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モンゴル南西部ツェール変成帯の温度構造

Thermal structure of the Tseel Metamorphic terrane in Southwestern Mongolia

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Mongolia geologically is separated into the northern and southern parts by Main Mongolian Lineament (Badarch et al., 2007). The Tseel metamorphic terrane extends in E-W trend for 500 km at the southern part of the Main Mongolian Lineament. The Tseel terrane is composed of a chain of four blocks; Bodonch, Uyench, Tsogt and Tseel blocks from west to east. Although it has been considered that this region were suffered from several igneous and metamorphic events (Windley et al., 2007), the relationships of these events and the detailed tectonic evolution are still unclear.
We show results of petrological study on metamorphic rocks from the Tseel block. The Tseel block is mainly composed of metasedimentary rocks (biotite, garnet-biotite gneiss, mica schist) and metabasites (greenschist, amphibolites, and garnet-amphibolite). Some intrusion of granite and gabbroic dikes are common in center part of Tseel block. The northern and southern boundaries of Tseel block are defined by faults in E-W trend. The strike of foliation is commonly E-W trend, except for near granite.
Based on the mineral assemblage of metapelite, the Tseel block is divided into two zones; bitote zone and garnet zone. The biotoite zones distribute in the northern and sourthern parts, and the garnet zones distribute in the central parts. In the biotite zones, metapelites is composed of biotite, plagiolase, quartz and muscovite with minor calcite, sphene and chlorite. In this zone, greenschists occurs with metacherts. In the garnet zone, the metapelite is composed of biotite, garnet, plagioclase, quartz and muscovite with or without sillimanite, cordierite and Fe-Mg amphibole, and staurolite. The spatial distributions of cordielite, sillimanite and staurolite are not clear enough to define their mineral zones. Chlorite and muscovite has also found as the retrograde products.
Amphibolite with and without garnet occurs as dikes, containing garnet, hornblende, Fe-Mg amphibole, quartz, plagioclase. Garnet in metapelites shows almandine-rich compositions (Grs 3-20, Alm 50-75, Sps 2-20, Prp 8-25). In the central part, garnet is rather homogeneous with slight Mg increase and Mn decrease at rim. In contrast, garnet in the western part is characterized by the reverse zoning with Mg decrease, Mn and Ca increase from core to rim.
Pressure-temperature conditions were estimated from metapelites by garnet-biotite geothermometry (Kaneko et al., 2004) and garnet-biotite-plagioclase-quartz geobarometry (Wu et al., 2004). In the central parts of the garnet zone, the P-T conditions estimated from the garnet rim and rims of matrix plagioclase and biotite are 550-640?C and 1.4-6.5 kbar. Although there are many granites in the garnet zones, there is no systematic change in temperature conditions with distance from granite, suggesting that the heat source of metamorphism is not related to granite intrusion. In contrast, the northern and southern parts of the garnet zones show higher pressures

and slightly lower temperatures than that of the central part, 8.0 kbar and 600?C in the north and 8.8Kbar, 550?C in the southern part. We will present the results of the more detailed analysis of P-T histories, and implications of them to the tectonic evolution of the Tseel block.

Keywords: thermal structure, geothermobarometry