

## Nature of the crust-mantle transition layer along the Izu-Bonin island arc deduced from seismic amplitude modeling

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The Izu-Bonin island arc is formed by subducting of Pacific plate beneath Philippine Sea plate and is supposed as a location where the island arc growth occurred (e.g., Suyehiro et al., 1996). This arc beneath the volcanic front has been shown by results of seismic surveys to have only the middle and lower crust but also the layer having 7.2-7.6 km/s of P-wave velocity (crust-mantle transition layer) between the lower crust and uppermost mantle (Kodaira et al., 2007a, 2007b). Moreover, Moho can not be defined as the one reflector because some seismic reflectors are distributed from the lower crust to upper mantle (Kodaira et al., 2007a, 2007b). To clarify the nature from the lower crust to upper mantle including the crust-mantle transition layer during the crustal growth, it is important to know seismic reflectivity from this part. 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 comparison of the synthetic waveforms and observed ones.

In 2004 and 2005, seismic refraction/reflection surveys using ocean bottom seismographs (OBSS) and a controlled source were conducted along the Izu-Bonin island arc from Sagami Bay to Kaitoku Seamount beneath the volcanic front (Kodaira et al., 2007a, 2007b). 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 (Larsen and Grieger, 1998) and compared observed waveforms with synthetic ones.

Along the Izu-Bonin island arc except for regions between Nii-jima and Kurose hall and between Nichiyo and Suiyo Seamounts, the top and bottom of the crust-mantle transition layer have a velocity contrast value of about 0.4-0.5 km/s and about 0.1-0.3 km/s, respectively. Between Nii-jima and Kurose hall, the velocity contrast value at the top of this transition layer (0.1-0.2 km/s) is smaller than that at the bottom of this layer (0.4-0.6 km/s). On the other hand, the region between Nichiyo and Suiyo Seamounts has one reflector with a large velocity contrast (0.5-0.6 km/s). However, this reflector can not define either the top or the bottom of this transition layer. Results of this study and petrological study (Tatsumi et al., 2008) show that this transition layer along the Izu-Bonin island arc except for the region between Nichiyo and Suiyo Seamounts is a mixture of mafic residues and olivine cumulates formed during crustal growth. The structure between Nichiyo and Suiyo Seamounts may be influenced by the rifting along Sofu-gan tectonic line or may show the incipient stage of island arc growth. In the uppermost mantle, reflectors having a large velocity contrast exist below Tori-shima, Sofu-gan, and Suiyo Seamount.