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SSS02-P01 Room:Convention Hall Time:May 25 18:15-19:30

Investigation of the Behavior of Shallow Parts of Mega-Thrust Earthquake Faults Based on Dynamic Rupture Simulations

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Recent inter-plate mega-thrust earthquakes, such as the 2011 Off the Pacific Coast of Tohoku earthquake (Tohoku Earthquake, Mw 9.0), the 2010 Maule, Chile earthquake (Mw 8.8) and the 2004 Sumatra earthquake (Mw 9.2), revealed some special features of ruptures, such as very large slip (order of several ten meters) and limited short period seismic radiations close to the trench. However, the mechanical origin of these phenomena has not been clarified yet.

In this study, we carry out simulations of the rupture process of large mega-thrust earthquakes based on dynamic models to understand the behavior of shallow parts of the faults. The model is governed by a slip-dependent friction law (Ida, 1972). The simulations employ the 3D Spectral Element Method (Galvez et al., 2014), which is numerically stable and accurate even for subduction models with low dipping angle. Based on these simulations, we explored some possible hypothesis for the generation of large slip on the shallow parts of the faults: large stress drop and thermal pressurization (e.g., Bletery et al., 2014). The results of our dynamic simulations provide useful clues to understand more generally the behavior of shallow parts of the mega-thrust earthquake faults.

Keywords: Rupture Simulation, Dynamic Model, Mega-Thrust Earthquake, Slip Distribution