

Biogeosciences Discuss., referee comment RC1
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Comment on **bg-2022-124**

Anonymous Referee #1

Referee comment on "Internal tree cycling and atmospheric archiving of mercury: examination with concentration and stable isotope analyses" by David S. McLagan et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-124-RC1>, 2022

bg-2022-124_reviewer

Reviewer's comments:

The manuscript entitled "Internal tree cycling and atmospheric archiving of mercury: examination with concentration and stable isotope analyses." by McLagan and co-authors examine THg concentrations and stable isotopes in two coniferous tree species, Norway spruce and European larch, surrounding a legacy Hg contaminated site in the German Black Forest. The goals of this study are to investigate if historical records of the industrial activities correlate with elevated THg concentrations in tree rings of sampled trees, to examine potential source related variations in MDF and MIF across the tree ring records and physiological processes that may separate pools of Hg in the transport mechanism from atmosphere to foliage to phloem to tree-ring/bole wood, and to investigate if deposition and sorption of Hg to tree bark is the dominant mechanism for bark Hg. For its overall quality and for being of interest to a large audience, this manuscript is worthy of publication to Biogeosciences. I would like to ask a few questions.

Major comments

- As a research setting, I would like to know why THg concentrations and isotope analysis were not performed for needles and soils as well. I think those data, rather than speculating from the literature, would have allowed us to correctly assess the adsorption and transport of mercury in this type of tree.
- Have you confirmed that mercury does not escape from samples that have been freeze dried, and that Hg isotope does not fractionate during freeze dry? Is it possible to correctly evaluate the original mercury concentration if the moisture content differs between the inside and outside of the wood (top and bottom?)?
- L196-197: Apple Leaves and China Soil were used for quality control. Although the major components of those two RMs and trees are very different, is it appropriate to use these two species as a confirmation of the pretreatment method? The same question applies to the RMs used in the isotope analysis.

Minor comments

- L165: "Bole wood (tree ring)..." A description of "Bole wood (tree ring)..." is found in L165, but A first appeared in L57. The explanation in parentheses should be placed in L57.
- L167, L172: Why is the height of tree samplings different between the two?
- L180: Heating temperature and duration of THg measurement are written in sample preparation part. Information on combustion should be included in the measurement, not in the preparation.
- The "Spruce" in "Spruce *" and "Spruce ISO*" is better to be capitalized (* is number).
- L238: Parenthese is not written. It should be "(no larch trees reached the 1stIP),"
- L241: It may be necessary to add and between sentences as following; "from tree rings in the BGP, and up to 521..."
- L302: saplings => samplings
- L422: "phloem (first layer of bark)..." A description of "phloem (first layer of bark)..." is found in L422, but A first appeared in L91. The explanation in parentheses should be placed in L91.
- L441: Please describe the variation of a GEM concentration (1.49 ng/m³).
- L466: Delete a space between ISO and 6.
- Table S4.1: "Spruce ISO5 (cont.)" needs to be deleted.