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

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We evaluate long-period ground motions associated with the Sagami Trough earthquakes, especially for the 1703 Genroku earthquake and the 1923 Taisho earthquake. The long-period ground motions are simulated by the finite difference method using a characterized source model and the 3-D velocity structure model. The parameters of the characterized source model are determined based on a “recipe” for predicting strong ground motion [Earthquake Research Committee (ERC), 2009]. We construct 408 source models for hypothetical Genroku and Taisho earthquakes assuming possible source parameters, including asperity configuration, asperity size and hypocenter location (120 models and 288 models for hypothetical Taisho and Genroku earthquakes, respectively). And then we introduce a multi-scale heterogeneity (Sekiguchi and Yoshimi, 2006) of rupture propagation (rupture velocity, slip, rake angle) to the characterized source models. The 3-D velocity structure model used in the simulation is a recently constructing model for the Kanto area (Senna et al., 2015, SSJ). Using these models, an analyzing period range of our simulation is >2 s.
We use peak ground velocity (PGV) and velocity response spectra (Sv) as indices for the evaluation. Spatial distribution maps of PGV and Sv indicate that the hypocenter location has larger impact on the distribution. Because the source areas are located beneath the Kanto plane, body waves predominate in simulated waveforms for station in the plane. Histograms of PGV and Sv show a log-normal like distribution. Using these results, we evaluate the long-period ground motion hazard for two types of Kanto earthquake.
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