

Interactive comment on “Long-term study on coarse mode aerosols in the Amazon rain forest with the frequent intrusion of Saharan dust plumes” by Daniel Moran-Zuloaga et al.

Anonymous Referee #2

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General Comments

This manuscript presents an unique and unprecedented multi-year time series of coarse mode aerosol measurements in Central Amazon. In the ATTO tower, it is even more representative of real remote aerosol characteristics. The manuscript also compares aerosol measurements with observations made on orbital platforms, and large-scale weather conditions, which further enriches the results presented here.

The paper is well written and deserves to be published in ACP. All proposed revisions by this referee are intended to improve the comprehension of the scientific results reported in this study.

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Specific comments

- For most of figures: the authors preferred to differentiate curves in plots using different colors. There are recommendations to avoid this approach due to color-blinded readers. So, whenever possible, change and prefer figures using different gray tones and different line patterns (dot, crosses, diamonds, trace-dot, etc.). This is the case of the following figures in the manuscript: S1, S2a and S2b, S3, S4, S5, S6 S9, S12; 1, 2, 4a (colors), 4b-d (symbols are equal), 6, 7, 8 (use different symbols), 9, 10e-f.

Reference: <https://www.nature.com/articles/nmeth.1618>

- C. Pohlker et al. (2017) is cited several times in the text and is related to important features of this study. However, it is in reference list as "to be submitted". It is not correct to use so often a paper that is not even submitted. The same holds for Saturno et al. (2017) despite it is much less cited than C. Pohlker et al. 2017

- Change "Amazonian" to "amazonian" (first letter lower case) in the whole text. Amazonian is an adjective, not a location. Amazon is a location.

- p.5 lines 1 and 5: the author refers to "winter dust plumes". It is confusing because the manuscript is dealing with a phenomenon that happens in both hemispheres. Winter in one hemisphere is summer in the other. Instead use the name of specific months you are referring. Another option, use wet or dry season (with respect to Central Amazonia) whose months are well known.

- p.5 lines 34 and 36: repeated to close in the text the expression "whether and to what extent".

- p.13 line 28: "NE basin" to "NE Amazon basin".

- p.15 line 12: P_BT was not defined before.

- p.16 last line: there is no meaning in $M_{BCe} = 0.02 \pm 0.03$. This discrepancy is due to the use of Standard Deviation in non-normal data. Use median and Interquartile

Range to avoid negative values in the confidence interval.

- p.19 lines 18-20: "We propose that the results obtained here for the year 2014 can be regarded as representative for a typical dust deposition scenario in the Amazon region, since 2014 was generally an 'average' year without 20 pronounced precipitation and circulation anomalies (M. Pöhlker et al., 2016; C. Pöhlker et al., 2017)." »>To state that 2014 was an "average year" is a strong affirmation, and should not use a "to be submitted" reference for such an assumption.

References: Rizzolo et al. (2016) was already published as final revised article in ACP: see <https://www.atmos-chem-phys.net/17/2673/2017/acp-17-2673-2017.pdf> and update it.

- Figure 2: it contains a lot of information in a single figure and it is somehow confusing to understand author's analysis and discussions due to the small size of curves. Improve it separating in different figures with larger sizes.

This figure also cites figure S4. To understand the figure it is mandatory to the reader to see supplement. So, it should not be in the supplement but in the main text. The same holds for Figure 3, 4, 9, 14. Also, (c) lacks BC equivalent in legend.

- Figure 4:

(a) very confusing to understand the actual meaning of colors in the figure. (c) and (e): change the experimental point symbol for the sake of clarity

- Figure 5: here you explain M_{BCe} , but it was previously used in Fig. 4 without any explanation. So, move it to previous figure.

- Figure 8: why some points show negative slope, with slope \pm uncertainty not compatible with zero?

- Figure 9: in the upper legend it cites Moran et al. (in preparation). Not adequate.

- Figure 11: include in caption the meaning of gray areas in the map.

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- Figure 12: in the caption: "are show overlay" > "are shown overlay"...

and (b) actually refers to figure (d).

- Figure 13, in caption: did you mean "NCEP Reanalysis" when writing "NCEP satellite"?

Supplementary material:

The manuscript cites too often figures containing in supplementary material. If a figure has to be cited frequently and it is important to the actual comprehension of the article context of the article it should be moved to the main text. This is the case of figures S4, S6 and S9, which should be inserted in the principal text.

Figure S2: at figure (c) the fitting seems to have forced parameter $a = 0$. It should be explained and/or justified it. Visual (separately) inspection of black and white experimental points does not seem to be statistically compatible with zero.

Figure S9: Really hard to understand the meaning of colors in part (b).

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1043>, 2017.

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