

Interactive comment on “Insights from mercury stable isotopes on terrestrial – atmosphere exchange of Hg(0) in the Arctic tundra” by Martin Jiskra et al.

Anonymous Referee #5

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Overall, I think this is a very nice paper, certainly worthy of publication in Biogeosciences. I think the authors do mostly a good job of integrating their previous and directly related work to the results of this study, but I can possibly agree with other reviewers that it does at times come across as slightly confusing what things are new findings and what are not. That said, the paper overall hinges on very novel measurements of Hg isotopes in both snow interstitial air and soil air. It also presents some nice gradient based measurements of Hg flux and atmospheric stability, which I think do add nicely to the other parts of the paper. I do think the previous work, since it complements these new and novel measurements so well, is in the end largely written in a way that I think is entirely acceptable. If anything, the authors could perhaps go out

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of their way a little more in the conclusions to more explicitly pinpoint and take credit for the particular novelty of this work in comparison to their previous work.

Specific comments:

Final paragraph of introduction: I find the write-up of these objectives miss the mark a little because they are vague. Is the purpose really just to “better understand” something or is it more pointed in trying to examine whether certain hypotheses hold up when doing some novel measurements? The list of measurements and such comes across as somewhat less focused than is actually presented. I think it is totally fine that this paper is a little descriptive, but I do think this last “purpose” paragraph could be a little more specific.

Line 36 of page 3: Is this large a variation in sample yield problematic for isotope analyses? It seems large to me, especially for mass dependent work, but if it is no issue, this could be stated here.

First half of first paragraph of section 3.1: This discussion is a little hard to follow because this study measures Hg isotope values in interstitial air, but refers to other studies that measure Hg isotopes in snow itself. Given the discussion, it seems a little unclear whether the snow interstitial air isotope signature is slightly processed (e.g., partially deposited) atmospheric mercury or is re-emitted from the snow itself into the interstitial air. I am sure this is a minor thing and just a point of clarity.

Line 35, page 6: I am unsure about the jump to referring to figure 6 here. I do not believe either of figures 4 or 5 have been introduced yet.

Line 18, page 7: Though this says Figure 11, it looks like “figure eleven”. Perhaps this could be formatted differently to avoid confusion unless this is the required convention?

Figure 2: I am unclear on whether the upper values are air above the snowpack or are indeed interstitial snow air? They appear to be above the average snow heights.

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