

Three-dimensional plate geometry and velocity models for the western Nankai Trough based on structural studies

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Great interplate earthquakes have repeatedly occurred in pairs along the Nankai Trough. In order to reduce a great deal of damage to coastal area from both strong ground motion and tsunami generation, it is necessary to understand rupture synchronization and segmentation of the Nankai megathrust earthquake. For a precise estimate of the rupture zone of the Nankai megathrust event based on the knowledge of realistic earthquake cycles and variations of magnitude, it is important to know the geometry and property of the plate boundary of the subduction seismogenic zone. To improve a physical model of the Nankai Trough seismogenic zone, the large-scale high-resolution wide-angle and reflection (MCS) seismic studies, and long-term observation have been conducted since 2008. Marine active source seismic data have been acquired along grid two-dimensional profiles having the total length of ~800km per year. A three-dimensional seismic tomography using active and passive seismic data observed both land and ocean bottom stations have been also performed. This study is part of 'Research concerning Interaction Between the Tokai, Tonankai and Nankai Earthquakes' funded by Ministry of Education, Culture, Sports, Science and Technology, Japan. The seismic survey was conducted off the Tokai area including the onshore survey across the eastern Kii Peninsula in 2012, the final year of this project.

Compiling those studies provides a three-dimensional plate geometry and velocity structure models of the western Nankai Trough at the moment. Although their reliability and resolution should be evaluated, these models can be applied to a numerical simulation to examine if the observed rupture zone of the historical event can be reproduced. We will also try to construct more fine-scale model for the entire Nankai Trough area.