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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 #1

Received and published: 8 January 2010

As a follow-up: I agree with Reviewer #3 that more uncertainty analysis is called for, especially with respect to the Ox:ANs slopes and the assumed branching ratios / rate constants.

Reviewer #3's main issue of dilution affecting the slopes in Fig. 6 is an interesting one. If we take a simple box model, with dOx/dt = Pox – kdil(Ox – Ox(bkg)), and similarly for ANs, one finds that dilution does not affect the Ox:ANs slope provided that the initial conditions are the same as the background conditions (perhaps a reasonable assumption for a secondary pollutant). I guess this is what the authors mean when they state that "If the whole plume is being diluted into the same background mixture, then dilution will impact the observed concentrations of Ox and ANs but not affect the slope of the correlation". However when one varies the initial conditions away

from the background conditions, dilution can change the slope away from the value expected by the ratio of the production rates. Probably some more discussion by the authors is needed to clarify and justify this. I tend to disagree with the reviewer that the issue undermines the entire paper; the authors do corroborate their argument by finding a comparable discrepancy between the observed (C1-C5:total ANs) ratio and that predicted from the respective production rates.

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