



Rupture Process of the November 2016 New Zealand Earthquake (Mw7.8) and Its Seismotectonic Implications

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The November 2016 earthquake sequence in Amberley, New Zealand, occurred in the transition area between the subduction zones in the north where the Pacific Plate subducts westward below the Australian Plate and the reversed subduction zone in the south. The MW7.8 main shock on November 13 was followed by several moderate aftershocks, including the MW6.5 Kaikoura earthquake 30 minutes after and ~75 km northeast of the main shock, and the November 14 MW6.5 Kaikoura earthquake near the main shock hypocenter but with a strike-slip mechanism, in contrast to the thrust mechanism of the main shock, suggesting an activation of multiple faults of different mechanisms in the region. We use three-component teleseismic as broadband waveforms recorded at globally distributed seismic stations as well as regional strong motion records to invert for the source slip distributions of the main shock and largest aftershocks of this earthquake sequence. Slip distributions indicate that the rupture zones of the aftershocks lie on the edge of the main slip zones of the main shock. We combine seismic records with GPS and InSAR observations to investigate the relations among the rupture zones of a sequence of large earthquakes in the source region and the seismogenic environment in the New Zealand region.