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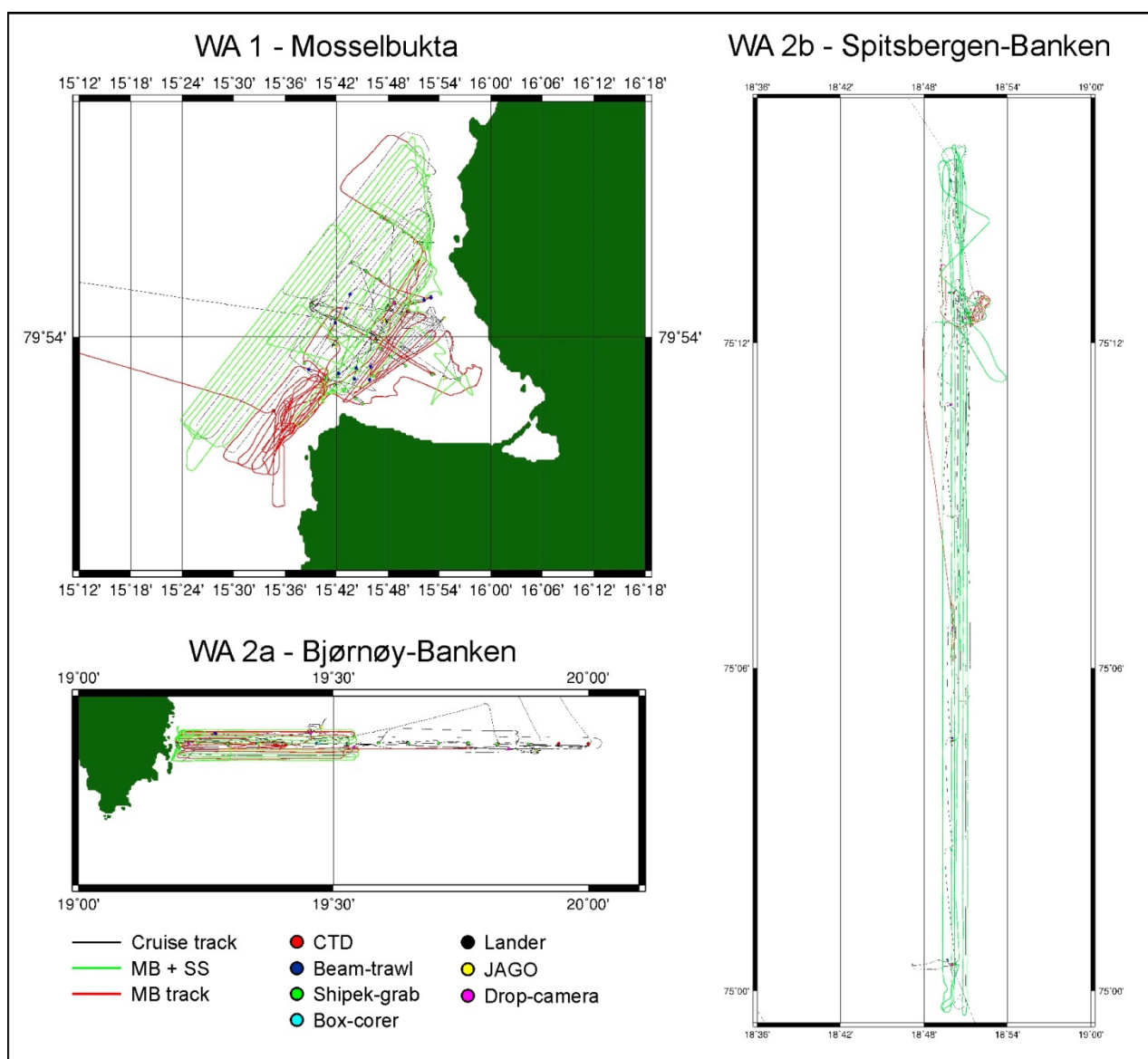
Short Cruise Report Maria S. MERIAN / MSM55

Reykjavik (Iceland) – Longyearbyen (Svalbard)

11.06. – 29.06.2016

Chief Scientist: Max Wisshak

Captain: Ralf Schmidt



Objectives

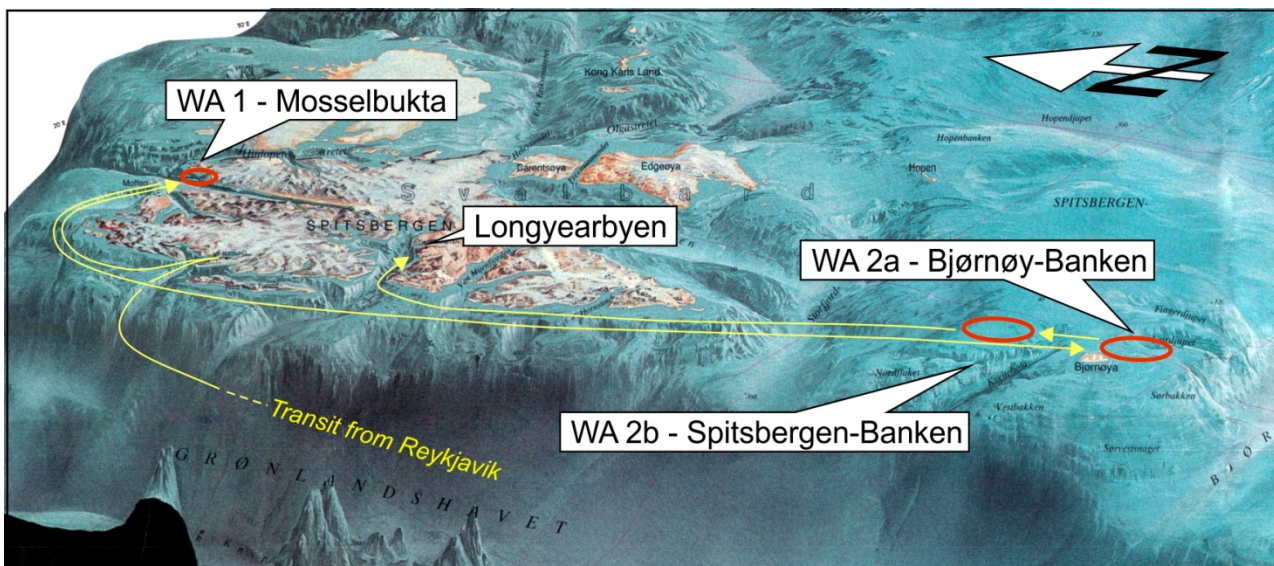
Biogenic carbonate production by benthic skeletal organisms on the shelf and in coastal waters of the arctic Svalbard Archipelago supports the northernmost cold-water carbonate factories known to date. However, their genesis and biosedimentary dynamics, and their sensitivity to environmental change, are still poorly known. Main objective of the MSM 55 was a multi-disciplinary characterisation and comparison of two contrasting working areas – the rhodolith beds in Mosselbukta in the far North of the archipelago, and the extensive biogenic carbonate sediments accumulating on the Spitsbergen- and Bjørnøy-Banken in the South. The main scientific goals and applied methods comprised:

