

SIT038-15

Room: 202

Time: May 27 09:15-09:30

Metamorphic and deformation history of ultramafic rocks from the Oeyama ophiolite

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The Oeyama ophiolite is juxtaposed to the Sangun high-pressure metamorphic belt in SW Japan. Dominant lithologies of this ophiolite are ultramafic rocks, which were probably originated in the forearc mantle at a Paleozoic subduction zone. We inspected metamorphic minerals in the ultramafic rocks for further understanding mantle processes and dynamics at supra-subduction zones. From petrographical observations, and structural and chemical analyses, we consider that the ophiolite was subjected to a sequence of events of metamorphism, metasomatism and deformation subsequently to equilibration at the spinel-lherzolite facies as follows: 1) relatively high-temperature metasomatism: formation of tremolite + chlorite + phlogopite + Mg-cummingtonite or enstatite, locally associated with intrusive olivine-bearing veins; 2) formation of peridotite mylonites: dynamic recrystallization of forsterite, chromite, Cr-diopside and tremolite; 3) formation of serpentinite mylonites: formation of lepidoblastic antigorite and "cleavable olivine"; 4) pervasive serpentinization under static conditions: formation of pseudomorphic serpentine (mainly lizardite) and associated minerals; and 5) thermal metamorphism by young granites and later alteration: formation of prograde metamorphic minerals including tremolite, forsterite, talc and enstatite, and later, retrograde talc and serpentine that form pseudomorphs after the prograde minerals.

Keywords: ophiolite, peridotite, serpentinite, metamorphism, metasomatism, deformation