

Interactive comment on “On the diurnal variability of particle properties related to black carbon in Mexico City” by D. Baumgardner et al.

D. Baumgardner et al.

Received and published: 6 March 2007

Authors' Response to Reviewer 2

We would like to thank the reviewer for the thoughtful review of our manuscript and the many helpful suggestions that were made. The measurements have been re-analyzed to take into account changes in the assumed density and refractive index of black carbon of 1.90 g cm⁻³ and 1.95 -0.79i, as suggested by Bond and Bergstrom (2006). We have also followed many of the other suggestions of Bond and Bergstrom, most notably changing the term 'back carbon (BC) to light absorbing carbon (LAC)' and using 'mass absorption cross section (MAC) in place a specific light absorption'. In addition, as suggested by the reviewer, we have recomputed the optical properties of the LAC mixtures assuming a shell model in addition to the mixing model that we have previously used. We now include both models in the paper to compare the two. In

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short, the use of a shell versus homogeneous mixture results in only small differences in the derived optical parameters.

In response to the reviewer's suggestion to address the issue of LAC that is in particles larger than the range of the SP2 and refer to the Johnson et al. (2006) results and conclude that particles larger than 0.6 μm may contain an appreciable fraction of the total BC mass.

We have also made several additional modifications that we feel improve the clarity of the manuscript. We have added additional information about the uncertainty in estimating the thickness of the layer on the soot particle, we found an error in our correction algorithm for the Babs measured by the PSAP (we were dividing by 1.2 instead of 2.2 and eliminated the need to find a physical explanation for the large difference between the PSAP and SP2-derived Babs).

The following is our response to the specific comments by the reviewer (authors' comments are in italics)

Page 1626, line 6. Bond et al. (2006) do not make the claim that the extinction efficiency of BC is enhanced by coated particles. Rather they state that the absorption is enhanced. A little clarification is necessary here.

Modified as recommended.

Page 1632, line 24. The h' after 24 is probably a typo.

The original manuscript had 'hours' written out. The ACP editor change to 'h'

Page 1640, line 24. Trivial typo. Semi-colon after T. C. - should be a comma.

Corrected

Page 1648, Fig.5. The definition of mass density could be clarified in the text (page 1633, last paragraph).

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We have removed the term mass density throughout the text and are now only using coating thickness. This was to address a suggestion by reviewer 1 and we feel that this is a more meaningful parameter.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 1623, 2007.

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