

Anonymous Referee #1

1 Summary

This paper compares climatologies (seasonal, annual mean, monthly mean) of four tracers measured by four satellite instruments as a function of latitudes (zonal means). This activity was part of the SPARC Data Initiative (SPARC-DI) that compared many more constituents. The comparison of each tracer is limited to rather short periods of common overlap between instruments (maximum of five years for SF₆). Another issue is that out of four instruments, two are occultation instruments which have a rather very low data sampling that impacts the interpretation of the results when looking at zonal mean data. Overall I think the paper is very well written and the salient points made. I have no major comments and recommend publication of the paper as is with only some very minor modifications as proposed below.

We thank Referee 1 for his/her valuable comments. We have changed the manuscript according to the comments listed below.

2 Minor issues

p.767, l.15 ... except for ACE-FTS where individual measurements are vertically binned using the mid-points between the pressure levels (in log pressure) to define the bins. Please explain why the binning procedure for ACE-FTS is different than for the other instruments.

The ACE-FTS binning method has been chosen over interpolation in order to stay consistent with the recently published ACE-FTS climatology suite that uses this binning method (Jones et al., 2012). This information has been added to the manuscript.

p.768, l.4: change "aims to analyze" to "aims at analyzing".

The text has been changed.

p.774, l.23: change "therefore" to ", therefore," (add commas)

The text has been changed.

p.777, l.13: change "At the high latitudes" to "At high latitudes"

The text has been changed.

p.778, l.18: change "with a good agreement" to "with good agreement"

The text has been changed.

p.780, l.18: In the mid-latitude LS, the seasonal cycle is the strongest signal and both time series agree on its overall shape with maximum values in the winter. This is only true for the NH, in the SH it is less clear, if I look at Fig. 9.

The comparison for the SH mid-latitudes is at 10 hPa, whereas the NH evaluation is at 100 hPa. Thus a direct comparison of the two hemispheres cannot be deduced from Figure 9. We have added 'NH' to the sentence above to make clear that this statement refers only the NH and not to the SH mid-latitudes.

p.781, l.11: ... ACE-FTS isopleths, in particular the ones at 4.5 and 5 pptv, are less steep than the corresponding MIPAS isopleths. At 5 pptv this is not so much evident, for 4.5 pptv and

below this seems correct. Maybe, one can mention here the influence of the low maximum retrieval altitude for ACE-FTS.

We have removed 5 pptv from the sentence and added the statement 'This is possibly related to the relatively low maximum retrieval altitude of ACE-FTS.'

p. 781, l.25: change "a very good agreement" to "very good agreement" (omit "a").

The text has been changed.

p.783, l.16: change "result" to "results".

The text has been changed.

p.784, l.8: change "At the high latitudes" to "At high latitudes".

The text has been changed.

p.784, l.10: change "which, if a general feature " to "which, if assumed to be a general ...".

The text has been changed.

p. 784, l.18: change "at the high latitudes" to "at high latitudes".

The text has been changed.

p. 784, l.23: change "a good agreement" to "good agreement" (omit "a").

The text has been changed.

p. 785, l.10: change "related to the data sampling density" to "related to the low data sampling".

The text has been changed.

p.785, l.11: change "show the steeper gradients" to "show steeper gradients".

The text has been changed.

References:

Jones, A., Qin, G., Strong, K., Walker, K. A., McLinden, C. A., Toohey, M., Kerzenmacher, T., Bernath, P. F., and Boone, C. D.: A global inventory of stratospheric NO_y from ACE-FTS, *J. Geophys. Res.*, 116, D17304, doi:10.1029/2010JD015465, 2011.

Jones, A., Walker, K. A., Jin, J. J., Taylor, J. R., Boone, C. D., Bernath, P. F., Brohede, S., Manney, G. L., McLeod, S., Hughes, R., and Daffer, W. H.: Technical Note: A trace gas climatology derived from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS) data set, *Atmos. Chem. Phys.*, 12, 5207-5220, doi:10.5194/acp-12-5207-2012, 2012.