Geophysical Research Abstracts
Vol. 17, EGU2015-6697, 2015
EGU General Assembly 2015

The effect of wind and eruption source parameter variations on tephra fallout hazard assessment: an example from Vesuvio (Italy)

Giovanni Macedonio (1), Antonio Costa (2), Simona Scollo (3), and Augusto Neri (4)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Vesuviano, Sezione di Napoli, Italy, (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Bologna, Italy, (3) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Sezione di Catania, Italy, (4) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Italy

Uncertainty in the tephra fallout hazard assessment may depend on different meteorological datasets and eruptive source parameters used in the modelling. We present a statistical study to analyze this uncertainty in the case of a sub-Plinian eruption of Vesuvius of VEI = 4, column height of 18 km and total erupted mass of 5×10^{11} kg. The hazard assessment for tephra fallout is performed using the advection-diffusion model Hazmap. Firstly, we analyze statistically different meteorological datasets: i) from the daily atmospheric soundings of the stations located in Brindisi (Italy) between 1962 and 1976 and between 1996 and 2012, and in Pratica di Mare (Rome, Italy) between 1996 and 2012; ii) from numerical weather prediction models of the National Oceanic and Atmospheric Administration and of the European Centre for Medium-Range Weather Forecasts. Furthermore, we modify the total mass, the total grain-size distribution, the eruption column height, and the diffusion coefficient. Then, we quantify the impact that different datasets and model input parameters have on the probability maps. Results shows that the parameter that mostly affects the tephra fallout probability maps, keeping constant the total mass, is the particle terminal settling velocity, which is a function of the total grain-size distribution, particle density and shape. Differently, the evaluation of the hazard assessment weakly depends on the use of different meteorological datasets, column height and diffusion coefficient.