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# Rupture process of the 2011 Tohoku, Japan, earthquake estimated by waveform inversion with empirical Green's functions

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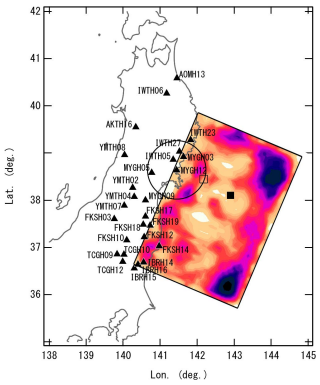
Ground motion records from the December 17, 2005 earthquake (MJ=6.1) (EQ1) were used as empirical Green's functions. The conventional least-squares linear waveform inversion (Hartzell and Heaton, 1983) was adopted. A fault plane with a dimension of 390km x 270km was assumed, whose strike and dip angles were set to be 203 and 10 degrees, respectively. The fault was divided into 39 times 27 fault elements. The rupture front is assumed to start from (38.1N, 142.9E, depth=24km) and to propagate radially at a constant velocity of 2.6km/s. Each fault element is allowed to slip 12 times in 6.0 seconds after passage of the rupture front at equal time intervals. The moment release of each slip relative to the moment of EQ1 was determined through the inversion. Conventional corrections for the geometrical spreading and time shifts (Irikura, 1983) were applied to the empirical Green's functions to represent arrivals from each fault element. The shear wave velocity in the source region was assumed to be 3.9km/s. Absolute time information for both the mainshock and the aftershock recordings was used.

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