We thank Editor Nadia Ursino and an anonymous reviewer for their constructive comments. Based on your comment and request, we have made extensive revision on the original manuscript. Here, we attached revised manuscript in the formats of both PDF and MS word, for your approval. A document answering every question from the referees is also included, the manuscript has been revised with the assistance of a native English speaker. The manuscript has been significantly improved by addressing the comments. The following are our point-to-point responses to their comments.

*General comments:*
*In the manuscript "Redistribution process of precipitation in ecological restoration activity of Pinus sylvestris var. mongolica in Mu Us Sandy Land, China" the authors present a study on the distribution of precipitation to evapotranspiration, soil water storage, and ground water recharge of an afforested versus a bare site in semi-arid China. This is definitely an interesting and highly relevant topic. Also the main results which is the lack of ground water recharge in afforested sites, is important. Unfortunately, the manuscript is badly written, there are a lot of repetitions, lots of things are described far too long, while other essential ones are missing or mentioned too late (e.g. the amount of sap flow sensors or lysimeters installed). Also, even though not clearly described, the study design appears to be extremely minimalistic (only one sap flow sensor, only one lysimeter/soil moisture sensor profile per site) and does not allow any estimation of (spatial) variability. Therefore, I have to conclude that this manuscript is not suited for publication in HESS.*
**Response:** Thank you for your positive comment of this research topic, we have made a comprehensive revision of the manuscript, adjusted the description of the experimental design and the installation of sap flow equipment. We have improved the part of the sap flow experiment to address reviewer's concern. The rationale for the section of sample plots are also articulated.

The repetitions are deleted, and the essential parts are explained in detail. A native English speaker assisted us in revising the manuscript. We have moved the content mentioned in the discussion to the introduction section.

Our experiment is based on a new Lysimeter system and a PSM sap flow monitoring. We have selected six PSMs and used six TDP sensors with one TDP sensor per PSM, over the four-year period, two sensors were damaged, and the data of the other three sensors were acceptable but not continuous. Only one sensor recorded continuous and reliable sap flow data. In the future, improvement is needed for innovative TDP sensor that can work under extreme conditions such as long-term (more than 150 days per year) sub-zero air temperature and physical impact of sandstorms.

We have corrected the tense and grammar errors and have used short sentences to describe the experiment and conclusion. We believe that the quality of the revised manuscript has been significantly improved and suited for publication in HESS.

*Specific comments*
*Abstract*

*Line 1: why "Precipitation was…" and not "Precipitation is…"? Is that not the case anymore? What has changed?*
**Response:** Implemented. This is a grammatical error. This sentence is rewritten as "Precipitation is the most important water resource in semi-arid regions of China". See line 1.

*Line 3: Not sure what you mean with the term "land surface ecological system sustainability". Better to be more precise here. Would also rather use "afforested"*
**Response:** Implemented. To reduce any unnecessary confusion, the sentence is rewritten as "The redistribution of precipitation among atmospheric water, soil water and groundwater are related to the land surface afforested ecological system will develop sustainability". Please see line 3.

*Line 7: To my knowledge, in (eco)hydrology the term "interception" is more used for water intercepted by the plant canopy (the opposite of throughfall) than in the soil, so I would use another term for water stored in the upper soil layer to avoid confusion (also in the following e.g. in line 14)*
**Response:** Implemented. Thanks for the reminder, we use "store" instead of "interception". This sentence is rewritten as "Precipitation infiltrated and part of the moisture was stored in the shallow soil layer, then evapotranspiration increased". See line 8 and line 13.

*Line 12: I would avoid pseudo-accuracy, for instance "54% of precipitation" instead of "54.03%". Please check in the whole text (e.g "7.58 mm" in line 15 or "153.98 mm/yr" in line 17)*
**Response:** Implemented. We have updated the numerical results to avoid the pseudo-accuracy issue according to the reviewer's suggestion.

*Line 13: Not sure about the effects of soil temperature on infiltration. It is quite straightforward that there should be differences in soil temperature between the afforested and the bare-soil plots due to shading etc. but how that might affect infiltration has to be explained…*
**Response:** Very nice comment. At the beginning of the experiment, we did set up two soil temperature probes to monitor the changes in soil temperature in different seasons to determine the impact of soil temperature on infiltration. Unfortunately, the soil temperature probe was damaged for several times, and the plot was in remote areas thus the damaged temperature probe cannot be repaired in time. We will continue to monitor soil temperature in the future. At this stage, we can only judge the influence of temperature on deep soil recharge based on seasonal changes. We decided to delete the sentence of infiltration-temperature relation to avoid unnecessary misunderstanding, and leave this issue for future investigation.

*Line 16/17: March to October is not really a one-year period but might be a growing season.*
**Response:** Implemented. The study site has frozen shallow soil in winter (usually from November to February next year during which the lowest temperature can be below minus 30 degrees Celsius), thus the infiltration experiment cannot be performed. Furthermore, based on our many years field experiences at the site, we have found that soil moisture probes (EC-5, METER), rain gauge (3525R, Spectrum), and sap flow equipment (FLGS-TDP, Dynamax) cannot function normally under frozen conditions. Therefore, the period from March to October in a one-year cycle yields the measurable high-quality dataset for analysis.

