

Earth Syst. Sci. Data Discuss., referee comment RC1  
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## Comment on **essd-2021-79**

Anonymous Referee #1

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Referee comment on "Stable water isotope monitoring network of different water bodies in Shiyang River Basin, a typical arid river in China" by Guofeng Zhu et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-79-RC1>, 2021

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### **Review: "Stable water isotope monitoring network of different water bodies in Shiyang River Basin, a typical arid river in China" by Zhu et al.**

Zhu et al. present a measurement campaign for stable water isotope data measured in river water, ground water, soil water, precipitation and xylem water in the Shiyang River Basin, China. The described data sets start in the year 2015 and end in 2019. Principally, the data set is very impressive due to their many measurements but the paper, as well as the data set, are missing some basic information, mainly about the methods, to have a significant and useful impact to the field of isotope hydrology. I think that in the presented form the scientific community cannot use fully confident the data set due to missing information about data quality, measurement uncertainty and measurement process. Given the explanation below, I think the paper does not fulfill the requirement for publication, yet. I would suggest major revisions.

Here I will present a selection of general and specific comments:

Regarding writing, style and readability:

1) Please, structure your text using paragraphs / line breaks! (especially in the introduction section)

2) The citation style and font is not consistent. A few times the first name of an author was used in the citation (see specific comments below). Additionally, the order of the bibliography is not always correct. Please, follow the journal guidelines.

3) Units are sometimes with space sometimes without space between number and unit. Please, follow the journal guidelines.

4) The structure of the chapters is not clear. Information about the methods, which ideally would be together in one section, are separated into different chapters.

5) Overall, I think that major parts of the paper should be rewritten.

Regarding the data set available under  
<https://data.mendeley.com/datasets/w5rpxwf99g/1>

1) The precipitation data is missing any numbers about the volume. Do we see mixed samples of the rain event?

2) The soil data is missing the information about the soil water content which, according to the paper, was measured.

3) Some data points are missing the day in the date. This is difficult to handle for any software like R to further process the data. As well, the paper does not tell anything about how to handle these measurements. Do we see monthly average values?

Regarding the data measurements

1) In my point of view, the most important information would be how the stable water isotope data were exactly measured. This includes:

- Which uncertainties can be expected due to the measurement unit?
  
- How did you exactly extract the water from the xylem or the soil?
  
- Which uncertainties can be expected due to water extraction?

However, this section is very short in the paper although, recent paper show how difficult and partly unreliable these measurement processes still are. I think that with this little information about measurement methods the data set can hardly be used by other research groups or compared with other measurement campaigns.

2) Soil properties can highly influence stable water isotope measurements (see for instance the work by Orłowski). However, information about the soil properties are not provided.

3) The study talks about "xylem" measurement. However, it remains unclear whether stem, branches or twigs were used. In addition, the tree / plant species remain unknown.

4) I miss the information about the delta notation of isotopes. I would assume it is in reference to the Vienna Standard.

Specific comments:

Abstract: I miss the very important information about the timescale.

L15: I think it would improve the readability when first the water bodies and then the areas would be explained. However, you also could mention that you measured stable water isotopes earlier in the abstract.

L20: maybe use the term stable WATER isotopes here. Make sure to use one term consistently in your text. Later you used the term stable water isotopes, too.

L20: please define roughly which meteorological and hydrological data is connected to your data set. Additionally, no meteorological or hydrological data are found in the data files.

L34: use D or  $^2\text{H}$  consistent in your paper, please

L37: please generally check your citation style! Sometimes the ";" symbols are weird looking sometimes there are too many symbols e. g. L47

L37ff: I would be nice to see some more specific examples which can be related to the

data presented here. Moreover, I am missing completely a critical view on the usage of stable water isotopes and their uncertainties here. E. g. unintended fractioning processes as well as troubles due to measurement methods!

L47: Christophe is a first name! Also, this article is about oceans I am not sure how well this fits your paper.

L47: I could find the article of Zhang et al., 2015 only in non-English language. Please provide another link in the bibliography or provide further information

L51-L52: I think other more important paper would suit this sentence much better! Also, Metthew is a first name!

L62: I think that this should be much more critical! There are many drawback and uncertainties using stable water isotopes which should be at least briefly mentioned. See: Poca et. al 2019 (doi: 10.1007/s11104-019-04139-1); von Freyberg (doi: 10.1111/2041-210X.13461) and many more!

L80: change ues to use, please

L76 ff: This is very similar to the abstract. I miss your motivation for the study and why the data of this specific region is important. In the abstract you mention something about ecological importance etc.

L93: what do the coordinate show / mean?

L94: numbers such as average discharge in m<sup>3</sup>/s would be more helpful, I think. If seasonality is important, show average values from summer / winter or dry / rain season

L96 what does average annual temperature below 6 C mean?

L126: rain collection is slightly unclear to me. How did you store the water to prevent evaporation before measurement? This would be crucial to know for further discussion of data quality and possible uncertainties.

L149 bold!

L150 unclear where soils samples are taken. What does "sequentially at 10 cm intervals" mean?

L155 a new paragraph would fit here

L155 did you use branches / twigs or stem xylem? How much (better in gram instead of a volume). Which tree species (conifers / hardwood)? Here, a lot of important information is missing!

L164: I think the abbreviations are everything else but "easy to understand and use". I would prefer abbreviation which include somehow sampling type (i. e. river, precipitation, soil) and the site

L168: the corresponding "weather station file" was not found in the data set. Also, should have multiple sampling types not have the same abbreviation in case someone will merge the different data sets.

L197-L198: please, define what did you do with the software for data quality check.

L205 very unclear

L213: you mention that you should not "select the wrong samples". How do you define "wrong samples"?

L247: I think that information about the water level are not of interested here. Discharge data would be more interesting to give the reader an idea about the river properties.

L286 I guess this conclusion is not fitting well since you would not expect soil water to be recharged by plant water

L293 What does 4.4 reference to?

L294 what do these numbers mean? Unit?

L317 the outlook is missing or it is at least very short

Figure. 1: It is unclear whether north is on top of the maps;

Big map: It is hard to find point b and point a is hardly visible. The scale of elevation shows very random numbers.

Subfigures a to h are too small to read anything! On subfigure d I would expect the river to "flow in" on the "bottom" and "flow out" on the top according to the bigger map. However, the river is only half way through the map. Subfigure g is random and not understandable. You never mention subfigure g in the text.

Table 1: the table is missing an appropriate caption. As well, the units are not clear. i. e. precipitation mm/ year? Additionally, in the study site description you mention annual precipitation of max. 600mm, however, according to your table one site received 1040mm (I guess per year)

Same for temperature: air or water temperature?

Figure 3: which water bodies / soil water sites are presented here?