

Seismic Activity around the Border of Fukushima and Yamagata Prefectures

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1. Seismicity

Seismic activity has been observed around the border of Fukushima and Yamagata prefecture (around the border of Kitakata city, Kitashiobara village and Yonezawa city) since March 2011. These earthquakes are located at the depth of 5 - 10 km. The distribution of the epicenters had spread northeast and southwest, and formed 4 clusters (center, west, northeast, and southwest) until the beginning of August. At the end of December 2011, the earthquakes mainly occurred in the center, west and southwest clusters.

The seismicity retained very high until the end of April 2011, and became lower after that. Until the end of December 2011, more than 1700 earthquakes which magnitudes are 2.0 or over occurred. The largest earthquake of this activity (M4.6) occurred on May 7th, in the west cluster. After the occurrence of this earthquake, the seismicity of the west cluster became lower.

2. Focal Mechanism

Three fault zones are known around the area of this seismic activity; the western marginal fault zone of Nagai Basin (the northeast of this activity), the eastern marginal fault zone of Aizu Basin (the south of this activity), and the western marginal fault zone of Aizu Basin (the southwest of this activity). According to the Headquarters for Earthquake Research Promotion, these three fault zones run in north-south direction, and are reverse faults.

Most of the earthquakes occurred in this activity are of magnitude under 3.0, so it is difficult to determine their focal mechanism. 24 mechanisms are determined by JMA as of the end of December 2011. Almost all the obtained focal mechanisms are reverse fault type, and their P-axes are oriented in the east-west to northwest-southeast direction, in accordance with the known fault zones.

3. b-value

We calculated b-values using 150 earthquakes which magnitudes are 2.0 or over, shifting 100 earthquakes in turn. high b-value (1.5 - 1.6) is exhibited until the end of April 2011, coincide with high seismicity, and lower b-value (1.0 - 1.3) after that.

4. JMA's treatment

The activity occurred relatively shallow, so people felt them though they were relatively small. We also report reactions of the local residents to this seismic activity and JMA's community relations performed for them.