Early crustal evolution of the Yangtze Block: Original zircon U-Pb ages and Hf isotopic composition evidence of the Paleoproterozoic granites from the Northern Kongling Terrain, South China

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Two granites ware disintegrated from the Kongling Terrain in the northwestern part of the Yangtze Block, which are characterized by high SiO_2 (69.63-74.51%) and alkali (6.11-8.55%), low CaO (1.12-1.58%) and Al_2O_3 (1.12-1.58%), similar to the feature of A2-type granite in post-orogenic environment. Both the two are enriched in Ga, Y, Zr and Nb, and that value of 10000*Ga/Al (8.98) are higher than statistic of A-type granite (3.75). Zircon $^{207}Pb/^{206}Pb$ dating illustrates the formation age of 1895Ma for Baizhuping grainte and 2234Ma for Kongziqiao granite respectively. The older granite shows negative $\varepsilon Hf_{(t)}$ values (−12.4 to −4.9) with old model Hf ages (2.8 to 3.1 Ga), while the younger one exhibits more negative εHf(t) values (−16.2 to −13.2) with younger model Hf ages (2.8 to 2.9 Ga). Combined with the old average crustal model age (3.53~4.22Ga), it can be indicated the granite magmas source was derived from melting of preexisted Neoarchean basement by recoreding the cratonization of Yangze Craton. There is a well-defined passive-type continental margin along the margin of the Yangtze Block at ca. 2.0 Ga. Thus, the Kongziqiao granite may go ahead of this passive-type continental margin with SSZ-type ophiolitic mafic-ultramafic rocks at ca. 2.2-2.0 Ga, in contrast, the later Baizhuping granite may witness the orogenic collapse – the start of the Columbia supercontinent breakup at ca.1.8 Ga.