



Geochronological, Geochemical and Sr–Nd–Hf Isotopic Characteristics of Plagiogranite Constrain the Jinshajiang Paleo-Tethyan Ocean Spreading in Eastern Pamir

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Abstract: Till now there is seldom information about the rifting and drifting of the Paleo-Tethyan suture in Pamir, and there are also seldom studies focusing on the correlation between different segments of the Paleo-Tethyan suture from Pamir to central and east Tibet. We present new LA-ICP-MS zircon U–Pb age, in-situ zircon Hf isotopes, whole rock major, trace and rare earth elemental data, and Sr–Nd isotopes from a granodioritic Waqia pluton in the west part of the Mazha-Kangxiwa suture zone, eastern Pamir. The samples from host granodiorites, dioritic enclaves and mafic enclaves are all dated with 322–318 Ma. Both the host and enclave rocks mainly consist of plagioclase, quartz, hornblende with minor amounts of biotite and accessory mineral. Those intermediate to silicic rocks belong to metaluminous, calc-alkaline and tholeiite series plagiogranite, and mainly composed of low-Al tonalite and trondhjemite. The rocks exhibit low total REE concentrations and flat REE pattern, they also display slight enrichment in Rb, Ba, Zr, Hf and negative Nb, Ta, P, Ti anomalies. Both mineral assemblage and chemical composition are similar to typical oceanic plagiogranites. Positive $\epsilon_{\text{Nd}}(t)$ values (+4.63 to +5.02) and $\epsilon_{\text{Hf}}(t)$ values (+9.9 to +14.7) indicate their ultimate origin is part from a depleted mantle source. Based on whole-rock major, trace and rare earth element data and Sr–Nd–Hf isotopic data we interpret that the 322–318 Ma rocks from Waqia pluton are related to the hydrous partial melting of ocean gabbroic rocks in a subduction-modified ocean island arc setting. Combined with the arc-island and syn-collisional granite datas in Pamir, the Mazha-Kangxiwa Paleo-Tethyan ocean has already existed before Carboniferous and it closed in early Triassic (Jiang et al., 2013). Furthermore, we conform this Paleo-Tethyan suture represent the west segment of the Jinshajiang suture based on the detrital zircons, SR–Nd isotopes, paleontological and stratigraphic studies (Robinson et al., 2012). Correlating of the Jinshajiang suture from Pamir to central and east Tibetan plateau, and we find the closure of the Jinshajiang Paleo-Tethys is diachronous and

may suggest a pattern of oblique convergence in plate convergence among the South Qiangtang, the North Qiangtang and the North China terranes.

Key words: Eastern Pamir, Jinshajiang suture, plagiogranite, zircon U–Pb age, Sr–Nd–Hf isotopic, Paleo-Tethyan.

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References

- Jiang, Y.H., Jia, R.Y., Liu, Z., Liao, S.Y., Zhao, P., and Zhou, Q., 2013. Origin of Middle Triassic high-K calc-alkaline granitoids and their potassic microgranular enclaves from the western Kunlun orogen, northwest China: a record of the closure of Paleo-Tethys. *Lithos*, 156–159, 13–30.
- Robinson, A.C., Ducea, M., and Lapen, T.J., 2012. Detrital zircon and isotopic constraints on the crustal architecture and tectonic evolution of the northeastern Pamir. *Tectonics*, v. 31, doi:10.1029/2011TC003013.

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