- #1: GIS-based habitat mapping along bathymetrical transects (multibeam bathymetry, sidescan-sonar, video-transects with submersible and/or drop-camera)
- #2: Epibenthos assessment of calcifiers and associated fauna (beam-trawls, video-transects with submersible and/or drop-camera)
- #3: Recording short-term fluctuations in environmental parameters and the dynamics of the benthic community (lander deployments)
- #4: Carbonate facies analysis of source and export areas (Shipek-grabs, video-transects with submersible and/or drop-camera)
- #5: Carbonate system characterisation of the water column (CTD + water sampler, submersible water samples, lander deployments)
- #6: Evaluation of carbonate cycling, including budgeting calcification versus bioerosion (recovery of 10-year settlement experiment)
- #7: Quantification of global change impact on the calcareous rhodophyte *Lithothamnion* (on-board acidification and temperature-stress experiments)
- #8: Application of the calcareous rhodophyte *Clathromorphum* as geochemical archive for past sea-ice cover (targeted sampling with submersible)

This combination of objectives and methods was applied, as far as feasible, in both working areas, allowing for a detailed comparative study of the two contrasting types of polar carbonate factories. The anticipated results are expected to foster our knowledge on carbonate production and re-cycling in polar carbonate factories under Holocene and projected environmental change.

Narrative

The cruise started in Reykjavik, Iceland, in the afternoon of June 11th, 2016 with one and a half days of delay, due to urgent repair of the A-Frame. With accelerated cruise speed and taking advantage of the unusually calm sea, this delay could partly be compensated already during the transit to Svalbard, where MARIA. S. MERIAN arrived in Kongsfjorden in the morning of June 15th. During a brief stop at Ny-Ålesund, the obligatory polar bear defence equipment for the planned excursions to shore was handed over by the AWIPEV station leader. MERIAN commenced transit to our first working area. On board an interdisciplinary team of scientists/technicians from SENCKENBERG am Meer in Wilhelmshaven, the GEOMAR in Kiel, complemented by selected experts from other institutions, and rounded up by a journalist team of the GEO Magazine.



Cruise track and locations of the working areas of the MSM55 in the Svalbard archipelago

Mosselbukta, located in the outer Wijdefjorden, near the northern tip of Svalbard's main island Spitsbergen, was reached in the evening of June 15th, where station work was initiated with a CTD, for acquiring a sound velocity profile, and subsequent multi-beam survey throughout the night. Following two CTDs with bottom and surface water sampling at two fixed stations, June 16th saw two dives with submersible JAGO and was chiefly dedicated to sampling *Lithothamnion glaciale* rhodoliths for the planned on-board experiments, and for scouting the anticipated deployment site for the Senckenberg lander. The latter was successfully deployed in close to 50 m water depth right in a rhodolith bed, in order to record high-resolution CTD plus PAR plus pH time series and seafloor images over the course of the following 6 days. The daily routine also included biological sampling (2 m beam-trawl) and geological sampling (Shipek-grab; box-coring turned out to be not feasible), whereas multibeam combined with sidescan-sonar surveys were carried out during night time. A very similar rhythm than during this first day of station work was followed throughout most of the cruise. Several of the JAGO dives during the following two days were dedicated to the relocation and recovery of three settlement platforms, deployed in 11, 46, and 127 m water depth during our 2006 MSM 2/3 cruise. While the deeper two of these platforms were successfully recovered, the shallowest platform has to be considered lost, either due to storms or piling ice drift. Further JAGO dives had the goal to capture video transects along bathymetrical gradients, alongside sampling of specific calcareous benthos organisms, with a priority on sessile balanids and on the crustose red algae *Clathromorphum compactum*. Even though wind picked up later during the first week of station work (max. 9 Bf), thus complicating or spoiling some of the planned JAGO missions, we were able to complete our biological sampling program with beam trawls in

25 m depth intervals, as well as the geological sampling program comprising 4 transects with Shipek-grabs in 25 m intervals. Two excursions to shore complemented this sampling program by including the inter- to supra-tidal zones. Station work in Mosselbukta was rounded up by the recovery of the lander, paving the road for a combined mid-term and summer-solstice party in the night of June 21st, while MERIAN began transit to our second working area in the far south of the archipelago.

Bear Island appeared on the horizon in the early morning of June 23rd, where station work commenced along the first out of two bathymetrical transects – from the rocky shores near Bear Island's southern tip due east to about 100 m of water depth. This profile was anticipated to cross the polar front, which was clearly confirmed by a profile with several CTD logs. Following a first JAGO dive, the lander was redeployed, again in about 50 m water depth. During the following JAGO video-transect dives we learned that even with accurate tide tables at hand, current velocities and directions on the Bjørnøy- and Spitsbergen-Banken are both hard to predict and near safety limits for JAGO. For this reason, our backup system, a classical drop-camera, was employed for about half of the planned video-transect work. By June 26th, the biological/geological sampling program, including one excursion to shore, was completed, the lander was successfully recovered, and multibeam plus sidescan-sonar surveys were complete, allowing transit to our last objective – a bathymetrical transect from the shallowest spots on the central Spitsbergen-Banken due south towards the Kveitehola channel. Supported by the prevailing surreal calm sea-conditions, and despite the harsh current regime, we were able to successfully complete the shallower half of this transect (18 to 60 m water depth) in our approved sample strategy combined with CTD profiles and numerous video-transects, before the port of call was calling.

