

Reply to interactive comments on “Estimation of Hourly Land Surface Heat Fluxes over the Tibetan Plateau by the Combined Use of Geostationary and Polar Orbiting Satellites” by Lei Zhong et al.

Anonymous Reviewer #2

This is an integral work for estimation of land surface heat fluxes based on remote sensing data, reanalysis meteorological data, and in-situ observations. The derived land surface heat flux, more like a heat flux dataset, was evaluated using observations of six eddy-covariance sites on the Tibetan Plateau (TP). And then, the diurnal and seasonal variations of the heat fluxes were also analyzed. This is of general interest for the readers of this journal. The TP is notorious for its lack of meteorological observations, which cripples the predictive power of numerical models for this region. The land surface heat fluxes are crucial for understanding energy and water cycle and also are the boundary conditions for numerical weather and climate simulations. This paper provides an integral investigation for land surface heat fluxes over the TP which will help better understanding the land-atmosphere interactions over this region. More importantly, this paper is one of the very few works to estimate land surface heat fluxes over the TP using high temporal resolution geostationary satellite data. The manuscript is well organized. Numbers of work are integrated into this paper, and abundant discussions are presented as well. I suggest acceptance after a minor revision.

Author Response: We would like to thank Reviewer #2 for the positive and constructive comments. All your thoughtful comments and suggestions have been taken into account to improve our manuscript. Please find our point-by-point responses below.

(1) P1, L16: “which” → “where”.

Author Response: This item has been corrected. (P1, L16)

(2) P1, L18-19: Change the sentence to “However, the high temporal-resolution information about the plateau-scale land surface heat fluxes has lacked for a long time, which significantly limit the understanding of diurnal variations in land-atmosphere interactions.”

Author Response: Thank you for this detailed suggestion. The sentence has been revised. (P1, L18-20)

(3) P1, L20: “a” → “the”.

Author Response: This item has been corrected. (P1, L21)

(4) P1, L21: “with a spatial resolution” → “at a spatial resolution”.

Author Response: This item has been corrected. (P1, L22)

(5) P4, L9: *The sentence “These stations are the only stations currently available: : :...” is not accurate. I am quite sure that there are other eddy-covariance sites on the TP apart from the six stations mentioned in the paper.*

Author Response: Yes, you are correct. There are several other eddy-covariance sites on the TP. However, these sites belong to different institutes, and the data are not available to the scientific community.

(6) P7, Equation (11) and (13): “Hs” → “Hs”.

Author Response: These items have been corrected. (P7)

(7) P8, L4: *I do not think “Zhong et al., 2011” is a proper reference here. Perhaps you cite the paper which introduces the production of GLDAS data.*

Author Response: Thank you for this suggestion. Rodell et al. published a paper in BAMS in 2004 to introduce the GLDAS data. This reference has been added. (P5, L23)

(8) P8, L12: *Provide some references for “traditional polar orbiting satellite” to strengthen your argument.*

Author Response: Thank you for your constructive suggestion. The following references have been added. (P8, L23-24)

Ma, Y., Zhong, L., Su, Z., Ishikawa, H., Menenti, M. and Koike, T.: Determination of regional distributions and seasonal variations of land surface heat fluxes from Landsat-7 Enhanced Thematic Mapper data over the central Tibetan Plateau area, J.

Geophys. Res.-Atmos., 111, D10305, DOI: 10.1029/2005JD006742, 2006.

Ma W, Ma, Y. and Ishikawa, H.: Evaluation of the SEBS for upscaling the evapotranspiration based on in-situ observations over the Tibetan Plateau, Atmos. Res., 138, 91-97, 2014.

Zou, M., Zhong, L., Ma, Y., Hu, Y., Huang, Z., Xu, K., and Feng, L.: Comparison of two satellite-based evapotranspiration models of the Nagqu River Basin of the Tibetan Plateau. J. Geophys. Res.-Atmos., 123, 3961–3975, DOI: 10.1002/2017JD027965, 2018.

(9) P10, L23: *“land-atmosphere heat flux data”* → *“land surface heat flux data”*.

Author Response: This item has been corrected.(P11, L14)

(10) P10, L24: Delete *“using a combination of geostationary and polar orbiting satellite data”*.

Author Response: This phrase has been deleted.

(11) *The English need substantial improvement. Please find a native speaker to help you to polish the manuscript.*

Author Response: According to your suggestion, the revised manuscript has been edited by a native English speaker.