

Response to Referee #2

The comparison studies for data analysis from paired observational sites under same (or similar) climate background could reveal the differences of energy budgets which resulted by land surface characteristics directly and quantitatively. The mid- to lower reaches of Yangtze Rivers is located within the East Asia Monsoon zone, and the mechanism of LULCC is complicated because of the interaction between the general circulation and human activities. The four surface types selected in this study are the most typical in the region. The paper is well organized and written, I suggest it will be published after some revision.

Response: We would like to appreciate the referee for providing the insightful suggestions, which indeed help us reconsider and further explore the the differences of land-atmosphere interaction at different surface types in the mid-to-lower Yangtze River valley. In the revised manuscript, we have added more clear descriptions on the location of the pair sites and comparison on physical characteristics with different land cover, as well as in-depth discussion concerning the mechanism.

Major comments:

- *A subplot is suggested to be added in Fig1, which content the location of 4 sites with satellite background. It will be better understanding than written-description.*

Response: Thanks. We have added the subplot in Figure 1. It will be easier for readers to know the location and surface types.

- *I also suggest the DX and XL are replaced by DX_urban and XL_suburb.*

Response: Accepted. “DX” and “XL” have been replaced by “DX-urban” and “XL-suburb” in the revised manuscript.

- *In P12, L1-2, this sentence should be present in part 2.3.1, after the variables description. Is there any more QA/QC consideration for eddy covariance data processes?*

Response: We rechecked the sentence in P12, line1-2, and there may be some misunderstandings. QA/QC is definitely a crucial issue for the proper use of eddy covariance data. In section 2.2, the QA/QC is mentioned as follows: “Strict correction and quality control (Foken et al., 2004) have been performed for all the turbulence measurements. Coordinate rotation correction (Wilczak et al., 2001), frequency

response correction (Moore, 1986), and WPL correction etc. are applied in this study.”

- *The approximate irrigation schedule should introduce in the part of LS_crop site description;*

Response: We have added the schedule of agricultural activities in the part of LS-crop site description in the part of LS-crop site description in P6, line 11-13.

- *In Fig 11. There exist obvious high correlation between albedo and precipitation for LS_crop and DX sites and low correlation between LS_grass and XL sites, I suggest the authors give some interpretation.*

Response: It is human activities that results in the high correlation between albedo and precipitation for LS-crop and DX-urban sites but not for LS-grass or XL-suburb sites. At urban site, roof of the building is nearly watertight, the waterlogging after raining leads to a high albedo in a short time. In cropland, the soil with sparse vegetation cover has high soil wetness during the growing season. When being covered by water after rainfall event, the albedo increases immediately. This phenomenon has been explained in the part of 3.3.1.

- *Page 16, L9-10, the variation for RH is mainly affected by synoptic system, it is hard to depict it varies with the Bowen ration and temperature.*

Response: Accepted. We rewrote this sentence in the revised manuscript. The variation of RH is not attributed only to vertical turbulent exchange, but also advection. Temperature and water vapor can not fully explain the change of RH in P16, line 18-23.