

Interactive comment on "Absorptivity of brown carbon in fresh and photo-chemically aged biomass-burning emissions" *by* R. Saleh et al.

Anonymous Referee #3

Received and published: 28 June 2013

A very interesting manuscript using Aethalometer measurements and Mie-core-shell calculations to calculate OC refractive indices an their wavelength dependence. While I'm somewhat skeptical that (1) a filter-based instrument can correctly retrieve the wavelength dependence of particle absorption, and (2) the core-shell model is valid for this application, the authors have done an adequate job in discussing these problems. Therefore, I suggest that the manuscript be published in ACP after taking the following comments into account:

1. P. 11511 Lines 12, 33 should read "light absorption of homogeneous, spherical particles can be calculated using Mie theory..." instead of "light absorption can be calculated using Mie-theory...".

C4298

2. P. 11513 Lines 22-23: "A 7-wavelength Aethalometer (Magee Scientific, model AE-31) was used to obtain the wavelength-dependence of the absorption coefficients..." The Aethalometer per se doesn't measure absorption coefficients or their wavelength dependence. However, different publications [e.g., Weingartner et al., 2003; Arnott et al., 2005] have suggested methods to derive absorption coefficients from Aethalometer measurements. On p. 11515 Eq. 1, it is questionable if the assumed 1/lambda dependence of MAC holds; see Arnott et al., 2005. This needs to be discussed and these two references need to be cited.

3. Figures plotting absorption coefficients as function of wavelength would greatly benefit from the use of a log-log scale enabling the reader to judge how well a power law describes the wavelength dependence.

REFERENCES

Arnott, W. P., K. Hamasha, H. Moosmüller, P. J. Sheridan, and J. A. Ogren (2005). Towards Aerosol Light-Absorption Measurements with a 7-Wavelength Aethalometer: Evaluation with a Photoacoustic Instrument and 3-Wavelength Nephelometer. Aerosol Sci. Tech., 39, 17-29.

Weingartner, E., H. Saathoff, M. Schnaiter, N. Streit, B. Bitnar, and U. Baltensperger (2003). Absorption of Light by Soot Particles: Determination of the Absorption Coefficient by Means of Aethalometers. J. Aerosol Sci., 34, 1445-1463.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 11509, 2013.