

Occurrence and distribution of pyroclastic fall deposits of Kuchinoerabujima volcano 2018-2019 eruption

*Masashi NAGAI¹, Shojiro Nakagawa², Yu Iriyama¹, Takahiro Miwa¹, Toshikazu Tanada¹, Hideki Ueda¹, Setsuya Nakada¹

1. Volcano Research Department, National Research Institute for Earth Science and Disaster Resilience, 2. Yakushima Chigaku Club

At Kuchinoerabujima volcano, eruption began intermittently from October 21, 2018. Relatively large eruptions such as Yakushima and Tanegashima Islands adjacent to the east side of Kuchinoerabujima Island are observed on December 18 and 28, 2018, January 17 and 29, 2019. The ash fall distribution survey was conducted on three eruptions excluding the December 28 eruption where the ash fall axis was in the southeast direction and ash fall on the land was small. In Kuchinoerabujima Island, we conducted an investigation in early February, 2019. We also used information provided by Japan Meteorological Agency Kuchinoerabujima Volcano Disaster Prevention Liaison Office and interviews with local residents.

The Ash fall deposits on Yakushima and Tanegashima Islands are all light gray to reddish light gray colored sandy to silty volcanic ash layers, the component are mainly composed of lithic fragments and hydrothermal altered fragments and small amount of fresh vitreous rock fragments. At the eruption of January 17, 2019 where the largest one during a series of eruptions, on the ash fall axis extending to the east, 400 g/m² of ash deposited in the northwestern part of Yakushima Island, 100 g/m² in the northeast part, and 20 g/m² in the southern tip part of Tanegashima Island. Part of the deposit had the characteristics that ash particles fell as mud rain. In the northern part of Yakushima Island, fine lapilli was also included, and the maximum particle diameter tended to be larger on the north side than the ash fall axis. The deviation between the axis of ash fall axis and the axis of maximum particle diameter distribution can be explained by the difference in wind direction and wind speed at altitude. In Kuchinoerabujima Island, there was an ash fall axis from the summit crater to the southeast direction as total air fall deposit of the series of eruptions, and a deposit amount of about 12 kg/m² was confirmed at a distance of about 1.5 km. The layer corresponding to the eruption on January 17 is coarse deposit contains lapilli with long diameter of about 5 cm or more.

The amounts of air fall deposits were obtained by the method of Fierstein and Nathenson (1992) using average deposition density of 1000 kg/m³. Based on the distribution data of distant deposits such as Yakushima Island, they are estimated to be ca.29,000 tons on the December 18, 2018 eruption, ca.62,000 tons for the January 17, 2019 eruption, and ca.14,000 tons for the January 29, 2019 eruption. These are smaller than the amount of air fall deposit of May 29, 2015 eruption estimated in the same method, ca.120,000 tons. When adding the depositional mass data of Kuchinoerabujima which is the proximal area to these distal data, the total of air fall deposits from December 2018 to January 2019 is estimated to be about 130,000 tons.

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