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Hydrology and Earth System Sciences
Discussions



# *Interactive comment on* "Predicting future US water yield and ecosystem productivity by linking an ecohydrological model to WRF dynamically downscaled climate projections" *by* S. Sun et al.

**Anonymous Referee #1**

Received and published: 5 January 2016

The paper entitled "Predicting future US water yield and ecosystem productivity by linking an ecohydrological model to WRF dynamically downscaled climate projections" by S. Sun et al. evaluated future climate change impacts on the evapotranspiration (ET), water yield (Q), and gross primary productivity (GPP) in the Conterminous US. The manuscript is fairly well written. The preliminary manuscript tells the full story of how the future climate scenario (i.e. A2) would likely affect ET, Q, and GPP in the Conterminous US. In my view, however, the analyses are not adequate.

Here, I have provided a number of comments for the authors to consider. 1. Like other modelling studies regarding climate change effects on water and carbon balance, the



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authors compared the hydrologic and carbon variables (e.g. P, ET, Q, and GPP) between the two periods. The differences in the variables between the two periods were caused by the climate change in your study. The results are not exciting, except for the combination of climatic and hydrological models. Further analysis, I think, can improve the readership and impact of this manuscript. I suggest the following two points for the authors' c. a. The preliminary comparisons were made based on HUC level. Those analyses were critical, for example, for each WRR. The results can also be further summarized based on the land cover and climatic zones and other variables. By doing this, could gain more information on how ET, Q, and GPP performed at each land cover, climate zones or other criterion in US. b. The authors compared the impacts of climate changes on each variable at different HUC level. As we can see from the results, different watersheds respond differently. Besides the spatial variabilities of the climate between HUC scales, the simulation results, in my opinions, offer a chance to evaluate how watershed characteristic (e.g. slope, land cover, etc.) affect the results. For example, the authors could investigate how ET, GPP, and Q changes respond to land cover, slope, etc. For simplicity, those relationships can be built as multiple regressions at annual step. Perhaps the relationships may not be strong, but any statistical relationship serves as supportive information for water resource management. For example, how does the ET and GPP change in forest and grass lands under different climate conditions?

2. The author mentioned watershed scale in the manuscript (e.g. last paragraph of introduction) for several times. Can you specify the watershed scale? Do you mean the spatial scale at the 12 digit HUC scale? 3. The reference style needs to be reformatted.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 12703, 2015.



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