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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of trans-Pacific pollution transport on acyl peroxy nitrate abundances and speciation at Mount Bachelor Observatory during INTEX-B" *by* G. M. Wolfe et al.

Anonymous Referee #2

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General comments:

This is an interesting paper describing a set of acyl peroxy nitrate data obtained using the TD-CIMS technique at a high altitude location in the Northwestern US. It focuses in particular on the potential contribution of Asian pollution to the air in the region, using an impressive set of back trajectories. It is generally well written and suitable for publication in ACP. I note that is listed as part of a special issue dealing with the MILAGRO project; I presume that is in error, it is intended to be part of an issue dealing with INTEX-B?

Specific comments:

The TD-CIMS technique has some advantages over the more established method of GC/ECD including the fact that it enables a better speciation of APNs, but the paper does not go very far in making use of this added value. Almost all interpretation is limited to PAN and PPN data that could be obtained by the much simpler GC/ECD method. A missed opportunity, or is chemical modeling exercise envisaged (which might be mentioned)?

The distribution of the PAN data is clearly skewed by a couple of ill defined episodes (a discussion of which is deemed outside the scope of the paper). The authors should use either the median or the geometric mean throughout the paper (starting with Table 2).

Minor comments:

P9140/L13 “highest levels” gives wrong impression because it is influenced by those ill defined episodes. Say “FT levels of Ĕ are in general substantially higher then BL levels”

P9142/L1 the sentence here could be interpreted as stating that the non-attainment of US EPA standards is due only to this Asian pollution. This is of course not true, it results from a combination of enhanced background levels (where the enhancement is possibly due to all sorts of hemispheric impacts, including Asian pollution), and local US pollution sources. Given political sensitivities the text should be modified.

P9142/L23 transport of NOx

P9144/L17 Hg and scattering data are not used for analysis of the APN data, and their mentioning should be deleted (see also below)

P9147/L4 while discussing the sensitivities, the fact that the PPN sensitivity changes in comparison with PAN due to H2O content should be discussed in this section, not later in the paper (P9157/L2)

P9147/L13 re the background noise test. Destructing APNs this way, a commonly used

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method to determine background levels in GC/ECD analysis for APNs, is of course similar how the TD-CIMS method works in the first place. So the key here is to show that the RCO3 has reacted away. In fact, would it be possible that the background count rates reflect remaining RCO3?

P9150/L6 this statement is rather confusing in the context of this paper (LRT tends to lower the PPN/PAN ratio, but here it is usually at the high end); may rethink how to formulate this, or at least mention that in what follows this is not necessarily the case

P9150/L24 a decrease of mean (7%) and standard deviation (17%) is not “minimal” (previous line) but granted, it has little impact on the discussion. In any case, a prime argument for using instead the geometric mean

P9153/L2 as with the PAN-CO relationship, mention that this is a log-linear plot

P9153/L3 are there periods when the PAN vs ozone correlation was negative?

P9156/L26 indicate what the r2 value represents. Is it the correlation between the trends, taking the phase shift into account?

P9156/L28 the discussion here is rather confusing to say the least, in part because of the switching between mean and median. If the medians (or geometric means) are used for the PPN/PAN ratios, does the plot still look as in figure 5a, and is the trend as comparable with O3 (also using the median or geometric mean)? Figure 5b shows that the mean diurnal variation in PPN and PAN is quite comparable, why would PPN correlate well with O3, but PAN not?

P9157/L23 Poor sentence; presumably should be “Medians for the total dataset, as well as the BL and FT subsets as derived above” (and by the way, PPN/PAN is not a chemical species)

P9158/L4 the number 686 is somewhat curious (it implies that for all APNs there are a total of 6860 5-min data points which seems doubtful). I presume it results from taking only data points when there are valid data for all APNs (including BDLs), and

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then binning the data in 10 bins of equal number data points (presumably 686). The procedure should be described better

P9158/L29 the fact that only the PPN/PAN ratio increases (correlates seems too strong a wording here) is somewhat curious and could use some additional discussion. Normally (as mentioned earlier in the paper) one would expect this ratio to decrease due to LRT etc, as reported by Singh and Salas

P9159/L4 delete the word initial (there is no follow up in this paper using a different method of analysis)

P9159/L18 I doubt that Hysplit calculates ground level at MBO at 1.0-1.1 km. Change the wording into “ground level for the grid in which NBO is located is taken by Hysplit at 1.0 km” or something along these lines

P9161/L9 This paragraph discussing Hg data should be removed since it is irrelevant to the topic of this paper. While maybe interesting, it does not add anything to the analysis of the APN data

P9175/fig1 indicate the corresponding levels of the APNs (at a minimum for PAN and PPN)

P9177/fig3b This figure needs some work: show the scale for the y-axis; there are no gray circles in my copy, but colored circles; with some effort I can only detect one cross in fig 3d only

P9179/fig5b indicate sunrise and sunset (as in fig 5a)

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 9139, 2007.

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