

Home

Online Library ACP

- ▣ Recent Final Revised Papers
- ▣ [Volumes and Issues](#)
- ▣ Special Issues
- ▣ Library Search
- ▣ Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact  
Factor  
4.865

ISI  
indexed



▣ [Volumes and Issues](#) ▣ [Contents of Issue 5](#)

Atmos. Chem. Phys., 3, 1353-1364, 2003

[www.atmos-chem-phys.net/3/1353/2003/](http://www.atmos-chem-phys.net/3/1353/2003/)

© Author(s) 2003. This work is licensed under a Creative Commons License.

## Vertical profiles, optical and microphysical properties of Saharan dust layers determined by a ship-borne lidar

F. Immler and O. Schrems

Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

**Abstract.** A unique data set of ship-borne lidar measurements of Saharan dust layers above the Atlantic ocean has been collected aboard the research vessel Polarstern with a mobile Aerosol Raman Lidar (MARL) during the LIMPIDO-campaign in June 2000. Extended Saharan dust layers have been observed in the region between 8.5° N and 34° N in an altitude range between 2 and 6 km. The continental, North African origin of the probed air masses is confirmed by 8-day backward trajectories. The Saharan dust is characterized by an optical depth in the range of 0.1 and 0.3, a depolarization around 10% and high lidar ratios of 45 sr at 532 nm and 75 sr at 355 nm. The backscattering by the dust particles at the UV-wavelength is relatively weak, resulting in a negative color index. From the measured optical properties the effective radius and the refractive index of the dust particles are derived using a new approach based on Mie Theory and non-spherical scattering calculations. The low backscatter coefficient observed at 355 nm is due to significant absorption which increases with decreasing wavelength. This finding agrees very well with results from satellite and sun photometer measurements. The effective radii decrease from about 3 μm at the base to 0.6 μm at the top of the dust plumes. The non-spherical shapes of the dust particles are responsible for the high values of the lidar ratios.

▣ [Final Revised Paper](#) (PDF, 840 KB) ▣ [Discussion Paper](#) (ACPD)

Citation: Immler, F. and Schrems, O.: Vertical profiles, optical and microphysical properties of Saharan dust layers determined by a ship-borne lidar, Atmos. Chem. Phys., 3, 1353-1364, 2003. ▣ [Bibtex](#) ▣ [EndNote](#) ▣ [Reference Manager](#)



Search ACP

Library Search

Author Search

News

- ▣ [Sister Journals AMT & GMD](#)
- ▣ [Financial Support for Authors](#)
- ▣ [Journal Impact Factor](#)
- ▣ [Public Relations & Background Information](#)

Recent Papers

01 | ACP, 11 Mar 2009: Measurements of Pollution In The Troposphere (MOPITT) validation through 2006

02 | ACP, 11 Mar 2009: Air-sea fluxes of biogenic bromine from the tropical and North Atlantic Ocean

03 | ACPD, 10 Mar 2009: Characterization of organic ambient aerosol during MIRAGE 2006 on three platforms

04 | ACPD, 10 Mar 2009: Regional differences in