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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Seasonal streamflow forecasts in the Ahlergaarde catchment, Denmark: effect of preprocessing and postprocessing on skill and statistical consistency" *by* Diana Lucatero et al.

Anonymous Referee #1

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General comments:

I found the paper interesting to read, and it addresses some relevant scientific questions within the field of hydrology and seasonal forecasting. The methodology is clearly outlined, and the overall presentation is well structured. However, I recommend that the introduction be expanded with more information about the use and skill of GCM-based seasonal forecasts in the region, where I found some information to be lacking. Also, the main scientific conclusion needs more clarification in my opinion. Finally, I suggest some minor revisions, for which I refer to the specific comments below.

The language is generally precise and understandable, albeit a bit verbose sometimes. I recommend maybe trying to shorten some sentences, and to use the active tense more instead of the passive tense. Finally, see also the technical corrections below to improve the English.

I do recommend the manuscript for publication, subject to minor revisions.

Specific comments

- p2, line 4: "perceived" : this gives the impression that the lack of reliability is a perception, do you mean a general observed fact here?

- p2, paragraph 4, and further on in the manuscript: you say that seasonal forecasting in the region is a "challenging endeavor". I would like some more information here on the state of the art and skill of current seasonal predictions for temperature, precipitation, .. in the region. I realize that results are/will be presented in a different paper (Lucatero et al), but since this is still "under preparation", it hinders me a bit in comprehending the general skill of the seasonal meteorological forecasts you are using as input for your hydrological model. Could you provide some salient features at least? It would also aid in understanding the conclusions better. If there is no skill past a certain forecast range for example, it is important to appreciate this before using the forecast as input... Is there a published reference that could be useful here?

- p.3, paragraph 3: concerning the DMI observations: I assume these are daily values? Please clarify. paragraph 4: does the hydrological model take snow melt into account? How important is snow in this area?

- p.3, section 2.2: you use acronyms here that haven't been explained yet (LS and QM). And as mentioned above, I would prefer to have some of the most important features of the (as yet unavailable) Lucatero et al paper available here.

- p.4, line 1: why the change in the number of ensemble members?

- p.4, section 2.3: could you add an existing publication referencing to the Quantile

Mapping method?

- p.5, concerning PIT diagrams. Is there a reason that you use these instead of e.g. verification rank (Talagrand) histograms? Since you are comparing ensemble members with observations (and not PDF's with observations), it seems less appropriate... Also, please clarify how you go from the ensemble to the CDF. Is it just the empirical CDF? Or do you use some smoothing, like fitting a gaussian to each ensemble (cfr. Grimit and Mass, 2004).

- p.6, section 2.5. Low flow forecasting. You evaluate these in the same way as the monthly flow forecasts. Could you comment on timing errors? For example, how relevant would it be for water management if the forecast predicts the correct low flow, but in the wrong month? You also mention two other studies on low flows that exist. Is there a link with their results and yours? Do they use the same verification methodology?

- p.9, Summary and Conclusions. I am missing a bit a general conclusion that could be useful for end users of the hydrological forecasts. Are the current seasonal meteorological forecasts just not good enough? Could better postprocessing techniques ameliorate the situation? Data assimilation? The last paragraph seems very important, concerning catchment characteristics and taking advantage of hydrological memory.. but seems almost added as an afterthought. A few final sentences on the "best way forward" according to the authors could help here, and if a more explicit link to the results on seasonal forecasts of Lucatero et al could be made, this could provide a clearer overview in my opinion.

Technical Corrections

- p.1 line 11: forecasts (plural) line 37: "or outputs from, use..." : not grammatically correct, please rephrase

- p.2 line 7: "should" instead of "may" ? line 25: "of ECMWF" instead of "from" line 31: "How do... compare to those..." (plural)

- p.4 line 2: should be "number of ensemble members"

- p.5 line 13: "Moreover..." -> this sentence needs to be rephrased line 15: should be "raw OR preprocessed" ?

- p.9 line 28: "effect on" instead of "in" line 33: "Thus, it seems..." instead of "It thus"

- p.10 line 13: "did not perform" instead of "did not performed" line 16: 'small' and 'large' errors (instead of 'high' and 'low') line 23: should be "..which in turn helps.." line 29: "particularly for" line 30: "which in turn translate"" please rephrase

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