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The Saharan Aerosol Long-range Transport and Aerosol-Cloud Interaction Experiment (SALTRACE 2013) – An overview

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Saharan mineral dust is regularly transported over long distances impacting air quality, health, weather and climate thousands of kilometers downwind of the Sahara. During transport, the properties of mineral dust may be modified thereby changing the associated impact on the radiation budget. Although mineral dust is of key importance for the climate system many questions such as the change of the dust size distribution during long-range transport, the role of wet and dry removal mechanisms, and the complex interaction between mineral dust and clouds remain open.

To investigate the aging and modification of Saharan mineral dust during long-range transport across the Atlantic Ocean, the Saharan Aerosol Long-range Transport and Aerosol-Cloud-Interaction Experiment (SALTRACE: http://www.pa.op.dlr.de/saltrace) was conducted in June/July 2013.

SALTRACE was designed as a closure experiment combining ground-based lidar, in-situ and sun photometer instruments deployed on Cape Verde, Barbados and Puerto Rico, with airborne measurements of the DLR research aircraft Falcon, satellite observations and model simulations.

During SALTRACE, mineral dust from five dust outbreaks was studied under different atmospheric conditions and a unique data set on the chemical, microphysical and optical properties of aged mineral dust was gathered. For the first time, Lagrangian sampling of a dust plume in the Cape Verde area on 17 June 2013 which was again measured with the same instrumentation on 21 and 22 June 2013 near Barbados was realized. Further highlights of SALTRACE include the formation and evolution of tropical storm Chantal in a dusty environment and the interaction of dust with mixed-phase clouds.

In our presentation, we give an overview of the SALTRACE study, discuss the meteorological situation and the dust transport during SALTRACE and highlight selected results from SALTRACE.