Geophysical Research Abstracts
Vol. 20, EGU2018-4078, 2018
EGU General Assembly 2018

Isotopic Geochronology and Tectonic Significance of Late Paleozoic Metamorphic Rocks of Wudaogou Group in the Eastern Yanbian Area, NE China

Yunsheng Ren (1), Cong Chen (2), and Qun Yang (1)

(1) College of Earth Sciences, Jilin University, China (renys@jlu.edu.cn), (2) Shenyang Geological Survey, CGS, Shenyang, China

The Yanbian area in northeast China is an important component of the eastern segment of the Central Asian Orogenic Belt (CAOB). During late Paleozoic and Mesozoic, this area experienced Paleo-Asian Ocean domain, Paleo-Pacific Ocean domain and their transforming process. Due to its special geologic evolution history, this area has been taken as a crucial region for tectonics, magmatism and metal mineralization.
The metamorphic rocks of Wudaogou Group occurring in the eastern Yanbian area host Yangjingou large tungsten and Xiaoxi'nancha gold deposits, and has drawn more and more attention. It was previously classified as Paleoproterozoic or Early Palaeozoic on basis of regional comparison. Recent studies, however, reported late Paleozoic ages from the meta-volcanic rocks and the meta-sedimentary rocks.
Two samples, two-mica quartz schist and carbonaceous andalusite two-mica metamorphic siltstone which experienced greenschist-low amphibolite facies metamorphism, were collected from upper Wudaogou group in Hunchun area, NE China. 69 grains of zircon have been conducted the LA-ICP-MS U-Pb dating. According to crystal shapes, U/Th ratios and REE compositions, these zircon grains can be classified as metamorphic and magmatic zircons. Their isotope ages change from 249±4 to 818±5 Ma. 8 metamorphic zircons yield age range of 249±4Ma to 266±4 Ma. Ages of more than 60 grains of magmatic zircon can be roughly divided into four group, 253∼269 Ma,300∼422 Ma,489∼500 Ma and 580∼818 Ma,respectively. The youngest zircon age group of 253∼269 Ma, can be taken as the maximum depositional age of the sedimentary protolith.
According to the new data obtained, it is suggested that volcanic and sedimentary protolith formed in the mid-late Permian, instead of Paleo-Mesoproterozoic or early Paleozoic Era. During early Triassic, the Wudaogou group experienced regional low-grade metamorphism. These isotope dating results, together with recent knowledge on regional tectonic evolution, indicate the Wudaogou group has closely relationship with the closure of the Paleo-Asian Ocean. Therefore, this study prefers a tectonic scenario that the Xar Moron River-Changchun suture zone which is taken as the boundary of CAOB and North China Plate, eastward extends to Hunchun area.
In addition, there widespread occur late Paleozoic granitic rocks intruding metamorphic rocks of Wudaogou Group in eastern Yanbian area. Rock types of these intrusions mainly include granodiorite, monzonitic granite, tonalite and quartz diorite. LA-ICP-MS zircon U-Pb dating indicate that all these granitic intrusions formed in late Permian period (250∼265Ma), almost simultaneously with the sedimentation and volcanism of metamorphic rocks of Wudaogou Group. Major and trace elements compositions show that these granitic rocks belongs to calc alkaline I-type granite and formed under island-arc or active continental margin tectonic setting. This conclusion is coincident with knowledge on metamorphic rocks of Wudaogou Group and regional tectonic evolution.

Acknowledgments:This work was supported by the National Key R&D Program of China (2017YFC0601304)