

Reply to RC1 and RC2

In the following, the referee's comments are reproduced (black) along with our replies (blue) and changes made to the text (red).

General comments:

RC1: This measurement report eloquently describes measurements of nitrogen oxides and other parameters needed to interpret factors contributing to the emission, chemistry and physical removal. The paper is exceptionally clear, the analysis clear and convincing and the interpretation persuasive. I recommend publication as is.

RC2: This study presents observations of NO, NO₂, NO_y, and O₃ in a suburban temperate forest and highlights some important sources and sinks strongly affecting the nighttime chemistry of NO_x. They found that the sustained high NO observed under very low O₃ conditions could be attributed to the soil NO source, and the lack of nighttime NO₂ increase can be related to its the nighttime deposition. Overall, this manuscript has comprehensively described their measurements and conducted an in-depth analysis on the observed nighttime NO₂ behaviors in the Rambouillet forest environment. Although the authors didn't employ box model to support their major conclusions, I do think the current analysis looks reasonable.

We thank both reviewers for their positive assessment of our manuscript.

Specific comments from RC2:

I only have a few minor issues. How about aerosol concentrations during the measurements? Does the uptake of NO₂ on the aerosol surface affect the NO₂ removal at night?

With an NO₂ uptake coefficient of less than 10^{-4} aerosol uptake becomes an insignificant loss term of NO₂ when calculating the overall lifetime. Text has been added in line 486-488 in the revised version:

"The low aerosol surface area during ACROSS combined with the low uptake coefficient for NO₂ renders losses due to heterogeneous processes insignificant (IUPAC, 2024)."

I also suggest the authors to add a table to list their ground and tower measurements and this will be helpful for the readers.

We do not believe a table is necessary since it is clearly stated in the text where the different instruments were placed. All the ground measurements are described in section "3.1.1 Ground" and all measurements from the top of the tower in section "3.1.2 Tower".

Lastly, I would encourage the authors to discuss about how to reduce the uncertainties in their estimated NO emissions.

The large uncertainty we report for the calculated NO emissions is caused by atmospheric variability in e.g. NO, O₃, soil moisture etc. More accurate estimates of the NO emissions would require height resolved measurements of NO, NO₂ and O₃ and also direct flux NO measurements. Such measurements were not part of this particular campaign.