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Overview of the Faroe Islands and Development of the Northwest Flank of the Faroe-Shetland Basin

Brian Bell¹, David Ellis², David Jolley³, Andrew Morton⁴ and Ragnar Poulsen²

¹Division of Earth Sciences, University of Glasgow, Gregory Building, Glasgow G12 8QQ, Scotland.

²Statoil (UK) Ltd, Statoil House, 11a Regent Street, London SW1Y 4ST, England.

³Department of Animal & Plant Sciences, University of Sheffield, Western Bank, Sheffield S10 2TN, England.

⁴HM Research Associates, 100 Main Street, Woodhouse Eaves, Loughborough, Leics LE12 8RZ, England.

The Faroe Islands consist of a thick sequence of lavas, together with minor pyroclastic and epiclastic volcanic deposits, which were erupted during the Paleogene in response to rifting, and which was ultimately to lead to sea floor spreading and the formation of new oceanic crust between the Faroe Islands and East Greenland. Thus the Faroes Block forms part of a rifted volcanic margin. These rifting events were a consequence of the same tensional stress field which was responsible for the Pre-Paleocene and early Paleocene sediment fill of the Faroe-Shetland Basin. At the beginning of the Paleocene (Danian, 63-65 Ma), a mantle plume impacted the base of the stretched continental lithosphere under Greenland. Initially the thinned crust was breached at a number of weak spots by upwelling magma, leading to surface volcanism and shallow level intrusions (central complexes, dyke swarms and sill complexes).

Prior to the late Paleocene major volcanism, the thermal buoyancy of the plume head caused significant uplift, possibly in the order of several hundred metres. Consequently, one of the earliest manifestations of the plume would have been erosion of considerable volumes of material, notably from over Greenland and its margins, and shed into adjacent basins (e.g. the Faroes-Shetland Basin).

Returning the Faroes Block to its pre-Anomaly 24r location (i.e. prior to ocean floor spreading ca 55 Ma, late Thanetian to early Ypresian), the close association of the Faroes volcanic rocks with the flood lava sequence of the Blossville Kyst of South East Greenland is evident. It is likely the separation was less than 100 km and possibly as little as 60 km. Thus, it is important to relate the pre-volcanic and volcanic stratigraphies of the two blocks, as we can now prove southeast Greenland area has provided much of the pre-volcanic detritus which filled the western flank of the Faroe-Shetland Basin.

The volcanic activity culminated with the eruption of the early Eocene Balder Tuff (s), a thick and extremely widespread sequence of basaltic volcanoclastic deposits formed at the time of plate separation and initiation of seafloor spreading. Thereafter, magmatism was restricted to the rift system and the Faroe-Shetland Basin underwent significant subsidence in the Eocene.