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Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Water stable isotopes (δ^2H and δ^{18}O) in the Peninsula of Yucatan, Mexico" *by* Eduardo Cejudo et al.

Anonymous Referee #1

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General comment

This manuscript focuses on presenting isotopic data of precipitation, groundwater and soil water sampled in the Peninsula of Yucatan, Mexico. The authors determined the regional meteoric water line for the study area, and discussed the origin of precipitation, as well as the variability in the isotopic signature of groundwater. I think the topic of this manuscript is potentially interesting for the readers of the journal, and I appreciated the effort done by the authors for the compilation of the isotopic dataset, which is based on a literature search and the collection of unpublished data. However, the paper needs a careful revision because the topic and the objectives of this study are not well presented in the introduction, the results are poorly described, and some discussion sections are disconnected from the rest of the manuscript. Furthermore, I think the

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manuscript would benefit from a careful revision of English, due to the presence of some awkward terms.

Specific comments

- The current introduction section (lines 22-39) presents basic definitions and a generic explanation of the first applications of stable isotopes in tracer hydrology. I think the authors should narrow down the introduction to the specific topic of the manuscript, and clearly identify the research gaps (more recent references should be added as well). Furthermore, section 1.1 only highlights research gaps, specific of a study area, whereas the readers of Hydrology and Earth System Sciences could be more interested in a manuscript with a focus that is not only strictly-related to the specific study site.

- The main and the specific objectives of the manuscript are not clearly presented. I think the authors should reformulate lines 50-57 (page 2).

- I think the manuscript lacks a table summarizing the isotopic data compiled by the authors (e.g., water type, sample size, sampling location and period, and descriptive statistics should be reported in the manuscript).

- The results reported in the figures are poorly described in the text (particularly Fig. 4-7). Probably the manuscript would benefit from a separation of the results (I encourage to expand the description of the findings) and the discussions (these should be re-organized).

- Section 3.3 introduces for the first time that there are sap isotopic data sampled in the study area, but they are not reported in the manuscript. Since this discussion is quite disconnected from the previous and the following sections, I suggest to remove it from the manuscript.

- Section 3.5 (but it should be 3.4) also seems quite disconnected from the other sections in the manuscript, and most of it (particularly lines 199-212) is not very meaning-

ful.

- Page 3, lines 73-75: It is unclear how the authors evaluated evaporation lines, and why they used evaporation lines for interpolation (spatial or temporal interpolation?) and comparison with the isotopic composition of groundwater.

- Page 5, lines 138-139: It is unclear how the authors could conclude that groundwater has a fast recharge by the examination of just few data reported in Fig. 5.

- Page 5, line 143: How did the authors determine that the groundwater follows the reported evaporation lines? I suggest to the authors to consider their results in light of recent findings reported in Benettin et al. (2018).

- Pages 5-6, lines 155-160: Based on the data and results reported in this manuscript, the inferred processes seem very speculative. I think the authors should remove these sentences or report the proper references supporting their statements.

- Figure 1: Where is located the state of Campeche? Please report the label in the map.

- Figure 7: Please increase the size of the labels.

- Figure 8: Symbols representing concessions are too small.

Technical corrections

- Page 1, line 15: Please replace “pore-waters” with “soil waters”.

- Page 1, line 25: “δ-plot” Probably the authors mean “a dual-isotope plot”.

- Page 2, line 47: “is a representation”.

- Page 2, line 55: Please explain the acronym “RMWL”.

- Page 3, line 82: Please remove “Quantum GIS” and refer only to “QGIS 3.8”.

- Page 3, line 84: It should be “Inverse Distance Weighted”.

- Page 3, line 91: “studied less”: Please revise this awkward sentence.

- Page 4, line 95: It is unclear what the authors mean with “that matrix”.

- Page 5, line 135: It should be “analyses”, however, the sentence is quite unclear.

- Page 8, line 228: Please replace “cycles” with “years”.

References

Benettin P., Volkmann T.H.M., von Freyberg J., Frentress J., Penna D., Dawson T.E., Kirchner J.W., 2018. Effects of climatic seasonality on the isotopic composition of evaporating soil waters. Hydrology and Earth System Sciences, 22(5), 2881–2890. DOI: 10.5194/hess-22-2881-2018

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