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## Zircon U-Pb ages and Hf Isotopic characteristics of Paleozoic granitoid intrusions from the Baluntai Region, Central Chinese Tianshan: Implications for Tectonic Evolution and Continental Growth

Huang, H.<sup>1</sup>, Wang, T.<sup>2</sup> Qin, Q.<sup>3</sup> and Tong, Y.<sup>1</sup>

<sup>1</sup> Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China

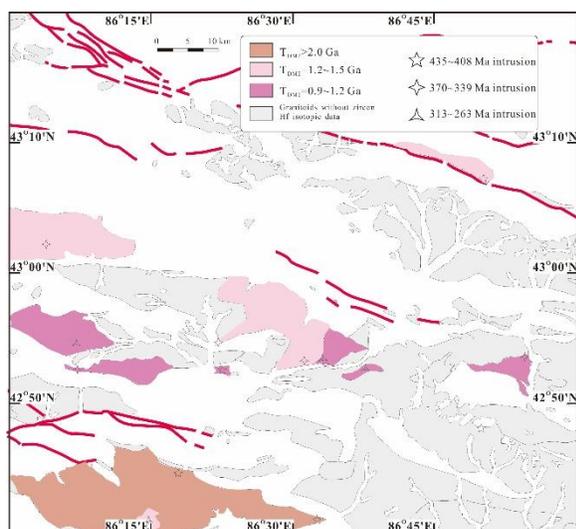
<sup>2</sup> Xi'an Centre of Geological Survey, China Geological Survey, Xi'an 710054, China

<sup>3</sup> China University of Geosciences, Beijing, 100083, China

Corresponding author E-mail: [huanghecugb@126.com](mailto:huanghecugb@126.com)

Chinese Central Tianshan Block, located in the central part of the Tianshan Orogenic Collage, is of significant importance for understanding the tectonic evolution, origination and continental evolution of the Central Asian Orogenic Belt<sup>[1]</sup>. Our study focuses on petrogenesis and tectonic implications of Paleozoic granitoid intrusions from the Baluntai region in the western part of the Central Tianshan Block. We report zircon LA-ICP-MS U-Pb geochronological and MC-ICP-MS Lu-Hf isotopic results for seven granitoid intrusion from the Baluntai region. The studied intrusions were respectively emplaced at 435±5 Ma, 432±4 Ma, 359±4 Ma, 312±4 Ma, 346±2 Ma, 306±5 Ma and 362±5 Ma.

The petrographic and geochemical features suggest that those Paleozoic granitoid intrusions are typical I-type granite in genesis, and were mainly derived from the partial melting of different types of deep crustal (meta-) igneous rocks. Besides, mantle-derived magmas played an important role in genesis of some intrusions. Based on present and previous data, three episodic magmatic events are recognized in the Baluntai region, i.e., Early Silurian to Early Devonian event (~435 to ~408 Ma) magmatic event, Late Devonian to Early Carboniferous (~370 to ~339 Ma) magmatic event and Late Carboniferous to Middle Permian (~313 to ~263 Ma) magmatic event. Such a temporal distribution is in good agreement with that of Paleozoic volcanic pulses of the western Chinese Tianshan. The first-stage magmatism was not only associated with the final closure of the Paleo-Tianshan Ocean that existed to the north of the Central Tianshan Block, but also a result of the subduction of the South Tianshan Ocean (STO) that existed to the south<sup>[2][3]</sup>. The magmatic quiescence during Middle to Late Devonian was probably associated with the suspension of subduction of the STO. The second-stage magmatism was likely related to the northward subduction of the STO, and the third-stage magmatism plausibly occurred in post-collisional settings after the final closure of the STO<sup>[4]</sup>.



According to the regional scale Hf isotopic mapping of Paleozoic granitoids in the study area, we propose that the Precambrian basement rocks were predominately formed at three stages, i.e., (1) ~2.47 to ~2.26 Ga continental growth, responding to the global continental crust growth, (2) ~1.47 to ~1.25 Ga continental growth, associated with the breakup of the Columbia supercontinent and (2) ~1.14 to ~1.02 Ga, overlapping with so-called “Grenville-ages” of

1300–900 Ma that are thought to be resulted from the assembly of the Rodinia supercontinent<sup>[1]</sup>.

*Figure 1: Hf isotopic (Two-stage Hf model age) map for granitoids from the Baluntai region*

*References:*

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- [2] Wang M et al. (2015) *Journal of Asian Earth Sciences* 113: 325-338
- [3] Xu XY et al. (2013) *Journal of Asian Earth Sciences* 72: 33-62
- [4] Han BF et al. (2011) *Earth-Science Reviews* 109: 74-93

