



MSM67 - SEGMENT

Structure and evolution of the NE Greenland continental margin in relation to the conjugate margin

(Reykjavik – Longyearbyen, 31.08.-04.10.2017)

Weekly report #4

RV Maria S. Merian departed from the harbor in Longyearbyen on Monday at 09:00. After a short transit, we arrived at the area of the KNIPAS experiment in the Norway-Greenland Sea by Tuesday Sep. 19th. Last year, the Alfred Wegener Institute had deployed ocean-bottom seismometers across the active Knipovich mid-oceanic ridge. The instruments are mainly intended to record earthquakes. However, to support the interpretation of the passive seismic data, an active seismic refraction experiment was planned in addition. For logistic reasons, the active part of the experiment was performed during cruise MSM67, while the instruments will be recovered during the next cruise with RV Maria S. Merian, MSM68. Initially this active part was planned for the end of cruise MSM67, on the way back to Longyearbyen. However, as the weather forecast for Greenland was not promising we started measurements already on Tuesday at 07:00. The five airgun-lines were completed by Wednesday evening and we sailed back to Greenland.

After another 1.5 days transit, a refraction seismic experiment on the Greenland shelf along previously acquired multichannel seismic line 202 was performed. Deployment of the 29 ocean-bottom seismometers of Geomar and GEUS/DanSeis started on Friday Sep 22nd early in the morning. The two teams nicely alternated and deployment was finished in short time. Already on Friday evening we prepared the airgun-system and measured the line until late Saturday Sep. 23rd. At the moment we are recovering the ocean-bottom seismometers.

The refraction seismic line runs along the shelf and thus in parallel to the continental margin. The line is intended to study the nature of the crust, but also the distribution of magmatic additions, predominantly in the lower crust. A distinct high-velocity lower crust as interpreted from ocean-bottom seismometers is an indication for such magmatic additions. In existing refraction seismic lines across the NE Greenland shelf, mainly from the Alfred Wegener Institute, considerable variations in the amount of lower crustal magmatic additions have been identified. With the new line, we want to study potential correlation between magmatism and large-scale structural discontinuities, as e.g. the Jan Mayen fracture zone. Further, we aim for a better understanding of the timing of magmatic, and volcanic phases. A number of authors have asked challenging questions about the timing, variability and origin of the atypical magmatic events that affected the Norwegian-Greenland Sea around breakup and from there on. We plan to contribute to this discussion and will also address the thermal evolution of the sedimentary basins on the NE Greenland shelf.

After finishing the refraction seismic line, we intend to acquire additional geophysical lines with multichannel seismics and magnetics during the last week in the study area.

On behalf of the 18 members of the scientific crew with kind regards from R/V MARIA S. MERIAN

Dieter Franke
Chief Scientist

First snow



Foto: Berenice Ebner