conditions but also for regional and global climate. The varying strength of the WGC is believed to have a significant impact on Labrador Sea deep-water formation, one of the key components of the Atlantic Meridional Overturning Circulation. The WGC is also important as variations in its strength and composition may be traced back to the inflow of water transported from Arctic Ocean combined with varying strength of the Gulf Stream-North Atlantic Drift system. Conditions along the West Greenland shelf and in West Greenland fjords are thus directly linked to the larger North Atlantic circulation system. The West Greenland fjords, which are fed by glaciers directly from the Greenland Ice sheet, also provide a strong record of glacier melting. Marine sediment cores from the Godthåbsfjord Complex will in this project be used to trace detailed variations in current system and glacier melting rates in order to improve our understanding of these important factors of the climate system.
- 2) *Microbiology and biogeochemistry*: The general scientific goal was to determine rates of anaerobic carbon cycling and turnover of microbial biomass in Arctic marine sediments and to identify the factors controlling these rates. Specifically the sampled stations allow contrasting shelf sediments of marine origin with the Godthåbsfjord sediments highly impacted by glacial runoff. The project is structured into individual sub-projects addressing down core carbon mineralization rates, microbial community composition, microbial mediated turnover of acetate, accumulation of methane and organic geochemistry focussing on microbial biomarkers and amino acid stereo-isomeric racemization.
- 3) *Hydrography*: The cruise also provided the opportunity to collect CTD data from sites within Godthåbsfjorden and on the shelf of Nuuk. The purpose was two-fold: A) to support the coring with data on the present hydrographical conditions at the site, and B) to provide additional data to the general long-term monitoring programme.

## RV Sanna and shipboard equipment

The RV *Sanna* (Figure 1) belongs to the Greenland Institute of Natural Resources (GINR), Nuuk. The ship is 32.30 m long, 458 GT and accommodates 16 persons (crew and scientists).



*Figure 1. R/V Sanna of Nuuk (Photo: Christof Pearce).*

For sediment sampling, a 6-m gravity corer (Figure 2) and a Rumohr lot corer from the Center for Geomicrobiology, AU, were deployed using the ship's main winch. A CTD (SBE19+, Seabird) was provided by the GINR. We had access to excellent laboratory facilities at the Greenland Institute of Natural Resources (GINR) for subsampling cores and for processing and preserving the subsamples, which were transported to Aarhus University for analysis. Transport of cores from the ship to the laboratory in Nuuk was done either using the small boat 'Aage V. Jensen' (twice) or when RV *Sanna* had a port call (twice).

When possible (2 out of 8 stations), stations were sampled with the following program: 4 Rumohr lot cores, 2 gravity cores, 1 CTD. The Rumohr lot cores were deployed to collect an undisturbed water-sediment interphase, while the gravity cores provided longer records of up to 6 meters. For most stations the full coring programme was however not possible either due to time constraints, unpermissible weather (swells) or problems with coring. In addition, CTD data were collected from all coring stations as well as from some additional standard monitoring stations. This provided data on modern conditions at the sampling sites, information which is invaluable interpretation of the



geological and microbiological data. The cruise also provided the opportunity of collecting hydrographical data for the general monitoring programme.



*Figure 2. For long sediment coring, a 6-m gravity corer deployed using the ship's main winch and A-frame. (Photo: Christof Pearce).*

## Participants – Scientific party

The cruise participants (Figure 3) consisted of a shipboard party and a shore-based party. The shipboard party collected cores while the shore-based party extracted samples for microbiological studies and pre-treated them in the laboratory at the Greenland Institute of Natural Resources (GINR).

*The shipboard scientific party consisted of eight scientists and students:*

Seidenkrantz, Marit-Solveig	AU, Denmark	Chief scientist
Røy, Hans	AU, Denmark	Responsible for deck work
Meire, Lorenz	GINR, Greenland	PhD student, responsible for CTD
Pearce, Christof	AU, Denmark	PhD student
Ouellet-Bernier	UQAM, Canada	MSc student
Lennert, Ann Eileen	GINR, Greenland	PhD student (3 days)
Sha, Longbin	AU, Denmark	Postdoc
Sheldon, Christina	AU, Denmark	MSc student

*The shore-based scientific party consisted of four scientists and students:*

Lomstein, Bente Aa.,	Aarhus University, Denmark	Responsible microbial. lab work
Kjeldsen, Kasper Urup	Aarhus University, Denmark	Scientist
Jaussi, Marion	Aarhus University, Denmark	PhD student
Braun, Stefan	Aarhus University, Denmark	PhD student

*Captain:* Aqqaluk Egede, Nuuk

*Logistic support was provided by:* Egon Randa Frandsen, AU and Carl Isaksen, GINR, Jens Weinell, GINR, Paaviaaraq Ludvigsen, GINR.



