

Estimate of isotopic composition and flux of Arima type fluid

TANAKA, Hidemi^{1*} ; TERUSAWA, Shuji¹ ; SUGAI, Shuto¹ ; TSUNOMORI, Fumiaki² ; MURAKAMI, Masaki³ ; KAWABATA, Kuniyo²

¹School of Science, University of Tokyo, ²Geochemical Research Center, Graduate School of Science, University of Tokyo, ³OYO Corporation

It has been well known that change in chemical compositions of ground water is associated with crustal activities including large earthquakes. Research for change in chemical compositions of fluids associated with earthquakes is still continuing all over the world. However, reasons to choose the location of wells to measure the chemical and isotopic compositions of the fluids, and to choose particular chemical and isotopic compositions for measurements have not been unambiguous so far.

Because no deterministic theory has been established to predict large earthquake from anomalous chemical precursor signals so far, and fluid-monitoring research to explore earthquake precursor is significantly declined in the community, it would be less meaning to collect more chemical precursors of the earthquakes by repeating procedure in future.

Instead, there are some meaning if observed chemical change can be explained by physical and chemical process in the crust associated with crustal activities. At present, following three subjects are especially important. First, establishing the reliable basis to choose proper fluids and wells, second, designing and constructing the mass-spectrometer which has sufficient performance for fluid continuous monitoring at on-site close to the fault zone, and finally, establishing and improvement of diagnostic theory of fault zone fluid.

Based on the idea mentioned above, the results of examination of fluid of hot springs at Arima area are presented. There are several hot spring sources which are flown out continuously to the surface. After hot spring drillings at the 1940 to 1950's constant amounts and quality of these hot springs are maintained by branch of coal government office of Kobe City. Many researches have been done for the hot springs so far, including surface geology, shallow underground structure, source of fluids and fluids paths. Fluid paths are inferred to be fracture zones of particular fault zones by results of geological survey and resistivity analysis. It is important to recognize these kinds of fluids as "fault zone fluids", since identification whether monitored fluids flow through fault zone or not is important issue to examine the crustal activities from the chemical and isotopic compositions of the fluids. It is also well known that fluids from Arima hot springs show specific isotopic compositions which is inferred to be very deep origin. In this presentation, we discuss about quantity of flux of deep source fluids of Arima hot spring which is important issue to answer the question why we need to observe the fluids for crustal activities and where? and compare the results between this and previous studies.

Keywords: crustal fluids, Arima type Hot spring, fluid flux, saline water, isotopic composition