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南海トラフ西端部日向灘に沈み込むフィリピン海プレートの形状
Geometry of the Philippine Sea plate subducting beneath the westernmost Nankai Trough

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In the Nankai Trough subduction seismogenic zone, the Nankai and Tonankai earthquakes had often occurred simultaneously, and caused a great event. Possibility of a megathrust earthquake along the Nankai Trough from Tokai to the Hyuga-nada, east off the Kyushu Island, Japan, is recently pointed out.

To know the genuine western end of the Nankai megathrust earthquake, a high-resolution wide-angle seismic survey was conducted in the Hyuga-nada region. Moreover, it is important to know the spatial geometry of the subducting Philippine Sea plate to understand rupture synchronization and segmentation of the Nankai megathrust earthquake.

Layered (or Layered-like) velocity models having velocity interfaces such as Moho are obtained by trial-and-error approach, ray-tracing technique [Zelt & Smith, 1992] combined with first arrival tomography based on the structural images derived from first arrival tomography and reflection traveltime mapping [Fujie et al., 2006]. Previously obtained marine seismic data in the Hyuga-nada region is also used to make precise and detailed geometry of the subducting plate. We also used airgun shot data observed by HI-NET stations located along the prolongation of across-trough seismic profiles to determine deep subduction structure and forearc structure.

The spatial geometry of the Philippine Sea plate was estimated from the layered velocity models. The subducting plate is deformed around the northeastern and southwestern margins of the Kyushu Palau Ridge. Both margins of the Kyushu Palau Ridge may correspond to the western end of the Nankai megathrust earthquake, southwestern end of the 1968 Hyuga-nada earthquake and the 1662 tsunami earthquake, respectively.

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