

Geological description of the DH-GAP04 borehole, Kangerlussuaq, Central West Greenland

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The *Greenland Analogue Project* (GAP) was initiated to understand the effects of glaciations on the thermal and hydrological behavior of crystalline rock during long-term disposal of nuclear waste for hundreds of thousands of years. To investigate the behavior of the crystalline rock within these circumstances a research borehole (DH-GAP04) was drilled to almost 650 m vertical depth, penetrating the permafrost and exposing the hydrology below the permafrost depth.

This study focuses on the geological observations made from the research borehole and its surroundings, which form the framework for the local hydrogeology. The borehole is drilled in a structural geologically complex location since it intersects a large shallowly plunging fold. The upper part of the borehole is located in the western part of the fold limb with parasitic folding while the borehole ends in the eastern fold limb. The fracturing and faulting within the borehole is also differing a lot both in terms of density and orientation. Moreover, the geology around the borehole is showing similar appearance with two larger lineaments exhibiting same orientations as the fracturing and faulting in the borehole. The final structural interpretation was of profound importance in understanding the hydrological variability observed in the research borehole.