

# Application and validation of the strong ground motion evaluation method to the 2003 Tokachi-oki, Japan, earthquake

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The National Research Institute for Earth Science and Disaster Prevention has carried on the special research project 'National Seismic Hazard Mapping Project of Japan'. In this project, strong ground motion evaluations for scenario earthquakes have been carried out based on the 'Recipe' for strong ground motion evaluation, proposed by Irikura et al. (2004). Here we simulate strong ground motions during the 2003 Tokachi-oki earthquake ( $M_w=8.0$ ) by applying the 'Recipe', and examine its validity.

A simplified source model consists of some rectangular-shaped asperities on a fault plane is constructed following the method proposed as the 'Recipe'. A 3D velocity structure model in and around Hokkaido, which is the target area for the simulation, is also constructed based on boreholes, reflection and refraction surveys, and geological data. Waveforms are calculated by the hybrid Green's function method (e.g. Kamae et al., 1998). We use the 3D finite-difference method and the stochastic Green's function method for low (lower than 0.2 Hz) and high frequency content, respectively.

As an overall feature, the peak ground velocity and seismic intensity distributions of simulated strong ground motions agree well with the observed ones. However, some problems become clear. The first is the underestimations in the frequency range of 0.2-1 Hz at sites located on deep basins. This may be a lack in the evaluation on the effects of 3D structure in the calculations using the stochastic Green's function. The second is the overestimations in high frequency range (higher than 2 Hz) at sites located on back-arc side. This may be caused by the existence of low-Q zone beneath the volcanic front, which is not considered in this simulation. In addition, the non-linear site effects also should be considered in strong motion evaluations, especially for soft soil sites near source region.