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Comment on acp-2022-408

Anonymous Referee #1

Referee comment on "Formation and impacts of nitryl chloride in Pearl River Delta" by Haichao Wang et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-408-RC2, 2022

This work conducted continuous field measurements of ClNO2 and N2O5 and performed comprehensive evaluation on the ClNO2 chemistry as well as its contributions to radical and ozone formation under different transport pathways. The results highlight the N2O5-uptake-limited ClNO2 formation and overall low contributions to RO2 radical and O3 formation in autumn in South China. The manuscript is generally well written with clear logic, deep analysis, and full discussion e. It can be considered to accept after addressing the following minor comments.

Specific comments:

- Line 76-77, 78-79, etc., blanks are missed in the middle of different citations. The same suggestion is given to other parts of the main text.
- Line 87-88, the sentence requires modification. e.g., "the challenge to accurately predict ClNO2 and particulate nitration production".
- Line 148, "seldom disturbs the sampling" can be written as "to have little influence on the sampling".
- Line 151, it's better to add "sometimes" after the word "are".
- Line 157, add "approximately" after the word "was".
- Line 203, with and without the constrains of the observed ClNO2, or with and without taking ClNO2 as the source of Cl radicals?
- Line 204-205, this operation will lead to overestimation on the contributions from ClNO2 chemistry. The potential uncertainty should be described here or somewhere else.
- Line 209, the average lifetime or a constant lifetime?
- Line 210, the "was" should be "were".
- Line 209-212, this sentence is not very clear. Is there any reference to support such lifetime setting?
- Line 249-250, what are the reasons for the lower abundances in 2019 than 2017? Smaller source strengths or larger sinks?
- Line 258, 500 m AMSL or AGL? Are the trajectories at 100 m similar to those at 500 m?

- Figure 5, a RMA correlation coefficient may be better for comparing the consistent.
- Line 401, add “in this study” before “than”.
- Figure 6 and Figure 7, suggest indicating the p values of the linear correlations.
- Line 468, 470, 473, “power plants emissions” should be coal-fired power plant emissions.
- Line 618, what does the “AH” mean? Double check the unit mmol/mmol.