

Olivine and orthopyroxene crystal fabrics in the Basal Shear Zone of the Horoman Peridotite Complex, Hokkaido, Japan

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The Horoman Peridotite Complex is a large-scale peridotite massif, consisting of several structural domains resulting from intensive deformation and recrystallization. The complex is characterized by various microstructures with the least serpentinization, so that many studies have been conducted to reveal mantle processes (e.g., Takazawa et al., 1999; Ozawa, 2004; Morishita and Arai, 2003)[MK1] [MK2]. However, since only a few studies have been focused on the whole deformation structure (e.g., Niida, 1975a; Sawaguchi, 2004), its deformation process is still quite ambiguous.

In this study, we analyzed the olivine and orthopyroxene fabrics (e.g., crystallographic preferred orientations, grain size distributions) and discussed the deformation structures preserved within the complex, in particular the Basal Shear Zone. The Basal Shear Zone occurs at the contact with crustal sequences in the southern part of the Hidaka metamorphic belt (Toyoshima, 1991; Sawaguchi, 2004) and may preserve the evidence for uplifting of the complex (Sawaguchi, 2004). We collected peridotite samples from the Basal Shear Zone and prepared polished thin sections. Most samples have mylonitic textures, characterized by well-elongated grains of olivine, orthopyroxene, and spinel. Some samples preserved symplectitic textures. For each thin section, we made the mineral-phase map by SEM-EBSD to determine grain sizes and crystallographic preferred orientations. We integrated fabric information of both olivine and orthopyroxene to infer the deformation process in the Basal Shear Zone. Then, we discuss the significance of the Basal Shear Zone on the structural development of the whole peridotite complex.

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