

Petrogenesis and tectonic implications of early Paleozoic TTGs in the Wuyi-Yunkai orogen, China.

Abstract

How the extensive magmatism of South China occurred during early Paleozoic time, and its potential linkage with assembly of east Gondwana, are key issues in understanding early Paleozoic tectonic setting of Wuyi-Yunkai orogen in east Asia. Besides, the TTG suites of the orogen didn't draw researchers' attention so that few studies have been carried out. Here we report new zircon U-Pb ages, geochemical and Lu-Hf isotopic data for the Tancheng TTG pluton in Cathaysia block to constrain their age, petrogenesis and tectonic implications. New LA-ICPMS U-Pb zircon dating results of zircon reveal that the protoliths of the Tancheng pluton crystallized at 436 Ma. The TTG pluton show low SiO₂ (average is 68.95%) and K₂O (average is 2.38%) contents, and higher content of CaO with low K₂O/Na₂O ratios (average of 0.64, less than 1), indicating it belongs to the sodic-rich or sodic-potassic transitional series. Not like modern adakites, these samples have lower Na₂O (3.42–4.19 wt.%) and Sr (290–451 ppm) contents, as well as Sr/Y ratios (19.17–50.5), and higher Y (8.15–19.3 ppm) and Yb (0.79–1.87 ppm) contents. The high initial ⁸⁷Sr/⁸⁶Sr ratios (0.7099–0.7121) and negative εNd(*t*) (-7.92 to -6.04) and εHf(*t*) (-6.3 to -1.5) values. Based on the evidence, the Tancheng pluton is likely to be formed from the crust with low maturity induced by the underplating of the basic lower crust enriched in amphibole by dehydration and partial melting under higher pressure. And during the ascending of magma, there was fractional crystallization and a small amount of upper crust materials were contaminated. In combination with the whole exposed early Paleozoic granitoids in the orogen, the early Paleozoic event may be an intracontinental one due to the far-field reaction connected with east Gondwana.

Key words: TTG; early Paleozoic; Wuyi-Yunkai orogen; east Gondwana