

Three-dimensional earthquake forecasting model for the Kanto district

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We started a research for constructing a 3-dimensional (3D) earthquake forecasting model for the Kanto district in Japan based on Collaboratory for the Study of Earthquake Predictability (CSEP) experiments under the Special Project for Reducing Vulnerability for Urban Mega Earthquake Disasters. Because seismicity in this area ranges from shallower part to a depth of 80 km due to subducting Philippine Sea plate and Pacific plate, we need to study effect of earthquake depth distribution. We are developing forecasting models based on the results of 2D modeling. In the first step of the study, we set up evaluation tests with the latest version within the CSEP study. Next, we defined the 3D - forecasting area in the Kanto region with a grid of horizontal 0.1 x 0.1 degrees and every 10 km in a depth from 0 km to 100 km. Then, the 3D forecasting model was compared with a 2D area with non-divided column from 0 km to 100 km in a depth. For example, RI10k model (Nanjo, 2010) forecasted with high expectations of earthquakes at the Izu peninsula with the depth of 0 - 10 km and off Choshi areas with 40 - 50 km for 3 month testing class, which demonstrated that the forecasts were reflected on depth distribution of past seismicity. The logarithm of likelihood of RI10k model on the 3D forecasting area was much better than that of 2D one indicating that 3D forecasting area considering depth distribution improved the performance of forecasting. The RI model with the smoothing radii of 5 - 10 km showed the best performance of forecasting in the 3D forecasting area from testing results of 5 rounds.

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