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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Interpreting the variability of CO_2 columns over North America using a chemistry transport model: application to SCIAMACHY data" *by* P. I. Palmer et al.

P. I. Palmer et al.

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We thank the reviewer for a useful examination of our paper. Below are our responses to specific comments (paraphrased and shown in italics).

The authors show a comparison of measured and modelled CO2 distributions...where they stop. Do this comparison help? The authors should make some meaningful comment on the comparison, as it would greatly enhance the paper.

This is view shared by the other reviewers and we will address this in the revised manuscript, as per our responses to other reviewers.

Please justify your choice of study period and location.

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The study location was chosen because of the relative abundance of in situ observations. We chose 2003 because it was the only full-year of data we had at the time of submitting this paper. Unfortunately, the Park Falls dataset did not start until 2004 but we can still usefully compare the magnitude of the seasonal cycle in 2003 over this site with measurements from later years. As stated in our responses to other reviewers, our revised manuscript will include a more extensive model evaluation (to be put in an appendix) that includes the Egbert ground-based FTS dataset and model columns over Park Falls and Kitt Peak.

I doubt the value of the comments on the observability of fluxes. I suggest the authors suspend this analysis until the inversion framework is in place.

With respect with disagree with this reviewer about this point. Our calculations, while including many assumptions, do convey the message that inverting for individual sources and sinks from column CO2 data will be difficult because of the spatial and temporal overlap of individual sources and sinks. We clearly state the limitations of our calculations to avoid any misinterpretation of our preliminary results.

Minor technical corrections.

Agreed. Typos corrected in revised manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 7339, 2008.

ACPD

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