The relationship between the frequent deep-focus earthquakes and the large shallow-focus earthquakes occurring immediately after

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http://www12.ocn.ne.jp/~time.f.h/

History and Hypothesis

I noticed that frequent deep-focus earthquakes occurred immediately before the shallow-focus earthquake of Miyagi-oki on July 26, 2003 and that of Tokachi-oki on September 26 of the same year and began investigation about the connection between the deep-focus earthquakes (including semi-deep-focus earthquake of 60km and deeper) and the shallow-focus earthquakes.

If it is possible to identify the area by collecting the records of the epicenter where shallow-focus earthquakes happened immediately after a deep-focus earthquake, or when the occurrence of deep-focus earthquakes increases dramatically, if it is possible to predict the outbreak of a big earthquake are the questions.

Method

I obtained the records of epicenter from Hi-net provided by National Research Institute of Earth Science and Disaster Prevention and from the unification data by Japan Meteorological Agency, then verified the method. After having confirmed the relevance, when deep-focus earthquake occurred, by using MS Access database software, I extracted deep-focus earthquakes that occurred near-by, i.e., less than +-0.5 both in latitude and longitude as well as less than +/-50km in depth of the data shown on Hi-net from the 700 thousand data, then found out shallow-focus earthquakes occurring in the succeeding four to six days in a chain reaction. And I plotted the shallow-focus earthquakes on a map to find out the area where they occur. Finally, I published the forecast with the 3 clarified elements shown below on the Internet. I got feedbacks from the public to improve the method.

Period: Four to six days,

Range: usually an oval of 300km*100km and shallower than 100km,

Magnitude: Greater than M4.7 in East Japan, and greater than M4.0 in West Japan.

The number of the forecasts and verification

Verification of the forecasts from the mid-October 2005 to the end of 2007 (usually M4.7 and grater).

The total number of forecast is 353. 30 are no occurrences of deep-focus earthquake, thus the effective number is 323.

All 3 elements pertinence: 80...24.8%

2 elements pertinence and 1 little different; 66...20.4%

(Adding above two cases makes 146...45.2%)

1 element pertinence and other two little different 46 cases...14.2%

No pertinence or missing: 129 cases...39.9%

During this period, those greater than M5.5 occurred 178 times around Japan.

The number of forecast is 22(12.4%), meaning missing for 87.6%.

There was considerably large number of the outbreak in the area where I usually did not predict. The number of such earthquake is 145. Thus I forecasted 22 times out of effective 33. The missing rate is 33.4%.

As for M6.0 and greater, omitting those which are in the area where I usually do not predict, the missing rate is 50%.

Conclusion

1. Once the deep-focus earthquakes happen, it seems that medium class earthquakes are likely to happen near the related plate.

2. It seems that it is possible to predict earthquakes by using statistics of previous data.

3. It seems that the deep-focus earthquakes are precursors of the shallow-focus earthquakes.