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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Weekly patterns of México City's surface concentrations of CO,NO_x, PM_{10} and O_3 during 1986–2007" *by* S. Stephens et al.

Anonymous Referee #2

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General Comments

In this paper the authors showed that measurements by an air quality network could be use in order to address sensitivity of the atmospheric chemistry. Also address the limitations and uncertainties of the method used. I recommend publication.

Specific Comments

Lines 22-30 (page 8359) The authors use the Sillman's concept of the photochemical indicators such as the total reactive nitrogen (NOy) to support a previous statement that ozone formation is also sensitive to other factors than just the direct measurement of

VOC/NOx ratios . However, they also mention that measurements of species such NOy "...have not been measured routinely in México City, and the few available measurements are too variable to assess spatially or temporally averaged sensitivities. Thus such assessments have been limited to modelling studies in which emissions of VOCs and NOx were varied around central estimates and the response of O_3 concentrations was examined, sometimes with conflicting results ...";

Several lines ahead (lines 1 to 20, page 8360), the authors introduce the use of the weekend-workday differences in ozone and other precursors to empirically assess the effect of changes on O_3 precursors emissions on O_3 concentrations and thus identify the O_3 sensitive in México City. In this paragraph, the authors present a long list of worldwide cases in which this weekday-workday effect has been observed, but just mention one reference for México City. In fact, they use this introduction as the basis for his paper.

In addition, in lines 9 to 13, page 8363, the authors use the concept of the NO-O_3 crossover to explain the phenomenon of the morning rise in O_3 concentrations on Sunday relative to other days, with any mention of similar findings in México City.

In the Discussion section (page 8365), second paragraph, the authors present the hypothesis that workday O_3 production in México City is VOC-limited and NOx-inhibited, and once again there is no any mention to similar findings in México City.

My concern on the above mentioned particular lines and paragraphs is the lack of a well bibliographical research on similar issues. In particular, I like to call the attention to the Ph.D. research thesis made by Torres-Jardón, R. (Comparative Assessment of the Sensitivity of Ozone to Nitrogen Oxides and Volatile Organic Compounds in Two Dissimilar Metropolitan Areas of North America: Cincinnati, Oh (U.S.A.) and México City, D.F. (México). University of Cincinnati, 2004) (available at: http://www.ohiolink.edu/etd/view.cgi?acc_num=ucin1100032213), in which these features were analyzed based on the Sillman's concept of photochemical indicators using

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measurements of NO_y and O_3 species in one receptor site of México City, on the use of the Multiscale Climatic and Chemistry Model (MCCM) for modelling O_3, NO_y, NO_z, H_2O_2 and HNO_3, and with the analysis of the weekday-weekday effect in México City by combining the concept of the VOC-limited and NOx-limited zones in the typical EKMA diagram with a statistical hypothesis analysis of the O_3 concentrations and the O_3 precursors differences on weekdays and weekend days. Torres-Jardón made a comparison of the O_3-NOx-VOC sensitivities in Cincinnati and México City by using the Sillman's concept supported by additional empirical analyses such as the NO-O_3 cross-over concept and concluded that O_3 production in México City is VOC-limited. However, the authors of this paper never mention this first effort to characterize the O_3 sensitivity in México City.

An additional article that address the use of monitoring data and can be useful is Curz Nuñez, X., Jazcilevich Diamant, A.
On the usefulness of atmospheric measurements for air quality evaluation in the context of recent urban meteorology findings in Mexico City (2007) **Atmosfera**, 20 (4), pp. 329-339

I suggest that the authors do a comparison of their results with those by Torres-Jardón in order to give a more in deep support to their conclusions.

Technical corrections

Figure 1 is hard to see and differentiate Friday and Thursday .

As suggestion, the authors can include a Methodology section (after section 2) where describe all the statistical, O_3 production, and extract that description from the discussion section.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 8357, 2008.

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