Geophysical Research Abstracts
Vol. 17, EGU2015-8867, 2015
EGU General Assembly 2015

Saharan Dust Export towards the Caribbean: Transport, Mixing and Deposition Processes over the Atlantic Ocean

Bernd Heinold (1), Kerstin Schepanski (1), Moritz Haarig (1), Albert Ansmann (1), Silke Groß (2), Andreas Schäfler (2), Bernadett Weinzierl (2,3), and Ina Tegen (1)

(1) Leibniz Institute for Tropospheric Research, Modelling Department, Leipzig, Germany (heinold@tropos.de), (2) Deutsches Zentrum für Luft- und Raumfahrt (DLR), Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany, (3) Meteorologisches Institut (MIM), Ludwig-Maximilians-Universität, München, Germany

Large amounts of Saharan dust are carried towards the Caribbean within the Saharan Air Layer (SAL), with maximum transport in late boreal spring and early summer. During long-range transport, the dust particles are transformed by aging and mixing, which may have significant but as yet unquantified effects on the dust impact on radiation, cloud properties, and the biogeochemical processes of ecosystems.
Here, we investigate the long-range transport of Saharan dust across the Atlantic Ocean by means of transport modelling that has been performed within the framework of the SALTRACE (Saharan Aerosol Long-Range Transport and Aerosol-Cloud Interaction Experiment) project. The emission, transport, dry and wet deposition of Saharan dust as well as the effect of dust radiative forcing are simulated with the regional model COSMO-MUSCAT. The model results are evaluated against the various ground and airborne observations from the SALTRACE field measurements at Barbados Island in June and July 2013. The dust simulations, in turn, help to interpret the observations, in particular from a Lagrangian flight experiment, by providing a spatiotemporal context.
Specifically, this study addresses the questions of (a) how the Saharan dust export towards the Caribbean is influenced by the atmospheric circulation over West Africa, (b) which role the different removal and mixing processes play during long-range transport, and (c) what is the impact of dust forcing on the vertical structure of the SAL? In addition, the Saharan dust simulations with COSMO-MUSCAT are combined with trajectory analysis to study particle aging and dust-cloud interactions.