

Triggering Sequence by Static Stress Changes of Large Aftershocks of the Niigata-Chuetsu, Japan Earthquake

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Following the 2004 Niigata-Chuetsu earthquake (M6.8), 4 large aftershocks (M6.3, 6.0, 6.5, 6.1) occurred: three within 40 minutes and one 4 days later. We examine the possibility for this triggering of these large aftershocks by static stress changes. For the close spatial triggering, it is important to have information about the fault geometries, slip distribution, and focal mechanisms. We determine the fault plane orientations from the aftershock distributions. Slip distributions of the main shock and largest aftershock are obtained by seismic waveform inversions of local strong-motion records. Mechanisms for the events are taken from CMT solutions. The temporal variations of Coulomb failure function changes (Δ -CFF) are calculated on the fault planes of the large aftershocks before their rupture. Positive Δ -CFF values (larger than 0.1 MPa) are obtained on the fault planes, indicating the possibility that static triggering from the main event and large aftershocks can explain the occurrence of aftershocks.