Element mobility across the boundary between UHP eclogite and gneiss: Insights into supercritical fluids in continental subduction zones

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We carried out a combined study of petrology, whole-rock major and trace elements as well as Sr-Nd-O isotopes on samples from a profile across the boundary between ultrahigh pressure (UHP) eclogite and gneiss from the Dabie orogen. The contact is characterized by the presence of amphibole-rich rocks that formed by retrogression from eclogite. Directly at the contact to the gneiss, the rock has higher concentrations in K, Al, LILEs, REEs and HFSEs, but similar SiO_2, FeOt and transitional metal element contents compared to retrogressed eclogite further away from the boundary. $\delta^{18}O$ values of the gneiss show a slight decrease, while retrogressed eclogites display a progressive increase towards the boundary. This indicates fluid-assisted O isotope exchange across the contacts of different lithologies at local scales. Mass balance calculations reveal variable but significant element mobility acrross the boundary of the mafic and felsic UHP metamorphic rocks with the following order of mobility : Ba > (K, Li, Cs, Rb, Pb)> U > Th > REE > Nb (Ta) > Zr (Hf). Amphibolite-facies retrogression of eclogites are known to have no effect on their major and trace elements [1, 2]. Also, Si-rich metasomatism from partially melted gneisses should increase the silica content of the retrogressed eclogite [2]. Therefore neither process is viable here. We thus propose that the variations observed here were caused at high pressures by supercritical fluids that were probably generated by the breakdown of phengite at P-T conditions above the second critical end-point for silicate-H_2O systems.

[1] Sassi *et al.*(2000) *CMP* **139(3)**: 298-315. [2] Zhao *et al.* (2007) *GCA* **71(21)**: 5244-5266.

Geochemical characteristics and geological significance of the basic intrusive rocks in Shifengshan copper deposit, Yimen, Yunnan, China

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Shifengshan copper deposit is the one of typical deposit which located at the Kunyang Rift of Proterozoic Yangtze oldland edge in Yimen Yunnan. It is found recently the basic intrusive rocks (sample as the gabbro in the 840m of the ore district) have presented intrusive contact connection with the surrounding rocks. it is seen chalcocitization in the edge of the gabbro.

Major elements are SiO_2 45.64-48.18×10^{-2}, Na_2O 4.66-5.20×10^{-2}, K_2O 1.06-2.56×10^{-2}, MnO 0.08-0.10×10^{-2}, characterized by high Na_2O but low MnO, the Rittmann index σ is 11.15-13.68. Trace elements present evident enrichment of K、Rb、Th, but the loss of Sr、Ta、Nb、Yb、Sc、Cr and so on, which are indicated the character of intra-continental rift basalts. ∑REE is 157.37-219.18×10^{-6}, Eu is Enrichment slightly (1.10-1.41), and it is rich in LREE(LREE/HREE=6.02-8.12, $(La/Yb)_N$ =7.99-12.70. REE distribution patterns show oblique to the HREE side and enrichment in LREE.

Based on reseach on geology. petrology and petro-geochemistry, we believe that the basic intrusive rock bodies formed in initial continental rift environment, which belong to the deep source of formation of basaltic magma, may be mixed with crustal material.

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