Atmospheric
Measurement
Techniques

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Discussions

Interactive comment on "Intercomparison and characterization of 23 Aethalometers under laboratory and ambient air conditions: Procedures and unit-to-unit variabilities" *by* Andrea Cuesta-Mosquera et al.

Anonymous Referee #2

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Intercomparisons among AE33 aethalometers were made under well-designed experimental conditions and procedures to quantify the accuracy of their measurement uncertainty, with large efforts from more than 20 research groups. The authors carefully investigated all possible factors affecting on the retrieval of eBC mass concentration, and overall finding and associated discussion are reasonable. This reviewer agrees to its publication in AMT, the following points have to be carefully addressed. This reviewer believes that this paper will greatly help to the people who operate or use data from AE 33.

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Discussion paper

Abstract: It is highly recommended to highlight key findings of this work, rather than explain the motivation/background of an intercomparison study. Please rewrite the Abstract concisely.

L281: what "diverse situations" means here? I understand that the comparison was performed with various conditions as shown in Figure 5. However, it is necessary to clearly explain the reason(s) why the authors select "Group D" here. This reviewer strongly suggests to present plots (like Figure 5 or Figure 6) for other groups in the supplementary materials.

Figure 7: How is well the spot size area among the aethalometers agreed? If the authors measure, please note.

It is hard to understand whether the aethalometers agree well or not after maintenance from the scatter plots (e.g., Figure 9). In addition to the slope and R2, the reviewer recommends to add BIAS, RMSE and data number in the plot. Other question is how much the aethalometers are disagreed among D01 $\sim$ 05 aethalometers? These questions also go to Figures 10 and 11.

It will be useful if the authors provide same plot of Figure 12 for R2, BIAS, and RMSE. Also, as the authors wrote, it will be helpful if the percent difference is provided. All experimental data are included in Figure 12? Clarify it.

The authors have to clarify that intercomparisons were not simultaneously made for 23 aethalometers.

The authors have to check the typo errors. Also it is needed to check the English by the native speaker.

This reviewer highly expect to see the wavelength-dependency of light absorption from 7-wavelength aethalometer measurements when starting to read the paper. The presentation and discussion of absorption Angstrom exponent (AAE) after calculating absorption coefficient with one of well-known methods will greatly enhance the findings

of this study.

The recommendations given in line 556-559 are simple and all aethalometer users know it, I believe.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-344, 2020.

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