

## Study on origin of high- pH spring in Yuzawa Geopark, Akita

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Yuzawa Geopark, located in the southeastern part of Akita prefecture, is famous for geothermal activity and various types of hot springs. In addition, there are many springs that are recharged by huge amount of snow in this area. A high-pH spring (pH>9) is located in a Neogene hill. There is no hydrological study on the high-pH spring. Therefore, this study aims to clarify the origin and groundwater quality evolution process of the high-pH spring. We will show the results of major dissolved ions and stable isotopes of springs that were collected in September and November of 2014.

The high-pH spring discharges from joint of Neogene clay layer, and white deposit (calcite?) was found in the joint around of discharge point. pH and EC of the high-pH spring were 9.7 to 9.9 and 460 to 480  $\mu\text{S}/\text{cm}$ , respectively. Groundwater quality showed Na-HCO<sub>3</sub> type. As for  $\delta^{18}\text{O}$  and  $\delta\text{D}$ , the high-pH spring was located along local meteoric water line (d=20). Considering the correlation between isotopic ratios and elevation of discharge points that were obtained from the springs that were collected in wide area of the geopark, elevation of the recharge area of the high-pH spring was estimated more than 400 masl. However, this value was much higher than the elevation of topographical recharge area of the high-pH spring. The results of this study suggest that the high-pH spring may be recharged by regional groundwater flow system and may have long travel time.

Keywords: high-pH spring, multi tracer, environmental isotopes, Yuzawa geopark