

This study conducted a detailed analysis on the soil water in the Three-river Headwaters Region, including its spatiotemporal variation, water sources and influence factors. The end member mixing analysis was adopted to determine the contributions of multiple soil water sources, based on the isotope data of different water bodies. The results are based on large amount of field measurement data, and could provide useful information about the soil water in this region, making it worth publishing in HESS. However, there are some issues not clear enough to me, which should be clarified before acceptance. I also recommend to improve the English writing thoroughly with the aid of a native speaker or professional English editing service.

Thank you very much for your comments. We will spend a great deal of time for improving the language and general presentation with the help of professional English editing service.

-Introduction: Please introduce the definition and importance of soil water sources, and reduce the references not related to this topic. It seems that the authors are introducing the research background of soil water (e.g., estimation of soil water, the change of soil water under climate change), but suddenly draw the conclusion that the research on the soil water sources is important. In my opinion, they are two different issues.

Thank you very much for your comments. We will revise the introduction as suggested, focusing on the definition and importance of soil water. On the other hand, we will remove sentences and references that are not relevant to the topic.

-Method: The definition of soil water sources is confusing. The authors collected soil water, precipitation, ground ice, river water, supra-permafrost water and glaciers snow meltwater, but only calculated the contributions of precipitation, ground ice and glaciers snow meltwater in the results section. So was the isotope data of river water and supra-permafrost water used in the calculation? Please clarify.

Thank you very much for your comments. River water and permafrost water are used to help us determine the relationship and transformation of various water bodies in the study region. For example, in Figure 5, through the clustering relationship of various stable isotopes of water bodies, we

can better identify the relationship between water bodies and verify the rationality of the research results through this relationship. At the same time, we will also elaborate on the role of such data in the revised manuscript.

Discussion:

- The authors calculated the correlation between soil moisture and meteorological/vegetation variables in this section, which is not clear to me. If I understand correctly, the soil moisture data was obtained by measuring the soil samples. However, the soils were sampled in a spatially distributed way, which means that they were sampled at several sites in a one-time field work, rather than sampled continuously during a long period, so there is only one soil moisture data in each site/grid in one month. It is confusing for me how to calculate the correlation between the one-time soil water data and the continuous meteorological/vegetation data. Please clarify this in the method section.

Thank you very much for your comments. Although we sampled in a one-time field work, however, our sampling points (2600 samples) cover almost the whole area of the study area. More importantly, we will measure the corresponding soil temperature, soil moisture and other data when collecting each soil sample. In other words, all data, including soil stable isotopes, soil temperature, soil moisture are on points, but we have many of these points, so we put them in one space and did their correlation.

We will clarify this in the method section.

- The authors described the correlation analysis results in details in this section. However, given that this paper focused on the soil water sources, I think there should be discussions about the relations between the isotope-based results and the correlation analysis results. Meanwhile, the connection between the water source results and the implications on vegetation restoration is not clear. I suggest the authors to do some analysis on the influence of soil water sources on vegetation, to combine them together.

Thank you very much for your comments. We will supplement the relations between the isotope-based results and the correlation analysis as

you suggested on the one hand. On the other hand, we will do some analysis on the influence of soil water sources on vegetation.

-Conclusions: Please shorten the conclusion section and summarize 3~4 points of most important messages.

Thank you very much for your comments. We will revise the conclusions as suggested.

-Please find the annotation in the attached pdf file for the minor issues, including comments on English writing, Figure and some specific questions.

Thank you very much for your comments. We will revise the manuscript carefully according to your suggestion