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COUPLED DELAMINATION AND INDENTOR-ESCAPE TECTONICS IN THE SOUTHERN PART OF THE C. 650-500 MA EAST AFRICAN/ANTARCTIC OROGEN

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The East African/Antarctic Orogen (EAAO) is one of the largest orogenic belts on the planet, resulting from the collision of various parts of East and West- Protogondwana between 620 and 550 Ma. The central and southern parts of the orogen are typified by high-grade rocks, representing the overprinted margins of the various colliding continental blocks. The southern third of this Himalayan-type orogen can be interpreted in terms of a lateral tectonic escape model, similar to the situation presently developing in SE-Asia. One of the escape-related shear zones of the EAAO is exposed as the approximately 20 km wide Heimefront transpression zone in western Dronning Maud Land (Antarctica). During Gondwana break-up, the southern part of the EAAO broke up into a number of microplates (Falkland, Ellsworth-Haag and Filchner blocks). These microplates probably represent shear zone-bound blocks, which were segmented by tectonic translation during lateral tectonic extrusion. The southern part of the EAAO is also typified by large volumes of late-tectonic A2-type granitoids that intruded at c. 530-490 Ma, and can constitute up to 50% of the exposed basement. They are likely the consequence of delamination of the orogenic root and the subsequent influx of hot asthenospheric mantle during tectonic escape. The intrusion of these voluminous melts into the lower crust was accompanied by orogenic collapse. The A2-type magmatism appears to terminate along the Lurio Belt in northern Mozambique. Therefore, the Lurio Belt could represent an accommodation zone, separating an area to the south in which the orogen underwent delamination of the orogenic root, and an area to the north, where the orogenic keel is still present. Erosional unroofing of the northern EAAO is documented by the remnants of originally extensive areas covered by Cambro-Ordovician molasse-type clastic sedimentary rocks throughout North Africa and Arabia, testifying to the size of this mega-orogen. Whilst the EAAO molasse in the north covers almost the entire North African platform, probably resulting from a long lasting high standing mountain range (no delaminated root), the molasse deposits of the southern EAAO are comparatively smaller, possibly resulting from the rapid and mechanical thinning of the orogen in the south (delaminated root).

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