

Response to Charles Driscoll

The referee comments are in black, while the author comments are in **bold print** and blue.

The article “Physiological and climate controls on foliar mercury uptake by European tree species” by Wohlgemuth et al. [bg-2021-239] summarizes an important study which examines controls on foliar mercury concentrations across several European tree species. This article is important because the authors synthesize mercury patterns across a relatively large spatial area involving many observations of different tree species and interpret these patterns in the context of tree physiological traits and climate conditions which control stomatal conductance. While the study presents few new findings, the authors do a great job presenting, synthesizing and interpreting their findings in context of a rather broad literature. Also based on their observations, the authors make recommendations for global mercury models to improve simulation of the role of “global vegetation as a mercury pump” and allows for depiction of the effects of changing climate on this important process.

The manuscript is well written and well organized. I only have a few minor suggestions below. I recommend the publication of this paper pending minor revisions.

Thank you a lot for your comments and the positive assessment of the manuscript.

Specific comments

Line 80. ...deposition to the **land surface** may ...

revised as suggested

Lines 96, 176, 243, 304, 329 and 335. The wording should probably be “among” rather than “between”.

Thank you, we will change accordingly.

Lines 152, 203, 215 and 414. "*in-situ*" should be in italics.

We will set *in-situ* in italics throughout the manuscript.

Line 179. ... needles and **largest** average ...

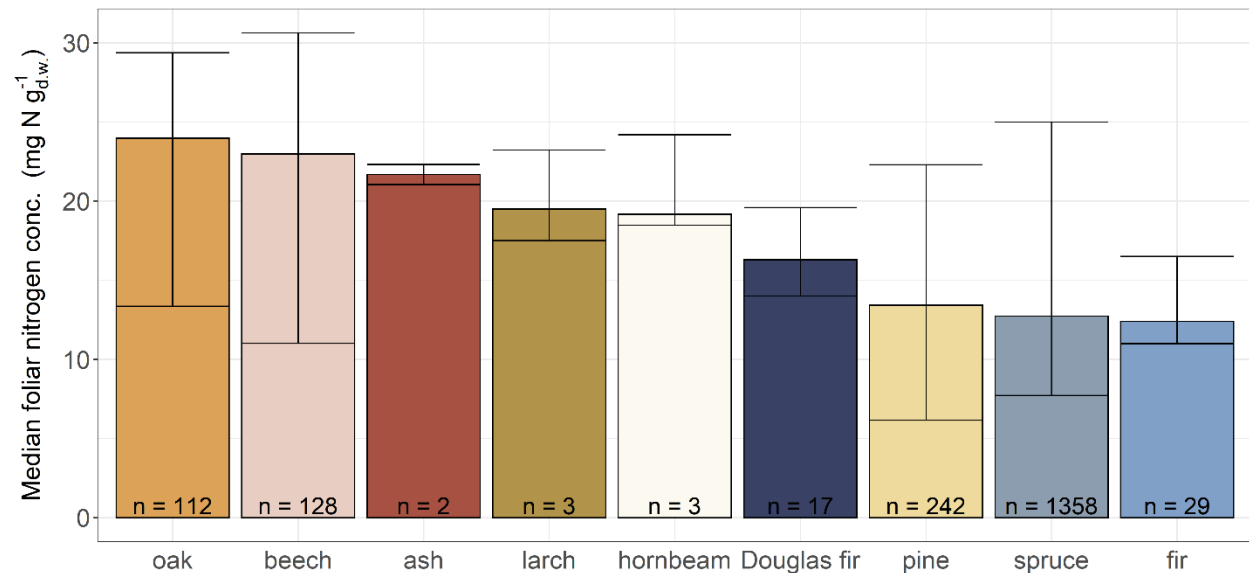
revised as suggested

Line 199. ... at various **dates over the annual cycle**, making ...

We will change it accordingly.

Figure 3. The authors might point out that the range of observations for species with a large number of observations is large compared to species with few observations and the reason for this variation.

A possible reason for the wider variation in daily Hg uptake rates for species of large sample numbers could be the greater range of foliage N concentrations in these species (see figure below). In Sect. 3.3 we discuss a positive relationship between foliar N and Hg uptake. The pool of foliage sample sites of tree species like beech and spruce are more diverse in terms of nutrient availability than of tree species like larch and Douglas fir, which possibly results in a greater variation of daily Hg uptake rates of beech and spruce. We will add the sentence to the manuscript: “Variation in daily foliar Hg uptake rates within a given tree species group could result from differences in physiological activity or foliage structure (see Sect. 3.3 and 3.4).”



Line 345. Average LMA values was ...

In response to a comment by referee Håkan Pleijel we will give all values from Figure 4 including average LMA in a table in the Supplement. Therefore, the sentence of Line 345 will read: “Error! Reference source not found. shows average LMA values (mean ± sd) of the subset of samples where LMA was reported, resolved by tree species, along with respective average daily Hg uptake rates and associated foliar N concentrations (all values displayed in Fig. 4 are listed in Table S3; see Fig. S8 for density plots of datasets from Table 2 and Fig. 4).” We will give numbers of LMA values for broadleaves and coniferous needles later in this Sect. 3.4.