Geophysical Research Abstracts
Vol. 15, EGU2013-11394, 2013
EGU General Assembly 2013

The effect of free tropospheric turbulence on the structure of volcanic ash layers

Helen Dacre
University of Reading, Department of Meteorology, Reading, United Kingdom (h.f.dacre@reading.ac.uk)

Lagrangian models are an important tool for predicting the transport and dispersion of volcanic ash in the atmosphere. Whilst it has been shown that these models can simulate ash layers that are generally consistent with observed ash layers, they are still unable to explain some features observed in distal ash clouds. These features include the formation of thin ash layers with sharp edges, and ash layers with horizontally inhomogeneous structure. For example, the ash layers observed during the Eyjafjallajokull eruption were often patchy and thin with typical depths of 550-750m, whereas the vertical structure of the ash clouds simulated by the Numerical Atmospheric-dispersion Modelling Environment (NAME) model were smoothly varying and about twice as thick.

Studies have highlighted the potential importance of the meteorology, especially the magnitude of sub-grid diffusion in controlling the structure of ash layers. Currently free tropospheric sub-grid diffusion (representing the dispersion by unresolved 3D turbulence) is assumed to have a constant value in the NAME model. We will present results investigating the impact of representing spatio-temporal variability in sub-grid diffusion on the structure of volcanic ash clouds.