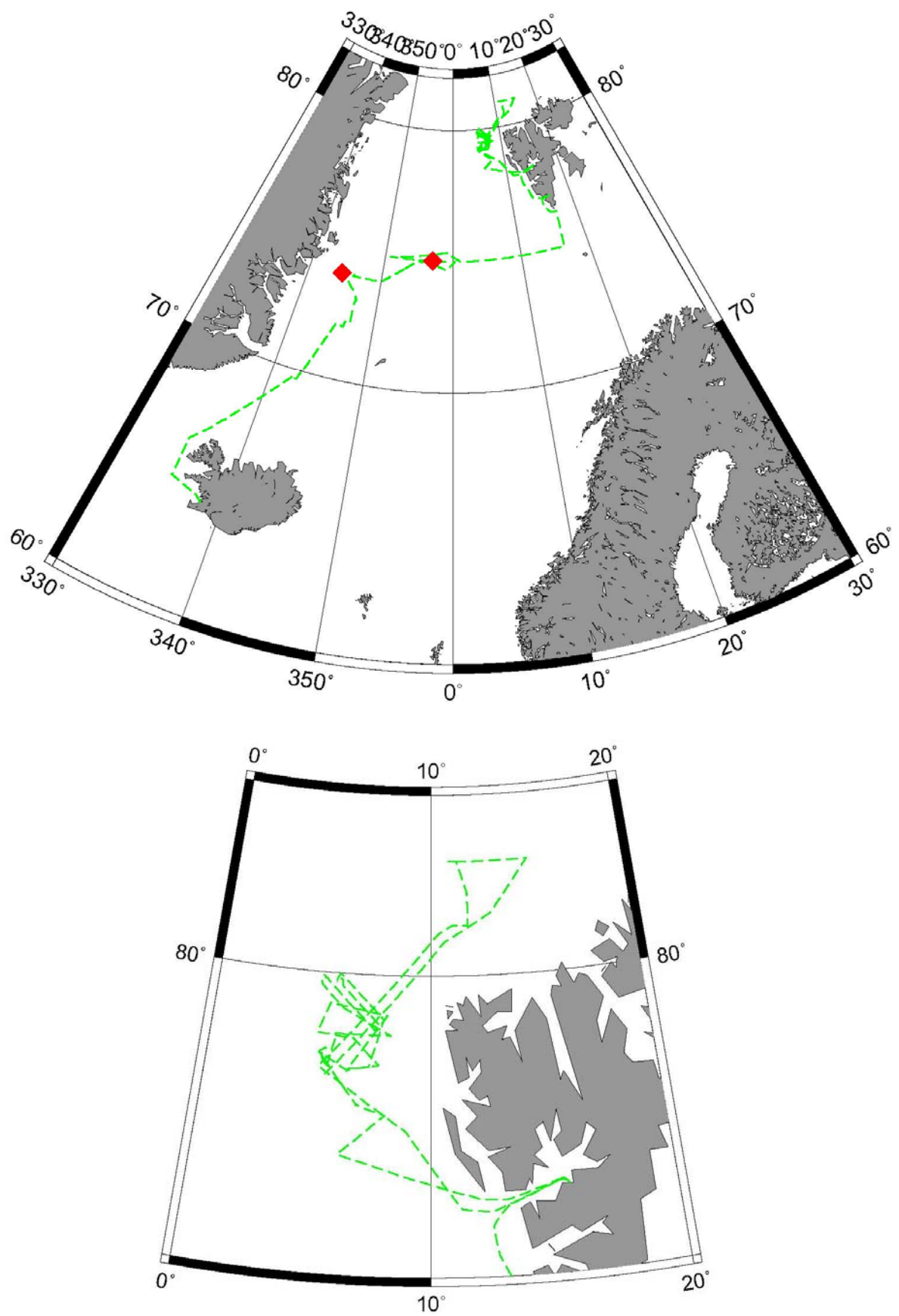


Gereon Budéus
Alfred-Wegener-Institut
Gebäude D
Am alten Hafen 26
D-27568 Bremerhaven

Tel.: 0471/48311702
Fax: 0471/48311149
email: gbudeus@awi-bremerhaven.de

Short Cruise Report
RV MARIA S. MERIAN Cruise MSM05/5

Reykjavik - Longyearbyen
July, 18th - August, 10th 2007
Chief Scientist: Gereon Budéus
Captain: Klaus Bergmann



Cruise track and mooring sites (red diamonds) a) total, b) marine geology part in detail

Objectives

The cruise leg MSM 05/05 consisted of three scientific programmes: An oceanographic programme in the Greenland Sea Gyre (G. Budéus, Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, Germany), an oceanographic programme in the East Greenland Current (D. Quadfasel, Centre for Marine and Atmospheric Sciences of the University of Hamburg, Germany), and a marine geological one (R. Spielhagen, Leibniz Institute of Marine Sciences at the University of Kiel) at the Yermak-Plateau. Scientists and students from the Geofysisk Institutt, University of Bergen, Norway; the Universitat Autònoma de Barcelona, Spain; the University of Tromsø, Norway; the Norsk Polarinstitut, Tromsø, Norway; the Scottish Association for Marine Science, Oban, United Kingdom also participated in the cruise as well as a french photographer and a german teacher of the IPY programme.

