

Interactive comment on “Measurement report: Leaf-scale gas exchange of atmospheric reactive trace species (NO₂, NO, O₃) at a northern hardwood forest in Michigan” by Wei Wang et al.

Anonymous Referee #1

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This a very thorough paper contributing to the body of literature on atmosphere-biosphere exchange of NO_x and O₃. It makes important steps to resolve inconsistencies between previous laboratory and field observation studies. It should be published after consideration of the minor comments below.

P2 L60: The citation of Delaria et al., 2018 and reported estimation of 15-30% removal of soil-emitted NO_x is correct—Oak woodlands have a very low LAI. However, in Delaria and Cohen 2020 (now published and not in discussion), they report much larger canopy reductions for forests with more typical LAI, in line with the 25-55% loss previously reported.

P3 L64: Extra parenthesis

P3 L83: Would be nice if the instrument were stated explicitly.

P3 L96: Correct “folia” to “foliar”

P7 L205: Several studies have observed significant stomatal opening during the night (e.g. Dawson et al., 2007–10.1093/treephys/27.4.561). Consider adding a discussion of how, if this was occurring in your chamber, this assumption would have affected your results (if at all).

P8 L246: A more detailed description of your empty chamber photolysis corrections would be useful.

P10 L314: Units for the intercept should be added. Additionally, under the resistance model framework you discuss, the relationship of V_d to g_{H_2O} is non-linear. How might this affect your inferences of cuticular uptake?

P12 L363: How high of emission rates would this require? Is it outside the range reported for trees of the species considered?

P13 L395-396: should this be VPD?

P13 L403: “In the future,”? “In future work,”?

P14 L437: This was also a conclusion of Delaria et al., 2018.

O₃ deposition: There are a number of recent references discussing ozone deposition that are not included. The paper would be stronger if it placed itself in the context of these and other recent papers on the subject (e.g. Silva and Heald GRL 2018 <https://doi.org/10.1002/2017JD027278>, Kavassalis and Murphy GRL 2017 <https://doi.org/10.1002/2016GL071791> and Clifton et al. in Reviews of Geophysics 2020 <https://doi.org/10.1029/2019RG000670>).

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-149>,

2020.

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