

Scenario earthquake shaking map using the shallow/deep integrated velocity structure model

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A new velocity structure model has been constructed for the Kanto region. In this study, we examined how to use this new structure model in creating the scenario earthquake shaking map. In the current scenario earthquake shaking map, the time history on the engineering bedrock ($V_s=600$ m/s) is obtained by the hybrid method and then the seismic intensity on the ground surface is obtained based on the amplification calculation using the AVS30 calculated from the geomorphologic classification. Therefore, we examined how to set the velocity of the engineering bedrock when using the new structure model, and evaluate amplification by shallow structure.

We assumed (a1) $V_s=350$ m/s layer and (a2) 600 m/s layer for the engineering bedrock, and (b1) amplification factor based on AVS30 from geomorphologic classification, (b2) amplification calculated from 1D velocity structure model at each point and (b3) amplification factor based on AVS30 from the velocity structure model for the evaluation of amplification by shallow structure. By combining these conditions, we calculated peak ground velocity and seismic intensity on the ground surface for the three fault zones in the Kanto region. The conventional method corresponds to the combination of a2 - b1, and the proposed method that is thought to be able to make full use of the new velocity structure model is a combination of a1 - b2. In the proposed method, the peak ground velocity and seismic intensity on the ground surface are equal or smaller than the conventional method. We considered that the evaluation based on the proposed method was closer to the average value than the conventional method because the proposed method used the velocity structure model for the amplification evaluation. On the other hand, considering that the heterogeneity in the mesh still remains, it is necessary to present not only the average evaluation by the proposed method but also the result considering the variation together as a prediction map.

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Keywords: shallow/deep integrated velocity structure model, detailed method, scenario earthquake shaking map