Geophysical Research Abstracts, Vol. 9, 08837, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08837

Occurrence of large earthquakes along the major Kanda fault system (Tanganyika-Rukwa rift, SW highlands of Tanzania)

A.S. Macheyeki (1), **D. Delvaux** (2), F. Kervyn (2), T. Petermans (3), K. Verbeeck (3), , E.B. Temu (4)

(1) University of Gent, Geology and Soil Science, Belgium, (2) Royal Museum for Central Africa, Belgium, (3) Royal Observatory of Belgium, (4) Geological Survey of Tanzania

(damien.delvaux@africamuseum.be)

The Ufipa Plateau is a tilted horst between the Tanganyika and Rukwa rift basins in the western branch of the East African Rift System. It is cut longitudinally by the 160 km-long Kanda normal fault system, the main active fault affecting the centre of the plateau. The region was hit by a Ms 7.4 earthquake in 1910 and the instrumental epicentre (although not precisely determined) was located near Sumbawanga town, along the northern portion of that fault. The Kanda fault largely reactivates an older strike-slip fault zone, itself affecting mylonites from a ductile shear zone developed in the Ubendian Paleoproterozoic belt. Fault-slip indicators for the recent movements along the fault scarp show almost pure top-to E/ENE normal faulting. Differential GPS topographic profiles were made every 5-10 km across the Kanda fault scarp in order to evaluate the vertical offset since the development of the last morphological surface, covered partly by a hard laterite crust. Offset associated with that morphological scarp reaches up to 50 m, with a mean value of 15 m. The offset values evolve along-trend, with 3 portions of maximal offset separated by 2 minima. This along-trend variation suggests that the entire fault system can be separated into 3 different fault segments with different multi-event faulting histories. According to the empirical relations between earthquake magnitude and maximum fault length, activation of the entire Kanda fault (165 km) would be able to generate a Ms 7.6 earthquake.

Electric resistivity profiling show that the total vertical offset associated with the Kanda fault, taking the top of weathered basement as a reference, is much higher

than the visible topographic offset of the morphological surface alone. High-resolution digital elevation extraction and modelling combined with Paleoseismic trenching and C14 dating shows that significant vertical movement occurred along that fault segment during the last 10.000 years.