

Estimation of groundwater-level anomalies associated with preseismic sliding of the anticipated Tokai earthquake

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In this paper we represent a detectability of preseismic sliding prior to an anticipated Tokai earthquake using groundwater-level monitoring network of National Institute of Advanced Industrial Science and Technology.

Kato and Hirasawa (1999) showed that volumetric strain associated with a preseismic sliding rapidly changes one day before the anticipated Tokai earthquake simulated by a friction law. In order to detect such changes as soon as possible, we need to know usual water-level changes and responses of groundwater level to volumetric strain in advance.

Kobayashi and Matsumori (1999) defined a maximum difference of borehole strainmeter strainmeter data with 5 minutes to 24 hours. Japan Meteorological Agency (JMA) is monitoring borehole strain data to detect anomalous data larger than the 'maximum difference' (Yoshida, 1999).

We investigate a maximum difference of groundwater level in six observation wells to detect anomalous groundwater-level changes associated with the preseismic sliding using the following procedure:

- We firstly estimate responses of the groundwater level to M2 and O1 tidal constituents using computer program BAYTAP-G, and compare them with response of JMA volumetric strainmeter data to these constituents or theoretical earth + ocean tides. We estimate a sensitivity of groundwater level to volumetric strain in each well using the result.
- We investigate maximum differences of the residual water level with 1, 3, 24-hours lags, respectively.
- We calculate strain change associated with a M6.0 preseismic sliding that occurs 10 km underneath each well. This calculation is based on Kato and Hirasawa (1999).
- We finally compare estimated strain change associated with the preseismic sliding with maximum differences of water level with 1-hour, 3-hours and 24 hours lags.

As a result we will detect anomalous groundwater-level changes associated with the preseismic sliding 1 - 45 hours before the mainshock.