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The seafloor geomorphology of the Kveithola trough, W Barents Sea

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The Kveithola trough is located on the Spitsbergen Bank, NW Barents Sea. This area is bordered to the north and south by the large troughs of Storfjorden and Bjørnøyrenna respectively. In this area the water masses are influenced by both warm Atlantic water and cold Polar water. The trough was surveyed using marine geophysical methods in July 2009. Multibeam swath bathymetry (approx. 1750 sq km) and sub-bottom profiler data were gathered simultaneously covering the whole trough. High resolution single channel seismic data was gathered along transects parallel (∼E-W) and transverse to the troughs long axis.
The multibeam data reveal a seafloor bathymetry dominated by striking parallel linear features (∼E-W oriented). The features appear best developed in the western part of Kveithola and become gradually less pronounced on the seabed further east. Three large transverse ridge forms are superimposed on the linear features in the trough. Sub-bottom profiler (CHIRP) data reveals that the linear features seen on the bathymetric data are inherited from a buried surface that has later been draped by younger sediments. The linear features are interpreted as bundle structures of mega scale glacial lineations. As such features are typically associated with fast ice flow the assumption is made that the palaeo-relief is of glacial origin and that an ice stream was operating in Kveithola at the time of its formation. The seismic data reveal that the large transverse ridge forms are composed of several seismic facies units. They appear to consist of loose sediments and are interpreted as composite morainal banks formed during ice stream readvance in the trough. In the innermost part of the Kveithola trough the palaeo-relief is obscured from view by overlying large sediment drift accumulations and the seabed has a much smoother appearance. Pockmarks are abundant and maximum pockmark density seems to coincide with maximum drift thickness.