

MIS036-P08

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Possible Prediction of 3.11M9.0 Gigantic Earthquake Based on Anomalous Aftershocks of 3.09M7.3 Miyagiken-oki Earthquake

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(0) Before 3.11M9.0 gigantic earthquake(EQ), M7.3 EQ took place in the offing of Miyagi prefecture on March 9, which was almost officially recognized to be a pre-shock of the gigantic EQ after its occurrence.

In this poster, possibility of prediction for the 3.11M9.0 EQ is discussed based on analysis of anomalous aftershocks of 3.09M7.3 EQ.

(1) Employing database on EQ(1926-) in Japan archived by the Meteorological Agency, the author has investigated all 30 interplate type EQs with magnitudes greater than 7.0 and seismic center depths shallower than 60km.

These 30 events are identified to be main shock.

The number of big aftershocks associated with the 30 EQs having $dM=Mo-Mj<1.5(1.7)$ and $dT=Tj-To<20$ hours are very small, only 0-2times (average 0.7) for $dM<1.5$ and 0-3times(average 1.1) for $dM<1.7$.

Here, Mo and Mj are magnitudes of main shock and aftershock respectively. To and Tj are occurrence times of main shock and aftershock respectively. This means that one of the essential characteristics of main shock is rareness of big($dM<1.5$ or 1.7) aftershocks.

(2) The statistical nature of the 30 events, i.e., the rareness of big aftershocks, described in (1) is expressed by the following formula,

(a) Uzu's formula(1969) $\log S = Mo - 3.7$ (for $5.5<Mo<8.5$)

(b) Seino's one(1984) $\log S = \log N + Mj - 2.6$

Here, S ; area of aftershocks in km^2

N ; number of aftershocks with $M>Mj$ (including main shock)

Combining (a) with (b), we get the formula,

(c) $\log N = Mo - Mj - 1.1 = dM - 1.1$ ($dM=Mo-Mj$)

In this way, N scales in dM , which justifies dM parametrization in (1). Using (c), number of aftershocks($N-1$) are calculated to be 1.5 and 3.0 for $dM<1.5$ and <1.7 respectively. These numbers are bit larger than (1), because they include aftershocks at $T>20$ hours.

(3) On the other hand, real 3.09M7.3 EQ had shown remarkable excess of big aftershocks, i.e., 7 times for $dM<1.5$ and 8 times for $dM<1.7$ at $T<20$ hours. It had 6 big aftershocks even for $dM<1.3$.

(4) Here, it is important to point out that giant "Miyagiken-oki" EQ is supposed in near future and 3.09M7.3 EQ was immediately interpreted not to be the supposed one. So that, "supposed one" remains to take place in near future.

Therefore, it would be not so difficult to consider a possibility that the prominent excess of big aftershocks of 3.09M7.3 EQ can be related to the mechanism which will cause forthcoming big event.

(5) In this way, on March 10, scientist could and should dispatch a warning message to society. If such warning was given in appropriate way, a great many human lives will be saved.

Keywords: Prediction of Earthquake, The Meteorological Agency Database on Earthquake, Regularity of Aftershock, Main Shock Characteristics, Anomalous Aftershocks, Warning to Society