

Interactive comment on “Atmospheric observation-based global SF₆ emissions – comparison of top-down and bottom-up estimates” by I. Levin et al.

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We wish to thank the reviewer for his/her kind and helpful comments. We will change the editorial and wording corrections as suggested; for the more substantial concerns and questions, our replies are given below.

Rev. 3: Page 26655. Line 15. It would be good to give the number for global warming potential of SF₆.

The current GWP of SF₆ is 23 900 (Forster et al., 2007); we will include this in a revised manuscript.

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Rev. 3: Page 26657. Line 21-24. It would be desirable to show (in the Supplementary Material) those two meridional profiles of SF₆ collected in 1990 and 1993 over the Atlantic Ocean. The authors announce them on page 26656 as belonging to the database discussed in the paper, but then did not show them.

These measurements have already been presented by Maiss et al., 1996, therefore we refrain from showing them here again.

Rev. 3: Page 26658. Lines 6-10. It would be worth to mention here that there is a natural production of SF₆ in the Earth's crust. This was proved by measurements of SF₆ concentrations in groundwater originating from specific lithologies (mainly silicic rocks). Thus, one may expect SF₆ emissions into the atmosphere via volcanic exhalations in some areas and/or via groundwater usage. Those emissions are most probably quite low but they should be mentioned here just for completeness.

We will include a respective sentence and references Harnisch & Eisenhauer, 1998 and Busenberg & Plummer, 2000.

Rev. 3: Line 13. In fact the inferred global emission do not increase steadily. As seen in Fig.2 and in Table 2, they decrease between 1987 and 1989.

We remove the word “steadily”.

Rev. 3: Line 21-22. I suggest to remove the sentence “. . .but it is not clear to us how independent the DGAR (2009) emissions inventory is from observed atmospheric mixing ratio changes” or to clarify this issue.

We have now received the information from Jos Olivier who has made the EDGAR SF₆ estimates: He confirmed that atmospheric observations were included in the global total of the EDGAR estimates and we will thus include this information in a revised manuscript.

Rev. 3: Page 26660. Line 25-29. This “almost perfect agreement” with observations can be misleading as the EDGAR adjusted annual totals were derived with the help of

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atmospheric data. . .

We do not understand/agree: We only claim here that the EDGAR source DISTRIBUTION but normalization to OUR global total gives almost perfect agreement.

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