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Corrigendum to

"The T1-T2 study: evolution of aerosol properties downwind of Mexico City" published in Atmos. Chem. Phys., 7, 1585–1598, 2007

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We have discovered an error in the organic carbon (OC) and elemental carbon (EC) concentration data values that we used in our recently published paper "The T1-T2 study: evolution of aerosol properties downwind of Mexico City" (Doran et al., 2007). For OC the corrected values average only about 7% less at T1 and 2% less at T2 compared to the values shown in Fig. 6, and the variation with time is generally similar. For EC the temporal behavior is also similar to our earlier results but the corrected EC values average nearly 40% higher than those shown in the figure. The increases in the EC values reduce the computed values of specific absorption α_{ABS} for EC that were shown in Fig. 7 and summarized in Table 1. A set of revised values of α_{ABS} is presented in a new Table 1 below. Values are given for 870 nm, at which the absorption measurements by the photoacoustic spectrometer were made, and also for 550 nm, assuming a λ^{-1} extrapolation for the absorption. The new extrapolated values at 550 nm are closer to values reported for α_{ABS} in the Mexico City area by other investigators (e.g., Baumgardner et al., 2002; Schuster et al., 2005; Barnard et al., 2007), which provides additional confidence in our revised EC values. As expected, and consistent with evidence found for the coating of soot in this region (e.g., Johnson et al., 2005), the median α_{ABS} is also larger than the value of α_{ABS}=7.5±1.2 $\mathrm{m^2\ g^{-1}}$ suggested by Bond and Bergstrom (2006) for freshly emitted soot.

Higher values of α_{ABS} at T2 than at T1 would be expected if the greater distance from the urban sources caused EC to undergo additional aging and coating en route to the more distant site, but in contrast to the behavior shown previously in Fig. 7, the values for α_{ABS} at T1 and T2 were generally similar. At the T1 site there was essentially no difference between median α_{ABS} values during transport and non-transport periods, which is probably attributable to the relative proximity of the T1 site to nearby sources of EC. The median value of α_{ABS} was higher at T2 than at T1 during transport periods. A Mann-Whitney test indicates that the differences in the medians are significant at the 15% level but not at the 5% level. A somewhat surprising feature is that for non-transport periods the median α_{ABS} at T2 was actually lower than that at T1, although the difference is again statistically significant at the 15% but not at the 5% level. Recent modeling exercises suggest that the influence of biomass burning was substantially greater at T2 than at T1, and this factor complicates a characterization of conditions that differentiates between transport and non-transport periods based solely on wind directions with respect to the urban sources of EC. Additional analyses of the possible contributions from biomass, urban, and mobile sources are being carried out.

In our earlier paper, Fig. 9 showed histograms of the distributions of α_{ABS} at T1 and T2, with the distributions skewed to lower values in the first case and to higher values in the second. The revised distributions shown in the accompanying Fig. 1 are more symmetric but some tendency toward higher values is again found at T2. The 90th percentile values listed in Table 1 also illustrate this tendency.

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Table 1. Median, 10th and 90th percentile values of specific absorption of EC in $m^2\ g^{-1}$ for DOY 74 to DOY 86 (15 March to 27 March), and for transport and non-transport periods during that interval.

	T1			T2		
	10th percentile	median	90th percentile	10th percentile	median	90th percentile
all periods 870 m	3.8	5.6	7.7	3.8	5.5	10.0
transport periods 870 nm	3.8	5.6	7.4	4.2	5.9	10.7
non-transport periods 870 nm	3.8	5.6	7.9	3.6	5.3	9.6
all periods 550 nm	6.0	8.9	12.2	6.0	8.7	15.8
transport periods 550 nm	6.0	8.9	11.7	6.6	9.3	16.9
non-transport periods 550 nm	6.0	8.9	12.5	5.7	8.4	15.2

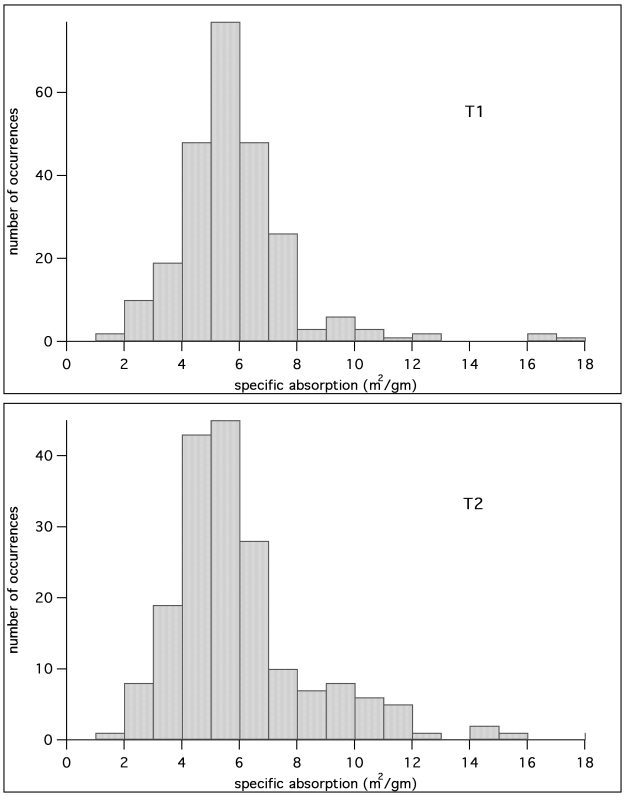

Fig. 1. Histograms of specific absorption of EC at 870 nm at T1 (top) and T2 (bottom). The histogram for T1 represents 250 h of data while that for T2 represents 188 hours.

References

Barnard, J. C., Kassianov, E., Ackerman, T., Johnson, K., Zuberi, B., Molina, L. T., and Molina, M. J.: Estimation of a "radiatively correct" black carbon specific absorption during the Mexico City Metropolitan Area (MCMA) 2003 field campaign, Atmos. Chem. Phys., 7, 1645–1655, 2007.

Baumgardner, D., Raga, G., Peralta, O., Rosas, I., Castro, T., Kuhlbusch, T., John, A., and Petzold, A.: Diagnosing black carbon trends in large urban areas using carbon monoxide measurements, J. Geophys. Res., 107(D21), 8342, doi:10.1029/2001JD000626, 2002.

Bond, T. C. and Bergstrom, R. W.: Light absorption by carbonaceous particles: an investigative review, Aerosol Sci. Technol., 40, 27–67, doi:10.1080/02786820500421521, 2006.

Doran, J. C., Barnard, J. C., Arnott, W. P., Cary, R., Coulter, R. L., Fast, J. D., Kassianov, E. I., Kleinman, L. I., Laulainen, N. S., Martin, T. J., Paredes-Miranda, G. L., Pekour, M. S., Shaw, W. J., Smith, D. F., Springston, S. R., and Yu, X.: The T1-T2 Study: Evolution of Aerosol Properties Downwind of Mexico City, Atmos. Chem. Phys., 7, 1585–1598, 2007.

Johnson, K. S., Zuberi, B., Molina, L. T., Molina, M. J., Iedema, M. J., Cowin, J. P., Gaspar, D. J., Wang, C., and Laskin, A.: Processing of soot in an urban environment: case study from the Mexico City Metropolitan Area, Atmos. Chem. Phys., 5, 3033–3043, 2005.

Schuster, G. L., Dubovik, O., Holben, B. N., and Clothiaux, E. C.: Inferring black carbon content and specific absorption from Aerosol Robotic Network (AERONET) aerosol retrievals, J. Geophys. Res., 110, D10S17, doi:10.1029/2004JD004548, 2005.