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Discovery and Tectonic Significance of the Early Paleozoic Nuodong Ophiolite in the North-western Yunkai Massif, South China

LIU Songfeng^{1,*}, PENG Songbai^{1,2}, WU Changfeng^{1,3} and LIN Musen^{1,4}

1 School of Geosciences, China University of Geosciences, Wuhan 430074, China

2 Center for Global Tectonics, China University of Geosciences, Wuhan 430074, China

3 Western Fujian Geological Team, Xiamen 361003, China

4 College of Zijin Mining, Fuzhou University, Fuzhou 350108, China

In this study we report the Early Paleozoic strongly deformed metabasalt, metadiabase and metapyroxenolite, located in the North-Western YunKai massif, South China,

which are NE-SW distributed as tectonic slices in the low-grade metamorphic strata. Geochemical studies of the metabasalt and metadiabase show that MgO=6.78%–

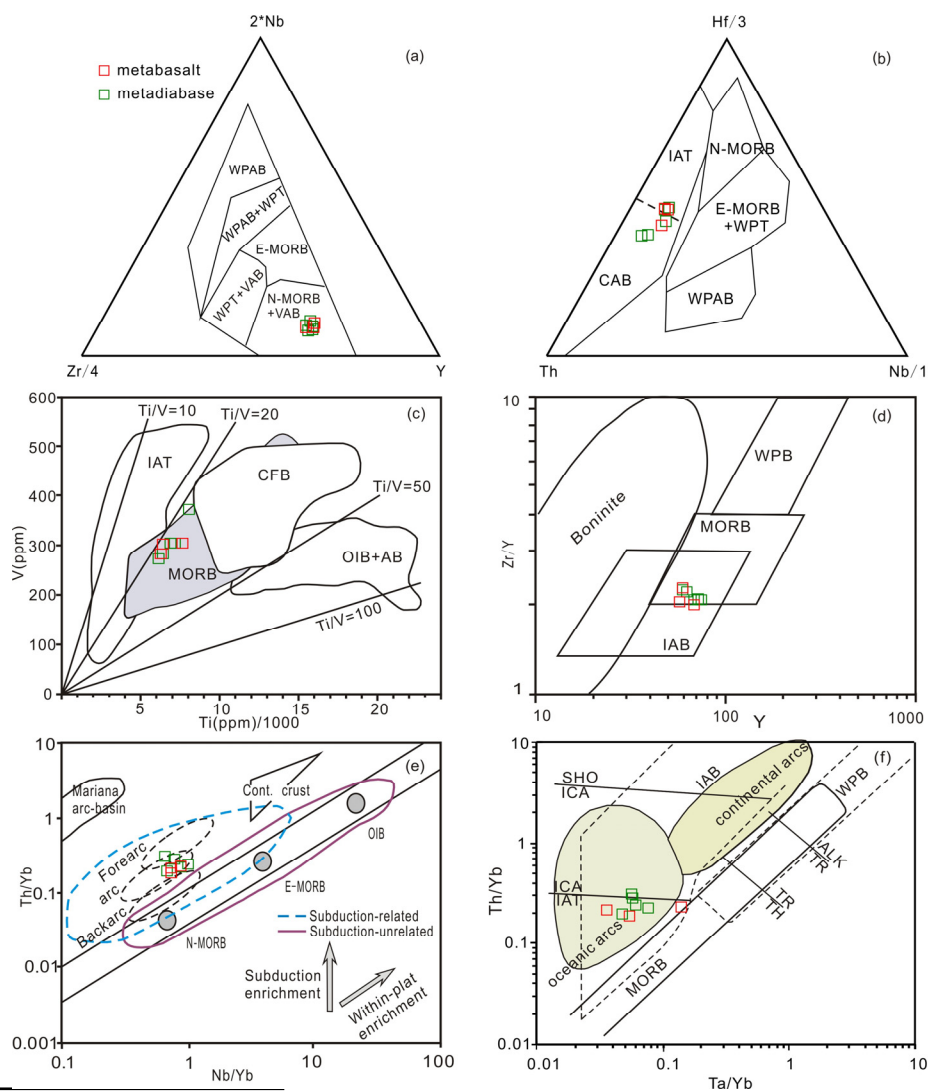


Fig. 1. Trace element tectonic discriminant diagrams for the Nuodong ophiolite.

(a) $2^*Nb-Zr/4-Y$ (Meschede, 1986); (b) $Hf/3-Th-Nb/16$ (Wood, 1980); (c) $V-Ti$ (Shervais, 1982); (d) $Zr/Y-Zr$ (Pearce and Norry, 1979); (e) $Th/Yb-Nb/Yb$ (Pearce, 2008; Metcalf and Shervais, 2008; Dilek, 2011); (f) $Th/Yb-Ta/Yb$ (Pearce, 1982).

* Corresponding author. E-mail: 1229069736@qq.com

9.11% , Mg#=55–63, $\text{TiO}_2=1.02\% -1.34\%$ (average 1.15%), $\text{CaO}/\text{Al}_2\text{O}_3=0.54-0.80$. The chondrite-normalized REE distribution patterns are slightly depleted—flat type with no obvious Eu anomaly, while the N-MORB-normalized spider diagrams show pronounced enrichment of LILEs (e.g. Rb, Ba, U, K, Pb and Sr) and relative depletion of HFSEs (e.g. Nb, Ta). $(\text{La}/\text{Yb})_N=0.68-0.95$, average La/Nb, Ce/Zr, Zr/Nb, Zr/Y, Ti/Y are 1.44, 0.14, 26.67, 2.13, 222.64, respectively. The tectonic environment of the metabasalt and metadiabase are similar

to the subduction-related ophiolites according to the trace element tectonic discriminant diagrams (e.g. Th/Yb-Nb/Yb). The LA-ICP-MS zircon U-Pb age of the metadiabase is $437\pm 5\text{Ma}$, which is belonging to Silurian. In conclusion, we suggest that the basic volcanic complexes are Early Paleozoic oceanic ophiolite fragments. The discovery and confirmation of the Nuodong ophiolite provide an important new evidence directly for the existence of the Early Paleozoic oceanic basin and ocean-continental subduction in South China.