This manuscript presents results of a field experiment to identify root water uptake using isotopically labelled irrigation. The measurement techniques are state of the art, which is to say that they are difficult to implement and interpret. The results are satisfyingly clear in terms of temporal behavior of isotopic composition of soil water and sap, and the experiment is thus a rare opportunity to quantify processes that are difficult to observe. The strength of the results lies in the spatial observations of tree water uptake, and the weakness is the mass conservation estimates. Some improvements in mass conservation estimation might reduce some of the considerable uncertainty that derives from recovering less than 5% of the tracer.

Thanks for these supportive comments. We address the mass-balance questions below.

L162 “UD” does not appear in Eq 1, and is later defined as something else (L167). Please move L168 to L162.

Correct, we will fix this. Equation 1 estimates total water uptake and Eq. estimates mean depth of uptake (UD).

L171 what is the exact scope of this non-evaporation assumption? For example, do the berry bushes count in the reported LAI or not? Also, mosses are a nontrivial pathway for E (e.g., Heijmans et al. Global Biogeochem Cycles 2004). Finally, Fig 4b, 5a pre-labeling lce<0 and vertical profiles of 2H both suggest soil evaporation (though there are also other possible explanations for these conditions). If the flux tower data and pre-labeling soil isotopic profiles are not sufficient to resolve the soil/moss/understory(?) E flux component, some rough, literature-based or isotope-based estimates would be helpful for estimating biases introduced by assuming it to be zero.

The assumption at line 171 refers to our estimate of mean uptake depth, which requires that a negligible amount of soil water is disappearing by evaporation. Given that our shallowest VWC measurement was made at 10 cm depth in the mineral soil, we think this is a reasonable approximation, especially as we applied the label below the moss layer and the bilberry canopy. In fact, we injected the label into the mineral soil precisely to avoid the evaporation, which would otherwise have been substantial. Moreover, especially during the long drought period, the dryness of the forest floor and the upper mineral soil would have limited the supply of water for surface evaporation. We return to these issues in the section on mass balance. We will add a caveat stating that the estimates of uptake depth do not account for uptake above 10 cm depth, but that we speculate it was negligible as the drought developed.

What is the likely magnitude of downward unsaturated flux—i.e., to a zone below the soil moisture sensors? If unaccounted for, this flux would give upward bias to estimates of water consumption in upper layers—more bias the shallower the layer.

We installed sensors down to 100 cm, but did not detect the label and did not detect a change in VWC there. The label was detected as deep as 70 cm at the end of the experiment and that may have been due to water vapor transport or unsaturated flow. However, the label intensities at 50 and 70 cm were so low relative to the upper horizons that we think that unsaturated downward transport was a minor proportion of the total, which would limit the bias in the estimate of uptake depth.

Fig 1 shows 8 trees within 4 m of the injection. This is a tree-dense part of the forest. What does this mean for extrapolation of the results to the stand scale?

Good point. 8 trees in 50 m^2 yields a density of approximately 1600 trees/hectare. The measured stand density was 1010 (sd =125) trees/hectare (Lim et al., 2015). So it is true that the labelling was placed in a tree-dense microsite. This was done to be able to reach several trees with the tubes that led to the analyser at plot center. We now recognize that the plot was not representative of stand density, but note that the observed root overlap was similar to estimates using 15N on replicated plots elsewhere within the stand (Henriksson *et al.*, 2021)**.**

L198 the whole-tree-bore equilibration method causes samples to equilibrate with all water along the hole, whereas the tree water might be dominated by recent uptake only at the outer few mm of xylem. Just as Marshall et al (2000) addressed this, it would be helpful to add some discussion of the likely magnitude of this effect in this experiment.

Agreed. We will remind the reader of this, but will also point out that the outer rings have the largest cross-sectional area and support the highest flow per area.

I think the Label Recovery section of the discussion more properly belongs in the results. Also, what are the consequences for the soil depth uptake calculations of accepting some alternative hypotheses about the fate of the unrecovered 95%+ of tracer?

Yes, we will move label recovery to the results. The uptake depth was estimated from VWC only, not from isotopic data. Nonetheless, the recovery estimates were similar between total water and the label. We will add some text addressing the possibility of unsaturated flow (discussed above) and preferential flow.

Fig 6 and its caption could be improved to explain the meaning of “days after labelling”—day of first observation? Also, isn’t it more logical to swap the axes?

We will change the x-axis label to "Days until label detection." The axes were placed this way because we were interested in the slope of this line, which we interpreted as lateral transport rate.

Are there no measurements of the monitored trees available? I expect differences in rooting and uptake might be related to things like relative crown size and sapwood area.

Unfortunately, we lack estimates of sapwood or crown area of the labelled trees. We provide measurements of the stand characteristics made nearby. Fortunately, the stand is quite uniform.