*Line 19/20: A better reasoning for the final statement would be good, it is quite a big jump from the basic hydrological data presented before to this conclusion*
**Response:** Very nice comment. For readers to understand our research more clearly, this sentence has been rewritten as "Through in-situ measurement and comparative analysis of the precipitation redistribution results of the BSL plot and the PSM plot, we find that PSM can significantly reduce the shallow soil water storage and DSR. However, substantial reduction of shallow soil water storage and DSR is detrimental for the long-term development of PSM forest. Therefore, it is necessary to reduce PSM density to cut the water consumption by PSM per unit area, thus to augment the shallow soil water storage and DSR, which will be beneficial for the PSM to survive under extreme drought condition in the future. This study helps us understand the role of precipitation-induced groundwater recharge in the process of vegetation restoration in semi-arid regions and explains the possible causes of PSM forest degradation." Please see line 17-26 in the revised version.

*Introduction*

*Line 31-33: A bit more information on these projects would be interesting, at least where they are situated.*
**Response:** Implemented. This sentence is rewritten as "The 3NSP was located between 73°29'~129°50' E and 33°30'~50°14' N. It was 4480 kilometers long from east to west and 560-1460 kilometers wide from north to south." Please see line 37-40 in the revised version.

*Line 38-63: A lot of results on the hydrology of afforested (semi-) arid regions are presented, but a clear structure is missing here. Instead of writing some researcher found this and other researchers found something else it might be better to present a concise theory of the effects of afforestation on the local water cycle (e.g. more trees => more interception by the plant canopy/less throughfall => less infiltration + change of soil properties => higher water storage at top soil layer + higher transpiration by trees => less groundwater recharge) and add the corresponding references at the respective places.*
**Response:** Implemented. We have revised the structure of this part. Firstly, we point out that various investigators have different views on the impact of vegetation reconstruction on the environment, can vegetation restoration solve existing environmental problems and prevent and fixing sand? Secondly, to study the impact of vegetation reconstruction on the environment, some investigators determine that different types of vegetation (herbs, shrubs, trees) have different precipitation interception effects after reconstruction, and then the water cycle frequency (or period) has changed at the basin scale. Selected a few representative studies in arid areas, and showed their results: It shows that vegetation restoration has caused the distribution of water, precipitation tend to storge in shallow soil or become atmospheric water vapor. Thirdly, it is still impossible to describe precisely how water resources are redistributed in the atmosphere, soil, and groundwater at a region scale, especially the DSR below the root layer is rarely monitored. Finally, vegetation restoration is so important for taming desertification in the 3NSP, so we use various methods to carry out research on the process of precipitation redistribution, answer some questions that cannot be answered at this stage. Please see line 49-65.

*Line 64-65: This rather general sentence would fit better at the beginning of the introduction*

**Response:** Implemented. The sentence has been moved at the beginning of the introduction. See line 31.

*Line 64-78: I would merge this paragraph with the one before, it is basically a more general repetition of possible effects of afforestation on the water cycle*
**Response:** Implemented. Please see line 85-91 in the revised manuscript.

*Line 78-90: This paragraph introduces Pinus sylvestris var. Mongolia and its degradation. The possible reasons for the later remain unclear, especially the question if precipitation actually decreases or increases. Could this be an effect of scale: large scale decrease of precipitation in the whole region but small-scale increases in the afforested stands due to higher air humidity caused by more evapotranspiration?*
**Response:** Very nice comment. There are two facts that need to be clarified. Firstly, PSM successfully tamed desertification at the beginning of plant restoration and grew normally but began to degenerate after 40 years. Generally speaking, PSM can live up to 100 years and usually will not start to degenerate in 40 years. Secondly, the annual precipitation in this area continues to increase in a 40-years period (1980-2020), and this is due to the following two possible reasons. The first reason is that large scale afforestation in the regional can increase the ET in the region, which leads to high air humidity and increased annual precipitation. The second reason is due to global climate change which has altered the atmospheric circulation in this region, which leads to increased annual precipitation. These two reasons can act independently or simultaneously to boost the annual precipitation in this region. Despite the increased annual precipitation in the region, PSM still experience degeneration at a relatively earlier stage (after 40 years). Our purpose of this investigation is to find out the reasons for PSM degradation from the redistribution process of precipitation in forest land. Please see line 93-105.

*Line 91-108: The research questions are the most important part of this paragraph. The beginning and end of the paragraph should be shortened/streamlined.*
**Response:** Implemented. We directly put forward the research problem and the solution to this problem. Please see line 106-118.

