

POST-COLLISIONAL PAN-AFRICAN MAGMATISM: MADAGASCAR AND BEYOND

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The island of Madagascar lies in the centre of the Late Neoproterozoic–Early Palaeozoic East African–Antarctic Orogen (EAAO). The basement geology of Madagascar comprises a number of Neoproterozoic and Archaean terranes that collided as the EAAO was formed. Voluminous granitoid plutons that post-date the collision are found along the length of much of the EAAO.

In Madagascar, these post-collisional granitoids are termed the Maevarano Suite. They include granitic, charnockitic, syenitic and more mafic compositions, typically in irregular plutons with sheeted margins. They are unfoliated to weakly foliated and appear to post-date the main collisional events. Geochemically, they are mildly alkaline and many, but not all, can be classified as A-type granitoids.

We have dated four granitoids and charnockites of the Maevarano Suite, giving U-Pb zircon SHRIMP dates between 537 ± 5 and 522 ± 6 Ma. Previously published dates for post-collisional granitoids in both North and South Madagascar fall within this range, as do dates for metamorphism.

Within Madagascar, post-collisional granitoids are very abundant in some basement terranes yet almost absent in others, suggesting some form of crustal control on their emplacement. Similar relationships are seen along the length of the EAAO; southern Mozambique, Antarctica, and the Arabian-Nubian Shield are characterized by voluminous, high-temperature, post-collisional granitoids and charnockites, yet such magmatism is rare in Mozambique to the north of the Lurio Belt and in Tanzania.

The presence of broadly coeval post-collisional magmatism along the southern part of the EAAO indicates the possibility of an orogen-scale tectonomagmatic process such as lithospheric delamination. However, smaller-scale regional controls are indicated both by the variations in abundance of post-collisional plutons in different basement terranes, and by local differences in age and chemistry of the plutonic rocks. The potential controls on the abundance of post-collisional magmatism will be discussed in this talk.