

The Mozambique Ridge – A Large Igneous Province with a Complicated Emplacement History

M. D. Fischer, G. Uenzelmann-Neben

Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany

The Mozambique Ridge (MozR), a supposed part of the South African Large Igneous Province (LIP) in the southwestern Indian Ocean, consists of four major geomorphological units associated with multiple phases of volcanic activity between 140 Ma and 120 Ma.

High-resolution seismic reflection data collected in 2014 reveals various magmatic centres within each of the geomorphological units. Intra-basement reflections can be identified up to several hundred ms TWT below top of basement. These are interpreted to represent massive lava flow units, which are characteristic of oceanic plateau eruptions. Additionally to primary volcanic features associated with the initial formation of the different segments of the MozR we identify secondary volcanic features indicating magmatic reactivation after its initial build-up. The internal reflections generally dip away from their magmatic centres and individual reflectors are typically traced for 5-15 km. Several faults cutting through basement and older sedimentary units are interpreted as extensional tectonic features.

Our observations hence provide further arguments for a LIP origin of the MozR. Still, this LIP obviously was subject to multiple magmatic and tectonic phases during its development, which we may relate with the opening of the South African gateway associated with Gondwana break-up and the separation of MozR from the conjugate parts of the proposed South African LIP. Further investigations will show whether more recent deformation can be traced back to further propagation of the East African Rift system.