Geochronology and geochemistry of peralkaline metagranites in the Dabie-Sulu terrane, eastern China: Constraints on Neoproterozoic tectonism along the northeastern margin of Yangtze Block

JIAN-SHENG QIU* AND JIAN HU

State Key Lab for Mineral Deposits Research, School of Earth Sciences and Engineering, Nanjing University, Nanjing 210093, China (*correspondence: jsqiu@nju.edu.cn)

In this contribution, we report on a detailed geochronological and geochemical study of peralkaline metagranites from Taihu (TH), Donghai (DH) and Lanshan (LS) in the Dabie-Sulu terrane, aiming to identify the protolith signature and to provide further constraints in understanding the Neoproterozoic tectonic setting along the northeastern margin of the Yangtze Block. Zircon LA-ICP-MS U-Pb dating of these metagranites yields Middle Neoproterozoic ages of 770~795 Ma for protolith crystallization and Triassic ages of 215~250 Ma for metamorphic resetting. Chemically, they are rich in silicon and alkaline, poor in calcium and magnesium, and high in $FeO^{total}/(FeO^{total}+MgO)$ ratios. The rocks also show enrichments of Ga, Y, Zr, Hf, and depletions of Sr, P, Ti, and display high $10^4\times$Ga/Al ratios. On the discrimination diagrams proposed by Whalen *et al*. (1987) and Eby (1990), they are all plotted in the A-type granite field. Combined with the features that they often contain alkaline mafic minerals (e.g. aegirine-augite, arfvedsonite) and show high zircon saturation temperatures (usually >820 °C), it is suggested that their protoliths belong to peralkaline A-type granites.

These metagranites also show relatively high Y/Nb and Y/Ta ratios, with geochemical characteristics affinitive to post-collisional granites, which are quite similar to that of the Late Mesozoic peralkaline A-type granites in the coastal areas of SE China. Moreover, the protolith rock associations of the metagranites and the metabasites in the Dabie-Sulu terrane are comparable to the extensional tectono-magmatic associations along an active continental margin. The above features clearly indicate that during Middle Neoproterozoic, the northeastern margin of the Yangtze Block was most likely under an active continental margin setting rather than an intra-plate rifting setting induced by the upwelling of a mantle plume.

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A Li isotopic study of an accretionary prism, the low-grade Otago Schist, New Zealand

L. QIU[1]*, R.L. RUDNICK[1], J.J. AGUE[2] AND W.F. MCDONOUGH[1]

[1]Department of Geology, Univ. of Maryland, College Park, MD 20742, USA (*correspondence: linqiu@geol.umd.edu)

[2]Department of Geology and Geophysics, Yale University, New Haven, CT, 06520, USA (jay.ague@yale.edu)

To investigate the behavior of Li during low-grade metamorphism and fluid flux in an accretionary prism we measured the Li concentrations [Li] and isotopic compositions (δ^7Li) of sub-greenschist and greenschist-facies Otago Schist composites [1]. The average [Li] of sub-greenschist facies composites (41 ± 13 ppm, 2σ) is significantly higher (97% confidence level) than that of greenschist facies composites (34 ± 9 ppm, 2σ). The latter have experienced mass addition of silica in the form of quartz veins precipitated from slab-derived fluids [1]. A linear regression of the correlation between [Li] and calculated mass addition indicates that the depletion of [Li] in greenschist facies composites is due to both dilution due to the addition of the quartz veins and metamorphic dehydration. Collectively, the [Li] of both groups of composites correlates with the CIA (Chemical Index of Alteration) (50-58), and plots at the lower end of the trend defined by pelites from the British Caledonides [2], consistent with the inferred graywacke protolith of the Otago Schists. The δ^7Li of sub-greenschist and greenschist facies composites are remarkably constant, with an average δ^7Li of 0.2 ± 1.7 (2σ) and -0.5 ± 1.9 (2σ), respectively. Thus, metamorphism has had no discernable effect on δ^7Li in these composites. The isotopically light Li of the schists is similar to that seen in pelitic sedimentary rocks [3, 4] and likely reflects the δ^7Li of the protoliths. Both the [Li] and δ^7Li of the fluid-fluxed greenschist facies composites do not support addition of Li from slab-derived fluids, indicating a Li-poor signature of the fluids. Studies are in progress on selected quartz veins in order to determine the Li characteristics of the fluids that deposited them.

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