Late intrusive complex intruded into lower crustal seqence of northern Oman ophiolite

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In Wadi Fizh to Wadi Bani Umar area in the northern Oman ophiolite, a large ultramafic to acidic plutonic complex is exposed. Although this complex was regarded as a huge 'wehrlite intrusion' (Reuber, 1988; Juteau et al., 1988), this complex is distinguished from common wehrlitic intrusions by many lines of evidence. such as crystallization sequence, mineral chemistry and constituent lithofacies. We already reported occurrence and petrography of the northern part of this complex (Adachi and Miyashita 1999, 2003). This time, we report a southern extension and occurrence of the basal part of this complex.

In the middle part of normal gabbroic sequence in Wadi Khabiyat, the gabbro sequence is intruded by wehrlite, which contains clinopyroxenite, and gabbronorite layers. The wehrlite intrusion changes into pyroxene cumulates which are mainly composed clinopyroxenite associated with olivine clinopyroxenite, websterite, olivine websterite, quartz-hornblende bearing melagabbronorite and hornblende gabbronorite. Generally this complex shows heterogeneous and massive occurrence, and modal layering is sometimes observed due to the appearance of dunitic and gabbroic layers. Thickness of those layers is a few tens of cm to few m. The attitude of modal layering trends about NS with 20 dipping east. Furthermore high Mg andesitic dikes intrude in this complex. These andesitic dikes are further intruded by leucocratic dikes to produce agmatitic occurrence.

This plutonic complex occurs between the upper most mantle and the basement of gabbro sequence in the southern part of Wadi Fizh area, and extends south- and southeastward to Wadi Bani Umar area through Wadi Khabiyat. The size of the complex attains about 10 km in NW-SE direction with 5 km in width. The western and southern margins of the complex are mainly composed of thick dunite to wehrlite layer with about 2 km wide, that is the thickest in the Oman ophiolite reported so far. Mantle harzburgites occur further west and south of this complex. Internal structures of the complex represented by layering is generally NS strike with 20 dipping east, which is concordant with general structure of the mantle-crust section in surrounding areas. However, it is curious that the dunite layer of the basal part of the complex extend in NS in the northern part then curved in EW direction at the southern part of the complex. Therefore, the distribution of the dunite obloquies to the internal structure of the complex.

Although the general crystallization sequence, mineral chemistry and lithofacies of the complex are definitely distinguished from common wehrlitic intrusions, the basal dunite resembles to those of the Moho transition zone and of the wehrlitic intrusions, at least at outcrops. Therefore it is an important subject whether it is possible to distinguish by mineral compositions between the basal dunite layer and those of the Moho transition zone and wehrlitic intrusions.