Dear Dr. Markus Hrachowitz, editor of Hydrology and Earth System Sciences:

Thanks very much for giving us the opportunity to revise this paper. Upon your request, we have carefully revised our manuscript (hess-2022-327) entitled "Quantifying river water contributions to riparian trees along a losing river: Lessons from stable isotopes and iteration method" after considering all the comments made by you and the other three anonymous reviewers. The comments have helped us greatly improve the overall quality of the manuscript. The following is the point-to-point response to all the comments. The page and line numbers in the following response refer to the revised manuscript with changes marked.

Response to the editor (Dr. Markus Hrachowitz):

Dear authors,

Thank you very much for your revisions. The reviewers generally appreciate your efforts and I large share this opinion. However, the reviewers also flag a few more points that could benefit from some more attention.

Please address the remaining reviewer suggestions in detail in a second round of revisions. Please make also sure that the manuscript is attentively proofread by native English speaker, as it still contains multiple language mistakes.

I am looking forward to receiving a revised version of your manuscript as soon as possible.

Response: *We are grateful to you and the three reviewers for your constructive and valuable comments on our manuscript. We have substantially revised the manuscript according to the comments (see the replies to Anonymous Referee #1, Referee #3, and Referee #4). We have improved the wording and grammar of this manuscript. We have also asked the EditSprings Company for English language editing of this manuscript.*

Response to Anonymous Referee #1:

General comments:

1. Comment:

The authors have generally well addressed the comments made on the first version of the manuscript. Although the wording and grammar can still be improved (I understand writing in English in

difficult for non-native English speakers), the science is understandable. After reading the response to reviewers the authors provided, I have some minor comments to add.

I would reorganize the discussion section; I would start by discussing the RWC to riparian trees (section 4.2 in the current version) which is the main objective of this study. Then, I would discuss the link between RWC, WUE and WTD (section 4.3) and end the discussion with the strength/limitations of the method you used (section 4.1). I would also try to improve the link/flow between the points discussed, sometimes it is difficult to understand why you move from one point to another.

Response: *Thank you for the positive comments and insightful suggestions. We have asked the EditSprings Company for English language editing of this manuscript. We reorganized the discussion section and started by discussing the RWC to the transpiration and effects of the distance from the river on RWC which is the main objective of this study. Then we discussed the Link between RWC/WUE/WTD and the implications and ended the discussion with the advantages and limitations of the MixSIAR model and the iteration method (see P.17, Line 457 to P.24, Line 639). We also have improved the link/flow between the points discussed in the discussion section to make the story clearer (see P.17, Line 457 to P.24, Line 639).*

Technical comments:

The number before each comment below refers to the number given to each comment on the response to reviewers.

2. Comment:

14. Line 175: Can you clarify; the mean or the median of the water source contributions?

Response: *Thank you for the helpful suggestions. We have clarified that the mean and standard deviation (SD) values of different water source contributions could be estimated with the MixSIAR model (see P.9, Lines 234-241).*

3. Comment:

15. Lines 185-187 + 60. Lines 165-168: I would rewrite the section “The average soil WI values at depths of 0-5 cm, …. For the 0-30 cm soil for the 170-300 cm soil layer”, the sentences are not clear.

For example, you could say: “The average soil WI value for the 0-30 cm soil layer was determined as the average of the soil WI values of the 0-5 cm, 5-10 cm and 20-30 cm soil layers.”, and ”Similarly, we determined the average soil WI values for the 30-80 cm (average of 40-60 cm and 60-80 cm soil layers), 80-170 cm (average of 90-110 cm and 150-170 cm soil layers) and 170-300 cm (average of …) soil layers”.

Response: *We have rewritten this section to make these sentences clearer: “The average soil water isotope values for the 0−30 cm soil layer were determined as the average of the soil water isotope values of 0−5 cm, 5−10 cm, 10−20 cm, and 20−30 cm soil layers because the water isotopes underwent strong evaporation and SWC changed considerably seasonally. We determined the average soil water isotope values for the 30-80 cm (average of 40-60 cm and 60-80 cm soil layers) and 80-170 cm (average of 90-110 cm and 150-170 cm soil layers) soil layers because the water isotopes and SWC were almost stable. The average soil water isotope values for the 170-300 cm soil layer were determined as the average of the soil water isotope values of 190−210 cm, 250−270 cm, and 280−300 cm soil layers, which varied with the fluctuations of groundwater levels.”(see P.9, Line 248 to P.10, Line 256).*

4. Comment:

23. Lines 299-304: I would give the p values as p < XX instead of p = 0.000.

Response: *We have changed “p = 0.000” to “p < XX” throughout the whole manuscript (see P.2, Line 30; P.17, Lines 451 to 453; P.24, Line 654; Fig.11).*

5. Comment:

31. Lines 38-40: I would divide the last sentence (“Therefore, understanding […] revegetated riparian zones”) in two, for clarity and readability.

Response: *We have divided this sentence into two “Therefore, it is critical to determine what water sources and how much river water are taken up by riparian trees and the responses of tree water use characteristics to groundwater level variations. This can help us to regulate river runoff and tree’s water needs in the revegetated riparian zones.” (see P.2, Lines 45-48).*

6. Comment:

73. Lines 224-229: I would rewrite the sentence “ANOVA […] different variables”, “incorporating”

does not seem to be the right word. I would clarify why each of these tests were performed, also clarify "to investigate the statistic differences of different variables". For example, you could say: "For each variable, we tested the homogeneity of variance between the 2 studied years and between the 3 plots using the Levene's test." …, be more precise about why you performed each test.

Response: *We have rewritten this sentence to be more precise about why we performed each test: "For each variable, we tested the homogeneity of variance between the two studied years and between the three plots using Levene's test. The one-way analysis of variance (ANOVA) was applied to examine differences in each variable among three plots in 2019 and 2021 ($p < 0.05$)." (see P.13, Lines 332-334).*

7. Comment:

Figure 6: I would check the wording, grammar and correct the sentences 2 and 3 of the caption. Maybe something like: "The LMWL was determined for each year from the precipitation samples taken over each year", and "The SWL was determined for each year and plot from the soil water samples taken each year"?

Response: *Thank you for the helpful suggestions. We have corrected the wording and grammar of sentences 2 and 3 of the caption "The local meteoric water line (LMWL) was determined for each year from the precipitation samples taken over each year. The soil water line (SWL) was determined for each year and each plot using the soil water samples taken over each year." (see P.36, Lines 861-865).*

8. Comment:

Figure 9: Correct "contributions of water sources to ripaRIAN groundwater" on the y axis.

