

# ***Interactive comment on “Changes in statistical distributions of sub-daily surface temperatures and wind speed” by Robert J. H. Dunn et al.***

**Anonymous Referee #2**

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This manuscript studied the changes in statistical distributions of sub-daily surface temperatures, dewpoint temperatures, as well as wind speeds, using station-based HadISD dataset. Both zonally averaged quantities and the spatial distributions were considered, and a quantile regression analysis was also performed. Besides the changes of the mean values, different statistical moments were also studied. This work provided great details about the changes of the temperatures and wind speed, in context of global warming. Roughly speaking, I think this manuscript can be a good reference for people who studies the effects of global warming. However, to publish this work in ESD, there are several issues that need to be addressed.

1, It is difficult to catch the highlights of this work. Many calculations have been done in this work, but by reading the manuscript, it is very easy to get lost. I would suggest

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the authors to make a better discussion, and the conclusion should be improved.

2, There are many figures in the supplementary materials. But the main text discussed these figures frequently. It seems that the figures are important. Therefore, why not include these figures in the main text? Or maybe the structure of the manuscript needs to be improved. Moreover, for the figures in the supplementary materials, I would suggest the authors use "Fig. S1, S2, etc.", to distinguish from the figures in the main text.

3, When studying the changes, what is the statistical significance level? What method was used to do the significance test? Why use  $1\sigma$  as the threshold?

4, Since only data over the past 45 years were analyzed. Are the observed changes influenced by potential decadal variabilities in the climate system? Can the statistical significance test rule out the potential influences from the decadal variabilities?

5, The results from this work were compared with the findings from previous studies. When the results are not in line with each other, which results are more reliable? Why? The authors may need to better explain why the results are different.

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