

Interactive comment on “Recent increases in the atmospheric growth rate and emissions of HFC-23 (CHF₃) and the link to HCFC-22 (CHClF₂) production” by Peter G. Simmonds et al.

Anonymous Referee #2

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This manuscript reports an update of the evolution of global mole fractions and emissions of HFC-23, an important greenhouse gas. The findings are novel and interesting and the overall work is certainly of sufficient quality for publication in ACP. I would however suggest a) clarifying the reasons for publishing this gas separately from the 2017 Simmonds paper on HFCs and HCFCs and b) the following changes:

L33-36 I'm not sure what the authors want to say here. Does this mean that the HCFC-22 production process has been releasing an increasingly high fraction of HFC-23 or are other sources important, too? This should be clarified in a concise way.

L47-49 So which regions are likely to be responsible for the other 98.5 %?

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L53-58 This sentence is very long. Consider splitting it up to improve readability.

L75 The date of that reference is inconsistent with the one in the reference list.

L75-91 This section is a rather abrupt change from the previous and could benefit from short introductory sentence or sub-heading. I would also suggest moving to after the next paragraph.

L88-91 I'm not sure why the extra details are relevant. Surprisingly, the reference to Simmonds et al., 2017, who reported HCFC-22 observations and emissions from the same network (and repeatedly discussed HFC-23), is missing, as are any other papers on HCFC-22.

L126-169 There are quite a lot of technical details in this section, which do not contribute to the main messages of the paper. These methods are also well established and I suggest moving large parts of the section to the supplement to improve readability.

L203 I would be interested to know the methodology used to calculate this “liberal estimate”. Is there a reference and could more information specifically on HFC-23 and HCFC-22 be given in the supplement?

L277 The annual growth probably relates to all of 2016, not just the end of that year?

L293-296 The authors should make it clear that they have already published the HCFC-22 data they refer to here.

L314-316 It is not clear whether this agrees with Carpenter and Reimann (2014) or not.

L469 Please correct: un-abated.

L779-781 As published in Simmonds et al., 2017?

L800-816 Missing from the two figures is previously published data and the respective sections of the manuscript would also benefit from a discussion of how mole fractions

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compare with published data. The axes on the inset of the first figure are very hard to read and the firn air is missing from the legend.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-929>, 2017.