

## ***Interactive comment on “The increasing atmospheric burden of the greenhouse gas sulfur hexafluoride (SF<sub>6</sub>)” by Peter G. Simmonds et al.***

**Anonymous Referee #2**

Received and published: 8 April 2020

This paper describes the surface mole fraction and emission history over the last four decades of SF<sub>6</sub> based primarily on AGAGE station measurements, inversion modeling and industry reports. This is a comprehensive analysis of the current knowledge of SF<sub>6</sub> emissions and how they have shifted from Annex-1 to non-Annex-1 countries in the last decade. The manuscript is well written and the techniques are clearly defined. I recommend publication in ACP after consideration of the minor comments listed below.

Specific comments:

Lines 78-88: This paragraph is an odd fit here since it includes too much detail. If the point is to quote the Patra et al. (1997) lifetime estimates then I would just include that with the Ray et al. and Kovacs et al. estimates in the prior paragraph. The profile shape and correlations with other tracers in the stratosphere aren't really relevant here

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since those details are well established and can be found in the cited references that derived the atmospheric lifetimes.

Line 175: 'through' instead of 'though' and maybe spell out 'five' so a dash isn't necessary before 'core'.

Line 329: 'resolved'

Lines 397-403: Are the large differences between the bottom up EDGAR and UNFCCC estimates easily explained? If so, it might be nice to include a brief statement on the reason(s) here.

Line 434: The values shown in Fig. 4 and Table 5 are actually the scaled emissions for all of China so that should be made clear here. As stated, it reads that the values shown are only for Eastern mainland China.

Lines 450-456: It seems like you're referring to the same UNFCCC black symbols in these sentences so it reads a little awkward.

Figure 4: I'm not sure if it's just my version but the axes on this figure are barely visible.

Line 503: It would be better to consistently refer to either FLITS or Urbino in the text and Figures 6 and 7.

Lines 511-512: '...emissions to the global total in 2018 was 3.1% (2.4-3.9%, Table 6, average of all inversions).'

Figure 8: The inset figure axes labels are so small they are difficult to read.

Line 659: add comma after '1978'

Line 672: remove comma before 'countries'

Table 5: Should include the population scaling factor here even if it is also in the text.

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