DEFORMATION HISTORY OF THE HOROMAN PERIDOTITE COMPLEX, HOKKAIDO, JAPAN

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ABSTRACT

The Horoman peridotites surrounded by the granulite or opx-grt tonalite in the low P/T Hidaka metamorphic belt preserve evidence of emplacement processes involving lithospheric extension followed by collision, such as those proposed for the emplacement of the ultramafic massifs in the Alps and Pyrenees. Based on deformation microstructures, the massif can be divided into 5 structural units as follows; (1) equigranular domain, (2) internal shear zone, (3) transitional, (4) porphyroclastic domain and (5) basal shear zone (Fig. 1). Structural unit boundaries may be ambiguous but are drawn in accordance with lithological layering. This division is different from that of *Upper/Lower zone* which is based on the lithologic and layering types (Niida, 1974).

Extensional movement is recorded in units (4) and (5). The porphyroclastic peridotite tectonites in (4) grade into the peridotite mylonites in (5) close to the basal fault contact with crustal rocks. LPO and shape preferred orientation of olivine in peridotite mylonites in basal shear zone show a top-to-the north extensional sense of shear.

Subsequent compression is recorded in unit (1) and (2). The average grain size of polygonal olivine in (1) decreases gradually downwards, reaching about 130 µm in (2). Strong LPO of olivine suggests a top-to-the-south sense of shear. Several cm-scale shear zones are also developed in unit (2), which are recognized by intense bending of foliation into these shear zones.

In the peridotite mylonite within cm-scale shear zones in (2), syn-kinematic amphibole reaction rims developed as fiber growths on Opx porphyroclasts. The chemical composition of amphibole fiber varies from pargasitic hornblende in the core to tremolite in the rim, and anthophylite grains developed at the rim of Opx porphyroclasts. Both the upper and lower zones of the Horoman peridotite complex experienced rapid cooling near the boundary of the spinel-plagioclase peridotite stability field (Ozawa and Takahashi, 1995). Considering the amphibole stability field and the P-T path of the Horoman peridotite complex, thrusting and thrust sheet movement along the internal shear zone is thought to have continued under retrograde conditions of metamorphism (from 900°C to 700°C at 4-6 kbar). These conditions are concordant with that of the granulites surrounding the massif during transpressive movement in the Hidaka metamorphic belt (Komatsu et al., 1989).

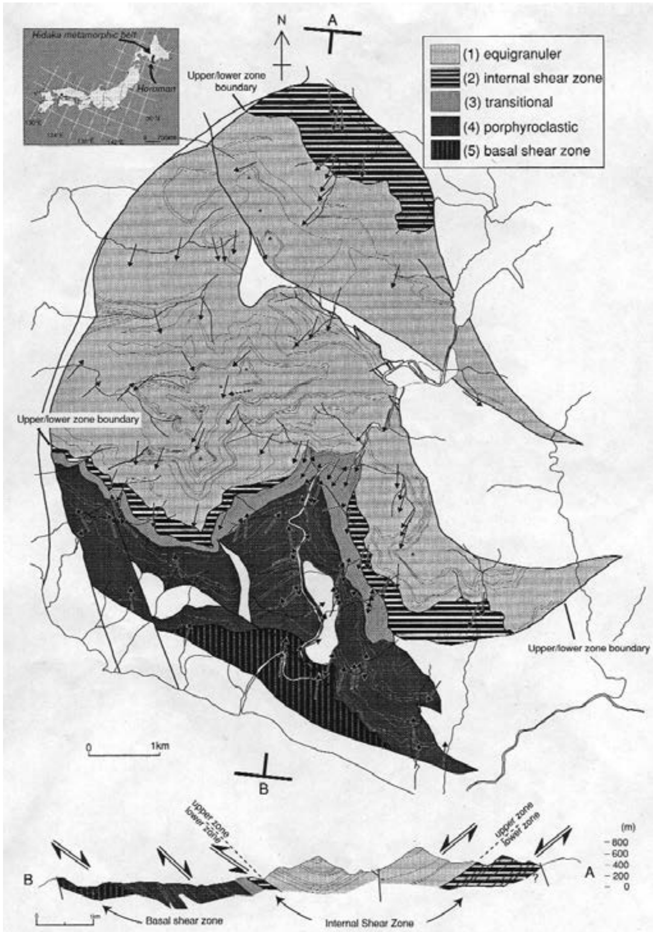

Fig. 1 - Structural units on the basis of deformation microstructures and sense of hanging wall movement in the Horoman peridotite complex.

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