

CSEP-Japan testing results with multiple runs since 2009 including the 2011 Tohoku-oki earthquake

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It is 5 years since we have established the Japanese testing center for the Study of Earthquake Predictability (CSEP) in Earthquake Research Institute, the University of Tokyo. During the period of testing, in 2011 March, Tohoku-oki earthquake with M9.0 occurred and seismic activity changed very much in entire part of Japanese Islands.

The CSEP Japan testing experiment consists of 12 categories, with 4 testing classes with different periods (1 day, 3 months, 1 year and 3 years) and 3 testing regions called "AllJapan," "Mainland," and "Kanto." Starting from 91 models in September 2009, a total of 160 models, as of January 2015, are currently under testing in the CSEP official suite with collaboration of CSEP Testing Center at the Southern California Earthquake Center (SCEC) (Nanjo et al., 2011; Tsuruoka et al., 2012). For 3-month and one-year testing experiments, more than 15 runs of fully prospective experiments have been operated. Probability gains of tested models with respect to a spatially uniform probability model show that some models have always better performances in regions of AllJapan and Kanto, but the best model varies rounds by rounds for the region of Mainland.

In the testing period including the 2011 Tohoku-oki earthquake, a model which has wider spatial smoothing radius of 100km of Relative Intensity Model (RI) shows larger probability gain than those with a narrow smoothing while in other periods a small smoothing radius of 10 km shows better performance. Probability gains of models for 3-month and 1-year testing class for each model are almost same although a magnitude of target events is different. A model of HISTETAS5PA (Ogata, 2011) shows best performance for 1 day class and a region of AllJapan before the 2011 Tohoku-oki event but after the event ETAS (Zhuang, 2011) is better than HISTETAS5PA.

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