Response: *We have corrected "Contributions of water sources to riparian groundwater" on the y-axis.*

9. Comment:

Figure 11: I would use "contribution of river water to riparian trees" instead or "proportion" on the y axis for consistency. I would also give the p values as $p < XX$ instead of $p = 0.000$.

Response: *Thank you for the helpful suggestion. We have used "Contributions of river water to the transpiration of riparian trees" instead of "Proportions of river water for riparian trees" on the y-*

axis for consistency. We also changed "p = 0.000" to "p < 0.01".

10. Comment:

Figure S1: Correct the references to the panels in the caption (for example: air temperature and VPD are shown on panels a and b, not c and d).

Response: *We have corrected the references to the panels in the caption "Daily mean temperature (°C) and daily mean vapor pressure deficit (VPD) (kPa) are shown in panels (a) and (b). Daily reference evapotranspiration (ET_0) (mm/day) and daily mean net radiation (W/m^2) are shown in panels (c) and (d)."*

Response to Anonymous Referee #3:

1. Comment:

In the introduction section, the statements need to be more focused and correspond to the purpose of your research. There is currently a lack of progress on water sources for plants at different distances away from the riverbank. In addition, the progress of radioactive isotope (222Rn) in related fields needs to be described.

Response: *Thank you for the helpful suggestions. We have closely linked the introduction section and the corresponding purpose of our research (see P.2, Line 35 to P5, Line 111). Moreover, we have supplemented a sentence to link with the second and third paragraphs as well as with the third and fourth paragraphs (see P.3, Lines 73-74; P.4, Lines 92-94).*

In the second paragraph, we elucidated the effects of different distances away from the riverbank on the river water contributions to the riparian trees: "Growing evidence suggested that riparian trees rarely took up river water directly at a certain distance from the riverbank because their lateral roots could not reach the river (Mensforth et al., 1994; Thorburn and Walker, 1994). Nevertheless, riparian trees can indirectly utilize river water that recharges deep zone (e.g., deep soil water and groundwater) when their roots tap into the groundwater level (Mensforth et al., 1994; Wang et al., 2019a). The RWC to the transpiration of riparian trees may be overestimated if the river water is considered a direct water source." (see P.3, Lines 65 to 71). In this study, the three plots at different

distances from the riverbank were selected to provide a gradient of WTD. We have added the critical effect of the different WTDs at different distances from the riverbank on river water contributions to the transpiration of riparian trees (see P.4, Lines 102-108).

We have supplemented the process of radioactive Radon (^{222}Rn) in related fields in the introduction section as follows: "The radioactive Radon (^{222}Rn) has been broadly utilized for tracing groundwater origins and corresponding pathways in riparian zones (Close et al., 2014; Zhao et al., 2018). Based on ^{222}Rn concentration, Stellato et al. (2013) estimated the river infiltration velocities into the riparian groundwater system in the Petrignano d'Assisi plain in central Italy, which varied from 1 to 39 m/day. It is helpful to estimate the residence time of recharged groundwater from river water and its effects on the RWC to the transpiration of riparian trees." (see P.4, Lines 85-90).

2. Comment:

Lines 35: What is the meaning of running dry? Giving some statements is necessary.

Response: *We have changed "running dry" to "drying up" to indicate the river has dried up (see P.2, Line 39).*

3. Comment:

The representativeness of Salix babylonica in the study area needs to be highlighted, otherwise any tree species can be selected

Response: *Thank you for the helpful suggestion. We have highlighted the representativeness of Salix babylonica "The deep-rooted riparian weeping willow (Salix babylonica L.) was one of the most widely planted species alongside the Chaobai River because the S. babylonica trees could adapt well to dramatic fluctuations in the WTD. Hence, this research selected S. babylonica trees as representative of riparian species. Three plots at different distances of 5 m (D05), 20 m (D20), and 45 m (D45) from the riverbank (one plot per distance) were also selected for field measurements and sample collection (Fig. 1)." (see P5, Lines 132-137).*

4. Comment:

How was the proposed iteration method used to quantify the proportions of the indirect river water source taken up by riparian trees? Please give more details steps.

Response: *Thanks for your suggestions. The detailed steps of the proposed iteration method have been highlighted: "In this study, water stable isotopes (δ^2H and $\delta^{18}O$) were integrated within the MixSIAR model and an iteration method was proposed to identify the contributions of the indirect river water that recharged riparian deep water to the transpiration of riparian S. babylonica trees (Figs. 4-5). First, the direct water source (including soil water in different layers and groundwater) contributions to the transpiration of riparian trees were determined via δ^2H and $\delta^{18}O$ values of different waters and the MixSIAR model. Second, the proportional contributions of river water to riparian deep water (i.e., riparian groundwater and deep soil water in the 80−170 cm layer) were determined by the MixSIAR model and water stable isotopes. Finally, the proposed iteration method was applied to quantify the proportions of the indirect river water source taken up by riparian trees (Figs. 4-5)." (See P.9, Lines 224-231).*

The total RWC (including the old river water before t-1 and current river water between t-1 and t) to riparian S. babylonica trees near the losing rivers, which was described as Equation (4) (see P.12, Line 310-315).

$$RWC = P_s * S_r + P_g * G_r$$

$$= P_s*(s_r^t + s_r^{t-1}) + P_g*(g_r^t + g_r^{t-1})$$

$$= P_s*(s_r^t + s_r^t * s_s^{t-1} + s_r^t *(s_s^{t-1})^2 + s_g^t * g_r^t + s_g * g_r^t * g_g^{t-1} + s_g^t * g_r^t *(g_g^{t-1})^2) +$$

$$P_g*(g_r^t + g_r^t * g_g^{t-1} + g_r^t *(g_g^{t-1})^2)$$

$$= (P_s * s_r^t + Pg * g_r^t + P_s * s_g^t * g_r^t) + (P_s * s_r^t * s_s^{t-1} + P_g * g_r^t * g_g^{t-1} + P_s * g_r^t * s_g^t * g_g^{t-1}) + (P_s * s_r^t *(s_s^{t-1})^2 +$$

