バブル定量化噴火学

2000 Fiscal Year Final Research Report Summary

Bubble-quantitative volcanology

Research Project

Project/Area Number

10440127

Research Category

Grant-in-Aid for Scientific Research (B).

Allocation Type

Single-year Grants

Section

一般

Research Field

固体地球物理学

Research Institution

kanazawa University

Principal Investigator

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Project Period (FY)

1998 – 2000

Keywords

Vesiculation / Crystallization / Eruption / Texture / Pumice / Scoria / Quantification / Eruption

Research Abstract

The aim of this project has been to establish the methodology for the quantification of volcanic eruptions from the vesicular texture of pumices or scoriae. This aim has not bee achieved yet but we have get several important facts that will be valuable to the further development of this project as follows. (1) Attempt to estimate the strain rate in the conduit using tabular vesicles : In the case study of pumice flow deposit in Toya volcano, we found that the relationship between aspect ratio and size of vesicles plays an important role to estimate the strain rate in the volcanic conduit. (2) The textural analysis of scoria from the B crater Plinian eruption of 1986 Izu-oshima volcano : In this research, we found that the vesicularity and the number density of groundmass microlites negatively correlate and that in the early and final stages of the eruption the microlite-poor type (A type) is dominated whereas in the middle stage the microlite-rich type is dominated. If the elevation of the effective liquidus due to the degassing controls the microlite crystallization, this fact suggests that the magma ascent rate in conduit changes from a slow, through fast and to slow rates again during

the eruption. (3) The experiment of bread baking using yeast fermentation : From the comparison of experimental results between the fermentation under free expansion and that in glass tubes, the 1 dimensional expansion enhances the bubble coalescence and elongation. This result has been taken into account in the first study concerning Toya volcano. These three studies confirm the underlying idea of this project that the vesicular texture can provide the important information for the quantification of volcanic eruption.

Research Products (6 results)

All | Other

All | Publications

[Publications] A.Toramaru 他: "Model of layering formation in a mantle peridotite"Earth and Planetary Science Letters. 185. 299-313 (2001)

[Publications] A.Toramaru: "Anumerical experiment of crystallization for a binary eutectic system with application to igneous texture."Journal of Geophysical Researches. 106. 4037-4060 (2001)

[Publications] A.toramaru and A.Iochi: "Transition between periodic precipitation and tree-like crystal aggregates : a detail experimental study"Forma. 15. 365-376 (2000)

[Publications] A.Toramaru, E.Takazawa, T.Morishita, and K.Matsukage: "Model of layering formation in a mantle peridotite (Horoman, Hokkaido, Japan)"Earth Planet Sci.Lett.. 185. 299-313 (2001)

[Publications] A.Toramaru: "A numerical experiment of crystallization for a binary eutectic system with application to igneous textures"J.Geophys.Res.. 106. 4037-4060 (2001)

[Publications] A.Toramaru and A.Iochi: "Transition between periodic precipitation and tree-like crystal aggregates : a detail experimental study"Forma. 15. 365-376 (2000)

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-10440127/104401272000kenkyu_seika_hokoku_

Published: 2002-03-25