

Interactive comment on “The role of retrospective weather forecasts in developing daily forecasts of nutrient loadings over the Southeast US” by J. Oh et al.

Anonymous Referee #1

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This paper develops a model for predicting water quality based on a k-nearest neighbor (k-NN) model and a nutrient load estimation (LOADEST) model. The modeling consists of two steps. Step 1 forecasts daily streamflow by the k-NN resampling approach; Step 2 forecasts total nitrogen loadings based on streamflow forecasts and LOADEST.

Generally, the paper is well-written and the methodology is clearly presented. However, there are major concerns with regard to the contribution of the paper:

Firstly, application of the model is quite limited. Nutrient loadings have been a major concern in agricultural and environmental engineering because of human use of fertil-

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izers. On the other hand, for undeveloped basins, water quality is usually quite good and nutrient loading is not a problem. Given that the model can only be applied to undeveloped basins, it is concluded that the paper tries to but actually fails to address the important issue of nutrient loadings. To make it a solid contribution, the paper should develop a model for river basins subject to human interferences.

Secondly, the simple combination of two models doesn't present a novel contribution. The model for nutrient loading forecast is based on the k-NN model and the LOADEST model, which are classical models and have been applied to many cases. To make the model combination a solid contribution, the paper should exploit the models and derive some new understandings, e.g., structural relationships between daily streamflow and nutrient loading.

Thirdly, besides daily streamflow, nutrient storage in the river basin is another key determinant of nutrient loading. This paper didn't consider this issue in nutrient loading forecast. Notably, the statistical models k-NN and LOADEST are based on historical samples, and the underlying assumption is "stationarity". However, nutrient storage can vary with time and is greatly affected by human interferences. How to consider this kind of non-stationarity in the statistical model?

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