



## **1.0 Ga Ophiolite on North Margin of the Yangtze Craton Clarifies South China's Amalgamation with Rodinia**

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We report the presence of a Grenvillian ophiolite on the northern margin of the Yangtze craton, drastically changing current ideas about South China's position in plate reconstructions of the Rodinia supercontinent. Strongly deformed pillow lavas, isotropic and layered metagabbro, diabase dikes, serpentized dunite and harzburgite with podiform chromite are dated at circa 1000 Ma (U-Pb zircon). The ophiolite is structurally dismembered and thrust over the Proterozoic shelf sequence that covers the north margin of the Yangtze craton, and overrode a conglomerate-wildflysch unit shed from the ophiolite and a magmatic arc terrane. The youngest clasts in the conglomerate are circa 861-813 Ma (U-Pb zircon), giving a maximum age for ophiolite emplacement. The fine-grain layered amphibolites exhibit  $\text{TiO}_2 = 1.14\%-1.48\%$ , slightly depleted-flat type REE curves with no obvious Eu anomalies,  $(\text{La} / \text{Yb}) \text{N} = 0.87-1.12$ , average  $\text{La} / \text{Nb}$ ,  $\text{Ce} / \text{Zr}$ ,  $\text{Zr} / \text{Nb}$ ,  $\text{Zr} / \text{Y}$ ,  $\text{Ti} / \text{Y}$  are respectively 1.04, 0.15, 18.78, 2.53, 290.51, and the average  $\text{Nb} / \text{Th}$  is 9.88. These features show that these amphibolites are N-MORB type tholeiites typical of mid-ocean ridge tectonic settings. The metagabbro has typical cumulate textures, flat REE distributions and obvious positive Eu anomalies. The REE characteristics of serpentized dunites show a U-shape of slight loss of middle REE, representing cumulates metasomatized by LREE slightly enriched mantle. All these features indicate that the metamafic-ultramafic rocks from the Proterozoic Miaowan Formation form a structurally dismembered ophiolite resting above an ophiolitic mélangé, sitting on top of the Proterozoic shelf sequence on the Yangtze craton. The discovery of the Proterozoic Miaowan ophiolite supplies important evidence for the existence of a Neoproterozoic oceanic basin on the north margin of the Yangtze craton, and demonstrates that the Yangtze craton first collided with Rodinia on its northern margin, with subsequent accretion of the Cathaysia block on the southern margin of the craton.