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Volcanotectonic architecture of the Rungwe Volcanic Province (East African rift, SW Tanzania)

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The Rungwe Volcanic Province lies at the intersection between the eastern and the western branches of the East African rift system in the SW highlands of Tanzania. In particular, it forms a triple junction with the NW-SE trending Songwe basin (southern extremity of Rukwa rift segment), the Livingstone basin (northern extremity of the Nyasa - Malawi rift segment) and the NE-SW trending Usangu basin. Volcanism started 8-9 Ma years ago concomitantly with normal faulting activation of the major rift border faults. Paleostress data suggest that this deformation occurred in a extensional stress regime with the horizontal principal direction of extension at a right angle from the trend of the rift basins. At a larger scale, it forms a region of radial extension centred on the Rungwe volcano, as could be expected from a triple junction. Since the Quaternary, however, the situation looks different. The Usangu basin became generally inactive and the triple junction evolved into a transform fault zone, transferring the extensional deformation from the Nyasa-Malawi rift to the Tanganyika rift, west of the Rukwa rift. As a consequence, deformation in the Rungwe volcanic province changed into a dominantly strike-slip regime. New high-angle fault systems developed, affecting the centre of the rift basins rather than their margin as it was the case during the preceding stage.

We investigated the seismotectonic architecture of the Rungwe region by a variety of approaches including remote sensing, SRTM - DEM and air photo processing and interpretation, all integrated in a GIS. We included also the distribution and characterization of Quaternary volcanic vents, hot springs and CO2 vents, as well as a compilation of existing geochronological data (Ar-Ar and C14). This compilation was

supplemented by field studies of active fault systems and volcanic deposits. A close relation between volcanism and regional tectonism can be evidenced. This poses major questions regarding the natural hazard mitigation in this very fertile and populated region, at risk for combined volcanic, tectonic and gas hazards.