

Groundwater study using drill holes in Abukuma granitic province (1): Water quality and stable isotope composition of crack water

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Chemical nature or origin of groundwater in cracks has been poor understood because of difficulties on collection of water samples preserving its natural conditions. We conducted a study on the flow parameter and/or processes of groundwater in cracks by drilling two bore holes for collection of water samples. The drill sites have set in a granitic province called Abukuma in Fukushima prefecture, and drill holes 140m- and 180m-deep were made. In situ sampling of waters at 6 depths for each drill holes are done with the single or double packer method. Chemical type of groundwater has changed at depth 40m, the shallower groundwater is categorized as Ca-HCO₃-type with slight NO₃ contamination whereas deeper groundwater has Na-HCO₃-type. Bicarbonate concentration becomes greater in deeper level suggesting that older groundwater is placed in deeper cracks. Stable isotope composition of water showed that all the sample water are of meteoric origin. However, the hydrogen isotopic ratio of waters at deeper level has significantly low values (20 permil lower than the present one). Obviously those groundwaters do not originate from the present one. Groundwater with very low isotope ratio is likely recharged in an ice age.