Dear editor Prof. Linderholm,

First of all, we are so sorry for our delayed response.

We would like to thank you for giving us another opportunity to improve the manuscript. Below is our point-by-point response to the questions and comments (**Q&C**). The **Q&C**s were illustrated in blue, the **Author replies** were illustrated in black. For details of the revision please refer to the revised manuscript.

We have uploaded (1) response letter, (2) revised manuscript (within track mode), (3) revised manuscript (track changes accepted mode).

We hope our revised manuscript could reach your expectations. Thanks!

Best regards

on behalf of all the authors

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Q&C 1:

Abstract should be more informative, e.g. include a conclusion. I would not give the individual years here, but rather summarise nicely.

Author reply:

Thanks for the suggestion. We have added a short conclusion at the end of the abstract, which is "*Our study provided with the first historical NGS precipitation reconstruction in the southeastern Tibetan Plateau which enriches the understanding of the long-term climate variability of this region. The NGS precipitation showed slightly increasing trend during the last decade which might accelerate regional forest hemlock growth*".

We have selected extreme wet/dry years to demonstrate the variability of the reconstruction series. The selected years were not continuous, and thus we could only demonstrate the individual years.

Q&C 2:

You need to describe the monsoon better. Here you get the impression that you only have a monsoon in summer, but you do also have the winter monsoon (which you call non-monsoon?).

Author reply:

Thanks. The new sentence is "*The non-growing season (NGS) of vegetation (from November of the previous year to February of the current year) includes the winter monsoon and pre-summer monsoon seasons in the SETP*".

Q&C 3:

Not very exciting objectives: this is just a basic dendroclimatological study. You should also state why this kind of study is relevant. Please revise.

Author reply:

Thanks for the suggestion. We have added the importance of the present investigation in the study objectives section, the revised objectives are "*In this study, we collected tree-ring cores of forest hemlock from the Xinzhu Village of northwestern Yunnan in the SETP. The main objectives of the present study were to (1) develop a new tree-ring chronology and identify the responses of forest hemlock radial growth to climate in the investigation area (2) reconstruct the historical NGS precipitation change and evaluate the recent NGS precipitation change in the long-term context, and (3) validate the reliability of the reconstruction. Our results not only enrich the historical hydro-climatic information in the SETP, but also provide with basis to understand the current trend of regional NGS precipitation variation, which is relevant for evaluating the future development of regional forest ecosystem*".

Q&C 4:

Suitable in terms of similar precipitation at sampling site.

Author reply:

Thanks for the concern. Meteorological station in Weixi is the closest one to our tree ring sampling site. The climate records of this station have been used in studies from surrounding region as well, such as Fan et al's (2008) and Fang et al's (2010) historical PDSI reconstructions (please refer to Figure 1 for the locations).

Q&C 5:

This is not very informative. You need to describe the sampling site much better, e.g. soil type, slope, exposure, open/close canopy... Which trees were sampled, dominant?

Author reply:

Thanks for the suggestion. We have added some descriptions of the sampling area "*The topography of the sampling area is relatively steep, and it is not in favour of the soil development, hence, thin soil layer of alpine meadow soil (Chinese soil taxonomy) covers the bedrock. Forest hemlock is the dominant tree species of the sampling site, and its tree-ring cores were collected from trees which are healthy and relatively isolated, an optimal condition for maximizing climate signals in tree rings (Li et al., 2017)*".

Q&C 6:

This does not sound like cross dating...

Author reply:

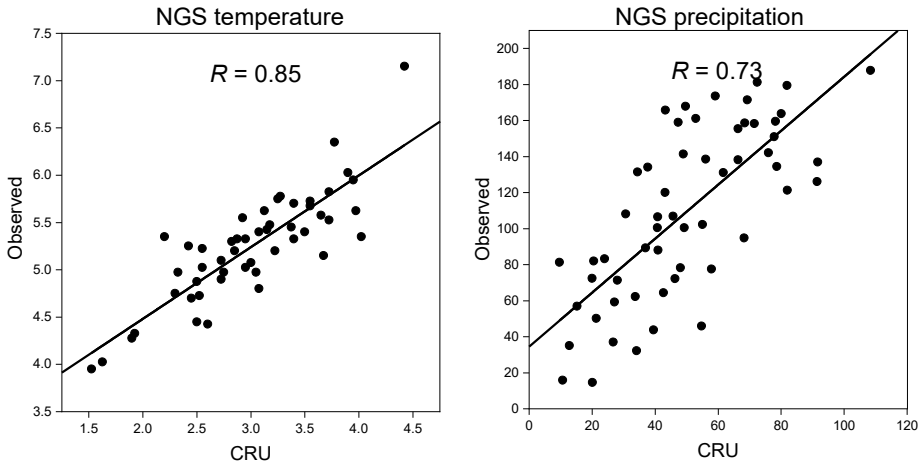
Thanks for the comment, we have revised as "*We have marked the tree rings of each sample at each ten-year interval and visually checked the tree ring pattern matching among samples, then confirmed the crossdating quality using the COFFECHA program (Holmes, 1983)*".

Q&C 7:

How well does the CRU data agree with observations?

Author reply:

Thanks for the concern. The following graphics demonstrated the association between instrumentally observed data and CRU data.



