SHRIMP U-Pb zircon geochronology of the Hengshan-Wutai-Fuping mountain belt, North China Craton

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Recent advances in understanding the architecture of the North China Craton have led to recognition of the Trans-North China Orogen, a Paleoproterozoic collisional orogen along which the Eastern and Western Blocks amalgamated to form a coherent craton. As the most lithologically representative exposure across the Trans-North China Orogen, the Hengshan-Wutai-Fuping belt is considered to be the most promising area for investigating the history of the orogen. In order to determine the timing of major geological events in the mountain belt, we have carried out extensive SHRIMP U-Pb zircon dating on the representative lithologies of the mountain belt and obtained numerous new age data. Based on these new data, we summarize the major geological events of the mountain belt as follows.

In the late Archean to Paleoproterozoic, the Hengshan-Wutai-Fuping region was part of a continental margin arc along the western margin of the Eastern Block, which was separated from the Western Block by an old ocean, with subduction of the oceanic lithosphere beneath the western margin of the Eastern Block. At 2550-2520 Ma, the deep subduction caused partial melting of the subducting slab and lower crust, producing the Wutai granitoids. At 2530-2520 Ma, the subduction of the oceanic lithosphere caused the partial melting of the mantle wedge, forming part of the Wutai greenstones. At 2520-2450 Ma, the further subduction caused the partial melting of the lower crust, forming the Hengshan and Fuping TTG suites. At 2360-2000 Ma, a number of episodes of granitoid magmatism occurred in the mountain belt. At ~1915 Ma, an asthenosphere-uprising event, probably related to the subduction of the oceanic ridge, resulted in the widespread emplacement of mafic dykes which were subsequently metamorphosed to be high-pressure granulites. At ~1850 Ma, collision between the Eastern and Western Blocks led to the final amalgamation of the North China Craton.

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