

Backscattering characteristic of volcanic eruptions based on LIDAR observation around Sakurajima Volcano

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Increases in aerosol due to eruptions have been detected by lidars distant from erupting volcanoes. Backscattering coefficient and depolarization ratio are examined related with volcanic ash particles (eg. Sassen et al.,2007). A lidar is installed on the flank of Sakurajima volcano and lidar observation is conducted for volcanic ash plume above the craters of the volcano to obtain spacio-temporal distribution of backscattering intensity and depolarization ratio. Sakurajima volcano is the most active volcano and has continued eruptions at the Showa crater since 2006 and white plume is emitted from the Minamidake crater continuously.

Depolarization ratio of white plume is almost the same as water cloud (0.05-0.1). On the other hand, depolarization ratio of volcanic ash cloud is much higher (0.40-0.45) than the white plume and water cloud. The highest value of depolarization ratio (0.72) was obtained only just above the crater immediately after eruptions for short-term. The high depolarization ratio is caused by larger density of volcanic ash particle with non-spherical shape.

Keywords: Volcanic smoke colored white, Volcanic smoke include volcanic ash, LIDAR, Backscattering intensity, Depolarization ratio, Sakurajima Volcano