Editor's comments and author responses

Comments to the author:

Dear authors,

Thank you for your responses and the carefully revised manuscript, I am pleased to accept your paper for publication subject to minor corrections. I provide a list of corrections as follows. Please note the line numbers below are from the revised manuscript with tracked changes.

1. Line 162-170: “delineate each catchment into sub-catchments and sub-areas”, “For the 100 catchments, size of a sub-area”. It is unclear what type of sub-areas they represent. Are the sub-areas like hydrological similar areas or are they simply sub-catchments as you said you used flow direction map to delineate? If the latter, please use ‘sub-catchments’ consistently as you mixed the two terms in the text.

   Author response: We acknowledge the editor's suggestion. The catchment delineation is only based on flow direction. However, we want to define three types of modelling units: catchment, sub-catchment, and sub-area. The smallest modelling unit is a sub-area to which a hydrologic model is applied. A collection of upstream sub-areas makes a sub-catchment. The hydrologic model is calibrated for each sub-catchment where all the sub-areas within a sub-catchment have the same parameters. We cannot calibrate the model to each sub-area since the observed discharge data are limited. Sub-areas are useful for representing the spatial rainfall distribution within the sub-catchment and enable stable channel routing. The precipitation and potential evapotranspiration in sub-areas within a sub-catchment are different. Therefore, the state variables and runoff in sub-areas are different.

   Kindly note that we revised the text from lines 161 to 173 (line numbers refer to track change document) to make it clear to the reader.

2. L210-215: “Alternatively, different number of ensemble member (m) samples can be generated independently and analyse them. However, it needs extensive computational resources that is unavailable to us. Another method is to dress the ensembles to create more members for each forecast time. However, we want to ensure that the forecasts are true ensembles”.

   Change ‘and analyse them’ to ‘analysed’

   ‘dress the ensembles to create more members’: the word ‘dress’ may be a jargon for the scientific community in ensemble forecasting. It needs to be explained here what you mean by ‘dress’ or refer to the literature that used and explained this word. Similarly, 'Ensemble dressing’ appeared on the next page also needs explanation.

   Author response:

   Line 216: Changed the text ‘and analyse them’ to ‘analysed’.

   Lines 217 & 220: Added references (Pagano et al., 2012; Verkade et al., 2017) that explain the ensemble dressing method.

3. Section 4.5 This new sentence “However, we relaxed the acceptance criteria for the locations with social and economic significance in consultation with the stakeholders.” Should be placed closer to the last sentence of the section “On users’ request, a further 17 forecast locations (including one additional catchment) with forecast skill slightly below the acceptance benchmark, are released to registered users only due to the economic and social significance of the forecasts.” The new sentence also needs rephrasing to minimising repeated information.

   Author response: As suggested by the editor, we deleted the first sentence in line 492-493 and, reworded and inserted to lines 506 & 508.

4. L643-644: However, implementation of a data assimilation method for probabilistic streamflow forecasting in a semi-distributed modelling setup is challenging.

   It is not only true in a semi-distributed model, but also for any hydrological model be it a lumped, semi-lumped or distributed. So, I would change ‘in a semi-distributed modelling setup’ to ‘using a hydrological model’.

   Author response: We modified the text (Line 622) as suggested by the editor.

5. L705-710 “Particularly, if poor quality observed data is ingested to a model,” Please state observed precipitation data, otherwise it is ambiguous and unclear what observed data you are referring here. Please consider changing the phrase ‘ingested to’ to perhaps ‘used in’.

   Author response: We modified the text (Lines 684-685) as suggested by the editor.

6. Section 6.4: you added “challenges relevant to Australian context”, but some of the challenges are also valid for countries other than Australia. It also makes the paper very limited to the country. I would remove it or just mention within bullet’s text when something is particularly relevant to Australia.

   Author response: We modified the text (Line 637) as suggested by the editor.

References

Pagano, T. C., Shrestha, D. L., Wang, Q. J., Robertson, D., and Hapuarachchi, P.: Ensemble dressing for hydrological applications, Hydrol. Process., 27, 106–116, https://doi.org/https://doi.org/10.1002/hyp.9313, 2013.

Verkade, J. S., Brown, J. D., Davids, F., Reggiani, P., and Weerts, A. H.: Estimating predictive hydrological uncertainty by dressing deterministic and ensemble forecasts; a comparison, with application to Meuse and Rhine, J. Hydrol., 555, 257–277, https://doi.org/https://doi.org/10.1016/j.jhydrol.2017.10.024, 2017.