We thank the reviewer for the useful comments and respond to them in blue font after the original comment in black font.

Reviewer 1

The manuscript "Soil and stem xylem water isotope data from two pan European sampling campaigns" presents a genuinely interesting data set as a result of an exemplary team effort. I can imagine that the presented data can help to answer some existing as well as to pose new questions regarding the investigation of tree water uptake with the help of stable water isotopes. I would recommend this manuscript to be accepted after minor revisions.

We thank the reviewer for the positive assessment of our manuscript. We agree that our isotope data are useful for an improved understanding of tree water uptake. Please find our point-to-point responses below.

The following issues should be resolved:

line 204: You requested 5 cm long sapwood samples. In the summer protocol you added 'Avoid sampling the heartwood'. Could you elaborate on why you added this to the protocoll and how well this instruction was subsequently followed by all contributors, especially the ones who sampled from trees with really small diameters (Tab 1 mentions minimum BHDs of 8 - 11 cm)? Do you think, that the isotopic samples of samples that included heartwood might skew your result? Do you think you could flag samples that might have inlcuded heartwood?

Thank you for this valuable comment. Although this aspect was mentioned in personal communications during online meetings before the first spring campaign, the core group decided to explicitly include the information (i.e. not to sample the hardwood) in the updated protocol for the summer sampling. In practice, one can often hear and feel when the heartwood is reached during coring, and we therefore think that in most cases the field crews correctly avoided it. We double-checked this aspect but could not reliably determine the presence of any heartwood after the water extraction, as dried samples lacked visible differences. As sapwood thickness varies with stem diameter and mature beech trees generally have thicker sapwood than mature spruce trees, small-diameter trees in our study, especially from spruce, may thus possibly include some heartwood despite efforts to avoid it. However, we decided not to flag individual samples as this could cause misinterpretation. Instead, we explicitly acknowledge this potential limitation for future data users and propose a solution in Section 2.3:

The wood cores mainly reflect sapwood as participants were instructed to avoid sampling the heartwood because there are indications of isotopic differences between sapwood and heartwood (Fabiani et al., 2022). However, we cannot fully rule out the presence of heartwood in some samples as visual determination of the heartwood after water extraction was not possible. A heartwood correction based on mean wood core length and tree diameter could be developed. Such an adjustment may be particularly important for samples from smaller spruce trees, which are likely to have limited sapwood depth (Peters et al., 2019).

line 250: An average gravimetric water content (gwc) of 40.9% seems pretty high for soil, especially if drier summer soil samples are included. For soils I am more familiar with typical values for volumetric water content (vwc), so maybe I'm just lacking an intuitive understanding of expectable gwc values. Could you explain why your average(!) gravimetric water contents ended up so high? Most of your soils are sandy loams, so if I'm not completely off with my gwc to vwc conversion, the average sample (including spring and summer) should have been very close to saturation. This does not seem right...

You are right that gravimetric water content (GWC) values should be interpreted carefully, in absence of direct volumetric water content (VWC) measurements. To clarify, GWC was calculated as GWC [%] = ((fw – dw) / dw) × 100, with fresh (fw) and dry weight (dw) measured in milligrams (but see Table 3). This is a standard mass-based approach to express the percentage of water relative to the dry mass of the soil. In the absence of any other site-specific soil moisture data like VWC, the GWC data can be used as a qualitative indicator of soil wetness.

To convert the GWC to a VWC, we need to multiply by the bulk density. We do not have this data but using an average number for woodlands across Europe of 0.73 g/cm^3 for 0-10 cm depth (Panagos et al., 2024, https://doi.org/10.1016/j.agee.2024.108907), we would get a VWC of 30%, which is perhaps closer to what the reviewer expected for the moisture content of the soil.

In addition, the high average value for soil GWC is partially influenced by the samples with high organic content for some sites but see also our response below. We now state in section 4:

"In combination with the gravimetric water content of the soil as a qualitative indicator of soil wetness (i.e., "gwc"; Table 3), gridded climate data, and precipitation isotope data (e.g., Nelson et al., 2021), the data could be useful for new soil and stem xylem water isoscape models and be used as complimentary data in hydrological studies"

Fig. 2C: Where do the really high gravimetric water contents > 200% come from? Are that measurement errors or is there another explanation for them?

These high gravimetric water contents are typical for organic soils, where the dry mass is very small compared to the amount of water retained. We now added in section 2.4:

"The very high soil gwc values (> 200%) were all obtained for samples from the ROT site and reflect the high organic matter content (i.e., peat soil) for this site."

Minor issues and some suggestions:

Fig.2: The caption refers to an inset in subfigure C, but the inset is shown in subfigure B

Thanks, we corrected the caption of Figure 2.

Fig.3: The legend item "Linear Model" in subfigure C confused me, since subfigure C does not contain such a line, but then I realized that this refers to the lines shown in subfigures A and B. Maybe you come up with a solution to improve this potentially confusing legend issue.

We removed "Linear Model" from the legend, as the black lines in Panels A and B clearly represent the linear regression lines.

Table 2: The aspect of the slopes could also be of interest. In case you have this kind of information, I suggest you add it to the data set.

Good idea, but unfortunately, we do not have the information on the slope aspect.

metadata.csv: Character encoding of the csv-files seems to be Latin3, my first guess of UTF-8 failed to properly display many of the special characters. Maybe add information on the proper encoding somewhere in the paper or within the repository.

Thank you for pointing this out. We have now updated all data files by converting them to UTF-8 encoding and standardized the delimiter to commas. This ensures that special characters are displayed correctly across platforms. We added a note in section 3:

"All .csv files are encoded in UTF-8 and use commas as delimiters."

Tab.5: The caption states that "Values in bold indicate the highest relative contribution...", but I do not see any bold values in the table...

Thanks for spotting this error. We now provide the corresponding values in bold.

Fig.6: The resolution of this Figure should be increased. The current version shows clear signs of compression artefacts. Better use a png-file, or even better better a vector graphic file format.

The available plots (including Figure 6) have been provided in screenshot quality to avoid large word and pdf files (as we had to share the document with many co-authors). Of course, we have high resolution plots for all figures, and we will provide them to ESSD in the final submission process to achieve the highest possible print quality.

line 74: The numbers in δ2H and δ18O should be in superscript.2

Thanks, corrected.

line 245-246: Apart from mean weight and maximum deviation, could you also specify the standard deviation?

Okay, we have modified the sentence and replaced the maximum deviation (= 0.3) by the standard deviation, now stating:

"The average weight of the exetainers was 13.0 ± 0.2 g (SD)."

line 271: "with [the] laser spectrometer"

Thanks, corrected.

line 277: "offset[s] between"

Thanks, corrected.

line 352: "than for spruce sites (41[%] in spring, 48% in summer)"

Thanks, corrected.

line 418: "standardized according [to] recently published"

Thanks, corrected.