

Source processes of the Mid Niigata prefecture Earthquakes in 2004 inferred from strong motion data

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The waveform inversions for the Mid Niigata prefecture Earthquakes in 2004 were performed using strong-motion records to determine the source processes. We carried out the inversions for the main shock (M6.8), the largest aftershock (M6.5) and the other M6-class aftershocks respectively. The strong-motion waveforms observed at 12 stations of KiK-net were used. The strike directions of the main shock and the largest after shock are almost same and are NNE-SSW, and dip toward west. The asperities of these earthquakes lie near the hypocenter of each earthquake, respectively. But the fault plane of the after shock occurred on Oct. 27 in eastern region is dipping toward east, and is situated in the conjugate position of the main shock.

We calculated the stress change on fault plane arisen by the main shock and after shocks respectively, and the results are compared to after shock distribution precisely determined using the Double-Difference method (Waldhauser and Ellsworth, 2000). It seems that a plenty of after shocks occurred at the portion where the stress drop is small in. We also estimated the Coulomb failure stress change using the results of waveform inversions. The delta-CFF value is positive around the asperity of the largest after shock. There is a possibility that complex fault geometry and activity of after shocks are explained by the stress change arisen by the slip distributions of prior earthquakes.