

南極セールロンダーネ山地アウストカンパーネにおける 変成作用と同時期の火成活動および流体活動

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Syn-metamorphic magmatic and fluid events at Austkampane, Sør Rondane Mountains, Antarctica

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Sør Rondane Mountains is located within Dronning Maud Land where Neoproterozoic to Cambrian age magmatic and high-temperature metamorphic terranes comprise the area more than 1000 km along the coast or the inland of Antarctica. Among those, the Sør Rondane Mountains consists of greenschist-facies through amphibolite-facies to granulite-facies metamorphic rocks with multiple leucocratic or granitic intrusions. The Mountains can be subdivided into at least two areas - the NE and the SW Terranes based on the lithological and metamorphic signatures (e.g., Asami et al., 1992; Osanai et al., 1992). The NE Terrane is characterized by the granulite-facies peak metamorphism followed by the extensive hydration at amphibolite-facies or lower grade conditions. Shiraishi et al. (2008) and Adachi et al. (2010) suggested the peak granulite-facies metamorphism at c.650-600 Ma and the subsequent thermal events at ~560-515 Ma based mainly on the SHRIMP zircon U-Pb ages.

In this study, we report the mode of occurrence of the sequences of magmatic/fluid intrusions especially focusing on the syn-metamorphic intrusions in Austkampane area, where is located within the NE Terrane and preserves the evidences of multiple magmatic and fluid events including syn-metamorphic and post-metamorphic as follows:

1) Garnet-sillimanite gneiss is cut by three sets of leucocratic veins. The earliest vein, constituted mainly of Qtz+Pl+Kfs+Sil, apparently cross cut but is partly intermingled with the host garnet-sillimanite gneiss. The second leucovein, consists of Qtz+Pl+Kfs+Bt+Ms, is layer parallel or slightly oblique to the host gneiss. The third vein, pegmatitic composed mainly of quartz and feldspars, discordantly cross cut the host gneiss and the former two veins. The first and the second veins along with the host garnet-sillimanite gneiss yielded c.650-600 Ma EMP monazite U-Th-Pb ages accompanied locally with >700 Ma and <560 Ma monazite grains, whereas the final discordant vein gave c.550-500 Ma monazite ages.

2) Garnet-biotite gneiss in the nearby locality is cut its foliation by garnet-bearing quartzo-feldspathic biotite gneiss which includes some magmatic textures such as non-deformed or slightly-deformed magmatic mafic enclaves (MME) and K-feldspar phenocrysts along with poikiroblastic garnet and biotite interpreted as metamorphic recrystallized grains. This garnet-bearing quartzo-feldspathic biotite gneiss is, therefore, assumed to be syn-metamorphic magmatic intrusion that was metamorphosed under with the host garnet-biotite gneiss. Magmatic zoned zircons in this garnet-bearing quartzo-feldspathic biotite gneiss gave 637±5 Ma U-Pb ages by SHRIMP interpreted as magmatic intrusion age (Adachi et al., 2010).

Base on these lines of evidences, we will discuss the signatures of magmatic and fluid events with their temporal relations with the peak granulite-facies and the later relatively lower-grade hydration/retrograde events in the area. The data presented in this study could be keys to understand the thermal history of the Sør Rondane Mountains, and further on to the deep crustal magmatic and fluid processes.

References

- Adachi, T., Metamorphic evolution and its implication for tectonic process in the central Sør Rondane Mountains, East Antarctica. PhD thesis submitted to the Graduate University for Advanced Studies, Tokyo, 2010.
- Asami, M. *et al.*, Metamorphic evolution of the Sør Rondane Mountains, East Antarctica. In: Recent Progress in Antarctic Earth Science, eds by Y. Yoshida et al., Terra Sci. Publ., Tokyo, 7-15, 1992.
- Osanai, Y. *et al.*, Geochemical characteristics of metamorphic rocks from the central Sør Rondane Mountains, East Antarctica. In: Recent Progress in Antarctic Earth Science, eds by Y. Yoshida et al., Terra Sci. Publ., Tokyo, 17-27, 1992.
- Shiraishi, K. *et al.*, Geochronological constraints on the Late Proterozoic to Cambrian crustal evolution of eastern Dronning Maud Land, East Antarctica: a synthesis of SHRIMP U-Pb age and Nd model age data. In: Geodynamic evolution of East Antarctica: a Key to the East-West Gondwana Connection, eds by M. Satish-Kumar et al., Geological Society of London Special Publications, 308, 21-67, 2008.