

Progress towards a Japan Integrated Velocity Structure Model and Long-Period Ground Motion Hazard Map

Kazuki Koketsu[1]; Hiroe Miyake[1]; Hiroyuki Fujiwara[2]; Tetsuo Hashimoto[3]

[1] Earthq. Res. Inst., Univ. Tokyo; [2] NIED; [3] MEXT

The Japan islands are in a complex tectonic setting with various subducting plates, and most of their urban areas are located on sedimentary basins. These lead to three-dimensionally complicated velocity structures, which cause significant effects on the propagation of seismic waves from an earthquake to the urban areas. Accordingly, it is important for the simulation of long-period ground motion and its seismic hazard to determine the three-dimensional (3D) velocity structure of the whole Japan islands. We have already proposed a standard procedure for modeling a regional 3D velocity structure in Japan, simultaneously and sequentially using various kinds of datasets such as the extensive refraction/reflection experiments, gravity surveys, surface geology, borehole logging data, microtremor surveys, and earthquake ground motion records. We applied the procedure to the Tokyo metropolitan area for constructing a reference 3D velocity structure model. As the last step of the procedure, we calibrated the model by comparison of observed and synthetic ground motions, since this modeling is carried out mainly for long-period ground motion hazard map. As this application confirmed the validity of the standard procedure, it is then applied to the central, eastern, and western parts of Japan in 2006 to 2008, to construct a Japan integrated velocity structure model. Long-period ground motions from future Tokai, Tonankai, Nankai, and Miyagi-oki earthquakes and their response spectra will be computed and combined into a Japan hazard map in 2008 and later by using this model.