*Material and methods*

*Figure 1: The red and blue dots are hardly visible in the map, either make them bigger or zoom further in (or you make just one point as the 2 plots are really close).*
**Response:** Implemented. We re-drawn the picture, simplified the picture, and clearly showed the study area.
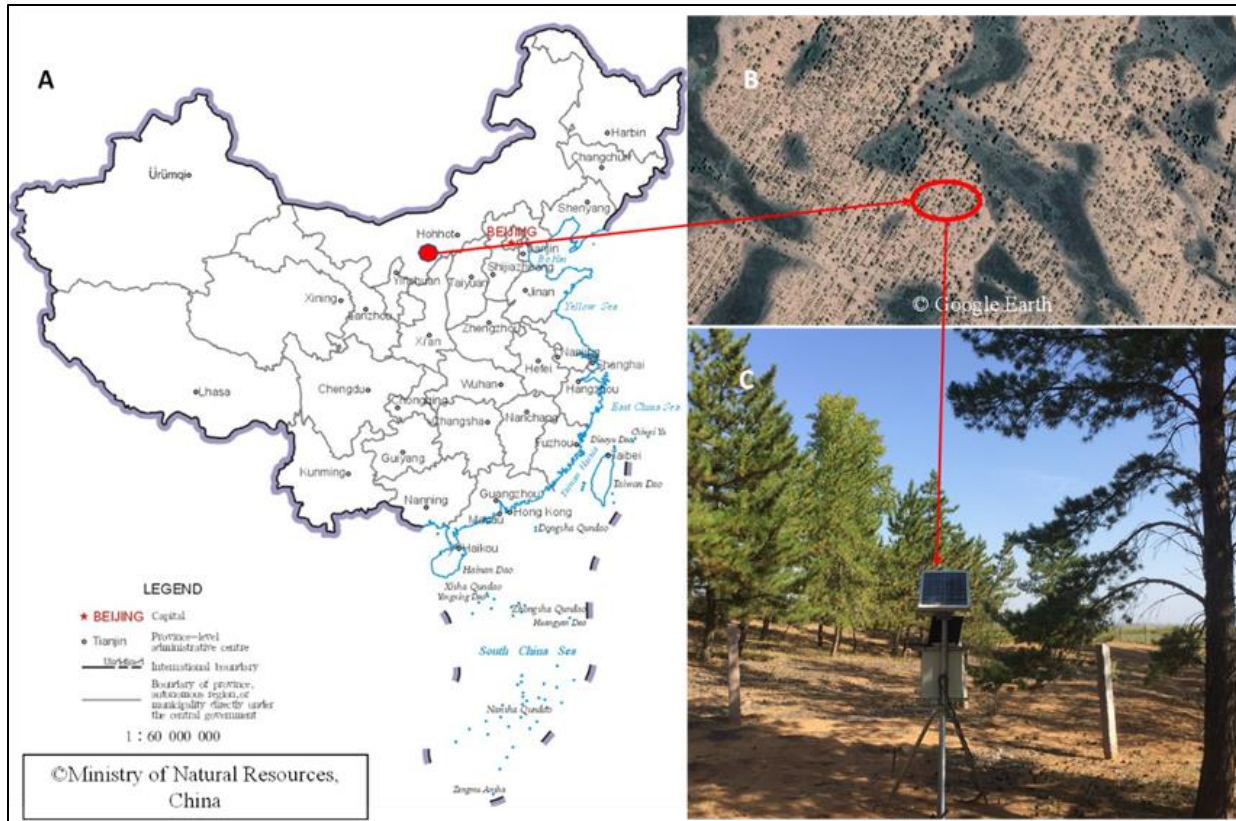
Figure 1 Location of research region: A, the location of the research area in China, northern arid-semi-arid areas; B, the characteristics of the PSM forest field in the research area, the strip-like PSM restoration zone: C, the in-situ experimental observation instrument.

*Line 116: Not sure what you mean with "soil freeze-thaw period". Is this a period where the soil freezes during the night and thaws during the day (in addition to a period with frozen soil in winter and non-frozen soil in summer)? Or is this the winter period where soil might freeze but it does not happen every day?*
**Response:** Implemented. The annual average temperature in the study area is 6.2 °C, and the shallow soil is completely frozen for about 150 days in winter. We have changed the sentence to "soil frozen period". Please see line 128.

*Line 125: Any idea about potential evapo(transpi)ration on the forested site.*
**Response:** Implemented. Potential evaporation of this area is 2563 mm, which is about 7.2 times the precipitation amount, all measured in annual averages. Please see line 131.

*Line 138: Any idea about the (original) distance between trees within one belt*
**Response:** Implemented. PSM are planted in line, and the distance between each two lines of PSM is 20 meters (belt). As the water resource for PSM to survive is precipitation, the roots of PSM grow horizontally. As shown in Figure 2, we excavated the roots of PSM and found that the roots of PSM are evenly distributed in the interval area (belt) between the two lines. See line 123-126.

