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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 #2

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This paper introduced a global operational seasonal hydrological forecasting system based on the ECMWF seasonal climate prediction and an extension of the Global Flood Awareness System (GloFAS). This is an important work to extend regional operational system to the global scale. The evaluation results, although preliminary, are very interesting. The paper is also well written, and it is suitable for publication in GMD. I have a few comments below, basically for the clarification. I hope they are useful to improve the paper.

1. My only major concern is about the validation of the system, and the corresponding interpretation. I understood this paper does not aim to comprehensively evaluate

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the system. However, additional clarification is needed to help the readers to obtain more information on the system. Section 4.2 discussed the evaluation, and mentioned the deficiency in hydrological model, meteorological forecast, and even the ERA5-R reanalysis used for the initial conditions. In order to separate the sources of uncertainties, some analysis could be carried out. For example, to diagnose the impact of the hydrological model, the forecast results could be compared with hydrological model simulated streamflow, driven by observed meteorological forcings. To diagnose the impact of meteorological forecasts, the results could be compared with the Ensemble Streamflow Prediction (ESP)-based simulations, etc. While I am not suggesting this paper should carry out these simulations and comparisons, I would like to see more interpretations of current results (e.g., Figures 6 & 7). For example, for the lower skill than climatology, how about the precipitation forecast skill in the events of low flows or high flows? How about the comparison with the offline-simulated streamflow? 2. P1L26, what is "seasonal weather forecasts"? Do you mean forecasting weather or synoptic phenomena (e.g., storms, heat waves) at seasonal time scale? Or, do you mean "seasonal climate forecasts"? 3. Besides introducing several regional operational systems, it would also be beneficial to mention a few research efforts for regional to global hydrological forecasting, e.g., Princeton's Global Seasonal Hydrologic Forecast System (Yuan et al., 2015), U.S.–Mexico Drought Prediction Tool (Lyon et al., 2012). 4. The authors' mentioned that there are 233TB data per day (P3L31). It is a huge amount of data, so it would be more useful if they can be widely shared to the community. Are there any thoughts for the data dissemination (e.g., cloud distribution)? 5. P4L9, what does "SEAS5" stand for? 6. P17L1, remove one of the "indicate that".

References: 1. Lyon, B., et al., 2012: Baseline probabilities for the seasonal prediction of meteorological drought. J. Appl. Meteor. Climatol., 51, 1222–1237, doi:10.1175/JAMC-D-11-0132.1. 2. Yuan, X., et al., 2015: Seasonal forecasting of global hydrologic extremes: system development and evaluation over GEWEX basins. Bulletin of the American Meteorological Society, 96, 1895-1912, doi:10.1175/BAMS-D-14-00003.1

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