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Petrogenesis of ca. 2.0 Ga granites in the Kongling Complex: Implications for a tectonic transition of the Yangtze Craton from compression to extension

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Ca. 2.1–1.9 Ga tectono-thermal events in the Yangtze Craton, South China, are coeval with global continental assembly in the dawn of supercontinent cycle. However, the tectonic regime for the ca. 2.0 Ga events there remains unresolved because magmatic rocks of both compressional and extensional environments have been reported. In this study, we report the results of an integrated study of ca. 2.0 Ga granitic rocks in the Kongling Complex of the Yangtze Craton, including whole-rock major and trace element results, zircon U–Pb ages, and zircon Lu–Hf and oxygen isotope results. The 2.0 Ga granites are divided into two groups: Group 1 granites show highly depleted HREEs, HFSEs and positive Eu anomalies with relatively higher zircon $\varepsilon_{Hf}(t)$ values, whereas Group 2 granites have higher HREE and HFSE contents with lower Eu/Eu* and zircon $\varepsilon_{Hf}(t)$ values. Zircon Hf isotopic signatures indicate the source materials for the two types were likely Archean tholeiite and Archean TTGs of the Kongling Complex, respectively. Thermodynamic modelling results suggest that magmas similar to the two groups of granites could be generated from partial melting of Mesoarchean Kongling Enriched Archean Tholeiite (kEAT) (Group 1 granites) and TTGs (Group 2 granites) under the same melting conditions of 800–900 ℃, 10–12 kbar. Such a *P–T* condition is consistent with the peak metamorphic *P–T* estimates constrained from 2.0 Ga mafic granulites in the same area, indicating that the Archean crust was remelted at great depth (> 1 GPa). Furthermore, the MgO/CaO ratios of the 2.1–1.9 Ga granitic rocks in northern Yangtze Craton shifted to higher values after ca. 2.0 Ga, likely caused by an increased melting temperature/pressure (*T*/*P*) ratio, i.e., a higher thermal gradient. Based on these results, we propose that the tectonic regime of the Yangtze Craton switched from compression to extension at ca. 2.0 Ga.