

Large Scale Correlation of Interplate-type Earthquakes in Japan and a Speculative Interpretation

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After gigantic earthquake, 2011.3.11M9.0, it is frequently pointed out that activity of the earth's crust has been enhanced over the entire Japanese archipelago. Recent big earthquakes(EQs) which took place at faults in continental plates, such as Hyogo-Nanbu EQ(1995, M7.3), Tottori-seibu EQ(2000, M7.3), Niigata-chuetsu EQ(2004, M6.8), Noto-hanto EQ(2007, M6.9), Niigata-jyochuetsu-oki EQ(2007, M6.8), and Iwate-nairiku-nanbu EQ(2008, M7.2), which are extensively distributed on a large scale over Japan, are sometimes discussed in relation to interplate-type EQ 3.11M9.0.

In the present study, the author has investigated long range(i.e., large scale) correlation between Ibaraki-oki interplate-type earthquakes and Hyuganada ones from 1930 to 2010, using the seismic intensity catalog archived by the Meteorological Agency of Japan. Here, earthquakes in two areas are considered to be independent in general, because Ibaraki prefecture is about 1000km distant from Miyazaki prefecture, and the former is belonging to North-American plate, while the latter is located on Firi-pin-sea plate.

The following results are obtained.

(1) Average event rate between 1930 and 2010 are 0.81 times/year(=4.1/5y) for Ibaraki-oki $M > 5.7$ earthquakes, and 0.45/y(=2.3/5y) for Hyuganada $M > 5.5$ ones.

Both areas seem to show similar time variability, though low statistics.

(2) Define H(high) phase as well as L(low) phase in Ibaraki-oki as the followings,

H phase ; period with 5 or more $M > 5.7$ earthquakes per 5 years

L phase ; period with 4 or less $M > 5.7$ earthquakes per 5 years

Hyuganada has the following $M > 5.5$ earthquakes in each phase of Ibaraki-oki,

Ibaraki-oki Hyuganada/5years

H phase ; 4.3 +/- 1.0

L phase ; 1.5 +/- 0.4

Although the above correlation is not robust in the present statistics, long range correlation of interplate-type earthquakes would be implied.

In a talk, the author will propose a model which is very speculative, to understand large scale correlation.

Keywords: interplate-type earthquake, time variability, long range correlation