[EE] Eveningポスター発表 | セッション記号 S (固体地球科学) | S-VC 火山学

[S-VC39]Pre-eruptive magmatic processes: petrologic analyses, experimental simulations and dynamics modeling

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2018年5月24日(木) 17:15 〜 18:30 ポスター会場 (幕張メッセ国際展示場 7ホール)

Processes leading to volcanic eruptions are central and yet still enigmatic issues in volcanology. Recent advances in understanding thermo-mechanical and open-system behavior of magma reservoirs and mineral zoning stratigraphy allow us to take a step forward to reveal the complex incubation processes during volcanic dormancy and following magma chamber tapping. This session aims at putting together recent knowledge on magmatic processes including 1) magma chamber evolution through magma reintrusion, crystallization-induced volatile exolution, magma mixing and gas fluxing, 2) externally-driven eruption trigger mechanisms, and 3) conduit processes and controls on eruption styles such as outgassing, dehydration-induced crystallization, fragmentation and rheological transition of ascending magmas. We welcome contributions based on petrological, mineralogical and geochemical analyses of pyroclasts and volcanic gasses, experimental simulations of magma reservoir conditions and conduit flow dynamics, and numerical modeling to integrate the elementary processes.

[SVC39-P15]Permeability measurements of heated and unheated ash erupted from Aso Volcano

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キーワード：火山灰、再加熱

The eruption of the Aso Volcano during 2014-2016 is mainly classified into ash eruption but Strombolian eruption, erupting scoriae rather than ash, is also observed (e.g., Yokoo and Miyabuchi, 2015). Such a transition may depend on the generation of ash and physical properties of the ash layer at shallow conduit. Ash once erupted out from the vent sometimes falls back. The reheated ash may stick together, that increases its strength and decreases its permeability. In order to characterize this process we heated the ash sampled from Aso Volcano sieved with a 53μm mesh at high temperature (950℃, 700℃, and 500℃) under normal stress of 26kPa. Only when the temperature is high enough (950℃), the ash stick together to be an ash plate. Next, we measured the permeability of this ash plate and unheated ash by using gas flow. The permeability of the ash plate is less than $2x10^{-13}$ m^2, while that for ash is larger than $10^{-11}m^2$; i.e., heating decreases the permeability of ash more than 2 orders of magnitude. Interestingly, the unheated ash particles can freely move in the container during the permeability measurements. This effect allows making pipe-like structures in the ash layer and increases its permeability with flow rate. Our measurements suggest that the sticking of ash can occur at 950℃ even under low normal stress, as low as 1m thickness of an ash layer. Once the sticking of ash particles occurs, that inhibits the movement of ash particles and restrict the gas flow in the ash layer.