

Spatial variation of seismicity along the focal regions of the Tonankai-Nankai earthquakes revealed by ocean bottom observations

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Large earthquakes with magnitudes greater than 8 repeatedly occur at constant recurrence intervals of ~100 years along the Nankai Trough. Distribution of seismicity and its dependency on variations in the crustal structure are key factors for long-term evaluation on earthquake occurrences. It is difficult to monitor offshore earthquakes and precisely locate their hypocenters by the on-land seismic network. In order to overcome such difficulties, we are conducting repeating seismic observations over expected focal regions of forthcoming large earthquakes along the Nankai Trough using long-term ocean bottom seismometers (LTOBS) since 2003.

We started a series of long-term observations by deploying 9 LTOBSs off Cape Shionomisaki in 2003. In 2004, those LTOBSs were recovered and re-deployed with additional 14 stations expanding the network coverage southwest to the west of Kumanonada. We recovered and re-deployed LTOBSs at the same stations in 2004. The network was shifted toward the trench axis with 2 additional stations (total of 25 LTOBSs) in 2005. The network was further expanded by adding 2 new stations in 2006. Two LTOBSs were added to the network over the Nankai Trough off Cape Shionomisaki. We completed the series of observations by recovering 29 OBSs in December, 2007.

Data from recovered LTOBSs are corrected for clock drifts. Seismic events are extracted by referring to the JMA catalogue, or visually identified for smaller events. P and S arrival times are manually picked, and hypocenters are determined. We completed processing the data up to those obtained by 2006. More than 3500 hypocenters were located. The hypocenters were distributed within the subducting oceanic crust. Earthquakes within the upper mantle of the subducting plate are dominant under the focal region of the Tonankai earthquake.