The measurements mainly contributed to the following projects

- Long term variability of the hydrographic structure, convection and transports in the Greenland Sea (LOTEVA-GS, IPY)
- Sonderforschungsbereiche 512 „Tiefdruckgebiete und Klimasystem des Nordatlantiks“
- Arctic Gateways, high latitude thermohaline circulation, sediment transport pathways and ice sheet dynamics (SEDARC, IPY)
- Holocene Variability in the Arctic Gateway (HOVAG, DFG)

The main objectives of the cruise were to

- exchange tube moorings in the East Greenland Sea
- perform a hydrographic/chemical transect across the Greenland Gyre
- exchange autonomously profiling deep sea moorings (EP/CC-Jojo) and install an autonomous underwater winch for near surface measurements (Sea-Elevator) in the Greenland Gyre
- deploy a Sea Glider for DAMOCLES in Fram Strait
- perform Parasound tracks on the Yermak Plateau
- carry out various sediment samplings in the eastern Fram Strait and on the Yermak Plateau

All work was carried out successfully without failures or losses with the exception of the Sea Glider deployment which was postponed.

Narrative

Embarkment was perfectly in time, but our departure was not. A delay of about eight hours had to be accepted because the luggage of six participants got stuck in Amsterdam and did not arrive at Reykjavik with the passengers. With only one flight per day from Amsterdam we were lucky to depart on the 18th of July with such a small delay.

First ice contact was encountered already at 4am during July, 20th at 70°N, somewhat east of Scoresby Sound, where the satellite images displayed no ice at all. This was a first warning that the attempt to enter the ice at 74°N might take more effort and time than originally expected. This was indeed the case. The recovery and redeployment of three moorings belonging to ZMAW Hamburg went well, nevertheless. The first of these moorings was exchanged on July, 21st and the last late on July, 22nd. All three were situated in dense pack ice with little space to move the ship (Foto O. Zenk). Patience was needed partially to wait for ice floes to drift off from the mooring's position or to surround large ice floes in the foggy conditions that were prevailing.

It became quickly evident that a second trip into the ice would consume too much time to be



feasible and consequently the trip's schedule was modified. Instead of moving to 75°N and start a hydrographic transect there, as was originally planned, the way out of the ice at 74°N was used to perform a CTDO₂ transect. Again, dense pack ice reduced the ship's speed effectively. At 10°W, now in open waters, we changed from the zonal eastern direction to a heading in the direction of the central Greenland Basin, where the autonomously profiling deep sea moorings (EP/CC-Jojos) of AWI were located.

We reached these moorings while performing the hydrographic/chemical transect on July, 26th and recovered and deployed three systems successfully without any loss or damage. Position accuracies are so exact nowadays, that the foggy conditions, which were combined to the low wind situation, did not hinder the work at all. A few moments after the acoustic release of the moorings, the top buoys appeared at the surface exactly at the expected positions where they had been moored with Maria S. Merian during the previous year. The update of the mooring winch to a speed of 1 m/s facilitated the mooring works greatly. The Sea-Elevator

system, as the last mooring to be handled, was deployed on July, 28th.

The zonal hydrographic/chemical transect was then continued along 75°N heading eastward. Finally, the sea showed us that it can be rough when we were sailing close to Bear Island. After two weeks of calm winds, wind force 8 and up to 9 in gales hit us during the last CTDO₂ stations on the large zonal transect at 75°N. The ship behaved well, and all stations could be done. Overall results are excellent. We finished the transect close to midnight on August, 1st.

On our way to Longyearbyen we planned to deploy the Sea Glider. Despite considerable efforts, it was not possible to deploy this instrument due to software and hardware problems. This was the first serious failure we experienced during our cruise. The performance control of this fish is done remotely via Iridium from Seattle, USA, and the search for failures was hindered by the slow and individual email transfers between the Seattle lab and Maria S. Merian. The glider was brought home and will be serviced on land.

Our 'touch down' at Longyearbyen on August, 3rd, necessary to exchange scientific personell, was scheduled to last only one or two hours, but took some more time as a diver had to inspect the propellers. This time was appreciated much by the new scientific crew members. The geologists had to put up their equipment under great time stress, as the sailing time to their investigation sites was extremely short. The small delay took off a bit of this stress. We had to deviate from our original plans which included sampling in regions, where 100% ice cover inhibited our visit of these areas. During the attempt to reach them, we certainly reached the northernmost point Maria S. Merian has approached up to now: We stayed only three miles south of 81°N. However, we gave up quickly and switched over to an alternative sampling scheme in the ice free waters north of Spitzbergen. Here, a variety of Parasound profiles was performed and sediment samples were taken using the gravity corer, giant box corer, and kastenlot. Disembarkation was on Friday, August, 10th in Longyearbyen.

Acknowledgements

We thank the captain, Klaus Bergmann, his officers, and the crew of Maria S. Merian for their excellent and friendly support of our field measurements. The ship time of Maria S. Merian was provided by the Deutsche Forschungsgemeinschaft (DFG) within the core programme METEROR/MERIAN. We also benefited from financial contributions by the involved research institutes. We gratefully acknowledge this indispensable support.