

Interactive comment on “An artificial neural network model for rainfall forecasting in Bangkok, Thailand” by N. Q. Hung et al.

Anonymous Referee #2

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General comments

This paper presents a rainfall forecasting result using an artificial neural network model applied to Bangkok in Thailand. Although a new ANN model is proposed, which is trained using consecutive rainfall data including non-rainy days, it is not clear how the ANN model is mathematically improved compared to an existing ANN framework. The manuscript does not include evaluations of the new ANN model compared to the conventional approach that precipitation of only rainy-days is used to train the ANN model. As a scientific paper to evaluate the ANN model performance, it needs in-depth analysis and discussion. I would suggest including discussion that how model performance would be improved when non-rainy days are included for training the ANN model. RMSE values in Tables 2, 3 and 4 would be reevaluated only for rainy-days.

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Also the forecasting results appeared in Figure 10 would be evaluated with some indices such as RMSE to assess matching of spatial distributions at each lead time so that a reader can easily understand the performance of the model.

Specific comments

1. P. 190, 21th line, "Artificial Neural Network" section: Need description how a newly proposed ANN model using non-rainy days for model training is mathematically different from the existing ANN models.
2. P. 191, 18th line: Need definition of d_i , i and j .
3. P. 191, 24th line: Need definition of $x_i(n)$ in Eq. (2).
4. P. 192, 4th line: The last term in Eq. (3) would be $w_{ij}(n)$?
5. P. 192, 10th line: Need definition of net_j and θ_j in Eq. (4).
6. P. 195, 25th line, "Results and Discussion" section: The section does not include evaluations of the new ANN model compared to existing ANN models which use only rainy-days data. Discussion on values of the new ANN model with quantitative evaluations should be presented. The output of ANN formulation in the paper is one-hour-ahead rainfall. The lead time is short, so to develop an ANN model only trained with rainy-day would be enough or rather than better in practical forecasting. The authors should show the strong points of a newly proposed ANN formulation.
7. P. 196, 1st line and Table 2: If the indices values in Table 2 include non-rainy-days, it is requested to make a similar table that excludes non-rainy-days to evaluate the model appropriately.

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8. P. 196, 5th to 7th lines: "This value however ... of training data." RMSE values only for rainy-days are requested to evaluate the model performance.
9. P. 197, 10th line: "overestimation"? Underestimation?
10. P. 198, 19st line and Table 3: If the indices values in Table 3 include non-rainy-days, it is requested to make a similar table that excludes non-rainy-days to evaluate the model appropriately.
11. P. 199, 8th line and Table 4: If the indices values in Table 4 include non-rainy-days, it is requested to make a similar table that excludes non-rainy-days to evaluate the model appropriately.
12. P. 200, 6th line and Figure 10: The forecasting results appeared in Figure 10 would be evaluated with some indices such as RMSE to assess matching spatial distributions at each lead time so that a reader can easily understand the performance of the model.
13. P. 201, 28th line: "Based on ... " The authors would need to show more evidence to conclude the proposed ANN model is "an appropriate predictor".

Technical corrections

P. 193, 26th line: Coulibaly *et al.*

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 183, 2008.

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