Transit to Longyearbyen (Svalbard) was smooth, packing and container logistics worked out in time, and the shipboard party disembarked by work boat shuttles in the night of June 29th for catching the flight back via Oslo to our various destinations.

Acknowledgements

We are indebted to captain *Ralf Schmidt and the entire crew of M. S. MERIAN* for their superb support and great hospitality – the foundation for making this cruise a scientific success. MERIAN proved to be the ideal platform for our scientific objectives. We acknowledge the support and the research permits issued by *The Norwegian Petroleum Directorate* (Ref #: OD 15/1045-/HeHa), *The Directorate of Fisheries* (Ref #: 15/14719) and the *Norwegian National Joint Headquarters*, and we thank the *Deutsche Botschaft Oslo* for the help in acquiring those permits. We thank *Briese Research*, the *Senatskommission für Ozeanographie*, and the *Leitstelle Deutsche Forschungsschiffe* for their support. Funding was provided by the *Deutsche Forschungsgemeinschaft* and we additionally benefited from financial contributions by *GEOMAR* and *SENCKENBERG*, the two principle research institutions involved. We are grateful to *Neptune* and *Poseidon* for the very favourable sea and weather conditions – highly appreciated!

Cruise Participants

1. Dr. Max Wisshak	chief scientist	SNG
2. Dr. Achim Wehrmann	carbonate facies analysis	SNG
3. Dr. Hermann Neumann	epibenthos assessment	SNG
4. Neele Meyer	bioerosion analysis	SNG
5. Dr. Alexander Bartholomä	hydro-acoustic habitat mapping	SNG
6. Dr. Peter Holler	hydro-acoustic habitat mapping	SNG
7. Maik Wilsenack	technician	SNG
8. Dr. Armin Form	on-board OA experiments	GEOMAR
9. Janina Büscher	on-board OA experiments	GEOMAR
10. Dr. Steffen Hetzinger	sclerochronology	GEOMAR
11. Kerstin Nachtigall	technician	GEOMAR
12. Karen Hißmann	JAGO management	GEOMAR
13. Jürgen Schauer	JAGO pilot	GEOMAR
14. Peter Striewski	JAGO technician	GEOMAR
15. Dr. Jacek Raddatz	oceanography, geochemistry	IFG
16. Dr. Sebastian Teichert	molecular biology	GZN
17. Dr. Jochen Halfar	sclerochronology	CPS
18. Dr. Andres Rüggeberg	oceanography	UNI FR
19. Bart van Heugten	malacology	NBC
20. Viola Kiel	journalist	GEO Magazin
21. Solvin Zankl	photographer	GEO Magazin

