Geology and petrology of the Lasail ‘late intrusive complex’, northern Oman ophiolite

Nobutaka Tsuchiya[1]; Shintaro Sato[2]; Hitomi Kawamura[2]; Yoshiko Adachi[3]; Sumio Miyashita[4]

[1] Dept. Geology, Iwate Univ.; [2] Iwate Univ.; [3] none; [4] Dep. Geol., Fac. Sci., Niigata Univ.

The Oman ophiolite contains a particularly well-preserved sequence; exposure is almost contenuous along strike and almost complete vertical sections. Lasail ‘late intrusive complex’ feeds the Lasail Unit volcanic rocks and felsitic sheets and andesitic cone-sheets around Lasail Mine (Alabaster and Pearce, 1985; Lippard et al., 1986). Lasail complex consists of gabbroic and tonalitic rocks. The gabbroic rocks are composed of layered gabbro (dunite, wehrlite, websterite, olivine gabbro, gabbronorite, and anorthosite) and massive gabbro (gabbronorite, hornblende gabbronorite, hornblende gabbro, and hornblend diorite). The layered gabbro is intruded by the massive gabbro, and often occurs as large blocks in the massive gabbro. These gabbroic rocks are intruded by small intrusions of hornblende diorite to hornblende tonalite. The tonalitic rocks consists of hornblende diorite to hornblende tonalite, and intrudes into the gabbroic rocks. The tonalitic rocks are characterized by MME (mafic magmatic enclaves) swarms of fine-grained gabbro to diorite in central to eastern part of the complex. The assemblage of these rocks belongs to the Opx-series classified by Umino et al. (1990).

Bulk chemical compositions of the felsic rocks from the Lasail complex are characterized by extreme depletion in incompatible elements; K_2O, P_2O_5, and TiO_2. Koepke et al. (2004; 2007) described that hydrous partial melting of cumulate gabbro is most likely process explaining the petrogenesisi of oceanic plagiogranite magma. TiO_2 contents of felsic rocks from the Lasail complex, however, shows clearly higher concentrations than that obtained by experimental results after Koepke et al. (2004). These petrochemical characteristics can be explained by the hypothesis that source rocks for the origin of plagiogranite magmas are late intrusive rocks with island-arc signature.