

Thanks for the reviewers' suggestions and remarks on our manuscript (hessd-9-65-2012). Our replies are as follows.

(Replies to questions of reviewers in Blue words; Revisions in red words)

List of disposition to all revisions suggested by the reviewer -2

Reviewer's suggestions or questions	Original text	Replies or revisions in revised manuscript
A. General comments		
<p>1.Firstly (and most importantly), I cannot agree with the authors' conclusions that the reconstruction of the runoff is based upon a "stable and reliable" foundation. Figure 5 clearly shows that there are substantial variations between the measured and the reconstructed runoff, which even exhibit entirely opposite trends during certain periods of time. Even if certain statistical requirements are met, the results presented do not provide a suitable basis for runoff reconstruction. Therefore, all the respective calculations given in the text, the figures and the tables have no solid foundation.</p>		<p>Replies:</p> <p>The question proposed by referee is the key of the article. The key of this paper is the reconstruction of runoff, and reconstruction quality is the most important, that the reconstruction of runoff is based on a "stable and reliable" basis.</p> <p>In this paper, the elm chronology used is established through the strict and standard process, chronology is reliable and available. Although the measured runoff and reconstructed value is the contrary trend in the individual rarely year, but don't affect the overall reconstruction results. Because, first, in the correlation, chronologies and the runoff of correlation coefficient in October and November achieved the 99% confidence level, it can be rebuilt. Second, this way and method of reconstruction , is conventional methods for researching the tree-ring climatology. Third, short sequences relationship is used to rebuild the long sequence value, but any the reconstructed results and the measured results in all year can't be completely consistent trend, there must be inconformity in an individual years.</p> <p>But, the overall reconstruction situation is consistent, it also reached the purpose for analysis of the past hydrological long sequence change characteristics and trend.</p> <p>So, in this study the calculation process reconstructed, its base is reliable.</p>

<p>2.Secondly, the authors provide no information on the tree ring chronology such as: which elm species has been investigated? What are the locations from which the trees have been selected? How many trees and how many cores per tree have been sampled? What was the age of the trees, and have there been any corrections for age effects? Even if details on the tree ring chronology are already published (e.g., Ma et al. 2011), this kind of information is essential for the present study, and not all readers might have access to the source of the respective information.</p>		<p>Replies: The basic information about sampling,have added completely when answer the question of refree 1.</p>
<p>3. Thirdly, the authors stress the close correlation between precipitation and runoff, but no information is provided on precipitation.</p>		<p>Revisions : The part information about precipitation has been put forward in the "3.2 Physiological mechanism explanation on the relationship between trees and runoff" , the precipitation figure was added here , see figure A.</p>
<p>4. Fourthly, the distance to ground water often is decisive for the growth (and even survival) of trees in arid regions, but ground water is mentioned only once (p 71, L 4), and is not related to tree growth. Fifthly, the Discussion and conclusion almost entirely is a mere repetition of the results, and fails to consider important implications such as land use or irrigation.</p>		<p>Replies: Groundwater is important for the growth of trees in the arid region, this is also consistent with in the 3.1 and 3.2 part. There is a reasonable explanation in 3.1 and 3.2 part of this article. From their respective relationship among precipitation and timeline, runoff and precipitation, precipitation and runoff as the breakthrough point, detailed analysis the reasons that the timeline can reflect the runoff in the October and November. There is a lagging effect that precipitation affect the runoff , it can be reflect on the role of groundwater to tree growth through the runoff, this is obvious. In addition, in the discussion, for other factors, such as land use or irrigation, there is no need to deliberately instructions. Because horqin sandy land, in many areas, especially elm sampling area, land use, irrigation less in low level .</p>
<p>B. Specific comments</p>		

<p>1. P 66, L 4: What are "hydrological climate changes"? Do the authors mean climate changes that affect the hydrology of a given region? Or do they mean climate changes that are connected with changes in precipitation or evapotran spiration?</p>	<p>1. P 66, L 4: Hence, hydrological climate changes in this region need to be investigated.</p>	<p>Replies : "Hydrological climate changes" Should be changed to "Climate changes" Revised text: P 66, L 4: Hence, climate changes in this region need to be investigated.</p>
<p>2. P 68, L 12-13: Give the scientific names of the tree species. P 68, L 26-28: Instead of this rather vague statement, the aim of the study should be formulated more precisely P 69, L 3: Give the scientific name of the elm species, and provide more information on the tree ring chronology used (see General comments).</p>		<p>Replies : Elm tree name: <i>Ulmus pumila L.</i> P 68, L 26-28: The statement about "The results provide some basic information on long-term changes in the Liaohe source runoff, ecological and environmental protection, as well as catchment economy progress." Is purpose for this paper. I think that is no relations for "formulated more precisely". P 69, L 3: This had been provided in the above.</p>
<p>3. P 70, L 3-10: It is not climate in general but the precipitation-driven runoff that the authors consider to be decisive for tree growth. Hence, the authors need to explain how runoff should affect tree growth two or three years after a given precipitation/runoff event. In most probability, this would involve groundwater depth, but the authors do not take this into account here. They try to explain the time lag between precipitation and runoff on p 71, L 20-23, but this remains rather superficial and does not really consider the groundwater table.</p>		<p>Replies : Thanks for the comments. This question has talked about in the foregoing, actually the relationship among rainfall, runoff and the trees expressed in the paper, also is the runoff formated by the rainfall in the end, and then through the underground water to supply tree growth, this is the problem of ground water level, the express is not clear, but essential meaning is so.</p>

