

Interplay between northern and southern sediment sources during Westphalian deposition in the Silverpit Basin, southern North Sea

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ABSTRACT

A heavy mineral study, integrating conventional petrographic analysis, determination of provenance-sensitive mineral ratios, mineral chemistry and detrital zircon geochronology, has provided evidence for an evolution in provenance during Westphalian deposition in the Silverpit Basin of the southern North Sea. The Ketch Formation (mid-Bolsovian to ?Westphalian D) was derived from the northeast, the source area probably lying on the Rinkøbing-Fyn High. During deposition of the preceding Cleaver Formation (late Duckmantian to mid-Bolsovian), there was interfingering of detritus sourced from the Rinkøbing-Fyn High with sediment derived from the Variscan orogenic belt to the south. Sources of sediment in the Langsettian to Duckmantian Caister and Westoe Formations are more difficult to specify because of a relative scarcity of data. However, there is evidence that some sediment was introduced from a northern sourceland via the Pennine river system

that dominated deposition in the Pennine Basin during Namurian times. Other sediment may have been introduced from the Wales-Brabant High or from the Variscan belt. The identification of southerly-sourced sediment in the Silverpit Basin confirms earlier suggestions that Variscan-derived sediment was transported into the Pennine Basin by transport systems routed through the southern North Sea, and places palaeogeographic constraints on the location of these transport systems.