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Syn-and post-breakup magmato-tectonic evolution of the mid-Norwegian margin

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The mid-Norwegian margin is probably one of the best examples worldwide of rifted volcanic margin and is often used as a case study for an end-member volcanic margin. In order to refine the structure and tectonic evolution of the margin, a new aeromagnetic survey (JAS-05) was acquired along the trend of the Jan Mayen Fracture Zone, to the west of the Vøring Marginal High. The difference between the new survey and old aeromagnetic data is significant and provides new insights in the geodynamic evolution of the Norwegian-Greenland Sea. The main faults, structure and magnetic anomalies have been re-interpreted using a systematic comparison between high-resolution bathymetry, gravity, magnetic patterns and seismic data. Magnetic chrons are now better identified, new anomalies have been detected and the fault pattern has been refined. Data and interpretation illustrate and document the post-breakup magmato-tectonic evolution of the margin. Anomalous melt production associated with the breakup of the mid-Norwegian margin is well known (SDRs, LCB); but surprisingly it continued episodically and significantly along the trend of the JMFZ, as suggested by local overcrusting processes. To explain this atypical tectono-magmatic process, we suggest a challenging geodynamic model. Plate reconstructions, show that a triple junction could have initiated during the breakup between the Vøring Marginal High and the Traill-igneous complex, a prominent magnetic anomaly, offshore Greenland. Mantle upwelling under the early spreading ridge and/or local stress reorganisation could have induced transtension and lithospheric thinning along the JMFZ. Magmatic activity could have increased locally along this "leaky transform". This early tectono-magmatic process can be compared to the Azores Plateau, which can be used as a

modern analogue to the early Norwegian spreading system initiated at C24B (54-53 Ma ago) or may be earlier as suggested by intriguing magnetic anomalies interpreted as C25 (?), south of the Jan Mayen Fracture Zone.