

Fast Inversion of Earthquake Rupture Process and Its Application in Earthquake Emergency Responses

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Abstract

A large amount of efforts have been made to effectively determine the kinematic rupture process of significant earthquakes in the past 30 years. They have much improved our understandings on the source physics and disaster-caused mechanisms. Since the 2008 Wenchuan earthquake, a systematic work of fast and routine inversion of the rupture process has been performing for significant earthquakes ($M_S > 6.5$ in China and $M_S > 7.5$ abroad) by the present authors. The time consumed of the inversions was reduced from 5 to 8 hours in 2009 to 3 to 5 hours in 2010, and to approximately 2 hours presently. The timely inverted rupture models revealed valuable disaster-caused mechanisms, and were routinely used by CEA in its works of earthquake emergency responses for strong earthquakes, such as the 2010 $M_W 6.9$ Yushu earthquake, the 2013 $M_W 6.6$ Lushan earthquake, the 2014 $M_W 6.1$ Ludian earthquake, and the 2015 $M_W 7.8$ Gorkha, Nepal, earthquake, among others.