Formation of the oldest rocks in the Cathaysia Block, Southern China

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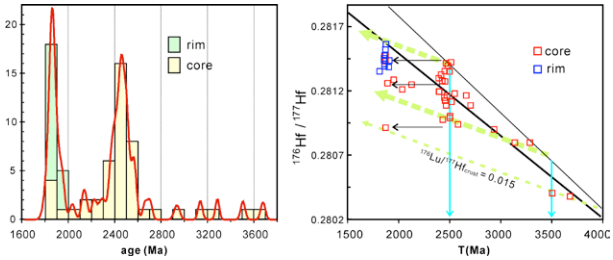
Precambrian basement in the Cathaysia Block of South China is mainly found in the Wuyishan area (southern Zhejiang and northwestern Fujian Provinces). The Badu Complex which is the oldest rock in the area consists of various mets-sedimentary rocks and was intruded by Paleoproterozoic (1.88-1.86 Ga) granites. CL images, U-Pb dating results and trace element compositions of zircons from the high-grade metamorphic rocks in the Badu Complex indicate that inherited zircon cores are of magmatic origin and predominantly formed ca. 2500 Ma ago, while the rims overgrew at 1886-1882 Ma and 252-234 Ma. Although some zircon cores have Paleoproterozoic ages similar to the rims, the similarity in the trace element and Hf-isotopic compositions between these Paleoproterozoic cores and those Neoarchean cores suggests that these zircon cores underwent intense Pb-loss resulting from late high-grade metamorphism. The unimodal age (~2.5 Ga) distribution of detrital zircons and positive εHf(t) of most Neoarchean zircons (Fig. 1) suggests that the detritus of these sedimentary protoliths probably came from a proximal volcanic arc, implying that they were deposited in an arc basin and almost synchronously with ~2.5 Ga volcanism. These are the oldest rocks in the Cathaysia Block found so far. The combination of zircon U-Pb ages and Hf-isotope data suggests that both generation of juvenile crust and reworking of 2.8 Ga and 3.5-3.3 Ga crust occurred at ~2.5 Ga.



Strong ~1.9 Ga thermal event only involved the reworking of older crust material without the input of juvenile crust.

Geochemical characters and LA-ICP-MS zircon U-Pb dating of the Lenglonglin volcanic rocks in North Qilian tectonic belt

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The Qilian Orogen is divided into the Northern, Central and Southern Qilian. Lenglonglin area of Menyuan is located in the east segment of Northern Qilian and is composed of volcanic rocks and little acid volcanic rocks. Geochemical analyses show that Lenglonglin rocks have SiO_2 ranging from 48.94 to 60.97 wt %, K_2O/Na_2O less than 1, SiO_2-Nb/Y and SiO_2 - FeOT/MgO diagram shows the samples belong entirely to the tholeiitic series. Low Ti and high Al,Fe indicating that they are typically characterized as is land arc volcanic rocks. These monzogranites are depleted in HFSE, such as Ta, Nb and Ti, such as enriched in LILE, such as K, Th, Rb and Ba, with total REE contents ranging from 9.88 to 42.21 ppm and ∑LREE/ ∑HREE ratios of 0.81-5.70. The Chondrite-normalized REE patterns of these volcanic rocks is weak negative Eu anomalies (δEu = 0.58-1.10), These results with the accepted Kermadec island volcanic of New Zealand is very similar.At the same time, Zr/Y-Zr、Ti-Zr、Tb-Th-Ta*2 and Hf/3-Th-Ta indicate that these volcanic rocks could represent typical land arc volcanic rocks. In order to limit accurate formation time of Lenglongling volcanic rocks in the east segment of North Qilian orogenic belt by LA-ICP-MS U-Pb isotope dating technique, combined with cathodoluminescence image(CL) study, was used to determine the zircons from Lenglongling Dacite. Two main populations of zircons from Lenglongling Dacite obtained, giving an average $^{206}Pb/^{238}U$ ages of 460. 17±0.92Ma and 203.2Ma±3.8Ma. With the relevantdata synthesized, Lenglongling Intermediate-Basic volcanic rocks were considered to form in the Middle Ordovician, It was transformated by the Yanshan collision orogeny. These new data have important significance for further research on the tectonic evolution and the ore prospecting directions in the east segment of the north Qilian orogenic belt .

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