

Interactive comment on “Global trends and European emissions of tetrafluoromethane (CF₄), hexafluoroethane (C₂F₆) and octafluoropropane (C₃F₈)” by Daniel Say et al.

Anonymous Referee #1

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This paper uses atmospheric measurements from the AGAGE network to infer global trends and northwest European emissions of 3 PFCs (CF₄, C₂F₆ and C₃F₈). The paper is very well written and makes an important contribution. The work on global trends updates previous studies of PFCs using the AGAGE network, but it is important to continue to monitor the trends. The work on European emissions is new and very interesting. I have only minor comments.

line 13-14 "Unlike CF₄ (and to a lesser extent C₂F₆), we observed no clear minimum associated with the 2008 financial crisis for C₃F₈." This sentence could be expressed more clearly to state what was observed for each of the 3 PFCs. It is currently written

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in a bit of a backwards way.

Fig 2-4 I assume the symbols are monthly averages of baseline measurements, should "baseline" be mentioned in the figure captions?

line 182 - add "in 2002" after "began" to remind the reader when the high-frequency measurements began.

line 185 - is that a reduction in emissions of CF4 per tonne of aluminium produced, or an actual reduction in emissions?

line 187 - The increase for CF4 between 1979 and 2019 is nearly 3 times, if you subtract off the natural background first. I believe that is the increase to compare to, but this should be made clearer in the text. It is not clear to me whether the authors took the increase for CF4 as close to 3 times, or less than 2 times (i.e. without subtracting the natural background) but "substantially larger" and "major sources of C2F6 not linked to the aluminium industry" sound big, suggesting the second option.

Figs 2-4 consider showing the global emissions for each PFC.

Line 211 - could spell out "sensitivity" of what to what, i.e. sensitivity of the measurement network to emissions from southern France and eastern Germany...

line 220 "no significant trend in NW Europe" - be more specific, is that no significant trend in NW European emissions?

line 225 - it looks to me like better agreement after 2016, rather than 2015

line 231 - "In the early and later parts of the record, this source is evident in our spatial maps" - the CF4 spatial map for 2005 in Fig 6 doesn't show any emissions around Dublin (2019 does) - should we expect to see emissions near Dublin on this map?

Line 335 - missing full stop

Fig 2 caption, last 2 lines - add "(dashed lines)" as follows: for each semi-hemisphere

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(dashed lines) and ...

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