可視映像解析による桜島昭和火口におけるブルカノ式噴火の衝撃波及び噴 煙の時間関係

Time variations between shock wave and a subsequent formation of bright cloud at Vulcanian eruptions of Showa crater, Sakurajima volcano, Japan

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To investigate mechanism of Vulcanian eruption, we analyzed eruption movies (30 frame/s) of Showa crater, Sakurajima volcano, Japan. 88 eruptions during December 2011 to May 2015, which accompanied variable infrasound wave, were selected for an analysis. First, we investigated the relationship between an intensity of infrasound and a speed of volcanic plume at the crater. Maximum amplitude of infrasound data observed at Seto and Arimura stations (JMA) shows positive correlations with the ejection speeds of volcanic plume. This result thought to be consistent with preceding vulcanian eruption models (Turcotte et al., 1990; Woods, 1995; Alatorre-Ibargüengoitia et al., 2010) which shows ejection speeds increase if overpressure in the conduit increase. Second, we investigated the time lag between an onset of visible shock wave and a subsequent formation of bright (white) cloud close to the crater. The obtained time lag varies from 0.2 to 1.1 s with maximum frequency 0.6s, and may be related with the variation of size and/or the location of "gas pocket" (e.g., Ishihara, 1985; Iguchi et al., 2008) formed under the crater just before the explosion at Sakurajima.