

## ***Interactive comment on “Combining semi-distributed process-based and data-driven models in flow simulation: a case study of the Meuse river basin” by G. Corzo et al.***

### **Anonymous Referee #2**

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This paper develops a hybrid forecasting methodology for combined use of the results of data driven models (Artificial Neural Networks(ANNs)) with the HBV-a conceptual rainfall-runoff model. The paper illustrates how the fashionable data driven models can work in a synergetic non-competing manner with traditional rainfall-runoff models to produce better forecasting performance. While the use of ANN in riverflow forecasting is well established, there are only few limited studies which have dealt with its use as a replacement for sub-basin conceptual rainfall-runoff models and a routing model integrating the generated sub-basin flows. Hence, studies aiming at exploring such a use should be welcomed.

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## Specific Comments

- The authors need to give more thought to the use of the term process-based model in the title as it is often used to refer to the distributed physically-based model.
- Page (737): For consistency the authors should provide all the equations used in assessing model performance.
- The methodology is long and difficult to follow a schematic diagram or a summary would help the reader to understand the overall framework.
- Page (743) 4.2 Data-driven sub-basin models: In my view the comparisons of the results of the sub-basins data-driven models with the HBV-S is not a fair as it is not a comparison of like-with-like. From equation (3) it can be seen that the data-driven models are operating in the updating mode while from the description given in the paper it appears the HBV-S is operating in the simulation mode without any feedback from the most recently observed flows. In order to have a fair comparison, the HBV-S model simulated discharges should be updated prior to comparison with those obtained using the data driven models. This is a fundamental point and has the potential to affect the outcomes and the conclusions of the paper.

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