

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

Anonymous Referee #2

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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 photochemical 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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- 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(HO_x) calculations. Why is URI not at least acknowledged? - OH/H₂O₂: I guess this data has also been used. Why is Penn State not acknowledged? - CO: Who measured CO and how? - NO_y: there is no explicit word on who measured NO_y 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.

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