Geophysical Research Abstracts
Vol. 21, EGU2019-8573, 2019
EGU General Assembly 2019

Detrital zircon U-Pb-Hf isotopes and trace element analysis of Paloezoic sedimentary rocks in the Bainaimiao arc belt: Implications for provenance and tectonic evolution of the eastern segment of the Central Asian Orogenic Belt

Bo Wang
the University of Hong Kong, Faculty of Science, Earth sciences, Hong Kong (wangbo88@connect.hku.hk)

It is broadly accepted by researchers that the North China Craton (NCC) was linked with the Pangea supercontinent by the Central Asian Orogenic Belt (CAOB) resulted from the final closure of the Paleo Asian Ocean (PAO), but when and how still be controversial, such as one-sided subduction and continental collision, or double-sided subduction and soft collision, the ocean basin closed in the Devonian or Late Permian and so on. We conducted zircon U-Pb-Hf isotopes analyses of 5 Paleozoic sedimentary samples which collected along the Bainaimiao area, locates at the northern margin of the NCC, and compared their zircon U-Pb isotopic ages and εHf(t) values with those former published data in the north orogenic belt (NOB) and the south orogenic belt (SOB) to trace provenance differences between the NOB and SOB. Our sedimentary samples have several prominent age peaks at circa 270 Ma, 460 Ma, 1350 Ma, 1750 Ma and 2500 Ma, respectively, and cover different εHf(t) values in different age peaks, which have shown complex tectonic evolution of the NCC and the Bainaimiao arc belt. In our comparison, the Neo-Proterozoic zircons are common seen in the NOB data, but rare in the SOB data, and Devonian zircons from the NOB have mostly shown positive εHf(t) values while most of which from the SOB are negative, which mean that the NOB magmatism events in Paleozoic period had formed juvenile crust but the SOB magmatism events in temporary period result from reworking of older crust according to detrital zircon ages and relevant εHf(t) values. In addition, trace elements analysis of the detrital zircons, such as U, Hf, Y, Th, Yb and so on, was also used to help distinguishing the tectonic setting of the formation of these zircons. Our data shows that most Paleozoic zircons have lower Y concentration and higher U/Yb (>0.1) ratios, which can be inferred that these zircons may crystalized in continental magmatic setting, which supports the viewpoint that the oceanic crust of the PAO subducted beneath the NCC in the Paleozoic to form and transform the Bainaimiao arc belt. In summary, we use detrital zircons geochronology and trace elements analyses to outline Paleozoic magmatic events occurred in the northern margin of the NCC, to discuss the attribute of the Bainaimiao arc belt, and imply that there was no material exchange between the NOB and the SOB in the Paleozoic, namely, the PAO oceanic basin still remained open until the Permian, and the eastern segment of the CAOB may finally formed after the Paleozoic.