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Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Acclimatizing Fast Orthogonal Search (FOS) Model for River Stream-flow Forecasting" *by* A. Osman et al.

Anonymous Referee #1

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The manuscript presents a new method namely Fast Orthogonal Search (FOS) for stream-flow forecasting, which is interesting. The model is tested using stream-flow data at Aswan High Dam located in Egypt. The subject is within the scope of the journal. Overall, I think the paper is well written and the authors address an important topic in hydrology (stream-flow forecasts) that is of keen interest of the Hydrology community Based solely on the paper results, I am fully convinced that the proposed FOS model has much advantage over the classical AR and ARMA (including periodic AR) even the Artificial Neural Network model classes of stream-flow forecast models. However, some results are NOT addressed and discussed adequately. Moreover, the apparent relative medium forecasting skill of the proposed model needs to be discussed. The manuscript, in its present form has the potential for publication in HESS with adequate revisions to the following points which should be undertaken in order to justify rec-

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ommendation for publication. âĂć For readers to quickly catch the contribution in this work, it would be better to highlight major difficulties and challenges, and your original achievements to overcome them, in a clearer way in abstract. âĂć Many assumptions are stated in various sections. More justifications should be provided on these assumptions. Evaluation on how they will affect the results should be made. âĂć The key FOS parameters are not mentioned. The rationale on the choice of the particular set of parameters should be explained. Have the authors experimented with other sets of values? What are the sensitivities of these parameters on the results? âĂć It is mentioned in p.4 line 17-19 that “Even though these AI models demonstrate to be proficient, the convergence of the model during the training (calibration) experienced a slow procedure which means that the model falls in the sub-optimal search procedure.”. Some justifications should be furnished on this. âĂć There is missing information about the major feature of the Nile basin and proper statistical analysis for the data. It is vital for the readers to get complete information about the basin and also brief statistical analysis for the raw data. âĂć The authors presents the three different training approaches for the model and shows graphically its time-line procedure, however there is absence of the major mode structure for the model, even the authors describe the model structure satisfactorily, it would be better to show a block diagram for the model structure. âĂć It would be of importance for the readers to see more performance indicators for the model evaluation to be presented. In addition, as long as the authors are presenting the results on monthly basis, it would be better to do so for each month. âĂć Moreover, the manuscript could be substantially improved by relying and citing more on recent literatures about case studies of application of various types of soft computing technique in discharge prediction such as the followings:

- Cheng, C.T., Wu, X.Y. and Chau, K.W., “Multiple criteria rainfall-runoff model calibration using a parallel genetic algorithm in a cluster of computer,” Hydrological Sciences Journal, Vol. 50, No. 6, 2005, pp. 1069-1087.

- Lin, J.Y., Cheng, C.T. and Chau, K.W., “Using support vector machines for long-term

discharge prediction," Hydrological Sciences Journal, Vol. 51, No. 4, 2006, pp. 599-612.

- Wang, W.C., Chau, K.W., Cheng, C.T. and Qiu, L., "A comparison of performance of several artificial intelligence methods for forecasting monthly discharge time series," Journal of Hydrology, Vol. 374, No. 3-4, 2009, pp 294-306.

- Wu, C.L., Chau, K.W. and Li, Y.S., "Predicting monthly streamflow using data-driven models coupled with data-preprocessing techniques," Water Resources Research, 45, W08432, doi:10.1029/2007WR006737, 2009.

- Cheng, C.T., Ou, C.P. and Chau, K.W., "Combining a fuzzy optimal model with a genetic algorithm to solve multiobjective rainfall-runoff model calibration," Journal of Hydrology, Vol. 268, No. 1-4, 2002, pp. 72-86.

- Chau, K.W., "Particle swarm optimization training algorithm for ANNs in stage prediction of Shing Mun River," Journal of Hydrology, Vol. 329, No. 3-4, 2006, pp. 363-367.

âĂć Complete results for all the performance indicators should be presented in the discussion section.

âĂć In the conclusion section, the limitations of this study, suggested improvements of this work and future directions should be highlighted.

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