Hydrology and Earth System Sciences Discussions

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 #3

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General comments: This is a well-written paper with clearly stated aims and methodology. The authors have done well in explaining their set-up of the time delay ANN (TD-ANN), which they have chosen for flow routing.

However, the authors failed to focus their paper on hydrological related issue but have chosen instead to explain the time delay ANN methodology in detailed. This is, in my view, a very unfortunate choice because they failed to add substantially new knowledge to our understanding (or usage) of TD- ANN.

Hence, I would like to propose the authors address the following issues in order to make the manuscript more informative and their exercise more meaningful:

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1. choice of data for developing the TD-ANN. As I am aware (based on discussions with Greek colleagues and checks on the web), Aliakmon river is heavily gauged and long historical records until present day is widely available. It is therefore interesting to understand the reason(s) behind restricting the calibration and validation period to 1977-1987. I would suggest the authors to use recent data for validation.

2. choice of forecasting horizon: The authors have chosen to forecast/ route flow for only 1 time-step ahead (and in this case, 1 day ahead). I would like to know whether there is any hydrologically sound reason for choosing this forecast horizon, since the distance between Siatista and Ilarionas is only 100km and the area is mountainous. I would like to suggest looking at higher resolution data (which exist for Aliakmon river) if the forecast lead-time of 1 day seems too long.

3. comparison of methodology: It is essential for the authors to demonstrate that their methodology is the most suitable one. One way of doing so is to compare with other well-known methods such as naïve approach or feedforward/ backpropagation ANN.

Minor and specific points (for authors):

1. I felt that the authors have cited too many references on 3 occasions: (i) page 2737 - where references were made on the adaptability of ANN in hydrology; (ii) page 2738 - on structure of ANN (normally quoting Haykin, 1994 is sufficient because it is commonly used as a standard text book), (iii) page 2738 - on Kalman's learning rule;

2. In Table 3, the performance of TD-ANN in terms of errors seems very inconsistent (-8% - +9% errors). Can the authors offer some explanations to this?

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