Geophysical Research Abstracts
Vol. 18, EGU2016-9422, 2016
EGU General Assembly 2016

Satellite observations and EMAC model calculations of sulfate aerosols from Kilauea: a study of aerosol formation, processing, and loss

Marloes Penning de Vries, Steffen Beirle, Christoph Brühl, Steffen Dörner, Andrea Pozzer, and Thomas Wagner
MPI Chemistry Mainz, Germany (marloes.penningdevries@mpic.de)

The currently most active volcano on Earth is Mount Kilauea on Hawaii, as it has been in a state of continuous eruption since 1983. The opening of a new vent in March 2008 caused half a year of strongly increased SO_2 emissions, which in turn led to the formation of a sulfate plume with an extent of at least two thousand kilometers. The plume could be clearly identified from satellite measurements from March to November, 2008. The steady trade winds in the region and the lack of interfering sources allowed us to determine the life time of SO_2 from Kilauea using only satellite-based measurements (no a priori or model information). The current investigation focuses on sulfate aerosols: their formation, processing and subsequent loss. Using space-based aerosol measurements by MODIS, we study the evolution of aerosol optical depth, which first increases as a function of distance from the volcano due to aerosol formation from SO_2 oxidation, and subsequently decreases as aerosols are deposited to the surface. The outcome is compared to results from calculations using the EMAC (ECHAM/MESSy Atmospheric Chemistry) model to test the state of understanding of the sulfate aerosol life cycle. For this comparison, a particular focus is on the role of clouds and wet removal processes.