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Geochemistry, Geochronology and Isotopic Evolution of the Chewore–Rufunsa Terrane, Southern Irumide Belt: a Mesoproterozoic Continental Margin Arc

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The southern Irumide Belt (SIB) is an ENE–WSW-trending, late Mesoproterozoic orogenic belt located between the Congo–Tanzania–Bangweulu (CTB) and Kalahari cratons in central southern Africa. It is separated from the late Mesoproterozoic Irumide Belt (IB) to the north by Permo-Triassic graben, raising the possibility that the younger rifts reactivated a suture between the two belts that has been rendered cryptic as a result of younger Karoo cover. Both belts are dominated by calc-alkaline gneisses, but in addition the SIB contains abundant metavolcanic and metasedimentary rocks. In this study we present detailed geochemical, isotopic and geochronological data for volcanic and plutonic lithologies from the southernmost part of the SIB, the Chewore–Rufunsa Terrane. This terrane comprises a wide variety of supracrustal to mid-crustal rocks that have major- and trace-element compositions similar to magmas formed in present-day subduction zones. Chondrite-normalized rare earth element (REE) profiles and whole-rock Sm–Nd isotope compositions indicate that the parental supra-subduction melts interacted with, and were contaminated by sialic continental crust, implying a continental-margin-arc setting. Secondary ionization mass spectrometry dating of magmatic zircon has yielded crystallization ages between c. *1095 and 1040 Ma, similar to elsewhere in the SIB. U–Pb dating and* in situ *Lu–Hf isotopic analyses of abundant xenocrystic zircon extracted from the late Mesoproterozoic granitoids indicate that the contaminant continental basement was principally Palaeoproterozoic in age and had a juvenile isotopic signature at the time of its formation. These data are in contrast to those for the IB, which is characterized by younger,* c. *1020 Ma, calc-alkaline gneisses that formed by the direct recycling of Archaean crust without significant addition of any juvenile material. We suggest that the SIB developed by the subduction of oceanic crust under the margin of an unnamed continental mass until ocean closure at* c. *1040 Ma. Subsequent collision between the SIB and the CTB margin led to the cessation of magmatism in the SIB and the initiation of compression and crustal melting in the IB.*

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