

Interactive comment on “Modeling global atmospheric CO₂ with improved emission inventories and CO₂ production from the oxidation of other carbon species” by R. Nassar et al.

Anonymous Referee #1

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This is a very comprehensive paper on the extension of GEOS-CHEM to simulate the formation and transport of the CO₂ associated with the oxidation of carbon species such as CO. This paper will be ready for submission after the authors address the following comments and questions.

1. Page 893, lines 7-4: this seems like a repetition of previous statements.
2. Page 894, line 9: are those biospheric fluxes of all carbon species or just CO₂
3. Page 895: please redo Figure 1, it is way too small.
4. Page 897, lines 1-5: this seems very much like an ad hoc choice. Could you

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substantiate?

5. Page 900, lines 1-9: this section needs clarification as it is unclear if the results discussed here are in agreement or not with other studies.
6. Page 900, line 25: add minus sign for consistency on negative numbers as sink. In addition, it is not clear to me if the ocean sink should be represented as a sink or sink rate? Since the models are changing the CO₂ distribution, one would think that a rate would be more appropriate. But maybe the uncertainty is so large that this is not important.
7. Page 907, line 25: Could CH₄ be playing a role in this distribution?
8. Page 909, lines 1-8: without the imbalances, would the change in CO₂ column exactly 0?
9. Section 2.7.3: it is unclear why this is not actually taken into account with the emission correction. Changing the CO distribution only means that the surface emission correction is different?
10. Section 3.1: a scatterplot (Figure 10) might help visualize the results better.

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