S107-002 **Room: 302** **Time: May 15 9:15-9:30**

The concentration of H2 gas corresponding to attitudes of incohesive fault rock layers

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High density H2 gas is observed in soil gases extracted above active faults. The concentration is up to a few volumetric percent. On the basis of maximum H2 gas concentration of each active fault, Sugisaki et al.(1983) discriminated that faults associated with higher H2 gas density correlated to historical earthquakes that faults associated with higher H2 gas density correlated to historical earthquakes. These H2 gas could be originated by chemical reactions between H2O and free radicals on the newly created mineral surfaces by cataclasis (eg., Kita et al., 1982; Kameda et al., 2003). Fault activity as a rate of birth of mineral surfaces, therefore, would be reflected in the H2 gas concentration. Measurements of H2 gas concentration could be lead us to assessment of fault activity. Many works have been carried out from 1980's in relation to H2 gas emission from faults putting geochemical earthquake prediction in view (Cf. Notsu, 2005).

One of the causes of reserving use of H2 gas density data as an assessment of fault activity seems to be wide variety of concentrations even in one active fault. That is to say, it is uncertain that fluctuation of H2 gas density reflects local activity on the sampling site or reflects unknown factors such as unevenly distributed conduit of H2 gas. The variation also shows necessity of optimum method for sampling site determination.

The research purpose is investigation into the cause of fluctuating H2 concentration even in an active fault. At first, we examined whether there are variety in concentration of H2 gas at an outcrop or not.

An outcrop of the Atotsugawa fault locates at the right bank of the Miya-river, Maruyama, Hida-city, Gifu Pre., central Japan. The size of outcrop is ca. 20 m by 3 m. There are incohesive fault rock layers hosted by cataclasite and weakly pulverized rocks. Incohesive layers show various attitude and ranges from a few millimeters to about 1 meter in width. In-situ H2 measurement was carried out for 19 sites of these incohesive layers. Procedures are as follows: drilling (9mm in diameter) more than 15cm along the incohesive layer, putting PFA tube into the hole and inlet for sealed case enclosing commercial H2 meter (measurement range is 0-2000ppm, 10% in measurement error, corrected by standard gas). The measurement was carried out over 30 minutes. Measured concentrations are range from 0 ppm to 150 ppm. Difference of weather condition should alter the equality of measurement conditions.

Emission layer and non-emission layer are classified on the boundary of 5ppm (ca. 10 times of H2 concentration of air).Attitudes of these two types are also shown in the area still divided on the stereographic projection. The division line is a small circle with half opening angle of 60 degrees around an axis dipping ca.10 degrees toward north. Poles to emission layer scattered in equator side. Continuous curved incohesive layers behave as emission and non-emission layer accompanied with change of its attitude. The small circle coincide macroscopic shear fracture in the case of uniaxial compression deformation test (sigma 1 laerger than sigma 2=sigma 3).

Clay minerals (less than 2 micrometers) collected at drilling site are checked by XRD using oriented glass slide method with usual EG treatment. There is no systematic change in mineral composition between emission and non-emission layers.

H2 gas density fluctuates in a few meters in area, and furthermore, reflects local attitude of incohesive layers even in the case of one layer. In-situ measurement of fault gas emission need non-preferred oriented layers to be measured. At least, one measurement of an outcrop resulted in insufficient discussions on the scale.

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