

## Foreshocks had been Observed since Two Days before the 2011 off the Pacific Coast of Tohoku Earthquake!

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Long-term predictions have been given for some giant earthquakes as the possibility of occurrence in several ten years based on periodicity of earthquake occurrence. Long-term predictions help people reinforce buildings, construct embankments, prepare evacuation system, etc. but never help people evacuate "before" giant earthquakes occur. On the other hand, short-range predictions seem difficult because sometimes we can observe precursors but sometimes we can't. Sometimes earthquakes occur after precursors but sometimes they don't. However, obvious foreshocks were observed in Japan before the 2011 off the Pacific coast of Tohoku Earthquake. Less than ten earthquakes with JMA (Japan Meteorological Agency) seismic intensity equal to or more than 1 were usually observed in a day in Japan. The daily rate began to significantly increase on two days before the main shock. It could be said at that time that it was better to prepare for giant earthquakes somewhere in Japan from this behavior. According to number of earthquake detection for each prefecture, no foreshocks were detected in Okinawa. Significant foreshocks were detected in Miyagi, Iwate and Fukushima. A few foreshocks were detected in Hokkaido, Chiba, Tokyo, Shizuoka and Niigata. Precise analyses should be made based on distribution of foreshock sources, however, possibility of immediate earthquake occurrence around Miyagi could be suggested even from this kind of very simple data analyses. Foreshocks were detected also in Iwate and Fukushima. Vastness of the seismic source of the main shock could have been predicted if an effective forecasting system had been developed. Damage of buildings and infrastructures could have been unavoidable, off course, even if people had been forced to evacuate. More than thousands of people however could have safely evacuated with their families taking valuables and emergency goods.