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## Discovery and Tectonic Significance of Paleoproterozoic Ophiolite from North Huangling Dome, Yangtze Craton

HAN Qingsen<sup>1,2</sup>, PENG Songbai<sup>1,2</sup>, CEN Yang<sup>3</sup> and JIANG Xingfu<sup>4</sup>

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

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

3 Geotechnical Engineering Institute, Zhejiang Guangchuan Engineering Consultation Co., Ltd. Hangzhou 310020, China

4 College of Earth Sciences, East China Institute of Technology, Nanchang 330013, China

Ophiolites represent fragments of ancient oceanic lithosphere, tectonically incorporated into continental margins during plate subduction or remained in the subduction-collisional orogenic belt. We report for the first time a Paleoproterozoic supra-subduction zone mafic-ultramafic complex from north Huangling dome, northern Yangtze craton. They are dismembered and incorporated within a NE distributed mélangé belt, and show close association with the strong deformed biotite-plagioclase gneiss/schist, metapelite, siliceous rocks and granitic gneiss. The metamafic-ultramafic rocks mainly consist of serpentinization harzburgite, olive pyroxenite, and amphibolite. Serpentinization harzburgite shows high magnesium and low silicon characteristic with low SiO<sub>2</sub> content (37.35-38.03wt.%), high MgO content (37.00-37.96wt.%) and high Mg<sup>#</sup> value (87.5-88.4),  $\Sigma$ REE=3.17-7.91 ppm. They have slightly enriched LREE patterns with flat shape of HREE and MREE distribution, while spinels from the harzburgite show abyssal peridotites origin, indicating a LREE-enriched abyssal residual mantle peridotites affected by subduction metasomatism. The TiO<sub>2</sub> contents of the amphibolite range from 1.02 wt.% to 1.39 wt.%, MgO from 5.87 wt.% to 7.29 wt.%, Mg<sup>#</sup> value from 45.9 to 53.0, and Na<sub>2</sub>O/K<sub>2</sub>O from 2.25 to 2.70, FeOT/MgO from 1.59 to 2.12, indicate that the amphibolite belongs to tholeiite series. Amphibolite exhibit subparallel and generally flat to right-sloping patterns with weak enriched LREE relative to HREEs and enrichment in LILE (e.g. K,

Rb, Ba, Th, Cs) along with HFSE negative anomalies such as Nb, Ti, suggest a supra-subduction zone (SSZ) environment with an enriched mantle source for the amphibolite. LA-ICP-MS zircon U-Pb dating give approximate formation ages of 2142-2148 Ma for Amphibolite and a later metasomatic event (2048-2025 Ma) both for amphibolite and serpentinization harzburgite caused by melt/fluid derived from the subducted slab. We infer that the protolith of amphibolite may derived from depleted mantle at early paleoproterozoic (ca. 2.20-2.15 Ga), and zircon in harzburgite show negative e<sub>HF</sub>(t) values and model age old as Archean, indicate the zircon grains mainly formed in the process of metasomatism by subduction melt/fluid in the mantle wedge. The quartz monzonitic dyke crosscutting the harzburgite yields a crystallization age of 1999±10 Ma, represent the minimum emplacement age of the mafic-ultramafic rocks. In conclusion, we infer that the metamafic-ultramafic rocks is paleoproterozoic (ca. 2.2-2.1 Ga) back arc ophiolite fragments formed in a supra-subduction zone in the northern Huangling dome, Yangtze craton, and it provides important geological evidence for the paleoproterozoic oceanic-continental subduction and accretion-collision orogenic event associated with the amalgamation of the Columbia supercontinent.

**Keywords:** Yangtze Craton; Huangling Dome; Paleoproterozoic; supra-subduction zone ophiolite; Columbia supercontinent

\* Corresponding author. E-mail: hanqingsen2008cug@gmail.com