

## Case study of the behavior of isotope in several hot-spring and geothermal field part2

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The Oxygen and hydrogen isotope data provide information about the origin and evolution of geothermal waters and relationship with hot spring reservoir and river water.

According to Enhanced Geothermal System (EGS), stable isotope data show the water source in reservoir or injected water. Recently, several EGS project are carried out in USA, Australia and Europe. And after nuclear power plant accident at 2011, we need new EGS project and the review of previous project at Hijiori. At Hijiori EGS site, the long term circulation test was carried out from 2000 to 2002. The tracer response changed with circulation (Yanagisawa et al., 2002, 2003) and calcium carbonate and anhydrite scale precipitated in circulation system (Yanagisawa et al., 2008). This shows the geochemical condition change in Hijiori system. And to develop EGS project, we have to survey the relationship between hot spring and EGS reservoir. Then, this presentation shows the results of stable isotope change of production and injection well at Hijiori test site and discuss the reservoir condition during circulation test.

During this test, hydrogen and oxygen isotope composition of production wells (HDR-2 and HDR-3), injection well, river water and hot springs were analyzed.

The isotope ratio of the river water and hot springs plot along the meteoric water line. The isotope ratio of hydrogen and oxygen ratio of HDR-2 increased with circulation and reached value of -45 ‰ of  $\delta D$  and -4.6 ‰ of  $\delta^{18}O$  at end of May 2001, respectively. However  $\delta D$  and  $\delta^{18}O$  rapidly decreased to -54.4 ‰ and -8.6 ‰ respectively from May to June and came close to meteoric line. The isotope ratio of HDR-3 plot at higher  $\delta^{18}O$  than that of HDR-2 and the change of the isotope ratio of HDR-3 is similar as that of HDR-2.

The change of  $\delta^{18}O$  value of HDR-2 is corresponds with Cl concentration change during the circulation progress.

Keywords: hot spring, geothermal, isotope, Hijiori, EGS