Hydrol. Earth Syst. Sci. Discuss., 8, C4741–C4743, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C4741/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Real-time flood forecasting by employing artificial neural network based model with zoning matching approach" *by* M. Sulaiman et al.

Anonymous Referee #1

Received and published: 28 October 2011

The manuscript presented an univariate analysis of river flow series based on a global nonlinear approach. Using a threshold for the water level series, the Authors improved significantly the performance of the forecasting results. However, the assumptions must be more clearly explained, the global nonlinear approach may not be the best approach and the forecasting assessment should be extended.

Major Comments:

1. The Authors assumed that the river flow has a stochastic behaviour, i.e. a linear random nature, but proposed an artificial neural network approach (ANN), a global

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

nonlinear approach. This seems contradictory, please explain your assumptions more clearly. In this way, in order to clarify your motivations, you should cite the studies which presented poor results of regression models (ARMA?) and explain why these models should not work.

2. Since your main goal is to improve predictions of water level above the flood alert level using a zoning matching approach (ZMA), you should test different data driven approaches, instead of ANN only. Moreover, we still cannot conclude that global non-linear approaches always outperform global linear or locally (non)linear ones based on the previous works about runoff series forecasting. Also, note that the best approach for a lead-time, e.g. 3 hours, must not be the best for another lead-time, e.g. 6 hours, because the river flow behaviour may change through the time-scales.

3. You should plot the errors of the forecasting vs. the observed water level, in order to investigate overestimation and underestimation in your results.

4. Please validate your approach also for the 11 flood events of the training set (Fig. 3) as you did for the 2 flood events of the validating set, because they have low recurrence and, consequently, are important to achieve the objectives of this work.

5. On the one hand, the ZMA improved significantly your results. On the other hand, it restricts even more the application of time series models to hydrological data, because needs even longer discharge or water level series. You should stress this in the conclusions.

Technical comments:

Include a schematic diagram about the stages of your analysis in the section 3.5.

Change the range of Figures 7-11 from [0, 1400] to [8000 to1300].

In the text, “data training” may be training and “data forecasting” forecasting.

See on page 9359 line 11: “water leve1”.

HESSD

8, C4741–C4743, 2011

See on p. 9360 l. 5 “underestimating overestimating”.

Substitute “with more than 12 flood events” by the exact number of flood events (see Fig. 3).

First paragraph of the Methodology should be in the introduction section.

See p. 9364 l. 10: “The reason a minimum”.

I think you do not need on p. 9364 l. 22-26: “Among the data... required for validation.”

Rewrite lines 8-10 on page 9367: “The third... 8000mm.””.

“are” instead of “is” on page 9374 line 2 and “assumed” on page 9374 line 6.

See last columns of Tables 3 and 4.

See caption of Fig. 7.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 9357, 2011.