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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Modeling the Potential Impacts of Climate Change on the Hydrology of Selected Forested Wetlands in the Southeastern United States" *by* Jie Zhu et al.

Anonymous Referee #1

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This study uses a linear regression model to estimate future water table changes in five forest sites in Southeastern US. The topic is interesting. However, this study lacks of innovation in climate change impact assessment. Besides the simple regression model, there are critical issues/errors in the methodology (see major comments). Please find my detailed comments below.

Major Comments

1. In fitting the regression model, water table at the current time step is the dependent variable while water table at the previous time step is included as one of the independent variables. This is not reasonable given the potential autocorrelations between current water table and antecedent water table especially at the daily scale. In fact,

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the unbelievably high R2 value of 0.97 in predicting water table at the LP site could be due to the inclusion of antecedent water table in the statistical model. What's more, how can future water table be predicted by the statistical model which requires inputs of antecedent water table conditions?

2. There are major issues related to the short calibration and validation periods for the statistical model. For example, two years of data is used for fitting regression model for the AR site while one year is used for validation. I am wondering whether climatic conditions in the validation year is significant different from the calibration year? Future climate especially for the later periods of 21st century would be quite different from the calibration periods based on which the regression model is constructed. Therefore, the historical relations trained from such a short time period may not hold in the future with significant changes in climate.

3. The downscaled GCM climate should be validated for the baseline period in the study sites before it can be used for future predictions.

Minor Comments

1. In Section 80, RCP stands for "Representative Concentration Pathway" rather than "Regional Concentration Pathways"

2. Hamon's equation is selected for estimating PET. Justifications on this should be added.

3. In section 130, the estimated PET is adjusted to match "realistic" PET values for forests. What are the realistic PET values for forests?

4. The climate for the baseline period is based on observations or GCM simulations?

5. A table with a brief description of the GCMs should be added.

6. This study focus on the projection of water table depth at five forest sites. The title should mention "water table depth" rather than "hydrology" which is a broad concept.

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