

Two episodes of granitoids in the Chinese Altai, Central Asian Orogenic Belt: Records for tectonic transition from post-collision to intraplate settings

ZHENG FAN LIN^{1,2}, CHAO YUAN¹, MIN SUN², YUNYING ZHANG²

¹ State Key Laboratory of Isotope Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China (linzhengfan@gig.ac.cn)

² Department of Earth Sciences, The University of Hong Kong, Pokfulam Road, Hong Kong, China (zyy518@hku.hk)

Tectonic transition from post-collision to intraplate settings is a basic process in orogenic belts. To characterize such a transition in the Chinese Altai, an integrated study on Permian to Triassic granitoids was conducted. Zircon U–Pb dating reveals that two phases of granitoids could mirror such a tectonic transition, namely the early Permian (291–286 Ma) and late Triassic (216–209 Ma) granitoids. Granitoids of both two phases show high SiO₂, low Mg#, low Cr and Ni, and variable Sr–Nd–Hf isotopes, all of which suggest a multiple crustal origin. In general, the Triassic granitoids exhibit similar $\epsilon_{\text{Nd}}(t)$ but relatively higher $\epsilon_{\text{Hf}}(t)$ values than those of the Permian granitoids. Moreover, the Triassic granitoids have relatively higher ASI and more variable Al₂O₃/TiO₂, CaO/Na₂O, Rb/Sr and Rb/Ba values than those of the Permian ones, suggesting that the Triassic magmatic sources were much variable and complicated with higher proportions of sediments. By integrating regional data, it is found that from early Permian to Triassic, the SiO₂, Na₂O + K₂O and Th contents, ASI and ⁸⁷Sr/⁸⁶Sr, Al₂O₃/TiO₂, Rb/Sr and Rb/Ba values for the felsic rocks gradually increase, implying more and more strongly reworking of continental crust. Also, the Rb, Y + Nb and Yb + Ta contents for felsic rocks increase progressively from early Permian to Triassic, demonstrating a geodynamic transition from syn/post-collision to intraplate settings.

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