$$P_g * g_r^t *(g_g^{t-1})^2 + P_s * s_g^t * g_r^t *(g_g^{t-1})^2) \qquad (4)$$

"The expression of "$P_s * s_r^t + P_g * g_r^t + P_s * s_g^t * g_r^t$" in Equation (4) was proposed to determine the current river water (between t-1 and t) contributions to the transpiration of riparian trees. The second iteration ($P_s * s_r^t * s_s^{t-1} + P_g * g_r^t * g_g^{t-1} + P_s * g_r^t * s_g^t * g_g^{t-1}$) and the third iteration ($P_s * s_r^t *(s_s^{t-1})^2 + P_g * g_r^t *(g_g^{t-1})^2 + P_s * s_g^t * g_r^t *(g_g^{t-1})^2$) were applied to quantify the proportional contributions of old river water that recharged riparian in-situ deep water to trees (Fig. 5). We only applied three iterations because the differences between the RWCs in the third iteration and the next iteration were smaller than 0.1%. Using this proposed iteration method, we accurately estimated the total proportions of old and current river waters to the transpiration of riparian trees." (see P12, Lines 324-330).

5. Comment:

Line 210: When combining different soil layers to 170−300 cm, 170-190 cm of soil layer is missing. "It indicated that the lateral roots of S. babylonica trees could not tap into the river", however, the roots of S. babylonica trees were not investigated.

Response: *Thanks for your suggestions. We have collected soil samples only at three depths of 190−210 cm, 250−270 cm, and 280−300 cm in the 170-300 cm soil layer. The average of the soil water isotope values at these three depths represented the soil water isotope values in the 170-300 cm soil layer in this study.*

The roots of S. babylonica trees were not investigated in this study. However, the approximate lateral root extent could be inferred basing on the projected edge of the canopy of S. babylonica. "Mensforth et al. (1994) and Thorburn and Walker (1994) characterized the projected edge of the canopy as the extension range of lateral roots. In this way, it is possible to determine whether or not riparian trees take up river water directly. The projected edge of the canopy in our study was less than 5 m for the riparian S. babylonica trees which were closest to the river (5 m away from the riverbank). This indicated that the lateral roots of S. babylonica trees could not tap into the river." (see P10, Lines 264-269).

We have illuminated that the lateral roots of S. babylonica trees should be directly investigated to confirm our inference in further research in the 4.3 section of "Advantages and limitations of the MixSIAR model and the iteration method" in this study: "Third, we inferred the approximate lateral root extent based on the projected edge of the canopy of S. babylonica, which indicated that S. babylonica trees could not tap into the river or take up river water directly. However, the lateral roots of S. babylonica trees should be directly investigated in further research to confirm our inference." (See P23, Lines 630-633)

6. Comment:

2.4.2 section, soil water in the 0−80 cm layer at t-1 contributes to deep soil moisture, but some isotopic changes from t-1 to t are not considered, such as fractionation during this period. Similar issues need to be considered when calculating groundwater sources.

Response: *Thank you for the insightful suggestions. We have assumed that "the isotopic changes from t-1 to t (such as fractionation during this period) were negligible when calculating the*

contribution of upper soil water (i.e., in the 0-80 cm or 0-170 cm layers) at t-1 to deep moisture (i.e., soil water in the 80-170 cm layer or groundwater)" in this study (see P11. Lines 292-294). The main reason was that upper soil water at t-1 generally contributed a small proportion to deep moisture. For example, the contributions of soil water in the 0-80 cm layer at t-1 to deep soil moisture were 16.0 ± 4.7%, and the soil water in the 0-170 cm layer at t-1 contributed 16.3 ±7.1% to groundwater (Figs. 8 and 9). This indicated that the fractionation-induced isotopic change between t-1 and t was little during upper soil water infiltration into deep layers.

Nevertheless, the isotopic changes between t-1 and t might be varied with intense rainfall and strong evaporation on the soil surface, which will be further investigated and considered in the calculation of deep soil water/groundwater sources. We have supplemented the statement in further research in the 4.3 section of "Advantages and limitations of the MixSIAR model and the iteration method" in this study: "First, the riparian deep-water sources were identified using the water isotopic data collected in campaigns taking place at an interval of about one month. The riparian soil water movement was complex, and the water stable isotopes might not be uniform between the two campaigns along the losing river. Nevertheless, the isotopic changes from t-1 to t (such as fractionation during this period) were negligible when calculating the contribution of upper soil water (i.e., in the 0-80 cm or 0-170 cm layers) at t-1 to deep moisture (i.e., soil water in the 80-170 cm layer or groundwater). Assuming the isotopic uniformity over such a time interval may cause uncertainties in estimating the RWC to the transpiration of riparian deep water." (see P23. Lines 618-625).

7. Comment:

The result and discussion about the average residence time (Tres, day) of recharged groundwater from river water is rare. It will be more meaningful to properly supplement the statements on the effect of residence time and plant water sources.

Response: *Thank you for the insightful suggestions. In this study, we elucidated the extremely short residence time of recharged groundwater from river water at different distances (5 m, 20 m, and 45 m) from the riverbank in the result section. "There was a significant increase of ^{222}Rn activity in groundwater from D05 (494.5 ± 107.5 Bq/m^3) to D45 (787.4 ± 153.2 Bq/m^3) ($p < 0.05$) (Table 1). The Tres of recharged groundwater from river water increased from D05 (0 days) to D45 (0.15 ±*

0.13 days) (Table 1). This also indicated that the river recharged riparian deep strata rapidly and frequently, particularly more significant in the plots closer to the riverbank." (see P16. Lines 416-420).

While in the discussion section, we speculated some possible processes of recharging riparian groundwater from river water in detail based on the groundwater residence time and river water contributions (RWC) to riparian groundwater. These detailed processes of recharging groundwater from river water can help us understand why river water contributed a small proportion to riparian trees. "The ecohydrological separation (Brooks et al., 2010; Evaristo et al., 2015; Allen et al., 2019; Sprenger et al., 2019) possibly resulted in large isotopic discrepancies between fast-moving water flow and immobile water for plant water uptake. Although the residence time of recharged groundwater from river water was extremely short (less than 0.28 days) (Table 1), only one-third of riparian groundwater was replaced by the lateral seepage of river water (Fig. 9). Our finding probably indicates that river water recharged mobile groundwater quickly but could not completely replace water held tightly in the soil pores (Brooks et al., 2010; Evaristo et al., 2015; Allen et al., 2019). This was consistent with Sprenger et al. (2019) who found that the lateral seepage of river water or rising groundwater level could briefly saturate riparian soils but could not entirely replace/flush immobile waters or homogenize different water pools isotopically." (see P18. Line 490 to P19. Line 499). In addition, we also supplemented the indications of the residence time of recharged groundwater from river water in the 4.1 section: "The declining water table and increasing residence time of recharged groundwater from D05 to D45 could consequently lead to the decreasing RWC to riparian deep water along the distance away from the riverbank. Thus, the interannual and spatial variabilities of the RWC to the transpiration of riparian S. babylonica trees were generally attributed to the various RWCs to riparian deep water rather than the water uptake patterns of riparian trees." (see P20, Lines 539-543).

