Neoproterozoic (~ 850 Ma) subducting in the Jiangnan orogen: New SHRIMP age of the Fuchuan SSZ-ophiolite, South Anhui, China

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The Jiangnan orogen separated the Yangtze continental terrane in the northwest and Cathaysia continental terrane in the southeast of the South China plate, the northeastern boundary of which is marked by the Fuchuan belt, the largest ophiolite block in South China. The Fuchuan ophiolite is represented by two tectonically distinct ophiolitic units: (1) the mantle peridotite unit, mainly composed of massive harzburgites; (2) the lava unit, including pillow lavas and cumulated rocks (dunite – whelrite – gabbro). Massive harzburgites are medium to heavily serpentinized, the high $Cr^{\#}$ (54 to 68) spinel and the U-shaped REE patterns of them consisting with those in the Izu-Bonin-Mariana peridotites indicate that the Fuchuan harzburgites formed in the suprasubduction zone (SSZ), and thought as a residue after about 35% partial melting of a primordial mantle source. The cumulated rock suite of dunite – whelrite – gabbro is considered as a record of suprasubduction zone tectonic setting [1] due to the stability field of olivine crystallization is decreased relative to pyroxene at moderate to high pressures [2, 3], as a result, the clinopyroxene co-crystallizing with olivine formed the wherlite in which the $Mg^{\#}$ of clinopyroxene (84.1-86.6) is equal to the Fo of olivine (84.5-85.6) in the Fuchuan ophiolite, and the low Ti (0.02-0.04 mol) and high Cr_2O_3 (0.9-1.3 wt%) aboundences of clinopyroxene in wherlite are consisitent with SSZ-ophiolitic ultramafic cumulates [4]. The SHRIMP U-Pb ages of the co-magmatic zircon domains from one gabbroic dyke, plagiogranite intruded in the harzburgite and the wehrlite are 848 ±12 Ma (n=7, MSWD=1.9), 849 ± 10 Ma (n=9, MSWD=1.4), and 827 ± 9 Ma (n=12, MSWD=1.4), respectively, suggesting that the subduction of the Jiangnan Ocean started before ~850 Ma. We infer that the Yangtze continental terrane and the Cathaysian continental terrane started to weld together at least before 827–849 Ma, which is consisting with the conclusion described early by Zhao and Cawood [5].

Keywords: SHRIMP, SSZ-ophiolite, Jiangnan orogen

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Silicon isotope compositions of the underground water, limestone and soil from Karst caves in Guilin City, Guangxi, China

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Silicon isotope variation in hydrosphere catches more attention of geochemists recently. Several studies have been done on silicon isotope compositions of oceanic and riverine water [1,2]. Significant variation of silicon isotopes is discovered in these environments, indicating fine prospects of using silicon isotope to study hydrological processes and silicon circulation. We know that underground water is an important part of hydrosphere. However, no results on its silicon isotope composition have been reported by now.

A silicon isotope study on underground water has been carried out. Some results on silicon isotope compositions of the underground water, limestone and soil from the karst caves are reported here. All samples were collected from Panlongdong and Xiaoyandong karst caves in Guilin city, Guangxi, China.

The $\delta^{30}Si$ values of underground water in these two caves vary from 1.4‰ to 1.9‰, with average value of 1.65‰.The $\delta^{30}Si$ values of trace silicon in limestone from two caves vary from -0.2‰ to 0.3‰, with average value of 0.05‰. The $\delta^{30}Si$ values of soils from these caves vary from -0.5‰ to -0.2‰, with average value of -0.4‰. No silicon isotope datum has been obtained for stalagmite, for its silicon content is too low. These results indicate that in the weathering process of limestone in the karst area, the produced soil tends to be enriched in ^{28}Si and the dissolved silicon in underground water tends to be enriched in ^{30}Si. These observations provide useful information for silicon transportation in continental environment.

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