Paleoproterozoic evolution of the Yangtze Block during the assembly of Columbia: Evidence from the Huashanguan post-collisional granite complex

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The Yangtze Block in South China is suggested to have been involved in the assembly of the supercontinent Columbia by the occurrence of high pressure metamorphism belt along the northern margin. However, the subsequent magmatism and the position of the block within the supercontinent have not been well constrained. The Huashanguan granite complex in the Nothern Yangtze Block is comprised by monzogranite and rapakivi granite. In situ zircon LA-ICPMS dating reveals that they have similar formation ages of 1816±50 Ma and 1843±9 Ma respectively. They have uniform negetive ziron $\varepsilon_{Hf}(t)$ values of -16.3 to -18.1, corresponding to T_{DM2} ages of ~3.6 Ga. The $\delta^{18}O$ values average at 6.80 ± 0.09 ‰. These indicate the granites were generated by partly meltting of Paleoarchean crustal materials, implying the wildspread of >3.5Ga continental crust in the Yangtze Block.

The formation ages of the Huashanguan granite complex are contemporaneous or slightly later than the 2.0-1.85 Ga metamorphism event in the northern Yangtze Blcok, but much earlier than the worldwide breakup event of the supercontinent Columbia. Furthermore, the granites show geochemical features as the A_2-type granite, which imply a post-collisional environment. Collectively, we suggest the Huashanguan granites were formed in a post-collisional setting following the arc-continental collision during the assembly of the supercontinent Columbia. It is inferred that the Northern Yangtze Block was located on the margin of the supercontinent Columbia, and experienced an accretionary orogeny process.