

RESPONSE TO EDITOR

Ms. Ref. No.: egusphere-2024-3388, doi:10.5194/egusphere-2024-3388

Journal: Atmos. Chem. Phys.

Point-by-point responses to remaining editor comments are given below. Comments are in blue and responses in black. Text added or altered is quoted in orange.

Responses to Editor comments:

The authors have done an excellent job responding to the comments. A couple of minor thoughts to further improve clarification would further clarify some of the comments by the reviewers:

1) An SI figure that either colors the scatter plot of NO_y from SEAC⁴RS either as MPN mixing ratio or the fraction of MPN to total NO_y, or the difference of the sum and measured NO_y vs MPN may help with better understanding the worst agreement.

We now include Figure S2 showing the SEAC⁴RS panel from Figure 4 and the points coloured by the relative contribution of MPN to total NO_y:

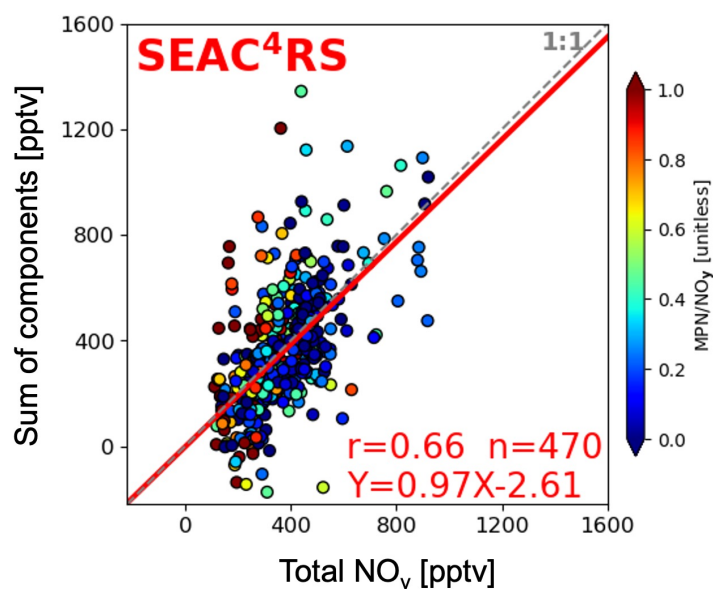


Figure S2: Proportion of reactive oxidized nitrogen components measured during SEAC⁴RS. Figure format and inset values are as in Figure 4, but for SEAC⁴RS only and points are coloured by the relative proportion of methyl peroxy nitrate (MPN).

And we draw the reader's attention to the figure in Section 3.1 in the paragraph immediately following Figure 4:

“The weaker correlation for SEAC⁴RS is from the large contribution of MPN to total PNs measured by the TD-LIF instrument, leading to a large contribution of MPN to total NO_y for many of the points that stray most from the 1:1 line (Figure S2).”

We also reference Figure S2 as motivation for further exploring the large contribution of MPN to total NO_y during SEAC⁴RS:

“The far larger fraction of MPN to total NO_y during SEAC⁴RS (Figure 5(b)) warrants further investigation, as the relative proportion of MPN to total NO_y ranges from negligible to 100% (Figure S2).” (page 13)

2) There is potential that PNA interference in MPN channel may also not be fully accounted for. A brief discussion and or quick look if the discrepancy could be due to double counting of PNA from the CIMS and TDLIF may be warranted here for further clarification.

We now use the ~11% HNO₄ interference from Nault et al. (2015) to calculate a non-significant impact of HNO₄ interference on MPN during SEAC⁴RS:

“A small proportion of HNO₄ is measured in the MPN channel of the TD-LIF instrument. About 11%, according to Nault et al. (2015). For CIMS median HNO₄ of 12.6 pptv during SEAC⁴RS, HNO₄ interference is only 1.4 pptv, so does not affect the 14-24% contribution.” (page 13)

Reference:

Nault, B. A., Garland, C., Pusede, S. E., Wooldridge, P. J., Ullmann, K., Hall, S. R., and Cohen, R. C.: Measurements of CH₃O₂NO₂ in the upper troposphere, Atmos. Meas. Tech., 8, 987-997, doi:10.5194/amt-8-987-2015, 2015.