

## ***Interactive comment on “Effects of climatic seasonality on the isotopic composition of evaporating soil waters” by Paolo Benettin et al.***

**Paolo Benettin et al.**

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Response to anonymous referee 2 :  
(referee's comments are reported in italic)

*This is a very interesting, well written and important manuscript. It is also very timely, as more and more ecohydrological studies are using isotopes to determine the source of water that is taken up by plants and these researchers may be tempted to use the intercept of the trendline through the soil or xylem samples to infer the isotopic composition of the source water. This study shows that this is clearly wrong (except for locations where the isotopic composition of the source water does not vary seasonally) and fortunately also gives a suggestion*

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*on how to obtain a better estimate of the isotopic composition of the source water (P12L12-18). The beauty and impact of the manuscript lie in the simplicity of the approach that was followed and the very clear figures. I highly recommend rapid publication of this manuscript and have only very minor comments or suggestions.*

We thank Reviewer 2 for these very positive comments on the manuscript

*1. P8L6: Isn't this the case for figure 4a as well?*

The sentence at Page 8 Lines 4-6 reads: “However, when residual water samples do not come from a single source (as in Figure 4), the trendline is not an evaporation line, and the intercept of this trend with the LMWL can lie far away from the average source water (and even far outside the range of all the source waters, as shown in Figure 4b)”. We believe that only in Figure 4b does the intercept lies “far outside the range of all the source waters”, as in Figure 4a it is rather close to the winter sources. We will look for ways to make the distinction between Figures 4a and 4b even clearer.

*2. P8L11: Can you clarify on what the  $x=0.58$  is based (i.e. why did you choose this value and not another value)?*

The seasonal patterns shown in Figure 5 were generated using sinusoids with growing means and growing amplitudes that are a function of the mean. Using mean = 0.3 and amplitude =  $0.9 \times \text{mean} = 0.27$ , one obtains a maximum value  $x = 0.57$  (and not 0.58, we see that the manuscript was slightly imprecise). To reduce the emphasis on this detail, we will reformulate the sentence as: “the five trendlines in Figure 5 are associated with different seasonal evaporation cycles, which feature similar low evaporation fractions in winter (roughly  $x = 0.03\text{--}0.05$ ), but different evaporation fractions in summer (roughly  $x = 0.15\text{--}0.60$ )”

*3. Perhaps add subheadings for the different results to make it even easier to follow or find the different analyses and results (from P6L26: evap from open*

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water, from P8L14: asymmetric evap, P9L2: evap from soil water mixture).

Thanks for the suggestion. We will separate this section into two or three subsections.

4. Figure 6: I would find it useful if evaporation lines connecting the residual liquid samples and the source water were shown as well – like it is done in the other figures.

Thanks for the suggestion. We will do this.

*Very minor editorial suggestions:*

*Title: Replace 'soil waters' by 'soil water'*

*Abstract: Make the abstract more concrete by removing some of the “qualifiers”: on P1L5: remove 'also', on P1L6: replace 'sometimes' by 'often'. Perhaps replace 'precipitation' by 'source water (and thus precipitation)'?*

*P1L17-P2L5: Either replace 'included' by 'focused on' or 'identifying' and 'quantifying' by 'the identification of' and 'quantification of'*

*P2L7: Remove 'at any location'?*

*P2L8: To avoid confusion with the trend line through samples of the remaining water, I would try to avoid using the word “trend” to describe the LMWL: replace 'follow a linear trend' by 'are linearly correlated' or 'plot on a linear line'*

*P2L12: Remove 'Collections of'?*

*P3L1-2: Replace 'waters' by 'water'*

*P3L15: Insert 'open water and' before 'soils' as it also describes the situations for shallow open water or small reservoirs*

*P3L12-14: Write in past tense 'simulate' -> 'simulated' and 'introduce' -> 'introduced'*

*P3L26: Add 'and' and 'It is. . .ratios' from the next sentence to the end of the sentence ending with 'equilibrium'*

*P3L26: Do you really need the 'super' here? Isn't it is just the ratio of the two isotopic ratios?*

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*P4L16: Replace 'under' by 'for'?*

*P5L6: Move the part 'with parameters. . .n=1) to the caption of the figure. It is more informative there*

*P6L15: Replace 'ensures' by 'ensured'.*

*P6L16: Replace ', and thus aids visualization' by 'aiding interpretation and visualization'*

*P6L16-17L Remove 'data. . .All the' and add reference to Figure 3 at the end of the sentence (after 'seasonality')*

*P6L20: Replace 'evaporation seasonality' by 'seasonality in evaporation rates' to make it clearer that this is the rate or fraction of evaporation and not fractionation or the conditions during which evaporation takes place. Replace 'modeled' and 'using' by 'represented' and 'by'?*

*Caption Figure 4: Replace 'evaporation seasonality' by 'seasonality in evaporation rates (represented by x, the fraction of the initial volume that has evaporated)'*

*P6L9: Replace 'feature' by 'represent'*

*Caption figure 7: Replace 'are' by 'were'*

*P11L7: Remove 'ecohydrological' or put it in parentheses*

*P11L12: Replace 'out' by 'the'?*

*P12L12: Replace 'would give' by 'gives'*

Thanks for these suggestions, which we will keep in mind as we finalize the manuscript.

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