[EJ] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG59]Structure and evolution of Japanese islands - Formation of island arc systems and earthquake cycles

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Subduction processes such as accretion, back-arc-spreading, and arc-arc collisions have shaped the Japanese island arc. Recent advances in seismic imaging, both passive and controlled source, have produced new images of the crust-mantle structure under Japan and surrounding regions. Through the influence of pre-existing faults and rheological structures, these crust and mantle structures are exerting strong control on active tectonic processes like seismic activity and crustal deformation in the overriding plate. We seek contributions that document and/or model the deformation of the Japanese islands over a variety of time scales from the earthquake cycle to the tectonic evolution of the Japanese island arc, and from a range of research fields including seismology, geology, geochemistry, tectonic geomorphology, and geodynamics. Multidisciplinary studies are encouraged. We also welcome contributions in numerical or analogue geodynamical modeling that explore deformation processes.

[SCG59-P02]Spatial distribution of reflection intensity on the upper surface of the Philippine Sea Plate, off the Boso Peninsula, Japan

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In the region off the Boso Peninsula, Japan, is known to have complex structure its underneath. The Pacific plate (PAC) is subducting westward beneath the landward plate from the Japan trench, while the Philippine Sea plate (PHS) is subducting northwestward under the landward plate from the Sagami trough. These complex tectonic interactions have caused various 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.

In May 2017, we published a 2D P-wave velocity structure under the survey area, showing geometry of the upper surface of PHS (UPHS) and reflection intensity variation along the UPHS. From our result and previous studies, relatively strong reflection from the UPHS can be observed near the main slip area of Boso SSEs. The reflective area may be related to the Boso SSEs, however, it is still insufficient to link both only from the 2D models. Therefore, further work is needed in order to reveal spatial distribution of the relatively strong reflection area.

From July to August 2009, we conducted a marine seismic experiment using airguns as sources off the

southeast coast of the Boso Peninsula. Airguns were shot along the 4 survey lines and 27 Ocean Bottom Seismometers (OBSs) were deployed in the survey area. We used 18 OBSs to determine 3D P-wave velocity structure, which has 150(x)×90(y)×30 (z) km size.

We estimated 3D velocity structure from airgun data recorded in the OBSs by using the FAST (First Arrival Seismic Tomography; Zelt and Barton, 1998). We also picked the reflection traveltimes likely reflected from the UPHS and applied them to the Traveltime mapping method (Fujie et al. 2006) to estimate spatial locations of the reflectors.

As a result, the reflections from the UPHS seem to be concentrated in the western and the eastern part of the survey area. The western reflective area is close to the main slip area of the Boso SSEs, which may suggest the presence of a thin low velocity layer along the UPHS in the area. The eastern reflective area seems to overlap with the local high velocity structure seen in our 3D velocity structure. The high velocity structure partially overlaps with the northern extent of relatively high velocity structure seen in the forearc region of the Izu-Bonin subduction zone.