

On the origin of the marginal plateaus north of Svalbard and Greenland

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The marginal plateaus north of Svalbard and Greenland are conjugate features with respect to the Gakkel Ridge and likely to share a geologic history.

Dredge hauls from three sites on the Yermak Plateau have recovered an abundance of metasediments and gneisses with strong affinities to known lithologies from northwest Spitsbergen. The results support the earlier idea of the plateau being a continental outlier except for its northeasternmost tip. The outlier rifted off the margin north of Svalbard and was emplaced as part of the Greenland plate which implies significant Paleogene dextral shear motion close to the coast of Spitsbergen. Past coast-parallel shear is supported by observed seismic velocity anomalies in the crust characteristic of continental transform boundaries.

A seismic reflection transect across Morris Jesup Rise show an eastern flat-topped spur of undeformed west-dipping layers and a western dome-structure cored by deformed sediments, possibly an imbricate stack of thrust sheets. High amplitude rough seismic reflections interpreted as lava flows are present at depth in the 40 km wide depression between these two structures.

The shared geologic history of the marginal plateaus involve Yermak Plateau rifting off north of Svalbard at Chron 24 and the eastern Morris Jesup Spur rifting off the Yermak Plateau at about Chron 15. The Morris Jesup Spur is likely to represent the pre-Cenozoic continental slope north of Svalbard.