Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SSS29-P02 Room:Convention Hall Time:May 22 17:00-18:30

Propagation dynamics of episodic tremor and slip governed by fault rheology and heterogeneity

ANDO, Ryosuke[1*], TAKEDA, Naoto[1], YAMASHITA, Teruo[2]

[1]Geological Survey of Japan, AIST, [2]Earthquake Research Institute, Univ Tokyo

Slow earthquakes called episodic tremor and slip (ETS) propagate over 100 kilometers at low velocities, ˜10 kilometers per day, along several plate interfaces. These low velocities differentiate slow earthquakes from ordinary earthquakes, and thus understanding their propagation processes is fundamental to understand the diversity and universality of earthquake processes. Comprehensive modeling and previously-unreported correlations of migration patterns with energetics of tremor observed in Japan show that rheological fault heterogeneity essentially governs ETS propagations. The fault has persistent small-scale segmentation, where the propagations always energetically started in brittle sections and decelerated in the ductile sections; spontaneous rupture calculations constrain the ductility to that caused by the Newtonian plastic flow or dilatant strengthening, but not by large-scale fluid flows.

Keywords: Slow earthquake, Rheology, Tremor, Model, Rupture dynamics, Simulation