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Seismic velocity structure and spatial distribution of reflection intensity off the Boso Peninsula, Central Japan, revealed by an ocean bottom seismographic experiment

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Off the Boso Peninsula, central Japan, where the Sagami Trough is in the south and the Japan Trench is in the east, there is a triple junction where the Pacific plate (PAC), the Philippine Sea plate (PHS) and the Honshu island arc (HIA) meet each other. In this region, the PAC subducts beneath the PHS and the HIA, and the PHS subducts beneath the HIA. Due to the subduction of 2 oceanic plates, numerous seismic events took place in the past. In order to understand these events, it is important to image structure of these plates. Hence, many researchers attempted to reveal the substructure from natural earthquakes and seismic experiments.
Because most of the seismometers are placed inland area and the regular seismicity off Boso is inactive, it is difficult to reveal the precise substructure off Boso area using only natural earthquakes. Although several marine seismic experiments using active sources were conducted, vast area remains unclear off Boso Peninsula. In order to improve the situation, a marine seismic experiment, using airgun as an active source, was conducted from 30th July to 4th of August, 2009. The survey line has 216 km length and 20 Ocean Bottom Seismometers (OBSs) were placed on it.
We estimated 2-D P-wave velocity structure from the airgun data using the PMDM (Progressive Model Development Method; Sato and Kenett, 2000) and the FAST (First Arrival Seismic Tomography ; Zelt and Barton, 1998). Furthermore, we identified the probable reflection phases from the data and estimated the location of reflectors using Travel time mapping method (Fujie et al. 2006).
We found some reflection phases from the data, and the reflectors are located near the region where P-wave velocity is 5.0 km/s. We interpret that the reflectors indicate the plate boundary between the PHS and the HIA. The variation of the intensity of reflection along the upper surface of PHS seems to be consistent with the result from previous reflection seismic experiment conducted by Kimura et al. (2009).
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