

***Interactive comment on* “Evaluation of tropospheric and stratospheric ozone trends over Western Europe from ground-based FTIR network observations” by C. Vigouroux et al.**

Anonymous Referee #2

Received and published: 18 March 2008

Evaluation of tropospheric and stratospheric ozone trends over Western Europe from ground-based FTIR network observations, C. Vigouroux, et al

This paper describes the measured trends in total column O₃ and for 4 discrete layers using a subset of the NDACC FTIR network over Europe in the latitude range from approx. 20-80N. It extends previous published work which employs a boot strap resampling method to determine statistically significant trends in an fitted empirical function to measured (partial) column amounts of trace gases over an approx. 10y period. In addition the data from the series is compared with correlative ground-based data where applicable which enhances the confidence in the trends.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Overall the paper is lucid, well organized and makes good use of a collaborative network to address an important geophysical question and concern. The physical detail and quality of the data are well discussed and justified. The results are placed in context of other recent studies and improves the larger knowledge base.

Next are questions which aim to further strengthen the paper followed by a few typographical or grammatical errors.

Data

Figure 1 shows a subset of the averaging kernels on the vertical retrieval grid which gives some sense of vertical resolution derived from the measurements. Then partial columns are created using DOFS to define regions that have real information content and these are justifiably broad in altitude. Figure 3 shows an uncertainty estimate vs altitude that appears to have quite high vertical resolution & structure. Can you reconcile this? For instance what aspect of the measurement process can give an uncertainty of $>15\%$ at $\sim 23\text{km}$ and $<5\%$ at 20km (for example, there are others in the figure)? Is this resolution the best for representing the uncertainty variation with altitude?

The total column uncertainty is given as 5.9% . Equation 3 gives an equation for calculating the uncertainty on a given partial column. These values appear to be used to create the random error of Table 5 but nowhere are the estimated partial column uncertainties given explicitly. It would be an advantage to list these in a table, perhaps Table 3.

Bootstrap Re-sampling Method

What was the final chosen order of the Fourier series for the fitting function. How was it determined? Was it the same for all sites? Especially in the Arctic the variation of O_3 due to chemical destruction can be highly variable and not necessarily subject to a repeatable yearly cycle. For instance the column in spring is simply due to the position

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

of the vortex on a given day. How is this high variability dealt with using the limited Fourier series.

There are no plots of the empirical trend/seasonal cycle function fits to the data for the reader to assess applicability of the curve. Nor a table of the fit parameters with a measure of the goodness of the fit.

Typographical or Grammatical Comments

1. p5012 FTIR retrievals strategy -> FTIR retrieval strategy
2. p5013 I12, profiles of target gas -> profiles of the target gas
3. p5014 I20, approach widely reduces -> approach largely reduces
4. p5016 I12, Experience learns however -> Experience shows however,
5. p5016 I24, the effective signal to noise -> the applied signal to noise
6. p5016 footnote, to be read -> to be employed
7. p5018 I21, That means that -> This means that
8. p5018 I21, comes for less -> comes from less
9. p5020 I14, in the concerned partial column -> into the appropriate partial column
10. p5020 I21, error Ss associated to the low vertical resolution retrieved profiles reads -> error Ss associated with the low vertical resolution retrieved profiles is
11. p5023 I5, is even better visible in Fig. 6 that shows -> is isolated in Fig. 6 which shows
12. p5029 I14, the indicative boundaries -> the approximate boundaries

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5007, 2008.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

