5.3.P12

Geochemistry of Neoproterozoic mafic-ultramafic rocks from northern Guiangxi, south China: Implications for arc magmatism along continental margin

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The western end of Proterozoic Jiangnan orogenic belt distributed along the southern margin of the Yangtze block is located at northern Guangxi, China, where the Mesoproterozoic Sibao group and the Neoproterozoic Danzhou group occur. A lot of mafic-ultramafic rocks are hosted in Danzhou group. The 828±7 Ma four mafic-ultramafic dykes intruded into Sibao group and the mafic rocks in Danzhou group have been considered to be correlative with 827 Ma Gairdner Dykes Swarm (GDS) and 824 Ma Amata suite in Australia and were thought to be an indicator for arrival of plume and breakup of the Rodinia supercontinent by some researchers [1].

The GDS and Amata suite in Australia show obvious continental food basalt and ocean island basalt, i.e. “within plate basalt” signatures, whereas the mafic-ultramafic rocks from Danzhou group are geochemically quite distinct.The most mafic-ultramafic rocks in Danzhou group have been plotted in the field of volcanic arc basalts in various tectonic discri-minative diagrams. Their primitive mantle-normalized patterns of selected HFSE and REE display negative Nb, Ta, Zr, Hf and Ti anomalies. They have higher Th/La_{pm}, lower Nb/La_{pm} and Ti/Ti* documenting the characteristics of arc volcanic rocks. It is evident that they are products of subduction of the oceanic crust along the southern continental margin of the Yangtze block. A few samples fall in back-arc area in some discriminative diagrams but showing arc-affinities. Therefore, they should be generally considered as the products of magma activities in convergent plate margins, and could not be regarded as a sign of the breakup of Rodinia.

References

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5.3.P13

Tectonic evolution of the central Higher Himalayan Crystallines in the Kharta area, southern Tibet: New constraints from geochronological data

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Within the Kharta area, east of Mt. Qomolangma (Everest), garnet sillimanite gneisses and granites of the Higher Himalayan Crystallines were displaced beneath the North Col formation by a ductile normal fault (STD1) and above the upper Lesser Himalayan Crystallines by a ductile thrust (MCT1), respectively. Both the garnet sillimanite gneisses and granites contain overprinted eclogite lenses. Zircons from several samples of the lenses were dated by the U-Pb TIMS method. All samples plot close to a discordia line with Neoproterozoic upper intercept ages, suggesting a late Proterozoic age for the basic dike emplacement. Metamorphic monazite from the garnet sillimanite gneiss yields U-Th-Pb ages between 32 and 24 Ma, which are interpreted to indicate Barrovian-type metamorphism taking place during the Oligocene to early Miocene. Monazites from two granite bodies beneath the STD1 give very similar crystallization ages between 12-13 Ma, indicating the active time of the STD1. Monazites from a sample of highly sheared sillimanite gneisses beneath the MCT1 give a lower-intercept age of 13.4±1.3 Ma, which is interpreted as an active age of the MCT1.

Our data show that the central Higher Himalayas comprises Proterozoic to early Paleozoic sediments and basic dikes. These rocks experienced HP-UHP metamorphism resulting in the formation of eclogite and HP metapelitic rocks during an early stage of India-Asia collision. Subsequently, these rocks underwent regional high-temperature and intermediate-pressure metamorphism and were converted into garnet sillimanite gneisses and garnet-bearing mafic lenses, respectively, at about 32 Ma. At around 13 Ma, these rocks were exhumed southwards to shallow depth via channel flow and to overlie the Lesser Himalayan Crystallines. Finally, both the Higher and Lesser Himalayan Crystallines underwent NNE-trending folding.