#Editor

We have now received new comments from the two referees on the revised paper. I agree with the reviewers that the manuscript presents a valuable contribution, but there are still comments to be addressed (comments by reviewer #2) before considering publication, including:

1) Inclusion of a figure (flow chart or conceptual diagram) to better explain the methodological approach.

Response:

Thank you for your valuable comments. We have added a conceptual diagram (Figure 1) illustrating the workflow of our research, including how we use the data and methodology.

2) Clarification on model testing.

Response:

Thank you for your comments. The T&C model has been validated in numerous previous studies. We have explained this better and included references to relevant validation studies in Section 2.3.

3) Addressing the comment on seasonality effects (It would be good to add some comments/paragraph in the discussion, mentioning possible effects). I believe these are all very useful comments and feedback that need to be answered/addressed to further improve the manuscript.

Response:

Thank you for your comments. We added some seasonal analysis in section 2.2 and in the discussion part, specifically at the end of Section 4.2. Additionally, we have highlighted the limitations of this study and outlined potential directions for future research.

#Reviewer1

None

#Reviewer2

In the response document, the authors frequently use future tense as in this example – "… We will test what is the difference in sensitivities across different seasons, to evaluate if this is indeed an important factor to consider.." Please state more clearly and indicate whether or not you tested or made actual changes in response to a comment, and please include line numbers. Apparently the seasonality comment I had was not adequately addressed by providing results.

Response:

Thank you for your comments. We have computed seasonal sensitivities across winter (December-January-February: DJF), spring (March-April-May: MAM), summer (June-

July-August: JJA), and autumn (September-October-November: SON) and annual mean sensitivities, for precipitation (PR), temperature (TA), specific humidity (SH) and wind speed (WS) changes in response to a solar radiation changes for the 115 sites in Figure S1 and Figure S2, and we have added some discussion about seasonality analysis in section 2.2 line 158-162 in tracked version. In this round revision, we added further details about the seasonality analysis and potential limitations in discussion part.

I now understand that geo-engineering angle in the paper is not the necessary drive, copying from the response—".. but our purpose is more generic: it is to understand climate sensitivities to a change in solar radiation (that can or cannot be driven by geoengineering).."I still cannot fully wrap my head around your work, and cannot reproduce it from the text. I would love to see the authors to develop a figure (flow chart, perhaps with drawings and conceptual diagrams) such that I can follow through the logic algorithmically and see exactly what they did and how I can reproduce it.

Response:

Thank you for your comments. We have added a conceptual diagram (Fig.1) illustrating the workflow of our research, including the data and methodology. We hope this addition is helpful.

My comments on seasonality are not addressed. I was just curious how growing and dormant season effects on water balance components would look like. I suspect there are some snow in some of these sites, perhaps the GPP may not be all that sensitive to this seasonal separation, but the reader would be curious to see how solar radiation be different on water balance components and whether GPP is actually has any strong connection to changes in dormant season water balance.

Response:

Thank you for your comments. As sensitivities at annual scale are best correlated with sensitivities during the growing season (Fig S2), we think that our climatic perturbations are representatives of the main changes in climatic variables that affect the functioning and response of vegetation. Plus given the numerous sites and the different sensitivities in each of those, in the presented results we are already testing a wide range of conditions where precipitation, air temperature and humidity might change of different amounts in response to a solar radiation change. In other words, the final results in Fig 4, 5 and 6 are unlikely to be affected by the exact values of the sensitivities, as far their magnitude and overall direction is correct. However, as we do not force the ecohydrological T&C model using seasonally variable sensitivities, we are remarking this as a limit in the discussion section (Section 4.2).