Seismicity and structure over the focal region of the Tonankai-Nankai earthquakes derived from long-term seafloor observations

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Great earthquakes with magnitudes greater than 8 repeatedly occur at fairly constant recurrence intervals of ˜100 years in the supposed focal region of the Tonankai and Nankai earthquakes. Seismic activity, the depth contour of the subducting plate that may be derived from the hypocenter distribution, and correlation between seismicity and crustal structure are important factors on long-term evaluation of earthquake occurrences and tsunami estimations. However, it is difficult to precisely monitor offshore seismicity by the land seismic network. We conduct continual marine seismic observations over the supposed focal region of Tonankai and Nankai earthquakes off the Kii Peninsula since 2003 in order to precisely comprehend seismic activity.

We have conducted one-year long repeating marine earthquake observations using long-term ocean bottom seismometers (LTOBSs) developed at ERI. We started the observation in 2003 by deploying 9 LTOBSs off Cape Shionomisaki. In 2004, we recovered those 9 LTOBSs and deployed, with additional 14 new LTOBSs, a total of 23 LTOBSs in a region from southeastward offshore of Shikoku to the west of Kumano-nada. In 2004, we recovered these 23 LTOBSs and re-deployed. In 2005, we recovered these 23 LTOBSs, and, with additional 2 new LTOBSs, we deployed a total of 25 LTOBSs in a region from southwest offshore of Shikoku to Cape Shionomisaki covering toward the trench axis. Those 25 LTOBSs are currently in operation. The LTOBSs have been deployed with a spatial interval of 20 ˜25 km. In order to determine their precise locations on the seafloor, and obtain shallow crustal structures beneath the stations, active seismic surveys were conducted using airguns in 2003, 2005, and 2006.

Data from the recovered LTOBSs were corrected for the time drifts, and seismic events were extracted along with the data from land seismic stations according to the JMA catalogue. P and S arrivals were then manually picked. We relocated the hypocenters of those extracted events using the manually picked arrival times, and applied tomographic analyses about the crustal structure. The results of these analyses will be reported.