Scenario framing and ground simulations for active fault systems with plural segments based on the strong motion prediction recipe

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We conducted strong motion simulations for the Nobi faults system and the Median Tectonic Line in Shikoku island from a viewpoint of parameter studies due to the difference of earthquake scenario framing. Source model for the scenario earthquake was constructed by following the strong ground motion prediction recipe (Irikura et al., 2003), though we discussed about the influence of the scaling model and the cascade model for seismic moment estimation and allocation.

Nine scenarios were selected for the case of the Nobi fault system to show a practical example of differences between scenarios and parameters. The Nobi earthquake of October 21, 1891 is one of the largest historical intraplate earthquakes in Japan with M 8.0, and caused severe damage especially in Gifu and Aichi prefectures. In order to perform strong ground simulation due to the Nobi fault system, the Packaged Fault Model (Nakata and Kumamoto, 2005) is applied to the Nobi fault system mapped on the detailed active faults map (Nakata and Imaizumi ed., 2002), as a forward modeling. Empirical Green functions are constructed from a shaking record of a small earthquake (2004/10/05, Mw4.6). For the case of the Median Tectonic Line in Shikoku island, sixteen scenarios were selected to show scenarios and parameter differences with a shaking record of a small earthquake (1999/10/30, Mw4.5) as the Empirical Green functions.

The aim of this simulation is to assess sensitivity of fault parameters and scenario framing on synthetic waveforms. The time domain ground motion waveforms of each case are compared with the empirical attenuation equation, and the velocity response spectrum. Although these are still preliminary and stir in discussion, collaborating with seismologist and earthquake engineer to apply active fault data to strong ground motion prediction, as well as probabilistic earthquake hazard maps, is important for future earthquake risk mitigation.