

FROM THE PALAEOZOIC COLLAPSE OF THE EAST AFRICAN-ANTARCTIC OROGEN TO GONDWANA RIFTING IN NE MOZAMBIQUE

Jacobs, J.¹, Emmel, B.¹, Ueda, K.¹, Kumar, R.¹, Thomas, R.J.², Kosler, J.¹, Horstwood, M.², Jordan, F.³, Kleinhanns, I.⁴, Engvik, A.⁵, Bingen, B.⁵ and Daudi, E.X.⁶

¹Department Earth Science, University of Bergen, Norway; joachim.jacobs@geo.uib.no

²British Geological Survey, Keyworth, UK

³John de Laeter Centre, Curtin University, Australia

⁴Institut für Geowissenschaften, University of Tübingen, Germany

⁵Norwegian Geological Survey, Trondheim, Norway

⁶National Directorate for Geology, Maputo, Mozambique

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The East African passive margin resulted from complex reactivation of the ca. 600–500 Ma East African-Antarctic Orogen (EAAO). With the help of a large set of new thermochronological data (U-Pb titanite, Ar-Ar hornblende and biotite, as well as zircon, titanite and apatite fission-track analyses) we have modelled the tectono-thermal history of NE Mozambique from the late (Lower Palaeozoic) stages of the East African-Antarctic Orogeny to its transformation into a passive margin in the Mesozoic. In a critical area in northeastern Mozambique, the continental margin follows pre-existing structures of the EAAO. Here, the orogen is represented by two tectonically very different domains, separated by the Lurio Belt, a distinct ENE-trending lineament obliquely oriented to the gross north-south trend of the orogen. We interpret the Lurio Belt as an accommodation zone within the EAAO, separating two thermomechanically distinct segments of the orogen. It separates an area to the south (Nampula Block), which shows evidence for delamination of its lithospheric root and subsequent extensional orogenic collapse and an area to the north, (Pemba Block) where the lithospheric keel is still present. Delamination to the south resulted in the influx of hot asthenosphere beneath the Nampula Block, giving rise to high-grade metamorphism and the generation of large volumes of late-tectonic granitoids. The Nampula Block is therefore characterized by comparatively weak, thin lithosphere and, as a consequence of asthenosphere uprise, shows a slow cooling trajectory from 530 to 430 Ma. To record the post-Lower Palaeozoic thermal history of the area, we present approximately 100 new zircon, titanite and apatite fission-track analyses across the Lurio Belt. We use these data as a quantitative measure of reactivation and exhumation across the belt. The data demonstrate that within a large area (ca. 150 000 km²) to the south of the Lurio Belt, significant amounts of exhumation followed Gondwana break-up in the Jurassic, whilst the Pemba Block basement to the north was already exhumed prior to break-up. We interpret our data to indicate thinning of the relatively juvenile and therefore rheologically weak lithospheric mantle in a pullapart type rift scenario to the south of the Lurio Belt. Thinning of the lithospheric mantle resulted in several kilometers of uplift of the Nampula Block with differential exhumation across the Lurio Belt.