

Anomalous electric fields before the off Tohoku M9 EQ on March 11, 2011

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To develop a method for earthquake prediction, electric fields are being observed, and the fields before and after the EQ of M9.0 on 2011/03/11 were recorded. But it is difficult to confess that the obtained data were the precursor of the EQ, because of the reasons as follows:

The data for one month before the EQ were lacking. Because our instrument erases the recorded data when the power comes back on after power failure. The power was cut off by the EQ, and we could not reach the observation site before the power came back on. Furthermore the source region of the fields is not located.

For detecting precursory electric fields, it is necessary to discriminate the precursory fields from man-made noise and from lightning fields. We have discriminated as follows:

In our observing area, except special bands, man-made noise is not simultaneously observed at the sites which are separated about 100km apart, so we regard the pulses as precursory ones only when the pulses are simultaneously observed at four sites. The data are recorded every two minutes, but it is doubtful whether the data at four sites were synchronized or not, as the clock is not accurate.

To reject lightning fields, the following relations are used.

$$E(1.5\text{kHz}) > E(3\text{kHz}) > E(12\text{kHz}),$$

as near lightning fields have the relation as

$$E(1.5\text{kHz}) < E(3\text{kHz}) \text{ and far ones have the relation as}$$

$$E(3\text{kHz}) < E(12\text{kHz}), \text{ where } E(f) : \text{Electric fields observed at frequency } f.$$

Observed Pulses before EQ

As the source region was not located, and as from 5th Feb. before EQ to 3rd Mar. after EQ no data

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were obtained, so it is doubtful really precursory fields were observed, but the possibility exists that precursor was detected. The reason is as follows:

From 2/2 22:40 (in the following, time is UT) the pulses were successively recorded three times and further more from 2/3 00:10 two times. On the contrary, from 4/26 05:00 to 5/25 00:00 for one month no pulse was observed. Namely successively receiving pulses is very rear, so it might be the precursor. Anyway it is essential to locate the source regions of the fields to predict earthquakes. By the way, the instrument to locate the source regions had been developed at CRL, but after S. Hyogo Pref. EQ of 1995/01/17 (M7.2) Japanese Government decided to give up the research on earthquake prediction, and the instrument was discarded.