Geophysical Research Abstracts
Vol. 17, EGU2015-6390, 2015
EGU General Assembly 2015

Initiation and development of the Kivu rift segment in Central Africa by reactivating un-favorably oriented structural weaknesses

Damien Delvaux (1) and Benoît Smets (1,2,3)

(1) Royal Museum for Central Africa, Earth Sciences, Tervuren, Belgium (damien.delvaux@africamuseum.be), (2) European Center for Geodynamics and Seismology, L-7256, Walferdange, Luxembourg, (3) Vrije Universiteit Brussel, Dept. Geography, B-1050 Brussels, Belgium

The Kivu rift region forms the central segment of the western branch of the East African rift system, between the northern termination of the Tanganyika rift and the southern extension of the Edward-George rift. Its structure and geological evolution has been revised in the light of a compilation of existing data on earthquake epicenters, focal depth, focal mechanisms, thermal springs and neotectonic faults.
It has long been shown that the link between the Kivu rift basin and the Northern termination of the Tanganyika rift basin forms an accommodation zone in which the Rusizi tectonic depression occupies a central place (Ebinger, 1989). In addition, our compilation suggests that the NNE-trending Kivu rift basin and the N-S northern half of the Tanganyika rift basin initiated as separated, partly overlapping and differently oriented basins. The orientation and development of the Kivu rift basin was controlled by an inferred Mid-Proterozoic crustal shear zone and a Pan-African reverse fault front. It was not optimally oriented with the general (first-order) stress field characterized by roughly E-W extension. In a later stage, the more optimally N-S oriented North Tanganyika basin progressed towards the North and connected to Kivu rift in its middle in a region now occupied by the town of Bukavu. This accommodation zone is marked by Quaternary volcanism, warm thermal springs, frequent and relatively shallow seismicity. The southwestern part of the Kivu rift became progressively abandoned but it is still seismically active and hosts a number of warm thermal springs. This particular architecture influences the present-day stress field.

This work is a contribution to the Belgian GeoRisCA project.

Ebinger, C.J. 1989. Geometric and kinematic development of border faults and accommodation zones, Kivu-Rusizi Rift, Africa. Tectonics, 8, 117-133