Petrology of gabbronorite complex and re-organization of oceanic crust in Wadi Rajmi Area, Northern Oman

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Geology of the Wadi Rajmi area in northern Oman ophiolite has been regarded as having normal oceanic crustal sequence: from mantle harzburgite, Moho transition zone, layered gabbro, upper gabbro, sheeted dike complex, to volcanic sequence, from west to east. However, there exist some unique features in this area: E-W trending sheeted dike complex that is nearly perpendicular to general N-S trending and appearance of Opx in most part of gabbro unit (e.g. Reuber, 1988). Smewing (1981) explained that these characteristics show the marginal part of a huge magma chamber. On the other hand, MacLeod and Rothery (1992) emphasized the effects by segment discontinuity in this area. However, Umino et al. (1990), Ishikawa et al. (2002) and Miyashita et al. (2003) indicated that the E-W trending dikes are not normal sheeted dike complex and proposed that they are late intrusive rocks because of their Arc-type signatures in the bulk rock composition. Therefore, it is expected that one present the plutonic facies of the E-W dikes in the gabbro unit of Wadi Rajmi, Northern Oman ophiolite (Umino et al.,1990).

Yamazaki et al. (2005MS) reported petrography, mineralogy and geochemistry of late magmatic rocks in Wadi Rajmi area. These late magmatic rocks are composed of the boninites in sheeted dike complex, the boninite dike swarm in gabbro section, the diorite-tonalite intrusives into lower upper gabbro and large gabbronorite complex in gabbro section. In this report, we show geology, petrography and geochemistory of the gabbronorites, and discuss the origin of the gabbronorites.

In Wadi Rajmi area, the gabbronorites distribute from lower layered gabbro section to lower part of upper gabbro section. These lithologies are classified into three types: 1) coarse- to fine- grained heterogeneous gabbronorite in lower and middle part of the gabbronorite complex, 2) fine- to medium-grained foliated gabbronorite in upper part of complex and 3) microgranular gabbronorite dikes intruding into 1) and 2).

The clinopyroxene compositions of gabbronorites show slightly lower Ti and Na contents than MOR gabbro clinopyroxene at given same Mg#(Mg/(Mg+Fe)). In co-variation diagram of clinopyroxene and plagioclase, the Wadi Rajmi gabbronorites are plotted in intermediate field between IAT and MORB fields. On the other hand, chondlite-normalized REE patterns of the gabbronorites are similar to MOR gabbros.

On the basis of these data, petrogenesis of the gabbronorites is documented in this report.