[EE] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG53]Science of slow earthquakes: Toward unified understandings of whole earthquake process

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Accumulating observational studies on various types of slow deformation events, such as tectonic tremors, very low frequency events, and slow slip events, portrays some universal characteristics in generally complex behavior, including interaction among events and influence by various outer loadings. Some of these phenomena seem to have causal relation with the occurrence of very large earthquakes. A unified understanding of these slow and fast earthquake processes requires an approach integrating geophysics, seismology, geodesy, geology, and non-equilibrium statistical physics. We welcome presentations based on, but not limited to, geophysical observation, data analysis, analytical theory, numerical simulation, field study, and laboratory experiments.

[SCG53-P12]Spatio-temporal evolution of long-term and short-term slow slip events in the Tokai region, central Japan estimated from a very dense GNSS network, during 1996-2016

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In the Tokai region, central Japan, the long-term slow slip events have been reported on the subducting Philippine Sea Plate in 2000-2005 and 2013-2016. In addition, many short-term slow slip events have been observed there since 1996. We analyzed GNSS data from 1996 to 2016 to estimate spatiotemporal distribution of interplate slip associated with these SSEs in this study. The GIPSY-OASIS II software (version 6.1) was used to estimate daily coordinates of GNSS stations operated by GSI and JUNCO (the Japanese University Consortium for GPS Research). It is well known that GNSS time series have many systematic signals and noises that do not result from SSEs. They include, for example, seasonal variations, co- and post-seismic deformation of the 2004 southeast off Kii Peninsula earthquake and the 2011 Tohoku-oki earthquake (M_w 9.0), and crustal deformation of volcanic activity on the northern Izu Islands. After removing them, we applied a modified Network Inversion Filter (NIF) [Fukuda et al., 2008]. The original NIF [Segall &Matthews, 1997] assumes a constant hyperparameter for the temporal smoothing of slip rates and thus often results in oversmoothing of slip rates. The modified NIF assumes a time-variable hyperparameter, so that changes in slip rates are effectively extracted from GNSS time series. We successfully estimated the spatiotemporal evolutions of not only the Tokai L-SSEs (M_w~7.1 and M_w~6.6) in 2000-2005 and 2013-2016 but also dozens of short-term SSEs (M_w<6.1). We will present a comparison of the spatiotemporal evolutions between these long-term SSEs and possible dependence of the occurrence style of short-term SSEs on the occurrence of the long-term SSEs.