

## ***Interactive comment on “Three years of greenhouse gas column-averaged dry air mole fractions retrieved from satellite – Part 1: Carbon dioxide” by O. Schneising et al.***

### **Anonymous Referee #1**

Received and published: 20 March 2008

General Comments: A thorough paper (albeit slightly long) examining SCIAMACHY WFM-DOAS CO<sub>2</sub> retrievals. The scientific content is good and the paper is well presented. It should be accepted for publication when the minor issues listed below have been addressed.

Minor Comments:

P5482 L24: Remove 'of the appropriate material' as it is unnecessary.

P5483 L13: Grammar, replace '60 km across track times 30 km along track' by '60 km across track by 30 km along track'.

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P5484 L19: Please use the same notation for the polynomial as specified in Eqn 2.

P5486 L20-30: How accurate is the method for retrieving the surface albedo using the pre-calculated radiances?

P5489 L4-7: Why is the RMS fit residuum quality threshold for O<sub>2</sub> much greater than that for CO<sub>2</sub>? Insert a sentence to explain this.

P5489 L16: Insert a sentence to explain why SZA less than 75deg are only used.

P5490 L10: I think you should replace 'which may be difficult to quantify' with 'which are difficult to quantify'

P5495 L25-26: Is the calibration performed using the ESA SciaL1C tool? If so, please mention this.

P5496 L9-12: The two sentences are repetitive, remove.

P5497 L26: Please check the logical order of Figures 9 and 10 and swap the figures around if necessary.

P5504: I think it is a bold statement to say that anthropogenic CO<sub>2</sub> emissions can be detected by SCIAMACHY. For instance how do the authors know (although it is most likely) that the elevated CO<sub>2</sub> is from anthropogenic sources? However, in Figure 16 the SCIAMACHY CO<sub>2</sub> over the densely populated Cologne area is enhanced but could this be a residual aerosol effect missed by the quality filtering? Are such enhancements over other densely populated centres (e.g. Tokyo) also observed? If elevated CO<sub>2</sub> is consistently observed over other large urban areas then I think this statement is more acceptable. I would feel more comfortable if the authors would insert (P5505 L4) 'regional anthropogenic CO<sub>2</sub> emissions can be potentially detected' and also similar in the conclusions.

P5504 L14: Typo, insert spaces between numeric coordinates and latitude/longitude.

P5507 L5-10: Will the higher variability of the SCIAMACHY data compared to the

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CarbonTracker also be examined in the future?

P5508 L15-16: Typo, use capitalization for 'full spectral initiation'

Figure 6: Please mention that the Carbon Tracker use ECMWF surface pressures in the caption.

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

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8, S872–S874, 2008

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