*Figure 3. The scientific party on the last day in Nuuk. (Photo and edits: Christof Pearce).*

## Results

Core collection was carried out at 8 different stations around the Godthåbsfjord complex and one station on the West Greenland shelf north of Fyllas Banke.

Weather was fair and calm during the entire cruise, although fog was common in the mornings. Rain was relatively limited. Despite of the fair weather conditions, coring from this relatively small vessel (unstable and very moving platform) proved to be very dangerous and only one of the originally two planned stations of the shelf was cored (Station 3). Coring in the fjord system went without such problems and here only strong current (Station 4) or stones (Station 1 and 2) or highly water-logged sediments (Station 7) proved problematic. Especially Rumohr lot cores proved to be difficult to obtain, although repeated trials and tweaking of the equipment sometimes solved the problem. Consequently, despite some general problems of lost core material, coring was successful.

Eight gravity cores (Stations 3, 5, 6, 8, 9) and 17 Rumohr lot cores (Stations 1, 3, 4, 6, 8, 9) were obtained (Appendix 1). In addition, some of the failed Rumohr lot cores still contained sufficient surface sediment for collection of surface sediment samples for modern data base work (dinoflagellate cysts, diatoms, foraminifera).

Gravity cores were cut into ~1-m sections, marked and stored for transport to Denmark (Geology) or transported to Greenlands Institute for Natural Resources for subsampling of porewater and solid phase (microbiology and biogeochemistry). Rumohr lot cores were capped and stored intact and upright after the sea water overlying the sediment surface had been removed. Only a few long (~180 cm) Rumohr lot cores were transported lying down. Those cores that were to be samples for microbiological studies were brought to land in order to be subsampled in the laboratory at the Greenland Institute for Natural Resources. Core stations are listed Table 1, CTD stations are listed Table 2, samples for microbiology are listed Table 3 and the full list of casts (successful and failed) is shown in Appendix 1.

*Table 1: List of sample stations and cores collected. There are two columns with water depth*

Station	Depth	Latitude	Longitude	Water depth (m)
Station 1	106,4	64°10.5369'	51°31.2530'	106,4
Station 2	142,2	64°09.8083'	51°25.6679'	142,2
Station 3	498,2	64°26.7425'	52°47.6486'	498,2
Station 4	260	64°13.9706'	51°40.6450'	260
Station 5	622,4	64°25.3479'	51°30.6209'	622,4
Station 6	389	64°29.0604	50°42.3240'	389
Station 7	576	64°36.65'	50°57.17'	576
Station 8	475,8	64°40.7078'	50°17.4672'	475,8
Station 9	413,7	64°19.4360'	51°16.4756'	413,7



Figure 3. Sample stations (produced via Google Map).

Table 2: CTD stations

Station	Cast name	Latitude (N) - Start	Latitude (N) - stop	Longitude (W) - Start	Longitude (W) - stop	Water depth (m) start	Water depth (m) stop
Station 1	SA13-ST1-09CTD	64°10.5390	64°10.5584	51°31.1810	51°31.2808	-	
Station 3	SA13-ST3-19CTD	64°26.7574'	64°26.7993'	52°46.7231	52°46.6569	518,9	517,2
Station 4	SA13-ST4-24CTD	64°14.0019'	64°14.0748'	51°40.4838	51°40.3236	192,8	184,2
Station 4	SA13-ST4-23CTD	64°15.98'	64°16.00'	51°40.26	51°40.7	362	360
Station 5	SA13-ST5-28CTD	64°25.47'	64°25.4201'	51°29.62	51°29.5255	593	565,5
Station 5	SA13-ST5-29CTD	-	64°25.3020'	-	51°29.5222	539,6	-
Station 6	SA13-ST6-41CTD	64°29.214'	64°29.118'	50°42.331	50°42.390	-	450
Station 7	SA13-ST6-43CTD	64°36.573'	64°36.579'	50°57.68	50°57.620	530	-
Station 8	SA13-ST8-44CTD	64°41,68'	64°41,620'	50°21,424	50°21,175	340	-
Station 8	SA13-ST8-48CTD	64°40.675	64°40.637	50°17.447	50°17.322	465	-
Station 7	SA13-ST7-57CTD	64°36.65	50°57.17	-	-	576	-
Station 10	SA13-ST9-65CTD	64°19.4208	-	51°16.4818	-	413	-



