Atmos. Chem. Phys. Discuss., 7, S7609–S7610, 2007
www.atmos-chem-phys-discuss.net/7/S7609/2007/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Method for evaluating trends in greenhouse gases from ground-based remote FTIR measurements over Europe" *by* T. Gardiner et al.

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Received and published: 12 December 2007

This manuscript about long-term trends investigations using FTIR measurements over Europe is an important scientific contribution. The main innovative aspects are that the trends were estimated for 6 different species measured over more than 10 years at 6 different sites in using the same approach and with the respective contributions of the stratosphere and the troposphere separated. Using the same measurement technique and the same analysis give a strong significance of the regional differences observed on the trends. Also comparisons with models are quite useful. The analysis is based on the standard multi-linear-regression method, and authors have carefully addressed the statistical significance using the bootstrap resampling method.

In addition to trends, only seasonal changes have been considered. While multi-regression can do more, one can wonder why other source of variability has not been considered. For a first trend attempt it can be acceptable, however the impact of other sources of variability need to be discussed. Trends are expected to be non-linear because of the recovery. Some comments are required while quadratic change (or more sophisticated functions) can be used with multi-regression approaches (see for example Kerzenmacher et al. J. Environ. Monit., 8, 682-690, DOI:10.1039/b603750j). Because the seasonal cycle is the strongest signal, if some series of anomalies can be shown it will help the reader to estimate the adequacy of the regression model and the data.

My second comment is about the discussion of the results. While the method has been discussed, trend results are given with not much comment. It will be interesting to discuss the differences with model and trend values among the different sites. The title seems to suggest that the objective if about method but then only one site is sufficient and model results are not required and more investigations on the model and residuals will be expected.

In conclusion, I strongly recommend the publication of this manuscript. I will suggest to change the title as "Trend evaluation in greenhouse gases from ground-based remote FTIR measurements over Europe" and keep both aspects method and trend results. The final manuscript requires additional comments on the model parameters and anomaly series, and even if the main focus is not the geophysical results more comments on the trend results will be appreciate except if a companion paper is in preparation.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 15781, 2007.

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7, S7609–S7610, 2007