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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Area-averaged evapotranspiration over a heterogeneous land surface: Aggregation of multi-point EC flux measurements with high-resolution land-cover map and footprint analysis" *by* F. Xu et al.

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General comments: Due to surface heterogeneity, it has always been a challenge to validate remote sensing heat fluxes with field measurements. This paper proposed an aggregation scheme to derive area-averaged heat fluxes from multi-point EC measurements, combining multivariate regression and footprint analysis. It provides a new method to compare fluxes measured by EC with those either measured by LAS or modelled using satellite data, which was evaluated with a complete and valuable dataset-HiWATER. However, there are still several issues to be considered. To address the scientific problem in this paper, 30-min flux might be sufficient, given the uncertainty in gap-filling methods (rainfall, fog etc.). Daily regional ET (section 4.4) does not help a

lot here. Instead, it might be more necessary to clarify data quality and uncertainty of the EC and LAS measurements. Besides, P-M estimated ET could be removed.

Specific comments: Page 5 Line 24 ' following Fig .3' Since it is the first figure appearing in this article, it's better to change the number from 3 to 1. Page 6 Line 15 ' EC data from 16 towers. . .' According to section 4.2, in addition to site 3, sites 5/8/13/16 were also not used. It is better to use a consistent dataset through the paper. Page 6 Line 16 ' no irrigation' And how was the weather during this period? Page 6 Line 22 ' coordinate rotation' Why not use Planar Fit? Page 6 Line 13 'MOST' There are different solutions. Add either corresponding equations or references here. And how were roughness height and zero-plane displacement estimated? Page 6 Line 16 ' daytime. . .'. It's a bit confusing. Local time is better. For data quality control, what is the threshold value of signal strength? Section 2.2.2 This section could be abbreviated if the preliminary land cover has already been done by Liu and Bo(2015). Page 8 Line 11, specify the date of the google earth image. Page 8 Line 16-20, it might not be necessary to compare with PM- ET. The principle of that is the same as the comparison with LAS in terms of flux aggregation and there might uncertainty in PM-ET. Section 4.3 Page 15 & Page 16. It's better to look into the details to figure out the factors contributing to the bias between EC and LAS, instead of just mentioning 'heterogeneous distribution of surface covers'. Section 4.4 I didn't see the difference between Table 5 and 6 in terms of addressing the problem despite their different units.

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