# Numerical Simulation of Transport and Sedimentation of Volcanic Ash for the Eruptions at Mt. Shinmoe-dake during 26-27 January 2011

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The tephra transport and sedimentation associated with the eruptions at Mt. Shinmoe-dake during 26 to 27 January 2011 are investigated with Japan Meteorological Agency Non-Hydrostatic Model (JMA-NHM) in which the mixing ratio and number concentration of tephra particles are prognosed to represent the behavior of tephra in the atmosphere. In the model, one-dimensional eruption column model is applied in order to represent injection of tephra particles into the atmosphere. The release of tephra is expressed by giving the production rates of total mass and number of tephra particles in the grids that compose the column. The production rate is a function of the column height, the level of the release point, and the size of released particle, following Suzuki (1983) and Shimbori et al. (2010). In actual eruption events, the eruption clouds were detected by the Tanegashima and Fukuoka radars of JMA as well as the high-sensitivity camera that is installed about 7.5 km away to the south of Mt. Shinmoe-dake and monitored at Kagoshima Local Meteorological Observatory. Based on the results of radar and camera observations (Shimbori et al., 2013), the temporal change of column height is given during the simulation. Comparison of the model result with ground survey on tephra deposit shows that the model well represents the major axis of tephra deposit and the difference in the grain size on both sides of the axis due to the sheared horizontal wind and a variety of the fall velocity of tephra particles (Hashimoto et al., 2012). On the other hand, the simulated ash cloud goes too far compared with the satellite observation after transported hundreds kilo meters away from the volcano. This means that the long-transported fine particles are released at higher altitude in the model than in the actual atmosphere, since the horizontal wind generally gets stronger in higher altitude. It is indicated that the eruption column model applied in the simulation needs modification with respect to the release rate of tephra particles as a function of the level of the release point and the size of released particle. The current performance and the issues for improvement of the model will be discussed.

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