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Weekly Report No. 1
16.10.2018 – 21.10.2018

Following the completion of installation of all equipment, we were able to leave Edinburgh harbour already in the afternoon of the 16th of October one day ahead of schedule. The main aim of this research cruise is to obtain sediment cores within and around the Scanner Pockmark, which is a seafloor crater. On board is a team of 20 scientists from Geomar, British Geological Survey (BGS), University of Southampton and the National Oceanographic Centre Southampton. This expedition is part of the EU funded research project STEMM-CCS, which aims to develop and test monitoring strategies for marine CO_2 storage operations. The Scanner Pockmark was formed by natural focused fluid expulsion and such structures are common in the North Sea. STEMM-CCS analyses if the presence of such structures is problematic for CO_2 storage operations. This research cruise is the third expedition to the Scanner Pockmark and complements previous geophysical experiments with sediment cores for sedimentological and geochemical analyses.

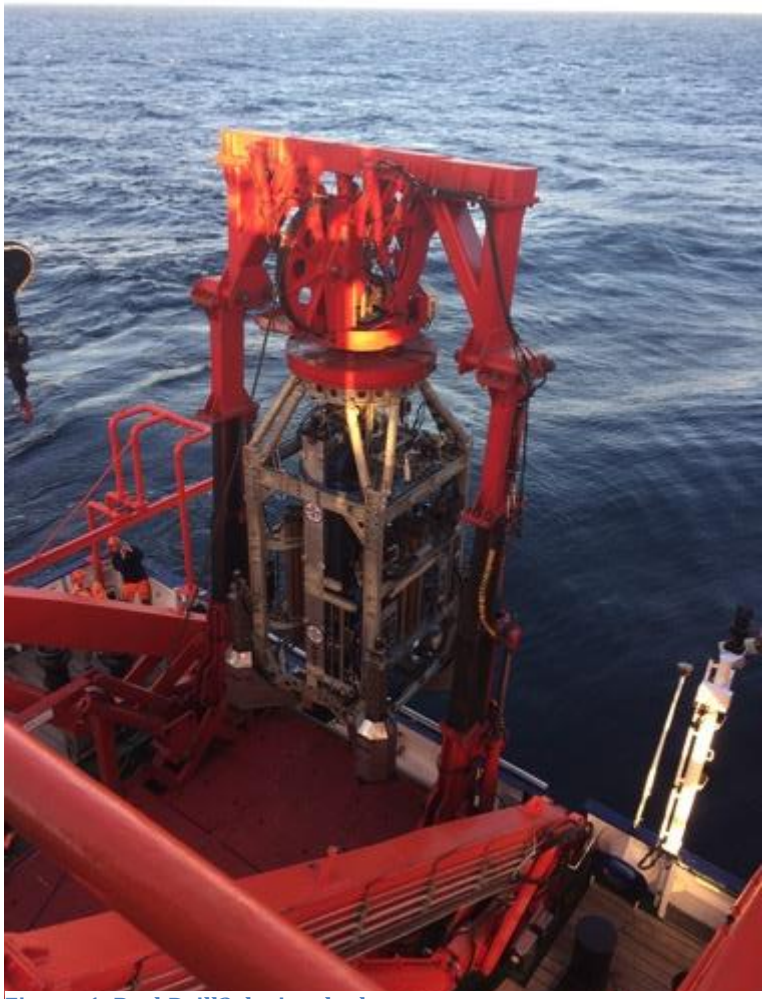

Figure 1: RockDrill2 during deployment

The cruise has two main study sites; one is the Scanner Pockmark itself and the other is a reference site outside the pockmark. The main coring tool is the RockDrill2 (Figure 1) by the BGS, which will be deployed on the seafloor and allows the remotely operated collection of sediment cores up to a length of 55 m. The borehole can additionally be analysed using various physical logging tools, which is highly valuable for cores with incomplete core recovery.

We started our scientific program in the early morning of the 17th of October with hydroacoustics surveys, which connected our working area with existing datasets. In the afternoon of the 17th, we deployed the RockDrill2 at the reference core location and obtained a sediment core with a length of 24 m. The core recovery was excellent within

mud-rich layers, but decreased to below 50% within glacial till layers. After recovering the core on the 18th, we immediately started with preparing the core and obtained pore water samples (Figure 2).

Figure 2: Pore water sampling of sediment core segments

On the 19th, we deployed RockDrill2 with slightly changed coring configuration within Pockmark for a 3,5 m test core. This core was again prepared and sampled after the RockDrill2 was recovered. The core recovery within the cored tills was satisfying and we deployed the RockDrill2 again within the Scanner Pockmark using the same coring configuration and an additional logging sensor. The drilled to a depth of 10 m and we recovered the core in the evening of the 20th. The core had an average core recovery of 50%, which can be attributed to layers with high sand content. The logging data will allow us to constrain the position of the sandy layers within the core more precisely. In the evening of the 20th, we deployed the RockDrill2 at the reference site to core till layers, which represents the reservoir controlling the formation of the Scanner Pockmark. These layers are located in a depth of 33 m. We had to stop drilling at a depth of 36 m and to recover the drill string due to technical problems. The recovery in the drilled segments was poor, but the samples are highly valuable for the understanding of the focused fluid conduit formation.

In the evening of the 21st, we recovered RockDrill2. At the moment, we don't expect to be able to deploy it again due to stronger winds and waves during the following days. We will continue our hydroacoustic surveys and obtain additional gravity cores within and around the Scanner Pockmark. Everybody on board is well and enjoying the cruise. The collaboration with the bridge and the crew is excellent.

In the name of the scientific team,
Jens Karstens