

## ***Interactive comment on “A time delay artificial neural network approach for flow routing in a river system” by M. J. Diamantopoulou et al.***

### **Anonymous Referee #1**

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The paper addresses an important issue of hydrological forecasting, however it offers no novel nor original material whatsoever.

If the paper was submitted 10-12 years ago, I would have recommended its publication. But from today's perspective, the paper is simply outdated and adds nothing new to support its publication in scholarly journal. Furthermore, the references used by authors are not appropriate as some of the seminal papers are not at all mentioned (Minns and Hall, 1997; ASCE SG paper, 2000). Finally, results are not presented in suitable and objective fashion. More about this in sequel.

There are number of erroneous statements in the description of neural networks. For

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example statement such as that neural networks are designed by allocating weights on connections. Neural networks are trained or fitted or optimised, but certainly not designed through the process of weight adaptation. Design can be described as the process of choosing appropriate connections, something that cascade-correlation algorithm helps with.

Despite of all this, there is a statement on page 2741 that "the network architecture and geometry are tested to avoid over-fitting as suggested by Maier and Dandy (2000)." Firstly the authors should not assume that each and every reader will be familiar with Maier and Dandy paper. Second, I do not understand why do they spend 2 pages (pages 2739-2740) describing trivial notions such as root mean squared error and devote no time to overfitting.

As already mentioned, information on pages 2739-2740 is elementary and could be safely left out without any loss.

On page 2742 authors write about cross-correlation. It is not clear how were correlograms used in ANN modelling? Also, this analysis is linear in nature and does not add much value to non-linear technique such as neural network.

Figures are small and do not reveal the most significant information in this sort of modelling: phase error. It would be more useful to provide zoomed-in figures so that one can observe magnitude of phase error.

Figure 3 offers accuracy during the calibration/fitting period which generally offers no useful information. We are interested in out-of-sample validation and only Figure 4 should be left in. However, despite small scale Figure 4 shows large phase error. It would be therefore useful to compare accuracy of the ANN against some other benchmark. The benchmark could be as simple as naïve forecast. This sort of information must be included in table 2.

Conclusions is nothing more than repetition of the text which was previously written in

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the text. This is not discussion of any findings.

Finally, references. There is a long list of references most of which can be safely replaced by few seminal papers in the field. I suggest that authors conduct proper literature survey of the work done in the field of hydroinformatics.

To conclude, I cannot recommend the paper for publication in the present form. The paper reads as a conference publication which was quickly put together and submitted to this journal.

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