[JJ] Evening Poster | S (Solid Earth Sciences) | S-VC Volcanology

[S-VC44]Magmatism and volcanic dynamics on subduction zone

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Subduction zones are characterized by magmatism and volcanism caused by magma generation, magma transportation and storage, and volcanic eruption. These magmatic process and volcanic dynamics have been investigated using laboratory experiments and sophisticated numerical modelings. Recent progress of observation techniques has revealed the structures under volcanoes. Besides, the studies based on seismological observations and geochemical analyses try to determine the spatial and temporal scale of magmatic activity and explain the process of magma generation. This session aims to discuss the latest studies about magmatism and volcanic dynamics from various perspectives and integrate these understandings.

[SVC44-P06]Lateral changes of GSD structures in the plinian fall deposits deduced by two-dimensional constant source model

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In a constant supply from a point source at a certain height in the one-dimensional sedimentation column, our 1DCS model (one-dimensional constant source model) can construct the overall vertical structure of grain-size distribution (GSD) in the fall deposits controlled by the supply duration and the source GSD (Iriyama et al., in press). Especially, the upper limit of the existence of the largest particle (critical level) characterizes the sedimentary feature. In the ash cloud of plinian eruptions, GSDs are modified by the segregation during the transportation to the 1D source position. So, in order to establish the model to realistic plinian eruptions, in this study, we develop a 2D model in which the lateral transport in the ash cloud and the segregation effect from the ash cloud are taken into account.

In the two-dimensional constant source (2DCS) model, we call the GSD above the vent as the 2D source GSD. We assume: 1) the 2D source GSD is constant during the supply duration, 2) the velocity field in the ash cloud is constant with time, 3) the fall velocity only depends on the particle size and is constant with time, 4) no lateral transport after segregation from the bottom of the ash cloud occurs (no wind condition).

We obtain the lateral change of the GSD in the ash cloud which decreases exponentially with distance from the 2D source due to the segregation effect. The GSD in the sediment (sediment GSD) corresponds to the GSD in the ash cloud satisfying the time relation for each particle. We analyze the lateral change of the critical level with a use of given velocity field in the ash cloud. The critical level decreases with the distance depending on degree of the particle segregation. For example, rapid expansion of ash cloud reduces the degree of particle size segregation, then the lateral change of the critical level becomes gradual. The decreasing rate of critical revel with distance become high with decreasing the supply duration because the

total amount of the largest particles decreases relatively. Using the 2DCS model and observed values (e.g., the 2D source GSD obtained by geological survey and the velocity field expected by the satellite image), the lateral changes of the GSD structures in the pyroclastic fall deposits can be predicted and can be compared to the observed ones.