Geophysical Research Abstracts
Vol. 19, EGU2017-6395, 2017
EGU General Assembly 2017

Transient plume- to continuous plate-related extension in the East African Rift System

Laurent Michon
Université de La Réunion, IPGP, Saint Denis, France (laurent.michon@univ-reunion.fr)

In the frame of plate tectonics, the East African Rift system (EARS) is the largest active tectonic structure illustrating the early stage of continental plate fragmentation. The occurrence of continental flood basalts and large topographic plateaux has long been interpreted as witnessing the key role of mantle plumes in the EARS development. Yet, the EARS is also composed of small, scattered volcanic provinces whose origin and genetic relationship with extension and mantle convection remain unclear. Compiling 870 isotopic ages of the volcanism spread over the western, eastern and southern branches of the EARS, I show that periodic mantle upwellings shoot off from two distinct mantle levels first controlled the EARS evolution (plume-related rifting stage), until a main regional extension due to Upper Miocene changes in plates circuit (plate-related rifting stage). Magmatic activity displays synchronous primary periodicities of $\sim$7 Ma in all provinces since Upper Oligocene, except in the Afar-Turkana area where flood basalts erupted every $\sim$15 Ma since Lower Oligocene. The remarkably similar periodicities of (1) Afar-Turkana, Walvis and Kerguelen primary hotspots, all situated at the margin of the African superswell, and of (2) the EARS' other volcanic provinces, atop the superswell, is a pivotal feature that will surely help decipher the processes controlling the initiation and dynamics of mantle anomalies.