8. Comment:

Figure 4 is confusing and need to be revised

Response: *We have revised Figure 4 and illustrated it in the caption.*

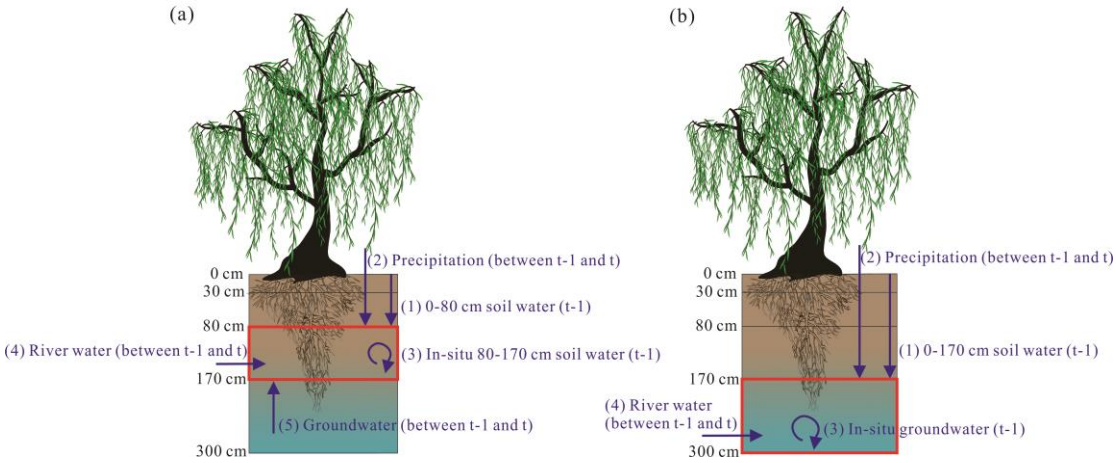

Figure 4: Schematic diagram of potential water sources: riparian deep soil water in the 80−170 cm layer (a) and groundwater (b). The red box represents riparian deep soil water in the 80−170 cm layer in panel (a) and groundwater in panel (b), respectively. The dark blue arrow indicates different potential water sources of riparian deep water.

Response to Anonymous Referee #4:

General comments:

1. Comment:

The comments of the reviewers have been largely addressed and the manuscript was significantly improved, very nice work! Yet, some open questions remain before the manuscript can be accepted for publication.

The sample size of the experiment seems very small, the authors sampled only 1 tree per plot and there are only 3 plots (1 per distance, see Fig.1), i.e., all results are just based on three trees? It would be important to clarify and properly discuss this point in the manuscript. Also, I did not find any information on how many leaves were sampled.

If the sample size was so small, please elaborate more in the text on: Why did you not sample more trees? Why is the chosen small sample size enough to support your conclusions? What implications does the small sample size have for your results?

I added some new remarks and comments, mainly on the MM section.

There are still many language mistakes, especially in the new text that need to be addressed. Please consider having a native speaker for proof-reading (I am also not a native speaker).

Response: *Thank you for your positive comments and insightful suggestions. We have carefully addressed the reasons for the sample size of the experiment and clarified this point in the discussion section in the revised version (see P23, Lines 633 to P24, 639). The MM section has been revised detailly according to the remarks and comments (see the responses to Comments 2-7). We have corrected the language mistakes and have the EditSprings Company for proof-reading of the revised manuscript.*

More than 50 mature leave samples were collected for each tree at each sampling campaign. We have added the number of leave samples as follows: "Meanwhile, more than 50 mature leaves without petioles were sampled from the collected stems using pruning shears and mixed into one leaf sample for $\delta^{13}C$ analysis." (see P7, Lines 167-169).

We think that the sample size of our experiment can support our conclusions, which can be explained by three un-exclusive reasons. First, we sampled three replicates of stem samples for each riparian S. babylonica tree at different distances of 5 m, 20 m, and 45 m from the riverbank. In order to reduce errors in random sampling, the average isotopic composition of three replicates was used to represent the actual isotopic value of each riparian S. babylonica tree (see P6, Line 165 to P7, Line 167). Secondly, we collected 108 plant stem samples in total and obtained 36 sets of different isotopic composition data for riparian S. babylonica trees along a gradient of depth to the water table (WTD) (ranging from 0.3 m to 4.0 m) in dry and wet years. In addition, the leaf $\delta^{13}C$ in these 36 sets of riparian S. babylonica trees varied a lot (between −26.5‰ and −30.4‰). The spatial (three plots at different distances from the riverbank) and temporal (two years) disparities in the tree water use characteristics (root water uptake patterns and leaf WUE) and water availability conditions (WTD and soil water content) can support us to investigate the effects of river water on the water use of riparian trees along a gradient of WTD. Thirdly, we have already investigated the overall water table conditions in the riparian zone along the Chaobai River in both 2019 and 2021 (these data have not been published yet). The riparian WTD along the reach of Chaobai River shown in Fig. 1 ranged from 0.2 m to 4.3 m. The chosen site in this study is the most representative site since there is a significant water table variation (range from 0.3 m to 4.0 m) in both spatial (at distances of 5 m, 20 m, and 45 m from the riverbank) and temporal (dry 2019 and wet 2021) scales. Therefore, the representative site coupled with three different plots is enough to support out conclusions.

We have elaborated more in the text to illuminate what implications the small sample size has for our results. "Fourth, the riparian WTD along the studied reach of Chaobai River (from Dam 5 to Dam 4) ranged from 0.2 m to 4.3 m in two studied years (these data have not been published yet). The selected site in this study was the most representative site since there was a significant water table variation (ranging from 0.3 m to 4.0 m) in the two studied years. However, the implications of quantifying the effects of river water on the water use of riparian trees in this study are only applicable to relatively shallow water table conditions (with the WTD less than 4 m). Further investigations should be conducted at deep-WTD sites to better understand and regulate river runoff and tree's water needs." (see P23, Lines 633 to P24, 639).

