Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
https://doi.org/10.5194/acp-2022-451-RC1, 2022

Comment on acp-2022-451

Anonymous Referee #1

Referee comment on "An assessment of land energy balance over East Asia from multiple lines of evidence and the roles of the Tibet Plateau, aerosols, and clouds" by Qiuyan Wang et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-451-RC1, 2022

This paper investigated the land energy balance over East Asia using several data, like surface observation data, satellite data, reanalysis data, and CMIP data. Results are interesting and indicate that a larger shortwave radiation of 5.2% is reflected and smaller shortwave absorption of 0.6% is estimated. In addition, cloud radiation effects (shortwave, longwave at the surface, atmosphere, and TOA) are also evaluated. Overall, this manuscript is clear. This study is of great significance to improve the new understanding of energy balance in East Asia. However, there are several issues that need to be taken care of before this paper becomes acceptable for publication.

Specific comments:

In Figure 6, the surface energy is not balanced due to the lack of sensible heat flux and latent heat flux values.
In Figure 7, the Spatial distributions of annual mean SSR biases derived from CERES, CMIP6 and ERA5 are both overestimated in the high value region, please try to explain the reason.
The radiative effects and radiative forcing of aerosols are rarely discussed in this paper. How to distinguish the radiative effects of clouds and aerosols under the All-sky situation?
The authors emphasize that the fewer low clouds due to the TP are very likely the causes for the smaller fraction of East Asian land surface downward longwave radiation. Is the conclusion that there are fewer low clouds over the TP consistent with the actual situation?
L573, why do you select ERA5 surface LW radiation as the reference? Why not choose CERES-EBAF as the reference?
It is better to introduce relative research (e.g., Li et al., Xu et al., Letu et al. 2022) in the introduction part.

Li, M., Letu, H., Peng, Y., Ishimoto, H., Lin, Y., Nakajima, T. Y., ... & Shi, J. (2022). Investigation of ice cloud modeling capabilities for the irregularly shaped Voronoi ice

scattering models in climate simulations. Atmospheric Chemistry and Physics, 22(7), 4809-4825.

Xu, J., Liang, S., & Jiang, B. (2022). A global long-term (1981–2019) daily land surface radiation budget product from AVHRR satellite data using a residual convolutional neural network. Earth System Science Data, 14(5), 2315-2341.

Letu, H., Nakajima, T. Y., Wang, T., Shang, H., Ma, R., Yang, K., ... & Shi, J. (2022). A new benchmark for surface radiation products over the East Asia–Pacific region retrieved from the Himawari-8/AHI next-generation geostationary satellite. Bulletin of the American Meteorological Society, 103(3), E873-E888.