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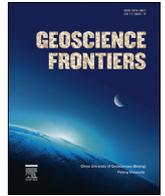


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Research Paper

Neoproterozoic tectonic geography of the south-east Congo Craton in Zambia as deduced from the age and composition of detrital zircons

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ABSTRACT

The Southern Irumide Belt (SIB) is an orogenic belt consisting of a number of lithologically varied Mesoproterozoic and Neoproterozoic terranes that were thrust upon each other. The belt lies along the southwest margin of the Archaean to Proterozoic Congo Craton, and bears a Neoproterozoic tectonothermal overprint relating to the Neoproterozoic–Cambrian collision between the Congo and Kalahari cratons. It preserves a record of about 500 million years of plate interaction along this part of the Congo margin. Detrital zircon samples from the SIB were analysed for U–Pb and Lu–Hf isotopes, as well as trace element compositions. These data are used to constrain sediment–source relationships between SIB terranes and other Gondwanan terranes such as the local Congo Craton and Irumide belt and wider afield to Madagascar (Azania) and India. These correlations are then used to interpret the Mesoproterozoic to Neoproterozoic affinity of the rocks and evolution of the region. Detrital zircon samples from the Chewore–Rufunsa and Kacholola (previously referred to as Luangwa–Nyimba) terranes of the SIB yield zircon U–Pb age populations and evolved $\epsilon_{\text{Hf}}(t)$ values that are similar to the Muva Supergroup found throughout eastern Zambia, primarily correlating with Ubendian–Usagaran (ca. 2.05–1.80 Ga) phase magmatism and a cryptic basement terrane that has been suggested to underlie the Bangweulu Block and Irumide Belt. These data suggest that the SIB was depositively connected to the Congo Craton throughout the Mesoproterozoic. The more eastern Nyimba–Sinda terrane of the SIB (previously referred to as Petauke–Sinda terrane) records detrital zircon ages and $\epsilon_{\text{Hf}}(t)$ values that correlate with ca. 1.1–1.0 Ga magmatism exposed elsewhere in the SIB and Irumide Belt. We ascribe this difference in age populations to the polyphase development of the province, where the sedimentary and volcanic rocks of the Nyimba–Sinda terrane accumulated in extensional basins that developed in the Neoproterozoic. Such deposition would have occurred following late-Mesoproterozoic magmatism that is widespread throughout both the Irumide and Southern Irumide Belts, presently considered to have occurred in response to collision between a possible microcontinental mass and the Irumide Belt. This interpretation implies a multi-staged evolution of the ocean south of the Congo Craton during the mid-Mesoproterozoic to late-Neoproterozoic, which ultimately closed during collision between the Congo and Kalahari cratons.

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1. Introduction

The southern margin of the Palaeoproterozoic/Archaean Congo Craton is traced from the Namibian Central Damara Belt, to the Lufillian Arc and Zambezi Belt of Zambia, Zimbabwe, Malawi and

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