Referee #1 – response from the authors

Referee comments are copied below in black. Author replies are indented in blue.

Streamflow forecasting plays a critical part in water resources management. In this paper, streamflow forecasting models are developed for Great Britain. The usefulness of the models are demonstrated through the Hydrological Outlook Portal (https://ukho.ceh.ac.uk/).

> The authors would like to thank the referee for their review and constructive comments to help us improve the paper. Responses to specific points are given below.

There are three comments on the paper.

First of all, the paper is more like a report, rather than a research article. It is mainly due to that the methods presented along with the results. For example, in "4.2 Performance of the forecast distribution", the equation of CRPS is illustrated and then the detailed results are presented. It is pointed out that for research articles, methods and results are mostly presented in different sections. In this way, all the methods are illustrated in the same section, so that people can better understand the framework of the proposed methods.

> This is a helpful remark. We will rearrange the material as you suggest in our revised version.

Secondly, the rainfall forecasts that drive the hydrological models can be improved. In "4.1 Performance of the ensemble mean", the performance of raw rainfall forecasts is examined. It is not surprising to see that the performance of raw forecasts is not satisfactory. It is noted that peer studies have developed post-processing methods to exploit the skill of raw rainfall forecasts. The authors are suggested to considered forecast post-processing.

> The authors agree that additional post-processing may improve the skill of the rainfall forecasts. This is beyond the scope of this work, but will be mentioned in the discussion of further work in the conclusions [Lines 491-499].

Thirdly, there exist some forecasting systems in Europe. Is it possible to conduct some comparisons?

> Qualitative comparisons can certainly be made, although a formal statistical intercomparison would be beyond the scope of this work. Over the next few years the Hydrological Outlooks research team plan to make such a comparison between the various methods and models used for UK streamflow prediction. In a revised version we will add some additional European examples to the introduction and a brief qualitative comparison to the discussion section.

References:

Alfieri, Lorenzo, Peter Burek, Emanuel Dutra, Blazej Krzeminski, David Muraro, Jutta Thielen, and Florian Pappenberger. "GloFAS–global ensemble streamflow forecasting and flood early warning." Hydrology and Earth System Sciences 17, no. 3 (2013): 1161-1175.

Li, Wentao, Quan J. Wang, and Qingyun Duan. "A variable-correlation model to characterize asymmetric dependence for postprocessing short-term precipitation forecasts." Monthly Weather Review 148, no. 1 (2020): 241-257.

Zhao, T., Bennett, J.C., Wang, Q.J., Schepen, A., Wood, A.W., Robertson, D.E. and Ramos, M.H., 2017. How suitable is quantile mapping for postprocessing GCM precipitation forecasts?. Journal of Climate, 30(9), pp.3185-3196.

Wang, Quan J., Yawen Shao, Yong Song, Andrew Schepen, David E. Robertson, Dongryeol Ryu, and Florian Pappenberger. "An evaluation of ECMWF SEAS5 seasonal climate forecasts for Australia using a new forecast calibration algorithm." Environmental Modelling & Software 122 (2019): 104550.

Huang, Zeqing, and Tongtiegang Zhao. "pyNMME: A python toolkit to retrieve, calibrate and verify seasonal precipitation forecasts." Environmental Modelling & Software 166 (2023): 105732.

We thank the referee for drawing our attention to these works. We will include citations to such works where appropriate in the revised version.