



Late Mesozoic granitoids from the eastern north Qinling Orogen, China: Petrogenesis and tectonic implications

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The Mesozoic Mangling (ML) and Muhuguan (MHG) plutons located in the North Qinling terrane (NQT) along the southern edges of the North China Craton (NCC). Clarifying their geochemistry signature and source components is crucial to understand the tectonic evolution of the Qinling orogen and the scope of destruction of the NCC. Our results reveal that Mangling (ML) and Muhuguan (MHG) plutons were emplaced at 142-154 Ma with abundant inherited zircon ages, which exhibit four stages of 210-252 Ma, 252-535 Ma, 605-975 Ma and 1711-1801 Ma and indicate their complicated magma sources. The Paleozoic and Neoproterozoic zircon ages widely occur in the NQT, whereas, the Mid-Paleoproterozoic is more common in the NCC, suggesting the both sides contribute to source materials of the ML and MHG plutons. The zircon age of ~210 Ma is identical to the widespread Late Triassic magma event in Qinling orogen possibly response to interaction of the Yangtze block and the NCC. The new-found Early Triassic zircon is crucial to interpret the Mesozoic tectonic evolution of Qinling orogen due to its quite scarce in the NQT. Geochemistry indicates the ML and MHG plutons are enriched in K, Th, U, Zr and Hf and depleted in Nb, Ta, P and Ti. Both the plutons show variational initial $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (0.703621-0.708299 and 0.706983-0.710276 for ML and MHG plutons, respectively) and $\epsilon\text{Nd}(t)$ values ($-7.9 \sim -14.5$ and $-7.0 \sim -11.1$ for the ML and MHG plutons, respectively). The several low initial $^{87}\text{Sr}/^{86}\text{Sr}$ ratios imply little input of mantle materials. Combine with published data, 160-130 Ma plutons have high Sr/Y (18-90) and La/Yb (15-50) ratios with low concentrations of Mg, Ni and Cr, similar to the affinity of adakitic rocks, probably originated from partial melting of thickened crust. The delamination of the thickened crust may be responsible for lithospheric thinning of the NCC.