

## **Modeling of the subsurface structure from the seismic bedrock to the ground surface for a broadband strong motion evaluation**

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In order to advance the accuracy of strong motion prediction, it is one of the important problems to develop a subsurface structure model which enables us to evaluate broadband seismic ground motion from 0.1 (sec) to 10 (sec). It is necessary to integrate shallow subsurface structure models and deep ones which have ever been modeled separately and to improve those models so that observed records can be reproduced.

In this study, first, all over Kanto area, we constructed geological and soil structure models from engineering bedrock to ground surface with boring exploration data we had collected from the local governments etc. in the past. Then we developed initial subsurface structure models (geological models) by integrating the shallow models described above into the deep ones developed in the past. Next, we collected earthquake observation records obtained at seismic ground motion stations of K-NET, KiK-net, JMA (Japan Meteorological Agency) and the local governments etc. and microtremor observation records obtained by a lot of array and single surveys. After that, S-wave velocity structure models, Q values and amplification factors etc. were evaluated based on the initial models. As a result, subsurface structure models were sophisticated. In addition, a planar interpolation method was investigated and subsurface structure from seismic bedrock to ground surface were modeled by meshes with the size of 250m.

By the way, model verification of the previous models were conducted in the following way. On the range of shorter period than 2(sec), we compared earthquake observation records with site amplification factors etc. obtained through the use of 1 dimensional multiple reflection theory. On the range of longer period than 2(sec), we compared earthquake observation records with results obtained by FDM computation .

### **References**

Shigeki Senna, Takahiro Maeda, Yoshiaki Inagaki, Haruhiko Suzuki, Hisanori Matsuyama, and Hiroyuki Fujiwara Modeling of the Subsurface Structure from the Seismic Bedrock to the Ground Surface for a Broadband Strong Motion Evaluation, Journal of Disaster Research, Vol8, No.5, pp.889-903, 2013.