Metamorphic evolution of central Indonesia

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論　文　内　容　の　要　旨

Various metamorphic rocks expose in the central part of Indonesia including Java, Kalimantan and Sulawesi Islands. High-pressure metamorphic rocks expose in the Bantimala and Barru Complexes of South Sulawesi, Luk Ulo Complex of Central Java, and Meratus Complex of South Kalimantan. Northwesterly-directed Cretaceous subduction was suggested responsible to build these formations. While in the Schwaner Mountains of West Kalimantan, expose low-pressure medium-temperature metamorphic rocks, which are formed by contact metamorphism of granitoids bodies that intrude into very low-grade metamorphic rocks during Cretaceous.

High-pressure metamorphic rocks predominantly compose of eclogites and blueschists with the K-Ar age of Early Cretaceous. The geochemical characteristics suggest that the eclogites and blueschists from South Sulawesi contain MORB, within-plate basalt, and arc signatures. Eclogites and blueschists from Central Java mostly show within-plate basalt signatures whereas amphibolites and garnet amphibolites are characterized by MORB. The results suggest the possibilities of different components between upper- and lower-oceanic crusts, different of the metamorphic age between eclogite- and amphibolite-facies, and change of the subduction angle between these two metamorphisms. The protolith of metatonalites from Schwaner Mountains were derived from volcanic-arc tectonic environments with some samples showing adakitic signatures.

The eclogite from Bantimala Complex experienced clockwise *P-T* path at primary stage on the epidote blueschist-facies and continues to the peak *P-T* condition at 615-678 ^{o}C and 2.6-2.7 GPa on the eclogite-facies. Retrograde decompression *P-T* path is determined by the textures and chemical variations of amphiboles in the matrix, which suggests from barroisite to the final stage of actinolite. The eclogite and garnet-glaucophane schist from Luk Ulo Complex also experienced clockwise *P-T* path at primary stage on the epidote blueschist-facies and continues to the peak *P-T* condition at 550-625 ^{o}C and 2.15-2.25 GPa on the eclogite-facies. The retrograde-decompression stage is also presented by changing mineral compositions from the barroisite to the actinolite. Garnet amphibolite experienced peak *P-T* condition at 434-443 ^{o}C and 0.7-0.8 GPa on the epidote amphibolite-facies. Garnet-bearing epidote-barroisite schist from Meratus Complex show clockwise *P-T* path that experienced primary stage on the stability field of paragonite + glaucophane + epidote and continues increasing pressure and temperature to the stability field of barroisite, which was peak *P-T* condition at 547-690 ^{o}C and 1.1-1.5 GPa, on the albite epidote amphibolite-facies. The retrograde stage is

presented by changing mineral compositions of amphiboles from the Si-rich barroisite to the actinolite. The *P-T* metamorphic evolution of high-pressure metamorphic rocks from South Sulawesi and Central Java exhibit low geothermal gradient. Whereas from South Kalimantan, high-pressure metamorphic rocks have lowest peak pressure and medium temperature compared to the other terranes.

LA-ICP-MS U-Pb dating on detrital zircons were carried out on the garnet-glaucophane-quartz schist from Bantimala Complex and garnet-biotite-muscovite schist from Barru Complex of South Sulawesi, and metatonalite from Schwaner Mountains of West Kalimantan. Metamorphic rocks from South Sulawesi give similar clustering ages of Silurian to Permian (ca. 430-280 Ma) that might have possibility derived from the similar provenance. The youngest age from Bantimala Complex yield Early Jurassic (ca. 199 ± 6 Ma) so that the metamorphic age still has possibility at Cretaceous. While the result of metatonalite yields Triassic age (233 ± 3 Ma), which probably the oldest age of granitoids could be found in this location since the Schwaner Mountains were considered to Cretaceous age. These might imply that the subduction mechanism and felsic magma genesis changed between the Early Triassic and the Cretaceous in the Schwaner Mountains.