Geophysical Research Abstracts, Vol. 7, 09079, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09079


# Density Distribution in Pyroclastic Deposits: A Comparative Study

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Investigations of explosive volcanism and the modelling of related processes require profound knowledge of the physico-chemical properties of the rock material involved. Parameters such as the rock's density and vesicularity highly influence the rheological properties as well as the fragmentation behaviour of the magma. As direct observation is not possible, information on the spatial and temporal variability of the ascending magma's vesicularity can easiest be achieved via the measurement of a statistically reliable amount of representative samples.

In order to relate density/porosity distributions of eruptive products to specific volcanic settings and eruption characteristics, we evaluated and compared the results of five field campaigns in the circum-Pacific area. The densities of 2500 pyroclastic-flow and block-and-ash-flow samples were measured directly in the field on St. Augustine (Alaska), Bezymianny (Kamchatka), Unzen (Japan), and Merapi (Indonesia). This field-based density measurement method is based on the Archimedean principle taking a sample's weight in air and under water, evacuated in a plastic bag to prevent water absorption. The results will be supported by detailed laboratory-based density and porosity measurements and investigations of their influence on rock fragmentation and viscosity.

This work is part of the BMBF project SUNDAARC which aims to quantify the potential risk of selected highly-explosive volcanoes by a combination of field and laboratory investigations.