

Recipe for Predicting Strong Ground Motion - State of the Art and Future Prospects -

Kojiro Irikura[1]; Tomotaka Iwata[2]; Hiroe Miyake[3]

[1] Kyoto Univ.; [2] DPRI, Kyoto Univ.; [3] Earthq. Res. Inst., Univ. Tokyo

We propose a recipe for the prediction of strong ground motion based on the most recent findings of seismology and earthquake engineering. The fault parameters of seismic sources for simulating ground motions are characterized from the waveform inversion results using strong motion data. Then, the source model of a future large earthquake is defined by three kinds of parameters, which we call: outer, inner, and extra fault parameters. The outer fault parameters define the entire source area and seismic moment of the earthquake. The inner fault parameters are parameters characterizing fault heterogeneity inside the fault area. The extra fault parameters are related to the propagation pattern of the rupture.

Ground-motion time histories in broadband periods are estimated using a hybrid scheme, long period motions in a numerical calculation for the 3D velocity structure and short period motions in stochastic simulation technique for the source model given by the recipe. The validity and applicability of the procedures for characterizing the earthquake sources for strong ground prediction are examined in comparison with the observed records and broadband simulated motions for the 1995 Kobe, 2000 Tottori, 2003 Miyagi-ken Hokubu as inland crustal earthquakes. In future directions, strong ground motions taking into account the source dynamics are encouraged to constrain fault parameters.