

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2021-268

Anonymous Referee #2

Referee comment on "A satellite-data-driven framework to rapidly quantify air-basin-scale NO_x emissions and its application to the Po Valley during the COVID-19 pandemic" by Kang Sun et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-268-RC1>, 2021

This article estimates Nox emissions and lifetimes in the Po Valley of Italy using OMI and TROPOMI satellite retrievals before the current pandemic, and then uses the methods to estimate the reductions in emissions during the pandemic.

The authors are to be congratulated for a thorough and methodical analysis and for interesting results and a topical analysis. I am happy to recommend publication.

Really my only comment is the reference to DOFS. The acronym should be spelled out in the caption for Fig 10. The method should then be explained and referenced in the main text.

About the seasonal signal in Nox emissions, the authors do note that "future work is suggested to better understand its variability." This is indeed the case – it does seem more likely that the variability is related to the method and the estimates of the lifetimes than to actual variations in emissions. I would recommend some more discussion of this point – either what might cause changes in actual emissions, or how the method can have biases that vary by season.