Geophysical Research Abstracts,
Vol. 11, EGU2009-6870, 2009
EGU General Assembly 2009

The influence of fine ash on the dispersal of a volcanic cloud

U. Niemeier (1), C. Timmreck (1), J.S. Rast (1), H.F. Graf (2), and S. Kinne (1)

(1) Max Planck Institute for Meteorology, Bundesstr 53, D-20146 Hamburg, Germany (ulrike.niemeier@zmaw.de), (2) Centre Atmospheric Sciences, University Cambridge, Downing Place, Cambridge CB2 3EN, Unitgdomed Kingdom

Volcanic eruptions exert a strong forcing on the Earth System caused by the emissions of ash and SO2. The life time of the emitted volcanic aerosol varies between a few weeks for fine ash and several years for sulfate in the stratosphere, causing strong radiative effects with consequences for atmospheric processes.

While several model studies concerning volcanic sulfate aerosol exist, not much is known about the impact of fine volcanic ash on atmospheric dynamics and composition. To study the influence of the fine ash on the transport, dispersion and evolution of the volcanic aerosol cloud, interactive simulations of a volcanic eruption in a global climate model are performed with the middle atmosphere general circulation model MAECHAM5 including the global aerosol module HAM. HAM calculates the aerosol microphysics of sulfate and other species and their source and sink processes. In addition a fine volcanic ash module for MAECHAM5 has been developed, which contains the emission of volcanic ash, transport, sedimentation and deposition of the ash and its impact on radiative processes. The ash size distribution is described with one log-normal distribution.

Model studies have been performed for two different volcanos in the tropics and high northern latitudes. Due to different meteorological conditions, the impact of the ash cloud on dispersion and radiation is quite different.