

Source process of Sumatra earthquake inferred from waveform modeling

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We have calculated synthetic seismograms for 2004 Sumatra earthquake using the Spectral-Element Method on the Earth Simulator. We use 243 nodes of the Earth Simulator and divided the three-dimensional Earth model into 5.4 billion grid points. This should provide synthetic seismograms that are accurate up to 5 second and longer. We use finite source model of Chen Ji of Caltech. This finite source model estimates Mw to be 9.0 and the rupture area is limited to just south of Sumatra Island. The source duration of this model is about 200 second.

The comparison of these synthetic seismograms with the observation shows that entire P-waveform does not model the complex feature of the observed waveform, which indicates that the finite source model should be improved. The analysis of tsunami propagation suggests that the rupture area should extend to north-west of Sumatra Islands. It should be necessary to include this rupture area in the finite source model.

We have modeled synthetic seismograms using finite source model predicted by tsunami simulation and will discuss about a possibility of the slow rupture propagation along the fault plane.