Hydrol. Earth Syst. Sci. Discuss.,
doi:10.5194/hess-2017-215-RC2, 2017


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 #2**

Received and published: 17 May 2017

General Comments

The discussion paper uses an empirical approach to determine hydrological effects on climate change for 5 wetland types in the southeastern U.S. The paper generally has scientific significance in that it tries to address uncertainties associated with climate change, and the overall structure of the paper is clear and concise. However, the paper lacks rigorous evaluation of the model and results. The general model structure appears flawed (see comments below), and model results are seemingly taken at face value. For example, the authors do not address a major source of uncertainty associated with climate change: water use efficiency (WUE). Climate change is associated with increases in CO2, not just temperature, and increased CO2 is known



Printer-friendly version

Discussion paper

to increase WUE, which would have major implications for the results presented here. There was also little consideration given to changes in water availability for vegetation, which drives actual ET. Additionally, the graphics and tables were lacking in quality and readability, and should be revised. There were many typographical and grammatical errors. Overall, this paper needs major revisions.

Scientific Comments

Line 78-79: Why is Greenberg et al. (2015) referenced here without discussing how it "satisfactorily" used an empirical model? All you say is that they used one.

Line 158-159: It is not clear what the rationale is for using lagged water table as an independent variable? It seems clear that the most recent water table value will be highly correlated to the water table now. Is this just using autocorrelation as a covariate? Consider revision.

Line 160: It seems like an autocorrelation covariance structure should be used given the time-series nature of the data.

Line 176: Water loss is also controlled by net groundwater flow, but more importantly by vegetation access to water and vegetation water use efficiency (WUE), which are not accounted for in the model. And because we know that WUE is strongly influenced by CO2 concentrations, this appears to be a major deficiency in the model.

Line 186-195: Did you also test for assumptions of normality of residuals and homoscedasticity of residuals? If you did not take into account autocorrelation of covariance it is likely that these assumptions may be violated.

Lines 196-199: What did you find with Durbin's h? Did it support autocorrelation or not?

Line 234-236: Are these estimates for changes to PET based purely on temperature changes? This seems important to note.

Line 270-271: This sentence is the opposite of what is suggested by the figure and is confusing to interpret.

Lines 272-279: This section is very difficult to understand, especially trying to reconcile with figures. Suggest re-writing.

Lines 283-285: Where are the R2 values coming from? Are these ratios of R2 to other sites? Clarification needed.

Line 288: Did you statistically test that the model coefficients were similar? They do not seem too similar to me. . .

Where is the discussion of how the model did not perform well? The model appears to be much flashier and tends to overpredict relative to observed data? RMSE or some other metric would be useful as a comparison.

Technical Corrections

Line 56: ". . .and more powerful hurricanes landfall." Word choice here is awkward.

Line 58: "process-based study" should be "process-based studies"

Line 70: add "and" before ". . .their potential uses. . ."

Line 73-75: This sentence needs revision for clarity and grammar.

Line 75: "Performance such type of models. . ." a word is missing.

Line 84: change "increased" to "subsequent increases"

Line 88: There is an extra "s" after the parentheses

Line 289: change "higher" to "lower"

Line 387: Missing a word in "Climate change from single has been used. . ." and "we-talnd" is misspelled.

Line 625: Table 1 should have consistent formatting for each of the data in columns

for ease of comparison. Consider a more generic description of soils instead of series names.

Line 670: Figure 3(d) what is meant by the orange dots?

Line 680 and 685: Figures 4 and 5 are begging to have significance letters attributed to each boxplot.

Line 685: Figure 6 – These axes should be flipped for ease of interpretation. Also fix the legend so it doesn't look like it was drawn by hand. Consider changing the x-axis label and putting the site name in the figure panel itself.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2017-215, 2017.



Printer-friendly version

Discussion paper