Oral | Symbol S (Solid Earth Sciences) | S-VC Volcanology

[S-VC51_29PM1]Hydrothermal systems beneath volcanoes

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Hydrothermal systems occur beneath volcanoes depending on different environments. Uderstanding of hydrothermal systems contributes not only to the study of the earth system but also to utilization of geothermal energy and prediction of volcanic eruptions. In this session, the structure and the flow of heat and mass beneath volcanoes are discussed from earth sciences and reservoir engineering.

3:45 PM - 4:00 PM

[SVC51-P01_PG]Fluid geochemistry of hot springs at Kotakara-jima,Tokara Islands

3-min talk in an oral session

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Yokose et al.(2010) proposed giant calderas related to Quaternary volcanic activity, on the seafloor along the Tokara Islands. Kotakarajima is located on the rim of the Takarajima Caldera, which belongs to this caldera chain. A hot spring called as Yutomari-onsen is located at the coastline of the Kotakarajima island, which water temperature reaches higher than 90 degC. Fluid chemistry of this hot spring was studied with the aim of understanding a hydrothermal sytem associated with the seafloor caldera. Hot spring water was collected in May, 2013. Temperature, pH, electorical conductivity, and oxidation-reduction potential were measured on site. Fluid samples were filtered with a 0.45 um diskfilter and stored. Major cations and anions were analyzed by ICP-AES and ion chromatography. Alkalinity was determined by HCl titration and Si concentration was determined by colorimetry. Fluid chemistry of the hot spring water is characterized by high Cl^- concentration, Na/Cl ratio (=0.75) closed to that of seawater, and isotopic composition similar to seawater, which strongly suggests that it is originated from seawater. Depletion in Mg^{2+} and SO_4^{2-} and enrichment in K^+ and Ca^{2+} compared with seawter, are in accordance with the idea that the fluid experiences seawater-rock interactions. Fluid temperature in the aquifer where interactions attain to equilibrium is estimated as 250-300 degC based on chemical geothermometers. From these results, the Yudomari-hotspring at the Kotakarajima Island is considered as fluid discharge of a submarine hydrothermal system that is associated with Takarajima Caldera.

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