A study for detectability of long-term Slow Slip Event using strain-meters

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We examined a detectability for a long-term Slow Slip Event (SSE) by using borehole strainmeters in two points of view. The one is a comparison between results of a long SSE analyzed by GNSS data and strainmeters. And another one is an offset system of the strainmeters which might affect its long-term stability.

The long-term slow slip event occurred in Tokai area from 2013 was detected by the borehole strain-meter network. Even though it was said that to detect a long-term SSE by strain-meters is very difficult because of their relatively lower long-term stabilities, the event was detected by using the geodetic data stacking (GDS) method reducing these background noise. A source area of the slow slip event was located on the plate boundary of the Philippine Sea plate beneath the west margin of the Tokai earthquake focal area. And a total amount of released seismic moment was 1.8e+19Nm equivalent to Mw 6.8. This event lasted for approximately 4 years, then it seemed to be terminated in 2016 or 2017. These result analyzed by strainmeter data is consistent well with that by GNSS data which has a high detectability for a long-term SSE. This means that the strainmeter got a detection capability of crustal phenomena in a wider temporal range.

However, differences between calculation and observation in the analysis of the SSE tended to be larger with time lapse because of an accumulation of various factors. A mechanical offset system seems to be one of the reasons but is needed for gaining a wide dynamic range and a high resolution of the strainmeter.

In the presentation, we would like to show the result of the L-SSE observation and analysis. And also we discuss how we should operate the offset system.

Keywords: strain-meter, long-term slow slip event, Geodetic Data Stacking method

