

The Simulation of Dynamic Rupture Propagation in Order to Develop the Technique of Strong Ground Motion Prediction

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Abstract

The investigation of dynamic rupture propagation is very important to understand the seismic behavior of the megathrust earthquakes such as the 2011 Tohoku earthquake that revealed the very complex phenomena showing huge amount of slip (around 60m) on the shallow area and depth-dependent radiation of seismic waves. In this study, we simulated the dynamic rupture propagation based on the initial conditions that combine the idea of Tsuda et al. (2015) which sets the initial condition based on the stress drop distribution and the results of experimental results that use the real material grabbed at the plate boundary. We have used the spectral element method (Galvez et al., 2014) that utilized for the large-scale computation for the simulation. We obtained the results of the case study for the slip weakening distance (D_c) at a depth shallower than 10 km. Our results shows that the length of the D_c is not effective for the slip amount and the long D_c leads to generate long period seismic waves.

Keywords: Dynamic Model, Rupture Propagation, Spectral Element Method, Slip-Weakening Law, Slip Weakening Distance