

Structural variation in the incoming Philippine Sea plate along the Nankai Trough

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The next large-thrust earthquake along the Nankai Trough, southwest Japan is concerned to occur within this century. Nonvolcanic deep low-frequency tremors and earthquakes are observed around the down-dip limit of the coseismic rupture zone of the last Tonankai and Nankai earthquakes [Obara, 2002]. One of the causes of these low-frequency seismic phenomena is considered to be fluid generated by dehydration processes from the subducting slab. It is important to investigate structural variation in the incoming Philippine Sea plate, including its fluid content to understand the generation of the low-frequency seismic phenomena as well as large-thrust earthquakes.

In 2014, we conducted the seismic refraction and reflection survey in the northern margin of the Shikoku Basin, where the Philippine Sea plate is subducting beneath the Eurasia plate at the Nankai Trough. We conducted a 360km long seismic profile about 50-60km seaward of the deformation front along the Nankai Trough. 35 OBSs were deployed along the profile with the interval of 10km. A tuned airgun array shot with a total volume of 7800 cu. in. every 200m for OBSs, and 380 cu. in. every 37.5m for a 192-channel, 1.2km-long hydrophone streamer.

In the time-migrated reflection section, variation in the sedimentary layer and basement reflection can be recognized off Shikoku, which may correspond with the boundary of the plate age proposed by magnetic lineation [Okino et al., 1999]. In the southwestern part of the profile, the basement reflection is not always clear, and shows smooth structure. Comparatively in the northeastern part, basement changes in depth drastically with prominent reflection signals. In the wide-angle OBS data, PS converted waves are clearly observed over along the seismic profile. In particular, PS converted waves refracted from the uppermost mantle can be

remarkably recognized in the northeastern half of the profile.

We will show the structural variation of the oceanic crust of the incoming plate, which may be related to the formation of the Shikoku Basin as well as the generation of the various seismic activities including the low-frequency events, by using OBS data.

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