

Interactive comment on “Long term measurements of aerosol optical properties at a pristine forest site in Amazonia” by L. V. Rizzo et al.

Anonymous Referee #1

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The manuscript, Long term measurements of aerosol optical properties at a pristine forest site in Amazonia, by L. V. Rizzo et al. provides a valuable dataset of aerosol optical properties measurements in Amazon. Such a long continuous in situ measurements with good data QA/QC should gain respects and the data analysis would help us to better understand the aerosol physics and its radiative properties in this region. There are too many figures presented in this manuscript and some of them are similar which can be combined. I do suggest that the authors should re-plot most of the figures. Overall, The manuscript is outlined logically. I think that the paper can be considered for publication after some minor revisions according to my following comments.

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(1) Weather patterns play a major role in determining the annual or seasonal variabilities of aerosol optical properties at the site. I suggest more information of meteorological processes and their relationship to aerosol properties need to be added in the discussion. I am not convinced by the trajectory analysis presented in the text.

(2) P23338 Line 14: Does “39 m” mean 39 m a. s. l. or 39 m above ground?

(3) P23338 Line 22: What were the frequencies of full calibration and zero check of Nephelometer? It is better to mention this in the manuscript.

(4) P23340 Line 27: It is not correct to use the temperature measured inside TSI Nephelometer to correct MAAP data. This temperature should be higher than the sample temperature because of the heating effect of the lamp.

(5) P23343 Line 14: As for the hemispheric backscatter ratio, new study shows that it is highly depend on the aerosol mixing state. Better to mention the impacts of mixing state on hemispheric backscatter ration here. See the following paper for more information. (Ma, N., Zhao, C. S., Müller, T., Cheng, Y. F., Liu, P. F., Deng, Z. Z., Xu, W. Y., Ran, L., Nekat, B., van Pinxteren, D., Gnauk, T., Müller, K., Herrmann, H., Yan, P., Zhou, X. J., and Wiedensohler, A.: A new method to determine the mixing state of light absorbing carbonaceous using the measured aerosol optical properties and number size distributions, Atmos. Chem. Phys., 12, 2381-2397, 2012.)

(6) P23345 Line 4: “has been investigated by (Kotchenruther and Hobbs, 1998)” should be revised as “has been investigated by Kotchenruther and Hobbs (1998)”

(7) P23346 Line 7: 1.59 should be 1.59-0i

(8) P23346 Line 25: The description of how to estimate the refractive indices is not clear. Does “calculated scattering coefficient” here mean the one which truncation and illumination function is considered in the calculation?

(9) Fig3 and fig4: There are too many figures in this manuscript and some similar plots can be merged into one plot. It is better to combine fig 3 and fig 4 into one figure, i.e.

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plot the median number concentration on the wind rose figure.

(10) P23347 Line 15: "30 to 3 h" should be "30 min to 3 h"?

(11) Fig5 and fig6: These two figures can be combined as two subplots.

(12) Fig10, fig11 and fig12: These figures can be merged into one figure with three subplots.

(13) P23352 Line11: The cloud cover was above 0.9 in 72% of the wet season days (P23355, line22). Is it possible to produce so many sub-micron particles via photo-chemical process under such cloudy days?

(14) Fig15 and fig16: It will be clearer to merge fig 15 into fig 16, just like fig 2.

(15) P23353 Line 25: All optic measurements were done for PM7 aerosol. But only particle number size distribution (PNSD) in size range of 10-500 nm was used for the relationship analysis. I do not know whether a better or worse correlation will be yield if PNSD for 10nm-7um is used. Is it possible to evaluate the influence of ignoring the PNSD of 0.5-7 um in the period that PNSD of supermicron is available?

(16) P23356 Line 25: There are two kinds of model calculated scattering coefficients: the normal one and the one simulating Nephelometer. Also there are two measured scattering coefficients: the raw data and the corrected data. it is confusing in the text on which kind of measured and calculated scattering coefficients they are.

(17) P23357 Line 3: Are 0.07 and 0.005 the standard deviations or the estimated uncertainties of the calculated refractive index? Several factors can induce uncertainties to the calculated refractive index, such as the measurement uncertainties and the assumption of aerosol mixing state. Is it possible to evaluate the uncertainties of this value?

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 23333, 2012.

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