*Line 149-193: There are two pages of description of the lysimeter and its installation which is just far too much, please condense it two maximum half a page.*
**Response:** Implemented. As shown in Figure 2 below, the new lysimeter was designed by us. Because this new instrument monitoring method and design are different from the traditional lysimeter, we gave a detailed explanation of its installation process and working principle, which took up a lot of pages. Traditional lysimeters need a semi-closed container to load vegetation. For this study, the root diameter of PSM is more than ten meters. It is impossible to use traditional lysimeters to monitor PSM water balance, so we use this new designed Lysimeter to monitor PSM land precipitation redistribution.
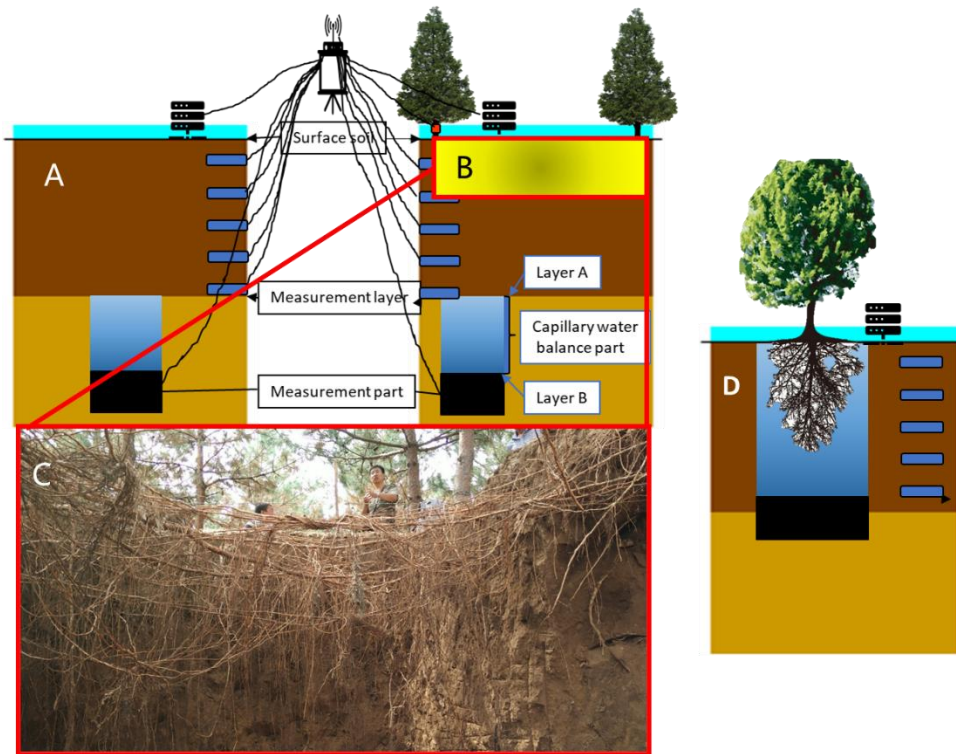
Figure 2 Schematic diagram of in-situ observation instrument installation, the PSM plot and BSL plot. A, B is the new Lysimeter, C is the distribution characteristics of PSM roots planted in the experimental field (Fig C adapted from (Dang et al., 2021)), D is the conventional Lysimeter.

*On the other site some important information is missing, e.g. what is the diameter of the lysimeters, how many lysimeters were installed, how many and which type of soil water content sensors (which producer) where installed, did you also measure soil water potential? This information could also be presented in a table.*
**Response:** Implemented. We drew a table (Table 1) that introduced the specifications of the new Lysimeter. The new Lysimeter has an upper water balance part and a lower measurement part which can directly measure the water flux. Specifically, the flux infiltrating into the balance part at the depth of the measurement face should equal the flux exiting the balance part and entering the measurement part. There is no need to build an impervious container to wrap the vegetation

tested for the new Lysimeter above the measurement face. Because we designed a soil moisture balance part based on the capillary water holding height (the soil moisture at the bottom of the balance part has reached the maximum field water holding capacity, any other water entering the balance part will break this balance state and will flow out from the bottom of the balance part into the measurement part)

Our research focuses on the process of precipitation redistribution, so we selected 6 EC-5 (METER, USA) soil moisture probes to measure the soil moisture change of the 200 cm depth soil layer, we did not measure soil water potential. One should be noted that because new Lysimeter have a water balance department, so we do not need to set a moisture probe in the barrel to monitor the water content, we monitor the soil moisture from the surface to the upper interface of the Lysimeter, to calculate the changes in soil water storage in shallow soils (200 cm depth).

*Table 1 Technical parameters of the new Lysimeter*

| Unit part | Feature |
|---|---|
| **External container material** | *Polyethylene (PE), It can bear 6000kg, and the balance and height can be adjusted to ensure the accuracy and stability of the load-bearing unit.* |
| **External container size** | *100 to 400 mm in diameter, 800-1200 mm in height optional.* |
| **Water balance part** | *The height is equal to the soil capillary water holding height in the study area, which is related to soil particle size. The sand capillary water holding height is about 400-1200 mm. The purpose is to maintain the soil column in the barrel to reach the maximum field water holding capacity.* |
| **Measuring part** | *The measuring part collects the water flowing out of the balance part into the measuring system through a funnel. There are two measuring systems: 1) an electronic balance (measurement accuracy 0.001g, suitable for areas with DSR less than 0.2 mm/year); 1) a tipping bucket (measurement accuracy 0.2 mm, suitable for areas with DSR larger than 0.2 mm/year).* |

