Late Magmatism in Wadi Rajmi Area, Northern Oman

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Geology of the Wadi Rajmi area in northern Oman ophiolite have been regarded as having normal oceanic crustal secquence: 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 strike of sheeted dike complex and apperance of Opx in most part of gabbro unit (e.g. Reuber, 1988). Smewing (1981) explained that those charactoristics show the marginal part of a huge magma chamber. MacLeod and Rothery (1992) explained due to the presence of segment boundary in this area. However, Umino et al. (1990), Ishikawa et al. (2002) and Miyashita et al. (2003) indicated that E-W dikes are Late intrusives rocks, because of their Arc-type signatures in bluk rock composition. Therefore, it is expected to be present the deeper facies of the E-W dikes in the gabbro unit of Wadi Rajmi, Northern Oman ophiolite (Umino et al.,1990).

Detailed field survey in the Wadi Rajmi during 2004-2005 carried out several new findings: a presence of boninitic dikes in the E-W trending sheeted dike complex, Boninitic dike swarm intruding into the gabbro unit, and blocks of wehrlite and layered gabbro in the gabbronorite body implying that the gabbronorite invaded these rocks. Furthermore, diorite-tonalite intruded between the upper part of the gabbronorite body and upper gabbro to have produced agmatitic lithofaces. It is noted that the gabbronoirte body occupies most part of the gabbor unit. Ultramafic complex consisting of dunite,wehrlite and clinopyroxenite appears at the basal part of the gabbronorite body (west side). Layered structuers are occasionally developed in the clinopyroxenites.

Mineral compositons of Cr-spinel and clinopyroxene of the ultramafic complex and E-W dikes are significantly different from those of layered gabbro and wehrlite block. They are charactrized by high Cr# values (over 0.6) and low TiO2-contents, suggesting arc-signature (e.g. Arai,1992) for the ultramafic complex. While those of layered gabbro and wehrlite blocks are characterized by lower Cr# values (under 0.6) and higher TiO2-contents, indicating MORB features for these rocks. Clinopyroxene of the gabbronorite body shows intermediate features between MOR-gabbro and E-W dikes.

Thus, most part of the crustal section of the Wadi Rajmi represent arc-signature.