G121-002 **Room: 301B** **Time: May 21 14:00-14:15**

Structural control on the hydrogen emission from active faults: an example from the Atotsugawa fault

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One of the origins of hydrogen gas emanated from active fault zones is considered to by a reaction of water on the newly created surface of minerals by cataclasis based on experimental and isotopic studies (eg. Kita et al., 1980, Kameda et al., 2003). Observation of hydrogen gas from active faults may provide information on: (1) the rate of new surface creation through cataclasis as an activity of a fault by the amount of hydrogen gas, and (2) the spatial distribution of flow-paths of gases and gas-satulated groundwater within the fault zone structure from deep to surface. The later is available for a grasp of flow-paths around fault zones useful for a strategy for the screening of appropriate drilling and observation point. Little is known, however, about structural control on the hydrogen emission within a fault zone. We conducted, therefore, a research on the relationship between fault zone structures and hydrogen emission at active fault zones such as the Atotsugawa fault or the Atera fault. Here, information from western part of the Atotsugawa fault is shown.

In an area of about 10 km widths along western Atotsugawa fault, in-situ 30 measurements on incohesive fault rocks using commercially available compact hydrogen sensor, and 40 measurements on soil near fault zones were carried out. Hydrogen gas emission was not detected from most of data from soil. Data from incohesive fault rocks are categorized by the rate of hydrogen emission as higher rate (over 100 ppm per hour) from 3 sites, moderate rate (20 _ 100 ppm per hour) from 11 sites, lower rate (under 20 ppm per hour) from 9 sites, and undetected from 11 sites. Strikes of measured fault rock layers of these categorized rates correspond to composite planner fabric of right-lateral strike slip movement of the Atotsugawa fault as follows: most of higher and moderate rates are situated as R1 and X shear, most of lower late is situated R2 shear and shear planes between P and X shear, most of undetected layers are situated as R1 and P shear. The maximum rate is observed from a layer corresponds to X shear (about 900 ppm per hour). Dextral declination of rate from X shear to P shear is observed. Various rate is observed from the strikes correspond to R1 shear.

Hydrogen emission from western part of the Atotsugawa fault partly indicates systematic variety depend on a strike of fault zone with respect to principal strike of the main fault zone. Shearing along the X shear seems to give a chance to connect flow-paths due to block rotation of host rocks and decreased normal stress component within a composite planer fabric. It is likely that the heterogeneous hydrogen emission is controlled by anisotoropic connectivity of open paths depend on the structure in fault zone such as composite planner fabric as well as generated amount of hydrogen. An area of higher rate of hydrogen emission should be a better position for drilling or monitoring to investigate flow-paths, migration-paths, permeability, and geochemical features around fault zones.