Precambrian crustal evolution of the Yangtze Craton: U–Pb and Hf-isotope evidence from detrital zircons*.

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This paper reports *in-situ* U-Pb ages and Hf isotopic data on detrital zircons from Sinian sandstones of the Liantuo Formation and tillites of the Gucheng and Nantuo Formations at the Neoproterozoic standard section in the Sanxia area near Yichang that provided important constraints on the Precambrian crustal evolution of the Yangtze Craton. Zircons from Neoproterozoic sandstones and tillites are all characterized by four major groups of U-Pb ages (>3.0 Ga, 2.6-2.5 Ga, ~2.0 Ga and ~830 Ma). The oldest zircons with 3.5 Ga are identified in the Liantuo and Nantuo Formations. The Mesoarchean (>3.0Ga) zircons have $\varepsilon_{Hf}(T)$ values of -5.8 to +4.0 and crustal model ages of 4.0-3.5 Ga, the Neoarchean (2.6-2.5 Ga) zircons have -14.5 to +6.6 with $\varepsilon_{Hf}(T)$ values of crustal model ages of 4.0-3.0 Ga, the Neoproterozoic (~830Ma) zircons have $\varepsilon_{Hf}(T)$ values of -20.2 to +13.1 with crustal model ages of 3.0-1.7 Ga, whereas, most of Paleoproterozoic (~2.0 Ga) zircons have negative $\varepsilon_{Hf}(T)$ values (-19.9 to +2.7) with crustal model ages of 3.8-2.7 Ga. The zircons with negative $\varepsilon_{Hf}(T)$ values indicate that their source rocks are crustal-derived source rocks, whereas, those with positive $\varepsilon_{Hf}(T)$ values suggest their source rocks are mantle- or juvenile crustal-derived. Therefore, our zircon U-Pb and Hf isotopic data identify three major episodic continental crustal growth during Precambrian, i.e., 3.6-3.4 Ga, 2.6-2.4 Ga and ca.700-900Ma, and existence of up to 4.0 Ga continental crustal materials in the Yangtz craton.

Keywords: U-Pb age; Hf-isotope; crustal model age; detrital zircon

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