Acta Geologica Sinica (English Edition), 2019, 93(supp.2): 212–213

U-Pb Zircon Geochronology and Geochemistry of Ophiolite in Xiemisitai Area of West Junggar, NW China

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Citation: Tan et al., 2019. U-Pb zircon geochronology and geochemistry of ophiolites in Xiemisitai area of West Junggar, NW China. *Acta Geologica Sinica* (English Edition), 93(supp.2): 212–213.

Abstract: The Central Asian Orogenic Belt (CAOB), known as one of the most enormous acrretionary orogens, sharing borders with the Siberia Craton by the north and the China-Tarim Craton by the south, spreads from Urals in the west, through Uzbekistan, Tajikistan, Kyrgyzstan, and Kazakhstan, northwest China, Mongolia, and northeast China to the Russian (Shen et al., 2012). The CAOB has an intimate connection with the evolution of Paleo-Asian Ocean which experienced geodynamic processes like seamounts accretion, ridge-trench interaction, the constitution of back-arc basins (BAB), etc (Xiao et al.2015). The West Junggar, situated in north Xinjiang of China between the Kazakhstan and Tarim Plate, is an essential part of the Central Asian orogenic belt. The tectonic events of the West Junggar is closely related to the Central Asian orogeny. The Paleozoic tectonic evolution in this areas has been formed by the ancient Asian oceans' subductions, accretions and other collisions simultaneously; the magma activities are relatively vibrant and the tectonic structures are more complex than any other areas in the West Junggar. Therefore, lots of the geologists from China and foreigners are longing to figure out remaining puzzles in this field. Inthis paper, we have carried out U-Pb ziron dating as well as geochemical researches in the Xiemisitai ophiolite in the middle of the West Junggar, representing the relics of Paleo-Asian Ocean crust.

The studying area is located in the southern part of the Xiemisitai Mountains, and it has 47 kilometers southwest far away from the Buxail Mongolian Autonomous County. The main exposed strata in the area are the Julumut group of the Devonian system. The main rocks in the Xiemisitai ophiolite composed of massive basalts, gabbros and peridotites, which have the typical ophiolite suite characteristics. Zircon mineral separates frin one of the gabbro samples get the U-Pb dating yielding a concordia age of 495.9±5.2 Ma (MSWD of concordance=1.3 n=23) in $^{206}Pb/^{238}U$ and $^{207}Pb/^{235}Pb$ within analytical errors (Fig. 1), This age is younger than the previous reported age of 517±3Ma (MSWD=0.16, n=15) (Zhao et al., 2013). Chondrite-normalized (Nakamura, 1974) REE patterns of Xiemisitai ophiolite (Fig. 2) are marked by: (1) moderately

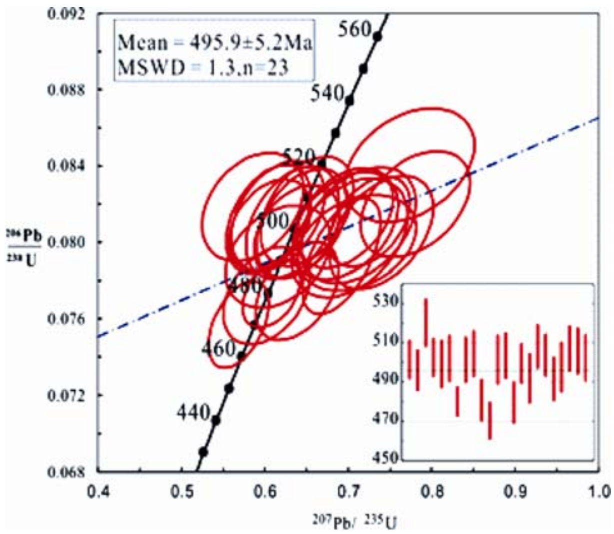

Fig. 1. LA-ICP-MS zircon U-Pb analyses.

LREE-depleted in gabbro, and (2) slightly enriched in HREE. Compare to depleted mid-ocean ridge basalts (N-MORB) (Sun and McDonough, 1989), the incompatible trace elements of the mafic rocks (Fig. 2) show: (1) short depletion in the large ion lithophile elements (LILE) and with enrichment in HFSE, Ce in gabbro. Each graph's lines show a kind of steady and smooth change trend. Nb, Ta both show negative anomaly, and this situation would be similar to the back-arc basin ophiolites characteristics. Thus, we suggest the Xiemisitai ophiolite was formed in a back-arc limited oceanic basin.

Key words: Ophiolites, West Junggar, Xiemisitai, Back-arc basin

Acknowledgments: This work is granted by the National Natural Science Foundation of China (Grant No. 41772059), CAS "Light of West China" Program (2018-XBYJRC-003), Guangxi Natural Science Fund for Distinguished Young Scholars (Grant No. 2018GXNSFFA281009), Guangxi Postgradute Innovation Project (Grant No. YCSW2019155) and

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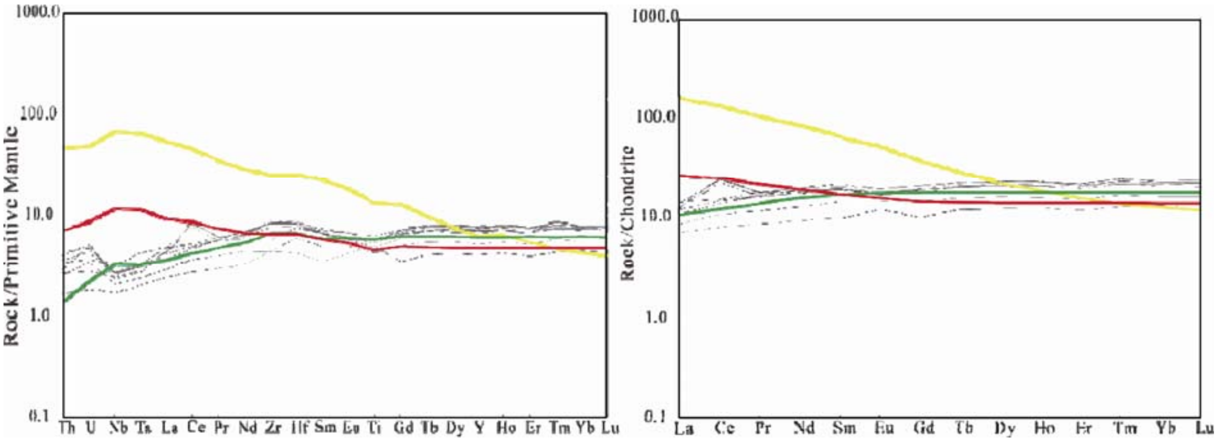

Fig. 2. Chondrite-normalized REE pattern and the incompatible trace elements pattern of Xiemisitai's ophiolite.

Bagui Scholar Innovation Project of Guangxi Province (to XU Ji -feng).

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