

Interactive comment on “Global estimates of CO sources with high resolution by adjoint inversion of multiple satellite datasets (MOPITT, AIRS, SCIAMACHY, TES)” by M. Kopacz et al.

Anonymous Referee #1

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This is a very well written paper describing the inversion of CO using retrievals from three satellite instruments. The work performed is described clearly and thoroughly. Previous work is well referenced. The results are clearly presented and explained. I feel the paper is worth publishing after addressing a few minor comments.

1) Section 2: While the paper gives the equations used to describe the relationship between the retrieved CO and the true profile, the times of retrievals that each instrument uses is not mentioned. It should be pointed out that MOPITT and TES (and maybe SCIAMACHY) use the optimal estimation technique described by Rodgers (2000), while AIRS uses a rather different retrieval (see, e.g., Warner et al., 2007, which you

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already reference). I think it is important to note this. While the paper concludes MOPITT and AIRS are generally consistent, the different retrieval procedures could explain some differences.

2) p.19978: Please clarify whether or not the anthropogenic a priori emissions have seasonal variation.

3) p.19979; Fig.5: Seems like it would be better to show a full year of TES data, such as the same time period as used in Fig. 6.

4) p.19983: What is used for the model error? Or do I misunderstand? When you say ‘We estimate the latter ...’ it sounds like you refer just to the representation error, but maybe you mean you use RRE to determine the observational error matrix? Please clarify.

5) TES is included in the title of this paper, and promoted in the abstract as being used for the evaluation of the a posteriori emissions, however, all that is given is a very brief paragraph on p.19992. A figure showing the results of the comparison (e.g., scatter plot as in Fig. 6) would be useful.

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