

Earth Syst. Sci. Data Discuss., referee comment RC1
<https://doi.org/10.5194/essd-2022-335-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on **essd-2022-335**

Anonymous Referee #1

Referee comment on "A global historical twice-daily (daytime and nighttime) land surface temperature dataset produced by Advanced Very High Resolution Radiometer observations from 1981 to 2021" by Jia-Hao Li et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-335-RC1>, 2022

This manuscript proposes a long-term (1981-2005) AVHRR land surface temperature (LST) dataset that includes outcomes at both daytime and nighttime. The algorithm is the generalized split-window (GSW) algorithm while in the production, this dataset also considered annual land cover change. Overall, the accuracy of the proposed dataset is promising, and it filled the gaps regarding long-term global LST datasets, especially at nighttime. Therefore, I would recommend it be published on ESSD after a major revision.

Major:

- Positive bias issue. Based on site validation and inter-comparison with MYD11 and the other two AVHRR LST products, the proposed GT-LST shows a clear positive bias (>1 K) nearly in all results. The authors claim the bias is due to the emissivity difference (Line 370), however, the proposed GT-LST has a clear bias than the other three products, and it seems that the emissivity used by GT-LST is not accurate. The authors mention that the dataset will be calibrated to remove the bias in the future (Line 436). I am thinking if it would be better to solve this issue in this paper as it doesn't need to be done in a separate paper.

6) Fig10: I would suggest changing Fig10 to another format: consider RMSE and bias as the two dimensions of the plot, and mark each dot by their names as using color to show the bias is not easily quantified.

7) Line 357: why do savannas and cropland show considerable bias?

Minor:

Line 35: Some of them used surface air temperature rather than LST to detect climate change and it should be not mixed.

Line 71: remove 'the'

Line 94: polar-orbiting

line 101: the first

Line 179: Especially

Line 298: identifier

Line 301: difference

Line 317: due to -> because

Line 327: RMSEs

Line 403: remove `in`

Line 404: `due to` should be followed by a noun rather than a sentence, suggest revising the whole manuscript for this issue.

Line 411: considers

Line 446: open-source

Line 451: cloud mask