

Classification of infrasound waveforms and analysis of video images at volcano eruption

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Volcano infrasound is an increasingly useful technique for measuring and analyzing eruptive activity. In order to reveal causes of characteristics of infrasound waveform, we analyzed infrasound records and video images at eruptions that occurred at Yasur Volcano, Vanuatu during an hour at 15:00, 21th September, 2011. Yasur Volcano has three active vents in the summit crater. Infrasound waves are generated every 1-3 minutes at various eruptions with reddish magma, vapor rich gas and ash. Infrasonic waveforms are mostly symmetric with a sharp compressive onset, followed by a small rarefaction phase. In this study, we analyzed infrasound events whose maximum amplitude is more than 50 Pa at one station on the summit crater rim. We conducted cross correlation analysis to 29 wave records and classified them into 3 types; A (13 events), B (12 events) and C (4 events). Time window of the analysis was 5s from a second before the maximum peak time. In contrast to type C, cross correlation coefficient among wave forms of types A and B was very high ($> \sim 0.75$). The compressive ratio and the ratio of positive and negative peak are different between type A and B. On the other hand, we analyzed selected video sequences of these eruptions. We read the RGB and brightness values on horizontal line above each vent until the end of the eruptions from 2s before the ejecta reaches the line. The maximum R and brightness value of type B events was twice as other type eruptions. This result may suggest that type B eruptions release relative much reddish magma and whitish gas compared to those of type A and C.

Keywords: infrasound, volcano eruption