

Itemized Replies to Dr. F. Yusof's Comments

5 This is the response to the comments by Dr. F. Yusof (Nonlin. Processes Geophys. Discuss., 1, C367–C368, 2014) on our manuscript NPGD, 1, 841–876, 2014, titled “An improved ARIMA model for hydrological simulations”.

Major Issues

10 *The authors proposed an improved ARIMA model which has higher prediction accuracy than the other conventional ARIMA model as they discussed. Clustering analysis was first applied to the monthly data to group the months with similar hydrological variation. Three data sets corresponding to maximum, minimum, and truncated mean were extracted from each class for ARIMA modelling. However, the architecture of the methodology involves building linear regression model, can the authors clarify to readers the link between the two techniques.*

15 **Response:** In order to incorporate this comment, we detailed Section 3 and Section 4.3 significantly. We illustrate the basic framework of the present approach as follows. First we cluster the time series into several classes (3 classes in the case study) using clustering analysis. For each class, its maximum, mean, and minimum data of each year are identified as characteristic variable of this class. A set of linear regression models are then fitted for the monthly precipitation of each month. For example, precipitation of January, 2001, is regressed as
20 a linear function of the maximum, mean, and minimum precipitation values of Class 1. At this point, the ARIMA model has not been used yet. For each class, ARIMA models are built for each of the three characteristic variables, namely the maximum, mean, and minimum data series of the hydrologic parameter. We predict the maximum, mean, and minimum value of each monthly precipitation in all classes using the built ARIMA models. We finally substitute the
25 predicted maximum, mean, and minimum values of each class into the linear regression model we developed before for the monthly precipitation for each month and estimate their values.

Minor

30 1. In line 11 page 843- “A hydrological time series $\{f(t) \ t = 1, 2, \dots, n\}$ can be divided into stationary and nonstationary: : :”, the statement might be confusing to a layman because of the word “divided”, -paraphrase.

Response: Thanks for pointing out this issue. We just rephrased the statement as “A hydrological time series $\{y_t, \ t = 1, 2, \dots, n\}$ could be either stationary or nonstationary.”

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2. In line 22 page 844 – better write P as seasonal autoregressive parameter.

Response: Thanks for the correction. Just corrected the text.