

acp-2019-587 Decision

Dear Cyrielle,

my apologies for the delay in the decision on the manuscript. I expected feedback from one reviewer who raised major concerns but never received an answer. So I conducted an editor's review of the revised manuscript which, however, took some time – sorry.

I request minor changes of mostly technical nature, which are listed in the following. Once I have received the revised manuscript, the decision will be made immediately.

Line numbers refer to the annotated manuscript.

GENERAL

Please check for NO_x instead of NOx.

Please check for the correct use of singular and plural cases.

I am wondering why the overview paper on dust properties by Formenti et al. (2011) is not referenced in the manuscript.

DETAILED

Line 23: please correct: "... as part of the ..."

Line 71: MEE should be introduced as "mass extinction efficiency"

Line 165 – 167: Referring to a comment of Reviewer 2, I suggest adding bit more explanatory information on the CPC MARIE since this instrument is not documented in literature. I propose something like "butanol-based conductive cooling type CPC" to give technical information.

Line 170: Please add information about the size range covered by the GRIMM OPC.

Line 178: Please rephrase: "TSI 3563 3-Wavelength Integrating Nephelometer" and refer to "integrating nephelometer" in the text.

Line 190 – 191: It would be beneficial to quantify the agreement between CAPS PM_{ex} and NEPH + PSAP. Is the agreement within the range reported by Petzold et al. (2013) for the same instrument configuration?

Line 233: I am a bit confused with the nomenclature used for the complex refractive index. To my knowledge, the agreed terminology is " $m = n + ik$ " but I understand that you refer to the real part as "m".

Line 255: can you please add a range of values used for MEE in your study? In the current version, the reader gets the impression that MEE is given in g/cm³.

Line 283: AAE for biomass burning aerosol can reach values close to 2.0, see Sandradewi et al. 2008. Please include this into your discussion.

Figure 4: I suggest modifying the y-axis title to “Altitude [m amsl]. Then, it is consistent with the nomenclature used in the text.

Line 399: To stay consistent with the rest of the manuscript, I suggest rephrasing “... , large differences were observed, ... “.

Line 490 ff: compilation of SSA values observed in the complex mixture of mineral dust and anthropogenic emissions over the city of Dakar is reported in Petzold et al. (2011). Here, we also found strong wavelength dependence of SSA for anthropogenic emissions, using the same instrumentation you have used in your study. It might be worthwhile referring to these observations here.

Table 2: Please refer here also to mass extinction efficiency (MEE) instead of extinction mass efficiency. Please mention units for the properties listed in Table 2.

Line 542: Please correct: “...the whole sets of ...”

Line 562: Please correct “... dust size distributions_...”

Figure 7: Please adjust font size of x-axis labels; currently this is hard to read.

Line 614: Please correct: “The high CO values ... further indicates ...”

Appendix 2: I suggest using CAPS PM_{ex} for the instrument used here, to distinguish from CAPS NO₂ and CAPS PM_{SSA}. Please adjust throughout the whole manuscript.

REFERENCES

Formenti, P., Schütz, L., Balkanski, Y., Desboeufs, K., Ebert, M., Kandler, K., Petzold, A., Scheuven, D., Weinbruch, S., and Zhang, D.: Recent progress in understanding physical and chemical properties of African and Asian mineral dust, *Atmos. Chem. Phys.*, 11, 8231-8256, doi: 10.5194/acp-11-8231-2011, 2011.

Petzold, A., Veira, A., Mund, S., Esselborn, M., Kiemle, C., Weinzierl, B., Hamburger, T., Ehret, G., Lieke, K., and Kandler, K.: Mixing of mineral dust with urban pollution aerosol over Dakar (Senegal): impact on dust physico-chemical and radiative properties, *Tellus*, 63B, 619-634, doi: 10.1111/j.1600-0889.2011.00547.x, 2011.

Petzold, A., Onasch, T., Kebejian, P., and Freedman, A.: Intercomparison of a Cavity Attenuated Phase Shift-based extinction monitor (CAPS PM_{ex}) with an integrating nephelometer and a filter-based absorption monitor, *Atmos. Meas. Tech.*, 6, 1141-1151, doi: 10.5194/amt-6-1141-2013, 2013.

Sandradewi, J., Prevot, A. S. H., Weingartner, E., Schmidhauser, R., Gysel, M., and Baltensperger, U.: A study of wood burning and traffic aerosols in an Alpine valley using a multi-wavelength Aethalometer, *Atmos. Environ.*, 42, 101-112, doi: 10.1016/j.atmosenv.2007.09.034, 2008.