*Table 3: Microbiological samples. Gravity cores were sampled at 10 cm intervals within the upper 1 m of the core and at 25 cm intervals in the remaining part of the core. Porewater was analysed for ammonium, sulphate, methane and volatile fatty acids and the solid phase is analysed for density, water content, sulphate reduction rates, micro-scopic cells counts, microbial nucleic acids, amino acids and stereochemistry and endospores.*

Nr.	Station	Core	Depth (cmbsf)
1	1	12R	1,25
2	1	12R	10
3	1	12R	15
4	1	12R	20
5	1	12R	25
6	1	12R	30
7	1	12R	35
8			
9	3	GC01	587
10	3	GC01	562
11	3	GC01	537
12	3	GC01	512
13	3	GC01	487
14	3	GC01	462
15	3	GC01	437
16	3	GC01	412
17	3	GC01	387
18	3	GC01	362
19	3	GC01	337
20	3	GC01	312
21	3	GC01	287
22	3	GC01	262
23	3	GC01	237
24	3	GC01	212
25	3	GC01	187
26	3	GC01	167
27	3	GC01	142
28	3	GC01	117
29	3	GC01	97
30	3	GC01	87
31	3	GC01	77
32	3	GC01	67
33	3	GC01	57
34	3	GC01	47

35	3	GC01	37
36	3	GC01	27
37	3	GC01	17
38	3	GC01	7
39	3	17R	1,25
40	3	17R	15
41	3	17R	25
42	3	17R	35
43	3	17R	45
44	3	17R	50
45	5	GC30	590
46	5	GC30	565
47	5	GC30	540
48	5	GC30	515
49	5	GC30	490
50	5	GC30	465
51	5	GC30	440
52	5	GC30	415
53	5	GC30	390
54	5	GC30	365
55	5	GC30	339
56	5	GC30	314
57	5	GC30	289
58	5	GC30	264
59	5	GC30	239
60	5	GC30	214
61	5	GC30	189
62	5	GC30	164
63	5	GC30	139
64	5	GC30	114
65	5	GC30	89
66	5	GC30	64
67	5	GC30	39
68	5	GC30	14



Table 3: Microbiological samples, continued.

Nr.	Station	Core	Depth (cmbsf)
69	6	GC40	550
70	6	GC40	525
71	6	GC40	500
72	6	GC40	475
73	6	GC40	450
74	6	GC40	425
75	6	GC40	400
76	6	GC40	375
77	6	GC40	350
78	6	GC40	325
79	6	GC40	300
80	6	GC40	275
81	6	GC40	250
82	6	GC40	225
83	6	GC40	200
84	6	GC40	175
85	6	GC40	150
86	6	GC40	125
87	6	GC40	100
88	6	GC40	95
89	6	GC40	85
90	6	GC40	75
91	6	GC40	65
92	6	GC40	55
93	6	GC40	45
94	6	GC40	35
95	6	GC40	25
96	6	GC40	15
97	6	GC40	5
98	6	RL35R	1,25
99	6	RL35R	15
100	6	RL35R	25
101	6	RL35R	35

102	6	RL35R	45
103	6	RL35R	55
104	6	RL35R	65
105	6	RL35R	75
106	8	GC47	561
107	8	GC47	536
108	8	GC47	511
109	8	GC47	486
110	8	GC47	461
111	8	GC47	436
112	8	GC47	411
113	8	GC47	386
114	8	GC47	361
115	8	GC47	336
116	8	GC47	311
117	8	GC47	286
118	8	GC47	261
119	8	GC47	236
120	8	GC47	211
121	8	GC47	186
122	8	GC47	161
123	8	GC47	136
124	8	GC47	111
125	8	GC47	101
126	8	GC47	91
127	8	GC47	81
128	8	GC47	71
129	8	GC47	61
130	8	GC47	51
131	8	GC47	41
132	8	GC47	31
133	8	GC47	21
134	8	GC47	11

## Future analyses

The cores collected during the cruise will among other be studied for sedimentology (grain size, lithology, trace elements and magnetic susceptibility), micropalaeontology (foraminiferal, dinoflagellate cyst and diatom communities) carried out at the Department of Geoscience, Aarhus University in collaboration with national and international partners. Furthermore, based on the results from solid phase and porewater analysis, carried out in the laboratories in the Center for Geomicrobiology, we will gain insight into the function of the microbial communities buried in Arctic sediments. Parts of this work will be carried out by PhD students as part of their PhD projects.

## Educational perspective

A total of eight students and early stage researchers from Denmark, Greenland, and Canada participated in the cruise thus giving the cruise a very significant educational impact. In addition six of the students from Aarhus University and Greenland have continued studying the material from the cruise for their projects.

