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Comment

## ***Interactive comment on “Spectrometric monitoring of atmospheric carbon tetrafluoride (CF<sub>4</sub>) above the Jungfraujoch station since 1989: evidence of continued increase but at a slowing rate” by E. Mahieu et al.***

### **Anonymous Referee #3**

Received and published: 9 September 2013

The paper under consideration is very well written and presents important new results concerning the evolution of the CF<sub>4</sub> trend. In addition, the authors carefully integrate their findings into the datasets available from ground-based in-situ and solar occultation sounders. I strongly recommend publication of this work in AMT, although I would like to suggest several (optional) revisions:

Several analysis runs are described: run 1 / run 2 / run 2 left / run 2 right. It did not become fully clear to me which recipe is the one finally selected for the analysis - I

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guess you use a sequential procedure using run1 in the first step (for adjusting the interfering species), followed by run 2 for adjusting CF4 - please clarify. It would be informative to provide the discrepancy between the run1 and run2 CF4 total columns (discussion on page 7542).

In the random error budget of table 1, the H<sub>2</sub>O and HDO profile slopes are listed two times? It would be interesting to compare the estimated random error with the empirical scatter between adjacent data points in the time series (the scatter of the data points recorded with the homemade spectrometer seems larger?). It would be instructive to present the partial column sensitivity of the FTIR retrieval. The annual cycle seen in the CF4 total column is a bit worrying. It might be worth to investigate this anomaly further (e.g. correlation with solar elevation, water vapour column, etc).

I would suggest to introduce the line list provided by Boudon et al. earlier in the paper (e.g. in section 2.1). Then the discussion could be a bit more extensive and more information could be provided: e.g. please quantify "consistently and significantly larger". Does use of the line list or use of the pseudolines achieve lower residuals?

The construction of an a-priori taking into account the age of air as function of altitude is an interesting exercise. Because the CF4 trend has been significantly variable over the course of the observation period, it might be worth to extend this investigation. (e.g. calculate two a-prioris, a "strong increase" a-priori and a "weak increase" a-priori. What is the effect on the stratospheric or surface mixing ratios deduced from the FTIR columns?)

Minor corrections / typos:

Fig.2 / text page 7546: What is a 20% smoothing function, please give more details: e.g. 20% of data points? 20% of time interval covered? Is this a running mean? Why then does the red line in Fig 2 covers the complete time interval?

Page 7538: "In the absence of..." -> "Due to the absence of..."

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Acknowledgements: "Görnergrat" -> "Gornergrat"

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7535, 2013.

**AMTD**

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