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Petrogenesis of Early Paleozoic Supracrustal Rocks in Southeastern Yunnan: Constraints on Intracontinental Orogeny in the South China Craton

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Early Paleozoic sedimentary rocks and granitoids are widely distributed across the South China Craton, which provides crucial insights into crustal reconstitution. This study examines petrology, zircon U-Pb-Hf isotopes and whole-rock geochemistry of supracrustal rocks in southeastern Yunnan, China. Detrital zircons from the paraschists show ages of 2702-513 Ma, with two main peaks at 665 Ma and 517-514 Ma and a maximum protolith depositional age of ~514 Ma. The protoliths were deposited in a continental arc-related basin at the southwestern Yangtze Craton. The gneissic monzogranite, granodiorite and K-feldspar granite have zircon U-Pb ages of 436 ± 3 Ma, 442 ± 2 Ma and 441 ± 2 Ma, respectively. All samples show A/CNK ratios greater than 1.1, negative $\varepsilon Hf_{(t)}$ values of -4.87 to -0.38 and T_{DM2} model ages of 1738-1453 Ma, classifying them as peraluminous S-type granites. They were originated from the partial melting of Paleoproterozoic to Mesoproterozoic crustal materials within a collisional setting. Minor amphibolites and epidote-tremolite schists suggested that some mafic dikes intruded into the paraschists between 452-428 Ma. A 414-400 Ma tectono-thermal event led to the formation of widespread pegmatite veins. The crust in the southwestern South China Craton was thickened at 500-460 Ma to >50 km and remained stable at around 440-420 Ma with low temperatures below 800°C, indicating an early Paleozoic intracontinental orogeny in the South China Craton.

Keywords: Geochemistry; Geochronology; Early Paleozoic magmatism; Intracontinental orogeny; South China Craton