

Dynamic Rupture Simulations to Study the Behavior of the M7-M8 Class Earthquakes

*arzpeima samaneh¹、津田 健一¹、小川 幸雄¹、渡辺 孝英¹、宮腰 淳一¹、岩瀬 聡²、佐々木 哲郎²、原田 怜²、Ampuero J-P³

*samaneh arzpeima¹, Kenichi Tsuda¹, Sachio Ogawa¹, Takahide Watanabe¹, Junichi Miyakoshi¹, Satoshi Iwase², Tetsurou Sasaki², Satoshi Harada², Ampuero J-P³

1. (株)大崎総合研究所、2. 中部電力株式会社、3. カリフォルニア工科大学、地震学教室

1. Ohsaki research institute,INC., 2. Chubu Electric Power Company, 3. California Institute of Technology

The fault rupture of the 2011 Off the Pacific Coast of Tohoku earthquake (Tohoku earthquake, Mw 9.0) ruptured huge amount of area along the Japan trench, including the area close to the trench, where large slip during the main shock was detected, as well as the Miyagi-Oki area around 30 km deep, which radiated short period energy, and their magnitude is usually M7-M8 class earthquakes, such as the historical Miyagi-Oki earthquakes (1978 and 1937).

The rupture of more than one asperity is a prominent phenomenon seen on the large subduction megathrust earthquakes. Understanding the parameters that control the simultaneous failure of multiple asperities, hence maximum magnitude and slip are very crucial for developing scenarios for the M7-M8 class earthquakes.

In this study, we focused on the behavior of the deep asperities from Tsuda et al. (2017) that host M7-M8 class earthquakes. We have simulated dynamic rupture propagation by varying features of the asperities, like their spacing, depth, and values of stress drop and strength drop. Then we make a comparison between these behaviors and the historical earthquakes, such as 1944 Tonankai (M 7.8) and the 1946 Nankai earthquakes (M8.4).

キーワード：沈み込み帯地震、複数アスペリティ、動力学シミュレーション、連動破壊

Keywords: subduction earthquakes, multiple asperities, dynamic simulation, simultaneous failure