What happen on the East Japan Megaquake; answer to sufferers

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Significant change on stress field was appeared on Northeast Japan. The difference on stress field can be identified by Euler rotation of principal stress axes (Niitsuma, JpGU2015, s-ss27), and the stress fields rotated toward trench side in southeastern part of Northeast Japan but not in northwestern, comparing to stress field of Megaquake. The foci of Megaquake was located on the boundary of the rotation, which indicate the rotation was caused by Megaquake.

Hida area in the central Japan sits on the southwest extinction of the rotation boundary. Hida area had earthquakes from 6 February 2011, 10 days before foreshocks of Megaquake. The activity was complementary with the foreshocks, and the polarities of the stress field (Niitsuma, JpGU2017, sss05-P01) were normal, except the last of 6th March with reversed polarity, comparing with stress field of Megaquake. The maximum foreshock happened 3 days and mainshock of Megaquake 4 days later the polarity reversal, which means Hida area was a part of the constitution to block subduction of Pacific Plate along Japan Trench. The southwestern extinction of Hida area consistent of continental crust, connecting to Korean Peninsula, and the strain for Megaquake had been accumulated in the longest continental crust in Japan and Pacific Plate.

The activity of earthquakes can be converted to Plate relative motion, using area of earthquake fault S from the magnitude M based on log S =1.2M −9.9 (Matsuda,1975). The total area of earthquake faults in North East Japan from 1923/9/2 (just after Kanto Earthquake) to 2011/3/10 (just before East Japan Megaquake) is stepwise increasing on Benioff Chart and reaches to area of M9.0 as same for East Japan Megaquake. The area of relative Plate motion along the Japan Trench for the time interval is 9% less than the earthquake faults, which means the strain for East Japan Megaquake could not be accumulated after Kanto Earthquake, but before.

The area of earthquake faults in North East Japan reached to area for M9.0 before Kanto Earthquake 1923 from 1793, for which area of relative Plate motion was 1.34 of M9.0 and could accumulate strain of 0.34 for M9.0. The Plate motion is not enough for the strain of M9.0 which should be accumulated before 1793.

Because records on historical earthquakes in Northeast Japan are poor comparing with Southwest Japan, the ratio 1.65 on areas of historical earthquake faults in Northeast to Southwest Japan from 1793 to 1923 for calculation on corrected area of earthquake faults in Northeast Japan before 1793.

The corrected area of earthquake faults in Northeast Japan is 0.73 of M9.0 from 1611 to 1793, whose area of Plate motion is 2.06 in which 1.33 could be accumulated enough for the Megaquake. The history of strain accumulation indicates that the Megaquake strain could be kept after filled up with spending for usual earthquake.

Before Megaquake, the focal distribution around non seismic Megaquake foci indicates that rupture was reaching to Megaquake foci. The difference in magnitude of CMT to initial moment in CMT solutions for Hida-side were small than 0.4, which means the main moments were smaller than one forth of estimated

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moment from initial moment. Such magnitude differences were identified on the foreshock of Kumamoto Earthquake in April 2016.

Keywords: East Japan Megaquake, Area of earthquake fault, Area of relative plate Motion, Benioff Chart, Difference in Magnitude of Earthquake, Hida

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