

## Elastic wave velocity of antigorite-bearing serpentinites

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Serpentinized peridotites in wedge mantle play key roles in the transport of water and the slab-mantle coupling. Geophysical mapping of serpentinization is essential for good understanding of subduction zone processes. Tomographic studies have related low-velocity and high-Poisson's ratio to serpentinized peridotites. It is, however, the case only in cool subduction zones like NE Japan, where serpentine minerals lizardite and chrysotile are expected to form. The other serpentine mineral antigorite is expected to form in warm subduction zones like SW Japan. Recently we have shown that antigorite-bearing serpentinized peridotites have higher velocity and lower Poisson's ratio [Watanabe et al., in press]. However, the argument was based on the arithmetic mean of velocities in three mutually orthogonal directions. Anisotropic nature should be taken into account in calculating the average velocity. The temperature dependence of velocities should also be investigated.

The compressional and shear waves were measured on octadecahedral specimens by the pulse transmission technique in various directions of propagation and polarization. Specimens were prepared from antigorite-bearing serpentinized peridotites collected in Hida outer belt (Hakuba, Nagano Pref.). Measurements were conducted at the room temperature and under the confining pressure up to 180 MPa. All elastic constants with orthorhombic symmetry were determined, and isotropic velocities and Poisson's ratio were calculated assuming that similar rocks are randomly packed. The higher velocity and lower Poisson's ratio of antigorite-bearing serpentinized peridotites was confirmed.

The compressional wave velocity of an antigorite rock (Miyazu, Kyoto Pref.) was measured up to 600 C at 1 GPa. Measurements were done with a piston cylinder type high-pressure apparatus at ISEI, Okayama University. The rock sample showed numerous parallel lines, which were interpreted to be parallel to a-axes of antigorite grains. At 400 C, the compressional wave velocity was 8.4 km/s and 6.6 km/s in the directions parallel and perpendicular to the lines. No significant velocity change with the temperature was observed in the direction parallel to the lines, while the compressional wave velocity decreases by 4% from the room temperature to 600 C in the direction perpendicular to the lines. Observed anisotropic behaviors are consistent with crystallographic structure of antigorite.