

## Three-dimensional simulation of seismic motions in the northwestern Chiba Prefecture, Japan

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Three-dimensional seismic simulation was carried out in the northwestern Chiba Prefecture, Japan, based on the results of geophysical survey conducted by Chiba Prefecture. The calculated waveforms were compared with the observed records derived from the seismometers installed by Chiba Prefecture. The model, which is 29.4km(NS) by 24km(EW) in dimensions, consists of three sedimentary layers (Shimohsa, Kazusa, and Miura formations) and a seismic basement. P-wave velocities are 1.7, 2.2, 2.9, and 5.7 km/s, while S-wave velocities are 0.45, 0.9, 1.5, and 3.0 km/s, respectively. The upper boundary of the seismic basement tends to deeper in the southern area. The deeper part beneath the seismic basement ( $V_s$  3.0km/s) was modeled based on Sato et al.(1998). A hybrid pseudo-spectral method / finite difference method parallel simulation with discontinuous grid spacing was used for the seismic simulation. The model was divided into four in the vertical direction. The grid spacing in the horizontal direction was 160m, while that in the vertical direction was 80, 80, 160, and 320m, at each subdomain. Data exchange between the adjoining subdomains are carried out by using MPI (message passing interface) library. The maximum frequency was 1.25Hz and the time increment is 0.005s. We simulated an earthquake occurred in the calculated region (M4.6, depth=71km). We used a point source with the source mechanism derived from F-NET (National Research Institute for Earth Science and Disaster Prevention, NIED) and the Herrmann's pseudo-delta function with a time width of 1.0s as a source time function (moment rate function). The velocity amplitude of calculated waveforms were in good agreement with that of observed records in the northern area, while those in the southern area were underestimated in the simulation. The calculated peak ground velocity in the southern part was smaller than that in the northern part. As the earthquakes used in this study were deep and small, it is probable that seismic motion at a rather long-period (2-10s) did not predominate and the effects of 3-D irregularity of the interfaces was not so obvious in the simulation.