**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Three years of global carbon monoxide from SCIAMACHY: comparison with MOPITT and first results related to the detection of enhanced CO over cities" *by* M. Buchwitz et al.

M. Buchwitz et al.

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Authors answers to Anonymous Referee #1 on paper Buchwitz et al., Three years of global carbon monoxide from SCIAMACHY: comparison with MO-PITT and first results related to the detection of enhanced CO over cities, Atmos. Chem. Phys. Discuss., 7, 405–428, 2007

First of all we would like to thank the referee for the constructive comments on our paper. Each comment will be carefully considered for the revised version of the paper. Below we give answers to each of the comments made by the referee.

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Answers to "Specific Comments":

Page 409, line 23

Details concerning the spectral fit will be added for the revised version of the paper (by adding a new figure showing an example fit). This will provide detailed information on which detector pixels are used and which not. This will also make clear how difficult the fit of the CO lines is (and also indicates why the choice of the pixel mask may be critical, see also next item).

Page 410, line 6

More information will be added concerning the impact of different pixel masks. As already indicated above, the fit of the weak CO lines is quite difficult because not many detector pixels are used and because of overlap with much stronger methane and water vapor absorption lines. Therefore, by removing pixels, not only the noise increases but also systematic changes occure. A new figure will be added to for the revised version of the paper to illustrate this.

Figure 8, right hand panel

Yes, the averaging kernels of SCIAMACHY and MOPITT are very different. The SCIAMACHY averaging kernels are close to unity whereas the MOPITT averaging kernels peak in the upper/middle troposphere, being close to zero at the Earth's surface. We have chosen for this paper to show a direct comparison with the CO

column data products of both sensors for several reasons: one is that for many applications the vertical columns are used and, therefore, we would like to provide details on how these data products compare. Of course much more sophisticated schemes are possible. A global comparison taking into account the different averaging kernels probably requires a global model. This is however considered to be out of the scope of the present paper. The referee is right that a simple subtraction of the columns needs significant interpretation. A detailed quantitative imterpretation probably requires a model. This however introduces additional assumptions. For this paper we simply wanted to show how the differences look like over and outside source regions. Of course much more sophisticated schemes should be used in the future.

Answers to "Technical Comments":

Page 407, line 14

The word "detailed" will be removed.

Page 411, line 21

Will be corrected.

Page 413, line 8

Will be corrected.

Page 413, lines 16-17

Will be corrected.

Page 414, line 10

Will be corrected.

Page 416, line 10

Will be corrected.

Figure 1

Figure caption will be improved.

Figure 4

Figure caption will be improved.

Figure 5

The referee is right that it is difficult to clearly see all the details. I tried to improve the figure without removing all the details but was not able to significantly improve the figure. I finally decided not to change the figure. The main information is contained in

the two (black and red) thick lines showing the average values for both SCIAMACHY and MOPITT. Both curves are clearly visible. All the other details are interesting but not really critical. We think that the most important information is to provide the reader with a feeling for the scatter of the data. This scatter is clearly visible even if it is difficult to distinguish between all the details.

Figure 6

Figure caption will be improved.

Figure 6

The figure will be splitted in four separate figures for better readability.

Figure 9

The black rectangle indicates the size of a single ground pixel. The quares are the 0.5 degree by 0.5 degree grid boxes (the SCIAMACHY data have been gridded using an 0.5 degree by 0.5 degree grid). The figure will be modified to better explain this.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 405, 2007.

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