



MSM 30 CORIBAR

– *Ice dynamics and meltwater deposits: coring in the Kveithola trough* –

Western Barents Sea

Tromsø – Tromsø

July 15th – August 16th, 2013

4th Weekly Report – August 05th to 13th, 2013

During the final week of our cruise, we have deployed MeBo five times. The first two sites were located at two successive *grounding-zone wedges* (GWZ) inside the Kveithola Trough. Drilling depths were 35 and 40 m penetrating the 20-m thick glaci-marine surface unit and the underlying tills of the GWZs. Both operation had to be stopped when the drilling advance came to a standstill due to the stiffness of the tills. Nevertheless, a GWZ was at least successfully drilled by a scientific group for the first time. The material retrieved (though the core recovery was limited due to the fact that high-pressure drill-hole flushing was required) allows an inside into the formation processes behind such glacial bodies.

We deployed MeBo at two further stations at the Kveithola trough mouth fan (TMF). The target was the continuous succession of various types of TMF-characteristic deposits (hemipelagites, plumites, glacialic debrites, landslide deposits) allowing the reconstruction of the fan formation history and of the ice-sheet dynamics on longer time scales. Two drilling attempts had to be aborted due to technical failures. A third was located inside an erosional channel-like scar structure which we wanted to use as a geological window into much deeper, thus older strata (back into the Eemian times or older). After having inter-penetrated a 20-m thick debritic landslide unit which covers these old successions, the flush water fully drained away into the underlying, much softer hemipelagic deposits. The thick landslide material had, however, a rather sticky consistency and that the bore rods stucked.

A central aim of the cruise was to gain experience on drilling into highly over-consolidated glacialic deposits in an polar environment. We know now that these sediments are much more sticky and consolidated than expected. We have received samples from each of these various types of deposits, thus holding scientifically novel material in our hands.

In addition to these MeBo deployments, we sampled seabed sediments and took sediment cores at 11 stations during this week. The shallow-shelf areas north and south of the Kveithola Trough host small depression fills and various types of moraine deposits which we have drilled with a vibro corer, providing ground-truthing to our numerous PARASOUND lines across the area. We also have completed a depth transect from the trough's mouth down to the TMF's toe at 2,000 m water depth, collecting surface sediments for palaeoceanographic studies. We received two sediment cores, especially taken for the analysis of regional methane fluxes. Profiling surveys performed during the nights extended the bathymetric map of the study area significantly, in particu-



lar run along the trough's northern and southern margins, around the trough's mouth, and at the TMF's toe. Thus, we are able now to understand the sub-recent as well as ancient processes in detail which have and had control on sediment dispersal as well as on slope instability.

Summarizing this cruise (net 20 working days in the study area), we deployed MeBo at 9 sites (with various technical problems), took surface samples and sediment cores (total length of 167 m) at 34 stations, and run 1,500 km of bathymetric and subbottom profiles. We got highly valuable material from all types of deposits and a deep insight into the shallow subsurface architecture. All scientists on board are excited to start analysing this rich pool of materials. Glacigenic deposits remain a challenge in terms of coring or drilling.

The success of this cruise is obvious and documents the high motivation and full activity of everybody – with special respect to the frequent spontaneous contingency decisions which had to be made and which required a lot of flexibility for all parts on the vessel, the bridge, the decks crew, the technical crew, and the scientists as well. We deeply acknowledge this great experience of collaboration and support!!

Till Hanebuth

Chief Scientist

On return transit to Tromsø, August 13th, 2013

