

Interactive comment on “Vertical distribution of aerosols in Mexico City during MILAGRO-2006 campaign” by P. A. Lewandowski et al.

Anonymous Referee #3

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This paper reports on very interesting Lidar measurements across an urban area. While this is a valuable dataset, I agree with the other referees that this paper should expand the analysis section to address specific science questions.

Major Comments:

1. Are there more comparisons possible with other aerosol measurements that would add value to the current analysis, as well as adding value to surface or point measurements by comparing them with vertical profiles?
2. There should be more detailed meteorological analysis and/or combination with some modeling studies, to lend extra significance to the results reported, please see comments below for specific examples.

C847

3. Discussion of the aerosol size distribution does not seem to take into account the location of the measurements along the route.
4. In Section 4.2, the discussion of ASD and MEE: is it possible to account for varying composition of urban plume versus crustal and biogenic aerosols? Should this section contain a discussion of the sensitivity of the Lidar to aerosol size - is there the possibility that the signal may be swamped by dust in certain places? Could this also be discussed at the end of Section 4.4?

Minor Comments:

1. 7 March was an unusually clean day, how does it relate to other days of the campaign, and to typical days in Mexico?
2. Were there measurements on other days? Even if they are not included in this analysis, it would be interesting to know about them.
3. Some of the description of the Lidar information was a little scattered in Section 1 and Section 2.1, it could be usefully rearranged.
4. What were the details of the RAMA PM10 measurements?
5. pg 6836, line 27: Wouldn't the Lidar identify the difference between droplets and aerosols? At that height, is it really plausible that diurnal cooling causes the changes proposed?
6. pg 6837, line 10-15: Please specify where and when this is. This discussion would benefit from more detailed wind analysis of available data to know where this pollution ‘outburst’ is from.
7. pg 6838, line 5-8: This is potentially very interesting, but there is insufficient data shown to support the claims being made or to figure out what is really happening to the plume.
8. pg 6840, line 21: 1-minute data is available and would probably be worthwhile in

C848

this case.

9. pg 6841, line 2: Boundary layer heights routinely get much bigger than this, please discuss this question in light of other measurements available.

10. pg 6841, line 13-16: It seems that there are large discrepancies that should still be discussed, so that people using this data have a better understanding of the uncertainties.

11. Would it be possible to label route locations on Fig. 6? Also, would a zoom of the surface layer help interpreting the data?

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 6827, 2009.

C849