Simulation of Strong Ground Motions Caused by the 2004 Off-Kii Peninsula Earthquake

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Strong ground motions caused by the Mj 7.4 2004 earthquake that occurred in the Nankai Trough to the southeast of the Kii Peninsula, Japan are simulated by a three-dimensional (3D) finite-difference method (FDM) using a fault-rupture model obtained by inversion of teleseismic seismograms and a 3D subsurface structure model for central Japan. Through simulations of the foreshock (Mj 6.9), the structural model is refined by comparison with observations, and the modified model is used to simulate the mainshock. The simulation provides a reasonable reproduction of the ground motions caused by the mainshock, including site amplification effects in the sedimentary basins of Kansai and Nobi. However, the current simulation model has limitation to produce the large and extended ground motion due to long-period Love waves in the Kanto Plain, as the model does not account for the sharp frequency selectivity for Love waves in the surficial structure of the Boso peninsula. It therefore appears necessary to develop a better model for longer-period waves.