

## 2018-2019 Kuchinoerabu-jima eruption plume/cloud echoes observed by JMA weather radar network

\*Eiichi Sato<sup>1</sup>, Keiichi Fukui<sup>2</sup>, Toshiki Shimbori<sup>1</sup>

1. Meteorological Research Institute, 2. Japan Meteorological Agency

At Shindake crater of Kuchinoerabu-jima volcano, a very small eruption occurred on October 21, 2018, and then continued intermittently until December 13. After that, three eruptions accompanied by pyroclastic flow occurred on December 18, 2018, January 17 and 29, 2019. Although Japan Meteorological Agency (JMA) failed to visually confirm the top of the former two eruption plumes, they were observed by Himawari-8, a meteorological satellite of JMA, and X-band MP radar of Disaster Prevention Research Institute (DPRI), Kyoto University. Meanwhile, the eruptions were also observed by JMA's weather radar network. In this presentation, we will report on the analyses using them.

Eruption plume/cloud echo associated with the eruption on January 17, 2019 was observed by Tanegashima radar and Naze radar. The plume echo height observed by Tanegashima radar was about 6.7 km above sea level (ASL), and about 6.5 km ASL by Naze radar. These are consistent with about 6 km above the crater edge (about 6.6km ASL), the result of the analysis with Himawari 8. On the other hand, the eruption plume echo height observed by the DPRI radar was about 4 km above the sea level. This may be due to the vertical wind shear. In other words, the authors think that the 125-degree RHI observation, i.e., vertical cross section observation by DPRI radar, did not capture the top of the plume, because the wind direction observed by the JMA wind profiler at Yakushima was northwesterly or north-northwesterly in the lower troposphere (2km or less), however, the wind was westerly in the middle troposphere (about 3-6km).

Meanwhile, in other cases including eruption cases on December 18, 2018 and January 29, 2019, the JMA radar network did not properly capture the eruption plume/cloud echoes. It is considered that the volcanic ash density especially near the top of the plume was low, and the mismatch occurred between the scan sequence of the radar and the rising process of the plume.

As a result of analysis by weather radar, we captured some of the eruption activity, however, there were many cases that could not be properly caught. We will show the limits of the observation method with weather radar, and show some possible countermeasures.

### References

Fukuoka Regional Volcanic Observation and Warning Center and Kagoshima Local Office (2019) Activities of Kuchinoerabu-jima volcano in January, 2019, <

[https://www.data.jma.go.jp/svd/vois/data/tokyo/STOCK/monthly\\_v-act\\_doc/fukuoka/19m01/509\\_19m01.pdf](https://www.data.jma.go.jp/svd/vois/data/tokyo/STOCK/monthly_v-act_doc/fukuoka/19m01/509_19m01.pdf)>. Accessed February 18, 2019.

Disaster Prevention Research Institute, Kyoto University (2019) Radar observation of volcanic eruption on January 17, 2019, <

<http://www.svo.dpri.kyoto-u.ac.jp/new/wp-content/uploads/2019/01/RadarKuchinoerabu20190117.pdf>>. Accessed February 18, 2019

Keywords: volcanic eruption, Kuchinoerabu-jima, weather radar