東南極 Lützow-Holm 岩体に産するアルカリ～高カリウム貫入岩の産状と組成

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Occurrence and compositions of post-metamorphic alkali ~ highly potassic dykes intruded into metamorphic rocks on Lützow-Holm Complex, East Antarctica

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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, situated to the west of Rayner Complex and to the east of the Yamato-Belgica Complex. Japanese Antarctic Research Expeditions (JARE) have carried out detailed surveys of its geology and tectonics for many coastal exposures found between 45°E and 37°E , and have identified various kinds of metamorphic rocks. 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 different stages of tectonism, especially during and after the peak metamorphism, were also recognized.

Mafic dyke rocks, which discordantly intruded the surrounding gneisses, were already found in some localities (*e.g.*, Botnneset region including Innhovde and Austhovde in the LHC (Shiraishi and Yoshida, 1987)). A few post-metamorphic mafic ~ intermediate rock dykes were newly found in Skallevikshalsen, Rundvågshetta, and Niban-Iwa as well as Innhovde and Austhovde in the LHC, during the geological survey by JARE-52. 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-iwa on the Prince Orav Coast, has a ten to twenty centimeter thickness and dip to NE with N70°W striking. Internal textures as mineral arranging and extension are parallel to the trend of the dyke intrusion. 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 0.1 and 2 mm. They consist dominantly of alkali-feldspar and subsequent biotite, augite, hornblende, titanite, apatite and minor amount of plagioclase and quartz: 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. Minerals, especially biotite flakes, are commonly aligned to parallel to boundary between the dykes and the host gneisses.

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. They are classified into tephrite, trachyandesite, and trachyte, according to their total alkali versus silica characters (Le Maitre *et al.*, 1989). In them, dyke rocks in Skallevikshalsen resemble lamproite for their ultrapotassic characters (K_2O = 8.10 - 8.72 wt.%) with much MgO (= 7.92 - 9.48 wt.%) and abundance of typical minor elements (*e.g.,* Ba, Sr).

In Rundvågshetta, host metamorphic rocks were partly metasomatized by hydrated reaction around the dykes, and garnet was broken down to biotite in the metasomatized domain: this hydration modification was stronger at close to the boundary, and garnet which far from the boundary was commonly survived. Since the dyke contains abundnat biotite and subsequent apatite as well as alkali feldspar, it is expected that the dyke supplied fluid for the metasomatism during its activity.

References

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