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Construction of underground structure model in the fault neighborhood(An example of Fukaya fault and Ayasegawa fault).

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Sophisticated predictions of strong ground motion are vital when constructing structure models that enable us to evaluate broadband ground motion features. In this study, we have created a subsurface structure model applicable from seismic bedrock to ground surface for individual Japanese individual prefectures, e.g., South Kanto Area, in attempts to sophisticate subsurface structure models.An essential issue in sophisticated prediction of strong ground motion is constructing structure models that enable us to evaluate broadband ground motion in a range from 0.1 to 10 seconds. It then becomes essential to integrate subsurface model and deep structure models, which used to be modeled separately, to enable us to reproduce observation data. Previous studies do not seem to have verified ground motion in 3D structure models. We therefore prepared an initial structure model for entire prefectural areas.

Using the initial structure models initial values, we obtained S-wave ground velocity, Q values and amplification features, i.e., spectral amplification factors, from seismic data at seismic observation points from K-NET, KiK-net, JMA, municipalities, and from numerous array and single-point survey data on microtremors collected area-wise. We worked out area-wise interpolation and created subsurface structure models from seismic bedrock to ground surface in 250-meter meshes. In creating the above subsurface structure model, we verified results at each stage in reference to seismic observation and site amplification by using one-dimensional(1D) multiple reflection for periods shorter than two seconds and referencing seismic observation data by using the finite difference for periods longer than two seconds in order to check whether created models were more sophisticated than previous structure models.

The final goal of this study is to facilitate and promote studies creating new structure models based on the above subsurface structure models, so we decided to construct standard structure models for predicting broadband ground motion in Japan and to make them available to the general public. This paper focuses on results of our study on standard structure models for test sites in Chiba and Ibaragi Prefectures.

Keywords: microtrmor observation, active fault, strong motion prediction, underground structure model