

**Title: The patterns and implications of diurnal variations in d-excess of plant water, shallow soil water and air moisture**

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General comments

The revised version of this manuscript has improved significantly. Some minor comments are noted below to help improve readability.

Minor comments:

1. Many small mistakes in language were found in the manuscript. I suggest an thorough language review by a native English speaker.

**Reply:** We again thoroughly revised the manuscript and paid special attention to wording and language issues. We also had it professionally checked.

2. P3L51: delete “drylands” in the key words section, or give a short description about “drylands” in the text.

**Reply:** We used “arid regions” to substitute “drylands”.

3. P7L138--142: “Polygonum viviparum L” should be “Polygonum viviparum L.”, and “Populus euphratica Oliv” should be “Populus euphratica Oliv.”. I think probably it’s better to use “Polygonum viviparum”&“Populus euphratica” or “Polygonum viviparum L.”&“Populus euphratica Oliv.” (but not mixed) to represent the tree of “P.V.”&”P.E.” in the text. Same to other species.

**Reply:** We used “Polygonum viviparum” and “Populus euphratica” in the manuscript as suggested.

4. P10L211. Please elaborate why “only leaf water  $\delta^{18}\text{O}$ ,  $\delta\text{D}$  and d--excess values of P.E. at S5-Aug were modeled for this study”?

**Reply:** We added description of the reason using P.E. at S5-Aug.

**Addition:**

**“...because it was sunny and had the most complete dataset through that entire study period”.**

5. P15 L311. Maybe one or two sentence is needed to briefly describe the meteorological condition during the sampling period in the upper reach and lower reach, because cloudy days only occurred in the upper reach during the sampling period. I think authors should mention this information clearly in the text.

**Reply:** We added a brief description as “During our study period, the cloudy days occurred only at the upper reaches (Table 1)” in P15 L311.

6. P15L322. Authors mentioned that “The large difference of d-excess of leaf water between the sunny and cloudy days was found (32.7‰), and the d--excess of leaf water varied from 12.0‰ to 55.7‰.....(Table 5)”. However, what I found from Table 5 is that the difference of d-excess of leaf water between the sunny and cloudy days ranged from -6.6‰ to 55.7‰, and the d-excess of leaf water varied from -114.0‰ to -20.4‰ in sunny days and from -116.9‰ to 11.1‰ in cloudy days.

**Reply:** We revised this paragraph for clarification.

**“The large difference of  $d_{\text{leaf}}$  between the sunny and cloudy days was found with a mean of 32.7‰ (excluding S2-Jun), and the difference varied from 12.0‰ to 55.7‰ (excluding S2-Jun)”.**

7. P16 Section 3.4.1. The logic of this section is unclear. Authors gave the correlation between d-excess of leaf water and RH in the upper reaches, but didn't give the corresponding correlation in the lower reaches. Besides, authors gave the

correlation between d-excess of leaf water and RH during sunny days, but didn't give the corresponding correlation during cloudy days. That's very difficult to get the point of this section. In addition, authors mentioned that "During the sunny days, the d-excess of moisture versus RH were -0.36‰/‰ and -0.31‰/‰, respectively, for near the ground and the canopy, which ...(Table 7)". However, I found that the d-excess of moisture versus RH were -0.36‰/‰ and -0.31‰/‰, respectively, for near the ground and the canopy in the upper reaches. Please elaborate such information clearly, otherwise, it will mislead readers.

**Reply:** We changed the wording at two places for clarification.

**1):** We changed it to "Significantly positive correlations were found between  $d_{\text{leaf}}$  and RH at all the study sites during the study periods (from June to September) (Table 6)".

