



## CHEMICAL COMPOSITION OF LONG RANGE TRANSPORTED MINERAL DUST AT THE CVAO

KHANNEH WADING FOMBA\*, KONRAD MÜLLER, HARTMUT HERRMANN

*Leibniz Institute for Tropospheric Research (TROPOS, Permoser str. 15, 04318, Leipzig*

*\*Fomba@tropos.de*

As the greatest single dust source, Saharan dust is constantly being long ranged transported and deposited into the Atlantic where it is known to influence the ocean biogeochemistry. One region for suitable monitoring of such activities is the Cape Verde Atmospheric Observatory (CVAO), situated in the Northern tropical Atlantic. Here we present observations of long term chemical characterisation of Saharan dust performed at the CVAO over a period of 5 years from 2007 to 2012. Sampling was done throughout the year in a 72 h period and during intensive field campaigns in a 24 h. PM<sub>10</sub> samples were collected using a 5-stage Berner impactor for size-resolved measurements and a high volume DIGITEL DHA-80 sampler for bulk analysis. The filters were analyzed for inorganic ions, soluble and non-soluble trace metals and organic and elemental carbon (OC/EC).

Our observations show that continental and Saharan dust air masses strongly influence the particulate matter in this region for about 55% of the year with strong seasonality observed with higher concentrations observed during the winter months. During dust events, sea salt contribution to the total PM<sub>10</sub> mass was low. In general, sea salt and mineral dust were found in the coarse mode PM while the organics and non-sea salt components were observed mostly in the submicron fraction. Inter annual and seasonal variability were observed for nearly all aerosol constituents. Strong seasonal trends were observed for ammonia and non-sea salt sulfate with peaks observed in the spring and summer, respectively.

Significant differences were observed in the trace metal concentration (especially iron) between days of dust outbreaks (about 20.0 Fe, 16.4 Ca, 2.3 Ti, and 0.3Mn µg/m<sup>3</sup>) and days without (less than 10.0 ng/m<sup>3</sup>). Mn was found to be the most soluble heavy metal followed by Zn and iron. Soluble iron was mostly present in Fe(III) form with Fe(II) often found only at lower pH. Dissolution experiments at varying pH (from 5.5 to 2) showed significant increase in trace metal solubility at lower pH with an increase of over 3 orders of magnitude for both Fe (II) and Fe(III) and about two orders of magnitude for Cu and Mn.