Mid-Neoproterozoic angular unconformity in the Yangtze Block revisited: Insights from detrital zircon U-Pb age and Hf-O isotopes

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South China Block was formed through the amalgamation of the Yangtze Block with the Cathaysia Block during Neoproterozoic, although the exact time is still controversial. Middle Neoproterozoic sedimentary rocks are widespread in the Yangtze Block, separated into the Sibao and the Danzhou groups (and their equivalents) by a "mid-Neoproterozoic angular unconformity". This unconformity, previously interpreted as the evidence of continental collision between the Yangtze and Cathaysia blocks, is crucial for understanding the early-middle Neoproterozoic tectonic regime in the South China Block.

In situ U-Pb, Hf and O isotopic analyses of detrital zircon are obtained from three sandstone samples, including two from the Yuxi Formation of the Sibao Group and one from the Baizhu Formation of the Danzhou Group that are located below and above the unconformity, respectively. Zircon from the lower part of the Yuxi Formation is dominated by a single age population peaked at 830 Ma, providing a maximum depositional age for the formation. While those from the middle part of the Yuxi Formation and the lowest part of the Baizhu Formation have very similar, "multi-peaked" age patterns, with five peaks at 840 Ma, 940 Ma, 1620 Ma, 1850 Ma and 2500 Ma, and Hf-O isotopic features, indicating that sediments across the mid-Neoproterozoic unconformity share similar sedimentary provenances and deposited within the similar tectonic setting. Appearance of abundant low-$\delta^{18}O$ magmatic zircon from these sediments is coincident with regional intraplate anorogenic magmatism at ca. 850 Ma, suggesting that both the Sibao and Danzhou groups were likely deposited in a continental rift basin. Thus, this study argues against the orogenic origin of the regional mid-Neoproterozoic unconformity between them. Our new data suggest that this unconformity is likely attributed to a rapid regional crust uplifting (associated with widespread mafic and granitic magmatism), unroofing and basin subsidence related to the proposed mantle plume activity at ca. 825-820 Ma.