Hydrology and Earth System Sciences Discussions

Interactive comment on "Daily reservoir inflow forecasting combining QPF into ANNs model" *by* Jun Zhang et al.

Anonymous Referee #2

Received and published: 25 February 2009

The paper describes an approach to forecast daily inflow into reservoirs using QPF and ANN. Due to the advancement of computing power, high resolution QPF has a huge potential for improving river flow forecast. The topic of this paper is very useful and of interest to the readers of HESS. However, the study carried out by the authors is not rigorous and there is very little new information for reader to gain from reading the manuscript, therefore I don't recommend its publication in HESS. Here are some comments that may help the authors to improve their study and produce a better paper in the future.

Major issues:

1) By using ANN, the authors have assumed that the system is nonlinear, hence it

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

würde be inappropriate to use ACF and CCF for identifying the input variables. ACF and CCF are tools suitable for time series analysis and help to identify linear models. For nonlinear models, you should use trail and error of different variable combinations to get the suitable past flow and rainfall inputs.

2) Even for linear models, the authors misused the information from ACF and CCF. In Fig 2, the authors simply assumed only one past flow was needed in the model because it had the largest ACF. This is wrong. The past flow after that also has useful information to contribute (ACF=0.7).

3) There is no need to plot CCF for positive lags since there is no causal-effect relationship between the future rain and past flow.

4) The selection for ANN input variables is not convincing. On Page 127, there is no justification for including P(30) and Q(30) (why not P(5), P(10), ..Q(5), Q(10),...). If a forecast is done at time t, there must be Q(t) available, but authors only used Q(t-1) to predict Q(t+1). Q(t) mysteriously disappeared in the calculations. Also, it seems more rainfall inputs were added in ANN input nodes without justifications (Eq (1), two rainfall inputs, Eq(3) 5 rainfall inputs, why? If 5 rainfall inputs are needed, Eq(1) should add P(t-3), P(t-4), ...)

5) Figures 7 and 8 are supposed to be for a flow forecasting system , but the presented results were only for hind-casting. They just look like past event analysis software (with both measured and model flow displayed). Generally, this part of the content is not useful to other readers and should be removed from the manuscript.

6) Although reservoir is mentioned many times in the paper, the methodology described is just a rainfall runoff modelling, so the description of how important of the reservoirs is not very relevant. It seems that cascade reservoir operations are not included in the calculations. This is wrong. At least the reservoir routing effect should be considered since its calculation is very easy and accurate. If some of the reservoirs are controlled by gates, they would have a huge impact to downstream flows.

Minor issues

1) P127, it is confusing to use symbol 'i'; for two purposes: For every day t, four MLP-ANNs models, namely Model(t+i) i=0, 1, 2, 3, are developed for the daily reservoir inflow forecasting with lead-times (represented by symbol i) varying from 1 to 6 days;

2) It would be useful to include some further information on QPF (data spatial and temporal resolution, domain size, data availability). You may also compare QPF with rain gauge data to check their quality.

3) Although the English in the paper should be understandable by international readers, it is still desirable to have the manuscript polished to remove some non-idiomatic words.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 121, 2009.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper