

장주기 지진파형과 GPS자료의 공동 역산에 의해 결정된 2004년 수마트라-안다만 지진의 Slip분포

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Slip of the 2004 Sumatra-Andaman earthquake from joint inversion of long period global seismic waveforms and GPS static offsets

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Abstract: The December 26, 2004 Great Sumatra -Andaman, earthquake opened a new era for the seismologists to understand the complex source process of a great earthquake. This is the first event with magnitude greater than 9 since the deployment of high dynamic range broadband seismic and GPS sensors on the globe. While several works on the source process of the event have already been reported, some important parameters for the fault geometry and slip distribution, such as dip angle of the fault plane and evolution of rupture velocities over the whole fault plane have not yet been well constrained. This study presents a thorough analysis of the ruptured fault plane geometry and slip distribution using data from long period seismic data sets and geodetic co-seismic slip near the fault plane. We start with the two fault geometries tested by GPS measurements (Barnerjee et al., 2005), and use a slightly modified one to simultaneously invert the global long period (100-500s) seismic measurements and GPS deformation observations. We perform thorough sensitivity tests for of fault plane geometry, including the perturbation of dip angles, and the variation in rupture velocity. We also compute error estimations of the slip distribution to illustrate the regions where the slip distribution is and is not well constrained.

Keywords: 2004 Sumatra-Andaman earthquake, Seismic Waveform, GPS offset.

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