

***Interactive comment on “Global emission estimates and radiative impact of  $C_4F_{10}$ ,  $C_5F_{12}$ ,  $C_6F_{14}$ ,  $C_7F_{16}$  and  $C_8F_{18}$ ” by D. J. Ivy et al.***

**Anonymous Referee #1**

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**1 General remarks**

The paper is a useful continuation of the companion paper by Ivy et al already published in ACP on perfluorocarbons. It presents state of the art estimates of the anthropogenic emissions of these powerful greenhouse gases and gives a good overview on the existing literature and own work, including measurements of infrared spectra and calculations of radiative forcings.

C4321

**2 Specific comments**

It is not true that there are no reanalysis meteorological data available prior to 1990 (section 2.1), there is for example ERA-40 with useful data from 1979 to 2000 (e.g. Uppala et al, 2005) and ERA-Interim from 1989 (1979) to present (e.g. Dee et al., 2011). ERA-40 data are available also prior to 1979 but more uncertain or with biases. A sensitivity study on this would be useful. At least there should be more discussion.

Concerning the model description (section 2.3), is the model spectral (the resolution would correspond to T42)?

Are the sinks by Lyman alpha photolysis and other processes included? They have an effect on lifetimes and inverse modelling of emissions. The issue is mentioned only in section 3.3 where it is confusing.

Table 1 partially repeats data given in a table in Ivy et al (2012). It might be more useful to shorten this and present instead the integrated band strengths of individual spectral regions of the new measurements given in Figure 3.

**3 Technical corrections**

It is not necessary, to give the Ivy-reference in the abstract since it is also in the introduction.

Eq. (1) should be included directly after line 9 on page 12992.

Isn't there a more recent reference for EDGAR4.2 than the old website for EDGAR4.0?

The first sentence of section 4 appears to be messed up, please rearrange.

C4322

The reference Ivy et al (page 13004) contains a lot of typos, including the doi.

Please include for clarity in the caption of table 1 "by mass" after global warming potential. I suppose you mean that, there is also the alternate definition by volume in the literature.

In figure 2 the legend appears to be incomplete (fire extinguisher?).

#### **4 References**

Dee, D.P. et al.: The ERA-Interim reanalysis: configuration and performance of the data assimilation system, *Q. J. R. Meteorol. Soc.*, 137, 553-597, 2011.

Uppala S.M. et al.: The ERA-40 re-analysis. *Q. J. R. Meteorol. Soc.*, 131, 2961–3012, 2005.

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