Development of a new tephra fall simulation code considering bending of eruption column under windy condition

*Kazutaka Mannen[1]

1. Hot Springs Research Institute of Kanagawa Prefecture

Today’s tephra fall simulation codes assume eruption columns that rise vertically from the source vent. This assumption is simple; however, under windy condition, eruption column bents in the downwind direction. The present advection-diffusion models, which assume relatively weak plume thus more or less fail to reconstruct observed thickness distribution. Tephra2, which is one of the most popular simulation codes, is not an exception.
Recently, several models that formulate column bending under windy condition have been proposed. Here I include bending of eruption column modeled by Woodhouse et al (2013) in Tephra2 and developing a remodeled code named wt (=windy tephra).
Woodhouse (2014) calculate coordinate of column center, column radius, upward velocity of the column, column temperature and etc. as a function of height. Tephra2 calculate coordinate of distribution center as a function of released height and particle diameter. wt calculate coordinate of distribution center based on column bending (Woodhouse, 2014) and atmospheric advection (Tephra2). Also, distribution width in Tephra2 is a sum of column radius and atmospheric diffusion. In wt, column radius is based on Woodhouse et al. (2014).
In the presentation, application of wt to the 2011 Shinmoedake eruption and the comparison of calculation results and observation will be discussed.

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