Study on shallow velocity structure modeling of sediments for strong-motion evaluation

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The National Research Institute for Earth Science and Disaster Prevention (NIED) has carried on the special research project National Seismic Hazard Mapping Project of Japan to support the preparation of the seismic hazard map in general view of the whole Japan, which is made by the Headquarters for Earthquake Research Promotion. We have studied that the method of strong-motion evaluation for the scenario earthquakes in any fault zone. However, these strong-motion evaluations are deeper than engineering bedrock.

In order to evaluate amplifications of strong-motion in surface soils, we use the empirical formulas according to Matsuoka and Midorikawa (1994) and Fujimoto and Midorikawa(2003). We also adopt a more precise method in which we use the surface soil(shallow) velocity structure models made from many boring profiles and geological data.

These models were created every 250m meshes. Shallow velocity structure is shallower than engineering bedrock. These models are creating about Kinki, Hokuriku and Kanto area. Moreover, these mesh size of models were changed and the variation in the creation result of models were examined. In this study, strong-motion evaluation analysis was created in the Hokuriku area. The results of Fujimoto and Midorikawa (2003) show higher correlation with those of the precise method using the shallow velocity structure models than the results of Matsuoka and Midorikawa (1994). This suggests that the tuning of models to evaluate site amplifications using proper boring profiles and geological data is indispensable. Toward more accurate strong-motion evaluations, it is necessary to examine the physical properties of soils from the engineering bedrock up to ground surface,

and to perform a precise modeling in which the nonlinear effects of material are took into account.