

A Source-to-Sink Study of the Neogene Sediment Fluxes in the Niger Delta

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ABSTRACT

We show how uplift and erosion of the Niger River basin can be related to Cenozoic sedimentary efflux recorded in the Niger delta and its surroundings. A drainage network encompassing the Niger River and its tributaries has been extracted from the Shuttle Radar Topographic Mission (~90 x 90 m resolution) digital elevation dataset. The Niger River and its tributaries drain the western portion of the basin incorporating the Fouta Djallon swell. The Benue River drains the eastern portion of the basin including the Cameroon Volcanic line and Jos Plateau. The longitudinal profiles of these rivers contain multiple knickzones with tens to hundreds of meters of relief. These observations and preliminary inverse modelling suggest that the domal swells within the Niger drainage basin experienced punctuated Cenozoic uplift and erosion. We use observations of solid sediment thicknesses offshore to test predicted sedimentary flux histories. The history of Cenozoic solid sedimentary flux has been reconstructed using an inventory of 2500 line km of reflection seismic data and 15 commercial wells. Preliminary results indicate that Late Neogene sedimentary flux was reduced in comparison to earlier periods. The reduction in the rate of gravity-driven deformation of the delta in the Late Neogene may be in response to this reduction in sedimentary load. This in turn may have been in response to aridification of the East Atlantic region, and a reduction in uplift in the source area.