(This graphic is only provided in the author reply file)

Q&C 8:

Do you have a reference to this?

Author reply:

Thanks for the concern. The monthly or seasonally aggregated precipitation was chosen as the reconstruction target instead of single month in a lot of tree-ring based historical precipitation reconstruction studies. By comparing the correlation coefficients between tree-ring width chronology and different precipitation aggregations we have selected the NGS precipitation as the reconstruction target.

Q&C 9:

please briefly describe all statistics that you used (both to evaluate the chronology and the reconstruction)

Author reply:

Thanks for the comment. We have added following lines to describe the statistics of chronology "*We have used the expressed population signal (EPS) to determine the reliable period of the chronology; mean inter-series correlation (Rbar), signal-to-noise ratio (SNR) and variance of first eigenvector (VFE) to evaluate the common signal among measurement series; standard deviation (SD) and mean sensitivity (MS) to show the degree of inter-annual variability of the chronology*".

Q&C 10:

But the strongest correlation (significant for both T & P) was found in May...?

Author reply:

Thanks for the constructive comment. When we compare the correlation coefficient between TRW chronology and the precipitation of individual months the highest correlation was found in current year May. But even higher correlation coefficient was detected between the precipitation of NGS (previous year November – current year March) and TRW.

Q&C 11:

a must come before b

Author reply:

Author reply: Thanks, we have re-arranged as suggested.

Q&C 12:

How was this calculated? It does not seem to be sensitive to number of trees in the chronology?

Author reply:

Thanks for the question. Calculating 95% percentile of the reconstruction was achieved by using matlab program. We first used the *polyfit* function to achieve the linear curve fit, and then *polyval* function to calculate the estimated value (reconstructed result) of each data point (tree-ring index) and the 95% percentile range of the estimation.

Q&C 13:

Better put the individual years in a table and give the general picture here (e.g. wettest/driest decades). Also, given the low degree of explanation (r^2) of your reconstruction, it is a bit too much to give the results with two decimals. I would go for no decimals.

Author reply:

Thanks. We have created the Figure 6 using the data without decimal. We have provided the extreme wet and dry years in a Table, please refer to Table 3 in the revised manuscript.

Table 3 Extreme wet and dry NGS years

Year	Wet	Year	Dry
1656	63	1627	181
1694	62	1638	175
1703	33	1654	183
1736	51	1832	187
1897	49	1834	199
1907	64	1835	204
1943	50	1992	173
1982	65		
1999	47		

Q&C 14:

Basically, you are comparing apples with pears. They are for different target seasons and indices, so you need to better motivate how you can make such a comparison.

Author reply:

Thanks for the concern. We agree with the idea of comparing the reconstructed NGS precipitation series with historical precipitation reconstructions. But there wasn't any report about precipitation reconstruction in the surrounding area. We could only compare the present reconstruction with other reconstructions of hydro-climatic factor (PDSI). The compared reconstructions are of the PDSI of spring or early summer which are closely related with the precipitation during the winter season. Hence, we think the comparisons make certain sense. In the revised manuscript, we also added some discussions to motivate the comparison of present reconstruction with PDSI reconstructions from surrounding regions.

Q&C 15:

This just shows that the trends are similar over distance. How does it look for 1st difference data?

Author reply:

Thanks. We have calculated 1st difference of both reconstructed and instrumental NGS data, and recreated the Figure 8. The similar results further indicated reliability of the spatial representativeness of the reconstruction.

Q&C 16:

You should also discuss that the strongest correlation was found in May, and the fidelity of the reconstruction: it is clear that it does not capture most very wet or dry years. What are the implications of this?

Author reply:

Thanks for comment. We have added following discussion about the strongest correlation in May "*The highest correlation between precipitation and TRW chronology was observed in May of the current year. This is because the active xylogenous activity to form earlywood coincided with the low precipitation in this month (Fig. 2). In addition, the melt water was probably used up (tree uptake + evaporation) during the early spring. Therefore, water stress was increased during the late spring (May)*".

As mentioned in the **Q&C 16**, there are discrepancies of wettest and driest years in the reconstructed and observed values of NGS precipitation, we attributed this to the lower explained variance of the reconstruction (28.5%). Although we had lower explained variance, the TRW based NGS precipitation transfer model was validated to be reliable based on the results of leave – one – out verification. Therefore, we think that our reconstruction could still make sense.

Q&C 17:

see my comment earlier. If you want to look at PDSI, why not reconstruct it? Better to discuss precipitation.

Author reply:

Thanks. As we have replied earlier, there was no other reconstructed precipitation series in the SETP, and thus we could only compare the present reconstruction with other hydro-climatic (PDSI) reconstructions.

Q&C 18:

Not a very good conclusion, better to refer back to the objectives (when you have revised them): this gives a feeling that you answer the questions you addressed.

Author reply:

We have added simple concluding sentence according to the suggestion. Which is "*Our results showed that the NGS precipitation demonstrated slightly increasing trend since 1980s which is in favour of the future forest ecosystem development. In the future, more efforts should be made to collect wide-area of tree-ring data and develop more proxy chronologies that will enable us to reveal historical precipitation variability at the longer and wider scale in the SETP*".