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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Physical and optical properties of aerosols over an urban location in Spain: seasonal and diurnal variability" *by* H. Lyamani et al.

H. Lyamani et al.

alados@ugr.es

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We thank the anonymous referee's comments that will help to improve our manuscript. In what follows we will explain our point of view concerning the questions raised by the reviewer. Anyway, we will modify the final version of the manuscript in order to include the additional references mentioned by the reviewer and the experimental evidences presented in those studies.

Concerning our comment on the reliability of the MAAP, we must say that this has been confirmed not only by the inventor of the instrument but also by other studies. Thus, Sheridan et al. (2005) showed that unlike the particle soot absorption photome-

ter, PSAP, the MAAP absorption measurements agreed with the reference absorption measurements by photoacoustic spectrometry and simultaneous measurement of aerosol extinction and aerosol scattering, for all laboratory experimental tests on externally mixed kerosene soot and ammonium sulphate. This additional reference will be included in the revised version of the manuscript.

As the reviewer states, filters based measurements of aerosol light absorption can experience problems with particulate emissions from biomass burning or other sources of liquid organic aerosol (Subramanian et al., 2007). Recent laboratory and field measurements indicate a strong systematic positive bias of the particle soot absorption photometer, PSAP, in the presence of high organic aerosol concentration (Subramanian et al., 2007; Lack et al., 2008; Cappa et al., 2008). Nevertheless, only a 10% systematic bias was detected for filter based measurements of aerosol absorption by the Aethalometer compared with photoacoustic values in the presence of high concentration of aerosol organic carbon in Mexico city (Paredes-Miranda et al., 2009). Anyway, all this information will be included in the revised version of the manuscript.

Slowik et al. (2007) have done some laboratory experiments with the MAAP, like those described in the previous paragraph. In this sense, Slowik et al. (2007) show that the responses of both MAAP and PAS are unaffected by a 10 nm organic coating of either oleic acid or anthracene or by 50 nm coating of oleic acid. On the other hand, these authors (Slowik et al., 2007) showed that after coating soot particles with 60 nm anthracene the MAAP readings increase only by 20% while PAS readings were 60% higher. These results may indicate the low bias that can suffer the MAAP in the presence of liquid organic aerosol.

Answering the question of the reviewer, about the capability of the MAAP radiative transfer model to handle light absorption at any depth in the filter matrix, we must say that, as far as we know, the radiative transfer used by the MAAP only considers a two layers system of particles laden layer plus particles free layer (Petzold et al., 2004).

Reference

Cappa, C. D., Lack, D. A., Burkholder, J. B., and Ravishankara, A. R.: Bias in filter based aerosol light absorption measurements due to organic aerosol loading: Evidence from laboratory measurements, Aerosol Sci. Tech., 42(12), 1022–1032, 2008.

Lack, D. A., Cappa, C. D., Covert, D. S., Baynard, T., Massoli, P., Sierau, B., Bates, T. S., Quinn, P. K., Lovejoy, E. R., and Ravishankara, A. R.: Bias in Filter Based Aerosol Absorption Measurements Due to Organic Aerosol Loading: Evidence from Ambient Measurements, Aerosol Sci. Tech., 42(12), 1033–1041, 2008.

Paredes-Miranda, G., Arnott, W. P., Jimenez, J. L., Aiken, A. C., Gaffney J. S, and. Marley N. A: Primary and secondary contributions to aerosol light scattering and absorption in Mexico City during the MILAGRO 2006 campaign, Atmos. Chem. Phys. 9, 3721–3730, 2009

Petzold, A. and Schönlinner, M.: Multi-angle Absorption photometry-A new method for the measurement of aerosol light absorption and atmospheric black carbon, J. Aerosol Sci., 35, 421–441, 2004.

Slowik, J. G., Cross. E., Han, J.-H., Davidovits, P., Onasch, T. B., Jayne, J. T., Williams, L. R., Canagaratna, M. R., Worsnop, D. R., Chakrabarty, R. K., MoosmÂĺuller, H., Arnott,W. P., Schwarz, J. P., Gao, R.-S., Fahey, D.W., Kok, G. L., and Petzold, A. (2007). An Inter-Comparison of Instruments Measuring Black Carbon Content of Soot Particles, Aerosol Sci. Technol. 41(3):295– 314

Subramanian, R., Roden, C. A., Boparai, P., and Bond, T. C.: Yellow beads and missing particles: Trouble ahead for filter based absorption measurements, Aerosol Sci. Tech., 41, 630– 637, 2007.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 18159, 2009.