

Whole-rock geochemistry and Heavy Minerals – a tool in provenance studies

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Elemental geochemistry of 1131 sandstone samples has been used to characterise five Palaeogene sandstone members in a system of density flow deposits within an incised submarine canyon, Danish North Sea. Diagenetic overprinting has complicated the use of most main and trace elements, but a group of “heavy mineral bound” elements with low mobility (Ti, Y, Zr, Nb and Th) has proved highly potential for correlation. The individual sandstone members exhibit very consistent relations between the “heavy mineral elements” along the canyon and, based on Zr/Ti plots, two families of sandstone members can be distinguished. The families are recognised on variations in inclination and intersection of linear regression lines which are related to subtle variations in provenance/source area. The inclination is believed to be controlled by the detrital heavy mineral (HM) suite and composition, whereas the intersections are controlled by the background contribution, such as HM inclusions in detrital rock forming minerals, e.g. quartz and/or feldspar, as well as substituted and/or adhered elements in glauconite. The correlation pattern has been used to suggest a re-interpretation of the stratigraphic relation of some of the sands.