Some general mistakes/points throughout the whole document:

2. Comment:

often "the" or "a" are missing.

Response: *Thank you for the helpful suggestions. We have checked the whole manuscript and added "a" or "the" in the text.*

3. Comment:

"at distance of 5m, 20 m, and 45 m away from" does not sound correct? maybe: at a distance of 5 m, 20 m, and 45 m from the shore, or: "at 5, 20, 45 m distance from the shore", "at distances of…"

Response: *Thank you for the helpful suggestions. We have changed "at distance of 5m, 20 m, and 45 m away from" to "at a distance of 5 m, 20 m, and 45 m from …" or "at distances of…" throughout the whole manuscript.*

4. Comment:

in "a" wet and "a" dry year, in "the" dry year?

Response: *We have changed "in dry/wet year" to "in a dry/wet year" throughout the whole manuscript.*

5. Comment:

it must be "water stable isotopes" NOT "stable water isotopes"

Response: *We have changed "stable water isotopes" to "water stable isotopes" throughout the*

whole manuscript.

6. Comment:

the use of "that" is often wrong as in "unclear that how" or "because that"

Response: *We deleted "that" in "unclear that how" as well as "because that". We have corrected "that" in the entire document.*

7. Comment:

"RWC to riparian trees" does not make sense as pointed out by both reviewers, it is the RWC to the transpiration/water uptake... , check the entire document for that expression. This also includes figures such as figure 10.

Response: *We have changed "RWC to riparian trees" to "RWC to the transpiration of riparian trees" in both the text and figure sections in Fig. 10.*

8. Comment:

please write the full name of the species when mentioned first (G. biloba)

Response: *Thank you for the helpful suggestions. We have written the full name of the species when mentioned first in this manuscript (see P4, Line 107).*

9. Comment:

I would also add "values" after δ2H and δ18O

Response: *Thank you for the helpful suggestions. We have added "values" after δ^2H and $\delta^{18}O$ throughout the whole manuscript.*

10. Comment:

in-situ NOT in-suit; check spelling of this word in entire document including figures.

Response: *We have changed "in-suit" to "in-situ" in the entire document including figures.*

Specific comments:

More comments can be found in the pdf (note: the comments on language mistakes are not complete).

Also, I noticed that the text in the authors' replies in the open discussion differs from the newly

submitted manuscript text. Line-by-line comments (line numbers refer to the tracked changes version):

11. Comment:

l14: brackets confusing, include into sentence

Response: *We have changed "rivers losing flow into underlying groundwater" to "rivers flow into underlying groundwater" in the bracket (see P1, Line 14).*

12. Comment:

l16: water stable isotopes

Response: *We have changed "stable water isotopes" to "water stable isotopes" throughout the whole manuscript.*

13. Comment:

l22: "contributed by 20.3% of water to riparian tree", to what of the riparian tree?

Response: *We have corrected this unclear sentence to "contributed 20.3% of water to the transpiration of riparian trees" (see P1, Line 23).*

14. Comment:

l138: "in combination with"

Response: *We have changed "together with" to "in combination with" (see P5, Line 113; P24, Line 643).*

15. Comment:

l56-57: trees… tree species; it is neither to combine or use the same term

Response: *We have changed "Similar findings have also been found in riparian phreatophyte trees (Populus fremontii and Salix gooddingii) and riparian deep-rooted tree species" to "Similar findings have also been reported regarding riparian phreatophyte trees (Populus fremontii and Salix*

gooddingii) and riparian deep-rooted trees (Busch et al., 1992; Bowling et al., 2017; Wang et al., 2019a).” (see P3, Lines 61-63).

16. Comment:

l76: mention Radon

Response: *We have changed “radioactive isotope (^{222}Rn)” to “radioactive Radon (^{222}Rn)” (see P4, Line 85).*

17. Comment:

l85: higher than what?

Response: *We have corrected this sentence as follows: “riparian Eucalyptus camaldulensis with more frequent access to river water had a higher tree WUE compared to those far away from the riverbank.” (see P4, Lines 99-102).*

18. Comment:

l100: “a temperate…”?

Response: *We have changed “The temperate continental sub-humid monsoon climate prevails in this area” to “a temperate continental sub-humid monsoon climate prevails in this area” (see P5, Lines 123-124).*

19. Comment:

l156: please state clearly that it is one plot per distance (as it is shown in Fig.1)?

Response: *We have corrected this unclear sentence as follows: “Three plots at different distances of 5 m (D05), 20 m (D20), and 45 m (D45) from the riverbank (one plot per distance) were also selected for field measurements and sample collection (Fig. 1).” (see P5, Lines 136-137).*

20. Comment:

l165: add “and in 2021”

Response: *We have changed "in 2019 and 2021" to "in 2019 and in 2021" (See P6, Line 145).*

21. Comment:

l186: please also add here that it is in total 3 trees?

Response: *We have added "in total 3 trees" in this sentence: "One riparian S. babylonica tree was selected in each plot (three trees in total) for δ^2H and $\delta^{18}O$ measurements in xylem water as well as $\delta^{13}C$ analysis in plant leaves." (see P6, Lines 161-162).*

22. Comment:

l192: how many leaf samples did you take?

Response: *More than 50 mature leave samples were collected for each tree at each sampling campaign. We have added the number of leave samples as follows: "Meanwhile, more than 50 mature leaves without petioles were sampled from the collected stems using pruning shears and mixed into one leaf sample for $\delta^{13}C$ analysis." (see P7, Lines 167-169).*

23. Comment:

l208: were extracted samples filtered to remove organics?

Response: *Yes. We have added "All the extracted water from the xylem and soil samples was filtered to remove impurities." in the text (see P7, Lines 181-182).*

24. Comment:

l213: how did you determine the accuracy?

Response: *The measurement accuracy for the IRIS and IRMS systems were determined by both the measured and true values of standard samples.*

25. Comment:

l214: did you only use one standard?

