

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-298

Anonymous Referee #2

Referee comment on "A renewed rise in global HCFC-141b emissions between 2017–2021"
by Luke M. Western et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2022-298-RC2>, 2022

This paper provides a thorough investigation into the apparent global increase in HCFC-141b emissions. The authors illustrate how the global decrease and increase in emissions track with the global increase and subsequent decrease of CFC-11 emissions, which HCFC-141b largely replaced. They provide regional emissions analysis and highlight the need for increased monitoring, given the gaps in knowledge in regional emissions over much of the global south. This is a timely paper that has important implications for monitoring adherence to the phaseout of HCFCs under the Montreal Protocol. I recommend that this paper be published, however, there are some points that require further clarification that I've outlined below.

Different time periods are used for assessing changes in emissions (e.g. 2020 emissions relative to 2008 or 2017) which makes it difficult to compare across regions. Is there a reason for this?

The authors note on line 352 that emissions from eastern China have increased from 3.7 to 7.7 Gg/yr between 2008 and 2020. What fraction of the global increase in emissions since 2017 can be attributed to eastern China? This would provide a useful comparison to the 40-60% of the global increase in CFC-11 emissions found in Rigby et al. 2019 attributed to the same region.

Equation 3 – this should be the square root of the sum of squares of uncertainties, no?

Line 283 – 284 – this increase is being driven by increases in the NH? This does not come through in the figures. I think it would be nice to add a third row to figure 3 showing the hemispheric differences so that this point comes through.

Lines 291-293 – why is aggregated emissions here so much higher than the 3 Gg/yr reported in the conclusions over the same period? (Line 415)

Line 424 – This line does not convey that while emissions from China cannot explain all of the rise in the emissions, it does explain part of the increase.

Line 394 – This conclusion regarding the increase in US emissions is not clear based on the figure since the observationally-derived emissions are over such a short time period.

Figure 3 – explain the shaded region around global values here.

Figure 4 – is reported consumption data the same thing as bottom-up estimates? Please be consistent throughout for clarity.

Figure 6 – why does the US bottom-up estimate not have uncertainties but the Australian estimate does?

Minor:

Line 74 – an extra 'not' is included here. Fix typo.

Line 382 – Add the S to HYSPLIT.