

Some 815 Ma high-grade metamorphic event in NW Yangtze block and its implications for Neoproterozoic unification of South China

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High-grade metamorphism recorded by ~860 Ma bimodal meta-volcanic suites along the NW margin of the Yangtze block, the Micangshan Mts in South China, is dated by U-Pb zircon. The metamorphic suites comprise the Hekou and Wangjiaping Formations, and their protoliths have long been regarded as Archean to Paleoproterozoic due to their high-grade metamorphic lithologies of upper amphibolite to lower granulite facieses. In addition to the ~860 timing for the interbedded metavolcanic suites, this work also reveals that the widespread leucogranitic veins hosted by the two strata formations formed at ~815 Ma with metamorphic T and P ranges of 658-789 °C and 8.65-12.5 kbar estimated by the elemental thermometer and geobarometer. The Hekou and Wangjiaping mafics are tholeiitic to alkaline, and tholeiitic, respectively, whereas the felsics of the both suites are calc-alkaline and peraluminous. Their elemental and Sr-Nd-Hf isotope geochemistry suggests that the alkaline and tholeiitic mafics were derived from highly depleted and metasomatic mantle source rocks, respectively, whereas the felsic rocks from the lower crust. These bimodal volcanic rocks are suggested to have formed at a back-arc tectonic setting and underwent a high-grade metamorphism at ~815 Ma which is explained by the closure of a back-arc basin. These new findings imply that there was an amalgamation between the South Qinling continental ribbon and the NW margin of the Yangtze block. Along with recently documented works, it is suggested that marginal accretion was a common regime for the growth both of the Yangtze and Cathaysia blocks during the early Neoproterozoic until their final welding along the Jiannan Orogenic Belt by collision.

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