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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Atmospheric observation-based global $SF_6$ emissions – comparison of top-down and bottom-up estimates" *by* I. Levin et al.

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We wish to thank Prabir Patra for his comment and the effort testing our SF6 emission estimates in his transport model and comparing with our measurements. We are very glad that our work is of use for the modeling community.

We agree that it is really important now to have more secured information about the regional distribution of emissions because this will be the key for validation of transport models with SF6. There exist other observational SF6 networks, and the responsible scientists are just in the process of also publishing their data and adding to this study e.g. with more stations in regions where recent changes of emissions presently occur



(see e.g. NOAA and AGAGE networks). We are part of an ongoing comparison study for SF6 with these groups at Cape Grim so that it will eventually be an easy task to integrate all data and make them available as one harmonized data set for the modeling community.

Still other tracers such as 85Krypton should also be used for model transport comparison and validation. As Referee 1 stated correctly: A model may be well calibrated for one tracer, but fail to simulate another one.

One point in the model run by Prabir Patra still remains a bit puzzling to us: We do not really understand why there is this large discrepancy between model estimates and observations after about 2001: In the model run by Prabir emissions seem to be missing, although in our study with GRACE we managed to correctly simulate observations in both hemispheres correctly (see Figure below). One reason for the discrepancy may be a difference in the total atmospheric mass (we use 5.1 x 10ˆ21 g of air in GRACE and no sink of SF6).

Caption Figur 1:

Comparison of GRACE simulations with observations at Alert and Cape Grim. The EDGAR distribution of emissions and the global total from the present study were used for the model calculations

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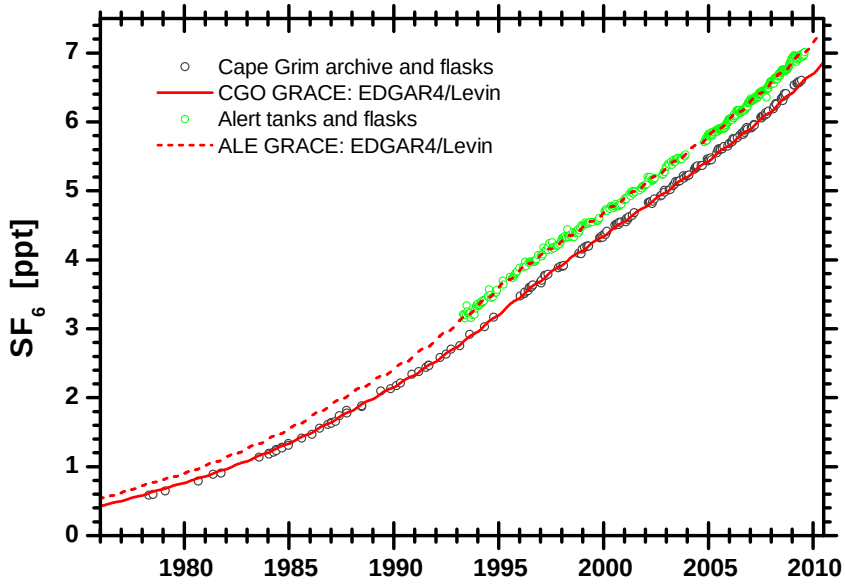
Cape Grim archive and flasks
CGO GRACE: EDGAR4/Levin
Alert tanks and flasks
ALE GRACE: EDGAR4/Levin
SF6 [ppt]
0
1
2
3
4
5
6
7
1980
1985
1990
1995
2000
2005
2010

**Fig. 1.**