

Interactive comment on “Legitimising neural network river forecasting models: a new data-driven mechanistic modelling framework” by N. J. Mount et al.

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Received and published: 18 April 2013

The editor fully agrees with the arguments in the latest authors’ comment. The new diagram explains the relationship between two types of legitimacy well. Possibly I was not clear enough in my last comment; my comment mentioned the future work indeed, and not a suggestion to change the considered paper and to take a RR model and to analyse the physical legitimacy. So I agree with the authors saying

"understanding a model’s mechanistic legitimacy is an important objective in its own right whilst also forming an essential pre-cursor to determining its physical legitimacy", and that

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"to try to add in alternative models and additional interpretations of physical legitimacy would risk making the value of these arguments less clear, not more. We therefore argue that the use of our framework to assess a model's physical legitimacy – perhaps using the example of a rainfall-runoff model – would be better undertaken in a separate, follow-on paper, which we would be delighted to generate."

However I would stay with the statement that in my view many practitioners tend to use models that they understand and hence these are typically process models based on physical theoretical principles (manly conceptual models) (so physical legitimacy). I understand their arguments but possibly they are missing a lot when they are not using techniques based on the strength of facts and empirical evidence (rather than theories), i.e. data-driven (statistical, machine learning) methods. Researchers' job is to provide evidence that data-driven (empirical) models work, they can be trusted, and to try to link them with the theory-based models. In this respect this paper can be seen as a good contribution to the discussion about how to ensure DDMs are seen more and more as "legitimate" and make this link happen.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 145, 2013.

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