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Petrogenesis and Geodynamic Setting of Mesozoic Granitoid in the Puziba Area, West Qinling, China: Geochronological, Geochemical and Sr-Nd-Hf Isotopic Evidence

QIU Kunfeng, DENG Jun*, YANG Liqiang, HUA Bei and LI Nan

State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Beijing 100083

The Mianlue suture zone, formed during the processes of Qinling-Dabie subduction-collision and superimposed by the Mesozoic and Cenozoic intracontinental orogenesis, defined as a series of fault zones consisting mainly of south-verging thrusts and nappes, represents the south boundary of the South Qinling Belt. To understand the nature of source region and geodynamic setting of the Mesozoic west Qinling, U-Pb dating and Hf isotopic analyses of zircons from Mesozoic granitoids in the Puziba area, combined with major and trace element and whole-rock Sr-Nd isotopic analyses, were undertaken to determine the petrogenesis and geodynamic setting of Mesozoic magmatism in the Puziba area of west Qinling, China.

Our new precise zircon U-Pb dating results reveal that the granitoids were emplaced at ca. 215 Ma. In addition, abundant inherited zircons are identified in the granite with four groups of age peaked at Paleozoic, Neoproterozoic, Mesoproterozoic and Paleoproterozoic, particularly at ~753 Ma, and ~805 Ma. Geochemical studies indicate that the granitoids, dominantly granodiorites and granites, are high potassium calc-alkaline to calc-alkaline as well as peraluminous granites in compositions, and they are characterised by high SiO₂, enrichment in large ion lithophile elements (LILEs; e.g., Rb, U, K) and light rare earth elements (LREEs), depletion in high field strength elements (HFSEs; e.g., Nb, Ta, Ti) and heavy rare earth elements (HREEs). These granitoids also display strongly fractionated REE pattern and weak negative Europium anomalies. It also exhibits high initial ⁸⁷Sr/⁸⁶Sr ratios (0.71074 to 0.71883), low $\epsilon_{\text{Nd}}(t)$ (-4.30695 to -3.20848) and variable zircon $\epsilon_{\text{Hf}}(t)$ (-14.2 to 12.5) values. Interpretation of the elemental and isotopic data suggests that in the Indosinian period, the granitoids formed in the transition regime from oceanic slab

subduction to intercontinental collision of the Qinling orogen, and the granitoid magma originated from partial melting of forearc accretionary triggered by dehydration of the underlying Paleo-Tethyan oceanic crust.

Key words: Geochronology, Sr-Nd-Hf isotopes, Petrogenesis, Tectonism, Granitoid, Puziba

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* Corresponding author. E-mail: djun@cugb.edu.cn

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