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Hydrology and Earth System Sciences
Discussions

Interactive comment on "A national-scale seasonal hydrological forecast system: development and evaluation over Britain" *by* Victoria A. Bell et al.

Anonymous Referee #2

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Review

This manuscript explores the potential for 1 month and 3 month hydrologic forecasts on a national scale, for different seasons. As a precursor, the manuscript describes how high resolution spatial information from a hydrologic model can be used to estimate initial conditions in a simplified manner.

General: Overall, the paper is well written and the structure provides for a coherent progression through the various sections. The main takeaway points, relative to the stated intention of development an evaluation of the system, are clear in that the seasonal differences in forecast skill are prominently noted and discussed. However, as the

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Discussion paper

manuscript as identifies the desire to link to decision making, I would suggest clarifying that link, maybe providing a section, as slight mentions of this link are unconvincing. I recommend the manuscript for publication in HESS after addressing minor revisions.

Page 2 Line 5-7 What is meant by perceived lack of skill? Is there skill or not? I would clarify as the lack of skill could discourage development of forecasts or it can also be the case that there is skill, yet amongst key people making decisions of research priorities, it could be perceived to not have skill. The second condition is more complicated and likely will need to be resolved with social science.

Line 26 A general note overall, and referencing the potential value for practitioners in line 29 of the abstract, it is important not to state skill acceptability in an overarching sense. In the literature differences in both perception of skill and more importantly acceptable levels of skill in order to justify using that forecast can vary across sectors and will likely be different for users compared to forecast developers. For more on this see: Hartmann, H. C., Pagano, T. C., Sorooshian, S., & Bales, R. (2002). Confidence builders: Evaluating seasonal climate forecasts from user perspectives. Bulletin of the American Meteorological Society, 83(5), 683-698.

Page 3 Line 16 – Correct in stating that downscaling would be necessary, but is there any evidence that downscaling would be a 'worthwhile' activity for improving national estimates of water flows?

Line 17 – What is meant by realistic water flows? I suggest adding context or changing the word as, in the current form, this is at unnecessarily high risk for misinterpretation.

Page 4 Line 19 – I suggest clarifying the period in which the long term average is calculated over. I think it can be interpreted as monthly or seasonally, which could impact the result.

Page 7 Line 14 Does 'relative to the rainfall forecast climatological mean' imply the 3 month anomaly will be distributed over each month based on a month's relative mean

contribution to the total seasonal precipitation?

Page 10 Line 1 The Forth region has median model performance for 1 month or 3 month leads? Or both combined?

Line 14 Seems that a comma is in error or a capital T is in error

Line 16 2a shows persistence on a 1 month lead more skillful than GloSea5+HIC. Can you explain why? Or I suggest noting that for overall assessments on a 1 month lead, persistence forecast should be explored in more depth.

Page 12 Line 15 Agreed, yet this point (how inclusion of avHIC with GloSea5 lead to 0 skill during some seasons) presents another that may be worth addressing – In figure 3, there exists an interesting pattern of skill at the sub-national level. Any thoughts on why?

Page 15 Figure 5 Is it possible to include a map that labels the regions (abbreviations should suffice)? I think the paper as a whole would benefit from this, even if one of the maps used in a previous figure could do this.

Line 9 It would be useful to note which regions are included in the 'Northern' and 'Western' cluster.

Page 17 Line 7 The presentation of this information to any user does not inherently alert them to anything. If they perceive the information (both the most likely possibility and the full range) to be trustworthy and if they are able to justify making (or changing a from normal protocol) a decision based on that information, then I can justify the use of alert in this context. I would suggest, in an over simplistic manner, what the presentation of the full range of scenarios does – presents the full range and the mean. This could be useful and interesting (and then, maybe advantageous) for a user but only if it is perceived to be relevant by them. Also this sentence uses the phrase 'presentation of the full range of scenarios' twice, so I would suggest re wording even if the above suggestion on content is not followed

Page 17 Line 14-16

Although the section notes recommendations will be included, I do not find any except for a weak statement regarding how an increase in spatial resolution could lead to improvement. This is not a new finding and I would consider reflecting on the content of the paper to develop recommendations that are more relevant.

It may be interesting to explore the role of ENSO. Referencing 4.3.5 of van Oldenborgh et al 2005, there is potential for some skill from ENSO for parts of the UK, including Scotland. Noting the skill in Scotland (figure 3), it could be a useful exercise to disaggregate by ENSO phase both in the target month and in the month of forecast issuance.

Jan van Oldenborgh, G., Balmaseda, M. A., Ferranti, L., Stockdale, T. N., & Anderson, D. L. (2005). Did the ECMWF seasonal forecast model outperform statistical ENSO forecast models over the last 15 years?. Journal of climate, 18(16), 3240-3249.

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