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# Cenozoic drainage evolution of the West African transform marginal upwarp

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We explore the large-scale relief and drainage evolution of the West African marginal upwarp by a spatial analysis of lateritic relict landscapes recording successive incision stages of a low relief, Early Cenozoic bauxitic envelope topography called the African surface. Four generations of stepped ironduricrust-capped paleolandsurfaces have been formed and abandoned on the slopes of interfluves below bauxitic relicts. Incision chronology is constrained by stratigraphic dating of the bauxites and Ar-Ar geochronology of Mn oxy-hydroxides produced in the weathering mantle of each paleolandsurface from the type locality of Tambao, in Northern Burkina Faso [1]. The Bauxites of the African surface result from intense rock chemical weathering that ended in the Middle Eocene (ca. 45 Ma). The so-called Intermediate paleolandsurface developed until the Oligocene-Miocene transition (ca. 24 Ma). Three generations of pediment (glacis from the French literature) emplaced afterwards. The so-called High glacis was shaped and weathered until ca. 11 Ma. The Middle Glacis settled by the end of the Pliocene (ca. 7-6 Ma) and the Low Glacis, which is mostly connected to the modern base level, dates from the end of the Pliocene. The regional study reasonably assumes the broad synchronicity of the lateritic levels at the scale of West Africa.

We have produced elevation maps of the first three erosion levels corresponding to the topography of the marginal upwarp at ca. 45, 24 and 11 Ma. They show the successive positions of the main drainage divides and thus drainage reorganisation since the Eocene. The elevation of paleolandsurface relicts along the main drains allowed reconstructing paleo-river long profiles at ca. 45, 24, 11 and 6 Ma to be compared with the modern long profiles.

The modern drainage of West Africa was established before the Oligocene-Miocene transition as a consequence of the inland growth of coastal catchments that have cut through the Eocene marginal upwarp. At this time West Africa was already entirely externally drained, i.e. the capture of the Niger internal delta by an Atlantic drain had already occurred. Drainage reorganization coincides with the onset of the Niger delta progradation and increased clastic fluxes along the margin. The overall shape of large river long profiles remained nearly stationary after drainage reorganization. Distributed low incision rates (< 8-10 m/my) attest to dominantly diffuse lowering of base levels controlled by the stability of major lithologically-controlled knickzones. Knickpoint retreat may have been locally efficient where incision rate exceeded 8-10 m/my. Upward-convex modern river segments delineate a large-scale active swell across the upwarp. The imaged swell is in agreement with epeirogenic patterns predicted from models of mantle dynamics and may tentatively by related to the Hoggar uplift.

[1] Beauvais et al., Journal of Geophysical Research, 113, F04007, 2008.