Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SSS30-10 会場:A05 時間:5 月 25 日 11:30-11:45

High-resolution tremor locations reveal behaviors of secondary slow slip fronts in the context of the main front

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Non-volcanic tremor is generally interpreted as the seismic manifestation of slow slip, and tremor locations have been used extensively to infer detailed behaviors of slow slip fronts due to higher spatial and temporal resolution over geodetic observations. Taking advantage of S-wave coherence among stations separated by roughly 10 km, we obtain high precision tremor locations in Cascadia using cross-station cross correlations, with either 3-station detectors (southern Vancouver), or 3-array detectors (Olympic Peninsula). We observe that near the main front, tremor migrations usually propagate along the main front, regardless of its orientation, and their recurrence intervals are too short to be tidally driven. Rapid tremor reversals (RTRs) originate from the main front, and sometimes start as migrations propagating along the main front. Although the occurrence of most of the RTRs appears to be correlated with high tidal shear stresses, we observe a few exceptions, which may suggest that the stress increase far behind the main front induced by secondary fronts at the main front is sometimes enough to initiate a RTR. Beneath Olympic peninsula, the spatial densities of tremor during the ETS and the inter-ETS events seem to be complementary, and RTRs do not often extend into regions that are de-stressed by the inter-ETS event.

Preliminary results of tremor locations beneath Guerrero, Mexico indicate that our method also performs well in this region. It seems that a tremor asperity about 50 km across ruptured quasi-periodically with a recurrence interval of ˜3 months until the 2006 slow slip event drastically decreased it.

キーワード: Episodic tremor and slip, Cascadia subduction zone, Mexican subduction zone, Cross-station method
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