東南極 Lützow-Holm 岩体に産するアルカリ～高カリウム苦鉄質貫入岩の鉱物と微量元素組成　～産状と起源の考察～

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Constituent mineral and minor element compositions of alkali ~ highly potassic mafic dykes intruded into Lützow-Holm Complex, East Antarctica, for consideration of their origin.

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The Lützow-Holm Complex (LHC) of Dronning Maud Land, East Antarctica, is a high grade metamorphic terrane within the East Antarctic Shield. The metamorphic grade of the LHC increases from upper amphibolite facies in the NE to granulite facies in the SW of the complex, with a thermal maximum at Rundvågshetta (Hiroi *et al.*, 1991). Subsequent igneous rocks as granites and pegmatites that intruded during and after the peak metamorphism, were also recognized. Some of them were modified their occurrence of constituent minerals since they were annealed by thermal activities after the peak metamorphism (Ishikawa *et al.*, 1994). Post-peak metamorphic mafic ~ intermediate rock dykes located on Skallevikshalsen, Rundvågshetta, and Niban-Rock in the LHC, newly found during the geological survey by JARE-52, were discordantly intruded the surrounding gneisses. The dykes on Skallevikshalsen and Rundvågshetta were thin sheets with a few ten centimeters to half meter in thickness, and almost NS (to slightly NNE-SSW) trending with dipping east steeply. On the other hand, dyke from Niban-Rock on the Prince Orav Coast, has a ten to twenty centimeter thickness and dip to NE with N70°W striking. Dykes in Rundvågshetta were strongly related for the origin with post-genetic pegmatites, and partly modified to amphibolite with coarse hornblende by the pegmatitic activity.

The dyke rocks are holocrystaline and aphyric, and grain size is mostly between 0.5 and 3 mm. They consist dominantly of alkali-feldspar ($An_{30}Ab_{69}$ for mafic rock on Niban-Rock, and $Or_{71\text{-}83}Ab_{15\text{-}20}$ for ultrapotassic rock from SW-LHC) and subsequent biotite (TiO_2 = 2.72~5.52wt.%), clinopyroxene, hornblende (TiO_2 = 1.00~2.37wt.%), titanite, apatite and minor amount of plagioclase and quartz: these minerals have poor compositional variations in each rock specimens and have no zoning profile in them. These mineral abundances vary according to their occurrences, and alkali-feldspar, apatite and quartz are commonly included in the dykes by all means more or less, and others are occasionally absence in some rock specimens. Mineral compositions also vary according to their occurrences, especially their whole rock compositions. Biotite was frequently found in the mafic rocks, thouth it was poor in intermediate to felsic ultrapotassic dyke rocks. Minerals, especially biotite flakes, are commonly aligned to parallel to boundary between the dykes and the host gneisses. Crystal coarsening from rim to center of dykes were partly found. Such occurrence and chemical composition of the minerals suggest crystal growth by annealing after the peak metamorphism of LHC.

Whole rock composition of dyke rocks are different in the 5 outcrops each; the K_2O content reaches 3.42~10.83 wt.% with higher K_2O/Al_2O_3 and K_2O/Na_2O levels than general igneous rocks, and the SiO_2 and MgO contents range from 46.3 to 60.2 wt.% and from 9.48 to 0.69 wt.%, respectively. Mafic dyke ricks in them are classified into minette, according to their mineral assemblages and whole rock compositions, though their minerals were coarsened. In them, dyke rocks in Skallevikshalsen resemble lamproite for their ultrapotassic characters with much MgO and abundance of typical minor elements. Ultrapotassic mafic dyke rocks from Skallevikshalsen and Rundvågshetta were especially enriched in LIL elements and LREE; such compositional characters suggests participation of lithospheric mantle as the origin of the magma as ultrapotassic dyke rocks from Sør Rondane Maountains (Owada *et al.*, 2008).

References

Hiroi, Y., Shiraishi, K. and Motoyoshi, Y. (1991): In Thomson, Crame, and Thomson (eds) *Geological Evolution of Antarctica*. Cambridge University Press, 83-87.

Ishikawa, M., Motoyoshi, Y., Fraser, G. L. and Kawasaki, T. (1994): Structural evolution of Rundvågshetta region, Lützow-Holm Bay, East Antarctica. Proceedings of the NIPR Symposium on Antarctic Geosciences, 7, 69-89.

Owada, M., Baba, S., Osanai, Y. and Kagami, H. (2008): In: M. Satish-Kumar, Y. Motoyoshi, Y. Osanai, Y. Hiroi & K. Shiraishi (eds), Geodynamic evolution of East Antarctica: *A key to the East-West Gondwana connection*. Geological Society, London, Special Publications. SP308, 235-252.