Response: *We used one standard (Vienna Standard Mean Ocean Water, VSMOW) to calibrate and*

normalize the δ^2H and $\delta^{18}O$ measurements in different waters. We used another standard (Vienna Pee Dee Belemnite, V-PDB) to calibrating leaf $\delta^{13}C$ values.

26. Comment:

l226: how did you determine the precision?

Response: *The precision of the ^{222}Rn monitor was the factory parameter, which was determined by the instrument manufacturer.*

27. Comment:

l272-273: this sentence is confusing, maybe: "To account for different soil layers…"?

Response: *This is a good comment. We have changed "Soil water at different depths was taken up by riparian S. babylonica directly." to "Soil water was an important direct water source for the transpiration of riparian S. babylonica trees." (see P9, Lines 244-245).*

28. Comment:

l286-287: would be nice to add numbers to show how similar

Response: *We have added numbers to show how similar as follows: "As the isotopic composition of soil water in the 170−300 cm layer (−57.6‰ ± 2.0‰ for δ^2H and −7.3‰ ± 0.1‰ for $\delta^{18}O$) was similar to that of groundwater (−57.7‰ ± 1.4‰ for δ^2H and −7.4‰ ± 0.1‰ for $\delta^{18}O$), they were considered to be one water source (groundwater)." (see P10, Lines 262-269).*

29. Comment:

l378: in Microsoft Excel

Response: *We have changed "in Excel" to "in Microsoft Excel" (see P13, Line 341).*

30. Comment:

l386: was the peak the same for both years?

Response: *No, the peak values of ET_0 as well as their corresponding time was different between the*

2 studied years. The original sentence "The daily mean VPD and ET_0 increased during the observation period, reaching a peak in June and May, respectively (Fig. S1)." is confusing and this result doesn't help to explain the discussions. Therefore, we deleted this sentence.

31. Comment:

l389: what did you test here, the remaining months? rather state the time frame.

Response: *We have changed "the remaining months" to "the rest of the months". And we also added the time frame of "the rest of the months" in this sentence: "There was a significant difference in the average daily ET0 from June to September between the dry year of 2019 (5.0 mm/day) and the wet year of 2021 (4.3 mm/day) ($p < 0.05$), but no significant difference was observed during the rest of observation period (i.e., April, May, October, and November) between the two years ($p > 0.05$) (Fig. S1c and d)." (see P13, Lines 351-355).*

32. Comment:

l390-391: please specify observation period here by months

Response: *Thank you for the helpful suggestions. We have specified "observation period" by months when the "observation period" first occurred in the result section as follows: "The observation period (from April to November) in 2021 was wet with total precipitation of 802.5 mm, which was 1.8 times greater than for the drier year 2019 (445.6 mm) (Fig. 2a)." (see P13, Lines 345-346).*

33. Comment:

l419: in both years

Response: *We have changed "in both two years" to "in both years" (see P15, Line 393).*

34. Comment:

l432: delete "it was found"

Response: *We have deleted "it was found" in this sentence.*

35. Comment:

l352: “most significant”

Response: *We have changed “most significantly” to “most significant” (see P16, Line 424).*

36. Comment:

l397: I am not sure if I understand correctly, to me it would make sense to state: “However, the riparian deep-water sources were identified using the water isotopic data collected in campaigns taking place in an interval of about one month.”?

Response: *Thank you for the helpful suggestion. We have corrected this sentence as follows: “the riparian deep-water sources were identified using the water isotopic data collected in campaigns taking place at an interval of about one month.” (see P23, Lines 618-620).*

37. Comment:

Figure 2 caption: I would not say “changes”. Just start with “Monthly…” (it is the absolute values, right?)

Response: *Thank you for the helpful suggestion. Yes, the monthly average precipitation amount from 1961 to 2021 is absolute value. We have deleted “changes in” in this sentence.*

38. Comment:

Figure 11: State/clarify that leaf d13C etc. are monthly (mean?) data from all distances in the legend.

Response: *The WTD, leaf $\delta^{13}C$ values, and river water contributions to the transpiration of riparian S. babylonica are monthly data at each plot at a distance of 5 m, 20 m, and 45 m from the riverbank during the observation period in both years. We have clarified in the caption of Figure 11.*

39. Comment:

Table 2: do you only have one value for each time point, or is the value a mean per time point?

Response: *We sampled more than 50 mature leaves without petioles from the collected stems and mixed into one sample to measure leaf $\delta^{13}C$ values. Therefore, we only have one value for each time*

point and each plot.

Additional comments in the pdf (note: the comments on language mistakes are not complete). Also, I noticed that the text in the authors' replies in the open discussion differs from the newly submitted manuscript text. Line-by-line comments (line numbers refer to the tracked changes version):

Response: *"The response letter to reviewer" document used by anonymous reviewer 4 was not the newly version of the response letter to reviewer. Some comments in the anonymous reviewer 4-revised document have been corrected in the newly version of the response letter to reviewer. But there are still many helpful and insightful suggestions for improving the manuscript. Here we showed the additional comments in the pdf.*

40. Comment:

Both the trace plots and three diagnostic tests are used to check that the MixSAIR model has converged (Stock and Semmens, 2013). Were used?

Response: *We have changed "are used" to "were used".*

41. Comment:

"Because the riparian trees" is not a sentence.

Response: *We have changed "Because....." to "This is because ....." (see P19, Lines 506 and 517).*

42. Comment:

"because that" is wrong

Response: *We deleted "that" in "because that". We have corrected "that" in the entire document.*

43. Comment:

Would need

Response: *We have changed "need" to "would need" throughout the entire document (see P22, Line 590; P23, Line 629).*

44. Comment:

phrasing.., even..., ?

Response: *We have corrected this sentence as follows: "several recent studies showed that phreatophytic/deep-rooted trees predominantly extended roots into fine pores to take up immobile soil water." (see P19, Lines 499-501).*

45. Comment:

add information in brackets to the sentence

Response: *We have corrected this sentence as follows: "In our study, we separated and determined the contributions of indirect river water sources (i.e., the river-recharged deep soil water in the 80−170 cm layer and groundwater also contained river water) to the transpiration of riparian trees." (see P19, Lines 521-523).*

46. Comment:

Change "supposed" to "suppose"

Response: *We have changed "supposed" to "suppose" (see P21, Lines 561-562).*

47. Comment:

Change "in wet year" to "in the wet year"

Response: *We have added "the" in "in the wet year" or "in the dry year" throughout the whole manuscript.*

48. Comment:

"in consistent with" is wrong

Response: *We have changed "These relationships are in consistent with previous studies" to "These relationships are consistent with previous studies" (see P21, Line 555).*

49. Comment:

Change “are likely due to that” to “are likely because”

Response: *We have changed “are likely due to that” to “are likely because” throughout the entire manuscript (see P21, Line 557).*

50. Comment:

Change “it” to “our finding”

Response: *We have changed “It was consistent with…” to “Our finding was consistent with….” (see P21, Line 579).*

51. Comment:

Change “supposed” to “suppose”

Response: *We have changed “supposed” to “suppose” (see P12, Line 305).*

52. Comment:

Figure S1: change “during the observation period in 2019 (c) and 2021 (c).” to “during the observation period in 2019 (c) and 2021 (d).”

