Atmos. Chem. Phys. Discuss., 9, C9341–C9343, 2010
www.atmos-chem-phys-discuss.net/9/C9341/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Alkyl nitrate production and persistence in the Mexico City Plume" *by* A. E. Perring et al.

Anonymous Referee #2

Received and published: 6 January 2010

TITLE OF PAPER: Alkyl nitrate production and persistence in the Mexico City Plume

AUTHOR(S): Perring et al

This paper deals with a comprehensive investigation of the role of in the Mexico City plume and their potential effect on P(O3). Overall, this paper is well written. However, some parts are obscure and might still need some further explanation (for specific details see below). After addressing the issues lined out below I would be happy to recommend the publication of this manuscript in ACP.

- it seems that phochemical age calculations based on 2-butyl nitrate to butane is based on an estimated and daily averaged OH concentration. Why did the authors not use the OH measurements aboard the DC-8?

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Interactive Discussion

Discussion Paper

- Page 23762, 3rd para: - HNO3: there is an old reference referring to measurements at Summit. How were these measurements adjusted for airborne measurements? - NO, O3: it seems the scientists who produced this data is neither mentioned in the list of authors nor acknowledged. - HCHO: what data was finally used: NCAR or URI data? - H2O2: I assume this data has been used at least in the P(HOx) calculations. Why is URI not at least acknowledged? - OH/HO2: I guess this data has also been used. Why is Penn State not acknowledged? - CO: Who measured CO and how? - NOy: there is no explicit word on who measured NOy and how? - 2-butyl nitrate: it should be explicitly mentioned what group was responsible for this measurement and how they were performed. A publication specifically referencing these measurements would be helpful.

- Page 23763, 2nd para: What were the reasons to use these criteria to discriminate the data? Does this kind of selection introduce bias into the data set?

- Page 23763, lines 13-14: Can Mexico City be considered an isolated point source considering its large spatial extension?

- Page 23769, lines 11-12: the VOC regimes in Mexico City and especially Houston are quite different. How can the authors use n-heptane measurements in Houston as a base to estimate other alkanes in Mexico City?

- Page 23757, lines 10-11: remove “a wide suite. . .”. It seems 30 hydrocarbons were measured (page 23769, line 8) which is a quite normal range. - Page 23770, line 13 and page 23772, line 28: remove “observed”, since most of the hydrocarbons were estimated, not measured.

- References: The following papers are either in submission or preparation. It is up to the editor, but personally I do not like these kind of references, since the reader has no access to this literature: o Farmer et al, submitted to PNAS o Fuchs et al, submitted to Atmos. Meas. Tech. o Wooldridge et al, in preparation, Atmos. Meas. Tech.

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- Figure 3: why are DC-8 flight 7 and DC-8 flight 8 highlighted? Also, assuming that the Mexico City area extends 100 km around the Mexico City center (see dashed black circle in figure 2) and cutting off these first 100 km in figure 3 the remaining data would not yield any good correlation.

- Figure 6: This figure needs additional information, e.g. r**2 and regression equations including error estimates for slopes in order to verify, if the regimes differ significantly from each other. Also, I only see two dotted lines for the intermediate age ranges, but according to the authors there should be three (see page 23767, lines 14-15).

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 23755, 2009.