Geophysical Research Abstracts
Vol. 15, EGU2013-3842-3, 2013
EGU General Assembly 2013

Coseismic Fault Slip Rupture from the Joint Inversion of Teleseismic, Local Strong-Motion and CGPS Related to the 2010 Jia-Shian Earthquake in Southwestern Taiwan

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The Jia-Shian earthquake (Mw=6.3) occurred on 04th March 2010 in the southwestern Taiwan. We used the waveforms of teleseismics to identify the strike, dip and rake of focal mechanism are 311/33/37. Furthermore, we explored the strike, dip and rake are 316/40/44 on the first pulse of the teleseismic P wave. We also took account of the Continuous Global Positioning System (CGPS) data for the coseismic offset. The maximum horizontal and vertical (uplift) of coseismic offsets at the surface are 29.8mm$\pm$ 1.0mm and 30.6mm$\pm$ 5.1mm, respectively at station GS51. Moreover, the space and time distribution of slip during the coseismic rupture was modeled by the joint inversion, which includes the CGPS coseismic offset, the teleseismic, and near field seismic records. We identified the faults geometry and reconstructed the rupture process of coseismic faults slip. The initial rupture was generated on the northwest – southeast trending fault and propagated to the northeast – southwest trending structure after 5 s of main shock. Their strike, dip and rake are 311/33/37 and 020/25/108, respectively. The average slip of rupture was 20.1 cm, with the maximum slip of 50.4 cm. The rupture of the seismic moment was 4.0 $\times$ 10$\hat{}$25 dyne-cm in 30 s of duration time.The slip rupture constrained the synthetic data quite well, especially for the CGPS coseismic offset. We inferred the Jia-Shian earthquake took place on blind fault and the northeast – southwest trending structure was activated following the rupture on main northwest – southeast trending fault.