*I also would not consider the idea of placing a lysimeter/seepage collector below the soil surface something completely new. What I was missing was a description of the lower boundary of the lysimeter, which could influence the amount of seepage measured.*
Response: Implemented. The working principle of the new Lysimeter is different from the conversational one. As shown in the figure below, we no longer need to plant PSM in a semi-closed container. In fact, the root system of PSM is massive (with the root distribution diameter

exceeding 15 meters) and we cannot plant PSM in a container. We designed this new Lysimeter to directly measure the amount of DSR below the root layer, using a tipping bucket to measure the amount of water discharged from the instrument (balance part).
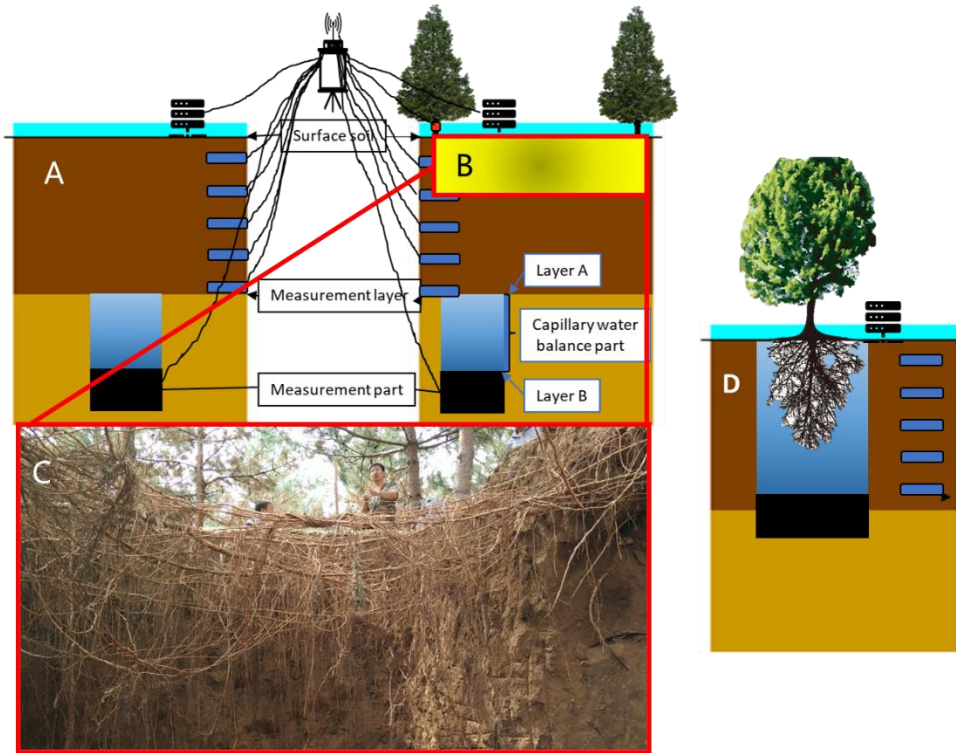
Figure 3 Schematic diagram of in-situ observation instrument installation, the PSM plot and BSL plot. A, B is the new Lysimeter, C is the distribution characteristics of PSM roots planted in the experimental field (Fig C adapted from (Dang et al., 2021)), D is the conventional Lysimeter.

*Line 198-229: Again, the description of which trees were chosen for sap flow measurements is too long, but in the end it remains unclear how many trees where measured in the end (only one)?*

**Response:** Implemented. We selected six PSMs and used six TDP sensors with one TDP per PSM, but two sensors were damaged, and the data of the other three sensors were not continuous, so there is only one TDP sensor attached to one PSM providing continuous high-quality datasets for the 4-year experimental period. We understand that this unfortunate experimental setback is unfavorable, and more reliable TDP will be used in future investigations. Fortunately, according to the comparison of the sap flow data in our neighboring experiment areas (conducted by colleagues of Beijing Forestry University), the sap flow data quality of this TDP is very reliable. We selected 500 trees to measure the diameter at breast height, found the median diameter at breast height, and then measured the PSM of the median diameter at breast height. We do want to point out that one should be cautious for conducting any upscaling of local value of evapotranspiration to large-scale evapotranspiration value. Please see line 268-300.

*Line 220/221: A reference for this equation should be given. In general, getting an exact amount of transpired water from sap flow is rather difficult (see e.g. Peters et al. (2018) New Pytologist*

*doi: 10.1111/nph.15241 or Flo et al (2019) Aricultural and Forest Meteorology (Flo et al., 2019)*
**Response:** Implemented. A reference for the equation has been added. The relationship between sap flow measurement and transpiration is indeed a research hotspot. Dissipation method is more appropriate to assess the relative sap flow and Pulse method is more suitable to quantify absolute flows. Our research here uses TDP and Pulse method. The results of our previous research find that there is indeed a great difference in the measurement of sap flow using TDP. This study finds that inserting a TDP probe on the north side of the PSM trunk to measure sap flow has a higher accuracy, and we have put great effort to provide details for the installation of the sap flow probe to improve the accuracy of measurements. At the same time, we have also discussed the possible uncertainty of measurements of sap flow. Please see line 254-267.

