

Interactive comment on “Enhanced cold-season warming in semi-arid regions” by J. Huang et al.

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We are very appreciative for the reviewer's thorough review of the paper. His/her suggestions and comments have been most helpful in improving the readability of the paper as a whole. The revised version of the paper has addressed all of the reviewer's concerns. We hope this revision is now acceptable for publication. The following are our point-by-point responses to the reviewer's comments:

Question 1. The study employed the CRU long-term gridded temperature dataset, but does not provide much insights of the dataset. They may explain how the dataset was developed, input data, the quality and accuracy of the data from any data assessment studies.

Response: We have added the content of detailed introduction to CRU data include the quality, accuracy and other results for data assessment to explain the practicality.

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Question 2. Elaborate more the formulae used to compute the temperature trend and regional contribution and the determination of contribution of regional trends to global trends

Response: All formulae used in this paper are elaborated more and explained more clearly.

Question 3. P4633, L12, change “to comparing” to “to compare”

Response: we have replaced “ to comparing” with “to compare”

Question 4. Separate “summary” and “discussion” as two separate sections. The discussion is concerned with explanations of the observed trends. It is a very important part of the study. The authors offer several plausible causes that maybe summarized in a table. Or use a schematic diagram. The present discussion is somewhat scattered.

Response: Thanks for reviewer's suggestion. We have separated the “summary” from discussion”. Summary used to discuss the explanations of observed trend. Figure 9 is the schematic diagram to show plausible causes to enhanced warming in semi-arid region. The discussion will be elaborated in another part.

Question 5. Just for authors' consideration, I'd think that the dependence of temperature trend on precipitation maybe explained as follows qualitative, or use a simple 0-dimension energy balance model. Over humid region, water cycle is accelerated by the availability of more plentiful of water. This can make use of more energy that would other wise be used to warm up the atmosphere to cause more heating. The contrary would be true for arid regions.

Response: We appreciate reviewer's suggestion. And we also agree to that the model work will help to prove and support our results. The model work is being planned for our next step work.

Question 6. P4637, L21-24. Combine the two sentences to avoid misunderstand for quoting findings from two studies, like“... water content, which was confirmed by sim-

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ulations . . .”

Response: We have combined the two sentences into one which is “Simulations using a cloud-resolving model confirm that there is a positive correlation between liquid water content and aerosol concentration of rain.”

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