Oral | Symbol S (Solid Earth Sciences) | S-SS Seismology

[S-SS32_1AM1]Fault Rheology and Earthquake Dynamics

Convener:*Kiyokazu Oohashi(Graduate School of Science, Chiba University), Takeshi Iinuma(International Research Institute of Disaster Science, Tohoku University), Wataru Tanikawa(Japan Agency for Marine-Earth Science and Technology, Kochi Instutute for Core Sample Research), Yuta Mitsui(Department of Geosciences, Graduate School of Science, Shizuoka University), Chair:Kiyokazu Oohashi(Graduate School of Science, Chiba University), Yuta Mitsui(Department of Geosciences, Graduate School of Science, Shizuoka University)

Thu. May 1, 2014 9:00 AM - 10:45 AM 315 (3F)

Interdisciplinary discussions on the rheology of seismogenic faults and earthquake generation processes among the following specialists; (1) fault rocks and fault zones, (2) theoretical and numerical studies on earthquake dynamics, and (3) seismology and geodesy. Presentations on fault-zone drilling projects are also welcome.

10:30 AM - 10:45 AM

[SSS32-P09_PG]Temporal evolution of slip event probability -Case study of slow slip off the Boso Peninsula and the Yaeyama Islands

3-min talk in an oral session

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Keywords:Repeating slow slip event, Event probability, Statistical approach, Off Boso Peninsula, Off Yaeyama Islands

Spatially-isolated slip events (earthquakes and slow slip events) have occurred quasi-periodically especially at plate interfaces (e.g., Nadeau and McEvilly [1997], Matsuzawa et al. [2002], Rogers et al. [2003]). This fact suggests that the concept of simple elastic rebound at the plate interfaces is true at a certain level.Of course, the recurrence intervals of the slip events have no periodicity in a strict sense. Probably it is because the slip events never repeat in the same pattern. Earthquakes with dynamic processes especially tend to have this trend. In fact, an earthquake event occurred beyond the expected period from the previous earthquake sequence (Bakun et al. [2005]). Moreover, seemingly spatially-isolated events can be strongly affected by nearby huge earthquakes (e.g., Uchida and Matsuzawa [2013]). Thus it is difficult to discuss the event recurrence quantitatively based on deterministic physical models. Reseacheres alternatively used probability distribution to evaluate the recurrence intervals.When we examine the event recurrence by the probability distribution approach, one of the most important point is actual event probabilities at the time of event occurrences. There has been little discussion on this point. We address it, focusing on slow slip events with shorter recurrence intervals. We select the Boso-oki slow slip events (Hirose et al. [2012]) and the Yaeyama-oki slow slip events (Heki and Kataoka [2008]). The probability distribution of the event recurrence intervals is the Poisson distribution. We evaluate the event probability as the subtraction of cumulative probability of zero occurrence from 100%. The cumulative probability reverts back to 100% at the time of an event. The mean recurrence interval as a parameter of the Poisson distribution is the sample average from the forepassed events. The above settings allow us to calculate the temporal evolution of the event probabilities off the Boso Peninsula and the Yaeyama Islands. **We can validate the calculated results** by comparing with the actual event occurrences.In the result off Yaeyama Islands, the event numbers that occurred at a stage with the smaller probability than 50% are five out of the total numbers twenty six.

About 80% of the events occurred with the event probability > 50%. Besides, off the Boso Islands, the event numbers during a stage of the smaller probability than 50% are two out of the total numbers five. The two events followed the 2011 Tohoku earthquake. This fact may reflect the effect of the stress perturbation due to the Tohoku earthquake, as suggested by Hirose et al. [2012]. In summary, few slow slip events occur with the event probability