

Interactive comment on “Where there is smoke there is mercury: Assessing boreal forest fire mercury emissions using aircraft and highlighting uncertainties associated with upscaling emissions estimates” by David S. McLagan et al.

Anonymous Referee #1

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General Comments

The manuscript estimates Hg emissions from wildfires using different methods based on aircraft measurements of GEM, CO, CO₂, CH₄ and NMHCS and also assesses the uncertainty of these methods. The manuscript provided thorough data analysis and the work would make important contribution to study Hg emission from biomass burning. However, my major complain is the structure of the manuscript and the presentation of tables and figures, which makes it hard to read and go through. Some paragraphs are really long, and it is hard to process the information. It would be helpful to break them

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down when possible. Please also see the following section for detailed comments.

Specific comments:

1. Line 127: what are NNW and NNE? please spell them out.
2. Figure 1: what are the red circles for? Please explain them.
3. Please change the label A and B to (a) and (b) to be consistent with the figure captions from Figure 1 to Figure 5.
4. Line 300 - 301: it is not clear how the Hg emissions estimates are based on CO, CO₂ and CH₄ as reference compounds.
5. Figure 3 is a little hard to read with different axis for different species. Is it possible to normalize the numbers somehow and just use one axis so that the figure is more readable?
6. Section 2.4 includes so much information and it would be helpful to break it down or better organize it. For example, one section can discuss in general how Hg emissions from biomass burning are estimated from ERs and EFs, which provides the background information. Then, another section specifically describes the four different methods used in this work. It is also helpful to make a table to list the four different methods used in this work which would make it easier to see the difference and similarity. It is hard to go through so much text information.
7. Line 238: how is 125% decided?
8. Section S6: The table should be moved to the main text rather than in the supplement as it is part of the method section.
9. Table 2 is hard to read. It would be helpful to break it down to three tables.

Corrections:

Line 45: inspiration? You mean respiration?

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Line 220: CO₂ and CH₄, make sure the subscript formats are correct

Line 257: the * symbol is missing in equation (3)

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1119>, 2020.

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