

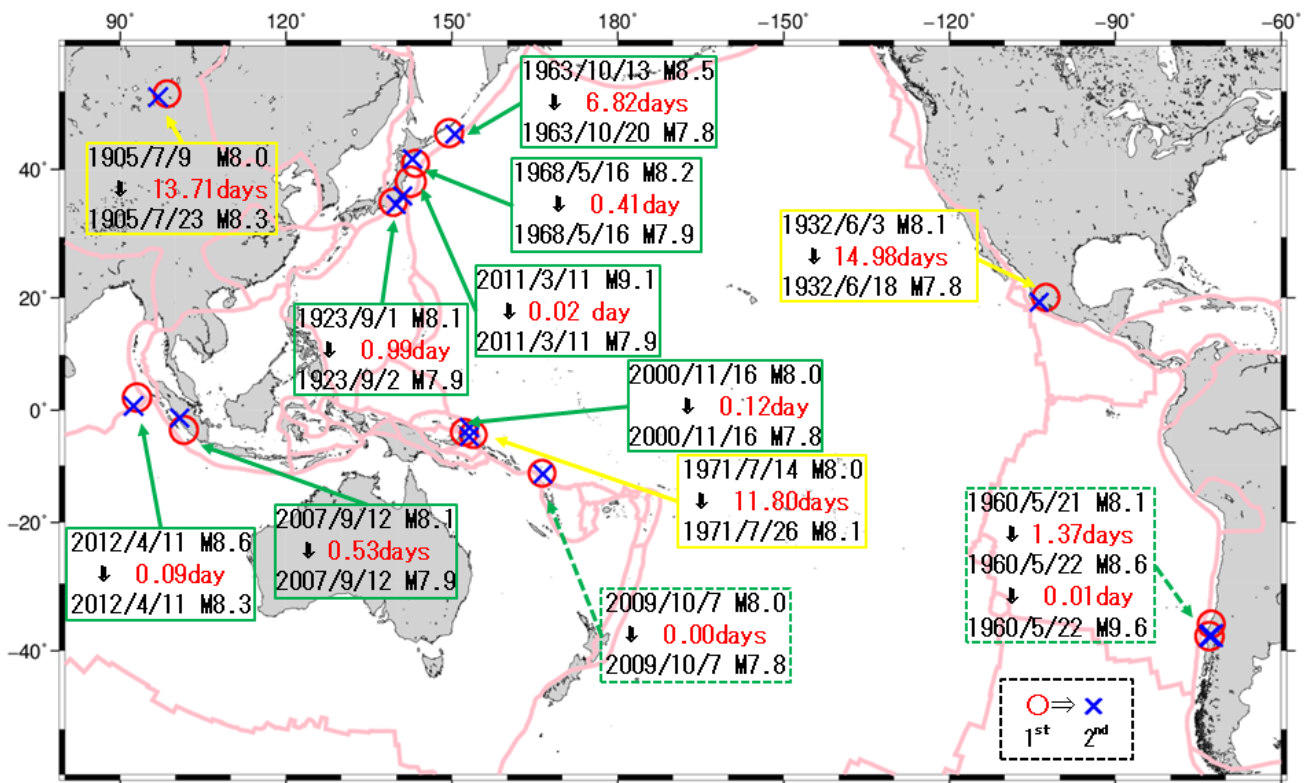
## Successively occurring large earthquakes in the world –comparison of real cases with expectations by the space-time ETAS

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In the government for evaluating criteria on abnormal phenomena along the Nankai Trough for disaster prevention measures, they made the criteria for events to announce the Nankai Trough Earthquake Information. In order to implement specific ways of disaster prevention, they discussed about specific criteria for what kind of phenomenon corresponds to the abnormal event. In this time, we presented the real cases of the successive occurrence of large earthquakes in the world on the newly revised ISC-GEM version 5.1 data (1904-2014) for contributing to the above discussion. And we estimated the large earthquakes occurrence by using the space-time ETAS (Ogata and Zhuang, 2006). The 103 earthquakes of Mw 8.0 over were extracted about the earthquakes in the world for about the last 100 years. There were 9, 10 and 13 earthquakes which were accompanied with the earthquake of Mw 7.8 over occurred within the epicentral distances 500 km within 3 days, 7 days and 30 days, respectively. We estimated occurrences earthquakes from summations of expectations by the space-temporal ETAS which was applied with the parameters around Japan of Ogata and Zhaung (2006) and  $b=0.92$  estimated with the JMA earthquake catalog. And then there were 5.3, 6.5 and 8.0 earthquakes of Mw 8 over which accompanied to the earthquake of Mw 7.8 over within the epicentral distances 500km within 3days, 7days and 30 days, respectively. The expected frequency of occurrence and the decreasing trend accompanying the elapsed time since the preceding earthquake were generally consistent with the above actual case. Acknowledgment: We used ISCGEMver 5.1 from ISC. In addition, we received great cooperation from the Earthquake Prediction and Information Division, Seismology and Volcanology Department, Japan Meteorological Agency.

Keywords: Nankai trough earthquake, Large earthquake, occurring in succession, ETAS



Epicentral distribution of pairs of the over  $M_w 8$  as 1st event(upper) and over  $M_w 7.8$  as 2nd event(lower) within 500km of the 1st. Time differences of two events are shown as red (yellow frames are over 7days). Pairs of less 50km of distance are shown as dashed frame. Plate boundaries data from Bird(2003). Map is drawn with GMT.