



Recurrence of large earthquakes in continental rifts, A paleoseismic study along the Laikipia-Marmanet fault, Kenya.

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The seismicity of the Kenya Rift is dominated by high activity, low magnitude events, concentrated along the rift axis. Its seismic character is typical for magmatically active continental rifts, where igneous material at shallow depth causes extensive grid faulting and geothermal activity. On January 6th 1928, the magnitude $M_s = 6.9$ Subukia Earthquake occurred along the Laikipia-Marmanet fault, the eastern rift-bounding structure of the Central Kenya Rift. It is the largest instrumentally recorded seismic event in the Kenya rift, standing in contrast to its overall seismic character. The distance between structures activated in the earthquake and the rift axis is less than the 1928 surface rupture length: thermally weakened crust and better oriented structures are present in close proximity, yet this major rift-bounding structure remains active.

We conducted a paleoseismic investigation, excavating the surface rupture of the 1928 Subukia Earthquake to find evidence for preceding ground rupturing events. This effort was rounded with a total station survey of the topography and geologic mapping around the trench site.

We identified six ground rupturing events, including the 1928 earthquake. The topographic survey around the trench site revealed a degraded fault scarp of ~7.5m height offsetting a small debris-slide. Using scarp diffusion modeling we estimated an uplift rate of $U = 0.06 - 0.15 \text{ mm/yr}$. Assuming an average fault dip of 70 degrees, this correlates to 4 -12% of the average rate of extension across the whole Kenya rift (0.5mm/yr). This suggests that major rift-bounding structures continue to play an im-

portant role, even after weaker and better oriented structures came to exist.