Affinity of the Trans-North China Orogen: Constraints from detrital zircon U-Pb and Hf isotope compositions from the Fuping Complex, North China Craton

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There is a broad consensus that the North China Craton was assembled by the collision between the Eastern and Western Block along the Trans-North China Orogen at ~1.85 Ga [1]. However, controversy exists on the affinity of the Trans-North China Orogen. The Fuping Complex is located in the central segment of the Trans-North China Orogen and is considered to be the most promising area to investigate the evolution history of the North China Craton. In this study, we investigate the U-Pb and Hf isotopes of about 200 detrital zircon grains from the Wanzi Supracrustals, which are the major lithologies of the Fuping Complex, and the results provide important insights into the problem. The analytical results on metamorphic zircon rims give ages of 1825-1843 Ma, corresponding to the tectonothermal event that led to collision between the Eastern and Western Blocks. Other analytical data on igneous zircon cores mainly yield two age populations at ~2.1 and ~2.5 Ga, with some inherited ages scattering between 2.6 Ga and 2.8 Ga. These two groups of age are equivalent to those of the ~2.1 Ga Nanying granitic gneiss and the ~2.5 Ga Fuping TTG gneiss, respectively [2]. All zircons with ~2.5 Ga age from different samples possess positive initial ε_{Hf} values, ranging from +1.4 ~ +10.9, with a peak at about +5. The depleted mantle Hf model ages of these zircons show a peak at about 2.8 Ga, identical to the main crustal formation age of the Eastern Block [3] and distinct from that of the Western Block [4]. These data suggested that the Fuping complex was emplaced in a continental margin arc system at the western margin of the Eastern Block, thus have affinity to the Eastern Block. The zircons of 2.1 Ga population have initial ε_{Hf} values of -4.9 ~ +6.0 and a younger depleted mantle Hf model age peak at 2.61-2.67 Ga, interpret as a re-melting of the above 2.5 Ga rocks with minor juvenile material contribution. This study was supported by the Hong Kong RGC Grants (7048/03P, 7063/06P, 7058/04P and 7055/05P) and a NSFC grant (40429001).

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Geochemical characteristics and isotope dating of moyite at the southeastern margin of the Kuruktag block, Xinjiang, China

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The plutons from the southeastern margin of the Kuruktag block, Xinjiang, which belong to Proterozoic or Carboniferous according to previous studies, are mainly the moyites. Geochemically, these rocks are metaluminous, alkaline I-type granites. The rocks are also characterized by enrichment of LREE and the REE-Chorinite patterns are similar to those of the he crustal granite. With respect to the trace element, the spider diagrams of the rocks are consisted with the volcanic arc granites. The zircon U-Pb dating yielded an age of the 430.6±1.0Ma (Fig 1), representing the emplacement age of these plutons. This study indicate that the existing of late Caledonia tectonic-magmas in the study area at the first time. The volcanic arc granites suggest the southeastern margin of Kuruktag block was a part of the east Tianshan early Paleozoic magmatism arc.

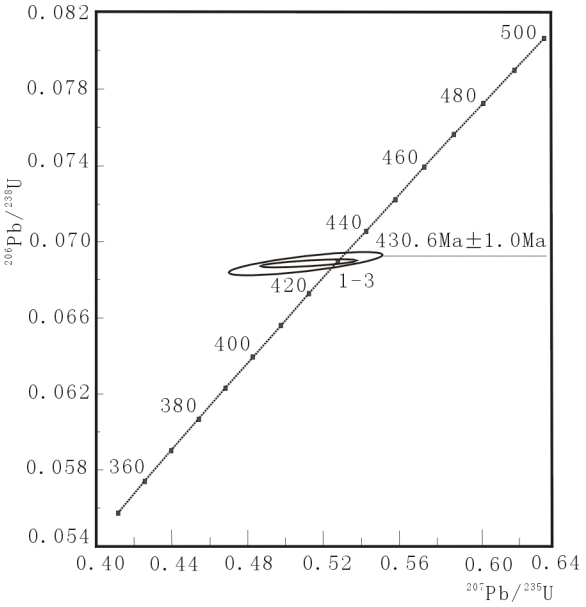

Figure 1. U-Pb dating result diagram of zircon from moyite

Keywords: Zircon U-Pb dating, moyite, the southeastern margin of the Kuruktag block