

Reexamination of seismic intensity inversion analysis of the inland earthquakes in the northern part of Miyagi Prefecture

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We reported the results derived from seismic intensity inversion analysis of the inland earthquakes in 1962, 1900 and 2003 in the northern part of Miyagi Prefecture to study the earthquake fault characteristics and magnitudes related to short-period seismic waves in the 2008 fall meeting of Seismological Society of Japan. Afterwards, we continued to verify the results, and finally have concluded that the most probable fault of the 1900 earthquake is different from the former result.

It is indicated that the present analytical results of the 2003 and 1962 earthquakes are the same as the reported former results obtained from the grid solution search of seismic intensity forward evaluation and the seismic intensity inversion analysis. They are consistent with results written in existing research papers regarding epicenter distribution of aftershocks and waveform inversion.

Furthermore, the optimal fault for the 1900 earthquake obtained from all the seismic intensity data of Miyagi Prefecture was located in the south of Kogota where the seismic intensity was the largest as reported in the 2008 fall meeting of Seismological Society of Japan. However, we found there was a problem of a spatially biased seismic intensity distribution where the large intensity area was located in the northern part of Miyagi and there were no data in Iwate Prefecture. It is indicated that it might cause a bad influence on the result. We therefore reexamined the 1900 earthquake using the data at only higher latitude than 38.25 degree to eliminate spatial bias of intensity distribution. In addition, we used only the seismic intensity data more than five minus in the seismic intensity of JMA scale, because there is no guarantee that all the data of intensity four and less are included in the database and low intensity is evaluated less reliably compared to higher intensities. We analyzed the both additional cases and obtained the result of the optimal fault plane locating in the northeast of Kogota. This area is located between the fault planes of the 2003 and 1962 earthquakes, and corresponds to the low-velocity zone of S-wave of 24km in depth where stress concentrates (Okada et al., 2008).

Finally, it is suggested that the three shallow inland earthquakes in the northern Miyagi Prefecture has occurred in different areas filling in the entire stress concentration zone and their magnitude are similar and around M6.4.