

Tectono-metamorphic Evolution of the East African-Antarctic Orogen in Northern Mozambique and Dronning Maud Land (East Antarctica)

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The Nampula Province of northern Mozambique together with high-grade rocks of Central Dronning Maud Land (East Antarctica) form the southern third of the more than 8000 km long East African-Antarctic Orogen. The orogen formed during Late Neoproterozoic to Cambrian (Pan-African) collision of various fragments of East- and West-Gondwana. Along the southern part of the orogen, the protolith ages of the crustal rocks are predominantly Mesoproterozoic in age (ca. 1200-1000 Ma). A suture zone is exposed in the Shackleton Range (East Antarctica).

In northern Mozambique, the basement is unconformably overlain by metasedimentary rocks including metaconglomerates, metaarkoses and metasandstones. These rocks were previously included into the Mesoproterozoic Chiure Group, however, new SIMS and ICPMS zircon provenance analyses with detrital zircons as young as ca. 610 Ma indicate that the sedimentary protolith were deposited immediately prior to orogenesis or syn-tectonically (Alto Benfica and Mecuburi groups). Additionally, the Nampula basement is overlain by granulite facies klippen (Mocuba, Monapo, Schirmacher) that show granulite facies metamorphism at c. 620 Ma. The age of emplacement of these klippen is unascertained. Anorthosite magmatism in Dronning Maud Land is dated at ca. 600 Ma. The main deformation and pervasive medium- to high-grade metamorphism in the main mountain range of Dronning Maud Land and the Nampula Province of Northern Mozambique is bracketed in age by metamorphic zircon rims between ca. 590 and 550 Ma and is interpreted to represent the collision phase. A late-tectonic stage is associated with extension, tectonic exhumation and south-directed extrusion between ca. 530 and 500 Ma, exposing mid- to lower crustal levels. This period is accompanied by syn-tectonic and late- to post-tectonic intrusions. The volume of igneous rocks drastically increases towards the end of the extensional period, culminating in voluminous and extensive A2-type granitoid-charnockoid magmatism. Late to post-tectonic granitoids with dominantly charnockitic mineralogy cover an area of more than 15000 km² in East Antarctica and northern Mozambique and might have resulted from delamination of the orogen root. This magmatism sharply stops along the Lurio Belt a conspicuous shear belt in NE Mozambique, oriented oblique to the main N-S trend of the orogen. We speculate that the Lurio Belt represents an accommodation zone that separates a part of the orogen with a delaminated orogen root to the south and a part of the orogen where the orogenic root is still in place to the north. Thus, northern Mozambique might represent a unique area to study the mid to lower crustal expression of a partially delaminated orogen root.