

Study of hydrogen gas emissions around active faults and non-active faults

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It has been observed that the hydrogen gas emitted from underground along the active fault exceeds the atmospheric concentration (e.g. Wakita et al. , 1980 ; Sugisaki et al. , 1983),and experiments have shown that H₂ is generated by a radical reaction due to rock fracturing caused by fault movement (e.g. Kita et al. , 1982; Kameda et al. , 2003). Based on these researches, we are examining the applicability of the investigation technique using hydrogen gas emission from fracture zone. It is reported that the hydrogen gas migrates to ground surface along fracture accompanied with groundwater flow. Therefore, it is expected to estimate the hydraulic properties such as the groundwater pathway, continuity in fracture zone around the fault.

To understand hydraulic properties around the active fault, it is necessary to measure the concentration distribution of hydrogen gas in wide areas.

We investigated the hydrogen gas concentration emitted from some of the active fault in Japan. ;the western part of the Atotsugawa fault zone, the Atera fault zone and the Neodani fault in central Japan, the Yamasaki fault zone and the north Awajishima in southwest Japan, the Yamagata fault zone in northeast Japan. In addition, we investigated the hydrogen gas concentration emitted from some geological features tectonic lines; the Butsuzo Tectonic Line in the eastern Kii Peninsula, southwest Japan and the Atokura Nappe in the Northeastern Kanto Mountains, Japan.

Wakita et al., 1980, Science, 210, 188-190.

Sugisaki et al., 1983, Journal of Geology 91, 239-258.

Kita et al., 1982, JGR 87, 10789-10795.

Kameda et al., 2003, Geophys. Res. Lett ., 30 , 2063 , doi:10.1029/2003GL018252 .