SNG - SENCKENBERG am Meer, Wilhelmshaven, Germany

GEOMAR – GEOMAR Helmholtz Zentrum für Ozeanforschung, Kiel, Germany

IFG - Institut für Geowissenschaften, Goethe-Universität, Frankfurt, Germany

GZN - GeoZentrum Nordbayern, Universität Erlangen-Nürnberg, Erlangen, Germany

UNI FR - Department of Geosciences, University of Fribourg, Switzerland

CPS - Department of Chemical & Physical Sciences, University of Toronto, Canada

NBC - Naturalis Biodiversity Center, Leiden, The Netherlands



MSM55 Station List

Date	Site	Station	Gear	Station				Start Survey / Bottom Contact				End Survey / Off Bottom			
				Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*
15.6.	Mosselbukta	412-1	CTD	79°52.49'N	15°34.67'E	22:38	69.2								
15.6.	Mosselbukta	412-1	MB	79°50.62'N	15°35.92'E	23:28	25.5	79°50.62'N	15°35.92'E	23:28	25.5	79°57.38'N	15°52.58'E	04:29	42.4
16.6.	Mosselbukta	413-1	MB+SS	79°58.08'N	15°49.37'E	04:56	124.2	79°57.75'N	15°47.94'E	05:06	139.3	79°55.44'N	15°37.69'E	05:58	138.1
16.6.	Mosselbukta	414-1	CTD	79°54.67'N	15°39.02'E	06:20	156.5								
16.6.	Mosselbukta	415-1	CTD+P	79°53.92'N	15°46.50'E	07:04	48.9								
16.6.	Mosselbukta	415-2	CTD	79°53.92'N	15°46.52'E	07:30	48.7								
16.6.	Mosselbukta	416-1	JAGO	79°54.69'N	15°48.74'E	09:05	46.6	79°54.69'N	15°48.61'E	09:19	49.2	79°54.79'N	15°48.67'E	11:47	49.2
16.6.	Mosselbukta	417-1	LA	79°54.69'N	15°48.72'E	12:37	46.7								
16.6.	Mosselbukta	418-1	BT	79°53.25'N	15°42.23'E	13:15	105.0	79°53.56'N	15°42.76'E	13:28	102.7	79°53.62'N	15°42.87'E	13:32	101.8
16.6.	Mosselbukta	419-1	JAGO	79°54.70'N	15°48.97'E	14:51	47.0	79°54.70'N	15°48.85'E	14:56	48.4	79°54.65'N	15°47.38'E	17:32	51.4
16.6.	Mosselbukta	420-1	SG	79°54.66'N	15°39.07'E	18:31	158.8								
16.6.	Mosselbukta	421-1	SG	79°54.39'N	15°41.69'E	19:03	149.6								
16.6.	Mosselbukta	421-2	SG	79°54.39'N	15°41.70'E	19:20	149.5								
16.6.	Mosselbukta	422-1	SG	79°54.33'N	15°42.44'E	19:41	128.5								
16.6.	Mosselbukta	422-2	SG	79°54.33'N	15°42.44'E	19:54	128.2								
16.6.	Mosselbukta	423-1	SG	79°54.24'N	15°43.26'E	20:14	100.4								
16.6.	Mosselbukta	423-2	SG	79°54.24'N	15°43.26'E	20:26	100.3								
16.6.	Mosselbukta	423-3	SG	79°54.24'N	15°43.26'E	20:37	100.2								
16.6.	Mosselbukta	424-1	SG	79°54.02'N	15°45.45'E	20:59	76.5								
16.6.	Mosselbukta	425-1	SG	79°53.91'N	15°46.48'E	21:14	42.9								
16.6.	Mosselbukta	425-2	SG	79°53.91'N	15°46.48'E	21:22	48.6								
16.6.	Mosselbukta	426-1	SG	79°53.23'N	15°53.13'E	21:56	23.9								
16.6.	Mosselbukta	426-2	SG	79°53.23'N	15°53.13'E	21:59	25.1								
16.6.	Mosselbukta	426-3	SG	79°53.23'N	15°53.13'E	22:02	25.3								
16.6.	Mosselbukta	427-1	MB	79°53.23'N	15°53.16'E	22:06	25.2	79°53.23'N	15°53.16'E	22:06	25.2	79°54.29'N	15°46.34'E	01:37	70.5
17.6.	Mosselbukta	428-1	MB+SS	79°53.95'N	15°44.32'E	01:53	82.7	79°54.02'N	15°44.63'E	01:54	82.3	79°56.40'N	15°52.89'E	06:58	21.5
17.6.	Mosselbukta	429-1	CTD	79°54.69'N	15°39.06'E	07:34	160.3								
17.6.	Mosselbukta	430-1	JAGO	79°53.80'N	15°41.90'E	08:33	109.4	79°53.86'N	15°41.74'E	08:38	119.0	79°53.93'N	15°41.65'E	10:52	127.6
17.6.	Mosselbukta	431-1	BT	79°53.33'N	15°38.75'E	11:40	141.8	79°53.92'N	15°40.65'E	12:01	152.4	79°54.00'N	15°40.92'E	12:06	153.9
17.6.	Mosselbukta	432-1	CTD+P	79°53.91'N	15°46.47'E	12:45	48.8								
17.6.	Mosselbukta	433-1	JAGO	79°54.36'N	15°47.46'E	14:19	48.8	79°54.33'N	15°47.82'E	14:24	47.0	79°54.34'N	15°47.81'E	18:06	46.2
17.6.	Mosselbukta	434-1	SG	79°55.54'N	15°43.81'E	18:41	162.1								
17.6.	Mosselbukta	435-1	SG	79°55.35'N	15°45.39'E	19:05	106.6								
17.6.	Mosselbukta	435-2	SG	79°55.35'N	15°45.41'E	19:16	106.3								
17.6.	Mosselbukta	436-1	SG	79°55.32'N	15°45.57'E	19:37	99.9								
17.6.	Mosselbukta	437-1	EX	79°54.80'N	15°52.73'E	20:10	26.6	79°54.44'N	15°58.95'E	20:31	0.0				
17.6.	Mosselbukta	437-2	EX					79°53.33'N	16°02.95'E	21:59	0.0	79°53.65'N	15°54.52'E	23:27	22.8
17.6.	Mosselbukta	438-1	MB	79°54.80'N	15°52.73'E	21:05	26.9	79°54.80'N	15°52.73'E	21:05	26.9	79°52.19'N	15°37.79'E	00:22	42.3

