

## Geochemical characteristics of hot spring water in Mt. Gassan area, Yamagata Prefecture -Part 2-

# Masaaki Takahashi[1]

[1] GSJ, AIST

Analyses of chemical and hydrogen (dD) and oxygen (d18O) isotopic compositions were carried out for hot spring water in Mt. Gassan area, Yamagata Prefecture. In this area, saline hot spring waters (higher than 10,000ppm Cl-) are discharged from several springs and wells, including 34,000ppm Cl- at Motosasagoya and 30,000ppm Cl- at Gassan-shizu hot springs. Chemical characteristics of the most hot spring water is neutral NaCl type.

Hot spring waters are classified in two categories by Cl-, dD and d18O.

(1) hot springs whose dD and d18O were distributed along the mixing line between local meteoric water (LMW) and brine A whose Cl- is 40,000ppm when dD is -10 to -20 permil.

(2) hot springs whose dD and d18O were distributed along the mixing line between LMW and brine B whose Cl- is 10,000 to 20,000ppm when dD is -10 to -20 permil.

The formation mechanism of brine A and B is concluded as follows.

(1) Brine A is in the right side of a mixing line between LMW and seawater on the Cl- vs dD diagram. Only Cl- of brine A is remarkably high compared with interstitial waters in marine sediments taken in the DSDP project. Thus, brine A may be formed of an addition of salt and/or hypersaline water which accompany intrusive rocks and/or neogranites, to interstitial water suffered from diagenetic alteration and/or oil field brine.

(2) Brine B may be originated from altered interstitial water and/or slightly-Cl-depleted oil field brine, because brine B is distributed between the DSDP interstitial waters and slightly-Cl-depleted brines obtained from oil and gas wells in Niigata and Yamagata areas on the Cl- vs dD diagram.

(3) Remarkably-Cl-depleted oil field brine distributed in Matsunoyama and Wakkanai/Enbetsu areas does not exist in this area.