

What can we expect from muon radiography to discuss volcanic activities?

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To discuss volcanic activities in general, first we should know about their products and their structure. This is the same to both extinct and erupting volcanoes. Close-range observations of volcanic eruptions are usually dangerous and difficult to get correct knowledge of the progressive events. After the activities end, we would begin geological and geophysical explorations of volcanic products and edifices. Various methods of modern technology such as seismic, geomagnetic, gravimetric and geothermal ones, would be applied for the purpose, but at present, it is not easy for us to get exact images of subsurface structures of volcanic edifices because of limited seismic wavelengths, indetermination of material constants concerned, and so forth. In such situation since the 19th century, various imaginative ideas have traditionally survived. “Cryptodome” in definition of lava domes, may be one of their examples. In the present report, structures of lava domes are mainly reviewed. Around Usu volcano, Hokkaido, there are several dome-like upheavals of dacite magmas formed prehistorically or under our eyes. The author has discussed their structures and further their formation mechanisms. However, the results have not always been able to convince volcanologists.

We expect that muon radiography should make pertinent suggestions regarding the following problems by exact imagery of the subsurface structures:

- 1) Parasitic vents branch away from main conduits at various depths beneath central cones. Sometimes the branch point is located above the base of the volcano body. The branching points are an important part of a magma plumbing system.
- 2) We know empirically that parasitic cones only erupt once: they are monogenetic. The reason why parasitic cones are monogenetic is of special significance from viewpoints of volcanology and disaster prevention. This can be explained by accurate surveys of density distribution in and around parasitic conduits.