[EE] Evening Poster | S (Solid Earth Sciences) | S-GC Geochemistry

[S-GC45]Volatile Cycles in the Deep Earth - from Subduction Zone to Hot Spot

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Volatile geodynamics and chemical differentiation in the mantle and crust by drastically changing mineral stability and rheological behavior. Fractionation-processes such as partial melting, hydration, and dehydration are all controlled by volatiles in the rocks. A significant portion of the volatiles in the Earth has been thought to be present in the atmosphere and oceans as a consequence of extensive degassing during accretion and subsequent mantle degassing. On the other hand, it has been recently recognized that substantial amounts of volatiles are recycled back into the mantle at subduction zones, where intensive devolatilization of descended materials during arc magma generation was once thought to act as an effective "subduction barrier". However, fundamental questions still remain, such as: how are volatiles species distributed throughout the early and present Earth? What are the mechanisms for, and rate at which, volatiles are fluxed between the atmosphere, crust, and mantle? And what role have volatiles played in driving the evolution of the Earth? The possible role of the core in storing primordial volatiles is also poorly constrained. We therefore welcome contributions from experimental, observational, and modeling studies that help shed light on the deep cycles of volatiles, such as hydrogen, carbon, nitrogen, noble gases, halogens and sulfur. We particularly encourage studies linking the behavior of multiple volatile elements and their isotopic compositions. Studies investigating the linkage between volatile and solid geochemical tracers, the phase equilibria of volatile-bearing mantle assemblages, and the effect of volatiles on the physical properties of the mantle are also welcome.

[SGC45-P03]Delineations of groundwater circulations and geothermal water origins using the geochemistry and noble gas of groundwater around the Yangsan fault, Republic of Korea.

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The geochemistry and noble gas isotope of groundwater in 10 deep groundwaters and 3 geothermal waters were examined for the characterization of groundwater circulations and the heat source origins of geothermal waters around major fault such as Yangsan fault, southeastern part of the Korean peninsula. The pH values of groundwaters and geothermal waters were in ranges from 5.65 to 8.16 and from 7.0 to 7.98, respectively. In the geothermal waters such as the Haeundae geothermal waters and the Dongrae geothermal waters, the average electrical conductivity was relatively high (3,890 *u*S/cm) due to the high Na and Cl concentrations. It indicates that the geothermal waters in the hot spring areas are affected by the seawater intrusion. The geochemical types of groundwaters and geothermal waters were Ca-HCO_3 (Ca-SO_4(Cl)) and Na-Cl type, respectively and showed indistinct relationship with the geological characteristics. In the results of noble gas analysis, the most of groundwaters were plotted along the air-crust mixing line on $^3He/^4He$ vs. $^4He/^{20}Ne$ diagram. It implied that the ^3He of groundwater except one groundwater sample are dominantly derived from the air and are mixed with the helium originated from the crust. Also, it indicates that the groundwater actively circulates along the faults and the faults cannot play a role of upward pathway of a

deep-seated helium gases. The ^{4}He concentrations of groundwater were relatively high in the aquifer. It indicated that the groundwaters are sufficiently interacted with the basement rock. The $^{3}He/^{4}He$ ratios of the geothermal waters, plotted on the air-crust mixing line, were in ranged from 0.41010^{-6} to 0.81010^{-6}. It suggested that the He gases in the geothermal waters are mainly originated from the atmosphere and crust, and partly from the mantle sources.