*Line 231-247: The horizontal distribution of the roots was mentioned before. I would add the description of the soil moisture sensors and soil water storage (and also deep soil recharge) to the description of the lysimeter before and describe the sap flow sensors afterwards.*
**Response:** Implemented. We have adjusted the order according to this suggestion. Please see line 232-249.

*Line 249-269: Basically everything in this chapter (vapor flow has not been measured but is of minor importance, deep soil recharge is essential) has been mentioned before and should not be repeated.*
**Response:** Implemented. We have removed the repetition.

*Results*

*In general there is a lot of text here which belongs to the methods chapter (most of it repetitions but also some things mentioned for the first time) and also some other which belongs into the discussion (everything that goes beyond describing your results, for example interpretating them and comparing them with the literature).*
**Response:** Implemented. We have deleted the repeated portions over the entire manuscript.

*Line 271: "ET" should be evapotranspiration, not precipitation.*
**Response:** Implemented. This sentence is rewritten as "The in-site experimental instruments recorded the precipitation redistributed into the atmosphere (ET), shallow soil layer (SWS) and groundwater (DSR) from 2016 to 2019". See line 338, table 2.

*Line 278-342: there is no need to repeat alle the information presented in the tables again in the text (and for example the deviation of precipitation from the long-term average could be added to table 1), better to summarize and point to important findings. Also be aware of pseudo-accuracy, I would not give two decimal places on annual sums, or 4-5 for an R².*
**Response:** Implemented. One decimal place is reserved for the measured value, and two decimal places for the correlation analysis result ($R^2$). We have revised the description of the experimental results to better summarize the important findings.

*Table 1: The abbreviations used in the table should be explained in the table caption, so that the table can be understand without reading the whole text (also important or figures). Also ET at BSL should be all E and not all T, as there is no vegetation.*

**Response:** Implemented. The abbreviations used in the table have been explained. The meanings of the abbreviations in the pictures and tables have been described in the caption, ET in bare sand land also has changed to T.

*Line 318-325: Did you correlate yearly sums of the different water balance components, or monthly sums, even daily sums would be possible and results may change with the time scale used.*

**Response:** This is a very good question. Two-scale (annual versus daily) analysis is carried out in the manuscript. Table 2 shows the water balance and the redistribution of precipitation on the annual scale; Figure 6 shows the water balance in 2016 with the distribution process of precipitation, evaporation and soil water storage on the daily scale. Because the six soil moisture probes were buried beneath the soil surface sequentially at depths of 20 cm, 40 cm, 80 cm, 120 cm, 160 cm, and 200 cm, the infiltration time to a certain depth shows different characteristics in different seasons. For instance, the infiltration may take more than one month from the surface to reach the 200 cm depth in October. On the other hand, it only takes about 3 days to reach the same depth in July.

Based on the setup of six soil moisture probes in this study and the infiltration times to those probes (lasing about days to months), we are unable to have a high-resolution daily or monthly distribution of precipitation in this soil-plant-atmosphere-continuity (SPAC) system. Therefore, we chose to study the water balance on an annual scale. In an annual scale, all the precipitation-induced infiltration signals can be observed with sufficient accuracy.

*Line 335-336: Why do you think reducing the density of PSM plantations would help it to cope with extreme drought? Inn general this is probably true, but more reasons and a clearer path to this conclusion should be given.*

**Response:** A point to note is that the soil water storage and DSR both can be directly consumed by PSM. According to the results in Table 2, more water entered the shallow/deep soil layer in the bare sand. Taking 2016 as an example, the annual precipitation reached 506.4 mm, the soil water storage increased by 95.7 mm, and the DSR also reached 273.6 mm. However, in the PSM forest land, most of the water resources return to the atmosphere in the form of ET. Also taking 2016 as an example, the ET reached 466.9 mm, the soil water storage increased by 38.1 mm, and the DSR was only 1 mm. Specifically, in 2019, DSR has ceased to exist, indicating that the PSM may suffer from water shortage in this year. Thus, maintaining a certain amount of DSR is crucial for the long-term survival of PSM in this region. Therefore, we concluded that reducing the PSM planting density can reduce its consumption of soil water storage and DSR per unit area and promote the recharge of deep soil or groundwater, thus is a preferred practice. At the same time, because the root system of PSM grows primarily horizontally, a lower planting density means that each PSM has a larger water catchment area, which is beneficial for its growth. Please see line 394-404.

*Line 346-355: Basically the whole paragraph belongs into the methods section and should not be repeated in the results (and if, with maximum one sentence).*

**Response:** Implemented. The repeated experimental methods involved here have been deleted. Please see line 407.

*Line 356-377 (including Figure 3): I think you confuse daily sap flow rates and annual sums of sap flow/transpiration in line 361.*
**Response:** Implemented. To avoid the unnecessary confusion, this sentence has been rewritten as "As shown in Fig. 4A, the sap flow curve had two peaks on an annual scale, the first in June and the second in August". Please see line 415.

