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Reply on RC3

Christoph Lécuyer et al.

Author comment on "Seasonal $\delta^2\text{H}$ and $\delta^{18}\text{O}$ changes in river water from a high-altitude humid plain of the southern Alps (Cervières, France): tracking the transit time through a watershed" by Christoph Lécuyer et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-132-AC3>, 2022

Dear reviewers, dear editor,

First of all, I would like to thank the three reviewers for the fair and elegant comments they made on our work. It is obvious that two of them, both with an academic background of physicists, provided negative recommendations for publication of our case study in HESS, while the third one, a geochemist was more enthusiastic.

Our basic idea was to consider a single and simple watershed to monitor the $d_{18}\text{O}$ and $d_2\text{H}$ of the Cerveyrette stream over two years. The isotopic record we obtained was interpreted as a seasonal record of ongoing precipitations delayed and buffered by the annual complete melting of the snowpack, keep in mind that there is no permafrost here with altitudes that remain below 2500 m in any case. Please, note also that the $d_{18}\text{O}$ and $d_2\text{H}$ variations are of very small magnitude and require very careful and optimal analytical conditions to be detected. Dephasing and flattening of the observed signal recorded in the stream is quantified relatively to the seasonal isotopic record of precipitations, itself inferred from the local meteorological data including monthly air temperatures combined to the equations relating the air temperature to the isotopic compositions of precipitations. Furthermore, it is well known since Rozanski et al. (1993) that the most negative $d_2\text{H}$ and $d_{18}\text{O}$ values of precipitation in Europe take place during the coldest months of the year. Our approach is indeed close to that used by Niinikoski, et al. (2016) who used stable isotopes to resolve transit times and travel routes of river water as exemplified by a case study from southern Finland.

We are aware that two reviewers recommended the rejection of our paper, so we consider to revise our manuscript taking into account all the comments, criticisms and suggestions we received from the reviewers before to submit it to a less-specialized journal.

With my best regards

On behalf of all co-authors

Prof. Dr. Christophe Lécuyer

