Hydrology and Earth System Sciences Discussions

Interactive comment on "Evaluation of 1-D tracer concentration profile in a small river by means of Multi-Layer Perceptron Neural Networks" *by* A. Piotrowski et al.

Anonymous Referee #1

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This paper proposes a new methodology for predicting the pollutant concentration-time profile at different locations along the river. The paper develops a modular approach for predicting the time profile based on the artificial neural network (ANN). In this approach, different ANNs are used to predict the rising limb, the falling limb, time to peak and peak value of the concentration-time profile. However, the essence of this approach is not very well explained in the introduction section of the paper. It is not clear to this reviewer why there is a need to use this modular approach. The paper does not provide any indications about the of the type of results which can be obtained using a non-modular approach (i.e. a single ANN to predict the whole time profile) which is simpler than the

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modular approach.

The authors argue that the approached they developed requires very little information about the river system. The counter argument to this is that the ANN models need a significant number of measured concentration-time profiles for calibration which may not be readily available in many cases. Thus, what are the advantages of using ANN in this context?.

Although the success of ANN applications is highly dependent of the selection of the input variables, the paper does not provide the details of the procedure used for selecting the sets of input variables used in the study.

In the opinion of the present reviewer, the methodology used for evaluating the ANN modular model is not fully developed in terms of bench-marking the results against other existing or plausible simple models for predicting the concentration-time profile. Although the authors benchmark the results in the case of the ANN models which predict the peak value and the time to peak no attempt has been made to benchmark the results in the others cases (i.e. rising and falling limbs). At least the results of the ANN models should be compared to those obtained from multiple linear regression models which use the same input (independents) variables as the ANN modular model. This would be a true test whether or not the additional modelling complexity of ANN modular model will results in significant enhancements to the prediction accuracy.

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