Geophysical Research Abstracts
Vol. 16, EGU2014-5562, 2014
EGU General Assembly 2014

Impact of atmospheric transport on the evolution of microphysical and optical properties of Saharan dust

Claire Ryder (1), Eleanor Highwood (1), Michele Lai (2), Harald Sodemann (2), and John Marsham (3)

(1) University of Reading, Department of Meteorology, Reading, United Kingdom (c.l.ryder@reading.ac.uk), (2) Institute for Atmospheric and Climate Science, ETH Zurich, Zürich, Switzerland, (3) School of Earth and Environment, University of Leeds, Leeds, UK.

Saharan dust affects the climate by altering the radiation balance and by depositing minerals to the Atlantic Ocean. Both are dependent on particle size. Aircraft measurements from the Fennec project comprising 42 profiles of size distribution extending into the giant mode (0.1–300 mm) will be presented, representing freshly uplifted dust over remote desert, regional aged dust, and dust in the Saharan Air Layer (SAL) over the Canary Islands. The mean effective diameter of dust in SAL profiles is 4.5mm smaller than that in freshly uplifted dust, while the vertical structure changes from a low shallow layer (0–1.5 km) to a well-mixed deep Saharan dust layer (0–5 km). Size distributions show a loss of 60 to 90% of particles larger than 30 mm 12 h after uplift. The single scattering albedo (SSA) increases from 0.92 to 0.94 to 0.95 between fresh, aged, and SAL profiles: this is enough to alter heating rates by 26%. Some fresh dust close to the surface shows SSA as low as 0.85.