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## Rift propagation north of Iceland: A case of asymmetric plume - rift interaction?

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Drilling by the Ocean drilling Program (ODP Legs 104, 152, 163) and geophysical studies have inferred a widespread and strong influence by the Iceland plume on the structure of the ~2500 km long volcanic rifted margins that formed between East Greenland and NW Europe during continental breakup ~56-54 Ma. A persistent, but spatially much reduced impact by the plume on crustal structure is evident along the ~250 km Greenland-Iceland-Faeroe ridge (GIFR). Spreading south of the GIFR has remained comparatively stable along the Reykjanes Ridge (RR). By contrast, spreading between the GIFR and northwards to the Jan Mayen Fracture Zone (JMFZ) involved northward rift propagation (~50-25 Ma) away from the Iceland plume and into the East Greenland margin. This was paired with a northward retreat of the initial spreading axis (Aegir ridge (AER)) further to the east. Slivers of the East Greenland continental crust topped by continental plateau basalts extruded during initial breakup were torn off by this northward rift propagation, and form segments of the Jan Mayen microcontinent (JMMC). Rift propagation resulted in the formation of the Iceland Plateau (IP) underlain by anomalously thick and shallow oceanic crust. The striking asymmetry in plate kinematics and crustal structures south and north of Iceland seems associated with a less enriched mantle source feeding the spreading system north of Iceland. This suggests a potentially long-lived north-south asymmetry in the composition and dynamics of the plume that, if confirmed, will favor the existence of distinctly different mantle reservoirs rather than a mixing (entrainment) process followed by a compositional de-convolution process during decompression melting and melt distribution. IODP proposal 976-Pre will address these topics by investigating the temporal and compositional development of the crust of the IP, as well as the transition from rift propagation by the IP rift (IPR) into the present day Kolbeinsey ridge (KR). Drilling will sample 2-3 stages of four IPR propagation stages we have mapped, the transition from the IPR to KR spreading, rifting and timing of transpressive movements along the pseudo-transform zone that linked the propagating IPR to the retreating AER. One drill site hopefully will establish the stratigraphic relationship between the JMMC basalts and the East Greenland plateau basalts. Sediment cover at the drill sites will constrain subsidence history and the paleo-environmental evolution of the high-latitude north-east Atlantic and its connectivity to

the global ocean. The proposed drilling addresses long-standing ocean drilling themes of continental breakup, rift propagation, mantle plume reservoirs and structure, and north Atlantic paleoceanography.

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