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Neogene palaeochannel deposits in Sudan – remnants of a trans-Saharan river system?

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Abstract

The start of Nile-type trans-Saharan drainage systems in NE Africa during the Cenozoic is disputed. Stratigraphical and sedimentological data in Egypt are partly in conflict with the uplift history of potential source areas of water and sediment in East Africa. Here, we investigate outcrops of the Wadi Awatib Conglomerate in Sudan that provide the first evidence of northerly flowing Neogene rivers in the region. Dimension and relief of basal erosion surfaces, overall geometry of deposits and palaeocurrent indicators demonstrate that the deposits represent the fill of northward-oriented incised valleys. The conglomerates were deposited in deep gravel-bed rivers, by hyperconcentrated flows, tractions carpets and gravel bars, primarily during heavily sediment-laden floods of probably monsoonal origin. Stratigraphical and geomorphological relationships show that the deposits are between Eocene and Pliocene in age. Considering the structural history of the region and periods in the Cenozoic with palaeoclimatic conditions suitable for the production and transport of gravels, we hypothesize that the dramatic base-level fall during the Late Miocene Messinian salinity