<p>4. P 71, L 1ff: In contrast to its title, section 3.2 does not provide an explanation on the basis of physiological mechanisms but remains rather descriptive.</p>	<p>3.2 Physiological mechanism explanation on the relationship between trees and runoff</p>	<p>Replies : Precipitation have important effects on the runoff formation and the trees growth. Precipitation played an important role to tree growth in 7, 8 and 9 , also played an important role on runoff formation, runoff change also represent the change of precipitation. Due to the lagging effect, rainfall of 7, 8, 9 months have a great influence to runoff of 10, 11 months. Because the runoff of the 8~11 months produce sustained supply to groundwater, lead to that underground water level produce corresponding change, trees utilize groundwater that will produce the certain response result, this phenomenon that relationship of chronology and runoff among 8 to 11 months is very good is explained. In addition, the relations of the chronology about t + 1 year, t + 2 years and t + 3 years sequence and the runoff is good, and also fully explain the lag response that the runoff supply groundwater.</p>
<p>5. P 72, L 5: It remains unclear whether summer or September is most important for elm growth. P 73, L 6: How does winter temperature come in here?</p>		<p>Replies : The two problems are a more in-depth topic that need another specially study.</p>
<p>6. Tables: Table 2: To which time period do the data refer that have been used for calculating the correlation coefficients?</p>		<p>Replies : Yes, the data refer that had been used for calculating the correlation coefficients.</p>
<p>5. Figures: Fig. 4 is useless and can be omitted.</p>		<p>Replies : This figure can be deleted.</p>
<p>C. Technical issues</p>		
<p>1. There are several errors in citing and listing the references. These need to be thoroughly checked. A certain amount of language editing is also necessary because several terms are not properly used (e.g., "tree wheel" instead of "treering").</p>		<p>Replies : The several errors in citing and listing the references will be thoroughly checked. Revised text: "Treering" will be insteaded of "tree wheel" in the paper.</p>

P 66, L 2:

I assume that "hounded" should mean "haunted", but I would suggest rewording here.

P 66, L 9:

What does "Feng" mean?

P 66, L 10:

What does "section" mean here?

P 66, L 16:

It does not make sense to give the mm-values of precipitation with 2 decimal places.

P 67, L 6:

Delete "via".

P 67, L 15-16:

The information contained in the sentence "This river is located : : ." has already been given on p 66, L25.

P 67, L 16-18:

These citations obviously refer to the sentence in L 15.

P 67, L 23:

Reword the phrase "more-less-less-more-less".

P 70, L 18-21:

This sentence is hard to understand. Rephrase.

P 71, L 10-11:

"The runoff in July : ": this is a repetition of p 70, L 12.

P 76, L 5: Replace "significant" with "significantly".

Revised text:**P 66, L 2:**

I had found the word "hounded" in the P 66, L 2.

P 66, L 9:

"Feng" is modified for "wet"

P 66, L 10:

The "section" mean "stream segment" and will be modified for "stream segmen"

P 66, L 16:

I will be delete decimal, and 1 decimal places will be retain.

P 67, L 6:

"Via" will be delete.

P 67, L 15-16:

I think this sentence should be retain.

P 67, L 16-18:

The sentence in L 15 is related to these citations.

P 67, L 23:

The phrase "more-less-less-more-less" is reworded "big-small-small-big-small".

P 70, L 18-21:

Therefore, using a rebuilding chronology for the October–November runoff to analyze wet and dry season changes, cycle changes, which can represent the changes in annual runoff to some degree, were constructed.

P 71, L 10-11:

"The runoff in July : " will be delect.

P 76, L 5:

"Significant" will be replace with "significantly".

Figures:

Fig. 1: The size of the figure should be extended to increase readability.

The term "Hydrological stations" in the legend is misleading as data from only one station have been used.

What does "runoff stand" in the figure caption mean?

Fig. 2: The lettering of the y-axes is missing. The lines of Sample size and STD cannot be discerned. The term "STD" needs to be explained in the figure caption.

Fig. 7: Should "sliding changes" mean "moving averages"?

Fig. 1: Paper size Limited, Fig. 1 can only is so big.

The term "Hydrological stations" will be revised for "Hydrological station".

The "runoff stand" will be revised for "runoff station".

Fig. 2:

Fig. 2 will be further modified in order to be more clearly

The term "STD" had been explained in the paper.

Fig. 7: "sliding changes" will be revised for "moving averages"?

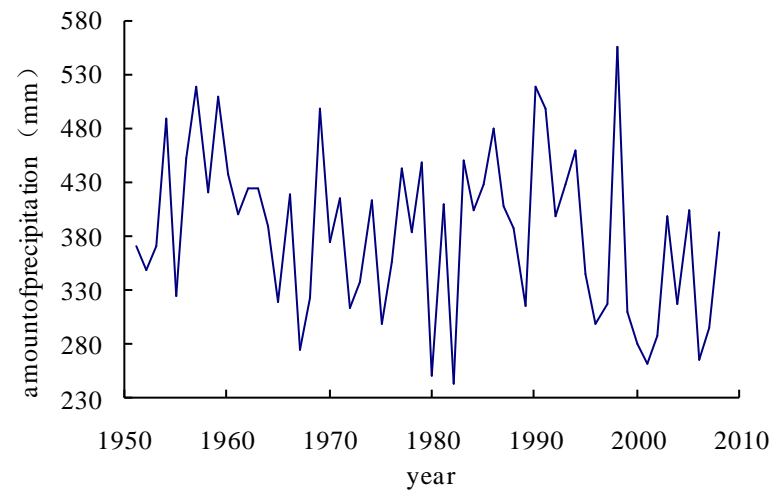


Fig A The results of the annual precipitation in horqin sandy land variation for many years