## Acknowledgements

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*Appendix 1. Full list of casts (gravity cores, rumohr lot cores and CTD) during the August 11-16 cruise with RV Sanna; both successful and failed casts listed. In core/cast name 'G' = gravity cores, and 'R' = Rumohr lot cores, CTD = CTD cast.*

Date	Area	Station	Hydrographical monitoring station no.	Core name	Latitude (N)	Longitude (W)	Water depth (m)	Core Length (cm)
August 11, 2013 (Sunday)	Kobbefjord	station 1		<b>SA13-ST1-01R-A</b>	64°10.479'	51°31.269	108,6	0
August 11, 2013 (Sunday)	Kobbefjord	station 1		<b>SA13-ST1-01R-B</b>	64°10.479'	51°31.270	108,6	0
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-01R-C</b>	64°10.479'	51°31.271	108,6	45
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-02R</b>	64°10.50'	51°31.32	107,7	41
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-03R</b>	64°10.5304'	51°31.2827	106,8	39,5
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-04R</b>	64°10.5369'	51°31.2530	106,4	43,5
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-05R</b>	64°10.5369'	51°31.2108	105,6	39
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-06G</b>	64°10.446'	51°31.3210	107,7	0
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-07G-A</b>	64°10.4775'	51°31.3344	106,8	0
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-07G-B</b>	64°10.5304'	51°31.3061	106	0
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-08G</b>	64°10.5384'	51°31.2688	104,4	70
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-09CTD</b>	64°10.4775'	51°31.280	-	-
August 11, 2013 (Sunday)	Kobbefjord	Station 2		<b>SA13-ST2-10G</b>	64°09.8083'	51°25.6679	142,2	0

Core name	Coring device	Succeeded/ Failed	Remarks	Weather
SA13-ST1-01R-A	Rumohr lot	Failed	Cast 1; Came up empty	Sunny
SA13-ST1-01R-B	Rumohr lot	Failed	Cast 2; Sediment flushed out when the corer was lifted up on deck.	Sunny
SA13-ST1-01R-C	Rumohr lot	OK	Cast3: Recovered ca 45 cm.	Sunny
SA13-ST1-02R	Rumohr lot	OK	Surface sampled for diatoms, dinoflagellate cysts and Foraminifera. The rest used by Hans Røy (for colleague).	Sunny
SA13-ST1-03R	Rumohr lot	OK		Sunny
SA13-ST1-04R	Rumohr lot	OK		Sunny
SA13-ST1-05R	Rumohr lot	OK		Sunny
SA13-ST1-06G	Rumohr lot	Failed	Corer fell over when hitting bottom. Came up with only a little sediment in core catcher, incl. Stones. The stones were sharp-edged and seems to be broken, not rounded from ice transport. The stones are presumably from a rock fall. The sides of the fjord are basically made up of rock fall, and as the fjord is very narrow, the rocks probably reached to the centre of the fjord.	Sunny
SA13-ST1-07G-A	Gravity	Failed	Corer fell over when hitting bottom. Empty	Sunny
SA13-ST1-07G-B	Gravity	Failed	Stones in core catcher	Sunny
SA13-ST1-08G	Gravity	Quality uncertain	The core hit bottom twice and we may thus have the surface twice.	Sunny
SA13-ST1-09CTD	CTD	OK	For details see list of CTD casts	Sunny
SA13-ST2-10G	Gravity	Failed	Stones in core catcher. Station 2 is a bit further into Kobbefjord than Station 1, where the fjord is slightly wider with less steep mountain sides. However, it the same problem with rock slides seems to have governed this site, so we abandoned.	Sunny



Date	Area	Station	Hydrographical monitoring station no.	Core name	Latitude (N)	Longitude (W)	Water depth (m)	Core Length (cm)
August 11, 2013 (Sunday)	Kobbefjord	Station 2		<b>SA13-ST2-11CTD</b>	64°09.8206'	51°25.3120	130	0
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-12R</b>	64°10.4390'	51°31.2475	106	?
August 11, 2013 (Sunday)	Kobbefjord	Station 1		<b>SA13-ST1-13R</b>	64°10.4496'	51°31.4151	107,3	33
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-14R</b>	64°26.8437'	52°47.6616	496,5	?
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-15R</b>	64°26.8855'	52°47.6544	495,5	53,5
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-16R</b>	64°27.0694'	52°47.5783	475	?
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-17R-A</b>	64°26.7465'	52°47.6144	498,2	0
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-17R-B</b>	64°26.743'	52°47.3664	498,2	?
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-18R-A</b>	64°26.747'	52°47.026	499,1	0
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-18R-B</b>	64°26.7392'	52°46.8718	515,2	0
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-19CTD</b>	64°26.7574'	52°46.7231	518,9	-
August 12, 2013 (Monday)	Shelf	Station 3		<b>SA13-ST3-20G</b>	64°26.7425'	52°47.6486	498,2	587
August 13, 2013 (Tuesday)	Outer Godthåbsfjord, close to Nuuk; basin where two fjords meet	Station 4		<b>SA13-ST4-21R</b>	64°13.9706'	51°40.6450	260	15

