

Interactive comment on “Quantifying the contribution of land use change to surface temperature in the lower reaches of Yangtze River” by Xueqian Wang et al.

Anonymous Referee #1

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General comment:

Land use/cover change (LUCC) has been known as one of the most important anthropogenic forcings to local and regional climate change. LUCC, resulting in the changes of land surface parameters such as albedo, Bowen ratio, surface roughness, and aerodynamic resistance, could induce the variations of surface heat fluxes, and ultimately change land surface temperature. Most previous studies of LUCC focused on modeling land surface processes, but the uncertainties in climate models limit our understanding of its impacts. However, few researches have used the field measurements for different types of land use to investigate the biophysical mechanisms behind LUCC.

Using in-situ data from three sites with different land cover types and the attribution

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method proposed by Lee (2011), this study quantified the contributions of different land surface parameters and background climate to the changes in land surface temperature over cropland, grassland and urban area. This paper is well organized, with some interesting results. However, some of the analyses seem not so solid and need further revisions. I would recommend it to be published with minor revisions as specified below.

Specific comments:

- (1) It would be helpful if more quantitative information can be provided in the “Abstract”.
- (2) It would be meaningful to show the site locations and the spatial distribution of land covers over the lower reaches of Yangtze River.
- (3) Page 2, Line 24: should be “weakening related precipitation”.
- (4) Figure 1: what do the lines of error bar indicate? How to calculate the uncertainty of temperature change?
- (5) As shown in Figure 2, the albedo in grassland is different from that in cropland, especially in June. This could lead to different energy distributions in these two sites, eventually the changes in surface temperature. However, Figure 3 shows that the contribution of surface albedo to the temperature changes over cropland is the least. Why?
- (6) This study suggested that the effect of evaporation cooling dominates the change in surface temperature. However, some studies based on Lee’s method reported different findings in other regions. It is worth comparing the results of this study with previous ones.
- (7) Eq (2): ΔS used in the calculation is the difference of net shortwave radiation between managed site and grass site. Is this mismatched?
- (8) Page 5, Line 16: the authors only show the differences in surface temperature. No

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more information on other atmospheric variables (e.g., humidity, precipitation) is given. It could not indicate that “extremely warm and dry condition in April and July was more evident in urban area than at the grassland site”.

(9) Page 5, Line 4: It isn’t reasonable to state that “Bowen ratio decrease when there is sufficient soil water content”, since other factors also can change Bowen ratio.

(10) Page 6, Line 15: The sentence “The largest differences in aerodynamic resistance between grassland and urban area and that between grassland and cropland. . .” seems to be contradictory to Figure 2.

(11) Page 6, Line 28: “observed T_s ” and “calculated T_s ” should be “observed ΔT_s ” and “calculated ΔT_s ”. Figure 3 shows the differences in T_s , not the original values.

(12) It would be helpful to change T_s and T_a to T_s and T_a .

(13) Please change Lee or Lee (2011) to Lee et al. (2011).

(14) Figure 3: It would be better if the scale ranges of y-axis were the same.

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