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Interactive comment on "Modeling Error Learning based Post-Processor Framework for Hydrologic Models Accuracy Improvement" *by* Rui Wu et al.

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As handling topical editor for this paper, I have struggled to get reviewers for it much more than normal (first to accept,and then if accepting, to submit). My take on the paper when accepting to handle it was that it appeared to be high quality and interesting/thought provoking, which is backed up by the one constructive, informed and positive review we did secure (thank you, Paul Miller; authors, please do acknowledge his constructive comments in your final manuscript). I did anticipate it might be difficult to secure reviewers as it is bringing an unsolicited perspective informed by disciplines beyond those that traditionally contribute to the already contested topic of "how best to handle errors in hydrological modelling" debate. I hadn't anticipated it would be quite as difficult as it turned out to be to get reviews. I think it's taking people outside their

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comfort zone, and that's a good thing.

Given my initial take on its quality, backed up by a more recent read, the reviewer comments and response from the authors, I am happy to recommend publication. I don't want a paper proposing a new perspective and approach with promise, whether or not that promise works out, to be held up any further by our continuing struggle in the academic community to find time for multiple peer review of an interesting but complex and somewhat out of left field proposal.

Before it proceeds to publication, I would ask the authors to reconsider their response to Paul's last comment and addressing it in the publication, as I'm not sure you fully got the gist of it (your responses to all the others were great, however).

Paul's final point was: "If there is no attributable physical reason for the errors identified through the learning algorithm, is it really appropriate to be making those changes; that is, are we getting the right (or more accurate) answer for the wrong reason? The modeling Error Learning algorithm may be just identifying a limitation of the model."

Your response to this just targets you are addressing limitations of the model in your approach. My take on this comment is that he was acknowledging the value machine learning algorithms could bring to hydrology but also stressing the importance, for it to be really valuable, of not just relying on mathematical/computer science data mining but also process understanding. This has been a hard learned lesson in hydrology.

The finding that errors of hydrological models are most strongly correlated with model inputs that you note in the abstract, is correct but already very well understood and acknowledged. We have had that understanding at least the last two decades, and recognize this often leads to our models sometimes compensating with structural and/or parameterisation errors that at least partially compensate for these biases. As data quality changes, these biases changes and our models aren't necessarily updated with structural changes that reflect that, which effects predictive power, and the models fitting the data are also used for hypothesis testing to understand dominant process

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better, so model structural compensations to address input bias hold our scientific understanding back. A pressing issue in hydrology.

I'd like to see a couple of paragraphs to recognise that in the paper. I do compliment you on the worth of the paper, but that issue of disentangling biassed input data and biassed parameters (all inputs from a mathematical sense, but distinct in that the parameters are related to structure) and issues with model structure are not solved by the approach, and that an extension to recognise and potentially help disentangle these to some extent would bring added value.

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