

# ***Interactive comment on “Comparison of land-atmosphere interaction at different surface types in the mid- to lower reaches of Yangzi River Valley” by W. D. Guo et al.***

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General comments:

This manuscript revealed the differences of land-atmosphere interactions in four typical land cover types (Urban surface, Suburban surface, Grassland surface and Cropland surface). It is well organized and written. I suggest this manuscript for publication in Atmospheric Chemistry and Physics after some minor revisions and corrections.

1. DX-Urban and XL-Suburb terms in the manuscript are suggested to replace corresponding DX and XL terms, and then land cover type will be distinguished more easily like LS-crop and LS-grass terms.

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2. Nighttime surface/air temperature differences are mainly emphasized in the manuscript, but daytime surface/air temperature differences are rarely discussed. From Figure 3, we can see that daytime urban site surface/air temperature is lower than sub-urb site or grass site, it is just the opposite of the existing results based on remote sensing LST data and meteorological station data, extra explanations or discussions about the contrary daytime surface/air temperature results are needed in this paper. Following existing publications are recommended for reference:

Liu, S., Jiang, R., Wang C. Wang Y.: Observation analysis on spatial and temporal distribution characteristics of summer urban heat island in Nanjing (in Chinese), *Trans Atmos Sci*, 37(1): 19-27, 2014

Zeng, Y., Qiu, X. F., Gu, L. H., He, Y. J., Wang, K. F.: The urban heat island in Nanjing, *Quaternary International*, 208(1), 38-43, 2009.

Zhou, D., Zhao, S., Liu, S., Zhang, L., Zhu, C.: Surface urban heat island in China's 32 major cities: Spatial patterns and drivers, *Remote Sensing of Environment*, 152, 51-61, 2014.

3. Similar descriptions or explanations such as “albedo decrease with the growing of vegetation” are mentioned in the manuscript many times, for example: Page15, line2-3, line9-10 and line12-14, etc. It is not appropriate for this paper in my opinion. Firstly, it can be seen that albedo increase with growing of the paddy rice from Figure 11, and this fact is mentioned in Page15, line5-7. Secondly, relations between albedo and vegetation fraction is not fixed, albedo may increase with the growing of vegetation according to existed studies. Therefore, descriptions or explanations such as “albedo decrease with the growing of vegetation” should be used with caution in order to avoid misleading the readers. Please refer the following papers:

Gao, F.: MODIS bidirectional reflectance distribution function and albedo Climate Modeling Grid products and the variability of albedo for major global vegetation types. *Journal of Geophysical Research*, 110, D01104, 2005.

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Rechid, D., Raddatz, T.J., Jacob, D.: Parameterization of snow-free land surface albedo as a function of vegetation phenology based on MODIS data and applied in climate modelling. *Theoretical and Applied Climatology*, 95, 245-255, 2009.

Wang, K., Liang, S., Schaaf, C. L., Strahler, A. H.: Evaluation of Moderate Resolution Imaging Spectroradiometer land surface visible and shortwave albedo products at FLUXNET sites. *Journal of Geophysical Research*, 115, D17107, 2010.

Specific comments:

1. Page11, line19: USR should be DLR, USR is affected by albedo, not clouds and aerosols in the atmosphere.

2. Page12, line15-18: It is hard to understand USR at the LS-crop site is smaller in the summer than in the spring as a result of albedo increase(line17-18), I think it is a mistake. The phenomenon that albedo at the LS-crop site in summer is smaller than that in spring can be seen clearly in Figure 12. The sentence “where surface albedo increases in the summer due to the decreased vegetation cover fraction” is also hard to understand, because vegetation cover fraction is supposed to increase with the paddy rice growing in summer, please explain this sentence more.

3. Page12, line18-19: The meaning of the sentence “As a result, the USR decreases by 90.35, 84.79, 59.49 W m<sup>-2</sup> at the LS-crop, XL, and DX sites respectively.” is apparently not corresponding to the Figure 6c, and LS-crop should be LS-grass because LS-crop is analyzed before. At LS-grass, XL and DX sites, USR all increases? Please confirm it.

4. Page16, line19-22: roughness lengths are not right according to Figure 13 and Figure 14, please change “0.05m, 0.02m, and 0.17m” to “0.02m, 0.05m, and 0.17m”.

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