# Variation of the crust-mantle transition layer along the northern-southern Izu-Bonin island arc by the seismic amplitude modeling

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The Izu-Bonin island arc is a typical oceanic island arc formed by the subduction of the Pacific plate beneath the Philippine Sea plate. Beneath the volcanic front along the Izu-Bonin island arc, this arc has been shown by results of seismic surveys to have not only the middle and lower crust but also the high velocity layer having 7.2-7.6 km/s of P-wave velocity(crust-mantle transition layer) between the lower crust and the uppermost mantle (Kodaira et al., 2007b). Along the northern Izu-Bonin island arc, the crust-mantle transition layer might have a mixture of the mafic residues and olivine cumulates formed during the crustal growth based on the petrological model (Tatsumi et al., in press) and the result of the seismic reflectivity. However, little is known about the seismic reflectivity below the lower crust, including the crust-mantle transition layer along the northern-southern Izu-Bonin island arc. For this study, to assess the seismic reflectivity between the lower crust and the uppermost mantle, we present the velocity contrast value at the top and bottom of the crust-mantle transition layer and interfaces in the uppermost mantle using a comparison of the observed and synthetic waveforms.

In 2005, a seismic refraction/reflection survey using ocean bottom seismographs (OBSs) and airguns were conducted along the northern-southern Izu-Bonin island arc from Sumisu-jima to Kaitoku Seamount beneath the volcanic front (Kodaira et al., 2007b). In record sections of several OBSs, not only the first arrived phases but also later phases reflected from interfaces in the crust and uppermost mantle are visible. In this study, to obtain velocity contrast values from the crust-mantle transition layer to the uppermost mantle, we computed synthetic waveforms using a finite difference wave propagation program code 'e3d' (Larsen and Grieger, 1998) and compared observed waveforms with synthetic ones.

The top of the crust-mantle transition layer has a velocity contrast value of about 0.4 km/s from Sumisu-jima to Kaitoku Seamount along the northern-southern Izu-Bonin island arc except for Tori-shima and Nichiyo Seamount. This value is similar to that of the southern area along the northern Izu-Bonin island arc. On the other hands, the velocity contrast value at the bottom of this transition layer has a large variation along the the northern-southern Izu-Bonin island arc. The velocity contrast value at the bottom of this transition layer is small ranging from Kayo Seamount to Nishi-no-shima (almost 0 km/s). This variation of the velocity contrast at the bottom of this transition layer differs from that of the southern area along the northern Izu-Bonin island arc. In the uppermost mantle, an interface has a large velocity contrast around Tori-shima, and between Sofu-gan and Nichiyo Seamount.