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Atmospheric Measurement Techniques Discussions

Interactive comment on "Comparison of different Aethalometer correction schemes and a reference multi-wavelength absorption technique for ambient aerosol data" *by* Jorge Saturno et al.

Anonymous Referee #1

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The paper presents an analysis of multiwavelength absorption data collected at an Amazonian site. Aerosol optical properties were measured with an aethalometer, MAAP and a nephelometer. The MAAP filter spots were later analyzed with an offline method, the MWAA that was considered here as the absorption standard. The MWAA is based on the same principle as the MAAP since it measures both transmitted and scattered light and a radiative transfer algorithm similar to that in the MAAP is applied to calculate the absorption coefficient. The good point is that it has several wavelengths, the weak points are that it is still a filter-based method with related artifacts and that its time resolution is not as good as that of online instruments.

The aethalometer data were processed with two methods, the Schmid et al. (2006) and

the Collaud Coen et al. (2010) algorithm and the important Cref value was retrieved for both methods. The analysis shows that there are large sources of uncertainty of Cref and the wavelength dependency of absorption (AAE). One of the algorithms seems to be better in one respect, the other in another way. Absolute truth is still not found.

My first question is related to Eq. (11). On line 256 you write that you use five different AAEs to calculate SSA and further Cref. Does this not result in five different Crefs? Do you give the average as the final Cref? Why not using the calculated AAEs instead of five fixed values? The whole procedure is not clear enough and unambiguously explained so that I would try to apply it to my own data.

Line 256. "Using different AAE (å_abs = 1,..." Why do you use the symbols AAE and å_abs for the same thing? Be consistent throughout the text.

L384-389 "A scatter plot of both corrections' outputs vs. MAAP measurements is shown in Fig. 4. We found that corrected AE data fitted very well the MAAP measurements in the case of the Schmid correction, with a slope of 1.04 (1.02 – 1.05); i.e, the Schmid correction overestimates the absorption coefficient by only 2– 5 %. In the case of the Collaud Coen correction, it was found that the AE corrected absorption coefficients were underestimated by 19 – 21 %." I don't understand. My first thought is that the Crefs are just wrong. As far as I have understood the whole thing of getting Cref is based on forcing the aethalometer-derived absorption to match the MAAP-derived absorption. Should not the slope should be very close to if not exactly 1 regardless of the algorithm selected? Please explain.

L439-440. It is reminded to evaluate critically the corrected filter-based absorption data when using it to retrieve BrC / BC contributions. There are quite a few papers that discuss this same issue. Give some references to such papers, some more credit to earlier work could be given.

Fig 3. Beta should have units. scattering coefficient = beta x lambdaˆ(-alpha)

Figures 6 and S4 are just the same with the exception that in S4 there is one more line. Why would you not show it simply in Fig 6 and omit S4?

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