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Spatial-temporal relationship between short-term slow slip events and deep low-frequency earthquakes in the Tokai area

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Geological Survey of Japan, AIST has a network composed of about 40 groundwater observation stations in and around the Tokai and Kinki areas in Japan. At some stations, borehole strainmeters are installed in some wells for monitoring crustal movements. Since 2006, AIST has been constructing observation wells of groundwater and crustal movement monitoring around Nankai Trough (Aichi Prefecture, Kii Peninsula and Shikoku) for research on the Tonankai and Nankai Earthquakes. 12 stations were completed in February 2009. Each station have three wells with different depths, which are typically 600 meters, 200 meters and 30 meters. In these wells, groundwater level sensors, borehole strainmeters, tilt meters, seismometers and others were installed.

There are the episodic short-term slow slip events (SSE) accompanied by deep low-frequency tremors and earthquakes (LFEs) on the plate boundary along Nankai Trough. We research the short-term SSEs by use of borehole strain meters in observation stations of AIST. In this presentation, we will introduce the short-term SSEs and LFEs occurred in Tokai area. At February 5 to 9, 2009, LFEs occurred in central Aichi Prefecture. The crustal strain changes at TYE station and TYS station in Aichi Prefecture coincided with LFEs. The strain changes during the first half of the period were different from those during the latter half. We estimated the slip models of short-term SSEs, refer to slip model of Kobayashi et al.[2006]. Slip areas partly overlapped areas of LFEs. Additionally, there is possible that the short-term SSE came a few hours before tremors or LFEs in the case of the event occurred in February 2009.

Keywords: crustal strain change, short-term slow slip, deep low-frequency earthquake, deep low-frequency tremor, plate boundary