

## Material scientific study on vulcanian eruptions of Sakurajima volcano, Japan

# Takahiro Miwa[1]; Atsushi Toramaru[1]; Masato Iguchi[2]

[1] Earth and Planet. Sci, Kyushu Univ.; [2] SVO

The present study explores the relations between material scientific parameters from volcanic ash and geophysical parameters from geophysical observations for the vulcanian eruptions of the Sakurajima volcano from aspect of material science. Volcanic ashes erupted by 17 vulcanian eruptions of Sakurajima volcano from 1974 to 1987 of which the time and date, maximum amplitude of explosive earthquake and amplitude of air shock of each explosion can be available for each event, are used for the present analysis. Using stereoscopic microscope, we classified ash particles into smooth into volcanic glass, ash aggregate and free-crystals, and then divide volcanic glass into sub-class of particles with smooth surface and non-smooth surface particle from the view point of the surface conditions of particle. Smooth surface particles were classified into N-particle (particles not include vesicles) and V-particle (particles include vesicles) by the polarized microscopic observation for polished thin sections. Statistical examination based on classification of volcanic ash shows 1) The number fraction of smooth surface glass has positive correlation with maximum amplitude of explosive earthquake, 2) ratio of the number of N-particles to V-particles (N/V number ratio) has positive correlation with the amplitude of air shock by explosions which do not accompany pre-explosion BL-type earthquake swarms and 3) for explosions which accompany the pre-explosion BL-type earthquakes swarms, N/V number ratio has the negative correlation with the duration time of pre-explosion BL-type earthquake swarms. Plagioclase microlite textual analysis was carried out for N-particles of 5 explosion events which do not accompany pre-explosion BL-type earthquake swarms. The result shows that plagioclase microlite number density (MND) and L/W ratio have the positive correlation with amplitude of air shock. Comparison between the present data MND, L/W ratio, crystallinity and the result of experiments carried out by Couch et al., (2003) suggests that plagioclase microlite texture of volcanic ash erupted by the vulcanian eruptions which do not accompany pre-explosion BL-type earthquake swarms could be generated by 100-150MPa decompression. MND is proportional to the power 3/2 of water exsolution rate from melt. The positive correlation between plagioclase MND and amplitude of air shock indicate that when water exsolution rate ( $3.8 \times 10^{-5}$ - $1.2 \times 10^{-4}$  wt.%/s) of magma is high, amplitude of air shock (54-360Pa: observed at station HAR) by explosion becomes high amplitude.