Seismic Hazard Assessment for Japan: Reconsiderations after the Great East Japan Earthquake Disaster

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ABSTRACT

We have been carrying out the seismic hazard assessment for Japan after the 1995 Hyogo-ken Nanbu Earthquake and have made the National Seismic Hazard Maps for Japan, under guidance of the Headquarters for Earthquake Research Promotion (HERP) of Japan. The National Seismic Hazard Maps for Japan are prepared to estimate strong motions caused by earthquakes that could occur in Japan in the future and to show the estimated results on the maps. The hazard maps consist of two kinds of maps. One is a probabilistic seismic hazard map that shows the relation between seismic intensity value and its probability of exceedance within a certain time period. The other one is a scenario earthquake shaking map. In order to promote the use of the National Seismic Hazard Maps, we have developed an open web system to provide information interactively, and named this system as Japan Seismic Hazard Information Station, J-SHIS.

The 2011 Tohoku Earthquake (Mw 9.0) was the largest event in the history of Japan. This mega-thrust earthquake was not considered in the National Seismic Hazard Maps for Japan. Based on the lessons learned from this earthquake disaster and experiences that we have engaged in the seismic hazard mapping project of Japan, we consider problems and issues to be resolved for seismic hazard assessment and make some proposals to improve seismic hazard assessment for Japan.

(1) Modeling of seismic activity with no oversight to low-probability earthquakes.
(2) Preparation of strong-motion evaluation considering low-probability earthquakes.
(3) Development of methodology for complementary use of PSHM and SESM.
(4) Sophistication of techniques for prediction of strong-motion for mega earthquakes.
(5) Sophistication of utilization and transmission of seismic hazard information.

We have made revisions of the seismic hazard assessment based on the revised versions of the "Long-term evaluation of seismic activity for the region from the off Sanriku to the off Boso" and the "Long-term evaluation of seismic activity for the Nankai Trough" by the HERP. Revisions of seismic activity models for other regions of Japan have been undergoing. After these revisions of long-term evaluation for whole of Japan, we will revise seismic hazard assessment for Japan.

KEYWORDS: Seismic Hazard Assessment, Strong ground motion, Seismic Hazard Map, J-SHIS