Oral | Symbol S (Solid Earth Sciences) | S-CG Complex & General

[S-CG63_2PM1]Geochemistry of fault systems

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Fri. May 2, 2014 2:15 PM - 3:55 PM 418 (4F)
Faulting changes environmental conditions, which lead to destabilize chemical bonds in fault systems. Consequently, traces of chemical reactions are observed on fault rocks. This session focuses on topics related to chemical processes from faulting to observations of rocks in fault systems. We welcome presentations on subjects in Seismology, Hydrology, Geochronology fields as well as Geochemistry.

3:50 PM - 3:55 PM

[SCG63-P02_PG]Chemical and isotopic examinations of Arima-type high saline hotspring water in southwest Japan

3-min talk in an oral session
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Keywords:Arima hot spring, Oxygen Isotope, Hydrogen Isotope, Brine fluids, original composition

Many researches have been conducted to explore component source, heat source and water source of hot spring in Japan. Matshubaya et al.,(1974) classified hot springs into four types by isotopic ratio of hydrogen and oxygen in water and geology (1) volcanic type, (2) Arima type, (3) coastal type, (4)Green tough type. Of these, Arima type is said to have deep origin source because hydrogen and oxygen isotope ratios suggests that the origin is mixture of meteoric water and magmatic water, and dissolving gas have abnormally high He isotopic ratio. Sugimoto (2012) selected 180 hot springs that seem to be classified as Arima type from 6058 hot springs in Japan, using Li/Cl and Br/Cl values. Li/Cl is used as index of temperature of water was experienced (You et al., 1996). Br/Cl expresses influence from sea water and biological effect (Hurwitz et al., 2005: Uemura et al., 1988). He selected hot springs which have more Li/Cl and less Br/Cl as Arima type. But, his discussion was only about dissolving ion and not discussed hydrogen and oxygen isotope ratios used in the definition of Arima type. So, we reselected 185 hot springs that seems to Arima type by Sugimoto (2012) method from 9887 hot springs in Japan and sampled 67 hot springs for isotopic analysis and ion analysis. As a result, the hot spring with the isotope shift in the same way as Arima hot spring is found along Median Tectonic Line (MTL) at Kinki, Western Shikoku and Central Japan (Kashio) districts. All mixing lines are converged to one point. Thus, we refer the fluid with this isotopic composition as origin water of Arima type. Since they converge to one point in the relationship of the hydrogen isotope ratio of the chloride ion concentration, the composition of the original water is as δ D = -35‰, δ18O = 5‰, Cl- = 42g/l. The method to determine the isotopic composition and the resultant value of δ D and δ18O is more convincing than those from previous results. Because shift lines from several regions are coincided at one point.