

Extensive wide-angle seismic surveys in the rupture zone of the Tonankai earthquake

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Destructive interplate earthquakes have repeatedly occurred every 100-150 years beneath the Kumano-nada, off the Kii peninsula owing to the subduction of the Philippine Sea plate beneath the southwest Japan arc. The last great interplate earthquakes in this seismogenic subduction zone was the 1944 Tonankai earthquakes. Many studies have been conducted to reveal the coseismic slip distribution of this earthquakes by the seismic and tsunami waveform analysis, and several possible, but partially conflicting, slip distribution models have been proposed. These slip distributions show regional variations, indicating that the regional variations in the geometry of the fault plane, that is, the plate boundary.

In 2006 and 2007, we conducted extensive wide-angle seismic surveys in the rupture zone of the 1944 Tonankai earthquake in order to reveal the detailed crustal structure, especially around the plate boundary. We designed four wide-angle seismic survey lines to cover the entire rupture zone of the 1944 Tonankai earthquakes; two of them were subparallel to the trough axis and the others were perpendicular to the axis. We deployed a total of 167 OBSs (Ocean Bottom Seismometers) along 4 lines with the spacings of 4km or 5km, and an airgun array with a total volume of 200L was fired every 100 meter on these lines. After airgun shooting, all the OBSs were successfully recovered. These surveys were a part of 'Structure research on plate dynamics of the presumed rupture zone of the Tonankai-Nankai Earthquakes' funded by Ministry of Education, Culture, Sports, Science and Technology.

To reveal regional variations in the crustal structure, we adopt the first arrival tomography for determining the P-wave velocity structure, and the travelttime mapping approach for determining the structure boundaries. The preliminary results obtained by the first arrival tomography imply that the plate boundary is not a flat plane but shows regional variations. In the presentation, we will show the overview of these surveys, and the preliminary structure models of all the four lines.