

SVC063-P13

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Swelling of crater bottom as a part of eruption processes at Suwanosejima volcano, Japan

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Movie-acoustic with seismic observations were conducted at Suwanosejima volcano in August 2005, and processes at the onset of eruption were examined based on results of the observations. In observed infrasound waveforms, weak and slow pressure increasing (the preceding phase) was recognized in 0.7 s prior to rapid and large increasing (the main compression phase). These pressure changes induced the faint phase change of H₂O in drifting steams above the crater. This phase change could not be easily recognized in the normal movie images. However, propagating phenomenon of the pressure waves was identified by image processing enhancing luminance changes above the crater. Deduced luminance changes exactly coincided to the compression phase of infrasound wave.

It could be an alternative signal of infrasound wave of the eruption. Origin time of the preceding phase estimated from arrival times of infrasound wave at two stations and the luminance data was almost same as that time of a vertical expansion occurring at a depth around 0.5 km beneath the crater bottom which was inferred from seismic signal. Considering the eruption processes of Sakurajima volcano, the preceding phase of infrasound wave was caused by the swelling of the ground surface of the crater bottom due to such expansionary event undergone beneath the crater. The volumetric change of this ground upheaval of Suwanosejima eruption was estimated to be 30-40 m³. Origin time of the subsequent main phase of infrasound wave coincided with the start time of the ejection of volcanic materials. This suggests that the crater bottom which had taken a role of a lid to the pressurized magma and gases failed with the ejection of volcanic materials after swelling of the crater bottom with 0.7 s duration.