

Interactive comment on “Comparative analyses of hydrological responses of two adjacent watersheds to climate variability and change scenarios using SWAT model” by Sangchul Lee et al.

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In this study, the authors investigated SWAT simulations of water and nitrogen fluxes under changing climate conditions in two adjacent watersheds. This is an important topic since climate change would significantly alter hydrological and biogeochemical processes, and thus challenge our ability to maintain sustainable water resources. The authors conducted systematic analyses of model simulations. However, I have several key concerns about this work. First, purpose of the study design is not clear. I assume the authors were planning to isolate the individual impacts of co₂, temperature,

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and precipitation, and the GCM simulations were to quantify the interacting impacts of the climate factors. However, if this is the purpose, the GCM simulations were not necessary because the authors can simulate the interacting effects in the sensitivity simulations by combing climate factors. In addition, CMIP3 data were used in the future climate scenario simulations, instead of the latest climate projections of CMIP5. Using the out-of-date climate data make the projections unnecessary. Second, discussions were not sufficient. I cannot agree with the authors that increased N export resulted from litter input. Forest is an important land cover in both watersheds. However, the authors only focused on cropland, but paid insufficient attention to forests. Here are specific comments. Line 73 cycle -> cycling Line 87, missing space 17 and Line 98, this paragraph is too long. Consider to split it to two. Line 104, do you mean their investigation was not spatially-explicit Line 123, are conductive Line 126, remove 'areas of' Line 133, would -> are expected to Line 135-140, this paragraph repeated what you stated in the previous paragraph. Consider to reorganize it, or delete it. Line 146, effects-> impacts Line 147, climate change scenario does not include changes in co₂, precipitation and temperature? Line 166, should cite the figure after insert to the text Line 173, results-> result Line 194-195, this sentence is not necessary Line 197, does leaching occurred with the previous three water fluxes? Line 211, should make clear why present equation 2 here, since it is similar to equation 1. A bit confusing here Line 233, what is grab sample? Line 250, to my understanding lots of key swat processes have a daily step. How did you conduct your simulation at the monthly step Line 278-297, I suggest to add more information how temperature and precipitation change scenario were prepared. Line 365, represented -> presented Line 369, is ET increase here comparable with other studies? Line 381-382. This does not make sense. N in litter were originally from inorganic N in soil. Increased litter means more uptake of inorganic N from soil, which decrease inorganic N in soil. Attribution of the increased N export resulted from the increased litter inputs were groundless. Line 412, I am wondering why denitrification, which is sensitive to temperature, is not considered in explaining changes in N load Line 529-530, how do you know fertilizer use will

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increase? –

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