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# In-situ calibration for various multi-component borehole strainmeters

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Geological Japan, AIST has constructed fourteen observatories in and around expected focal zones of the Nankai and Tonankai earthquakes to monitor groundwater and borehole strain for prediction research of Nankai and Tonankai earthquakes. The Ishii's multi-component borehole strainmeter or the Gladwin Tensor Strain Meter (GTSM) was deployed at each observatory. Moreover, the Ishii's analog multi-component strainmeter or the Sacks-Evertson-Sakata multi-component strainmeter was deployed near some active faults. Here I represent the results of in-situ calibration for the various multi-component borehole strainmeters, and evaluate the results.

The in-situ calibration for the borehole strainmeter, tidal response of the borehole strainmeter and theoretical tide are used which is the same method of Matsumoto et al. (2010). Oceanic tidal loading of the theoretical tide is calculated by green's function at arbitrary depth for a surface point load (Kamigaichi, 1998) and the modified GOTIC2 program which can apply the green's function to the calculation of theoretical strain. The calibration coefficients are evaluated by long-period surface wave data observed by the borehole strainmeter and diagonal and/or non-diagonal elements of the calibration matrix.

All calibration coefficients for the eleven Ishii's strainmeters and one GTSM are reasonable, further calibration is needed for other three GTSMs. The results of in-situ calibraton for the Ishii's analog multi-component strainmeters or the Sacks-Evertson-Sakata multi-component strainmeters are also evaluated.

Keywords: strainmeter, in-situ calibration