Core name	Coring device	Succeeded/ Failed	Remarks	Weather
SA13-ST2-11CTD	CTD	OK	For details see list of CTD casts	Sunny
SA13-ST1-12R	Rumohr lot	Failed?	Good recovery. Clear water on top of sediment	Sunny
SA13-ST1-13R	Rumohr lot	OK	Clear water on top of sediment. Udes for surface samples for dinocyst, diatoms and benthci forams.	Sunny
SA13-ST3-14R	Rumohr lot	Shaken	When core came on deck it was shaken due to the big swells making sampling difficult. Therefore the top sediment was mixed with water. The core was used for sampling for a colleagues of Hans. Røy	Clam wind, but swells made coring difficult/dangerous
SA13-ST3-15R	Rumohr lot	OK	Good core with water on top.	Clam wind, but swells made coring difficult/dangerous
SA13-ST3-16R	Rumohr lot	Somewhat shaken	Somewhat shaken making the water above teh top sediment muddy. However the stratigraphy of the core seemed OK.	Clam wind, but swells made coring difficult/dangerous
SA13-ST3-17R-A	Rumohr lot	Failed		Clam wind, but swells made coring difficult/dangerous
SA13-ST3-17R-B	Rumohr lot	OK		Clam wind, but swells made coring difficult/dangerous
SA13-ST3-18R-A	Rumohr lot	Failed		Clam wind, but swells made coring difficult/dangerous
SA13-ST3-18R-B	Rumohr lot	Failed		Clam wind, but swells made coring difficult/dangerous
SA13-ST3-19CTD	CTD	OK	For details see list of CTD casts	Clam wind, but swells made coring difficult/dangerous
SA13-ST3-20G	Gravity	OK	6 sections + 0.07 top ("Section 7") which was mixed. Section 1 + section 6 (bottom + near top) may have been a bit disturbed. Very high swells made this a very difficult and dangerous work. The top was collected for potential surface samples.	Clam wind, but swells made coring difficult/dangerous
SA13-ST4-21R	Rumohr lot	OK	Very strong currents.The ship was drifting a lot due to strong currents so the water depth is only approximate. Sandy sediment on top underlayn by more silty/clayish sediment. Affluted organisms (forams or worm tubes) at surface.	Calm wind, strong current

Date	Area	Station	Hydrographical monitoring station no.	Core name	Latitude (N)	Longitude (W)	Water depth (m)	Core Length (cm)
August 13, 2013 (Tuesday)	Outer Godthåbsfjord, close to Nuuk; basin where two fjords meet	Station 4		<b>SA13-ST4-22R-A</b>	64°13.9535'	51°41.2323	366,3	0
August 13, 2013 (Tuesday)	Outer Godthåbsfjord, close to Nuuk; basin where two fjords meet	Station 4		<b>SA13-ST4-22R-B</b>	64°13.9183'	51°40.7906	283,2	0
August 13, 2013 (Tuesday)	Outer Godthåbsfjord, close to Nuuk; basin where two fjords meet	Station 4		<b>SA13-ST4-23CTD</b>	64°14.0019'	51°40.4838	192,8	-
August 13, 2013 (Tuesday)	Outer Godthåbsfjord, close to Nuuk; basin where two fjords meet	Station 4	close to monitoring station GF5	<b>SA13-ST4-24CTD</b>	64°15.98'	51°40.26'	362	-
August 13, 2013 (Tuesday), 12h52	Godthåbsfjord	Station 5		<b>SA13-ST5-25R</b>	64°25.6397'	51°30.4519'	624,1	-
August 13, 2013 (Tuesday)	Godthåbsfjord	Station 5		<b>SA13-ST5-26R</b>	64°25.2'	51°29.2	624,1	-
August 13, 2013 (Tuesday)	Godthåbsfjord	Station 5		<b>SA13-ST5-27R</b>	64°25.45'	51°30.19	624,1	-
August 13, 2013 (Tuesday)	Godthåbsfjord	Station 5		<b>SA13-ST5-28CTD</b>	64°25.47'	51°29.62	593	-
August 13, 2013 (Tuesday)	Godthåbsfjord	Station 5		<b>SA13-ST5-29CTD</b>	64°25.3020'	51°29.5222	539,6	-
August 13, 2013 (Tuesday)	Godthåbsfjord	Station 5		<b>SA13-ST5-30G</b>	64°25.3479'	51°30.6209	622,4	607
August 13, 2013 (Tuesday)	Godthåbsfjord	Station 5		<b>SA13-ST5-31G</b>	64°25.35'	51°30.98	622,4	635,5

