

Lisa Behrens
Institut für Umweltphysik/MARUM
Universität Bremen
Otto-Hahn-Allee 1
28359 Bremen
Germany

Tel.: +49(0)421 218 62093
Fax: +49(0)421 218 98 62133
email: lbehrens@iup.physik.uni-bremen.de

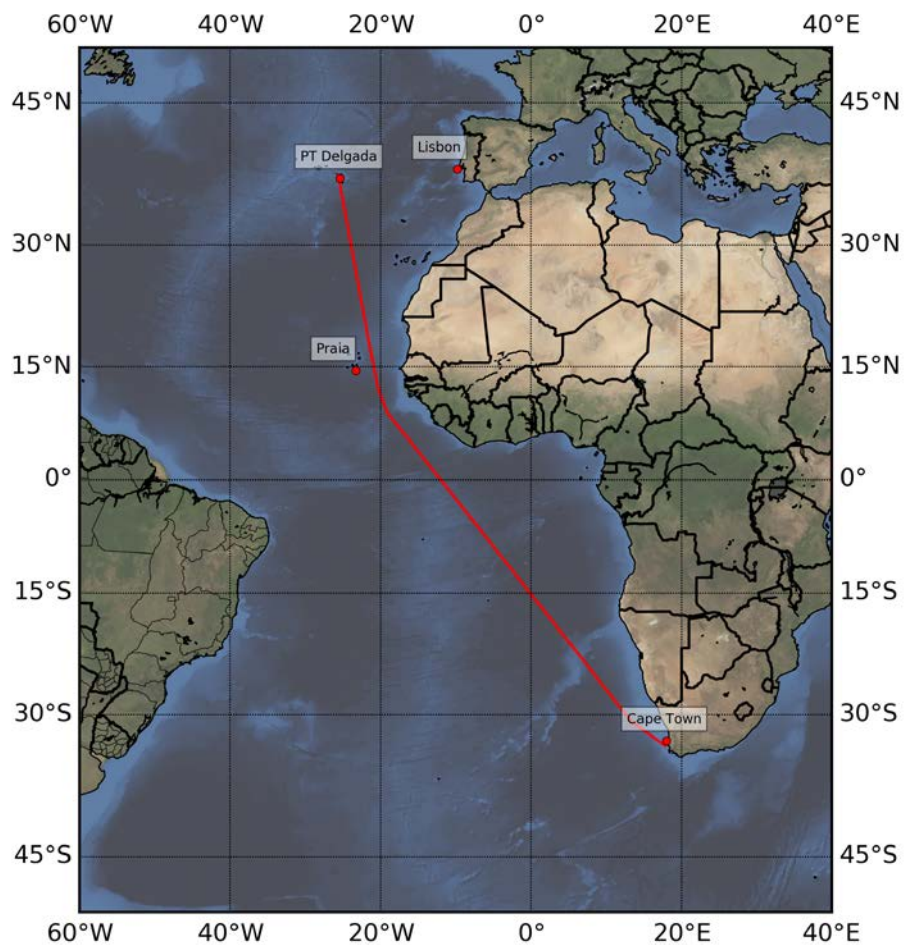
Short Cruise Report
- RV Maria S. Merian, cruise MSM-58/2 -

Ponta Delgada (Azores) – Cape Town (South Africa)

08 October 2016 – 25 October 2016

Chief Scientist: Lisa K. Behrens

Captain: Ralf Schmidt



Objectives

In order to investigate the state of the atmosphere above the Atlantic Ocean, the transit leg from Ponta Delgada (Azores) to Cape Town (South Africa) was upgraded to research cruise MSM58/2, only few months before departure. Of particular interest were the continental outflow of air pollution towards the marine troposphere with the spatial gradients and the ambient levels of atmospheric key species. These findings will be used to validate the vertical column densities of NO_2 , HCHO and CHOCHO from satellite instruments, which show enhanced abundances of these species over the Atlantic Ocean. The validated results will help to evaluate global chemistry models. Furthermore, O_3 and O_4 will be analyzed.

Additionally, aerosol load and water vapor abundance in the atmospheric column over the ocean were measured. These data will also be used to validate satellite measurements as well as model simulations. The data will be fed into the NASA data-base and contribute to an aerosol climatology.

Narrative

The scientific party of the expeditions MSM58/2 arrived at the RV Maria S. Merian in the harbor of Ponta Delgada on Friday the 7th of October. On this cruise, two experiments were carried out. The first instrument was a Multi-Axis Differential Absorption Spectrometer (MAX-DOAS) prototype. This instrument was continuously measuring scattered solar radiation at different elevation angles throughout the whole cruise. The instrument recorded spectra in the ultraviolet and visible wavelength range and operated fully autonomously. The installation of the MAX-DOAS instrument started immediately and was finished the next day. The second experiment was a handheld MICROTOPS instrument, which measures direct solar radiation and therefore needs an unobstructed view of the sun's solar disk. The measurements were taken manually, approximately every 30 minutes.

On the 8th of October at 8:00 in the morning, the RV Maria S. Merian left Ponta Delgada for the expedition MSM58/2. As both experiments did not require any station time, the ship could drive with constant speed from Ponta Delgada towards Cape Town, passing between Cape Verde and the African continent. Due to the very short period for the cruise

planning, permission to measure inside the Cape Verde EEZ could not be obtained in time. Therefore, no measurements are available from the 11th of October in the afternoon until the 13th of October in the early morning. On the 25th of October at 9:00 in the morning the RV Maria S. Merian arrived in Cape Town.

During the entire cruise, the weather conditions were good for the measurements with mostly moderate relative wind from the front. The MIRCOTOPS instrument needed an unobstructed view of the sun. Due to this fact, it was not possible to take measurements on four days of this cruise due to cloudiness. The MAX-DOAS measurements are not influenced by clouds, but a relative wind from the front is needed, because otherwise the measurements might be contaminated by the plume of the vessel.



*Figure 1: MICROTOPS measurements on the cruise MSM58/2
(http://aeronet.gsfc.nasa.gov/new_web/MAPS/Merian_16_0_500_Daily_Average_15.gif).*

Acknowledgements

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instrument. The financial support was provided by the “Deutsche Forschungsgemeinschaft (DFG)/ Senatskommission für Ozeanographie“.

Teilnehmerliste

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|--------------------|--------------------------------------|-----------|
| 1. Lisa K. Behrens | Fahrtleiter / <i>Chief Scientist</i> | IUP/MARUM |
| 2. Bernhard Schulz | MICROTOPS | MPI-M |

IUP University of Bremen, Institute of Environmental Physics, Bremen, Germany

MARUM University of Bremen, Center for Marine Environmental Sciences, Bremen, Germany

MPI-M Max Planck Institute for Meteorology, Hamburg, Germany

Stationsliste

- no stationary work