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Geoscientific Model Development Discussions

Interactive comment on "Developing a global operational seasonal hydro-meteorological forecasting system: GloFAS v2.2 Seasonal v1.0" *by* Rebecca Emerton et al.

Anonymous Referee #1

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General comments

This paper describes the modelling chain used to provide the new GloFAS global streamflow forecasting product: 4-month ensemble streamflow forecasts generated at the weekly time step. The manuscript is commendably clear and concise, guiding the reader through the components of the system, and clearly describing its advances and its value. I believe the manuscript is well suited to the aims of GMD. This forecasting service is of global significance, and the manuscript is likely to be of high interest to forecast researchers and beyond. However, I thought the evaluation of their system (Section 4) could be improved: a crucial property of ensemble forecasts - reliability - is

completely ignored, as ROC curves ignore this aspect of forecasts. I therefore suggest the authors consider revising their manuscript to include a measure of reliability.

Major comments

1) Reliability is ignored in this manuscript. The system presents precise confidence intervals on their forecasts, which a user could reasonably assume to mean, for example, that "the 80% confidence interval indicates an 8 in 10 likelihood that the observation will fall in this band". The user's decisions may be influenced by this assumption. Uncalibrated precipitation ensemble forecasts from GCMs are generally overconfident (I'm not sure about SYS5), meaning that this assumption could be wrong. I suggest the authors acknowledge this issue by presenting a figure summarising the reliability of the forecasts (e.g., an attributes diagram pooling information from all sites for forecasts exceeding the 80th %ile and dropping below the 20%ile). If the forecasts are overconfident, this is an avenue for future improvement (and if they are reliable, then great!).

Specific (minor) comments

P1 L27-28 "will differ from normal conditions" No change suggested here, but I'd note that some forecasting systems aim to forecast specific quantities of rainfall, streamflow, etc.. This sentence implies that forecasts of deviations from the (model) climatology are the only aim of seasonal forecasts. The two aims align in the case of perfectly unbiased and reliable forecasts, but reliability in purely dynamical forecasting systems like this one is very difficult to achieve. Some comment on reliability of forecasts in the introduction is probably warranted (not necessarily here, but at some point).

P4 L13-14 "that it better simulates" Better than...? Do the authors mean that it improves over SYS4?

P5 L11 "resampled" Resampling usually implies (at least in statistics) that some sort of random process is used. Is this what the authors are implying? Or do the authors

mean 'interpolated' or perhaps 'regridded'?

P8 L12 "The interface consists of three principal modules, outlined below." For clarity, I suggest: "The interface consists of three principal modules: MapServer, GloGAS Web Map Service Time and Forecast Viewer. Each module is outlined below."

Typos/Grammar

P3 L9 "In 2016, work began in collaboration with the University of Reading, to implement" The collaboration is parenthetical, but not the work. Suggest "Work began in 2016, in collaboration with the Unversity of Reading, to implement..." (or perhaps: "In 2016, work began (in collaboration with the Univeristy of Reading) to implement...")

P3 L11 "...was released; this..." should be "...was released. This..."

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