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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measurements and receptor modeling of volatile organic compounds in south-eastern Mexico City, 2000–2007" *by* H. Wöhrnschimmel et al.

Anonymous Referee #2

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General Comments

This manuscript provides important data as to the sources and nature of hydrocarbon air pollution in one of the most polluted metropolitan areas in the world, the results of this study are important, and add unique information to that already available in the literature, nevertheless several issues are not explained enough. Then I would suggest that the authors attend to the following points prior to publication

Introduction

The sentence "Sulfur dioxide (SO2) has also become a local problem in the northern parts of the city" should be deleted since last Quality Air report that SO2 has a de-

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creasing trend since 1990 with a 88% of reduction. Besides, this study is related with the Sotheastern area.

Methods Sampling How many grab samples were taken by year? Which was the frequency?, Describe over what period of time the "grab" sample was obtained. Was it three hours? This (3h) would be an integrated sample given the variability of hydrocarbon concentrations in an urban area. Was the flow rate regulated? Was the meteorology measured at the site? On the other hand in the reference of Sosa et al (2008), canisters were used for sampling, and it seems that it is not the case in this research. A better explanation is necessary. There is insufficient description of the sampling site and possible local influences, what kind of industries, main avenues, what is CENICA?

Analysis Although other studies are cited for analysis, a discussion of measurement uncertainty is needed, as well as detection limits and results of reference materials analysis.

Source profiles and CMB On page 3326, authors say that newer profiles determined in Guanajuato were included. Then, it is necessary to describe these profiles, and the differences with the previous profiles published, since the results could be very sensitive to the new profiles. On the other hand, although this profiles are newer than other published, neither the fuels used in Guanajuato (gasoline and diesel) are the same than in Mexico City, nor the vehicle fleet is similar. Then it could be questionable the use of those profiles. It is important to define show the uncertainties of these profiles since they are important data for CMB application. Which were the fitting species (all of them?). Were Sensitivity tests performed?

Results and discussion. Table 1. Why the number of data of each VOC is different? Why the n of the sum of VOC is around 20% lower that the data for the individual compounds. Did the instrument failed?. How it could fail for toluene and not for benzene? This is very unclear. Only complete data sets should be used for modeling.

Figure 1. It is confused. Why all data is 00:00-24:00. How many intervals are? It

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seems that there are only three intervals: night, morning and evening. Are there other intervals to say in all data that they have an entire day? How was averaged “all data”? The analysis of VOC trends is really short and I think that a more detailed analysis could be done. Is there some explanation about the differences among the years?

Toxicity was noted in relation to Benzene, but no information was given on whether exposure at the levels measured would be a problem at the site. Maybe it could be included an analysis at different hours, different months, that could give a final conclusion about this issue.

Are the reactive VOCs concentrations high or low, by what criteria? The authors claimed in the introduction that the ozone levels are VOC sensitive, how the results are related with this situation?

Table 2. Page 3328. It would be useful the addition of a column with the decreasing percentage of all species to clarify the trends.

Figure 2 The cyclic annual patterns should be discussed deeply. How is the seasonal variation?, Which are the differences between the rainy and the dry-warm season? Is there some influence of the relative humidity or rain?

Figure 3. What is mid2000? June?. Page 3329. “Reductions did not occur homogeneously over the day or for each VOC species in the same way. How do you explain the differences? The discussion about the species in the supplementary information is important. Taking into account that source activities are not homogeneous over the MCMC, it is not possible that some local sources were responsible of the high contribution of the LPG. This result should be discussed.

Table 4. Although b translate to a yearly rate of change with the formula in page 3325. It would be convenient to add a column with these results.

About weekends it is not clear why VOC concentrations are lower since Saturdays are the days with more traffic and higher concentrations of ozone. If LPG is the main source

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of VOCs, why the total VOC are lower in weekends when people is at home and use this fuel? More discussion is needed.

How is explained that trends of LPG contributions are similar to exhaust contributions if they are independient sources? There is no comparison with other countries.

The authors need to make the information relevant to the reader and discuss (and justify) the implications of the results.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 3319, 2010.