

Interactive comment on “SCIAMACHY CO over the oceans: 2003–2007 interannual variability” by A. M. S. Gloudemans et al.

Anonymous Referee #2

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The article of Gloudemans et al. describes novel estimations of CO in the cloudy troposphere over the oceanic scenes employing the Near InfraRed (NIR) CO-sensitive SCIAMACHY radiances. This well-written paper represents the first multi-year dataset of global CO column measurements retrieved by the NIR sensor over the land and ocean. The multi-year data were compared with the comprehensive chemistry-transport model simulations highlighting the value of CO global observations to optimize surface CO emissions. The study discusses the strong year-to-year variations of CO from SCIAMACHY. Authors emphasize the potential impact of the SCIAMACHY data to evaluate and constrain model predictions. Manuscript contains brief comments and references on comparisons between SCIAMACHY CO and other CO data acknowledging the previous studies of global CO observations by space-borne instruments.

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General and Specific Comments:

1. Discussions of the first figures, related to the new algorithm (comparisons of IMLM versions) and statistical analysis of data vs model results should convince that TM4 can help to evaluate different versions of data. I recommend adding (or rewriting) a paragraph that describes essence of de Laat et al. (2007) statistical analysis (page 5590) to understand properly discussions and illustrations provided by Figs. 3-4, and 8.

2. Paper highlights a value of new CO product to perform data fusion studies (assimilation and/or optimization of emissions). It would be useful to comment on the data-data differences between SCIAMACHY/SRON and SCIAMACHY/Bremen retrieved CO products (over the land) for data analysis studies.

3. Suggestion: the title of manuscript “SCIAMACHY CO over the oceans . . .” may be replaced onto “SCIAMACHY CO over the oceans and land . . .” because in the discussions of interannual variability (section 4) authors analyzed (explicitly or implicitly) the land CO data (Figs. 11-14). The second paragraph of the abstract (“The five year of CO data over the land and clouded ocean scenes. . .”) may confirm this suggestion.

4. To advertise the multi-year SCIAMACHY/SRON CO data for chemical analysis I suggest commenting on typical number of high quality data points over the globe (land and ocean, daily or monthly) that can be analyzed. The good place to provide this information for potential users is a section 3.3.

Minor comments:

1. I suggest to use the unified dimension for CO columns (text and Figures) e.g. molec/cm² rather than 1/cm²

2. Page 5602 (15), Conclusions: “. . . interannual variations of biomass-burning emissions derived from . . . fire emission database GFEDv2..”. These unclear details on the specification of TM4 CO emissions do not belong to the conclusions. Sentence

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can be rephrased to emphasize that the year-variable CO surface emissions of TM4 (or year-to-year variations of simulated TM4 CO columns) correlate well with observed variability of CO from SCIAMACHY/SRON.

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