

Review of:

Differences in Aerosol Absorption Ångström exponents between correction algorithms for Particle Soot Absorption Photometer measured on South African Highveld by Backman et al.

This paper reported the effect of correction schemes on Absorption Ångström exponent (AAE) values of aerosols determined using a filter based photometer, Particle Soot Absorption Photometer (PSAP). The impacts of the AAE values estimated using the different correction schemes on the evaluation of the contributions of light absorption by brown carbon were also discussed. This manuscript includes sufficient originality and novelty, and the topic seems to fit the journal. I therefore recommend publication to AMT after the points below have been addressed.

Major comments

- 1) Recently, Lack et al. (2013) reported that the estimation of the contributions of brown carbon using the AAE should have large uncertainties. I recommend adding some comments on the relation of this work with their report.
- 2) When measuring the contributions brown carbon using filter based photometers, change in particle shape of the brown carbon may need to be considered. How do you think about the issue?
- 3) Discussion in section 3.3
It seems that the AAE values were relatively high, when high σ_{AP} and σ_{SP} were observed (Fig. 7). These results imply that the high σ_{AP} events may be related to the local combustion and σ_{SP} may be related to the dust event. How do you think about the consumptions?

Minor comments

- 1) Page 9736, line 10
“In addition, desert dust is a major constituent of total suspended particle mass also absorbs light at short wavelengths.”
=> I recommend adding some reference in this sentence.
- 2) Page 9739, line 22
=> What is the “regular basis” means?
- 3) Page 9741, line 9
“The noise of $\sigma_{0,S}$ the can be estimated...”
=> “the” may not be needed.
- 4) Page 9742, line 1

“...and their standard deviation (δQ_{DIL} and δQ_S) calculated from the data set.”

=> The possible systematic uncertainties in the determination of flow rates should also be taken into account.

5) Page 9742, lines 5-6

“Data associated with significant deviations or fluctuations from the desired Q_{DIL} value were omitted.”

=> Criteria of the data selection should be added.

6) Page 9744, lines 9-10

=> One of the two “absorption” is not needed.

7) Page 9744, line 10

=> “Eq.(11a)” may be “Eq.(12a)”

8) Page 9744, line 26

=> “Eq.(11)” may be “Eq.(12)”

9) Page 9745, line 21

=> Why the authors use ‰ instead of %?

10) Page 9748,

“The use of ATN to calculate AAEs will in both cases show consistently lower AAE values than those calculated from ← AP using different correction schemes”

=> This sentence is unclear. The AAE values calculated using ATN seem to be larger than those using some corrections in Fig. 5(b).

11) Page 9749, line 9

=> “chan” may be “can”

12) Figure 5, caption

=> “Tr <0.775” should be “Tr <0.575”

13) Figure 8

=> Unit of the y-axis in (a) may not be “ Mm^{-1} ”. It seems to be relative value to absorption at 660 nm.

Reference

Lack, D. A. et al., *Atmos. Chem. Phys.*, **13**, 10535-10543 (2013).