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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Three years of greenhouse gascolumn-averaged dry air mole fractionsretrieved from satellite – Part 1:Carbon dioxide" *by* O. Schneising et al.

O. Schneising et al.

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Author's answers to interactive comments of anonymous referee number 1 on paper Schneising et al., Atmos. Chem. Phys. Discuss., 8, 5477–5536, 2008

First of all we would like to thank the referee for the comments. Below we give answers to all these comments which will all be considered for the revised version of the manuscript.

P5482 L24: Will be removed.

P5483 L13: Will be replaced.

P5484 L19: Will be considered.

P5486 L20-30: For the revised version of the paper we will add information on the estimated accuracy of the retrieved albedo based on independently measured spectral albedos for various surface types, surface type maps, retrieved surface albedo maps from the SCIAMACHY data and simulated retrievals.

P5489 L4-7: The RMS quantifies the relative difference between the spectral measurements and the fitted radiative transfer model. The O_2 absorption is much stronger than the CO_2 absorption. Therefore, the relative error in the O_2 absorption band is typically higher compared to CO_2 where the O_2 absorption is strong as the absolute radiance is small in this region (although the absolute error may be similar). In addition, the largest relative error occurs where the O_2 absorption varies significantly with wavelength, especially in the wings of the R branch. Here errors resulting from slit function uncertainties but also by spectroscopic errors (including line mixing effects etc.) may have a much larger impact compared to the relatively weak CO_2 absorption which varies less at SCIAMACHY resolution.

P5489 L16: Will be inserted.

P5490 L10: Will be considered.

P5495 L25-26: Yes. This information will be added.

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P5496 L9-12: Will be considered.

P5497 L26: Will be considered.

P5504: Anthropogenic CO_2: For the revised version of the paper we will add more details on this aspect including a discussion of aerosol related errors and sampling aspects (please see our detailed answers to the comments made by the third referee, Houweling et al., 2008). We will also add that elevated CO_2 can be observed over several other anthropogenic source regions such as the eastcoast of the US, parts of China and Japan (e.g., around Tokyo). Taking the comments of all three referees into account and that at this stage we can provide evidence that we can detect the regional anthropogenic CO_2 but can strictly speaking not proof this (due to the difficulty of accurately quantifying the error of the highly averaged data) we will replace "can be detected" by a less strong statement.

P5504 L14: Will be corrected.

P5507 L5-10: Yes. We will aim at doing this using for example higher resolution model data. Especially for one important aspect we will add more details for the revised version of the paper: In the ACP discussion paper we were not able to offer a clear explanation for the differences w.r.t. CarbonTracker concerning the seasonal cycle over the southern hemisphere. For the revised version of the paper we will offer a very likely explanation. Our recent studies have shown that a large fraction of the differences can be explained by interferences with subvisual cirrus clouds.

P5508 L15-16: Will be done.

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Figure 6: This information will be added.

References:

Houweling et al., 2008, ACPD, 8, S2530-S2534.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5477, 2008.

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Interactive Comment