Serpentinite body in the Ohmachi Seamount, Izu-Bonin arc.

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A serpentinite body, covered by the Eocene arc volcanic rocks, occurs on the normal fault scarp of the Quaternary rift cross-cutting the Ohmachi Seamount in the Izu-Bonin arc. Floats of amphibolites experienced the eclogite facies metamorphism was reported from the northern end of the serpentinite body, implying that it came from a deeper level of the infant subduction zone. We present preliminary geological and metamorphic characters of the serpentinite body, based mainly of submersible surveys during the Yk08-05 cruise.

The recovered serpentinites are roughly classified into the schistose and massive types. The schistose serpentinite is highly foliated and characterized by preferred orientation of antigorite and stretching lineation of magnetite pseudomorphs after spinel, and such manner of extensive deformation is common with the amphibolites. Rocks of this type mainly occur in the central to north parts of the study area. Foliation dips to the southeast with varying angles: less than 20 deg. in the northernmost part, and grade steeper up to 70 deg. toward the south. Constituent minerals are antigorite + magnetite +- diopside +- olivine +- chlorite +- carbonate minerals. The massive serpentinite is much less deformed. Some of them are extensively crystallized by interpenetrating antigorite, whereas the others contain relict olivine or mesh-textured low-temperature serpentine after olivine. Low-temperature serpentine minerals are considered as the secondary products after the main metamorphism. Mineral assemblage during the main metamorphism is olivine + antigorite + magnetite + chlorite occasionally with diopside or tremolite. Two metamorphic grades are recognized based on CMSH mineral assemblages: the 'tremolite grade' (Ol + Atg + Tr: the amphibolite grade) limited in the massive serpentinite, and the 'diopside grade' (Atg + Di +- Ol: the greenschist to lower amphibolite grade) both in the schistose and massive serpentinites. Diopside retrogressively postdates tremolite if both the phases co-occur in a single specimen.

Based on the observed geologic structure, the schistose serpentinite in the northern parts underlies the massive serpentinite in the south. The localities of amphibolites of eclogite origins, presumably hosted by schistose serpentinite, thus lie near the lowermost structural horizons within the serpentinite body. The amphibolites experienced heating during the pressure increase, followed by decompression. Whereas the massive (especially relic-subtype) serpentinites seem to have been cooled directly from peridotite, suggested by interpenetrating antigorite after olivine, tremolite after pargasite, and diopside after tremolite. In the Ohmachi seamount, it is thus assumed that two rock units of differing histories were juxtaposed: the cooled hanging-wall of the massive serpentinite, and the underplated amphibolites which experienced heating during subduction. The schistose serpentinite could represent the boundary shear zone.