

Interactive comment on “Temporal variability of mineral dust concentrations over West Africa: analyses of a pluriannual monitoring from the AMMA Sahelian Dust Transect” by B. Marticorena et al.

Anonymous Referee #1

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Report on: Temporal variability of mineral dust concentrations over West Africa : Analyses of a pluriannual monitoring from the AMMA Sahelian Dust Transect

Author(s): B. Marticorena, B. Chatenet, J. L. Rajot, S. Traoré, M. M. Coulibaly, A. Diallo, I. I. Koné, A. Maman, T. NDiaye, and A. A. Zakou MS No.: acp-2009-881

I did already a review on this re-submitted paper. Most of my comments and suggestions were already taken into account in this new version. This paper contains very interesting information on ambient surface concentrations of PM levels in the Sahel.

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The data is of interest from the scientific, environmental and health points of view. The authors did a good methodological application, obtained relevant data and applied a good discussion. However, there are several issues still to be reviewed in my opinion.

1. Abstract: first line: ‘..... a region where the mineral dust content is.....’ to be replaced by ‘..... a region where atmospheric levels of suspended mineral dust are.....’

2. Abstract: reorder: ‘.... Seasonal cycle of surface wind velocity suggesting that it is mainly controlled by Saharan dust transport. A decrease in the dust concentration is observed when moving from Niger to Senegal. However, local dust..... the beginning of the rainy season.’ to be replaced by: ‘.... Seasonal cycle of surface wind velocity locally measured, suggesting that it is mainly controlled by Saharan dust transport. Local dust..... the beginning of the rainy season. A decrease in the dust concentration is observed when moving from Niger to Senegal.’

3. Page 8053 Introduction 1st row: ‘West Africa is the world’s largest source of mineral dust.’ To be replaced by: ‘West Africa is the world’s largest emission source of atmospheric mineral dust.’ Row 14: et al, to be replaced by et al.

4. IMPORTANT: In page 8054 you should also discuss results from Viana et al. 2002. Atmospheric Environment. Volume 36, Issue 38, December 2002, Pages 5861-5875, where daily data from 1999-2000 on ambient aerosols measured at a number of sites in the Canary Islands allowed to define the seasonal patterns and height of the impact of African dust transport towards the Atlantic on air quality.

5. IMPORTANT: Section 2.2., page 8057. You should define PM₁₀ as the inlet adapted to the TEOM used in this study. These are not particles finer than 10 microns but as defined in article 2-18 of the 2008/50/CE directive: ‘PM₁₀’ shall mean particulate matter which passes through a size-selective inlet as defined in the reference method for the sampling and measurement of PM₁₀, EN 12341, with a 50 % efficiency cut-off at 10 μ m aerodynamic diameter. This is relevant for the modellers in case this data is used.

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6. IMPORTANT: Page 8057: You should test if the PM10 inlet you are using is properly performing PM size cutting off at the very high levels of PM you are measuring. Most inlets have a guaranteed cut off at PM levels lower than 100 micrograms PM10/m³. This is not referred to TEOM detector but to the size cut off process. You need to report also on the maintenance of the cut off inlet. How often was this cleaned? With the amount of dust you have the inlet should be cleaned very often.

7. Page 8057 row 21. A reference should be given for the loss of Volatile material by TEOM.

8. I recommend deleting the text: Page 8058: 'Despite this limitation, this instrument is widely used, in particular in air quality monitoring networks (i.e. AIRPARIF network in Paris, France since it provides relevant measurements with a limited cost in terms of maintenance.' This is based on the fact that it is true that this is widely used, but in air quality networks a correction of the measurements done by TEOM or Beta instruments are mandatory by law (2008/50/CE) because it is recognized that semi-volatile material is lost. Then when using TEOM in air quality networks in Europe you should also have a simultaneous reference instrument to correct measurements. This is not affecting the quality of the dust measurements because dust is not semi-volatile, but the text you added is a bit confusing.

9. Page 8059: Bottom of the order of 5%. Do you mean on annual average??? Please clarify

10. Page 8059: Give a reference for the 5 microgram/m³ in PM10 of sea salt (not sea salts) in the Atlantic.

11. IMPORTANT: Both top and bottom text of page 8060. I made already this comment in my previous review: Take also into account that if you do not take into account days when dust influence is not detected, then you can not obtain annual means. It is difficult to compare these dust data with the limit values from the EC and NAAQs_USA. You should compare the whole annual PM mean measured in your study (including

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Harmatan days, marine days, anthropogenic influenced days, ... and so one) with these air quality standards that refer to annual means or annual daily exceedances of exposure levels. Later on you may discount the days you like for the dust studies. If data has to be used in future studies for health purposes, you can not delete low level measurements, these days are needed to compare health effects with those from highly polluted ones.

12. VERY IMPORTANT: Page 8061: are these means obtained by excluding 'clean' days? All days? Dust days? Clarify!. In my opinion you may exclude days in which works around the site made the measure spatially not representative, but you should give the annual means without excluding clean days. Later on you may calculate the means for the dusty days.

13. Page 8063: Rows 7 to 15: See Also Viana et al 2002. They have long measurements (3 years) in a large number of sites across Canary Islands. In February 2000, daily PM10 levels reached 600 microg/m³ PM10 inside the marine boundary layer, and simultaneously recorded in a number of sites.

14. In my opinion the sections on scenarios are very descriptive and may be slightly reduced in length.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 8051, 2010.

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