Project DELAM: Mid- to lower crustal expression of a partially delaminated orogen root recorded in the East African-Antarctic Orogen of northern Mozambique

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This poster reports first results of the NFR project DELAM. This project investigates the mid- to lower crustal expression of a possibly partially delaminated orogen root. The orogen under investigation is the Late Neoproterozoic/Early Palaeozoic East African-Antarctic Orogen in Northern Mozambique. The East African-Antarctic Orogen is a good example for an orogen that shows a strong lateral variation in orogenic style. It is also one of the largest orogens on Earth. It resulted from a multiplate collision of various parts of East- and West-Gondwana and stretches for more than 8000 km along the eastern margin of Africa, from Egypt, through Tanzania and Mozambique into East Antarctica. The orogen is up to 1000 km wide. It is characterised by accretion in its northern third and by continent-continent collision in its central and southern part. The deep erosion level allows unique insights into an orogen that changes from a largely accretionary orogen in the North (the Arabian Nubian Shield) to a continent–continent collision orogen in its central and southern part. The southern termination of the orogen, within Dronning Maud Land (East Antarctica), is characterised by orogenic collapse and lateral extrusion, similar to the present situation in south-eastern Asia. Additionally, the southern third of the orogen from northern Mozambique into Antarctica records the intrusion of large volumes of A2-type granites at ca. 530-490 Ma, that resulted from partial melting of lower crustal rocks, following delamination of the orogenic root and influx of hot asthenosphere. The large volume of A2-type granitoids stop sharply at 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. We are trying to test whether the hot southern part of the orogen underwent rapid mechanical thinning and orogenic collapse, thus underwent differential exhumation compared to the orogen N of the Lurio Belt. We use a broad range of thermochronological methods including U-Pb titanite, Ar-Ar mineral and combined titanite and apatite fission-track analyses coupled with PT data to constrain the differential exhumation histories on either side of the Lurio Belt and to characterize the complex Lurio Belt itself. These new data will allow to critically test alternative models for the structural evolution of the East African-Antarctic Orogen in northern Mozambique.