

Elastic wave velocities of sandstones and mudstones from the Southern Chichibu and Shimanto belts in the Kanto Mountains and greenstone from the Tanzawa group at high pressure.

*Satoko Honda¹, Masahiro Ishikawa¹

1. Graduate School of Environment and Information Sciences, Yokohama National University

The lithological interpretation of crust and mantle beneath the Japan islands is important to understand the crustal evolution of the Honshu arc.

The Izu-Bonin arc is developed along the eastern margin of the Philippine Sea Plate. In the Kanto area, the forearc of the Izu-Bonin arc is subducting as the Philippine Sea slab under the Honshu arc, whereas the Izu peninsular have been collided with the Honshu arc (Taira et al., 1998). In recent geophysical studies (Arai et al., 2009, 2013, 2014), seismic velocity models have been constructed by refraction/wide-angle reflection seismic profiling across the Izu collision zone and the Kanto Mountains.

The Kanto Mountains is located at the northern side of the Tanzawa Mountains Izu collision zone, and mainly composed of the Paleozoic to Mesozoic accretionary complex represented by the Sambagawa metamorphic belt, the Chichibu belt and the Shimanto belt.

We collected sandstone and mudstone samples from the Shimanto and Chichibu belts and greenstones from the Tanzawa group and measured compressional wave velocities (V_p) and shear (V_s) wave velocities. Ultrasonic measurements on these rock samples were conducted up to 1.0 GPa at 25°C in a piston cylinder apparatus. At pressure up to 0.35 GPa, V_p and V_s of the sandstone and mudstone samples from the Shimanto and Chichibu belts are 5.9-6.0 km/s and 3.6-3.7 km/s, respectively. The low V_p/V_s ratio (1.61-1.65) reflects the high content of quartz in the sandstone and mudstone samples. In contrast, V_p/V_s ratio of the greenstone sample from the Tanzawa group shows higher value. We then compared the rock velocities with the seismic velocity profiles (Arai et al., 2009, 2013, 2014), and inferred that the Shimanto and Chichibu belts are not distributed at depths deeper than 10 km.

Keywords: elastic wave velocity, Shimanto belt, Izu collision zone