

## Spatio-temporal evolution of long- and short-term slow slip events in the Tokai region, central Japan estimated from a very dense GNSS network, during 1997-2017

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The long-term slow slip events (SSEs) have been reported on the subducting Philippine Sea Plate in the Tokai region, central Japan during 2001-2005 and 2013-2016. Many short-term slow slip events have been also observed there since 1996. We analyzed GNSS data from 1997 to 2017 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 earthquakes ( $M_w$  7.3/7.4), the 2008 Ibaraki-ken-oki earthquake ( $M_w$  6.9), the 2008 Fukushima-ken-oki earthquake ( $M_w$  7.0) and the 2011 Tohoku-oki earthquake ( $M_w$  9.0), and crustal deformation of volcanic activity on the northern Izu Islands in 2000. After removing them, we applied a modified Network Inversion Filter (NIF) [Fukuda et al., 2008] to estimate daily slip and slip rate on the subduction plate interface.

Our results suggest that not only long-term SSEs ( $M_w \sim 7.1$  and  $M_w \sim 6.7$ ) in 2000-2005 and 2013-2016, but also short-term SSEs ( $M_w < 6.1$ ). The maximum estimated daily slip rates for short-term SSEs are an order of magnitude larger than those of the long-term SSE, and peak slip for short-term SSEs migrates along strike with LFTs synchronously. It suggests that LFTs are loaded directly by SSEs, and that slip rate regulates LFT genesis. We will present the change of back slip rate between inter short-term SSEs and characteristics of short-term SSEs (e.g. slip rates and recurrence interval) depending on the occurrence of long-term SSE.

Keywords: slow slip event, Tokai region, GNSS