

Characteristics of a plinian eruption producing caldera-collapse: an example of the 40-ka Shikotsu Pyroclastic Fall Deposit, Hokkaido, Japan

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By the collapse caldera formation, there are many examples to begin with a plinian eruption prior to a large-scale pyroclastic flow eruption.

Then what is the plinian eruption not to cause that a collapse caldera is raised different in? For this problem solution, we carried out field study for the plinian pyroclastic fall deposit (Spfa1) of the Shikotsu caldera forming eruption approximately 40 ka it was the model example of the caldera collapse and particle size analysis of the deposits. Spfa1 holds a distribution main axis in the ESE direction from Shikotsu caldera and can be traced for 180 km to Cape Erimo. And its magma volume is 40 to 48 km³ DRE. The significant characteristic of Spfa1 is that the particle size distribution of the pumice particle is different from the lower part at the upper part. Thus, the upper part shows the distribution of double modes whereas the pumice particle is lognormality distribution of the single mode at the lower part. When the upper atmosphere of November in Sapporo that the wind velocity has a big are assumed, the heights of eruption-columns are 30 to 20 km and 15 to 10 for the coarse and fine modes in the upper part, respectively.

In addition, the mass ratio of the coarse mode grains is around 70 wt% along the distribution main axis, but it decreases to 30 wt% at 25km north perpendicular to the main axis. This means that the sources of both modes existed in the place of the geographically remote independence. In other words, Spfa1 which caused the caldera-collapse was a product of coincided plural plinian eruptions, and it is thought that this eruption was different from the eruption from the normal single source in beginning of eruption.

Keywords: Shikotsu caldera, plinian eruption