[JJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS15]Fault Rheology and Earthquake Physics

convener:Hideki Mukoyoshi(Department of Geoscience Interdisciplinary Graduate School of Science and Engineering, Shimane University), Wataru Tanikawa(Japan Agency for Marine-Earth Science and Technology, Kochi Instutute for Core Sample Research), Takanori Matsuzawa(国立研究開発法人　防災科学技術研究所, 共同), Keisuke Yoshida(Tohoku University)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The goal of this session is to integrate theoretical, experimental, observational, and numerical perspectives from various fields such as seismology, geodesy, geology, mineralogy, and so on, to define what is known about earthquake source processes and the physical and chemical elementary processes of faulting. This session welcomes studies that address such issues as pre-, co-, and post-seismic processes, the rheology of seismogenic faults and fault rocks, laboratory experiments on elementary processes, numerical models based on frictional laws, and estimates of the stress field in the seismogenic zones. We also welcome studies on fault-zone drilling projects and in situ stress measurements.

[SSS15-P20]Dynamic Rupture Simulations to Study the Behavior of the M7-M8 Class Earthquakes

*samaneh arzpeima[1], Kenichi Tsuda[1], Sachio Ogawa[1], Takahide Watanabe[1], Junichi Miyakoshi[1], Satoshi Iwase[2], Tetsurou Sasaki[2], Satoshi Harada[2], Ampuero J-P[3] (1.Ohsaki research institute,INC., 2.Chubu Electric Power Company, 3.California Institute of Technology)

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

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).