Atmos. Chem. Phys. Discuss., 13, C4187–C4189, 2013
www.atmos-chem-phys-discuss.net/13/C4187/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Stratospheric ozone trends and variability as seen by SCIAMACHY during the last decade" *by* C. Gebhardt et al.

Anonymous Referee #1

Received and published: 25 June 2013

General comments: This article deals with changes in ozone vertical profiles using measurements from the SCIAMACHY instrument during 2002-2012. The article is well written and includes ample number of references. The results are interesting and there is a good initial analysis of possible (atmospheric) reasons for observed trends. The observed trends are larger than perhaps expected. The paper is not so strong dealing with other potential reasons for observed trends like instrument aging, changes in sampling patterns etc.

I recommend the paper to be published in ACP after some revision. I have the following comments and questions about the paper:

Detailed comments:

Sec. 2. SCIAMACHY. You should add a discussion about SCIAMACHY validation and aging studies.

p. 11274, line 10: How do you estimate the error of the mean value? Do the individual error estimates of measurements play any role in the error calculation?

p. 11274, line 10: Is mean the best estimator or should you use a weighted mean or median?

p. 11274, line 14: South Atlantic Anomaly. You are giving data exclusion limits but are these satellite coordinates or coordinates of the measurements? To my knowledge SAA affects directly the functioning of the instrument.

p. 11274, line 26: It would be useful if you could provide some information about the autocorrelations you have observed in the fitting residuals.

p. 11278, 11-15: Are the 3-4 month harmonics included in the fit? If yes, how large are their amplitudes compared to annual and semiannual terms.

Sec. 5. Results: The results show rather large changes in ozone. Usually the trends are shown by % in decade. In order not to confuse with other publications, I would recommend using decade as a time unit.

Sec. 5. Results: It would also be interesting to see the fitted solar and QBO contributions.

Fig.7. This picture does not show where the results are statistically significant. Please add shading a similar aid.

Sec. 5 Results: It would also be interesting to see the fitted solar and QBO contributions in the same ways as ozone in Fig. 7.

Sec. 6.1. Comparison of trends. It is a little bit unfortunate that authors do not perform a comparison of SCIAMACHY, MLS and OSIRIS measurements using collocated measurements. It would be valuable to see how the instrument-instrument biases are

developing as a function of time. This would give some information about the question if the detected trends are partly resulting from instrumental aging, changes in sampling patterns (spatial or diurnal) or similar processes. For example, OSIRIS PM-measurements covered tropical regions only during the early years of the mission. I would like to see that authors provide some discussion about these possibilities.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 11269, 2013.