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Discussions

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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.

Xueqian Wang et al.

guowd@nju.edu.cn

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Response: We would like to thank the referee for providing the insightful suggestions, which indeed help us reconsider and further explore the underlying problems in quantifying the relative contributions to local surface temperature change in the lower reaches of Yangtze River. In the revised manuscript, we have added more clear descriptions on data selection and mechanism analysis to better understand the effects of different land conversions on climate change. The revisions corresponding to each specific comment are tracked in the marked-up manuscript respectively.

Specific Comments:

1.To my understanding, terms in Eq. (2) are originally at the interval of every half hour, then averaged as the monthly mean. Please add more details to let us know how you select the data, especially the land surface turbulence data. Some descriptions on the details of monthly mean value in Fig.2 are also needed; Response: We used the selected data at half-hour intervals to obtain the daily averages of albedo, Bowen ratio and aerodynamic resistance. Then we calculated their contributions to ΔTs based on Eq. (2) and made a discussion on monthly scale.

Quality assessment/quality control of land surface turbulent data is crucial for the reliability of results achieved from observations of surface fluxes. In our manuscript, we adopted the ITC approach proposed by Foken et al. (2004) to select well-developed land surface turbulent data. We added the details of data selection and calculation in the section of Data and Method.

We averaged the daily values to discuss the monthly variations of different factors. Different land surface types have different surface color, permeable rate, heat content and surface roughness, which results in the different properties and impacts in the land-atmosphere interaction. Human modifications in the urban area make it more obviously different from that in grassland and cropland, especially in the surface roughness. Some human activities also make the special case in the cropland, like the extremely low albedo in June due to the straw burning. More details of monthly mean value in Fig.2 has been discussed in the part of section 3.2.

2. P4L9, "parent", should be "apparent"; Response: It has been corrected in P6L1.

3.P6L28,29,30, "Ts" at X axis of Fig.3 should be delta_Ts; Response: Thanks. We have replaced it P9, Line18-21.

4.Is it suitable to regard "Bowen ratio" as a land surface parameter? Or it is more likely to be regarded as a kind of land surface characteristics? Considering the fact that changes of evaporation in cropland are mainly affected by human activities like irrigation, Bowen Ratio may reflect some characteristics of underlying surface rather than

a single parameter. Attentions should be paid to this issue throughout the analyses section of the paper. Response: Accepted. This study attributes surface temperature change to different factors. Albedo represents the effect of radiative forcing, Bowen ratio and aerodynamic roughness represent the effect of energy distribution together. It is true that Bowen ratio is not just a single parameter. It reflects the characteristics both associated with the water content and temperature difference between land and atmosphere. We have changed it as a "factor" that effects on ΔTs in our revised manuscript.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/acp-2016-1013/acp-2016-1013-AC2-supplement.pdf

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