Response: *We have corrected this sentence to “Daily reference evapotranspiration (ET_0) (mm/day) and daily mean net radiation (W/m^2) are shown in panels (c) and (d).”.*

53. Comment:

Figure S1: change “Temperature” to “Air temperature”; change “KPa” to “kPa”

Response: *We have changed “Temperature” to “Air temperature” and changed “KPa” to “kPa”.*

54. Comment:

give amount per year as well e.g. in brackets. Delete “and….”

Response: *We have added the precipitation sample amount per year in this sentence: “A total of 135 precipitation samples were collected throughout the whole years of 2019 (53 samples) and 2021 (82 samples).” (see P6, Lines 155-156). We have deleted “and” in the “And a total of ….” (see P6,*

Line 155).

55. Comment:

so 3 three per distance? please add this information to be more clear

Response: *We have corrected this sentence as follows: "One riparian S. babylonica tree was selected in each plot (three trees in total) for δ^2H and $\delta^{18}O$ measurements in xylem water as well as $\delta^{13}C$ analysis in plant leaves. The mean breast-height diameter of three sampled trees at different distances of 5 m, 20 m, and 45 m from the riverbank was 28.6 ± 4.4 cm." (see P6, Lines 161-164).*

56. Comment:

you mean summarized to? averaged?

Response: *We have corrected this sentence as follows: "The average soil water isotope values for the 0−30 cm soil layer were determined as the average of the soil water isotope values of 0−5 cm, 5−10 cm, 10−20 cm, and 20−30 cm soil layers" (see P9, Line 248 to P10, Line 250).*

57. Comment:

Change "isotopes values" to "isotope values"

Response: *We have change "isotopes values" to "isotope values" (see P10, Line 249).*

58. Comment:

Table S1 might be worth not to put in the supplemental but in the text

Response: *We have put Table S1 in the text (Table 3).*

59. Comment:

Table 1: did you add this to your method part, this would be important to mention that negative values were set 0

Response: *We have clarified that the negative values were set to 0 in our mention part.*

60. Comment:

you could still consider testing how the fit looks like within a year (additionally). Especially since you plot them nicely with different colours.

Response: *We have corrected the Figure 11 as follows:*

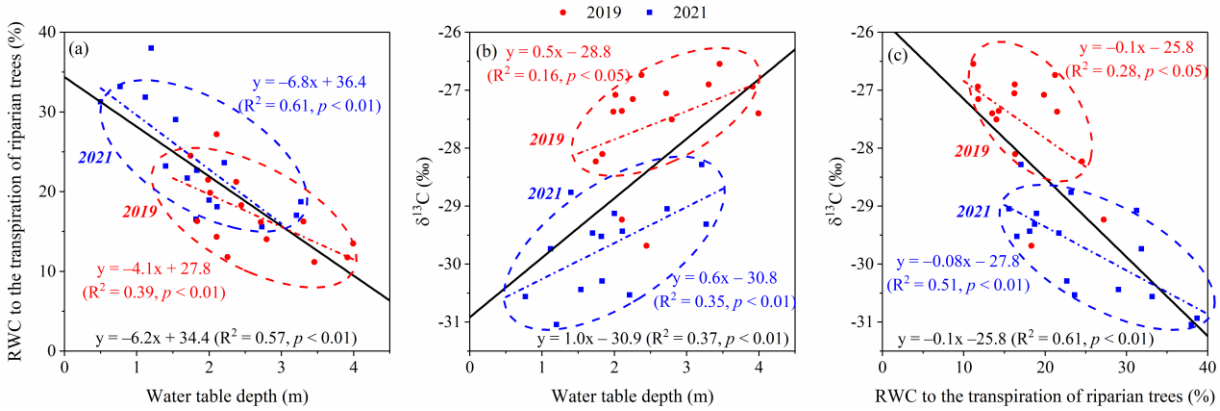

Figure 11: Relationships between the contributions of river water to the transpiration of riparian trees and the water table depth (a), between the leaf $\delta^{13}C$ values and the water table depth (b), and between the leaf $\delta^{13}C$ values and proportions of river water contributions to riparian trees (c). The red line represents the linear relationship fitted by the monthly data in three plots in 2019, while the blue line represents the linear relationship fitted by the monthly data in three plots in 2021. The black line represents the linear relationship fitted by the monthly data in three plots in both years. The WTD, leaf $\delta^{13}C$ values, and river water contributions to the transpiration of riparian S. babylonica are monthly data at each plot at a distance of 5 m, 20 m, and 45 m from the riverbank during the observation period in both years.

61. Comment:

Change "WUE" to "leaf WUE".

Response: *We have added "leaf" in the "WUE" throughout the entire manuscript.*

62. Comment:

Delete "that" in the "it remains unclear that how to separate…"

Response: *We have deleted "that" in the sentence of "it remains unclear that how to separate…"*

in the entire document.

63. Comment:

Change “These suggested” to “This suggests”.

Response: *We have changed “These suggested” to “This suggests” (see P24, Line 655).*

64. Comment:

delete in linear functions, or write linearly correlated

Response: *We have deleted “in linear functions” and corrected “linearly correlated” throughout the whole manuscript (see P1, Line 29 to P2, Line 30; P17, Line 453; P24, Lines 653-654).*

65. Comment:

Change “would trigger” to “may trigger”

Response: *We have changed “would trigger” to “may encourage” throughout the entire document (see P2, Line 30; P22, Line 597; P24, Line 656).*

66. Comment:

Add reference here

Response: *We have added the reference behind the sentence “It is generally assumed that when C_{System} is around or lower than 80 Bq/m^3, the existing C_{System} can be ignored accordingly (Saphymo, 2017).” (see P8, Lines 204-205).*

67. Comment:

soil layers were rather group to 4?

