**Dynamic versus static neural network model for rainfall forecasting at Klang River Basin, Malaysia**

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**We would like to thank the editor-in-chief and the reviewers for their objective and thorough review of our paper. We have addressed all the reviewers' comments in the following point-by-point response. All changes made to accommodate the reviewers' comments are underlined in the revised manuscript.**

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## Reviewer #1:

**General Comments:**

The manuscript presents dynamic versus static neural network model for rainfall forecasting at Klang Gate, Malaysia, which is interesting. The subject addressed is within the scope of the journal. The manuscript is well organized and understandable and easily to follow. However the manuscript, in its present form, contains several weaknesses and could be improved if the authors considered the following comments to strengthen the position of the manuscript. Adequate revisions to the following points should be undertaken in order to justify recommendation for publication.

**Reply**

**The authors thanks the reviewer for his appreciation of our research contributions**

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1. Some references are cited but do not appear (Noureldin et al, 2011 and Elshafie and Noureldin, 2011) in the References section.

**Reply**

**Both references have been added in the references list and all the references list have been reviewed.**

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2. Usually using the third order model (i.e., the rainfall at time t-3, t-4 and t-5 still has impact on the rainfall at time t) is physically probable for this problem, especially for the wet period months.

**Reply**

**Basically, the proposed neural network model in our study is NOT mainly rely on the physical and/or hydrological behavior of the system in the study area, it is conceptually a time series forecasters with consideration of the rainfall pattern of consecutive months. To predict the time series of different systems' behavior that uses the previous and most recently behavior of a system to predict its future changes. The major advantage of this method is the ability to predict the behavior of systems without fully consideration or analytical prediction rules (hydrological/physical). As a result, within this concept, any month could be forecasted as long as the previous data records could help enhancing the forecasting skills and are available in the time series.**

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3. Some justifications should be provided on using the back-propagation algorithm, which has the drawbacks of local convergence and slowness.

**Reply**

**The authors fully agreed with the referee in this point. The back-propagation algorithm experienced several drawbacks such as, local optima, slowness. There are many advanced methods offered by researchers to overcome these drawbacks such as Particle Swarm Optimization (PSO) and Genetic Algorithm (GA). In fact, the authors preferred to use back-propagation algorithm method at this stage of this study on to introduce the dynamic neural network at the classical stage. However, the other algorithms could be applied and re-adjusted to be included in more advanced neural network types whether static (radial basis function or self-organizing neural network or probabilistic neural network) or dynamic neural network ( recurrent, input delay and NARX neural network) with different types of training algorithms PSO and GA.**

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4. 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.

**Reply**

**It is true that there are some assumptions in our research. Hereafter, we will try to highlight the major ones.**

- **Assume the input pattern only 1 to 5 previous months/weekly.**

**The findings of the cross-correlation analysis between two consequences months shows that the cross-correlation is relatively poor if go more than 5 months/weeks behind the one under study to be forecasted for most of the months.**

- **The performance indicators**

**Actually, in developing such forecasting model using Neural Network, the model could perform well during the training period and might provide higher level of error when evaluating during either validation or testing period. In this context, in this study the authors used these performance indices to make sure of that the proposed model could provide consistent level of accuracy during all periods. The advantages of utilizing these two statistical indices as a performance indicator of the proposed model are as follow:-**

1- **Using the maximum error is to make sure that the highest error while evaluating the performance is within the acceptable error for such forecasting model.**
2- **While utilizing the Root Mean Square error is to ensure that the summation of the error distribution within the validation period is not high.**
3- **Consequently, using both indices is guaranteed consistent level of errors which is providing a great potential for having same level error while examining the model for unseen data in the testing period.**

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5. The key ANN 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?

**Reply**

**In fact, there is no formal and/or mathematical method for determining the appropriate "optimal set" set of the key parameters of Neural Network (number of hidden layers, number of neurons with each hidden layer and the type of transfer function between two consequence layers). Accordingly, the authors decide to perform this task utilizing trial and error method. The authors experimented several sets and examined each experiment but we report only the best trial.**

**However, the authors reported some observations about the proposed model performance and sensitivity analysis under different set of key parameters in the revised version of the manuscript.**

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

**Reply**

**The conclusion section has been improved and includes the limitations of this study, suggested improvements of this work and future directions.**

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