

Interactive comment on “Investigating the impact of land-use land-cover change on Indian summer monsoon daily rainfall and temperature during 1951–2005 using a regional climate model” by S. Halder et al.

Anonymous Referee #2

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This study, the authors investigate the impact of land use land cover change over Indian region on the change in the moderate rainfall events and surface temperature using a regional climate model. Four sets of experiments are performed, with pre and present LULC, and with/without the impact of SST trend. In questions posed in the manuscript is important in terms of understanding the variability in Monsoon and is adequate to address through a small study like this. The results are also positive. However, there are some limitations in the experimental designs those need to be addressed before this can be accepted for publication.

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1. This study uses a regional model, where the lateral boundary condition is provided from reanalysis data, from 1982-2008. The surface boundary condition (over ocean) in the PLC and HLC experiments are also from Reynolds SST during the same period. This makes the model simulations transient in time and any change such as LULC will need time to get into equilibrium. Ideally, such a study need to be done in a global modelling framework with fully coupled components. Or, even to avoid a transient simulation, the boundary conditions can be repeated (e.g., climatology) for several years to get ensemble simulations at equilibrium.
2. The prescription of the boundary conditions virtually imposes the the remote impact over this region to the present climate scenario (1982-2008). Therefore, the impact seen between HLC and PLC simulations are really only local impact, which might get enhanced or even eliminated when remote feedback is present.
3. In the detrended SST experiments, SST trend is removed only over Indian Ocean (the domain of the model). Therefore, these experiments do not include the impact of change in SST over other regions like the Pacific or Atlantic Oceans, where multi-decadal oscillations is SST are observed.

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