Response: *Thanks for your helpful suggestions. This sentence is confusing. The soil layers were indeed rather group to 4. We have corrected this sentence as follows: “To reduce errors in the analytical procedure, four soil layers (0−30 cm, 30−80 cm, 80−170 cm, and 170−300 cm) were determined to identify the main root water uptake depth of riparian trees according to seasonal*

variations in the SWC, water isotopes, and WTD." (see P9, Lines 246-248).

68. Comment:

Figure 4: replace "of" by ":"

Response: *Thanks for your helpful suggestions. We have replaced "of" by ":"*

69. Comment:

Change "WTDs" to "WTD", change "δ^2H and $\delta^{18}O$ in different water sources and xylems" to "δ^2H and $\delta^{18}O$ of different water sources and xylem water"

Response: *Thanks for your helpful suggestions. We have changed "WTDs" to "WTD" and changed "δ^2H and $\delta^{18}O$ in different water sources and xylems" to "δ^2H and $\delta^{18}O$ of different water sources and xylem water" throughout the whole manuscript.*

70. Comment:

"It was ascribed to that" is wrong

Response: *We have change "It was ascribed to that…" to "This discrepancy was ascribed to the fact that…" (see P20, Line 545).*

71. Comment:

Change "riparian S. babylonica tree" to "riparian S. babylonica trees" in the sentence of "the outer projected edge of canopy was less than 5 m for riparian S. babylonica tree closest to the river.

Response: *We have change "riparian S. babylonica tree" to "riparian S. babylonica trees" (see P10, Line 268).*

72. Comment:

Change "It indicated" to "This indicated" in the sentence of "It indicated that the lateral roots of S. babylonica trees".

Response: *We have change "It indicated" to "This indicated" (see P10, Line 268).*

73. Comment:

"…, which could not be recommended in order to both…" sounds strange

Response: *We have corrected this sentence as follows: "The rising groundwater level may encourage riparian trees to increase the water extraction from groundwater/river and to exhibit a consumptive river-water-use pattern, which can have an adverse impact on the protection of both rivers and riparian vegetation." (see P2, Lines 30-33).*

74. Comment:

you mean the contribution to the transpiration flux? or uptake? you do not really know how they "used" the water as you have no transpiration data

Response: *We have changed "water use patterns" in this sentence to "water uptake patterns". Nevertheless, we still have several expressions of "water use characteristics of riparian trees" to indicate "the water uptake patterns and leaf WUE of riparian trees" in this manuscript.*

75. Comment:

Change "in riparian zone" to "in riparian zones"

Response: *We have changed "in riparian zone" to "in riparian zones" (see P4, Lines 87 and 103; P22, Line 598).*

76. Comment:

please state directly how you calculated the efficiency

Response: *We have added the equation of water extraction efficiency in the text (see P7, Lines 187-190).*

$$E_{WE}=\frac{W_{BE}-W_{AE}}{W_{BE}-W_{OD}}\times 100\% \quad (1)$$

Whereas E_{WE} represents the efficiency of water extraction. W_{BE} and W_{AE} represent the weights of xylem/soil samples before and after extraction, respectively. W_{OD} represents the weights of oven-dried xylem or soil samples.

77. Comment:

put 2021 after month directly

Response: *We have corrected this sentence as follows: "The riparian S. babylonica took up the most river water in July 2021 (35.2 ± 7.0%), whereas the highest RWC to the transpiration of riparian trees occurred in June 2019 (24.2% ± 1.6%)." (see P16, Lines 428-430).*

78. Comment:

The response to the comment "-27.7 is not remarkably larger than -29.7" does not consider the reviewer's comment. please better state: differences were significant but small.

Response: *Yes, the differences in leaf $\delta^{13}C$ of riparian S. babylonica trees between two studied years were small (2.0‰) but significant ($p < 0.05$). We have corrected this sentence as follows: "The leaf $\delta^{13}C$ of riparian S. babylonica trees was significantly higher in 2019 (−27.7‰ ± 1.0 ‰) than in 2021 (−29.7‰ ± 0.7 ‰) ($p < 0.05$) (Table 2)." (see P17, Lines 444-445).*

79. Comment:

Change "characterized as" to "characterized by"

Response: *We have changed "characterized as" to "characterized by" (see P21, Line 558).*

80. Comment:

Change "more proportions" to "a higher proportion"

Response: *The expression of "more proportions" does not occur in the newly submitted manuscript text.*

81. Comment:

however, you did not normalize your WUE against radiation, maybe repeat that radiation was not different between years.

Response: *Yes, we have repeated that radiation was not different between two years in the 4.2 section: "Higher leaf WUE associated with lower RWC to the transpiration of riparian trees and*

lower groundwater levels are likely because water stress restricts the stomatal conductance and further reduces the transpiration rate of riparian trees. Specifically, the dry year of 2019 was characterized by higher water demand (indicated by higher VPD) and lower water availability compared to the wet year of 2021, but the energy resource (indicated by net radiation) for riparian trees was similar between the two years (Figs. S1-S2). Hence, we suppose that water limitation rather than energy limitation regulates the leaf-level stomatal conductance of riparian S. babylonica trees. The high water demands but low river water availability in the dry year likely resulted in the stomatal closure of riparian trees to minimize water loss, which eventually led to a decrease in transpiration rate and even photosynthetic rate (Fabiani et al., 2021; Behzad et al., 2022). Aguilos et al. (2018) further found that water stress would enhance radiation-normalized WUE because the lack of water availability induced a stronger reduction in transpiration than photosynthesis. With no difference in the average net radiation between dry and wet years, the lower river water availability in a dry year probably increased leaf WUE. It can be inferred that riparian S. babylonica trees took up more river water and possibly exhibited a consumptive river-water-use pattern in the wet year compared to the dry year. This agreed well with previous investigations during which the woody plants showed lower leaf WUE and consumptive water use patterns in the rainy season, while they showed higher leaf WUE and conservative water use patterns with lower soil water availability in the dry season (Horton and Clark, 2001; Cao et al., 2020; Behzad et al., 2022). However, consumptive river water taken up by riparian trees could result in a great loss of river water, which should be avoided in the riparian zone of a losing river that is under restoration by "ecological water"." (see P21, Lines 556-575).