*Table 1 shows that there is a large difference in the annual sum of transpiration at PSM between 2016 (323 mm) and the other years (max 198 mm). From Figure 3 one might think that there is hardly any difference in daily rates between the 4 years displayed, however the layout of figure 3 makes it hard to really compare between the years. Instead of using bar graphs, it would be better to use lines, then you could actually combine all 4 years in one graph and see immediately where there are differences.*
**Response:** Implemented. We have corrected the error about E and T in Table 2. The four-year monitoring data showed that the transpiration (sap flow) of PSM in different years was not very different from each other, where the maximum transpiration was 165.4 mm in 2017, and the minimum transpiration was 90.5 mm in 2018. Above maximum and minimum transpirations differ by 74.9 mm, which is substantially smaller than the difference of maximum and minimum annual precipitations of 2016-2020 period, which is 266.6 mm. Therefore, we have reached the following conclusion: the annual water consumption of PSM is relatively stable. Such a stable water consumption mechanism of PSM may not function well in dry years when water shortage is severe.

*Also sap flow velocity is displayed in the figure while actual daily sums of sap flow/transpiration would be far better and allow a comparison with the annual sums in table 1.*
**Response:** Implemented. The sap flow flux was calculated based on the sap flow rate, and we have recalculated the sap flow flux as required and the result is shown in figure below.
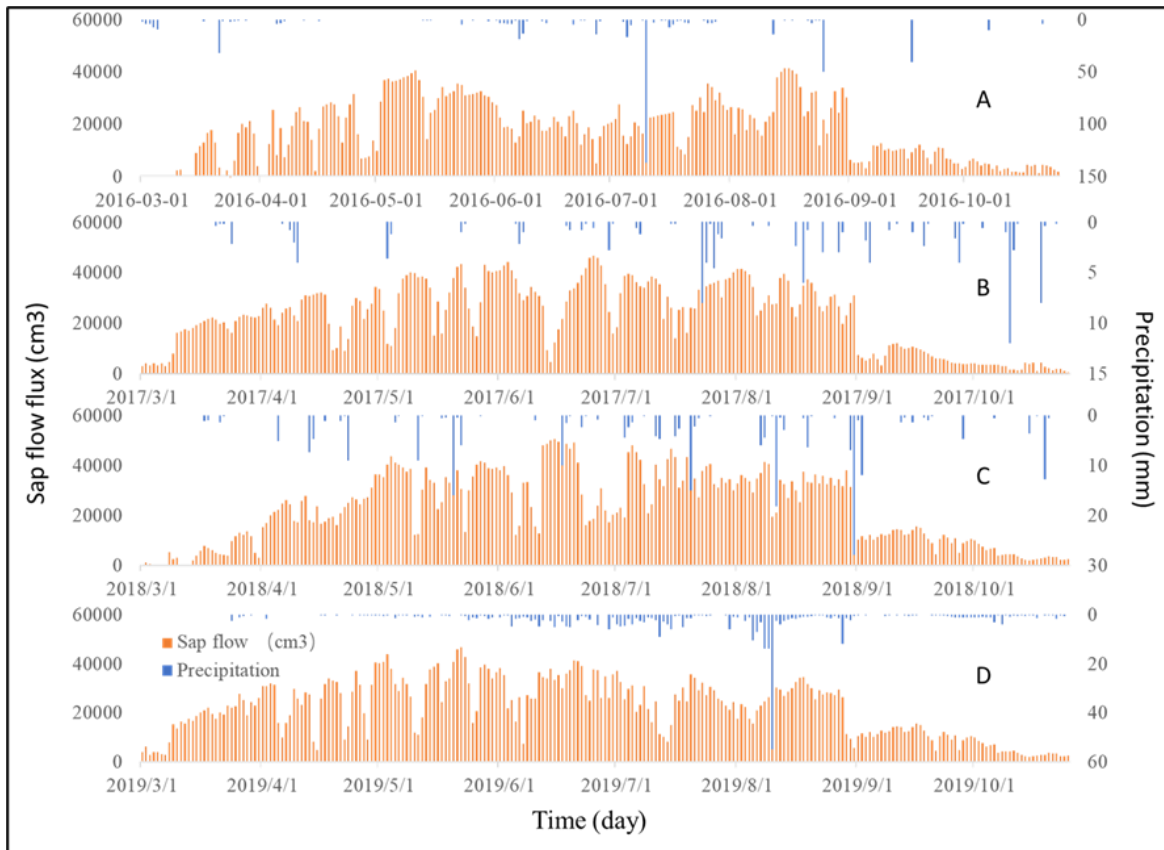
*Figure 4 Annual variations of DBH sap flow flux on the north side of PSM, 2016-2019.*

*If you really think nighttime transpiration is important, you have to show daily courses of sap flow (of a selected period) where you can actually see it.*
**Response:** Implemented. In this manuscript we mainly focus on the annual transpiration, so we are not going to show the daily sap flow characteristics, including nighttime transpiration.

