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Palaeosurfaces, incision and long wavelength deformation of the Congo Cuvette during Cenozoic times

François Guillocheau (1), Bastien Linol (2), Marteen de Wit (2), François Mvondo (3), Dominique Chardon (4), and Luc Tack (5)

(1) Université Rennes 1, Geosciences, Rennes, France (cecile.robin@univ-rennes1.fr), (2) AEON and Department of Geology, University of Cape Town, South Africa, (3) Université de Douala, Cameroun, (4) LMTG, Université de Toulouse III-CNRS, France, (5) Royal Museum for Central Africa, Tervuren, Belgium

The goal of this study is to use morphological surfaces, their weatherings and associated sediments to constrain the geomorphological evolution of the Congo Cuvette, and its long wavelength (x1000km) deformation during Cenozoic times.
At the scale of North-West Africa (from Senegal to Nigeria), two main paleosurfaces (Chardon et al., 2006) have been mapped and dated using Cryptomelane dating by 39Ar/40Ar (Beauvais et al., 2088) on bauxites weathering profiles: the bauxite surface (or African surface) weathered from 59 to 45 Ma (Late Paleocene-Middle Eocene) and the "Surface intermédiaire" (Intermediate Surface), weathered from 29 to 24 Ma (Late Oligocene). The incision of those two surfaces started between 24 and 18 Ma, with the development of three different glacis, that record steps in the river incision.
We mapped the bauxitic and intermediate surfaces on the northern side of the Congo Cuvette, from République Centre-africaine to Cameroon, Gabon and Congo-Brazzaville and Haut Katanga (based on the work of J. Alexandre, 2002). We established a relative chronology of those surfaces with respect to the Tertiary deposit of the Congo Cuvette. We reevaluated the age of the sediments previously assumed to be Plio-Pleistocene in age of the Congo Cuvette (J. Lepersonne, 1974, Geological Map of Zaire), using available wells (Dekese, Gilson, Mandaka, Samba). We now assume them to be equivalent of the "Grès polymorphes", as previously suggested by de Heinzelin (1962).
From the mapping, we suggest the following scenario:
1. Growth of the Bauxitic surface (=African surface) during Late Paleocene to Middle Eocene (58-45 Ma),
2. Deposition of the "Grès polymorphes", lacustrine (northward) to eolian (southward) deposits (x10 m to 200 m-thick),
3. Low deformation of the Congo Cuvette (40-35 Ma?) and planation by the weathered "Surface Intermédiaire" (=Post-African surface) formed during the Late Oligocene (29-24 Ma),
4. Deposition of "Sables ocres", fluvial (?) sands (x10 m-thick),
5. Deformation of the Congo Cuvette (flexuration and incision) during the Early Miocene (24-18 Ma).
This chronology is in good agreement, with the stratigraphic record on the margin (Leturmy et al., 2003). Indeed, (i) the first growth of the Congo delta occurred after a major erosional surface around the Eocene-Oligocene boundary and corresponds to the discontinuity at the base "Sables ocres". Also, (ii) the major clastic flux increase occurred during Miocene times. This implies that the Congo Cuvette is not a subsiding domain during Cenozoic times (the maximum thickness of Tertiary sediments is indeed 300 m). Its present-day shape results from a differential uplift between the center and the borders related to pre-existing heterogeneity of the crust during Miocene time.
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