				Station				Start Survey / Bottom Contact				End Survey / Off Bottom			
Date	Site	Station	Gear	Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*
18.6.	Mosselbukta	439-1	MB+SS	79°52.51'N	15°37.89'E	00:28	59.9	79°52.51'N	15°37.89'E	00:28	59.9	79°54.38'N	15°39.97'E	05:44	167.5
18.6.	Mosselbukta	440-1	CTD	79°54.68'N	15°39.05'E	06:03	160.0								
18.6.	Mosselbukta	441-1	CTD	79°53.93'N	15°46.54'E	06:41	49.7								
18.6.	Mosselbukta	442-1	JAGO	79°54.38'N	15°54.59'E	08:41	12.7	79°54.41'N	15°54.85'E	08:45	11.0	79°54.39'N	15°54.71'E	12:02	12.3
18.6.	Mosselbukta	443-1	BT	79°53.12'N	15°45.85'E	12:47	47.3	79°53.22'N	15°45.88'E	12:51	46.5	79°53.29'N	15°45.92'E	12:55	44.9
18.6.	Mosselbukta	443-2	BT	79°53.39'N	15°45.99'E	13:17	43.5	79°53.44'N	15°46.02'E	13:19	45.3	79°53.51'N	15°46.07'E	13:23	49.3
18.6.	Mosselbukta	444-1	SG	79°55.18'N	15°46.96'E	13:50	71.9								
18.6.	Mosselbukta	445-1	SG	79°54.84'N	15°49.85'E	14:06	50.7								
18.6.	Mosselbukta	445-2	SG	79°54.84'N	15°49.85'E	14:17	50.7								
18.6.	Mosselbukta	446-1	SG	79°54.69'N	15°51.12'E	14:22	24.5								
18.6.	Mosselbukta	446-2	SG	79°54.69'N	15°51.12'E	14:30	24.5								
18.6.	Mosselbukta	447-1	JAGO	79°55.95'N	15°51.11'E	15:09	59.6	79°55.94'N	15°51.47'E	15:08	50.4	79°55.90'N	15°53.86'E	18:27	13.5
18.6.	Mosselbukta	448-1	SG	79°55.82'N	15°52.67'E	19:02	26.1								
18.6.	Mosselbukta	449-1	SG	79°55.93'N	15°51.66'E	19:20	44.2								
18.6.	Mosselbukta	449-2	SG	79°55.93'N	15°51.66'E	19:25	44.4								
18.6.	Mosselbukta	450-1	SG	79°56.15'N	15°49.85'E	19:46	76.2								
18.6.	Mosselbukta	450-2	SG	79°56.15'N	15°49.87'E	19:54	76.3								
18.6.	Mosselbukta	451-1	EX	79°52.63'N	15°40.39'E	20:50	25.4	79°52.29'N	15°41.57'E	20:58	0.0				
18.6.	Mosselbukta	451-2	EX					79°52.02'N	15°58.70'E	22:30	3.0				
18.6.	Mosselbukta	451-3	EX					79°51.98'N	16°00.40'E	23:09	0.0	79°53.16'N	15°46.31'E	00:00	31.9
18.6.	Mosselbukta	452-1	MB+SS	79°54.63'N	15°41.14'E	21:45	157.6	79°54.63'N	15°41.14'E	21:45	157.6	79°57.20'N	15°51.01'E	06:39	76.3
19.6.	Mosselbukta	453-1	CTD	79°54.67'N	15°39.11'E	07:10	159.6								
19.6.	Mosselbukta	454-1	CTD	79°53.91'N	15°46.56'E	07:53	48.3								
19.6.	Mosselbukta	455-1	JAGO	79°54.31'N	15°47.63'E	08:34	49.3	79°54.34'N	15°48.25'E	08:39	41.5	79°54.35'N	15°47.87'E	09:45	45.0
19.6.	Mosselbukta	456-1	BT	79°53.14'N	15°44.08'E	10:33	73.6	79°53.25'N	15°44.17'E	10:38	78.5	79°53.31'N	15°44.26'E	10:42	77.8
19.6.	Mosselbukta	456-2	BT	79°53.36'N	15°44.29'E	11:02	78.2	79°53.48'N	15°44.40'E	11:07	76.5	79°53.55'N	15°44.47'E	11:11	76.5
19.6.	Mosselbukta	457-1	SG	79°53.76'N	15°47.10'E	11:36	40.5								
19.6.	Mosselbukta	457-2	SG	79°53.76'N	15°47.11'E	11:41	40.6								
19.6.	Mosselbukta	458-1	SG	79°53.60'N	15°48.30'E	21:02	37.5								
19.6.	Mosselbukta	459-1	SG	79°53.41'N	15°50.06'E	12:30	40.3								
19.6.	Mosselbukta	460-1	JAGO	79°54.59'N	15°44.76'E	13:14	96.2	79°54.58'N	15°45.20'E	13:18	80.9	79°54.54'N	15°48.41'E	18:17	40.0
19.6.	Mosselbukta	460-2	ROV	79°54.57'N	15°48.37'E	15:26	36.5	79°54.57'N	15°48.37'E	15:35	35.1	79°54.57'N	15°48.38'E	17:55	35.2
19.6.	Mosselbukta	461-1	SG	79°56.35'N	15°48.10'E	18:54	98.1								
19.6.	Mosselbukta	462-1	SG	79°56.44'N	15°47.24'E	19:21	122.7								
19.6.	Mosselbukta	462-2	SG	79°56.44'N	15°47.24'E	13:32	122.8								
19.6.	Mosselbukta	462-3	SG	79°56.44'N	15°47.24'E	19:43	123.0								
19.6.	Mosselbukta	462-4	SG	79°56.59'N	15°46.01'E	20:32	146.7								
19.6.	Mosselbukta	463-1	FRB+SS	79°55.82'N	15°52.24'E	20:12	37.8	79°56.17'N	15°54.50'E	21:23	15.0	79°55.85'N	15°52.79'E	00:10	47.0
19.6.	Mosselbukta	464-1	MB +SS	79°57.88'N	15°50.01'E	21:59	108.7	79°57.59'N	15°48.76'E	22:04	129.4	79°53.44'N	15°35.80'E	06:48	116.0

