Revision of probabilistic seismic hazard maps for Japan based on a new long-term evaluation for subduction earthquakes

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We have been conducting seismic hazard assessment for Japan under the guidance of the Headquarters for Earthquake Research Promotion of Japan (HERP) since the 1995 Hyogo-ken Nanbu Earthquake, and have made the National Seismic Hazard Maps (NSHM) for Japan. The maps consist of probabilistic seismic hazard maps (PSHM) and scenario earthquake shaking maps. The 2011 Great East Japan 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. After the earthquake, the long-term evaluation for subduction earthquakes by HERP is taking the diversity of source region and magnitude into consideration. Based on the consideration, the long-term evaluations for earthquakes in Nankai trough and Sagami trough were revised and seismic activity model in NSHM was also largely revised in 2014 version (Morikawa and Fujiwara, 2016).
The long-term evaluation for subduction earthquakes along Kuril trench was revised and published in the last December by HERP. In this study, we conduct PSHM based on this new long-term evaluation. As a result, the hazard level in Hokkaido, which is close to the Kuril trench, becomes higher than the conventional maps. By comparing the result of re-aggregation the seismic hazard, it is found that the main factors are the following two points.

1. A mega-earthquake whose magnitude is about 9 that was not considered in the conventional model was included into the new model.
2. As a result of taking diversity into consideration of earthquakes with magnitude 8 class that had been evaluated, larger earthquakes were included in the new model (e.g. magnitude of earthquakes in Tokachi-oki are from about 8.1 to 8.0-8.6).

Since earthquakes that are not known to have occurred in the past are also included, the large uncertainty is also included in the new model.

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