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南海トラフ西端部日向灘の地震波速度構造
Seismic velocity structure around the Hyuga-nada region, western end of the Nankai Trough

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In the Nankai Trough, three major seismogenic zones (Tokai, Tonankai and Nankai) of megathrust earthquake exist. The Hyuga-nada region is located on the west of Nankai seismogenic zone and it was distinguished from these seismogenic zones because of the lack of megathrust earthquake. However, recent studies pointed out the possibility of simultaneous rupture of the Tokai, Tonankai, Nankai and Hyuga-nada segments. Thus, the seismological structure in Hyuga-nada region is important to understand segmentation and synchronization of seismic rupture along the Nankai Trough subduction zone. To understand the possibility of seismic linkage of Nankai and Hyuga-nada segments, Japan Agency for Marine-Earth Science and Technology has been carried out a wide-angle active source survey and local seismic observation in the western end of the Nankai seismogenic zone. In the southern west part of observation area, it is considered that the Kyushu-Palau Ridge is subducting. This observation is conducted as a part of ‘Research concerning Interaction Between the Tokai, Tonankai and Nankai Earthquakes‘ funded by Ministry of Education, Culture, Sports, Science and Technology, Japan. From active source survey, Nakanishi et al [2010, AGU] showed that subducting Philippine Sea Plate can be divided into three zones and there is the zone of the thin oceanic crust of the subducting Philippine Sea Plate between Nankai segment and Kyushu-Palau Ridge segment. However, their imaging range is limited in the shallow part of the offshore region. Deep structure of the subducting slab and the structure of arc/ocean transition zone are also important to consider the possibility of the seismic linkage and the location of the boundary among three zones described above.

To extend the seismic image to the coastal area and to investigate the fine structure of subducted slab, we performed a three-dimensional seismic tomography combining the local seismic data recorded on 157 ocean bottom seismographs and 107 land seismic stations. From the result of hypocenter relocation, microseismicity near the trough axis is active on the western part of the ‘thin oceanic crust‘, whereas inactive on the eastern part. Obtained velocity structure of subducted slab crust indicates that the width of ‘thin oceanic crust zone‘ is narrow and it extends to about 30 km in depth of plate boundary. The continental crust just above the coseismic slip zone of 1968 Mw7.5 earthquake shows relatively high velocity. Besides, velocity structure of the uppermost part of the subducting slab mantle shows spatial heterogeneities. In the thin oceanic crust zone, high velocity slab mantle is imaged from near the trough to coastline. On the other hands, in the Kyusyu-Palau Ridge segment, western part of the ‘thin oceanic crust‘ segment, two low velocity zones are imaged in the slab mantle. Because the locations of these low velocity zones are corresponding to the low magnetic anomaly area, we consider that these low velocity zone may be related to the subducted Kyusyu-Palau Ridge. Focal mechanisms estimated from P-wave first motion indicate that the normal fault earthquake is dominant in this region.

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