

Interactive comment on “Particle characterization at the Cape Verde atmospheric observatory during the 2007 RHaMBLe intensive” by K. Müller et al.

Anonymous Referee #1

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1. General Comments

In this article, a data set of: i) PM₁₀ particle chemical composition (performed by filter sampling), ii) size segregated chemical composition (performed by cascade impactor sampling), and iii) number size distribution (determined by SMPS and APS measurements), collected in Cape Verde is presented. This data set is used for performing a physicochemical characterisation of atmospheric particles. This study is of interest and fit within the topics covered by ACP.

I have only one major comment. The chemical characterization performed with the cascade impactor is analysed in detail. This is of course of interest, however, this cascade impactor data set cover a relatively short time period (14 May to 14 June 2007), when only two dust events occurred. On the other hand, the data set of PM₁₀ samples (col-

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lected on filter) cover a two years period (2007-2008), and it is not analysed in detail (at least not with the same degree of detail than the cascade impactor). In my opinion, this PM10 composition data set worth a much deeper analysis for several reasons: i) it will provide a much general view of the aerosol composition along the different seasons, ii) it cover the dusty (winter) season in Cape Verde, an issue not properly covered by the cascade impactor samples. In this data set, there are several questions of interest, e.g., amount of dust in the winter vs the summer dust events, ammonium deficit vs sulphate and nitrate, amount of OC, EC, sulphate, nitrate and ammonium transported from North Africa (mostly winter) vs those transported from the ocean (mostly summer). I think that, in addition of the already shown monthly PM10 averages (Fig.6), an additional plot showing the daily mean average PM10, dust (calculated from Fe), marine compounds, sulphate, nitrate and OC concentrations would be very illustrative. Then use it for discussing the data. In my modest opinion this would significantly enrich the study.

2. Specific Comments

2.1. Introduction. I suggest saying the meaning of RHaMBLE in any part of the introduction.

2.2. OC/EC analysis. When reading the abstract I observed that EC concentrations are really high for a remote site, EC= 1.25 ug/m³ as average !!! This mean value is only slightly lower than that registered in European urban areas (e.g. Rodriguez et al., 2007 Atmos. Chem. Phys., 7, 2217–2232, 2007; 1.6 to 1.9 ug/m³ in Milan, Barcelona and London). I then read in the Methodology section than a “two step thermo-graphic method” was used. It is very well know that methods for determining OC and EC concentrations based on two steps temperature produces a pyrolysis of the sample during the analysis (charring). Consequently, OC concentrations are underestimated and EC concentrations overestimated. For correcting this artefact during the analysis alternative methods (such Thermo-optical transmittance or Thermo-optical reflectance) have been developed. My question: is the OC EC analytical method used in this study free

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of artefact, or have they been corrected?. This should be clarified. I think that the OC EC data presented in this study are of interest even if the method used is not artefact free. However, I think that this should be included in the text, by saying something such as “the method used may produces over estimation in EC concentrations and underestimation in OC due to charring during the analysis”. Details on charring during the analysis are presented by Schmid et al. (Results of the “carbon conference” international aerosol carbon round robin test stage I. Atmos Environ, 35, 2111-2121, 2001) and by ten Brink et al. (INTERCOMP2000: the comparability of methods in use in Europe for measuring the carbon content of aerosol. Atmos Env, 38, 6507–6519, 2004).

2.3 Section “Impactor measurments”, pag 22747. Sentence: “The estimation of the mineral dust content is made only from the iron content according to the mean of 4% in Saharan dust.” Where this data came from?. As reference is needed.

2.3 Section. Impactor measurements section. I have a question. Did the >10um size fraction analysed?, if that is the case, what was found these and in what concentration?, I would expect a significant amount of dust there.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 22739, 2009.

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