**List of relevant changes**

- We have clarified the usage of the term snow processes, as it was previously not sufficiently clear that the type of precipitation (rain or snow) was also included in the model and is essential for the correct interpretation of the results.
- We have slightly rewritten the abstract and conclusion to better represent the main findings of the manuscript.
- We have added examples on the forcing interactions that our forcing swap approach cannot capture.
- A new figure was added to the supplement, replacing the snow storage and melt figures in the previous version. This figure adds a precipitation time series, showing the amount of precipitation falling as snow or rain. Additionally, we ensured all panels have the same x-axis, and have corrected all relevant values to basin average mm $h^{-1}$ units.
- We added a new paragraph to the discussion to describe the limitations of the way we simulate glaciers.

**Reply to review**

We would like to thank Anonymous Referee #2 (AR2) again for reading our latest version of the manuscript. We understand the confusion, which is hopefully clarified with a revised graph in the supplement. Below, we will reply to the points made by AR2, with the comments from AR2 in black, and our response in blue.

- I think the addition of Figure S4 is very helpful for interpreting the results, but would like to see more discussion put into the 'offsetting' effects of increased snow processes throughout the majority of the year and more of an attempt to disentangle the effects from snowmelt and glacier melt. For example, in the supplementary you show decreases of snow storage (S3), snow cover (S3), and snowmelt rate (S4) with increasing temperature, but increasing glacier melt (S4) (it would be better if S3 and S4 had the same range for x-axis for easier comparison). Grouping snowmelt and glacier melt into the same term is misleading as they represent two water storages with very different residence times and thus different consequences of ecosystem vulnerability to warming scenarios.

  Thanks for this suggestion. We have combined the two snow-related figures in the supplement into a single figure, to better depict how changes in type of precipitation and melt affect different components of the hydrological cycle. This new figure shows the amount of total precipitation, and the amount of this precipitation that is falling as snow. More rainfall results in more direct discharge, and we have stated this more clearly in the newest version of the manuscript. Additionally, we understand the concerns about the grouping of melt from both snow and glaciers. This figure in the supplement helps to depict the response of these two factors better, but we have described this more carefully in the latest version of the manuscript as well.

- The results from Figure S4 imply the increase in Jan-Feb discharge (Figure 5b, 6a) is caused by increases in glacier melt, since snow melt rates decrease during this time (and all times). Is this correct? Based on the larger magnitude of glacier melt during the summer from Figure S4, I would have expected larger changes in discharge to occur in the summer (i.e. more blue pixels during May-Jun and Sep-Oct compared to Jan-Feb).

  This is partly correct, but is largely caused by the change in type of precipitation. We hope the new panel, and better descriptions in the manuscript clarify this. Assuming the blue pixels refer to Figure 6: these blue pixels are the glaciers and are the pixels responsible for the slight increase in discharge.

- Why do increases in discharge occur from snow processes during Jan-Feb (Figure 5, 6a) if snowmelt rate decreases during this time and glacier melt is close to 0? Can you rescale the y-axis in Figure S4 so that each plot is comparable (i.e. averaged over the entire basin)?

  Thanks for the suggestion on the y-axis, we have implemented this. This increase in caused by more direct runoff (liquid versus solid precipitation). We have stated this more clearly in the manuscript.

– Based on the results from Figure S4, the offsetting effect is solely due to increased glacier melt, as snowmelt is shown to decrease under warmer scenarios for all months. This needs to be discussed more as the water stored in glaciers is finite, thus this offsetting effect will be eliminated under warmer scenarios when the glaciers have completely melted.

This is correct, and we have added this to the discussion.

– L11: Please specify what an interaction of the variables means in the abstract since more than half of your results are due to the interaction and understanding the interaction is vital.

We have added two examples to describe the interaction of the variables.

– L14: When applicable, please mention whether the 'changes' are positive or negative. Switching the language to 'increases' or 'decreases' would ease in interpreting the main results. You use the terms 'changes' and 'differences' throughout the manuscript and it would be easier to interpret if you clarify if they are positive or negative changes.

In some cases, the changes imply both the negative and positive changes. We have clarified these sentences.

– L14 / 386: This is still one of my biggest concerns in regards to interpreting your results. Again, I think the term 'partially offset' is misleading as discharge clearly decreases due to increases in evaporation and the increased snow processes barely make a difference. Also, be consistent of what the low flow period refers to. Earlier in the manuscript low flow referred to Sep-Oct, now you are including Nov too. I feel that the main take-away from the second experiment (Figure 5), which should be emphasized more in the abstract and conclusion than the offsetting from snow processes, is that simulated discharge is lower in every month and primarily caused by increases in evaporation.

We understand how the term "partially offset" could be misleading. We have rephrased this throughout the manuscript to be better in line with the results.

– Further, since these results do not distinguish between snow melt and glacier melt, this is problematic if most of this offset is due to glacier melt (as indicated by S4), which is a finite supply of water, thus will eventually disappear given enough warming. I think you should clarify that this 'offsetting' will not occur in future warmer scenarios when the glaciers are depleted and more precipitation falls as rain compared to snow.

We have added this to the discussion, as this is indeed a valid point.

– L201: Rewrite "For example, temperature and precipitation are linked as the type of precipitation (rain or snow) is dependent on temperature.". It is still confusing what the interaction of the forcing components refers to.

We have added a more detailed example on what we mean with these interactions. Hopefully this will remove the confusion.

– L242: change "in stead" to "instead".

Thanks for this correction.

– L274: The term 'snow processes' is still confusing to me. Why is 'liquid precipitation' in parentheses following 'snow processes' (again in L361). Are you referring to snowmelt and not rain?

When we change the temperature, this will also affect type of precipitation that falls (see also the new example mentioned two comments above). Additionally, with the addition of the snowfall panel in the supplement, we hope that this clarifies that we include the type of precipitation (rain or snow) in the term "snow processes".

– L293/301: Please include the complete figure reference (i.e. Figure 5b & 5d instead of panel b and d). Further, please add more references to the figures when possible for justifying your statements. For instance, on L302 you write "Substantial influence of rooting depth on the evaporation simulation is visible", but nothing is 'visible' if there is no reference to a figure or table for the reader.

Thanks for this suggestion, we have fixed this.

- L349: Why switch “increased” to “exacerbated”, they have opposite meanings here?

  This is indeed incorrect, and we have fixed and clarified this sentence.

- L382-384: Please specify whether the ‘differences’ or ‘changes’ are positive or negative when applicable here and throughout the manuscript.

We have clarified this throughout the manuscript.