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Relationship between stress and groundwater around TRIES area - consideration taking into account poloelasticity -

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Tono Research Institute of Earthquake Science (TRIES) have developed a borehole stress meter for continuous observation and multi-component borehole instruments. At the present time about 15 borehole stations are in operation. We have investigated crustal movements and behavior of underground water. In one place stress meter and a commercial water pressure meter are installed in the same borehole. Spring water was generated by boring work approximately 300m from these instruments. The water pressure and vertical stress component recorded the same variation in concurrence with this. This indicates that the developed stress meter is reliable.

Both meters recorded the same waveforms originated by 2011 Tohoku earthquake where epicenter distance is about 600km. The amplitude of stress meter is twice larger than water pressure meter and the trace is o.35second ahead in stress meter. We have more comparisons between two meters like tidal variation and so on. These observation facts are explained by taking into account poroelastisity of surrounded media.

We will present interpretation explaining the observation facts.

Keywords: stressmeter, water-pressure gauge, behavior of groundwater, poloelasticity