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Interactive
comment

Interactive comment on "Historical gridded reconstruction of potential evapotranspiration for the UK" *by* Maliko Tanguy et al.

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Received and published: 4 April 2018

This paper documents the development of a unique and valuable PET dataset for application in historical hydrological reconstructions for the UK. For full disclosure I have been involved as a subcontractor within the Historic Droughts project that has supported this work. My role was providing extended monthly temperature datasets with newly digitised climate data that are used and referenced in this paper. However I did not have any direct involvement in the specific work in question, the development of the PET dataset that is being described, or the writing of the paper.

In my opinion this paper provides a very clear description of the production process of this dataset, the calibration and evaluation framework that informed and justify the

methodological decisions that were made. This is important because there are significant assumptions required for such a temperature only derivation of PET. Therefore I recommend this work is accepted for publication.

My only significant comments would be: 1) While the paper provides sufficient comparison of different potential approaches, in section 5 the paper does not provide much context for how the uncertainties and limitations of this PET dataset might impact or be handled by subsequent application in hydrological modelling of 19th and early 20th century. Are there any firmer recommendations or quantifications the authors can make in that regard?

2) Will a significant factor in the evaluation metrics be the seasonal cycle? Would this explain why some of the differences between the performance of the choice of temperature data is marginal, because they all have good representation of the seasonality and the daily variance is of secondary importance?

3) I did find I had to keep referring back to section 2 to remind myself which specific data were being discussed. A summary table of datasets would help rather than just a list I think.

4) In section 2 it is probably worth being more explicit about what temperature data. For UKCP09 and HistDrought the monthly mean temperature is derived from the average of daily Tmax and Tmin averaged across the month at each contributing station and then stations with no more than 2 missing days within a calendar month are gridded as per Perry and Hollis (2005).

Minor points:

1) Page 4, line 5: could include reference to Legg (2014) https://rmets.onlinelibrary.wiley.com/doi/abs/10.1002/joc.4062 that documents the spatial sampling uncertainty in the monthly gridded data.

2) Page 4, lines 10-30. I think this could be reworded slightly with a table to lay out the

datasets in a slightly clearer way.

3) Page 4, line 18. Provide either a description or reference to pchip.

4) Page 5, line 27. It is not clear why this max/min constraint is important in this context. This dataset only covers the observational period 1891-2015. What forecasts are used?

5) Page 6, line 14-16. Suggest including shorthand used elsewhere. e.g. "from a global parameterisation (GB) leading to a single equation (1P) for all 43 catchments (1P-GB)"

6) Page 7, line 4: How often is PET 0. Does this skew the MAPE score in certain situations?

7) Page 8, line 13: Figure 4 includes "no calibration" how does this differ from "uncalibrated" I didn't quite follow this.

8) Page 8, line 25: I don't think 'forcing' is the right term here. perhaps just data?

9) Page 8, line 26: Referring to my comment above, is the small day-to-day variability in relation to the magnitude of the seasonal cycle and therefore why the differences are only marginal? Does this have implications for any particular use-cases?

10) Page 9, line 11: I'm afraid I lost the thread of this a little. Intuitively I agree it seems surprising that this is the case (how significant is the difference?), but not sure specifically what PET estimate is closer to what observed data in the final sentence?

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Discussion paper