

3-D seismic velocity structure and distribution of reflection intensity near the main slip area of the Boso Slow Slip Event

*Akihiro Kono¹, Toshinori Sato¹, Masanao Shinohara², Kimihiro Mochizuki², Tomoaki Yamada², Kenji Uehira³, Takashi Shimbo³, Yuya Machida⁴, Ryota Hino⁵, Ryosuke Azuma⁵

1. Graduate School of Science, Chiba University, 2. Earthquake Research Institute of Tokyo University, 3. NIED, 4. JAMSTEC, 5. Graduate School of Science, Tohoku University

Off the Boso Peninsula, Japan, the Pacific plate (PAC) is subducting westward beneath both the Honshu island arc (HIA) and Philippine Sea plate (PHS), while the Philippine Sea plate is subducting northwestward beneath the Honshu island arc. These complex tectonic interactions have caused numerous seismic events such as the Boso Slow Slip Events (SSEs). To better understand these seismic events, it is important to determine the structure under this region.

Although many previous studies have attempted to reveal the structure from natural earthquakes and seismic experiments, still further work is needed for farther offshore.

We conducted a marine seismic experiment off the east coast of the Boso Peninsula, from July to August 2009. Airgun shooting was conducted along the 4 survey lines, and 27 Ocean Bottom Seismometers (OBSs) in total were deployed in the area.

In the 2016 fall meeting of the Seismological Society of Japan (S06-11; Kono et al.), we presented 2-D seismic velocity structures and distribution of the reflection intensity from the upper surface of the PHS (UPHS) under the 3 seismic survey lines, and we showed that some strong reflections have been seen close to the main slip area of the Boso Slow Slip events (SSEs). This time, we additionally used the data from the off-line OBSs to estimate a 3-D seismic velocity structure and distribution of the reflection intensity from the UPHS in the off-line area, which is close to the main slip of the Boso SSEs.

We estimated 3-D P-wave velocity structure from the airgun data recorded in the OBSs by using the PMDM (Progressive Model Development Method; Sato and Kennett, 2000) and the FAST (First Arrival Seismic Tomography; Zelt and Barton, 1998). Next, we will pick the reflection traveltimes likely reflected from the UPHS and apply them to the Traveltime mapping method (Fujie et al. 2006) to estimate locations of the reflectors. It seems that reflections from the UPHS can be seen in several off-line OBS data, and we are still working on estimating distribution of the reflection intensity.

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