Climate
of the Past

Discussions

EGU

Interactive comment on "Probabilistic precipitation and temperature downscaling of the Twentieth Century Reanalysis over France" *by* L. Caillouet et al.

Anonymous Referee #1

The paper presents a novel downscaling technique to obtain daily temperature and precipitation data over France back to 1871. The authors use an analog re-sampling approach within an existing daily data set for France and discuss various strategies of how to choose the analogs in the best way (from the Twentieth Century Reanalysis data set) in order to obtain an accurate estimate of precipitation and temperature variability on daily to interannual time scales. The paper is scientifically sound and fits well into the scope of Climate of the Past. Similar approaches may be applied in other regions or settings in order to extend our daily data record.

The manuscript is at various instances rather technical and it is not easy for the reader

to always grasp the idea. Particularly, the reader is not well guided in the methods section. However, the method is promising. Overall the paper merits publications, but some revisions to enhance the readability will make it more valuable for the larger community.

Major points:

- Better explanation of the methodological steps: I had to read the manuscript several times to be able to understand what is done. Please add at least one schematic figure that shows the individual steps. This would help the reader. Perhaps it might also help to express some of the steps in the form of equations.

- Daily vs. seasonal scale: The methods provides daily output, but most of the evaluations as well as the given example refer to monthly or seasonal averages. This is a bit puzzling and the reader is left wondering whether the daily output is not useful (or, conversely, whether other methods would work equally well on the monthly or even seasonal scale).

Minor:

Abstract: The performance on daily scales is not mentioned.

P. 4428, l. 15-20: Have these studies produced long, continuous data sets or cases? Could this be seen as an advantage of this method?

P. 4430, l. 18: Were the data used 6-hourly or daily fields? Concerning T2m: Could also station observations be used here or would this make the procedure worse? How was the seasonal cycle treated?

P. 4431, l. 5: It is surprising that a monthly data set is used for obtaining daily data. I think this should be explained in a bit more detail.

P. 4431, l. 7: Safran is capitalized earlier on.

P. 4431, l. 21: Is daily 0-24 UTC or something else?

P. 4433, l. 17: Perhaps say a few words about the time of day.

P. 4433, l. 22: "Previous applications ... considered all zones individually as target location" This implies that the presented approach does not. But in fact it does, as I take from P. 4434, l. 17 ("combining analogue days independently from one zone to another and from one day to the next"). This is a crucial point and should be clarified.

P. 4434, l. 3-4: The procedure is repeated 5 times, but could results in almost the same selection of analogue days, right? So the 125 days are not 125 different analogue days?

P. 4434, l. 17 "combining analogue days independently from one zone to another and from one day to the next": This is crucial. So there is not necessarily a continuity from one zone to the next, but on the other hand you have probabilistic information. It would be very important, particularly for applications, to have a little more information here. The reader might get the impression that this is the reason why the focus later is on the monthly or seasonal scale. Is this a statement you want to make? Should the product only be used on that scale?

P. 4435, l. 14: How big are these domains? How different are they for neighbouring climate zones?

P. 4435, l. 20: I think "keeps the N2 analogues closest to the target calendar day" would be more clear

P. 4436, l. 10: Again with respect to (monthly) SSTs: Is the ambition to include a large-scale predictor that also captures longer time scales?

P. 4438, l. 13: +/-60 days is quite a lot if the seasonal cycle is not removed. This will certainly affect the evaluation. But my question is more general: Why is the seasonal cycle not removed from temperature (or also GPH, omega, humidity)?

P. 4446, l. 3: "Minimum, median and maximum" of what? Of the ensemble or of the daily precipitation sums within the month? The figure suggests it's the former but this

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is not fully clear.

P. 4447, l. 21: I think the members are available, but maybe I am wrong.

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