**Analyzing the rupture process of the 2011 Tohoku-oki Mw 9.0 earthquake**

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**Abstract**

The devastating 2011 Tohoku earthquake was observed by dense networks of geophysical instruments, including near-field strong-motion records, geodetic data, and teleseismic observations. The complete dataset can serve as a great access to study the rupture process of this megathrust event. Finite-fault inversions are frequently applied to resolve the rupture process and slip distribution of large earthquakes. Each of the datasets, however, demonstrates distinct features in separate inversions owing to the differences in their intrinsic properties. *Lee et al., (2011)*, thus, proposed a finite-fault model through joint inversion in order to determine a model that mostly satisfies the multiple datasets. The result of the back-projection method proposed by *Wang and Mori, (2011)* is introduced as a comparison. It’s an alternative, independent approach that has been recently used to study the rupture process of large and moderate earthquakes. By stacking the normalized amplitude of coherent phases in teleseismic P waveforms to potential locations and time windows, high resolution images of rupture propagation can be revealed. Zones near the hypocenter that generate large slip are recovered through both approaches. While finite-fault inversions most account for zones near the trench with large slip, back-projection images the source of high frequency seismic radiation located in down-dip region of the subduction system. Accordingly, this event could be concluded as a combination of megathrust event and a large tsunami earthquake in the area near the Japan Trench.

**References**

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