Observations of the evolution of eruption columns at Sakurajima volcano using Himawari-8 Super-Rapid Scan 30-sec imagery

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Japan Meteorological Agency (JMA) began operation of the new-generation geostationary meteorological satellite, Himawari-8, on July 7, 2015. The imager on board is called Advanced Himawari Imager (AHI), whose observation performance is highly improved compared to that of the predecessor geostationary meteorological satellites MTSAT-series.
1) The number of observation bands is increased from 5 (1 visible band and 4 infrared bands) to 16 (3 visible bands, 3 near-infrared bands, and 10 infrared bands).
2) The spatial resolution is almost doubled (1 km to 0.5-1 km for visible and near-infrared bands and 4 km to 2 km for infrared bands).
3) The full-disk observation frequency is improved from hourly to every 10 minutes.
4) The small regions including Japan (two areas coverage of the 2000 km (E/W) and 1000 km (N/S) rectangle over the North-Eastern and South-Western Japan. Region 1 and 2) and target area (1000×1000 km, Region 3) is carried out high-frequency observation as much as every 2.5 minutes. The target area usually take aim at Kamchatka volcanic region for VAAC, but that looks to Mayon/Philippines for the high volcanic activity as of February 19, 2018.
5) The imagery at two Landmark areas of the 1000 km (E/W) and 500 km (N/S) rectangle can be obtained at every 30 seconds (Super-Rapid Scan observation. Region 4 and 5). The main purposes of this observation are the navigation of satellite, image registration, and moon and deep space observation for calibration of AHI (Bessho *et al.*, 2016). In recent times, the landmark areas are used experimentally for observation of phenomena such as rapidly developing cumulonimbus clouds and volcanic eruptions, and these set at the areas which contains the active volcanoes such as Sakurajima. Region 4 and 5 is collecting the 30-sec imagery of Agung/Indonesia and Sakurajima volcano as of February 19, 2018.

These high-resolution and high-frequency data enable us to observe relatively small-scale and quickly changing phenomena, such as volcanic eruption clouds. The increase in number of the observation bands improves the capability of volcanic ash clouds detection and estimation of various parameters, such as amount and particle size of ash (Hayashi *et al.*, 2016), and can be expected to estimate an amount of sulfur dioxide in volcanic clouds (e.g. Ishii *et al.*, 2018).

In order to detect the changes of ground surface temperature at the crater just before the eruption and the growth of the eruption column just after the explosion, we started the study on the dynamics of eruption columns just after the beginning of eruption by using the Super-Rapid Scan data. Fukui *et al.* (2017) examined by the comparative studies of Himawari-8 Band 3 (0.64 μm, spatial resolution 0.5 km) Super-Rapid Scan imagery of the eruption column of Sakurajima volcano with the observational data obtained by weather radars (Sato *et al.*, 2017) and video data captured by volcano monitoring cameras of JMA. In this paper, we talk about the results investigated the ascending process and thermal change of eruption column of Sakurajima volcano by using Band 3 and Infrared band data.

Reference

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