Geophysical Research Abstracts, Vol. 9, 02348, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-02348


# Saharan mineral dust experiment SAMUM 2006: Surface observations of size distributions and mass concentrations.

L. Schütz (1), K. Kandler (2), M. Ebert (2), S. Weinbruch (2), C. Deutscher (1), R. Jaenicke (1), S. Zorn (1), A. Schladitz (3) and A. Maßling (3)

(1) Institute for Physics of the Atmosphere, University of Mainz, 55099 Mainz, Germany, (2) Institute of Geosciences, Darmstadt University of Technology, 64287 Darmstadt, Germany, (3) Leibniz-Institute for Tropospheric Research, 04318 Leipzig, Germany (schuetz@uni-mainz.de / Fax: ++49 6131 392 3532 / Phone: ++49 6131 392 2865)

The Saharan Mineral Dust Experiment (SAMUM) is dedicated to the understanding of the radiative effects of mineral dust in a major source region. A first joint field campaign took place at Ouarzazate and near Zagora, southern Morocco, in 2006. Aircraft and ground based measurements were performed from May 13 to June 7. An experimental data set of surface and atmospheric columnar information was collected. This data set combined with satellite data will provide the base of the first thorough columnar radiative closure tests in Saharan dust. During the course of this campaign, aerosol physical and chemical properties were measured.

We will report on measurements of size distributions and mass concentrations conducted at the Zagora ground station. Various atmospheric conditions were encountered during the measurement period: For clear atmospheric conditions, mass concentrations of approximately 100 $\mu$g m$^{-3}$ for total, 80 $\mu$g m$^{-3}$ for "$PM_{10}$" and 30 $\mu$g m$^{-3}$ for the "$PM_{2.5}$" were found. During moderate dust storms, concentrations of up to 300.000 $\mu$g m$^{-3}$, 3000 $\mu$g m$^{-3}$ and 1000 $\mu$g m$^{-3}$, respectively, were encountered. The aerosol size distribution from 20 nm to 500 $\mu$m was measured. Thereof, the size range of 20 nm $<$ d $<$ 10 $\mu$m was investigated by a DMPS/APS combination, whereas particles with 3 $\mu$m $<$ d $<$ 500 $\mu$m were measured by impactor collection on coated glass substrates and automated microscopic image analysis of the individual particles. The DMPS/APS combination was measuring quasi-continuously; the large and giant

particle range was investigated once a day. Variations due to local and regional mineral dust emissions could be observed for particles with d $>$ 300 nm. Signatures of anthropogenic influence were detected in the submicron range. The largest concentration variations were found in the range d $>$ 100 $\mu$m. Of the three measured mass concentrations, the total particulate matter correlates best with the local wind speed. This indicates mainly local production of the giant particles and significant contribution of advection to the concentration of the smaller ones. Under high dust concentrations giant particles with d $>$ 10 $\mu$m account for more than 90 % of the total airborne aerosol mass.

This data set will basically contribute to the thorough columnar radiative closure modelling of Saharan mineral dust.