Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

MAG39-P04 Room:Poster Time:May 1 18:15-19:30

Three-dimensional earthquake forecasting model for the Kanto district: Completeness magnitude of earthquake catalogs

YOKOI, Sayoko[1] ; TSURUOKA, Hiroshi[1*] ; HIRATA, Naoshi[1]

[1]Earthquake Research Institute, The University of Tokyo

We started to construct a 3-dimensional (3D) earthquake forecasting model for the Kanto district in Japan under the Special Project for Reducing Vulnerability for Urban Mega Earthquake Disasters based on the Collaboratory for the Study of Earthquake Predictability (CSEP) experiments. Because seismicity in this area ranges from shallower part to a depth of 80 km due to subducting Philippine-Sea and Pacific plates, we need to study the effect of earthquake depth distribution.

We tried to construct a prototype of 3D earthquake forecasting model for the area based on the Relative Intensity model (Nanjo, 2011) which forecasts earthquake probabilities using historical data. For a large earthquake forecasting, we need a longer period of earthquake data than current studies. Therefore, we analyzed completeness magnitude (Mc) every 10 km in a depth from 0 to 100 km of earthquake catalogs of Utsu (1979, 1982), Japan Meteorological Agency (JMA) and National Research Institute for Earth Science and Disaster Prevention (NIED) which are partially covered from 1885 to 2013 by the Maximum curvature method (Wiemer and Wyss, 2000) to assess a quality of their catalogs considering a depth of hypocenters. In the case of JMA catalog, an average and its standard deviation of Mc for a year from 1923 to 1970's showed 3.7 and 0.4, respectively. Then, they decreased from 1970's to 2000, which means that quality of the catalog improved with time. After the 1980's, Mc showed heterogeneous distribution with depth. Mc in shallower depth are smaller than that in deeper one. For example, averaged Mc and its standard deviation from 2000 to 2010 is 0.25 and 0.14 with 0 to 30 km in depth against 0.67 and 0.10 with 60 to 100 km in depth. In this presentation, we discuss how use the heterogeneous catalog to develop a 3-dimensional forecasting model in Japan.

The authors thank JMA and NIED for their earthquake catalogs. This work is sponsored by the Special Project for Reducing Vulnerability for Urban Mega Earthquake Disasters from Ministry of Education, Culture, Sports and Technology of Japan.

Keywords: Three-dimensional forecasting model, Kanto district, Collaboratory for the Study of Earthquake Predictability, earthquake catalogs