



A new tectonic model for the Eocene opening of the Norwegian-Greenland Sea - simplified geology by using modern aeromagnetic data

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Geological Survey of Norway aeromagnetic data, acquired in the Norwegian Sea of the NE Atlantic, have been merged with reprocessed adjacent data sets. Reconstruction to Chron 22 (c. 47.7 Ma) of the Norwegian-Greenland Sea aeromagnetic data reveals a c. 50 km wide continuous anomaly "belt" extending obliquely from the East Greenland to the conjugate mid-Norway margin, i.e. crossing Chrons 24 b and a, Chron 23, as well as the spreading axis. This anomaly is interpreted to represent an igneous complex, here referred to as the Traill Ø-Vøring igneous complex. The central portion of the complex coincided with the East Jan Mayen Fracture Zone, suggesting that the fracture zone was a center of magmatic activity at an early stage of formation. On the Greenland margin the complex can be linked up with the NE-trending initial magmatic lineament (IML) extending between Traill Ø and Kangerlussuaq. The IML has been suggested to relate to a failed attempt of direct linkage between the Reykjanes and Mohns Ridges. Several sub-volcanic complexes on mainland Greenland form an integrated part of this igneous complex, including the magmatic complex near Kangerlussuaq. While various intrusions in East Greenland remain somewhat poorly dated, magmatic rocks in the Kangerlussuaq area are better constrained and are dominated by a c. 50 Ma event. The magnetic response to the Traill Ø - Vøring igneous complex has earlier been interpreted to represent spreading anomalies 24A and 24B along the Vøring margin. This interpretation in turn introduced the need to invoke an abandoned spreading ridge and the Gleipne Fracture Zone in this area. The new data reveal intense magmatic activity NE and SW of the East Jan Mayen Fracture Zone. In addition to the existence of the Traill Ø - Vøring igneous complex, the

new compilation strongly suggests that previously interpreted oceanic fracture zones (Gleipne, Surt, Bivrost, Jenegga and Vesterålen) do not exist; these were artefacts of poor navigation and wide line spacing of the vintage datasets. Consequently, opening of the Norwegian-Greenland Sea between the Jan Mayen and Senja-Greenland fracture zones occurred along a stable axis without offsets of the oceanic spreading anomalies or jumps in spreading axis. As the fracture zones do not exist, there can be no spatial relationship between transfer zones and fracture zones on the Lofoten margin, and nor on the NE Greenland margin where they have been projected.