				Station				Start Survey / Bottom Contact				End Survey / Off Bottom			
Date	Site	Station	Gear	Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*
20.6.	Mosselbukta	465-1	CTD	79°54.69'N	15°39.06'E	07:03	160.2								
20.6.	Mosselbukta	466-1	CTD	79°53.94'N	15°46.55'E	07:39	49.9								
20.6.	Mosselbukta	467-1	JAGO	79°53.15'N	15°54.64'E	09:38	29.8	79°53.22'N	15°54.29'E	09:41	24.6	79°53.15'N	15°56.56'E	12:14	22.5
20.6.	Mosselbukta	468-1	BT	79°54.80'N	15°53.01'E	13:20	25.5	79°54.78'N	15°52.65'E	13:23	28.1	79°54.76'N	15°52.32'E	13:27	26.5
20.6.	Mosselbukta	468-2	BT	79°54.75'N	15°52.21'E	13:44	25.0	79°54.75'N	15°52.21'E	13:44	25.0	79°54.72'N	15°51.81'E	13:48	24.6
20.6.	Mosselbukta	469-1	SG	79°52.63'N	15°45.03'E	15:53	19.5								
20.6.	Mosselbukta	470-1	SG	79°52.73'N	15°44.22'E	16:10	46.7								
20.6.	Mosselbukta	471-1	SG	79°52.89'N	15°42.90'E	16:26	75.0								
20.6.	Mosselbukta	471-2	SG	79°52.89'N	15°42.90'E	16:33	74.9								
20.6.	Mosselbukta	472-1	SG	79°53.01'N	15°41.76'E	16:47	101.1								
20.6.	Mosselbukta	472-2	SG	79°53.01'N	15°41.76'E	16:55	100.9								
20.6.	Mosselbukta	473-1	SG	79°53.16'N	15°40.60'E	17:10	111.1								
20.6.	Mosselbukta	473-2	SG	79°53.16'N	15°40.60'E	17:00	111.4								
20.6.	Mosselbukta	474-1	SG	79°53.46'N	15°38.25'E	17:41	148.0								
20.6.	Mosselbukta	474-2	SG	79°53.46'N	15°38.25'E	17:51	147.9								
20.6.	Mosselbukta	475-1	BT	79°54.29'N	15°41.84'E	18:33	148.5	79°54.12'N	15°41.28'E	18:41	148.0	79°54.09'N	15°41.17'E	18:43	149.0
20.6.	Mosselbukta	476-1	MB	79°53.97'N	15°40.92'E	19:10	149.1	79°53.97'N	15°40.92'E	19:10	149.1	79°54.44'N	15°49.67'E	06:48	25.7
21.6.	Mosselbukta	477-1	CTD	79°54.68'N	15°39.10'E	07:06	159.4								
21.6.	Mosselbukta	478-1	CTD	79°53.91'N	15°46.49'E	07:40	48.7								
21.6.	Mosselbukta	479-1	JAGO	79°54.69'N	15°48.52'E	09:10	50.4	79°54.59'N	15°48.92'E	09:13	39.7	79°54.67'N	15°48.68'E	14:23	46.4
21.6.	Mosselbukta	479-2	DC+LA	79°54.69'N	15°48.68'E	15:24	48.7	79°54.69'N	15°48.70'E	15:47	42.0	79°54.69'N	15°48.70'E	15:54	42.1
21.6.	Mosselbukta	480-1	BT	79°54.87'N	15°43.58'E	16:32	121.4	79°54.72'N	15°43.33'E	16:38	117.2	79°54.66'N	15°43.21'E	16:42	116.9
21.6.	Mosselbukta	480-2	BT	79°54.58'N	15°43.08'E	16:54	122.0	79°54.44'N	15°42.83'E	17:00	119.5	79°54.39'N	15°42.75'E	17:03	119.5
23.6.	Bjørnøy-Banken	481-1	CTD	74°22.49'N	20°00.02'E	05:10	104.9								
23.6.	Bjørnøy-Banken	482-1	CTD	74°22.48'N	19°45.85'E	07:25	87.0								
23.6.	Bjørnøy-Banken	483-1	CTD	74°22.47'N	19°31.70'E	08:07	59.8								
23.6.	Bjørnøy-Banken	484-1	JAGO	74°23.09'N	19°28.69'E	09:21	53.2	74°22.98'N	19°28.35'E	09:24	51.1	74°22.88'N	19°27.58'E	11:26	45.3
23.6.	Bjørnøy-Banken	485-1	LA	74°22.85'N	19°27.35'E	11:54	41.5								
23.6.	Bjørnøy-Banken	486-1	CTD	74°22.51'N	19°17.64'E	12:45	42.2								
23.6.	Bjørnøy-Banken	487-1	CTD	74°22.52'N	19°11.57'E	13:17	21.6								
23.6.	Bjørnøy-Banken	488-1	SG	74°22.49'N	19°28.21'E	14:07	50.6								
23.6.	Bjørnøy-Banken	488-2	BC	74°22.50'N	19°28.30'E	14:19	50.2								
23.6.	Bjørnøy-Banken	488-3	BT	74°22.50'N	19°28.07'E	14:37	49.5	74°22.50'N	19°27.80'E	14:40	49.2	74°22.50'N	19°27.62'E	14:43	50.0
23.6.	Bjørnøy-Banken	489-1	JAGO	74°22.50'N	19°21.40'E	15:43	44.4	74°22.62'N	19°21.42'E	15:45	43.8	74°22.47'N	19°23.99'E	18:36	43.5
23.6.	Bjørnøy-Banken	490-1	SG	74°22.48'N	19°24.65'E	19:09	43.7								
23.6.	Bjørnøy-Banken	491-1	SG	74°22.49'N	19°21.11'E	19:27	41.9								
23.6.	Bjørnøy-Banken	491-2	BT	74°22.50'N	19°21.04'E	19:41	42.0	74°22.49'N	19°20.76'E	19:44	42.6	74°22.49'N	19°20.63'E	19:46	42.2
23.6.	Bjørnøy-Banken	492-1	SG	74°22.48'N	19°17.57'E	20:07	41.4								
23.6.	Bjørnøy-Banken	493-1	MB	74°21.97'N	19°17.35'E	20:30	42.0	74°21.97'N	19°17.35'E	20:30	42.0	74°21.95'N	19°12.97'E	22:01	35.2
23.6.	Bjørnøy-Banken	493-2	MB+SS	74°21.95'N	19°12.97'E	22:01	39.9	74°21.97'N	19°14.07'E	22:07	39.9	74°22.39'N	19°12.28'E	08:27	31.7

