

Three dimensional velocity structure in and around the Philippine Sea slab estimated by Double-Difference Tomography method

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Many great, interplate earthquakes have occurred along the Nankai Trough, but little is understood on the detailed 3D velocity structure of the Philippine Sea plate.

In this study, the study area covering from Tokai to Kyushu districts is divided into five regions, and for each region the Double-Difference Tomography method (Zhang and Thurber, 2003) was applied to arrival-time data recorded at 504 stations from 9,010-11,469 earthquakes. The total number of arrival-time data used in the inversion varies from 160,000 to 230,000 for P wave and from 150,000 to 230,000 for S wave. Horizontal grid nodes were set up in the model space with intervals of 30-40 km parallel to the Nankai Trough and 10-15 km perpendicular to the trough. Vertical grid nodes were spaced at intervals of 5-10 km.

Obtained results show clear low-velocity zones of S wave below the plate boundary which was estimated from seismic experiments in Tokai district, Kii peninsula and eastern Shikoku (Kodaira et al. 2000, 2001, 2004, Ito et al. 2005). In Kyushu district, there is a clear low-velocity zone above intraslab earthquakes occurring at depth of 30-60 km in the Philippine Sea slab.