Three-dimensional plate geometry and velocity model for the Nankai Trough subduction seismogenic zone based on structural studies

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Not only to estimate precise coseismic rupture area of the Nankai megathrust earthquake but also to predict seismic and tsunami hazard, it is necessary to make more realistic three-dimensional plate and velocity structure models of the entire Nankai Trough seismogenic zone. Although various three-dimensional plate models for the Nankai Trough has been used or proposed in each numerical calculation study, it is important to provide the most realistic and reliable three-dimensional geometry of the subducting plate as the standard plate model for consistent evaluation on each study. We present a three-dimensional plate and structure models of the Nankai Trough subduction seismogenic zone, based on results from a wide-angle ocean bottom seismographic (OBS) surveys. Our plate and structure model of the coseismic slip area show the first time the visible, reliable and realistic three-dimensional model. The reliability of the three-dimensional plate model and three-dimensional seismic velocity model is confirmed by comparing theoretical first arrivals calculated from two-dimensional structure models sampled from the three-dimensional model along seismic profiles with observed traveltime data.   Spatial validity of the three-dimensional model is also confirmed by sufficiently small difference in hypo central parameters determined from previously published result of seismic tomography and our three-dimensional structure model in the Hyuga-nada region; latitude and longitude within ±0.1° and depth within ~±5km. We therefore conclude that such an extent or degree of difference in hypocentral parameters will have an effect on results of numerical simulation study in which our three-dimensional models are used.