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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Effect of aerosols and NO_2 concentration on ultraviolet actinic flux near Mexico City during MILAGRO: measurements and model calculations" *by* G. G. Palancar et al.

Anonymous Referee #2

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The MILAGRO campaign offered a unique opportunity to assess the role of pollution in modifying actinic flux; thus impacting the photochemistry that regulates the pollution itself. This field study is especially useful given the range of aerosol loadings, SSAs, and NO2 levels observed. The analysis is appropriate and insightful, although some assumptions (e.g., wavelength independence of some aerosol properties extrapolated from 441 nm) were needed since aerosol radiation observations do not emphasize UV wavelengths. In a few cases discussion of the figures should go into more depth, but these are not major issues. This paper should be published after the following comments have been addressed.

Specific Comments:

page 19250, line 14: The authors note that due to the sparse availability of data for aerosol optical properties, daily averages were used. In this case, it would be appropriate to note why this data is sparse. It is my understanding that these properties can only be retrieved by Aeronet through almucantar scans that can only be accomplished at high solar zenith angles. Since these scans are time consuming and can only be accomplished at certain times of day, this information should be shared with the reader to clarify that the data collection method rather than missing data is responsible for the sparse nature of these observations.

Figure 2: There appears to be a strange jump in the impact of NO2 on actinic flux on each day around 12-12:30. The authors should provide an explanation for this or at least acknowledge it. This feature is not of major concern to the conclusions drawn from this work.

Figure 4: The data in this figure seem inconsistent with figure 2 where Corr SSA appears to fully correct model-versus-observed actinic flux. I realize that figure 2 is for integrated actinic flux and figure 4 is for 368 nm only. I am wondering if there is a spectral dependence in the simulation that can account for this. Earlier in the text, the authors state that SSA is assumed to be wavelength independent. Corr et al. (2009) also states that there is insignificant spectral variation in SSA from 332-368 nm. Is it possible that extending the Corr SSA to the longer wavelengths (368-420 nm where there is more actinic flux) is allowing for a stronger aerosol absorption effect than is reasonable, thus correcting the gap for integrated actinic flux in figure 2 while falling short of agreement at 368 nm? The authors should comment on this.

Figure 5: The C-130 overpass time in this figure seems rather long. Did it pass over the site multiple times?

Typos:

Page 19250, line 7: “cloud cleaning” should be “cloud clearing” Page 19253, line 28: “the 95%” should be just “95%”

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 19243, 2012.