

## ***Interactive comment on “Aerosol plume transport and transformation in high spectral resolution lidar measurements and WRF-Flexpart simulations during the MILAGRO Field Campaign” by B. de Foy et al.***

**Anonymous Referee #1**

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The paper elegantly relates complex observed remote sensing properties with a model to provide support for analysis. The model used has tradeoffs. While a lagrangian approach allows complex semiquantitative analysis, and is easier to use at higher resolution, a chemical transport model could have also been used, but also adding uncertainty in terms of processes analyzed. The authors make an effort in adding as many emission sources, with updated fire (offline, satellite based) and dust (online) emissions. Some discussion on whether increased vertical resolution could help in terms the model having terrain following plumes vs the observations showing constant alti-

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tude would be useful. Also the method, which includes release of particles in Flexpart only partially describes the selection of magnitude of particles per emission category. Overall the paper is clear in it's analysis of current literature, and it provides interesting ways of analyzing lidar observations using models, in particular with surrogate modeled aerosol properties, plume age, etc. Also results were summarized and synthesized for ease of analysis.

Technical comments

Abstract should include aircraft in which HSRL was on. P28473 L20. Strictly speaking high hourly concentrations of PM are not necessarily a health concern, but possibly 24h and annual means, so maybe some of that language can be incorporated in addition to speaking of the extreme hourly concentrations. L 23. Wind suspended dust. P28474. L22.I would add “Those” to specify that particles referred to are from Adachi and Buseck, 2008) study. P28475 L7 I would add a phrase to summarize a characterization of MCMA aerosol composition to sum up the section, or make a smoother transition to next section. P28476 L4. May add MCMA if necessary. L9. Perhaps broader than larger can define size distribution.14. Can cut the “not to be confused part” by adding reference earlier. P28477 L13 high concentrations of SO<sub>2</sub>? Even though

It would be relevant to justify why FLEXPART and not a full chemistry model was not used for this study, just for reference. P28483 L12. Online emissions may be higher but important to see which dust emissions the MCMA inventory because these probably represent other processes more related to traffic related as is discussed in <http://www.epa.gov/ttn/chief/efdocs/fugitivedust.pdf>. L13 MCMA inventory of primary PM from dust?

Figure 3 can have larger panels, and add scale.

Figures including lidar plots and flexpart products are too small and will probably not print well, or require zooming. Final version should be substantially larger and use

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space better.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 28471, 2010.

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