				Station				Start Survey / Bottom Contact				End Survey / Off Bottom			
Date	Site	Station	Gear	Latitude	Longitude	Time (UTC)	Depth (m)*	Latitude	Longitude	Time (UTC)	Depth (m)*	Latitude	Longitude	Time (UTC)	Depth (m)*
24.6.	Bjørnøy-Banken	494-1	DC	74°22.50'N	19°12.98'E	08:50	34.7	74°22.50'N	19°12.86'E	08:55	33.0	74°21.97'N	19°12.23'E	12:06	30.0
24.6.	Bjørnøy-Banken	495-1	SG	74°22.51'N	19°14.09'E	12:28	38.6								
24.6.	Bjørnøy-Banken	496-1	SG	74°22.51'N	19°14.08'E	12:38	38.3								
24.6.	Bjørnøy-Banken	496-2	SG	74°22.49'N	19°11.58'E	13:04	20.8								
24.6.	Bjørnøy-Banken	497-1	BT	74°22.82'N	19°16.11'E	13:32	39.2	74°22.81'N	19°15.96'E	13:34	39.0	74°22.81'N	19°15.80'E	13:37	39.0
24.6.	Bjørnøy-Banken	498-1	SG	74°22.49'N	19°31.76'E	14:24	59.7								
24.6.	Bjørnøy-Banken	499-1	BT	74°22.49'N	19°31.64'E	14:37	59.2	74°22.49'N	19°31.28'E	14:41	57.8	74°22.49'N	19°31.04'E	14:45	56.8
24.6.	Bjørnøy-Banken	500-1	JAGO	74°22.45'N	19°12.05'E	16:05	28.0	74°22.33'N	19°12.27'E	16:09	33.0	74°22.27'N	19°12.38'E	16:21	33.0
24.6.	Bjørnøy-Banken	501-1	SG	74°22.48'N	19°11.57'E	17:01	21.1								
24.6.	Bjørnøy-Banken	502-1	SG	74°22.46'N	19°11.56'E	17:13	23.3								
24.6.	Bjørnøy-Banken	502-2	SG	74°22.46'N	19°11.56'E	17:17	23.4								
24.6.	Bjørnøy-Banken	502-3	SG	74°22.46'N	19°11.56'E	17:45	23.5								
24.6.	Bjørnøy-Banken	502-4	SG	74°22.46'N	19°11.56'E	17:59	23.5								
24.6.	Bjørnøy-Banken	502-5	SG	74°22.46'N	19°11.56'E	18:15	23.1								
24.6.	Bjørnøy-Banken	503-1	SG	74°22.44'N	19°11.64'E	18:48	22.7								
24.6.	Bjørnøy-Banken	504-1	SG	74°22.42'N	19°11.69'E	18:59	20.8								
24.6.	Bjørnøy-Banken	505-1	SG	74°22.39'N	19°11.74'E	19:09	22.1								
24.6.	Bjørnøy-Banken	506-1	SG	74°22.37'N	19°11.79'E	19:16	21.7								
24.6.	Bjørnøy-Banken	506-2	SG	74°22.37'N	19°11.79'E	19:21	21.3								
24.6.	Bjørnøy-Banken	507-1	EX	74°22.44'N	19°11.64'E	20:07	22.9	74°22.47'N	19°09.92'E	20:18	0.0				
24.6.	Bjørnøy-Banken	507-2	EX					74°23.25'N	19°10.33'E	21:19	0.0	74°22.01'N	19°11.05'E	23:27	21.4
24.6.	Bjørnøy-Banken	508-1	MB	74°22.88'N	19°12.16'E	20:26	26.9	74°22.88'N	19°12.16'E	20:26	26.9	74°22.25'N	19°11.96'E	01:10	30.2
24.6.	Bjørnøy-Banken	509-1	MB+SS	74°22.10'N	19°12.70'E	01:16	33.7	74°22.10'N	19°13.43'E	01:20	37.9	74°22.33'N	19°41.14'E	5.33	75.1
25.6.	Bjørnøy-Banken	510-1	CTD	74°22.47'N	20°00.03'E	06:11	106.0								
25.6.	Bjørnøy-Banken	511-1	CTD	74°22.49'N	19°56.52'E	06:37	100.0								
25.6.	Bjørnøy-Banken	512-1	CTD	74°22.48'N	19°52.98'E	07:30	96.0								
25.6.	Bjørnøy-Banken	513-1	CTD	74°22.48'N	19°49.41'E	07:30	89.3								
25.6.	Bjørnøy-Banken	514-1	CTD	74°22.49'N	19°45.86'E	07:57	87.0								
25.6.	Bjørnøy-Banken	515-1	DC	74°22.32'N	19°50.66'E	08:33	88.3	74°22.32'N	19°50.66'E	08:33	88.3	74°22.54'N	19°51.71'E	10:23	80.6
25.6.	Bjørnøy-Banken	516-1	JAGO	74°22.54'N	19°51.71'E	10:40	82.5	74°22.50'N	19°51.55'E	10:44	82.8	74°22.77'N	19°51.54'E	12:45	80.8
25.6.	Bjørnøy-Banken	517-1	SG	74°22.51'N	19°35.31'E	13:45	69.8								
25.6.	Bjørnøy-Banken	518-1	SG	74°22.50'N	19°38.84'E	14:08	82.5								
25.6.	Bjørnøy-Banken	518-2	BT	74°22.51'N	19°38.77'E	14:20	83.1	74°22.50'N	19°38.20'E	14:26	83.0	74°22.50'N	19°38.06'E	14:28	79.9
25.6.	Bjørnøy-Banken	519-1	SG	74°22.50'N	19°42.37'E	14:53	79.1								
25.6.	Bjørnøy-Banken	520-1	SG	74°22.51'N	19°45.90'E	15:14	88.5								
25.6.	Bjørnøy-Banken	520-2	BT	74°22.52'N	19°45.88'E	15:25	88.3	74°22.51'N	19°45.26'E	15:32	86.4	74°22.51'N	19°45.07'E	15:35	85.9
25.6.	Bjørnøy-Banken	521-1	DC	74°22.38'N	19°32.43'E	16:13	61.5	74°22.38'N	19°32.43'E	16:13	61.5	74°22.38'N	19°32.45'E	17:03	60.9
25.6.	Bjørnøy-Banken	522-1	JAGO	74°22.27'N	19°53.89'E	18:27	102.0	74°22.19'N	19°54.55'E	18:29	99.2	74°22.23'N	19°53.37'E	20:30	93.0
25.6.	Bjørnøy-Banken	523-1	SG	74°22.48'N	19°52.98'E	21:00	95.5								
25.6.	Bjørnøy-Banken	524-1	SG	74°22.47'N	19°49.23'E	21:24	88.8								
25.6.	Bjørnøy-Banken	525-1	DC+LA	74°22.84'N	19°27.31'E	22:58	52.7	74°22.84'N	19°27.31'E	22:58	46.2	74°22.85'N	19°27.37'E	00:29	42.0

