

Tracing Rupture Process of the 2011 Tohoku M 9.0 Earthquake Using Small Seismic Arrays in China

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Back projection(BP) can trace rupture front of large earthquakes. It has been widely applied for better understanding rupture processes of recent large earthquakes. An important result/output from BP is rupture length, which roughly corresponds to the final size of earthquakes given geological environment. Thus it can be used for fast estimate of the size of large earthquakes for the purpose of tsunami warning and disaster evacuation.

Most studies were focused on using data recorded at distances of 30 to 85 degrees to epicenter, in which distance range the first coming wave is direct P wave which ensures a good resolution for the results from BP.

Here we applied several sub China array data to trace the rupture propagation of the Tohoku earthquake to investigate the effect of the other regional phases such as Pn. We tested the effects with seismograms recorded in sub arrays of China seismic array. The results suggest that the overall rupture length can be recovered, though there is some visible disconvergence, especially for those results derived from distant sub arrays.

Keywords: Back projection, Rupture Process, The 2011 Tohoku M 9.0 Earthquake, Small Seismic Arrays in China