

Long-period ground motion evaluation for the Nankai Trough megathrust earthquakes

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The megathrust earthquakes in Nankai Trough have been occurring with an interval of 100-200 years. The past earthquakes show various occurrence patterns and we have no exact idea for the occurrence pattern of next earthquake. Thus it is important to understand a possible range of long-period ground motion by considering the uncertainty of source model. In this study, we evaluate long-period ground motions for the Nankai Trough megathrust earthquake, especially for the anticipated largest earthquake, using many scenarios with various possible source parameters including asperity distribution and hypocenter. We also assumed a variation of rupture velocity and source time function for the shallower part of source area. The long-period ground motions were simulated by the finite difference method using characterized source model and 3D velocity structure model of Japan. We used the GMS (ground motion simulator) for the 3D finite difference simulation.

The simulation results at selected sites show that deeper part of source area has larger contribution to long-period ground motions for the anticipated largest earthquake than shallower part of source area. The asperity distribution on the deeper part of the source area and hypocenter location cause variation of the peak ground velocity (PGV) by a factor of two and a factor of up to five, respectively. The simulated PGV values show a large scattering compared to those for smaller earthquakes in the Nankai Trough which we have already simulated.

Keywords: Nankai Trough, long-period ground motion, megathrust earthquake, GMS