

## ***Interactive comment on “Aethalometer multiple scattering correction $C_{\text{ref}}$ for mineral dust aerosols” by Claudia Di Biagio et al.***

### **Anonymous Referee #1**

Received and published: 9 May 2017

The authors have done a commendable job of executing a well-designed experiment to measure  $C_{\text{ref}}$  for mineral dust aerosols. The experimental methods were carefully designed, with sufficient redundancy to test closure in the data. They applied the measurements to several aerosol types to determine the role of single scatter albedo and wavelength dependence on their values. The manuscript is well written and I recommend the paper be published after attending to minor comments below.

Comments Line 12: I suggest spelling out “CAPS PMex”, and including “respectively” after “nephelometer”.

Line 19: Change “The calculated mean  $C_{\text{ref}}$ .” to “The calculated mean and one standard deviation  $C_{\text{ref}}$ ”, or something along those lines so the reader knows what the numbers in parentheses refer to.

C1

Line 21: Does the  $C_{\text{ref}}=2.14$  correspond to a specific wavelength? If so, include here.

Line 22: Does the 3% change correspond to both wavelengths?

Line 26: Include “respectively” after 660 nm.

Line 52: Include “such” between “species” and “as soot”

Line 54: The “-“ in my version reads as a division sign, between  $\sim 100$ -100000 and  $\sim 0.1$ -100.

Line 99: Can the authors clarify as to what they mean by “optimized”?

Line 109: Correct “wavelentgth” to “wavelength”

Line 121: Same as previous comment.

Line 137: Please clarify sentence “so the same aerosol size distribution as input for all instruments”. It seems to be missing a word.

Line 189: Should  $\ln(\text{ATN})$  in equations 6a and 6b be  $\ln(\text{ATT})$  ?

Line 276: Can the authors provide more detail regarding how this “conversion” was accomplished? Did they calibrate the OPC to provide a parameterization between refractive index and geometric and optical size? Can they comment on the role of relative humidity and how this might impact their data, since it didn’t appear, especially in the ambient outdoor measurements, that they controlled RH? Addition of water would affect refractive index and change the instrument response.

Line 270: Please state the size range of the fine and coarse mode. It can be read off the integrals in equations 12 and 13 but would be clearer in the text.

Line 299: Were all of the Niger samples from size different areas combined to form 2 for the experiments?

Line 314: Why was the OPC not included in this control? (line 309-310).

C2

Line 342: Change “251” to “2.51” (I assume this is a typo).

Line 380: Can the authors mention what the error bars refer to in this Figure and in the discussion for the following figures?

Line 465: What about the dependence of  $C_{ref}$  and the coarse component at 450nm? (Figure 8, lower left).

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-65, 2017.