Atmospheric
Measurement
Techniques

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Discussions

Interactive comment on "Aerosol Optical Depth retrievals in Central Amazonia from a Multi-Filter Rotating Shadow-band Radiometer on-site calibrated" *by* Nilton E. Rosário et al.

Anonymous Referee #2

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This article has as main goal of establishing and verifying an alternative setup for MFRSR calibration over the Amazonian basin. The need is clear: Amazonian atmosphere have to be continuously monitored and gaps (for example to send the instrument to a calibration facility) must be avoided. I think the authors achieved their objective with this work. Moreover, this article present a good example of comparison with the AERONET network, in terms of aerosol optical depth and Angström exponent. I find that the paper will be scientifically sound and it might be acceptable for publication after addressing the major points listed in my specific comments.

Specific comments:

C1

Page 3, lines 12-14: For non-familiarized reader it would be more convenient to describe on Figure 1 the meaning of midst, upwind and downwind pollution plume. Is the plume generated inside Manaus city? Which kind of particles are mainly present?

Page 8, lines 12-16: Ozone and dioxide nitrogen content was obtained from Sciamachy and OMI, but did you use a daily value, a monthly value or an average value over 2012-2015?

Page 9, line 2: How many individual Langley calibrations were performed over the period 2012-2015? Is this number robust enough? Only information on years 2012 and 2015 is included in the manuscript and supplement material.

Page 9, lines 8-9: You wrote "$\alpha\lambda 1, \lambda 2$ is a practical parameter to evaluate aerosol particles size". This sentence is too general. What it can be inferred from the Angstöm exponent is the predominance of submicrometric or micrometric particles, but not the actual particle size. For that, information on particle size distribution (for instance) must be retrieved.

Page 9, line21: please include also the reference Moran-Zuloaga et al. (2018)

Moran-Zuloaga, D., Ditas, F., Walter, D., Saturno, J., Brito, J., Carbone, S., Chi, X., Hrabě de Angelis, I., Baars, H., Godoi, R. H. M., Heese, B., Holanda, B. A., Lavrič, J. V., Martin, S. T., Ming, J., Pöhlker, M. L., Ruckteschler, N., Su, H., Wang, Y., Wang, Q., Wang, Z., Weber, B., Wolff, S., Artaxo, P., Pöschl, U., Andreae, M. O., and Pöhlker, C.: Long-term study on coarse mode aerosols in the Amazon rain forest with the frequent intrusion of Saharan dust plumes, Atmos. Chem. Phys., 18, 10055-10088, https://doi.org/10.5194/acp-18-10055-2018, 2018.

Page 9, line 24: replace "aerosol optical depth" by "AOD" because you have already introduced the acronym. Check along the manuscript.

Page 10, lines 5-6: Cloud screening is done based on the large standard deviations from the mean observed in some cases. However, it is necessary to quantify what you

refer with "large standard deviations".

Page 10, lines 8-9: replace the word "true" by "reference". Page 12, Table 1 and Table 2: Following equation 1 the slope (after changing its sign) provides information on the daily average of AOD. All the values shown in Table 1 and Table 2, both referred to 500 nm, are in the range 0.20-0.30, what from my point of view are not low enough to be considered as clear atmosphere or values similar to those obtained at a mountain top (above the atmospheric boundary layer). In this sense, more discussion is needed.

Page 14, line 2 (but also this is an overall comment): Only years 2012 and 2015 are analyzed in this paper? What about 2013 and 2014? Is there any reason for this lack of information?

Page 15, line 17: You attributed the few suspicious points to the presence of optically thin cirrus. This can be easily checked from lidar measurements. Do you have simultaneous lidar measurements to corroborate this?

Page 16, line 5: AERONET is not an instrument, replace by Sun-photometer or the AERONET Sun-photometer. The same in page 7, line 2.

Page 17, line 3: what about the results for 2013 and 2014? Page 17, figure 4: From this figure it seems that there is a overestimation of AOD from MFRSR respect to Cimel values, and underestimation of Angström Exponent values. Due to the different temporal resolutions I consider more convenient to present the temporal series of daily values or monthly values to check the overall coherence of both datasets. If monthly values are shown, the whole dataset (2012-2015) can be presented.

Page 18, figure 5: All wavelengths should be shown here. Also, explain the meaning of asterisk on the y-axis unit (interpolated values, I guess), and the meaning of red dotted line (1:1 line).

Page 18, figure 6: The information from Figure 6 is summarized in Table 6. It would be nice if you replace figure 6 about AOD by the scatter plot of Angström exponents.

C3

Page 19, Table 4: All wavelengths and years must be shown here. Other table 7 might contain the corresponding information for Angström exponent

Technical corrections:

Page 2, line 26: in "...the forest it is..." remove "it".

Page 7, line 7: replace "...using leas-square..." by "...using least-square...".

Page 15, line6: keep the same format along the paper (don't use $I_{(DN,\lambda)}$).

Page 15, line 22: replace "one minutes frequency" by "1-min frequency".

Page 16, line 14: replace "sows and enhancement" by "shows an enhancement".

Page 17, caption figure 4: replace "Depth" by "depth".

Page 17, line 11: replace "For the 2015 years trends" by "The year 2015 trends".

Page 19, Table 4, caption: replace "aerosol optical depth" by "AOD" and "optical depth" by "AOD".

Page 19, line 7: replace "Do Central Amazonian pristine atmosphere provides" by "Does Central Amazonian pristine atmosphere provide".

Page 19, line 9: "Amazônia" Please, in English not in Portuguese.

Page 19, line 18: replace "varied" by "varies".