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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Temporal variability, sources, and sinks of C_1-C_5 alkyl nitrates in Coastal New England" *by* R. S. Russo et al.

Anonymous Referee #2

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Russo et al., Temporal Variability, Sources, and Sinks of C1-C5 Alkyl Nitrates in Coastal New England

General comments:

Russo et al. present a detailed analysis of long-term measurements of C1-C5 alkyl nitrates from mainland and coastal regions in New England. The data set is impressive and the efforts made to maintain a high level of accuracy/precision over the sampling period should be commended. The authors extract two insightful observations from the analysis of the measured alkyl nitrates (C1-C5, seven individual compounds): i) MeONO2 deposits readily (vd = 0.13 cmsec-1), and ii) the marine source of C1-C5 alkyl nitrates is insignificant in New England. The material presented here fits well with the scientific scope of ACP and I recommend publication follow the author's attention

to the follow comments:

Specific comments:

1)The authors should be careful with the use of "total alkyl nitrates" and SRONO2 notation. It has been demonstrated that in many air masses, C1-C5 alkyl nitrates comprise only a small fraction of the true total alkyl nitrates due to the dominance of isoprene-derived nitrates (See Perring et al. ACP 2009). Most notably, line 5 on page 23395 needs to be reworded. I would also highly recommend a short few sentences in the introduction that reference the fraction of the total alkyl nitrate abundance that is the form of a C1-C5 straight chain AN.

2)What is the deposition rate of the other measured alkyl nitrates? This data should be included for comparison. I would be surprised if the deposition mechanism was substantially different for EtONO2 or 2-PrONO2 as compared with MeONO2. Given that these two compounds are more abundant on average (Table 1), the authors need to comment on this.

3)If deposition is the major sink mechanism (at least for MeONO2), why is it not included in the analysis in section 5? It should be an important contribution to equation 2? How does this alter these results and previous interpretations of RH/AN ratios using this methodology?

Technical corrections:

Page 23380 line 18: The use of median and standard deviation together is a bit awkward. I would suggest either including the mean and standard deviation or the median and the interquartile range.

Page 23381 - 23382: Shouldn't observations of CO provide some hint as to whether the summer minimum is due to transport or photochemistry.

Page 23384 line 17: Please provide an explanation of why the MeONO2 concentration was constant for a few hours. If the nocturnal boundary layer was stable and deposition

was somewhat rapid (0.1 cmsec-1) wouldn't we expect the concentration to continue to decline?

Page 23385 line 9: Given the slow vertical mixing conditions of the nocturnal boundary layer, wouldn't you expect a strong gradient in MeONO2 concentration? How would this impact your analysis?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 23371, 2009.