

東海域の海陸統合地殻構造

Crustal structure of the Tokai region

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In 2008, Japan Agency for Earth-Marine Science and Technology carried out a seismic survey using R/V Kairei and R/V Kaiyo in areas around the Suruga Bay and Sea of Enshu, which the Philippine sea plate is subducting beneath the central Japan. An objective of this study is to clarify the seismogenic structure of Tokai region, which occurrence of a large earthquake will be expected. In addition, it is known that a subducting crust has uneven crustal thickness and that it is not typical thin oceanic crust (Kodaira et al., 2004). Therefore, normal subduction like off Kumano in the Nankai Trough does not occur in this region. It is important to understand crustal structure of the subducting Philippine sea plate and velocity structure of the hanging wall side. A multichannel reflection survey (MCS) and a refraction survey using ocean bottom seismographs (OBSs) were conducted on ten and four lines, respectively. P-wave and S-wave structures are estimated adding to the reflection imaging. Receivers are OBSs with an interval of 2.5 km, OBC with a group interval of 25 m, two hydrophone arrays and land stations with an interval of 500 m. Data analyses for refraction data are tomographic inversion using first arrivals (Zhang et al., 1998), reflection mapping using picked traveltimes (Fujie et al., 2006) and 2-D conventional layered modeling (Zelt and Ellis, 1988). Those for reflection data are a velocity analysis with an interval of 100 CDPs, stacking, some filtering, poststack migration, prestack depth migration and attribute analysis.

As the results, it is clarified that the subducting Philippine sea plate has 6 km/s layer and uneven topography. In addition, the hanging wall side has thick sedimentary materials with a velocity of approximately 4 km/s and the velocity structure changes reversely (distribution of low velocity materials) beneath the Omaezaki Spar. Materials with a velocity of 5-6 km/s distribute beneath the western side and thick sedimentary basin is developed in this region. A Poisson's ratio of the hanging wall is almost 0.25 except uppermost sediments. On the reflection sections, we sporadically identified the subducting Philippine sea plate roughly inclining west beneath the central Japan and uneven topography, and the imaging is not like the Nankai Trough region with clear reflectors of top of the subducting plate and the decollement.

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