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A new plate kinematic model for the Paleogene motion of Greenland relative to North America

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A new simplified plate kinematic model for the Paleogene motion of Greenland relative to North America has been developed using spreading centers and transform faults interpreted from gravity data in Baffin Bay combined with data from Labrador Sea. The new model has been used to reinterpret published magnetic profiles in Baffin Bay revealing the location of the Paleocene spreading center and the extent of both Eocene and Paleocene oceanic crust in central Baffin Bay. In northern Baffin Bay, magnetic data identify a previously unknown fracture zone and gravity modeling suggests that Lancaster Sound is a failed rift-arm of the Eocene spreading system. In the Nares Strait, the new kinematic model shows 200km of NE sinistral motion of Greenland relative to Baffin Island in the Paleocene followed by 250km of NNW-oriented plate convergence during the Eocene. The definition of a new “Ellesmere-Plate”, that moved independently of both Greenland and North America during the Eocene, has been used to explain this motion within the known geological constraints in the region. In the Davis Strait, c. 100 km of NE-oriented Paleocene extension formed new sea-floor in western Davis Strait, followed by approximately 300km of sinistral strike-slip motion along the northward extension of the Ungava Fault. The refit shows that the Cape Dyer and Disko-Nuussuaq volcanics were in close proximity during eruption and there was a separate volcanic province farther south consisting of the Saglek Basin, Gjoa Rise and southern West Greenland volcanics.