

Petrogenesis of deep-seated xenoliths from the Xuhuai area, China: New insights from Hf isotope

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The whole-rock Nd–Hf isotopic data for a rare suite of eclogite and garnet clinopyroxenite xenoliths hosted in Early Cretaceous dioritic intrusions from the Xuzhou–Suzhou area along the southeastern margin of the Eastern Block of the North China Craton (NCC) suggested that nine of the 11 studied xenolith samples plot significantly above the terrestrial Hf–Nd isotopic array. The well correlated isotope and trace-element ratios indicate that emplacement of the host intrusions and metamorphism had little effect on Hf isotope. The xenoliths could be subdivided into two groups based on their REE pattern and isotopic compositions. However, both of them give whole-rock Lu–Hf isochron ages of 2.4–2.5 Ga. Thus, the xenoliths have an affinity to the Archean basement beneath the NCC. Instead, The whole-rock Sm–Nd isochron age records a metamorphism of ~2.1 Ga. A reasonable explanation to the observed Hf–Nd isotopic characteristics of the xenoliths is that they are result of melting of thickened lower continental crust producing TTG magmatism caused by basaltic underplating at 2.5 Ga, with garnet as a stable and residual phase of the source, and strengthened by the 2.1 Ga metamorphism that leading to a decreasing in Sm/Nd ratios. The melting or differentiation events were associated with crustal growth in NCC.

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