

Interactive comment on “Long-term chemical characterization of tropical and marine aerosols at the CVAO: field studies (2007 to 2011)” by K. W. Fomba et al.

K. W. Fomba et al.

herrmann@tropos.de

Received and published: 30 May 2014

At first the authors wish to thank the referee for the reading of our manuscript and the helpful comments. In the following, we are answering the comments one-by-one:

For the observed seasonal variations of aerosol chemical components, the authors mostly attributed to the air masses and chemical processes. I wonder if the meteorological conditions played any roles, e.g. the rainfall and developing of the boundary layers.

Precipitation plays a minor role at the site of the CVAO. During the years of interest the

C2959

annual precipitation amount was found between 24 and 342 mm. Even in the years with higher precipitations the number of annual events was low (between 3 and 10). The rainfall season is between August and October. 100% of the annual precipitation was measured in these three months in the years 2009, 2010 and 2011. The daily development of the boundary layer does not differ strongly because the temperature and the relative humidity variation are lower than 15% and this daily changes do not vary strongly throughout the year. The samples discussed are 24 to 72 hour samples with most samples collected over 72 h making effects arising due to daily variations not significant. On a small island in the tropical Atlantic near the equator the boundary layer may be neglected, too.

Page 3930, Line 8-9. In this study, significant differences of sea salt concentrations were observed between the two sampling heights (4 m and 32 m). The authors attribute this to that the 4 m sampling height was in the marine boundary layer. However, the 32 m sampling height was generally also in the marine boundary layer. So I guess maybe the sea salts at CVAO are not homogeneous mixing. There may be an evident vertical profile for the concentrations of sea salts in the marine boundary layer. I wonder if the authors had ever designed some experiment to verify this issue, e.g. simultaneous sampling at the heights of 4 m, 15 m, 32 m and maybe 60 m. This kind of result should be quite useful for the further modeling work on the global environment and climate change.

The surfzone of the island usually constitute the internal marine boundary layer. The sampling site is only 70 m from the coastline, which is a cliff line with heights between 1 and 3 m height. The influence of the sea spray generated from this cliff line plays an important role at low sampling heights such as at 4m height but the inlet at the 32 m sampling height on the tower is affected only in a few exceptional days when wind speeds are high. The tower basically represents the conditions of the open ocean. Niedermeier et al. (2014) discussed this aspect extensively on pages 2252 and 2253. Measurements at different heights have not yet been performed but this could be the

C2960

focus of future field experiments. N. Niedermeier, A. Held, T. Müller, B. Heinold, K. Schepanski, I. Tegen, K. Kandler, M. Ebert, S. Weinbruch, K. Read, J. Lee, K. W. Fomba, K. Müller, H. Herrmann, and A. Wiedensohler Mass deposition fluxes of Saharan mineral dust to the tropical northeast Atlantic Ocean: an intercomparison of methods, *Atmos. Chem. Phys.*, 14, 2245-2266, 2014.

In section 3.4. Why the correlations were only presented in summer and winter? How about in spring and autumn?

Seasonality plays a role at Cape Verde islands but the main seasons are dust season and non-dust season which mostly fall within the summer and winter months. These seasons vary in the radiation intensity and the wind direction. During the winter half year the air masses reaching CVAO are influenced significantly more often by the African or European continent than during the summer half year. For the statistical treatment of the data set, the distinction into four seasons would yield an overestimation of single exceptional events like the dust event in May 2007 which may not be conclusive. During spring or autumn the changes in the meteorological conditions at CVAO is little and the conditions are similar to those of winter and summer since this region does not experience 4 climatic seasons in a year as it's the case in the northern hemisphere.

Page 3918, line 20. Change "where" to "when". The correction has been done.

In the figure caption of Fig. 1, I believe it was out of order for Fig. 1C and 1D. Please check it.

The figure caption and the text passages have been corrected.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 14, 3917, 2014.