

The Magnetization History of Sills from the Early Cretaceous Diabasodden Suite, Svalbard

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Abstract

Early Cretaceous sills constituting the Diabasodden Suite (DBS), crop out all over Svalbard, Arctic Canada and Franz Josef Land. They have also been identified offshore on seismic in sedimentary basins in the North Western Barents Sea. Recent dating of the sills using U-Pb and Ar-Ar methods suggest a magmatic event around 125 Ma. The magnetization history of the DBS is rather complex. Sills from eastern Svalbard carry Early Cretaceous paleopoles (reverse polarity).

Demagnetization and magneto mineralogical studies on a new suite of samples from central Svalbard reveal two well defined clusters of paleomagnetic directions. The paleopoles of these two clusters are interpreted to represent the 125 Ma event and a complete post Early Cretaceous overprint. Sills collected in or near the Billefjorden fault zone in central Svalbard carrying steep magnetization directions (reverse polarity), are suggested to represent a post Early Cretaceous magnetization overprint that may be related to fault activity prior to and during the Eocene West Spitsbergen Fold-and-Thrust Belt.

Steep magnetization directions (both polarities) are also found in sills outside the Billefjorden fault zone and in eastern Svalbard. Preliminary results from the Kong Karl Land lavas, also show steep magnetization directions. Published paleomagnetic results of the Devonian, Permian and Triassic sedimentary rocks of Svalbard reveal partial remagnetization.

Svalbard and the North Western Barents Sea have seen regional uplift in the late Cretaceous and flank uplift caused by the Paleocene-Early Eocene sea floor spreading. The entire Barents shelf was uplifted and eroded during Neogene time. The North Western Barents sea and Svalbard are characterized by high heat flow, young magmatism and a thin lithosphere.

It is discussed if the regional remagnetization found in magmatic and sedimentary rocks on central Svalbard was due to uplift, erosion and tectonics in the Late Cretaceous or in the Cenozoic.

Keywords: Paleomagnetism, remagnetization, Early Cretaceous, Svalbard.

