

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 #3

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Overall, I enjoyed reading the manuscript by Jiskra et al. on "Insights from mercury stable isotopes on terrestrial – atmosphere exchange of Hg(0) in the Arctic tundra". I agreed with another review that perhaps some information and data have already been presented in previous papers by the team, but I also think this is a very nice "wrap up" paper for all these results, they are complicated and I think the authors did an excellent job to put together the story, despite with some degree of uncertainty.

I agree with most comments posted by Referee 1 & 2, I only have minor comments here and one suggestion as listed below:

P.2 L3: State percent of Hg to Arctic Ocean derived from Arctic Rivers? I thought Sonke

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et al. (2018 PNAS) found that values. P.2 L4: Suggest "... bioaccumulates and bio-magnifies...", without the latter, we don't have too much Hg problems. P.2 L21: Do you want to emphasize abiotically, photochemically and microbially induced re-emission of Hg(0)? How they may be distinguished by Hg isotopes? P.2 L28: Regarding to "triple isotopic fingerprint", I think we mainly rely on MDF and odd-MIF for that, less so with even-MIF, right? P.2 L29: Regarding to "60-90% of Hg in soils is derived from Hg(0) uptake by vegetation", does this already account for wet vs. dry deposition only? how about geogenic source? P.3 L24/25: State the lowest amount of Hg needed for isotopic analysis. P.3 L30/31: Not quite clear to me about "40 vol.% 2HNO₃:1HCl"? P.5 L29: Typo-arctic snow P.5 L39: Wrong unit: ~2000 ng m⁻² P.6 L35: Is it correct to refer the text to Fig. 6 here? P.7 L1/2: For "...as a promising tracer to distinguish between atmospheric deposition of Hg(II) in precipitation...", do you mean to distinguish deposition of precipitation Hg(II) from gaseous Hg(0)? P.7 L31: Such large, estimated enrichment factor is interesting to see, would be interesting to propose how to "test" that experimentally. P.8 L1-10: This is cool explanation! Last suggestion: Besides summarizing better on the seasonal differences on these processes as suggested by another referee, I wonder if vegetation uptake is the dominant pathway for Hg(0) to deposit onto arctic tundra soils, should the authors consider here (or another paper) to show the global warming effects on Hg(0) deposition in longer summer in the future, and any impacts on Hg isotopic signatures in soils?

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