Climate of the Past Discussions

Clim. Past Discuss., referee comment RC2
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Comment on cp-2021-139

Anonymous Referee #1

Referee comment on "Reassessing long-standing meteorological records: an example using the national hottest day in Ireland" by Katherine Dooley et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-139-RC2, 2021

General

This paper makes a well-argued case that the record Irish (Eire) temperature should be the record for Boora in 1976.and not Kilkenny in 1887. However, I have a significant suggestion that could make this finding either stronger or weaker, or just possibly, change the decision. This involves considering the evidence from the several Figures in the paper like Figure 4. Here 500mb heights are shown in addition to the very useful pressure at mean sea level (PMSL) maps. It would be considerably more useful to replace 500mb heights, difficult to interpret in the context of this paper and not made much of anyway, by a relatively low-level reanalysis temperature field that is unlikely to be corrupted by a bad surface air temperature observation. I come back to this in the specific comments below

The other main comment is that aspects of the presentation should be improved, particularly many of the remaining diagrams. Nevertheless, the text is generally well written. I recommend this paper be accepted subject to significant/major revision.

Specific Comments

- Lines 30- 62 of Introduction and/or Table 2. Somewhere about here it would be very useful to add the latitude, longitude and height location of Kilkenny Castle. In Table 2 it would add useful information to add these details for all the other stations shown –much as done in Table 3.
- Figure 1. It is not so easy to see on a printed copy where Kilkenny Castle is located on either map. Perhaps an arrow and superimposed text of suitable size saying “Kilkenny Castle” could be added.
- Figure 2. The coloured dots would be easier to see if the green background was much lighter.
- Figure 3. This diagram is not very clear on a printed copy, mainly because of the grey background. This can be fixed by making the graph lines thicker. The key is odd: the heading should be “stations” not “variable” and Kilkenny has a coloured line in the key, even though there are no data for this date, except the single point highlighted in the text. On the left, the label should add “degrees” before “Celsius”. In the caption “air” should be added after “surface”.

- Figure 4 and similar Figures. This is my most important comment. On the main Climate of the Twentieth Century Reanalysis v3 NOAA web site atmospheric temperature analyses are available in ensemble mean form for 8 times of the day for each day until 2015. I strongly recommend that 500hPa height be replaced by an appropriate relatively low-level temperature (850hPa temperature or lower, as long as not significantly affected by station biases). This would be done (probably) for 1500 hours for each sub-diagram shown in Figure 4 and the similar figures. Ensemble mean PMSL would need to be be plotted for the same time of day for consistency. This would add genuine new information about the relative likelihood of the hottest temperature extremes. This type of information could become an important part of the evidence for daily surface air temperature extremes more generally. As far as I can see, appropriate sub-daily maps can be easily plotted for such data using the on line facility at https://www.psl.noaa.gov/data/20thC_Rean/ . After 2015, similar data should be available from ERA5.
- Figure 5. On a printed copy, the red circle is less clear on some sub-diagrams than it should be. These are good diagrams otherwise. It might be useful to add combined simultaneous differences for all stations in a sixth panel -currently blank.
- Figure 7. Where relevant, I have the same comments about the graphs as for Figure 3.
- Figure 10. Same comments about the red dots as for Figure 5.

Minor comments

- At Line 241, Parker (1994) is missing from the Reference list.