Date	Site	Station	Gear	Station				Start Survey / Bottom Contact				End Survey / Off Bottom			
				Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*	Latitude	Longitude	Time (UTC)	Depth [m]*
26.6.	Bjørnøy-Banken	526-1	MB	74°22.62'N	19°27.34'E	01:00	48.4	74°22.62'N	19°27.34'E	01:00	48.4	74°22.21'N	19°52.68'E	05:59	97.2
26.6.	Spitsbergen-Banken	527-1	DC	75°00.49'N	18°49.96'E	10:19	56.1	75°00.49'N	18°50.07'E	10:49	55.3	75°00.50'N	18°50.04'E	10:50	55.1
26.6.	Spitsbergen-Banken	528-1	JAGO	75°00.50'N	18°50.03'E	11:10	58.3	75°00.45'N	18°49.72'E	11:14	56.6	75°00.41'N	18°47.17'E	12:48	56.8
26.6.	Spitsbergen-Banken	529-1	CTD	75°00.50'N	18°49.99'E	13:28	56.7								
26.6.	Spitsbergen-Banken	529-2	SG	75°00.56'N	18°49.71'E	13:41	56.5								
26.6.	Spitsbergen-Banken	529-3	BT	75°00.58'N	18°49.68'E	14:01	56.8	75°00.46'N	18°49.86'E	14:06	56.2	75°00.41'N	18°49.92'E	14:09	56.8
26.6.	Spitsbergen-Banken	530-1	SG	75°00.49'N	18°50.28'E	14:23	56.1								
26.6.	Spitsbergen-Banken	531-1	SG	75°02.62'N	18°49.96'E	14:50	50.8								
26.6.	Spitsbergen-Banken	531-2	BT	75°04.70'N	18°50.03'E	15:21	44.1	75°04.62'N	18°50.05'E	15:24	44.3	75°04.60'N	18°50.04'E	15:25	44.4
26.6.	Spitsbergen-Banken	532-1	SG	75°06.74'N	18°50.06'E	16:01	31.2								
26.6.	Spitsbergen-Banken	532-2	DC	75°06.70'N	18°50.01'E	16:18	31.1	75°06.70'N	18°50.01'E	16:24	31.4	75°07.21'N	18°49.98'E	17:34	38.2
26.6.	Spitsbergen-Banken	532-3	DC	75°06.74'N	18°50.08'E	17:56	30.9	75°06.74'N	18°50.04'E	18:02	31.0	75°06.14'N	18°50.13'E	19:22	40.9
26.6.	Spitsbergen-Banken	533-1	MB	75°06.13'N	18°50.04'E	19:29	41.1	75°06.13'N	18°50.04'E	19:29	41.1	75°14.73'N	18°49.75'E	22:19	25.6
26.6.	Spitsbergen-Banken	534-1	MB+SS	75°14.69'N	18°49.70'E	22:20	25.2	75°14.69'N	18°49.70'E	22:20	25.2	75°12.20'N	18°51.03'E	07:56	28.7
27.6.	Spitsbergen-Banken	535-1	DC	75°12.31'N	18°51.36'E	08:30	22.6	75°12.31'N	18°51.36'E	08:30	22.6	75°12.45'N	18°51.32'E	09:13	19.2
27.6.	Spitsbergen-Banken	536-1	JAGO	75°12.53'N	18°51.11'E	09:53	22.0	75°12.47'N	18°51.09'E	10:00	21.8	75°12.40'N	18°50.91'E	10:17	25.0
27.6.	Spitsbergen-Banken	537-1	DC	75°12.46'N	18°50.97'E	10:53	21.7	75°12.46'N	18°50.97'E	10:53	21.7	75°12.48'N	18°52.15'E	11:44	21.7
27.6.	Spitsbergen-Banken	538-1	SG	75°15.00'N	18°49.88'E	12:18	22.2								
27.6.	Spitsbergen-Banken	538-2	SG	75°14.99'N	18°49.85'E	12:22	22.1								
27.6.	Spitsbergen-Banken	538-3	BT	75°14.98'N	18°49.94'E	12:33	22.4	75°14.97'N	18°50.04'E	12:34	22.3	75°14.96'N	18°50.24'E	12:37	22.4
27.6.	Spitsbergen-Banken	539-1	SG	75°12.93'N	18°49.89'E	13:09	23.0								
27.6.	Spitsbergen-Banken	540-1	SG	75°12.93'N	18°49.81'E	13:11	23.0								
27.6.	Spitsbergen-Banken	540-2	BT	75°10.86'N	18°49.90'E	13:47	33.9	75°10.79'N	18°50.16'E	13:51	34.2	75°10.76'N	18°50.25'E	13:53	34.4
27.6.	Spitsbergen-Banken	541-1	SG	75°08.79'N	18°50.02'E	14:24	38.1								
27.6.	Spitsbergen-Banken	542-1	DC	75°10.87'N	18°49.98'E	14:58	34.0	75°10.87'N	18°49.98'E	14:58	34.0	75°11.38'N	18°49.06'E	16:33	29.9
27.6.	Spitsbergen-Banken	543-1	CTD	75°12.93'N	18°50.13'E	17:21	23.2								
27.6.	Spitsbergen-Banken	544-1	CTD	75°08.79'N	18°50.07'E	18:07	38.7								
27.6.	Spitsbergen-Banken	545-1	CTD	75°04.65'N	18°50.07'E	18:50	44.3								
27.6.	Spitsbergen-Banken	546-1	CTD	75°00.48'N	18°50.05'E	19:33	56.7								
27.6.	Spitsbergen-Banken	547-1	MB+SS	75°00.03'N	18°49.66'E	20:14	56.4	75°00.29'N	18°49.36'E	20:22	56.1	75°12.93'N	18°51.91'E	07:27	23.0
28.6.	Spitsbergen-Banken	548-1	DC	75°12.93'N	18°51.91'E	07:28	22.9	75°12.60'N	18°51.95'E	08:20	21.9	75°12.60'N	18°51.95'E	08:21	22.1
28.6.	Spitsbergen-Banken	549-1	DC	75°13.43'N	18°49.25'E	08:55	20.7	75°12.71'N	18°49.39'E	10:36	25.5	75°12.71'N	18°49.39'E	10:36	25.5
28.6.	Spitsbergen-Banken	550-1	MB	75°12,71'N	18°49,39'E	10:37	25.2	75°12,71'N	18°49,39'E	10:37	25.2	75°15.18'N	18°50.18'E	13:58	16.7

* = all depths given as absolute depth below sea level

Abbreviations:

MB = EM1002 Multibeam-Echosounder
P = Bottom-water Pump
DC = Drop-Camera
BT = Beam-Trawl

SS = Sidescan-Sonar
JAGO = Submersible JAGO
SG = Shipek-Grab
LA = Camera-Lander

CTD = CTD with rosette sampler and PAR profiler
ROV = Camera-ROV
BC = Box Corer
EX = Excursion to Shore