

A chronotectonic framework of the Kongling complex in Yangtze craton, South China

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The Kongling complex, an important part of the basement block for the Yangtze craton, is exposed in the northern of the Huangling anticline in western Hubei province. It mainly consists of high-grade metamorphic TTG gneisses, amphibolites, leptynites and khondalite series. Zircon U-Pb ages and Lu-Hf isotopic compositions from the Kongling complex were analyzed by LA-ICP-MS and LA-MC-ICP-MS. Taking into together with the available geological data, a perfect chronotectonic framework of the Kongling complex can be summarized as follows: (1) At (>3.2)Ga, there are already old crustal relicts existence. The detrital zircons from the Huangling area show that juvenile crustal additions occurred mainly between 3.2 and 3.8 Ga. (2) At (3.2-3.0)Ga, the tholeiitic basalt is produced and formed the greenstone belt. Based on trace elements and isotope geochemical data, the mafic volcanic rocks is formed continental initial rift. (3) At (2.9-2.7)Ga, the greenstone belt was intruded by TTG granites(diorite, tonalite, trondhjemite), so that the Archean granite-greenstone terrain formed. (4) At (2.6-2.5)Ga, the first tectono-thermal metamorphic event caused unconformable contact between Archean and Proterozoic, and the TTG granites and tholeiitic basaltic rock were transformed into TTG gneisses and amphibolites, so that the Archean granite-greenstone terrain was transformed to Neoarchean stable landmass. Soon afterwards, the granite-greenstone landmass had suffered weathering and denudation to last for 500Ma so that thick detrital sedimentary formed. (5) At (2.0-1.9)Ga, the second tectono-thermal metamorphic event may be related to the assemblage of Columbia supercontinent. The detrital sedimentary sequences metamorphosed to Khondalite series due to this tectono-thermal at ca.2.0 Ga. These high-grade metamorphic rocks was tied to Neoarchean stable landmass, so that the Huangling crystalline basement was formed in early Proterozoic. (6) At ($1.85 \pm$)Ga, the Kongling complex was intruded by the K-feldspar-rich granite(1854Ma) and mafic dikes(1852Ma). This revealed that the Yangtze craton shows enough rigidity to produce large-scale brittle rupture and mantle magmatism.