

Comment on hess-2022-218

Anonymous Referee #2

Referee comment on "Ensemble streamflow prediction considering the influence of reservoirs in Narmada River Basin, India" by Urmin Vegad and Vimal Mishra, Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-218-RC2>, 2022

The paper *Ensemble streamflow prediction considering the influence of reservoirs in India* presents an original study aiming at setting up an ensemble hydrological prediction system at the scale of India. The authors propose a first regional approach on the Narmada river catchment. The authors rely on the VIC hydrological model that supports reservoir management. This approach is particularly interesting when it comes to improving flood forecasting in a context where reservoirs can be used to store water but also represent a danger if the reservoir management is not adapted in case of flood. The article focuses on 4 reservoirs of the same catchment area but it will be necessary to extend the study to other reservoirs of other regions for the implementation of a possible warning system at the scale of the whole country.

Major comments:

- It seems to me that the study should be extended to other catchments with more contrasting hydrometeorological conditions. The study focuses on a regional scale warning system.
- In the description of the hydrological model, a table summarizing the parameters or a diagram could help the reader in the operation of the hydrological model. Additional information on the operation of the reservoir-specific module could be useful as this is one of the original features of this study. The characteristics of the reservoirs necessary for the operation of the hydrological model are also missing.
- Concerning the calibration and validation periods of the hydrological model on the 4 reservoirs, it is unfortunate that the periods are not identical for the Mandleshwar and Garudeshwar stations.

- To evaluate the quality of the forecasts, the authors could also have used the NCRPS (Hersbach, 2020)

- When evaluating the VIC hydrological model, it can be seen in Figure 8 that the model underestimates the volume of water in the reservoir compared to the observed level, isn't this a problem when looking at flood events? Finally, one may think that the volume of the flood can be stored in the reservoir when it is not the case. I wonder if for a future publication, we should not look at the propagation of uncertainties along the modeling chain.

- For the comparison of the two forecast products, do we have enough hindsight on the GEFS product? Indeed, if we look at Figure 13, the dispersion of the ensemble for the year 2019 is much larger than for the year 2020.

- As an additional comment, I think it might have been interesting to show a hydrometric station not influenced by reservoirs to evaluate the forecast products before adding complexity to the study with the introduction of reservoirs. This would have allowed us to see if the same biases were observed.

- A comparative analysis of the four reservoirs is missing. Are the observed biases due to the hydrometeorological context of the reservoir, or are they due to the characteristics of the reservoir?

Minor comments:

- In Figure 7, do the authors have any idea of the difference between observation and simulation for the year 2007 for Bargi Reservoir. The minimum and maximum reservoir levels are missing. Were there any spills in the management operations simulations?

- In the legend of Figure 8, perhaps the dates of the periods should be indicated. Comparing the seasonal cycle of the reservoirs is a little difficult because the average cycle was not calculated over the same periods.

- The boxplots in Figure 12 are difficult to read for the fourth reservoir.

Reference:

Hersbach, Hans. "Decomposition of the Continuous Ranked Probability Score for Ensemble Prediction Systems", *Weather and Forecasting* 15, 5 (2000): 559-570, [https://doi.org/10.1175/1520-0434\(2000\)015<0559:DOTCRP>2.0.CO;2](https://doi.org/10.1175/1520-0434(2000)015<0559:DOTCRP>2.0.CO;2)