

Interactive comment on “Application of

SCIAMACHY and MOPITT CO total column measurements to evaluate model results over biomass burning regions and Eastern China” by C. Liu et al.

Anonymous Referee #2

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This is a valuable and interesting paper and should be published after revision. Previous comments have dealt with some of the issues with the manuscript. In particular the correspondence between J. de Laat (1/3/2011) and the authors (6/3/2011) deals with some of the things that I would have raised, although probably in more detail than I would have done. The authors are already putting a lot into this one paper, and if much more were attempted I would recommend splitting it into several submissions.

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In concert with the other comments, the major point that I would like to see dealt with in the final manuscript is the degree to which the cloud-corrected, bias-corrected SCIAMACHY data can be trusted. With each of these corrections, there are significant potential improvements in the measurement, but with the added complexity comes more potential for things to go wrong. As others have pointed out, a wider set of comparators than just the MOPITT data would be advisable.

Some specific comments:

1. Page 1268 Line 17-22 There is an impression in the text that the SCIAMACHY data have an enhanced sensitivity to CO concentrations near the surface. “Thus, in contrast to observations in the thermal IR (...), SCIAMACHY measurements have a substantially higher sensitivity even for the atmospheric layers near the surface.” It might be just a point of language but Fig. 4 shows clearly and correctly that SCIAMACHY has a reduced sensitivity to near-surface layers, but nowhere near as severely reduced as MOPITT. There is no “higher sensitivity” near the surface, only lower sensitivity in varying amounts.
2. Page 1270 line 17 ... in order to correct for the remaining biases... I believe that this phrasing better reflects the authors’ intentions.
3. Page 1280 line 15 Not sure what is meant by the statement “about half of that in the red spectral range”, nor sure what the motivation or significance of the changed value would be.
4. Page 1285 line 16 “Over the biomass burning regions very similar seasonal cycles are found in both data sets. In most cases the SCIAMACHY CO VCDs are systematically higher than the MOPITT CO VCDs indicating the higher sensitivity of SCIAMACHY towards the surface.” That is certainly one interpretation of the data, but since the datasets are not totally independent, some other evidence would make the case more compelling.

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5. Page 1295 Line 8 – see comment #1 above.

6. Page 1311 Figure 7 The attribution of the variations in the apparent values of CO over Si Chuan province to cloud effects needs more justification than “is probably related to the effect of clouds”. It is a significant variation that needs some significant explanation.

7. Page 1324 the Figure 11 panel on this page is the same as that on Page 1317.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 1265, 2011.