**Climate
of the Past
Discussions**

Interactive
Comment

Interactive comment on "Benchmarking monthly homogenization algorithms" *by* V. K. C. Venema et al.

Anonymous Referee #3

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Recommendation: accept subject to minor amendments.

This is a worthwhile paper documenting a valuable project. I have few significant comments on the manuscript and think it will be suitable for publication after minor amendments. I am particularly impressed by the effort which the authors have gone to to develop a synthetic data set with a realistic structure of breaks, something which I believe has been missing from some previous benchmarking efforts which have used models which are unlikely in real-world data (e.g. a doubling of standard deviation with no change in mean).

Significant comments

- One metric which is missing from the benchmarking study is one which assesses

how well variability is reproduced at various timescales. I do not expect the authors to redo the study to include such a metric but it might be worth noting explicitly that this aspect was not considered. I also note that the error metrics don't consider extremes, but this is not so important for monthly mean data as it would be for daily observations.

- Page 2665 line 11 – was the deseasonalisation only with respect to means? (i.e. anomalies from a reference period), or was some kind of deseasonalisation carried out on variability too? (and if so, how?)

- Page 2667 lines 3-7 – it is not quite clear what you are doing here – do I understand it correctly that a seasonal cycle with an amplitude drawn from a Gaussian distribution with standard deviation 0.4˚C is superimposed on an annual breakpoint with a standard deviation of 0.8˚C? (i.e. if both 'random' points were at the one SD point, the mean annual breakpoint size would be 0.8˚C, varying seasonally between 0.4 and 1.2˚C). Also, what level of randomness (if any) is there in the time of year when the seasonal cycle of the breakpoint is at its maximum/minimum? (in general, section 3 would benefit from a couple of illustrative diagrams).

- Page 2668 line 26-27 – how do ratio-based methods deal with zero or near-zero monthly precipitation amounts? If there are no such amounts in your data set, then the paper should say so (but the issues of zeroes should be acknowledged, since, even if they do not exist in the test regions, they certainly occur in other parts of the world where the homogenization methods might be used).

- Did any methods consider a combination of detection at the annual timescale and adjustment at the monthly timescale?

- Page 2679: It might be useful, if it can be done without too much difficulty, to present results on POD stratified by the size of the break – it would seem to me

that an important aspect would be the ability of a method to effectively detect large breaks, with detection of small breaks being less important.

- Page 2685 lines 14-15 – this wording suggests that the amplitude of the seasonal cycle of the breaks is a fixed 0.4˚C, which contradicts the description on page 2667 (unless I have misunderstood it). Something somewhere will need to be fixed.

- Page 2685 lines 2-3: in addition to new technologies/measurement systems, there could be other reasons for inhomogeneities to have a tendency to be in one direction, e.g. a systematic pattern of station moves from town centres to airports.

- Page 2688 lines 12-18: it should be noted that there may be some circumstances (although perhaps not in Europe) where absolute homogenization may be the only option because of a lack of reference series (e.g. stations in remote areas).

- Page 2689 lines 16-19: the comments on local trends are noted, which raises the question of how often local trends exist in the real world?

Minor comments

- Page 2659 line 13 – should be Pollak (not Pollack)

- Page 2659 line 19 – delete comma before 'were adjusted'

- Page 2659 line 24 – is there a reference for the Abbe criterion?

- Page 2659 line 25 – insert 'an' before 'appropriate'

- Page 2660 line 15 – should be 'were inspired'

- Page 2662 line 19 – should read 'Break inhomogeneities'

- Page 2667 line 1 – should be Poisson (not Poison). Also, I think this would be clearer if 'on occasion' is inserted after 'also inserted'.

- Page 2669 line 8 – should read 'Student's t'

- Page 2669 line 14 – suggest rewording 'estimated directly from'

- Page 2669 line 27 – replace 'himself' with 'themselves' (unless you know that all of the developers are men!)

- Page 2672 line 21 – should Eq. (1) read Eq. (3)?

- Page 2690 line 8 – should be 'that it should' (not 'that is should')

- Page 2693 lines 22-23 – the meaning of this sentence is not clear to me.

Interactive comment on Clim. Past Discuss., 7, 2655, 2011.