Biogeosciences Discussions

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Comment on bg-2021-127

Anonymous Referee #1

Referee comment on "Isotopic differences in soil–plant–atmosphere continuum composition and control factors of different vegetation zones on the northern slope of the Qilian Mountains" by Yuwei Liu et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-127-RC1, 2021

General comments:

This manuscript (bg-2021-127), entitled "Difference of SPAC composition and control factors of different vegetation zones in north slope of Qilian Mountains", Â investigated the differences in SPAC composition of three different vegetation zones Â of the period of April 2018 to October 2019, and attempled to find the controlling factors. This paper is the one that I have seen so far in the research on SPAC water cycle with relatively rich data and very reasonable argumentation. This manuscript provides a lot of valuable isotope data for understanding the water cycle in arid and semi-arid regions. In this paper, the micro-SPAC water cycle is well correlated with the basin water cycle, and the case studies are compared and discussed at the regional and global scales. It is a writing style that I admire a great deal. So I support the publication of the article. However, there exist some problems, including English language, basic format, and the description of the research samples is not enough. In addition, many explanations in the text are not clear enough. A good article must be very scientific and well expressed. Therefore, I think the article can only be published after having solve the following problems.

Specific comments:

- Why choose these three sampling points as the research area of this manuscript?How long is the sampling interval? The author has made a lot of descriptions on sample collection and experimental analysis, but if the author can more clearly describe how to select samples, it will be more reasonable, for example, in Section 2.2: We have collected samples of precipitation, groundwater, soil, and plantÂ at Lenglong (alpine meadow), HulinÂ (forest), and XiyingÂ (arid foothills) in the Shiyang River BasinÂ from April 2018 to October 2019.
- Section 3.1: With the continuous progress of vegetation restoration, the vegetation coverage of alpine meadows will continue to increase. How do you know that the

vegetation coverage of alpine meadows has increased? Is the conclusion drawn from the relevant literature or based on actual data?

- Section 3.2: â□□Along the three vegetation zones of alpine meadow-forest-arid foothills, soil water isotope gradually enriched.The coefficient of variation of the arid foothills is the largestâ□□.Why is the coefficient of variation of the isotope of soil water in the dry mountain foothills the largest?
- Section 3.2: â□□The soil water content of alpine meadows is higher than that of forests and arid foothills, and the soil water content of alpine meadows increases with the soil depthâ□□. Why does the soil water content of alpine meadows increase with the increase of soil depth? The author did not give an explanation in the manuscript. Does this characteristic of change appear in different soil depths?
- Section 3.3, line 228-229: â□□High temperature is related to groundwater level exposureâ□□.What does this sentence mean?
- In the discussion section, why only discuss the impact of temperature and altitude on SPAC? Why are other factors not discussed?
- Line 240-241:This phenomenon shows that precipitation plays a major control role in the water cycle of precipitation-soil-plants.Â What does this phenomenon mean?
- Line 241-242: â□□Previous studies have shown that local factors, especially local temperature mainly control the stable isotope changes of precipitation in mid-latitudesâ□□. The author does not mention any information about the previous research in the manuscript, such as the source of the research.
- Line 248-250: â□□From alpine meadow to arid foothills, the correlations between temperature and soil are 0.41, 0.30, and 0.19, respectively, and the correlations with plants are 0.24, 0.27, and 0.25, respectivelyâ□□.How are these correlation coefficients obtained?
- Section 4.2: In this part, the author mainly discusses altitude and precipitation isotope, but the description of the relationship between soil water isotope and plant water isotope and altitude is too little.
- Line 255-256: â□□...the correlation between the isotope of precipitation in the arid mountain foothills and the temperature fails the significance test.â□□Why fails the significance test?

Minor comments:

- In the abstract, the author directly proposed SPAC, the author did not give any explanationabout wahst is SPAC.
- Line 28:the reference is incorrectly cited.
- Part 2.3, the font size of the formula (1-1) , (2-1) to (2-4) are different.
- Line 47: change â□□The content of the SPAC hydrological cycle research are dramatically enriches and expandsâ□□to â□□The content of SPAC hydrological cycle research has been greatly enriched and expandedâ□□.
- In the manuscript, some formats are not standardized, and some letters should be superscripts, such as in line 34, 18O; line 57, Î´18O; line 88, 15.75Ã□
- The scientific counting method of temperature in this manuscript is inconsistent, as in section 4.1: 8â□□, 23.92â□□.
- Line 88: change 75Ã□108 km3to 1.58Ã□10^8 km^3.
- Lin 89-91: please add the corresponding references.
- Improve the clarity of Figure 1 to Figure 4 to make it easier to obtain relevant information from the diagram.
- Line 226 and line 228: In order to maintain consistency, please change â□□arid piedmontâ□□to â□□arid foothillsâ□□.

- Line 256: Please pay attention to the spaces between the text , such as change â□□0Â°Candâ□□to â□□0Â°CÂ andâ□□.