

Interactive comment on “Evaluation of surface properties and atmospheric disturbances caused by post-dam alterations of land-use/land-cover” by A. T. Woldemichael et al.

Anonymous Referee #2

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The authors employed the use of a regional climate model to identify the effects of dam and irrigation related LULC change. One control scenario, and two theoretical scenarios were run. Precipitation, surface temperature, turbulent heat fluxes, wind, atmospheric water vapor, and soil moisture fields were analyzed, as well as planetary boundary layer development, in an attempt to identify the modification of LULC dependent land-atmosphere interactions. This study provides a useful follow up to Woldemichael et al. (2012, 2013) papers, which analyzed modification of extreme precipitation during the same study period. The paper fits well within the scope of the journal, and a clear objective and precedent is outlined.

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It is unclear if all scenario simulations are initialized with the same data, and “nudged” using data assimilation towards the same observations? Or was this only used on the control run? It is not clear to me after reading this paper, as well as two other publications from the same group discussing these same simulations, whether or not any spin-up would be required for these theoretical cases. Fields derived from the NCEP/NCAR Reanalysis are inherently tied to the contemporary LULC scenario. Similarly, it seems that the data assimilation could further exacerbate this problem, as forcing the model to towards observations that are dependent on a different LULC could mask any feedbacks that would otherwise be present. Further evidence and discussion about why these methods were employed is necessary.

The authors present an interesting discussion of CAPE development conditioned on the different scenarios, but Fig. 12 and Fig. 13 only show results from the control case, and no direct comparison of CAPE between the simulations is made.

The results are presented very well in the figures, but the discussion could be more developed. The discussions of Fig. 5 and 6 are based on the maximum differential of the variables, but the spatial patterns, and variability are not thoroughly discussed. In order for the conclusions to be made clearly, a more robust numerical analysis would be helpful.

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