

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-79

Anonymous Referee #2

Referee comment on "Investigating the global OH radical distribution using steady-state approximations and satellite data" by Matilda A. Pimlott et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-79-RC2>, 2022

This is a very interesting and novel idea that is worth publication in ACP once several deficiencies (listed below) have been addressed.

Comments in order of line number:

Minor comment: Line 51: In situ measurements are scarce also as it's not a simple measurement. There aren't very many OH instruments and they certainly aren't commercialized yet.

Major concern: Line 279-285: What are the implications of these conclusions for your ability to use satellite observations to constrain OH? I would expect that you could devote an entire section to this discussion.

Major concern: Line 287: Just how much of the tropospheric burden of OH resides between 600 and 700 hPa? How important is this layer for the tropospheric oxidation of methane and other trace gases? That is, can you give an idea of how much of the troposphere's oxidizing capacity that you can constrain from space? Even if the answer is "not much", I still believe that your paper represents a great first attempt to indirectly constraining OH using space-borne observations of the species that influence OH.

Major concern: Figure 2: Can you discuss how cloudiness affects your sample number and, subsequently, your uncertainties? What are the other limitations of satellite data for your purposes?

Major concern: Line 336: This is a bold statement given the limited spatiotemporal extent of the OH observations. For example, do you expect your SSA to compare well over and downwind of continents where air is more polluted?

Line 457: What about the issue of cross-correlations? Are many of the drivers of ozone concentrations also the drivers of OH concentrations? Would you expect the same result if you had, for instance, NO_x in your SSA equations?