*The fact that sap flow was measured at only one tree (370-371) should be mentioned in the methods section and given the variability of sap flow measurements often observes and its dependence on correct installation casts a serios doubt on the overall validity of this study.*
**Response:** Implemented. We actually measured 6 PSM sap flow, but some of the probes were damaged, maybe the low temperature in winter. Now only one PSM plot has complete data for these four years. We have similar studies in the same area. I found that the quality of our data is relatively reliable with comparative analysis. I added relevant research as citations to increase the reliability of our research.

*In general, I would expect daily sap flow rates to be low when it rains, high when the sun is shining/temperatures are high/air humidity is low, but the soil is still wet, and then decreasing when the soil moisture starts to decline. If you cannot see that when plotting daily values, also weekly or monthly ums might help.*

**Response:** Implemented. In this research, the main concern is the amount of sap flow on the annual scale, so we have deleted the daily scale analysis.

*To facilitate the interpretation, it would also help to combine sap flow data with precipitation and soil moisture data in one plot (also deep seepage could be added, all line graphs).*
**Response:** Implemented. We have combined the precipitation data, sap flow data and DSR data into one figure, as suggested.

*Also, sap flow sensors are usually somewhat limited in their functionality when the air temperature is below 0 °C, so this should be considered when showing all year data.*
**Response:** Implemented. Not only does the sap flow probe work abnormally under low temperature conditions, but also the soil moisture has similar problems, so we chose the data from March to October as the annual data for analysis to avoid unnecessary misunderstandings.

*Figure 4/5: Again line graphs would be much better here and would allow the combination of both years and maybe even both sites in one graph.*
**Response:** Implemented. We have redrawn the graph, as suggested by the Editor and this reviewer.

*Line 393: More likely the amount of organic matter in the soil improves with reforestation rather than soil texture (i.e. the ration of sand/silt/clay) itself, but the studies showing that have to be properly referred to in any case (add citations). And then his should go to the discussion section.*
**Response:** Implemented. First, organic matter in the soil may improves with reforestation but it is not a major concern, so it is not measured in this investigation. Second, a previous study by our group (Cheng et al., 2020) has measured the soil texture in the site of this investigation and this study indicated that the soil texture has changed with reforestation. Such a change is primarily related to the existence of sandstorms in the study area, and PSM is found to be effective in fixing a large amount of sand and dust where the particle size of the fixed dust is very small (less than 0.2 mm), which is much smaller than the particle size of native sand (about 1-5 mm) in the bare sand plot. After 30 years, the texture of the shallow soil layer with PSM reforestation has been changed considerably because of such a sand and dust-fixation mechanism of PSM. See line 452-460.

*Line 424: You should actually see if PSM has entered dormancy in your sap flow data.*
**Response:** Implemented. Thank you for your suggestion. Here we have performed a cross-check verification. The sap flow data began to decrease to 0 at the end of September with sporadic data points in October. From the perspective of water balance analysis, we found that at the end of September and early October, there was no transpiration, and we only observed surface evaporation. Furthermore, the daily evaporation amount was almost the same, indicating that PSM has entered dormancy. Please see line 488-498.

*Figure 6: Is there any reason why July is (c) but august is (b)?*
**Response:** Implemented. Thank you for your careful review. There is no special meaning here. To avoid misunderstanding to readers, I adjusted the order of the pictures and arranged them in chronological order. Please see Figure 6 in line 500.

*Line 444-452: You actually do not show any concreate soil temperature data, therefore it is no possible to evaluate this conclusion. I would also be careful to draw such a general conclusion based on only two observations.*

**Response:** Implemented. We do not have temperature data, we only speculate on temperature changes based on seasonal changes (high temperature in summer, low temperature in spring and autumn). These are our subjective judgments, so we deleted this sentence.

*Discussion*

*Line 459-499: In general, in the discussion chapter, you should compare your results with other studies in the literature. You did that in some cases already in the results-chapter, those should be moved here. in the starting paragraphs of your actual discussion, you are describing very broadly topics of soil water transport, land degradation, and vegetation restoration, but without a connection to your actual study. So, this part could actually be a part of the introduction, but it is far to long here in the discussion.*

**Response:** Implemented. We compared our research results with the literature and simplify the unnecessary part of the discussion. please see line 529-554.

*Conclusions*

*Generally, the conclusions section should not be a summary of the manuscript so far, but it should present conclusions from the study which go beyond its specific scope. In your case that could be for example (1) that tree density should be reduced in further plantations in the future (but provide specific, clear arguments for that), (2) what are the further consequences of reduced ground water recharge due to afforestation in the region, or (3) how the water balance is related to PSM vitality decline and mortality observed in dry years.*

**Response:** Implemented. The conclusion is rewritten into three points: the precipitation redistribution process has changed, the water use pattern of PSM are stable, and the planting density of PSM needs to be changed. Please see line 556-577.

We would like to express our gratitude to the reviewer again. The critical and careful review help us greatly to revise the manuscript. The grammatical or typographical errors have been revised. All the lines indicated above are for the revised manuscript.