Core name	Coring device	Succeeded/ Failed	Remarks	Weather
SA13-ST4-22R-A	Rumohr lot	Failed	Very strong currents.	Calm wind, strong current
SA13-ST4-22R-B	Rumohr lot	Failed	Very strong currents.	Calm wind, strong current
SA13-ST4-23CTD	CTD	OK	For details see list of CTD casts	Calm wind, strong current
SA13-ST4-24CTD	CTD	OK	For details see list of CTD casts	Calm wind, strong current
SA13-ST5-25R	Rumohr lot	Failed	Top valve failed to release	Calm, medium strong current
SA13-ST5-26R	Rumohr lot	Failed	Additional led weight was put on the cable to make the top valve close	Calm, medium strong current
SA13-ST5-27R	Rumohr lot	Failed	Mud seen on the outside of the core all the way up to the core top (led), i.e. >1 m	Calm, medium strong current
SA13-ST5-28CTD	CTD	OK	For details see list of CTD casts; Iceberg turned over right next to the station while the CTD was decending. This was after the CTD had passed the relevant depth	Calm, medium strong current
SA13-ST5-29CTD	CTD	OK	For details see list of CTD casts. Only short cast to check if the iceberg had influence the results of SA13-ST5-28CTD	Calm, medium strong current
SA13-ST5-30G	Gravity	OK	7 sections. Very fine light gray mud/clay. Probably intact surface.	Calm, medium strong current
SA13-ST5-31G	Gravity	OK	7 sections. Very fine light gray mud/clay. Top ca 70 cm may be slightly distrubed. This core has been used for geomicrobiology.	Calm, medium strong current



Core name	Coring device	Succeeded/ Failed	Remarks	Weather
<b>SA13-ST4-22R-A</b>	Rumohr lot	Failed	Very strong currents.	Calm wind, strong current
<b>SA13-ST4-22R-B</b>	Rumohr lot	Failed	Very strong currents.	Calm wind, strong current
<b>SA13-ST4-23CTD</b>	CTD	OK	For details see list of CTD casts	Calm wind, strong current
<b>SA13-ST4-24CTD</b>	CTD	OK	For details see list of CTD casts	Calm wind, strong current
<b>SA13-ST5-25R</b>	Rumohr lot	Failed	Top valve failed to release	Calm, medium strong current
<b>SA13-ST5-26R</b>	Rumohr lot	Failed	Additional led weight was put on the cable to make the top valve close	Calm, medium strong current
<b>SA13-ST5-27R</b>	Rumohr lot	Failed	Mud seen on the outside of the core all the way up to the core top (led), i.e. >1 m	Calm, medium strong current
<b>SA13-ST5-28CTD</b>	CTD	OK	For details see list of CTD casts; Iceberg turned over right next to the station while the CTD was decending. This was after the CTD had passed the relevant depth	Calm, medium strong current
<b>SA13-ST5-29CTD</b>	CTD	OK	For details see list of CTD casts. Only short cast to check if the iceberg had influence the results of SA13-ST5-28CTD	Calm, medium strong current
<b>SA13-ST5-30G</b>	Gravity	OK	7 sections. Very fine light gray mud/clay. Probably intact surface.	Calm, medium strong current
<b>SA13-ST5-31G</b>	Gravity	OK	7 sections. Very fine light gray mud/clay. Top ca 70 cm may be slightly distrubed. This core has been used for geomicrobiology.	Calm, medium strong current

Date	Area	Station	Hydrographical monitoring station no.	Core name	Latitude (N)	Longitude (W)	Water depth (m)	Core Length (cm)
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-32R</b>	64°29.0882'	50°42.2266	389,5	98,5
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-33R</b>	64°29.0110'	50°42.2318	373,3	182
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-34R</b>	64°28.9163'	50°42.3219	344,8	181
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-35R</b>	64°29.1406'	50°42.4669	411,6	83
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-36R</b>	64°29.0765'	50°42.5532	398,7	96
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-37R</b>	64°29.0461'	50°42.5604	391,1	90,5
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-38R</b>	64°29.1391'	50°42.3719	406,2	-
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-39R</b>	64°29.1288'	50°42.3716	403	83
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-40G</b>	64°29.0604'	50°42.3240	389	562

