PROTEROZOIC TECTONIC EVOLUTION OF SOUTHERN AFRICA

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The Precambrian foundation of southern Africa consists of Archean cratonic nuclei surrounded by belts formed during three separate global Proterozoic orogenic episodes. Crust that formed or was reworked at 2.1-1.8 Ga is represented by orogenic belts (e.g., Kheis-Magondi, Ubendian-Usagaran) that partly wrap the ancient craton margins and by extensive basement inliers in younger belts. Original relations between these diverse 2.1-1.8 Ga crustal elements generally are unclear due to subsequent plate displacements. 1.35-1.0 Ga orogenic belts record accretion of juvenile arc terranes and microcontinents leading to final assembly of the Rodinia supercontinent by 1.0 Ga. Major convergent plate boundaries active at this time include the Namaqua-Natal belt along the southern margin of the Archean Kaapvaal craton, a contiguous, NE-trending orogen largely buried beneath the Kalahari sands, and a broad collisional zone farther north represented by the Kibaran and Irumide belts and extensive juvenile arc crust in Malawi and Mozambique. Breakup of Rodinia is signaled by widespread alkaline and bimodal magmatism at 900-750 Ma in rift zones that in some cases evolved into major ocean basins. Subsequent amalgamation of Gondwana led to collisional orogenesis culminating at 550-530 Ma in Himalayan-style belts along the present east and west margins of the subcontinent (Mozambique and Kaoko-Gariep-Saldania belts, respectively). Coeval deformation in the interconnecting, transcontinental Damara-Lufilian-Zambezi orogen may reflect collapse of linked ensialic rifts and/or narrow, Red-Sea-type ocean basins driven by far-field stresses from the collisional plate margins.