

Metamorphic process and whole rock compositions of metamorphic rocks from Sanjiang region, SW China

Kazuhiro Yonemura[1]; Yasuhito Osanai[1]; Nobuhiko Nakano[1]; Masaaki Owada[2]; Sotaro Baba[3]

[1] Earth Sci., Kyushu Univ.; [2] Dept. Earth Sci., Yamaguchi Univ.; [3] none

The Sanjiang region in Yunnan, SW China is a brilliant place where some micro continents had been collided within a narrow area. Metamorphic rocks in this area have been thought as the Precambrian basement rocks due to their metamorphic grade through the very old-fashioned ideas. Then, the detailed studies of metamorphic rocks using advanced knowledge are shed light on the evolution of metamorphism and its tectono-metamorphic processes during the continental growth of Asia.

We carried out a specific fieldwork in the Cangshan Mountains and Nujiang River area of southeastern and southwestern part of the Sanjiang region, respectively. The Cangshan Mountains is thought to be of the northern extension of the Red River Shear Zone in Vietnam as the boundary between the S-China and Indochina cratons. The Nujiang River area is considered as the boundary between the Shan-Thai and West Burma cratons. Here, we report metamorphic processes of the Cangshan Mountains and north part of Nujiang river area (Gongshan).

In Cangshan Mountains, greenschist- to amphibolite-facies metamorphic rocks are exposed. Major metamorphic rock types are Bt-bearing metapelite (Bt-Ms schist, Grt-St-Bt schist and Grt-Sil-Bt gneiss) as well as Grt-bearing amphibolite. Most of metapelites show mylonitic deformation texture. Ky in Grt-Sil-Bt gneiss is replaced and surrounded by Sil, and they are further surrounded by Pl and secondary Ms. This reaction texture would be indicating a heating and/or decompression process during clockwise metamorphic evolution. The main constituents of Grt-bearing amphibolite are Grt, Hbl and Pl with or without Cpx and Bt. The color of Hbl core is brown and rim is pale green.

In Gongshan, greenschist- to amphibolite-facies metamorphic rocks are exposed with dominant granitoids. Major mineral assemblages of the metapelites are Bt+Ms, Grt+St+And+Bt+Ms and Grt+Sil+Bt. Characteristically, And porphyroblast includes Grt and Bt, and Sil is present only in the matrix. The main assemblages of amphibolite are brownish Hbl and Pl with or without Cpx and Bt.

A peak *P-T* condition of Cangshan Mountains is estimated from Grt-bearing amphibolite. In the Grt, Mg-increase and Mn- and Ca-decrease and/or flat profiles are identified from core to rim. A chemical zoning in Cpx is almost flat. Therefore a peak *P-T* condition is estimated using core compositions of Grt and Cpx to be of 700-750°C and 8-9 kbar. This *P-T* conditions, the phase transition from Ky to Sil as described above, and a chemical zoning pattern of Grt suggests that a clockwise *P-T* path. In Gongshan, anti-clockwise *P-T* path was already established from mineral chemical compositions of metapelites and And-Sil phase transition.

The whole rock chemical compositions are analyzed from amphibolite and Hbl schist. The SiO₂ contents of amphibolites and Hbl schists from the Cangshan Mountains yields 41-54wt.%, and their X_{Mg} (=Mg/(Fe+Mg)) values and total alkali contents (K₂O+Na₂O) are 0.3-0.7 and 1-6 wt.%, respectively. For Gongshan, SiO₂ contents are 47-48 wt.%, X_{Mg} are 0.4-0.5 and alkali elements are almost 3 wt.%. Exclude low SiO₂ content Hbl schist, the major elements composition of amphibolites and Hbl schists from the both areas show the character of tholeiitic basalt. N-MORB normalized trace element patterns for the rocks from the both areas imply that most analyzed samples are similar to N-MORB characteristics. However, some of them from the Cangshan Mountains are depleted HFS elements in comparison with N-MORB.

A consideration of collision tectonic events in Sanjiang region during the growth of Asian continent is still in progress, and then we are now going to do the analyses more and more.