Core name	Coring device	Succeeded/ Failed	Remarks	Weather
SA13-ST6-32R	Rumohr lot	Surface may be lost	Core overshoot and no water was left on the surface --> surface may have been lost.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-33R	Rumohr lot	OK	Water on top = intact surface. Upper 2.5 cm of the sediment is reddish brown, below the sediment is olive gray with heavy bioturbation down to 76 cm. Manganese horizon at 44 cm.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-34R	Rumohr lot	OK	Water on top = intact surface. Upper 2-4 cm of the sediment is reddish brown, below the sediment is olive gray with heavy bioturbation down to 66 cm. Manganese horizon at 66 cm.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-35R	Rumohr lot	OK	1-m tube; Reddish-brown surface at top 2-3 cm, below olive gray bioturbated mud. Used for geomicrobiology.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-36R	Rumohr lot	OK	Water on top = intact surface. Top = reddish brown, below the sediment is olive gray with heavy bioturbation down to 46 cm. For Geoscience.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-37R	Rumohr lot	OK	Water on top = intact surface. Top 1-2 cm of reddish brown sediment, below the sediment is olive gray with heavy bioturbation down to 43 cm.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-38R	Rumohr lot	Failed	Tube empty, sediment was flushed out while bringing it on board	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-39R	Rumohr lot	OK	1-m tube; water on top = intact surface; top 2 cm reddish brown sediment.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-40G	Gravity	OK	Full penetration; sediment all to the plate.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.

Date	Area	Station	Hydrographical monitoring station no.	Core name	Latitude (N)	Longitude (W)	Water depth (m)	Core Length (cm)
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-41CTD</b>	64°29.214'	50°42.331	450	-
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 6		<b>SA13-ST6-42G</b>	64°28.9248'	50°42.4486	348,5	571
August 14, 2013 (Wednesday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-43CTD</b>	64°36.573'	50°57.68	530	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-44CTD</b>	64°41.68'	50°21.424	340	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-45R</b>	64°40.7498	50°17.4609	475,8	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-46R</b>	64°40.7413	50°17.4899	475,8	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-47G</b>	64°40.7078	50°17.4672	475,8	569
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-48CTD</b>	64°40.675	50°17.447	465	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-49R</b>	64°40.6230	50°17.0147	470	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-50R</b>	64°40.5765	50°16.8461	468,9	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-51R</b>	64°40.6536	50°17.4042	472,4	-
August 14, 2013 (Wednesday)	In front of the glacier	Station 8	GF13	<b>SA13-ST8-52R</b>	64°40.5659	50°17.3319	468,9	-
August 15, 2013 (Thursday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-53R</b>	64°36.4932	50°57.6022	577,5	-



Core name	Coring device	Succeeded/ Failed	Remarks	Weather
SA13-ST6-41CTD	CTD	OK	For details see list of CTD casts	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST6-42G	Gravity	OK	Worm tupe at the top - the surface may be near-intact. Lower ca 10 cm sediment in the core was caught in the core catcher and during opening of the core it was pushed into the core liner.	Cloudy, calm, ship was very steady; sun come out during the day. Only relatively week currents.
SA13-ST7-43CTD	CTD	OK	For details see list of CTD casts	Clam, cloudy
SA13-ST8-44CTD	CTD	OK	For details see list of CTD casts	Clam, cloudy, MANY icebergs
SA13-ST8-45R	Rumohr lot	Failed	Sediment flushed out right as it reached deck. Sediment seemed light gray, finegrained, water filled. Weather: calm, heavy fog, many icebergs	Clam, cloudy, MANY icebergs
SA13-ST8-46R	Rumohr lot	Failed	Sediment flushed out right as it reached deck. Sediment seemed light gray, finegrained, water filled. Weather: calm, heavy fog, many icebergs	Clam, cloudy, MANY icebergs
SA13-ST8-47G	Gravity	OK	Sediment light gray, finegrained	Clam, cloudy, MANY icebergs
SA13-ST8-48CTD	CTD	OK	For details see list of CTD casts	Clam, cloudy, MANY icebergs
SA13-ST8-49R	Rumohr lot	Failed	Sediment flushed out (2-m core, 2 x lead)	Clam, cloudy, MANY icebergs
SA13-ST8-50R	Rumohr lot	Failed	the corer did not close (2-m tube, no lead)	Clam, cloudy, MANY icebergs
SA13-ST8-51R	Rumohr lot	Failed	Jerry-rigged with a plate of wood to stop it from overpenetrating. Did not release.	Clam, cloudy, MANY icebergs
SA13-ST8-52R	Rumohr lot	Failed		Clam, cloudy, MANY icebergs
SA13-ST7-53R	Rumohr lot	Failed	Return to Station 7; Sediment flushed out (1-m core). Sediment: very fine mud with small drop-stones.	Clam, cloudy