**2):** As suggested, we rephrased this paragraph as "Except near the ground at S1-Sep, significantly negative correlations were found between  $d_{\text{moisture}}$  and RH at all the study sites during our study periods (June-September), when including both sunny and cloudy days (Table 6). Significantly negative correlation was found between  $d_{\text{moisture}}$  and RH at S1-Sep when only sunny days were considered (Table 7). The  $d_{\text{moisture}}/\text{RH}$  were -0.15‰/‰ at S1-Jun and -0.27‰/‰ at S2-Jun for near the ground air moisture. For the canopy air moisture, the  $d_{\text{moisture}}/\text{RH}$  were -0.24‰/‰, -0.32‰/‰, -0.25‰/‰, -0.15‰/‰, -0.13‰/‰ and -0.68‰/‰ at S1-Sep, S1-Jun, S2-Jun, S3-Aug, S4-Aug and S5-Aug, respectively. During the sunny days, the  $d_{\text{moisture}}/\text{RH}$  were -0.36‰/‰ and -0.31‰/‰, respectively, for near the ground and at the canopy in the upper reaches, which were larger than the results based on data including both sunny and cloudy days (Table 7)."

8. P17L352--353. Does the significantly negative relationships between d-excess of leaf water and T was also found in the lower reaches?

**Reply:** Yes, the significantly negative relationship between d-excess of leaf water and T was also found in the lower reaches. We revised this phrase as "During the sunny day, there were significantly negative relationships

between  $d_{\text{leaf}}$  and T in the upper reaches (Table 7) and the lower reaches (Table 8).”

9. P17 L371--372. From which figure authors can get the result that “...an opposite pattern between the diurnal variations of d--excess of leaf water and d--excess of moisture”? Please note it.

**Reply:** The Figure 9 shows result that “...an opposite pattern between the diurnal variations of d--excess of leaf water and d--excess of moisture”, and we added this note in the manuscript: “During the sunny days, we found an opposite pattern between the diurnal variations of  $d_{\text{leaf}}$  and  $d_{\text{moisture}}$  (Fig. 9).”

10. P20 L438. “S.Q.” should be “Q.S.”

**Reply:** Thank you! We corrected this mistake.

11. Table 1. The specified sampling data should be added in the column of “Time and interval” for easily understanding the sampling frequency and the meteorological condition during the sampling period.

**Reply:** In Table 1, we added the specified sampling date in the column of “Time and interval” as suggested.

12. Table 1. Maybe it is better to use “ecosystem type” replace “vegetation type” in the column 2 because “Gobi” is not a type of vegetation.

**Reply:** In Table 2, we used “ecosystem type” replace “vegetation type” in the column 2 as suggested.

13. Table 6--9. Authors mentioned that “ $p < 0.001$  indicate statistical significance at the 99% significance level, ...”. However, I think that  $p < 0.01$  indicate statistical significance at the 99% significance level. Please check and correct it.

**Reply:** We replaced the “99%” as “99.9%” in Table 6-9.

14. Table 7--9, P17 L363--369. Please unify the representation of the significance level by using capital letter P or lowercase letter p. Also unify the representation of the correlation coefficient by using r or R2.

**Reply:** In Table 7-9, we used lowercase letter p and unified r.

15. Fig. 3. The legend for this figure is unclear, especially for the “xylem water of Q.S.”, “xylem water of P.V.”, “LMWL of the UR” and “LMWL of the LR.

**Reply:** We revised the legends for the “xylem water of P.V.”, line format for “LMWL of the UR” and “LMWL of the LR”. We changed the caption to “Figure 3. Plot of  $\delta D$  and  $\delta^{18}O$  of different water pools at each site. For reference, the LMWL (cited from He (2011)) is plotted for each site (dark line is the GMWL (the global meteoric water line), blue dotted line and dashed lines are the LMWL of the upper and the lower reaches, respectively). Note: the panels a, b, c, d, e and f were same as the Figure 2, and the abbreviations of plant’s Latin name were same as the Table 3.”

16. Fig.7. Subfigures e and f are missed or the description of figure caption has a mistake.

**Reply:** The description of Figure 7 has a mistake, and we corrected it in the revised version.