

# Slow slip events in the Bungo Channel over 15 years as inferred from GNSS data (1996-2011)

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We estimated space-time evolution of inter-plate slip and slip velocity associated with slow slip events (SSE) in the Bungo Channel over 15 years between January 1, 1996 and February 28, 2011, from GNSS data.

We use GNSS time series at 80 stations around the Bungo Channel out of GEONET stations. Time series were obtained with GIPSY-OASIS II software by Nishimura (personal communication). We removed data during SSE and estimated secular velocities, annual and semi-annual seasonal variations, and offsets associated with earthquakes, SSEs and instrumental events. Then we remove contributions of those components from time series with SSE to prepare time series for the inversion. We constructed plate interface based on iso-depth data by Baba et al. (2002) and Hirose et al. (2008), and setup the model region that is 200km long east to west and 280km long north to south. The model region was subdivided into 719 small triangular patches. We employed the inversion method based on the Monte Carlo Mixture Kalman Filter (Fukuda et al. 2008) and estimated slip and slip velocities on the fault continuously over 15 years.

First, Long-term slow slip events (L-SSE hereafter) that lasted for several months were inferred in 1997, 2003 and 2010 as obtained by, such as, Ozawa et al. (2012, 2017) and Yoshioka et al. (2015). In addition to basic characteristics described in these previous studies, short-term slow slip events (S-SSE hereafter) were inferred just before or just after the main slip event. This result suggests that stress perturbations by SSEs trigger other SSEs. Therefore the inferred cumulative moment in this study was smaller than previous studies because we successfully excluded contributions from S-SSEs. Second, S-SSEs have repeatedly occurred with the interval of about three or four months over 15 years. Those S-SSE were located at depths of about 30-40km and associated with low frequency tremors.

In this presentation, we focus space-time evolutions of L-SSE in 2010 and S-SSE in 2005.

Keywords: Slow slip in the Bungo Channel, crustal deformation, Monte Carlo Mixture Kalman Filter