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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The impact of biogenic carbon emissions on aerosol absorption in Mexico City" *by* N. A. Marley et al.

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This study of multiple wavelength absorption measurements is an interesting contribution to the growing wealth of information on Mexico City aerosols. The authors have generated added value to the absorption measurements by utilizing evaluation of the C13 to C14 ratios to identify the fraction of absorbing material coming from fossil fuel combustion versus biomass burning. These data complement a growing body of information that indicates that much of the pollution that inundates the Mexico City region is from biomass burning rather than from motorized vehicles: a conclusion that is contrary to popular thinking.

There are two semi-major additions to this manuscript that I would like to see prior to publication in ACP: an analysis of the validity of AAE derived from the seven wave-

lengths and a comparison with Aeronet data.

The method for deriving AAE assumes that the relationship between absorption and wavelength follows a power-law but this relationship has to be validated before the subsequently derived AAEs can be interpreted. The variation in AAEs can be attributable to poor fits to the power law as much as to changes in the exponent of the power law. In order to convince the reader that the measurements can be approximated with the power law, the linear fits to the logarithmic form of the power law equation have to be statistically test and demonstrated as robust. If they are not, this doesn't mean that a power law cannot be used, rather that maybe only certain wavelengths can be used if justified, particularly the shorter wavelengths most affected by the organic aerosols that are sensitive to photochemical processes.

The recommendation concerning including Aeronet data is that this links the surface data to vertical distributions. Aeronet data are available for the two periods discussed in this manuscript and are easy to obtain. If the argument is being made that long range transport of biomass burning emissions is what is producing the higher AAEs and C13 to C14 ratios, then these particles will be transported at higher altitudes. Column measurements with Aeronet, that has similar wave bands, should show the same tendencies as the aethalometer data. A quick glance at the data from 2003 and 2006 shows AAEs that are generally higher than reported in this paper. This would seem to validate the conclusions drawn here and provide a way to interpret the Aeronet measurements.

Finally, the higher AAE and C13 to C14 ratios in 2003 are attributed to Yucatan biomass burning but as Yokelson et al in their recent MILAGRO paper show, there was a similar source in the latter half of March, 2006, so perhaps the higher T1 values attributed to local fires could also be due to the Yucatan source and the only difference is circulation patterns between 2003 and 2006.

In Figure 4 the colors are difficult to see.

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In Figures 4,6 and 7, date is mislabeled, 2001 instead of 2006

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