



Geochronologic constraints on formation and exhumation of the Foping migmatitic gneiss dome, Qinling Orogen, central China

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The Foping dome situated at the narrowest conjunction between the eastern Qinling and the western Qingling, occupying the northeastern Tibet Plateau foreland, is a key region to understand the post-orogenic tectonic evolution of the Qinling and the Late Cenozoic eastward growth of the Tibet Plateau. This work addresses the exhumation pattern in the poorly understood Foping dome, multi-method geochronology reveals the thermal history of the gneiss and granitoid rocks from their metamorphism/ emplacement to near-surface conditions. LA-ICP-MS U–Pb zircon dating suggests an identical age of gneiss metamorphism at ca. 215 Ma and granitoid emplacement at 216 Ma, respectively; Both ages confirm the occurrence of Late Triassic magmatism and high temperature metamorphism in the Foping dome, this interval correlates with the Triassic collision between the North China Block and South China Block. Biotite $40\text{Ar}/39\text{Ar}$ age of ca. 130 Ma, zircon fission-track ages of ca. 100 Ma and zircon (U–Th)/He age of ca. 92 Ma record regional rapid cooling in Early Cretaceous with rate of 3°C to $5\text{°C}/\text{Myr}$, it is interpreted to reflect intracontinental deformation from the Late Jurassic to Early Cretaceous of the Qinling Orogen after the Triassic collision. Apatite fission-track (AFT) and apatite (U–Th)/He (AHe) thermochronology and thermal-history modeling indicate cooling in two stages: rapid cooling at 70–40 Ma with rate of $3.3\text{°C}/\text{Myr}$ is correlated with the Late Cretaceous–Early Cenozoic transtension in Eastern China, which is characterized by series dextral strike-slip fault zones within variably oriented extensional stress fields along the Dabie to Qinling. The post-Eocene (after ca. 40 Ma) very slow cooling, stagnation, suggests insignificant exhumation, implying that the Foping dome was least affected by the Late Cenozoic exhumation and has not been or was little involved into the eastward growth of the eastern Tibetan Plateau.