

## Responses to the editor

*Thank you so much for your excellent contributions to improve our paper. Revisions in the manuscript (as described below) in response to your questions are highlighted with light blue color in the Word file for easy reference (we kept the changes based on reviewers' comments in yellow).*

**Co-Editor Decision: Publish subject to minor revisions (review by editor)** (26 Nov 2018) by Jennifer G. Murphy

Comments to the Author:

The authors have generally done a good job in addressing the concerns of the reviewers. I have a few remaining suggestions prior to publication in ACP.

Section 3.3.1 – I am still confused about how to interpret the MLR statistics.

Are the 'standardized relative importances' presented in Figure 4 meant to be interpreted as 66% of PAN comes from biogenic precursors, as the text seems to suggest? In other words, in 2013, twice as much PAN comes from biogenic precursors compared to anthropogenic precursors.

*This interpretation is based on the coefficient of determination,  $R^2$ , between predicted PAN and measured PAN. We partialized the  $R^2$  for each independent variable as Eq. (3) and (4) (and standardized by total  $R^2$  in Figure 4). We revised this section.*

Or is it that twice as much of the variability in the amount of PAN is explained by variability in biogenics compared to variability in anthropogenics?

*Since  $R^2 = \frac{\sum(\hat{y}_i - \bar{y})^2}{\sum(y_i - \bar{y})^2} = 1 - \frac{\sum(y_i - \hat{y}_i)^2}{\sum(y_i - \bar{y})^2}$ , where  $y_i$  is measured PAN,  $\hat{y}_i$  is predicted PAN, and  $\bar{y}$  is average of measured PAN, and  $\hat{y}_i$  depends on the variability of dependent variables,  $R^2$  is technically related to variability of dependent variable.*

Page 2, L16 – NO is not reduced in this reaction, it is oxidized

*Modified to "reduction **by** NO".*

Page 2, L17-18 – Would make more sense in the context of the paragraph to say that 'Peroxy radicals compete with NO...'

*Replaced as suggested.*

Page 2, L18-19 The content in the boxes should be reformatted as reactions (R1,-1 and separately R2) and the equation should be listed separately as Eq 1

*Reformatted as suggested.*

Page 6, L21-23 – This sentence is worded strangely. Why would RO<sub>2</sub>+NO reactions becoming faster make ozone production decrease? Isn't it that NO<sub>x</sub> radical termination reactions become

the dominant HOx sink?

*We reworded our description to better reflect your point that radical termination steps that remove NO<sub>x</sub> from the system are heightened under high NO conditions, namely formation of nitric acid and organic nitrates.*

Page 7, L6-7 “Most rural sites...” Do the authors mean that PAN was more sensitive to NO<sub>x</sub> at sites with low NO<sub>x</sub>, which tended to be rural? The sentence is not clear as written.

*Yes, it does. Clarified as suggested to read “PAN at sites with lower NO<sub>x</sub> levels seem to be more sensitive to NO<sub>x</sub> concentrations, as is seen for most of the rural sites in this region.”*