Impact of volatiles on the processes of formation and evolution of the Earth's interior

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Characterization of the processes that govern the behavior, budget, and recycling of volatiles in the Earth's interior is fundamental to our understanding of the formation and evolution of the solid Earth, its oceans, and atmosphere. In the proposed session, we will focus on theoretical, experimental, and observational characterization of solubility and solution mechanisms of C-O-H-N-S volatiles in molten and crystalline materials and of oxide components in C-O-H-N-S fluid in the pressure, temperature, composition and redox range of Earth's past and current interior. The major session foci will be:

?Modeling the impact of C-O-H-N-S fluids on composition and evolution of the Earth via metasomatic and magmatic processes. ?Characterization of structure and properties in silicate- C-O-H-N-S melt, mineral, and fluid systems via theoretical modeling and high-temperature/-pressure experimental studies. ?Experimental characterization, at high temperature and pressure, of fractionation of components, compounds and isotopes in the C-O-H-N-S system between minerals, melts, and fluids. ?Element complexing in individual phases, interaction between silicate and trace and minor elements in fluids and melts at high temperature and pressure. ?Examine the principles on which to quantify property behavior and its application to natural processes that include fluids and melts.

Dynamic and cyclic process of carbon-bearing phases of the terrestrial interior

3-min talk in an oral session

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The results of the present study are summarized as follows:1) Carbon-bearing mineral phases of the terrestrial interior are discussed to elucidate dynamic change of material states (air, liquid and solid) on active Earth planet.2) Samples used in this study are diamond (Congo,Africa), limestone (Akiyoshi, Japan), carbonatite (Lengai, Tanzania,Africa and Europe-North America), and shungite (Shunga, Russia) together with carbonate grains of Libyan glass (Africa) to observe micro nano-grains of carbon-bearing materials with the FE analytical SEM etc.3) The present data indicate that micro carbon-bearing grains are easily changed and remained as the three materials states mainly as solidified glasses by high pressure shock waves of earthquake, volcano and impact events to the surface to the interior.4) Local fluid-bearing depositions irregularly distributed on the surface and interior of active Earth are based on storages on the interior formed by solidified mixtures of multiple carbon-bearing material states originally triggered by impact process on primordial Earth and ocean floors of evolved Earth.5) The primordial planet Earth with remained heterogeneous surface by original impact-related process is considered to produce dynamic cyclic system of three material states (air, liquid and solid) of carbon-bearing materials with macro-life activity which is formed by huge production from the interior triggered by huge collision process of the giant impact and followed inner movement of active Earth with
complicate local reservoir.