

Insights into Cretaceous–Palaeogene sediment transport paths and basin evolution in the North Atlantic from a heavy mineral study of sandstones from southern East Greenland

Andrew G. Whitham¹, Andrew C. Morton² and C. Mark Fanning³

¹*CASP, Department of Earth Sciences, University of Cambridge, West Building, 181a Huntingdon Rd, Cambridge CB3 0DH, UK (e-mail: andy.whitham@caspcam.ac.uk)*

²*HM Research Associates, 100 Main Street, Woodhouse Eaves, Leicestershire LE12 8RZ, UK (e-mail: a.c.morton@heavyminerals.fsnet.co.uk) and Department of Geology and Petroleum Geology, University of Aberdeen, Kings College, Aberdeen AB24 3UE, UK*

³*Research School of Earth Sciences, The Australian National University, Canberra, ACT 0200, Australia*

ABSTRACT: Major changes in sandstone provenance occurred during the deposition of the Cretaceous–Eocene succession in Kangerlussuaq, southern East Greenland. These changes can be recognized on the basis of provenance sensitive heavy mineral parameters (apatite:tourmaline and rutile:zircon ratios and garnet geochemistry) and the SHRIMP U–Pb dating of detrital zircons. The results support the subdivision of the succession into three units separated by major unconformities spanning the Late Coniacian to Late Campanian and Late Maastrichtian to Early Eocene. Rifting during the deposition of the first unit (Aptian–Late Coniacian) led to rift flank uplift and resulted in the local sourcing of sediment. Thermal subsidence during the deposition of the second unit (Late Campanian–Late Maastrichtian) led to rift flank subsidence and sediment sourcing from outside the immediate region. Renewed rifting immediately preceding the third unit (Early Eocene) resulted in a return to local sediment sourcing. The basin morphology during the deposition of the second unit would have been more conducive for the long-distance transport of sediment into the adjacent Faroe–Shetland Basin than during deposition of the first and third units. The results provide a framework for the identification of Greenland-sourced material in the Faroe–Shetland Basin.

KEYWORDS: *East Greenland, sandstone provenance, Cretaceous–Palaeogene*