

Remarkable crustal strain and Groundwater level changes associated with reflood of the underground gallery

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Tono Research Institute of Earthquake Science has been investigating the relationship between the variation of groundwater level and variations of crustal tilt, stress, and strain. We have installed a multi-component borehole instrument (three Ishii-type borehole strainmeters, two borehole tiltmeters and thermometer) at the bottom of boreholes site (BH-1; 50m depth) in the Tono mine (JAEA) in the Tono region, central Japan, as a part of the research. The BH-1 site is located in the Toki granite.

At Tono mine, backfilling of underground galleries were started from March 2012 and completed in March 2015. The drainage pump stopped on December 9, 2014. In this study, we report the crustal strain changes associated with reflood of the underground gallery. As research advances, the following results were obtained: (1) Observed strain change of maximum principal strain, minimum principal strain, and areal strain at the BH-1 site are -1.075×10^{-6} strain, -5.448×10^{-5} strain, -5.556×10^{-5} strain, respectively. (2) Compression of ENE-WSW direction is remarkable at the BH-1 site.

We consider that observed 'compression to excellence in ENE-WSW direction' may be caused by the hydrogeological structure, such as the orientation of the crack in Toki granite neighborhood of borehole strainmeter.

Keywords: reflood of the underground gallery, Strain observation, Groundwater level observation