

Atmos. Chem. Phys. Discuss., referee comment RC2  
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## Comment on acp-2021-583

Anonymous Referee #2

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Referee comment on "Exploiting satellite measurements to explore uncertainties in UK bottom-up NO<sub>x</sub> emission estimates" by Richard J. Pope et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-583-RC2>, 2021

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This paper presents satellite measurements of NO<sub>2</sub> from OMI and TROPOMI for the UK, and estimates NO<sub>x</sub> lifetimes, emissions, and trends. The goal is to reduce uncertainties in bottom-up emission inventories. The paper itself is well written. However, some figures need updates (legend, too small caption, ...), some concerns need to be verified:

- When comparing the results with the GEOS-Chem model, emissions are derived from 2016 emission sources. This does not take into account sector- or region specific changes. If possible, this should be reconsidered.  
In order to highlight the differences between the TROPOMI output and the chemical transport model, it would be good to consider a higher resolution nesting with the GEOS-Chem model.
- If you use ECMWF wind data from ERA5 for the SMBA, why not considering this model as input for your GEOS-Chem model?
- The use of the quality flag is not clear to me, can you please explain which threshold value you are using here?