

# **EVOLUTION OF PALEOCENE SEDIMENT DISPERSAL SYSTEMS IN THE FOINAVEN SUB-BASIN, WEST OF SHETLAND**

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## **ABSTRACT**

Heavy mineral assemblages in deepwater Paleocene sandstones of the Foinaven Sub-basin (west of Shetland) reflect the influence of three main provenance and dispersal systems. The Schiehallion system has relatively uniform characteristics and persisted through much of the early-mid Paleocene. Its sphere of influence was centred on the Schiehallion Field, but it progressively encroached into the Foinaven area with time. Its main source was the Triassic Foula Formation, with minor supply from Lewisian and Moine basement rocks. The Foinaven system shows marked changes in character, related to evolution of the source area. The earliest sands were derived from a heavily weathered late Cretaceous regolith, and represent the onset of uplift and exhumation of the Shetland Platform. Progressive unroofing led to the incorporation of increasing amounts of Lewisian- and Moine-sourced detritus. Following deposition of the main reservoir sandstones in Foinaven and Schiehallion, there was a progressive change in provenance, with a gradual increase in the amount of sediment shed directly from metamorphic basement. Pulsing of the proto-Icelandic plume has been proposed as the mechanism for repeated influx of sand to the basins around Scotland. However, on the basis of available geochronological data, there does not appear to be a direct link between events in the British Tertiary Igneous Province (BTIP) and changes in provenance in the Foinaven Sub-Basin. The initial influx of sediment from a weathered land surface may have been coeval with the onset of magmatism in the BTIP, but the cessation of supply through the Foinaven system at c. 59 Ma does not appear to be related to magmatic events in the BTIP. The waning of magmatism in the BTIP around 58 Ma is broadly coincident with a gradual increase of first-cycle basement detritus.