Hydrology and Earth System Sciences Discussions

Interactive comment on "Hydrological model coupling with ANNs" *by* R. G. Kamp and H. H. G. Savenije

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ANSWERS OF THE AUTHORS First we would like to thank the anonymous referee # 2 for the comments on this paper. The comments will help us to improve this paper. We will answer the questions in the same sequence of general comments and detailed comments for each paragraph.

GENERAL COMMENTS We are pleased that the referee agrees with the idea that hydrological model coupling can be a valuable instrument for researchers and software developers. However, in the current paper it appears not to be fully clear to the reader what the objectives are. There are also too few details on the case study presented. We shall pay more attention to these aspects and also to the description of the models, the methodology, the definitions of model coupling, and on ANNs. We shall also consider

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the references and see if we can give a more balanced list of literature.

DETAILED COMMENTS

INTRODUCTION It is clear that the introduction is not complete and requires revision. An important issue is the need for clear definitions and the explanation of terminology. The phrase "set up quick connections" was used in relation to traditional connections between coupled models, for example via a software framework. A schematic diagram can illustrate how model coupling is achieved. A better description of this methodology may also help the reader.

The objective of the paper is not to quantify the difference between ANN coupling and traditional coupling in terms of speed. The focus of the paper is to demonstrate the methodology. The rationale behind the four models is that they are examples of typical hydrological processes and models.

MODEL DESCRIPTION We shall give a better and more balanced model description of the four models. Too much detail may however distract the reader from the methodology. Especially a detailed description of neural networks, with details on layers and transfer functions, is probably redundant and does not enhance the understanding of the model.

METHODOLOGY / DESIGN AND TRAINING The description of how the models are coupled will be explained in more detail. More references on model coupling will be included. For ANNs, the strategy, design and the selection of training datasets are important.

HBV / SALT INTRUSION / SECCHI MODEL There are a few methods to deal with time delays in sub-systems. The use of previous catchments states or linear auto-regressive models can also perform this task, instead of the HBV model. In general the input descriptions for all models will be improved.

The comments on titles, figures and the conclusions will be followed up in the revised

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