

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

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We thank Anonymous Referee #1 for their supportive comments on our manuscript. Referee #1 encouraged us to formulate several elements of the title, introduction, and abstract in stronger terms. We previously considered alternative titles that pointed more strongly to one of our main results, namely that so-called "evaporation lines" in soil waters are often artifacts of seasonality in precipitation isotopes and climate. We elected to use a more general title instead, because our analysis goes beyond just this point, to illuminate climatic effects on soil water isotopes more generally.

Likewise, the reviewer encouraged us to strengthen the main conclusions in our

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abstract, "Here we use numerical experiments based on established isotope fractionation theory to show that these trendlines are often by-products of the seasonality in evaporative fractionation and in the isotopic composition of precipitation. Thus, they are often not true evaporation lines, and, if interpreted as such, can yield highly biased estimates of the isotopic composition of the source water". We believe it is important to keep the word "often" in both sentences, not as a matter of false modesty but instead as a matter of technical accuracy. Specifically, apparent "evaporation lines" may really be evaporation lines, in cases where the isotopic source of the evaporating soil water does not vary seasonally (for example, in locations where there is not significant variability in the isotopic composition of precipitation, or where soil water is supplied by exfiltration of old groundwater with constant isotopic composition). Thus our concluding statements would be inaccurate if they were stated as absolutes.

The reviewer notes, *"P2L13-P3L10: several time you write: 'If...If....this should be valid if ....But what if the don't?' But if you know something is incorrect then also write it like this. For example: 'The erroneous interpretation of these trendlines as single-source evaporation lines, ...'"*. We do it this way because we are defining the key question to be explored in the paper. At this stage in the paper, we do not "know" (or at least we haven't proven) that interpreting trendlines as evaporation lines is erroneous, so we need to state it as a question rather than a conclusion. In revising the conclusions section of the manuscript, however, we will look for opportunities to state our conclusions even more clearly.

The reviewer's last comment is, *"Lastly, the authors mention xylem water samples but as they neglect transpiration in their analysis (I agree) I think it is more correct to only talk of soil water samples"*. We appreciate the point that we mention xylem in the abstract and introduction, but then we don't discuss it further. Rather than omitting xylem water entirely, we think that a better approach is to revise the paper to explicitly state

that because plant uptake is generally not strongly fractionating, xylem water composition will closely follow the composition of the soil water, and thus our conclusions will also apply to xylem water. We think that this is important because trendlines have been mis-interpreted as evaporation lines in both xylem water and soil water.

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