

Earthquake precursor judgment method analysis for Tree Bio-electric Potential (TBP)

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1. Introduction

Since 1977 Tree Bio-electric Potential (TBP) has been measured at Sugunami Tokyo, anomalous potential changes were often observed preceding earthquakes of magnitude 5 or above. This paper reports trend analysis of an earthquake occurrence sign based on the TBP unusual phenomenon observed in Sagamihara city, Kanagawa.

2. Measuring System

A silver electrode (diameter: 0.5mm, length: 50mm) is inserted into living tissue of the tree and another copper electrode is buried at a depth of 1m into the ground at a point 1 or 1.5m from the tree. Both electrodes are connected with shielding wires to input terminals of Preamplifier, ADC (Analogue/Digital Converter), then to PC. The potential difference between 2 electrodes is measured at the sampling rate of 20 seconds.

3. Trend analysis of TBP unusual phenomenon

TBP observation data is carrying out the characteristic which usually shows daily pattern which surges slowly. It sometimes changes suddenly like electric charging curve then changes gradually decrease like electric discharging curve. Typical example is shown in attached figure.

After this charge - discharge curve appears, an earthquake occurs in many cases. The pulse-like signal is judged to be earthquake precursor when it continues more than 1 minute.

The place of earthquake occurrence can be presumed from polarity (+/-), magnitude is from strength of potential. Preceding time is from the law learned by experience.

Especially when the polarity of abnormalities is -, earthquake occurs often at North Kanto, Northeast Japan, or Hokkaido on the North American plate. When the polarity of abnormalities is +, earthquake occurs often at South Kanto, Izu islands, or Ogasawara islands on Philippine Sea-plate.

The magnitude of the earthquake depends on potential and electric discharging time. However, magnitude is small if it is an earthquake at near place from observation post. If the earthquake occurs at long distant place, it can be judged as a big magnitude.

If appearance frequency of anomalies are high, it can be judged as earthquake occurs at near place, and if low, it can be judged as far place.

Earthquake occurrence precedence time is within 1 week in case of small-scale earthquake (M is less than 5.0), within 2 weeks in case of middle-scale earthquake (M is between 5.0 and 6.0), within 3 weeks in case of large-scale earthquake (M is more than 6.0).

4. Conclusions

Although TBP observation are carried out by using 2 trees in Sagamihara-city Kanagawa, 2 trees in Kamakura-city Kanagawa, and 1 tree in Toyohashi-city Aichi, it is rare to have observed synchronized anomalies. This is considered that the characteristic of each trees are different and that the place where a precursor appears at different place for each earthquake.

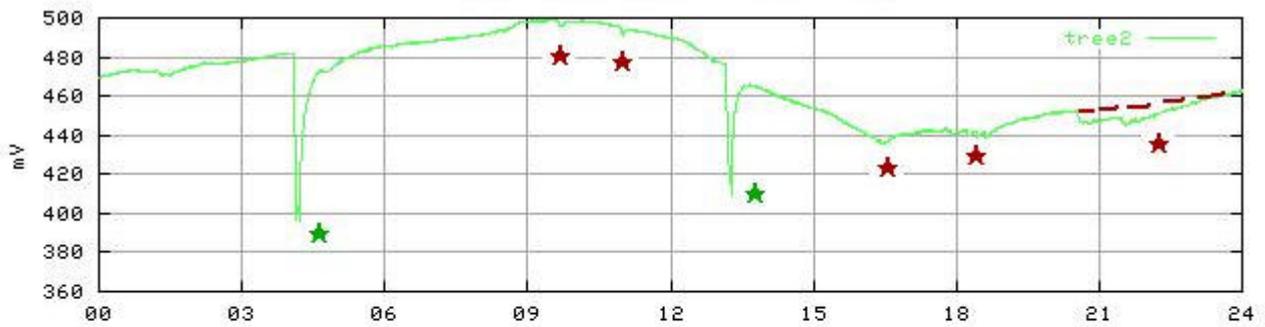
The present prediction level has been reached at quite high level, I think that it can contribute greatly for future big earthquake occurrence prediction, if other electromagnetism phenomenon are observed together with TBP at many points.

References

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Tree2 @ Sagamihara [2004/12/03]



Tree2 @ Sagamihara [2004/12/06]

