

Planation surfaces as a record of medium to large wavelength deformation: the example of the Lake Albert Rift (Uganda) on the East African Dome

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African relief is characterized by planation surfaces, some of them of continental scale. These surfaces are slightly deformed according to different wavelengths (x10 km; x100 km, x1000 km) which record both mantle dynamics (very long wavelength, x 1000 km) and lithosphere deformation (long wavelength deformation, x 100 km). Different types of these planation surfaces are recognized:

- Etchplains capped by iron-duricrust which correspond to erosional nearly flat weathered surfaces resulting from the growth of laterites under warm and humid conditions.
- Pediments which define mechanical erosional surfaces with concave or rectilinear profiles delimited by upslope scarps connected upstream with the upper landforms.

We here focused on the Lake Albert Rift at the northern termination of the western branch of the East African Rift System of which the two branches are superimposed on the East-African Dome. Different wavelengths of deformation were characterized based on the 3D mapping of stepped planation surfaces: (1) very long wavelength deformations resulting from the uplift of the East African Dome; (2) long wavelength deformations resulting from the opening of the eastern branch and (3) medium wavelength deformations represented by the uplift of rift shoulders like the Rwenzori Mountains.

The paleo-landscape reconstruction of Uganda shows the existence of four generations of landforms dated according to their geometrical relationships with volcanic rocks. A four stepped evolution of the Ugandan landforms is proposed:

- 70 - 22 Ma: generation of two weathered planation surfaces (etchplain U_w and I_w). The upper one (U_w) records a very humid period culminating at time of the Early Eocene Climatic Optimum (70-45 Ma). It corresponds to the African Surface. A first uplift of the East African Dome generates a second lower planation surface (I_w) connected to the Atlantic Ocean base level;
- 17-2.7 Ma: planation of large pediplains connected to the local base level induced by the birth of the Albertine Rift System and the formation of the proto-Lake Albert;
- 2.7-0.4 Ma: uplift of the Rwenzori Mountains and degradation by river incision of the previous large pediplains;
- 0.4-0 Ma: long wavelength downwarping of the Tanzania Craton between the two branches of the rift, creation of the Victoria Lake, inversion of the drainage and formation of the fault-bounded scarps of Albert Rift.