

Age constraints on Karoo magmatism from felsic volcanic rocks in Mozambique

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The Karoo Large Igneous Province (LIP) covers an area of over 3×10^6 km² in southern Africa, Antarctica, and Falkland Islands as well as Tasmania. The Karoo LIP is mainly composed of mafic volcanic and plutonic rocks. Rhyolites and granitoid rocks are present in minor amounts.

In Mozambique, the Karoo volcanic rocks are related to the Jurassic Africa-Antarctica rift zone and crop out in 1) the Lebombo Monocline, 2) the Nuanetsi-Sabi volcanic flexure and 3) the Tete province, central Mozambique. The majority of the rift-zone volcanites are basalts and picrites and rhyolites are found as intercalated beds and minor intrusive bodies. In our ongoing project, rhyolite samples from these three areas have been collected in order to constrain the timing of the currently poorly dated rift-zone magmatism of the Karoo LIP and the source of its felsic volcanism. The samples have been processed for U-Pb single-zircon dating by secondary ion mass spectrometry, and for Lu-Hf analyses by laser ablation ICP mass spectrometry. The samples include both conformable beds and cross-cutting dikes.

The feldspar porphyritic rhyolites in southern Lebombo in southern Mozambique yield ages from ~182 Ma to ~172 Ma. The youngest age is from a unit close to the top of the bimodal basalt-rhyolite lava pile. The Hf isotopic signature of zircon in this unit is fairly homogeneous, and moderately juvenile. The initial ϵ_{Hf} values are between +4 and +10, corresponding to crustal residence ages of ~300–400 Ma.

The quartz and feldspar porphyritic rhyolites of Doa and the aphyric and feldspar porphyritic rhyolites of Tete represent silicic interbeds and dikes in the presently undated volcanic succession in the the Tete province, the NE end of the Jurassic rift zone. Dating and Hf isotopic measurements of these samples will be performed in April 2015.