Date	Area	Station	Hydrographical monitoring station no.	Core name	Latitude (N)	Longitude (W)	Water depth (m)	Core Length (cm)
August 15, 2013 (Thursday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-54R</b>	64°36.5493	50°57.5055	577,5	-
August 15, 2013 (Thursday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-55R</b>	64°36.6050	50°57.3924	577,5	-
August 15, 2013 (Thursday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-56R</b>	64°36.6370	50°57.2780	575,8	-
August 15, 2013 (Thursday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-57CTD</b>	64°36.65	50°57.17	576	-
August 15, 2013 (Thursday)	Godthåbsfjord	Station 7	GF10	<b>SA13-ST7-58G</b>	64°36.6989	50°56.9117	575,8	-
August 16, 2013 (Friday)	Godthåbsfjord	Station 9		<b>SA13-ST9-59R</b>	64°19.3106	50°16.3892	417	137
August 16, 2013 (Friday)	Godthåbsfjord	Station 9		<b>SA13-ST9-60R</b>	64°19.3446	50°16.4082	415,9	95
August 16, 2013 (Friday)	Godthåbsfjord	Station 9		<b>SA13-ST9-61R</b>	64°19.3741	50°16.4888	414,8	-
August 16, 2013 (Friday)	Godthåbsfjord	Station 9		<b>SA13-ST9-62R</b>	64°19.3831	50°16.5015	414,8	-
August 16, 2013 (Friday)	Godthåbsfjord	Station 9		<b>SA13-ST9-63R</b>	64°19.3975	50°16.5029	413,7	96
August 16, 2013 (Friday)	Godthåbsfjord	Station 9		<b>SA13-ST9-64G</b>	64°19.4360	51°16.4756	413,7	592
August 16, 2013 (Friday)	Godthåbsfjord	Station 10		<b>SA13-ST9-65CTD</b>	64°19.4208	51°16.4818	413	-

Core name	Coring device	Succeeded/ Failed	Remarks	Weather
SA13-ST7-54R	Rumohr lot	Failed	Sediment flushed out (1-m core)	Clam, cloudy
SA13-ST7-55R	Rumohr lot	Failed	Sediment flushed out	Clam, cloudy
SA13-ST7-56R	Rumohr lot	Failed	Sediment flushed out just before the core was brought on board	Clam, cloudy
SA13-ST7-57CTD	CTD	OK		Clam, cloudy
SA13-ST7-58G	Gravity	Failed	Just a little sediment caught in the core catcher and a few cm sediment above. Seems to consist of mixed surface sediments. The sediment consists of fine clay and drop stones. The core must have started filling than hitting stones. The sediments are sampled for surface studies of diatoms, dinocysts and foraminifera.	Clam, cloudy
SA13-ST9-59R	Rumohr lot	OK	Sediment: Olivegray mud, surface layer of 2-3 cm was disturbed during coring. Below OK. Dark manganese layer at 3 cm depth, some bioturbation.	Beautiful, calm with a slight morning fog, low clouds, very calm sea.
SA13-ST9-60R	Rumohr lot	OK		Beautiful, calm with a slight morning fog, low clouds, very calm sea.
SA13-ST9-61R	Rumohr lot	Failed	Valve never closed	Beautiful, calm with a slight morning fog, low clouds, very calm sea.
SA13-ST9-62R	Rumohr lot	Failed		Beautiful, calm with a slight morning fog, low clouds, very calm sea.
SA13-ST9-63R	Rumohr lot	OK		Beautiful, calm with a slight morning fog, low clouds, very calm sea.
SA13-ST9-64G	Gravity	OK	Core catcher contained 13 cm of undisturbed sediment. This core catcher sediment was placed into the bottom of the core yet undisturbed. Sea grass leaf found at the bottom of the core catcher sediment. A shell fragment was found 4 cm above the bottom in the core catcher sediment. Upper few cm of the cores and thus the surface was lost, but a dark manganese horizon is seen.	Beautiful, calm with a slight morning fog, low clouds, very calm sea.
SA13-ST9-65CTD	CTD	OK	For details see list of CTD casts	Beautiful, calm with a slight morning fog, low clouds, very calm sea.