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Comment

Interactive comment on “Modelling constraints on the emission inventory and on vertical diffusion for CO and SO₂ in the Mexico City Metropolitan Area using Solar FTIR and zenith sky UV spectroscopy” by B. de Foy et al.

Anonymous Referee #1

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General comments

Several speculations on the behavior and the origin of the CO and SO₂ concentrations are given through the article. They lead to confusion. For example: they use sentences like CO emissions would be due to... “the authors do not give clear justification.” The work can be of benefit for the scientific community in the sense of counting with a model for MCMA where gas diffusion has a vertical scheme.

Specific comments:

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1.- Figure 8. When comparing CO measurements, SOF measurements, and the model results, one observes that in all cases, the models overestimated values. And there are very few points in which the models were on target. With regard to this matter authors commented on this behavior without showing clearly what happened in each case and each place.

2. Figure 10. CO measurements obtained using an FTIR in CENICA and MER, were presented; both places are in urban areas with high traffic conditions. The model overestimates CO concentrations by far in the case of CENICA, at the time of the day when emissions were more abundant. It is necessary to give an explanation about this matter.

3. To better understand this behavior, at least of the measurements, it would be convenient to include a paragraph labeled “site description” and give specific site characteristics. Question. Where did the highest emissions show up? In what schedule? At what times peaks were observed? And why?

4. Figure 11. Reported CO measurements correspond to RAMA ones. Again the model sometimes overestimated (XAL and VIF) and in others underestimated (PED and AZC) in the hours where CO emissions were high. Question: Under what conditions the model works best?

5. Figure 13. Time series of Tula and Popocatepetl are not easily distinguishable. Suggestion: Making two graphs (one for low emissions and another for high emissions) or else to put two axes, granted that it is intended to show events where Tula and the volcano have important contributions on the MCMA.

6. Figure15. In CENICA as well as in MER, DOAS instruments were used get measurements of SO₂. Am I supposed to think that inter-comparison tests were done between the two DOAS used in both places?. If you go that way I do not understand why the model overestimates in CENICA regarding the measurements with the DOAS; And in the case of the MER the model underestimates DOAS measurements.

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Section 5.4 Discussion

The supposition that Tula and the volcano impact the MCMA is very weak since it is not demonstrated in any of the results and much less there is evidence that 20 % of SO₂ measured in MER and CENICA have relation to Tula or to the volcano!!!

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