Comments on “Improving inflow forecasting into hydropower reservoirs through a complementary modelling framework”

This manuscript aims to present a new approach of using hydrologic models and time-series models complementarily to improve hourly reservoir inflow forecasting. The approach enables probabilistic inflow forecasting and is adaptive to multiple lead-time forecasting. I totally agree with the first reviewer that this approach has been well established and widely used in the hydrology community. This work is an interesting application of a mature method, but the proposed complementary modelling framework can’t be treated as a new approach at all. Please refer to the detailed comments below for more explanations and some other technical concerns.

Major comments:

1. Lack of scientific innovation as a methodology paper. I couldn’t consider the proposed complementary modelling framework as a new approach because inflow forecasting has been done by applying error models to base hydrologic model simulations for more than 20 years. There is nothing new on error model structure, hydrologic model calibration or the way to combine two models. I am aware there is a paragraph on Page 12067 attempting to describe two innovations of this work: forecasting with a lead-time up to 24 hr and enabled probabilistic forecasting. The length of lead-time depends on the need of the application, and it is not part of innovation. The probabilistic forecasting directly derived from error models have been already considered intensively in most previous work.

2. Lack of assumption validation as an application paper. To warrant a successful application, the model assumption should be examined under scrutiny. For example, the ACF and PACF plots based on the forecast error in the transformed space (instead of in the original space) should be provided. I doubt that an AR(1) model is sufficient to account for the strong persistence in the hourly time series. The normality of the residuals (after appropriate transformation) in the AR(1) model should be also validated.

3. Unclear method description. (i) I can’t see whether the AR model is applied to transformed or original data. From Equations (2) and (3), it seems to apply to the inflow without transformation. If so, I don’t know why the Box-Cox transform is mentioned in the section related to “Parameter estimation”. (ii) Some notations are not used consistently and cause confusion. For example, ε_t is differently defined in Equation (2) and in the last line of Page 12071. I am not sure why $\hat{\varepsilon}_t$ instead of e_t is used in Equation (5).

4. The estimation of the transformation parameters described on Pages 12071-12072 is incorrect. My understanding is that the authors attempt to minimise the sum of forecast error in the transformed space (not really sure because of unclear notations). I suggest that the transformation parameters are estimated by a likelihood approach.

Minor comments:

1. Page 12073 Line 12: Can you explain the confidence interval given in Equation (6)? I am sure that it is not only unnecessary but also incorrect.

2. Page 12068 Line 15: “a concluding remark” should be “concluding remarks”

3. Page 12096 Figure 4(a): the unit of y-axis should be mm/h.