Origin of minette dyke from Skallevikshalsen, Lützow Holm Complex, East Antarctica.

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The Lützow-Holm Complex (LHC) on the Dronning Maud Land, East Antarctica, situated to the west of the Rayner Complex and to the east of the Yamato-Belgica Complex, is a high grade metamorphic terrane within the East Antarctic Shield, where small coastal exposures are found between 45° and 37°E. Japanese Antarctic Research Expeditions (JARE) have carried out detailed surveys of its geology and tectonics, and have identified various kinds of metamorphic rocks on the LHC. The metamorphic grade of the LHC increases from upper amphibolite facies on the NE to granulite facies on the SW of the Complex, with a thermal maximum at Rundvågshetta (Hiroi *et al.*, 1991). Some kind of igneous rocks such as granites, pegmatites, and intermediate to mafic dyke rocks that intruded at different stages of tectonics, especially during and after the peak metamorphism, were also found in the Complex. Alkali to ultrapotassic mafic rocks are also recognized as important igneous activities because their origins are considered to be relating active mantle (*e.g.*, Murphy *et al.*, 2002). Therefore, we can expect to understand precisely by research of such intrusions about genesis of such magma and modifying condition in the mantle, and magma migration at their intrusions. Actually, K-rich intermediate to mafic dyke rocks, which discordantly intruded into the surrounding gneisses, were already found Botnneset region including Innhovde and Austhovde in the LHC (Shiraishi and Yoshida, 1987). The dykes were interpreted as an evidence of post orogenic igneous activity linked to the Pan-African orogeny (Arima and Shiraishi, 1993).

On Skallevikshalsen, such dyke was found in the northwest area during survey at JARE-52. The dyke runs largely N-S direction over 10 m length with a few ten cm thickness, and cut host gneissosity obliquely. Marginal parts of the dyke become finer than its center domains, and were partly eroded. It contains some small pieces of gneiss as xenoliths, therefore, it is clear that the dyke intruded after peak metamorphism. The dykes are holocrystaline, and consist dominantly of alkali-feldspar and subsequent biotite, augite, titanite, apatite, and minor amount of quartz and plagioclase. Some minerals, especially biotite flakes are commonly aligned or extended to parallel to the trend of the dyke intrusion. Grain size of the minerals is ranging 0.5 to 3 mm, and some kind of minerals (especially biotite, augite, and titanite) were occasionally coarsened from margin to center in the dyke, although alkali-feldspar and quartz were relatively coarse, and their size was not so different in the dyke rocks. Such occurrence suggests that the dyke intruded after peak metamorphism and some minerals were probably arranged their orientation parallel with dyke strike influenced by stress of circumstance at the intrusion. Besides, other minerals were coarsened during annealing after intrusion as hypabyssal rocks. According to such occurrences, biotite and augite were original minerals produced during igneous activity. In the dyke rocks, apatite contains much fluorine and lesser chlorine. Fluorine and chlorine were also contained in biotite in the dyke. Such characters about volatile components in the minerals were regarded to originate from igneous activity.

The dyke rocks were characterized by their highly potassic and mafic in compositions. They have much incompatible elements, especially LIL elements. Therefore, the dyke rocks are regarded as minette, a kind of lamprophyre resembling to lamproite, after considering with mineral assemblages and whole rock composition. The feature rich in LIL element is also found in typical lamproite and some minette though their mafic composition, which are thought to be originated from metasomatized mantle (Mitchell and Bergman, 1991). Since the minette dyke found on Skallevikshalsen has resembled chemical composition, it was probably originated from such mantle emplaced below of the LHC. Some lamproite emplacements were found in the Napier Complex on Enderby Land (*e.g.*, Miyamoto *et al.*, 2000), and many mafic rocks originated from metasomatized mantle were also found Sør Rondane Mountains on the Dronning Maud Land, East Antarctica (Owada *et al.*, 2008). Therefore, the metasomatized mantle might have been spread below from Dronning Maud Land to Enderby Land after East and West Gondwana. Beside they show negative spike for Ti and Nb on spidergram, suggesting Ti-rich accessory phase controlling magma compositions as residual role in subducted oceanic crust with hydrous component bearing condition (Green and Pearson, 1986).

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