How to set wind condition data for stochastic ashfall risk assessment?

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The tephra fall (pyroclastic fall) caused by large-scale eruptions is widely advected and diffused by the wind , affecting not only near the vent, but also several hundred kilometers away from the volcano. Regarding the uncertainty by wind, even if the eruption phenomenon itself is the same, the uncertainty due to the difference in the wind direction and wind speed in the sky is large, so in the ashfall risk assessment, appropriately evaluate the diversity of the wind in the sky It is extremely important to do. Therefore, for example, in the recently created ashfall hazard map, efforts have been made to show the maximum thickness by performing ashfall simulation using the wind for the past several years comprehensively (Towada Volcano Disaster Prevention Council, 2018) . In addition, ashfall simulations using wind data from past decades based on long-term reanalysis weather data (JRA-55) have been attempted (Sasaki et al., 2019).
On the other hand, in the probabilistic ashfall risk assessment, it is general to use not only the above-mentioned wind direction and wind speed but also the logic grey, which branches the eruption scale, etc. (Jenkins, 2012). If the long-term wind direction / wind speed is comprehensively applied to this logic tree, the number of branches becomes enormous. Furthermore, when all volcanoes in the world are targeted, it is necessary to reduce the number of branches of the wind direction and speed.
In this study, for the Hoei scale eruption of Mt. Fuji, the conditional excess probability of ashfall was calculated using all wind direction and speed data (n = 10,685) for the past 30 years. Next, it was confirmed that the wind direction and speed were steady data although the seasonality was strong. Therefore, random sampling was performed every month, and a hazard curve was created based on the sampled wind direction and wind speed data. As a result, it was confirmed that there is no effect even if it is reduced to 120 in the east of the crater (Fig. 1). On the other hand, in other directions, more wind data is needed to reproduce the hazard curve based on all wind data, and the amount of ash fall required by wind data of about 240 to 600 is required (Fig. 2).

Keywords: stochastic ashfall risk assessment, Tephra2

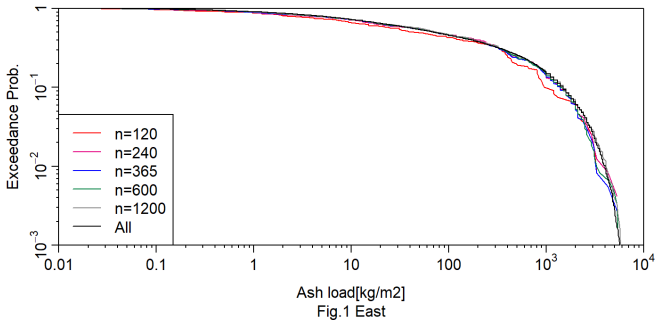

Fig.1 East

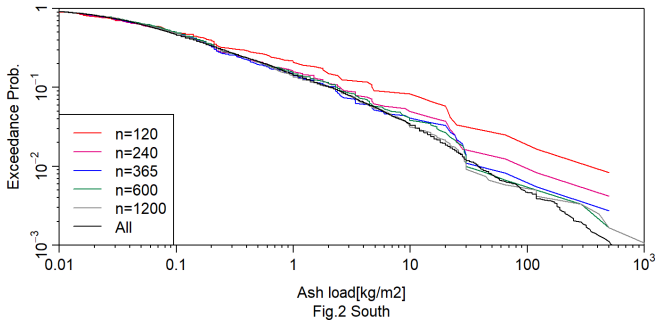

Fig.2 South

