

Interactive comment on “Return Levels of Temperature Extremes in Southern Pakistan” by Maida Zahid et al.

Anonymous Referee #3

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Return levels of temperature extremes in southern Pakistan by M. Zahid and co-authors

The study deals with the analysis of return levels of daily temperature extremes in the southern part of Pakistan, considering both daily maximum temperature and daily maximum wet-bulb temperature. The latter is important, as it affects the well-being of humans. The study used both observations and ERA-Interim re-analyses at the nearest grid points, both the original re-analyses and bias-corrected values. Given the overall increasing trend in the frequency or intensity of extremes related to daily maximum temperatures, such an analysis could lead to very relevant results. This study, however, does not present such an analysis according to international standards and, therefore, in my view is not suitable for proceeding beyond the discussion part of Earth System Dynamics before a major revision of the manuscript. These are my main reservations:

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The motivation: It does not become clear, why the re-analysis data are relevant here, except that they might be used to fill gaps with missing observations. In this respect, it appears important to correct the re-analyses for biases. That would, however, require a more advanced method as the one used here, combining local information at the stations with information on large-scale conditions.

The presentation of the methodology: The presentation of the methodology fills a rather large part of the manuscript, although much of it is widely used. Therefore, this part of the manuscript could be shortened.

The presentation of the results: The presentation of the results is not very concise. Numerous numbers and maps are included in the manuscript, but often they are not properly presented.

The discussion of the results: The results of the study are not really discussed, neither with respect to the scientific literature nor with respect to the underlying physical mechanisms and, only partly, with respect to the representativeness of the results for southern Pakistan for the rest of Pakistan or the rest of the wider region.

Concluding section: The concluding section is just a repetition of the main results of the study, and no conclusions of this study are given.

Tables: As for Table 2, it is not clear, why monthly mean values of the daily minimum and mean temperatures are presented here. As for Table 3, I am puzzled by the substantially different behaviour of the p-values according to the KS-test and the p-values according to the AD-test. As for Table 4, I am missing the units.

Figures: Generally, the figures and/or figure captions are lacking units. Also, in many cases the use of different plotting ranges for panels, which show the same kind of estimates for different data sets or different locations make it difficult to draw firm conclusions from these figures. As for Figs. 8 and 9, the layout of the panels makes it very hard to extract the relevant information from the map, since the information on the

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magnitude is hidden in the respective column including the symbols.

References: Most of the references to the scientific literature are used in the Introduction and in the methodology section, also highlighting the fact that the sections on the results and the discussion are not properly done.

In addition to these general concerns, I have numerous specific concerns, which might be relevant for the revised version of the manuscript.

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