

Detection of short-term slow slip events along the Nankai Trough

*Akio Kobayashi¹

1. Meteorological Research Institute, Japan Meteorological Agency

In the Nankai Trough, slow earthquakes such as short-term slow slip events (SSEs) and long-term SSEs have been observed. Nishimura et al. (2013, JGR) detected short-term SSEs along the Nankai Trough using GNSS data. Kobayashi and Kimura (2016, SSJ fall meeting) tried to detect objectively long-term SSEs along the Nankai Trough using GNSS data. Here, we try to detect short-term SSEs objectively using the method of Kobayashi and Kimura (2016).

We used the daily coordinates of the GEONET F3 analysis operated by the Geospatial Information Authority of Japan. We removed coseismic offsets, artificial offsets, and long-term trend component using 365 day moving median. For the stations in the Chugoku region where the influence of short-term SSEs is not observed, the median within the region was obtained for each day. The median was subtracted from the coordinate value of each station. The S55E (opposite to N55W) component was calculated from the horizontal components. We set points at 0.1 degree intervals longitudinally along the Nankai Trough on the 30-km plate depth contour. For each point, an average value within a rectangular range of 50 × 100 km centered on the point was calculated. Then, we obtained cross correlations with a ramp function with arbitrary gradient period and created a distribution of spatiotemporal correlation values.

We can see many cases that activity of the nonvolcanic deep low frequency earthquakes matches the derived spatiotemporal high correlation values. It seems unsteady displacements which is less than 1 cm in the horizontal vector in that period but are gathered collectively in the region, suggesting the existence of some slip phenomena at the plate boundary. On the other hand, there are also high correlation periods irrelevant to the low frequency earthquakes. We need to adjust so that optimum detection can be performed by changing the slope period, the effective correlation coefficients, the amount of change, the size of the rectangular range, and other parameters.

Keywords: slow slip events, Nankai Trough, GNSS