

Interactive comment on “Rapid ventilation of the Mexico City basin and regional fate of the urban plume” by B. de Foy et al.

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The authors would like to thank the referees for their reviews.

Referee #1:

The three citations suggested are indeed pertinent and will be added to the paper.

The model does use the carbon monoxide inventory in calculating the urban tracers. On the time scales considered, transformation and deposition play a minor role and the tracers are representative of the urban plume.

Because there is little information on the vertical structure of the pollutants, it is difficult to validate the vertical diffusion coefficients. Vertical mixing in the MCMA is vigorous and remarkably well captured by the MRF model (see ref #2 comment). In terms of

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Lagrangian particles, these are fairly well mixed throughout the mixed layer on time scales shorter than one hour. This suggests that the difference between FLEXPART and MRF-MM5 should not affect the results of this paper. Nevertheless, vertical diffusion is an important area for future investigation.

Vertical profiles of horizontal wind velocities are shown in de Foy et al., 2005c, along with a discussion of model accuracy. This is too big a subject to include here as an aside.

Pseudo-balloons are passive tracers with the vertical velocity set to a constant. It seems that “virtual” would be a better word than “pseudo”. Clearly, this introduces a discrepancy between the model and the real balloons which is mentioned at the end of section 3 and will be further clarified in the text. Previous work (Baumann and Stohl 1997) used actual balloon heights. This could be done for radiosondes but not for the pilot balloons. Estimates of the variation in vertical velocity of the radiosondes based on the known height suggest that the impact of this discrepancy should be smaller than other sources of error.

ACP allows the use of Local Time which was the campaign convention. This will be clarified in the text.

The political boundary displayed shows the outer limit of the “delegaciones” of the “Distrito Federal” and the “municipios” of the State of Mexico which together form the MCMA at the time of the campaign. While these have since changed, it makes sense to use the ones from the period of study.

Referee #2: The description of the Residence Time analysis will be clarified and reference made to the paper of Ashbaugh et al. 1985. This will clarify the units, which are indeed number per cell per day. For the column plots, the cell is taken as the entire column above a surface rectangular cell. For the radial plot, the cell is a three-dimensional radial cell allowing for vertical resolution.

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Thank you also to both referees for the technical comments which will be used to improve the quality of the paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 839, 2006.

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