

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

Anonymous Referee #1

Received and published: 7 April 2006

1. General Comments:

This paper addresses an issue worthy of the ACP in the sense that it expands and corroborates some aspects on the discussion of the atmospheric flow in the Valley of Mexico and Central Mexico presented in other research articles. Since this geographical area is a subject of intense international measurement campaigns such as MILAGRO, its publication is especially convenient.

The main result and conclusion as the title suggests, is about the residence time in the Valley of Mexico of an air parcel. This information establishes that the atmospheric

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pollution is the result of the day emissions and therefore the "leftover" emissions of the day before do not play an important role.

The main and important omission of this paper, and something that should be corrected before its acceptance for publication, is the **lack of credit to prior and recently published work** related to some of the subjects of this paper. Not only does this make the references list incomplete, but the authors fail to use this information to their own advantage, since some of the flow descriptions here are similar to the ones obtained by other authors, adding credibility to all findings.

Such is the case of the local confluence phenomenon described in:

Locally induced surface air confluence by complex terrain and its effects on air pollution in the Valley of Mexico, Aron D. Jazcilevich, Agustín R. García, Ernesto Caetano, *Atmospheric Environment*, **39** (2005), pp. 5481-5489,

and the flow through the Chalco pass described in:

A study of air flow patterns affecting pollutant concentrations in the Central Region of México, Aron D. Jazcilevich, Agustín R. García, L.Gerardo Ruiz-Suárez, *Atmospheric Environment*, **37**, pp. 183-193, 2003,

not mentioned here.

Also a similar computational experiment as described here is the subject of the Los Alamos- IMP paper:

Development and testing of meteorology and air dispersion models for Mexico City, M. D. Williams, M.J. Brown, X. Cruz, G. Sosa, y G. Streit *Atmospheric Environment*, **29**, 21, 2929-2960 (1995),

although a hydrostatic meteorological model was used in that case.

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2. Specific comments:

The model used here as the authors point out, does not include a deposition, nor an emission model. Therefore, the words “plume” and “pollution transport” should not be used and should be replaced by “air parcels” or “air flow”. These convey a better idea of the paper’s intentions which is to visualize how air parcels travel by using pseudo particles and pseudo balloons. The title should be changed accordingly.

When the episodes names O3-South, O3-North and Cold Surge are presented in page 842 paragraph 25, a description of why these names were chosen should be included there.

Does the fact that FLEXPART uses different vertical diffusion coefficients than MM5 important? If not, say why in the text.

In the same way as the vertical mixing height graph in Fig. 4 was included, a graph showing some vertical velocity profiles captured by MM5 should be added to asses the model performance.

What is meant by pseudo balloons in paragraph 5 page 846? Does the floating and aerodynamics of a balloon been included? Or it is just particles released in the same area of the real balloons? Could this explain some of the differences in the trajectories? Please explain this in the text.

Zulu time should be chosen in the paper to avoid confusions.

The description of the flow in the large domain is too detailed and confusing. Only the main features should be described. The text for this section should be reduced and simplified.

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3. Technical corrections:

In the caption of Fig.8 what is meant by "... forward CO trajectories... "?

The political boundaries are wrong in the figures. These could be taken out and show the metropolitan area by other means.

Replace "...very spread..." in page 852 paragraph 5 by "widely spread".

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

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