Slow slip events and temporal changes of coupling condition on the shallow side of the Nankai Trough

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GNSS-A was developed to capture slow seafloor crustal deformation on the seafloor. At present, it is the most generalized seafloor geodetic observation technology. Our research group estimated inter-plate slip deficit rate of Nankai Trough subduction zone using GNSS-A seafloor geodetic data obtained from 2006 (partially 2012) to June 2015 (Yokota et al., 2016). Then, we revealed spatial heterogeneity of slip defect rates which was not clearly detected from onshore GNSS data only. Using the same data, Nishimura et al. (2018) estimated slip deficit rate and plate coupling rate from advanced model considering block motion of micro plate.

We have been developing the GNSS-A technology to extract the temporal change of coupling condition including slow slip events (SSE). Recently, Yokota and Ishikawa (2020) analyzed GNSS-A data up to 2018 statistically and revealed the existence of the SSE around the shallow side of strong coupling regions estimated in Nishimura et al. (2018).

The temporal resolution of GNSS-A is extremely low, and the year-scale resolution is the limit. Neither the coupling nor the SSE introduced in above section can accurately determine the time constant. In other words, it is not possible to discuss in detail whether there is a time when the coupling is weakened or there is a time when the strain is completely released as the SSE without the coupling. In this presentation, we discuss the temporal change of the coupling and the SSE to the extent possible from the data so far, and explain the mystery of the SSE in the Nankai Trough that should be elucidated.

Keywords: GNSS-A, Nankai Trough, SSE, coupling condition

