

Reviewer 1 response:

I am pleased to see that all of my comments and suggestions were taken onboard. The manuscript is much more solid now. The option to limit the analyses to clear-sky only scenes (to the greatest extent possible) was sensible and makes the intercomparisons fairer and easier to explain. The inclusion of the SST dataset also increased the robustness of the results. The caveats of the analyses are now more explicit. I am happy to recommend this manuscript for publication.

Thank you!

Just a couple of minor comments:

- L348- RMSE values are between 2 and 3 for the datasets expect for LST CCI. -> correct to “except”

Done

- There is one new sentence that I consider as a key limitation of the usage of Skin Temperature as a climate indicator: “The stronger negative anomalies in IASI during 2020–2022 are consistent with the La Niña period, during which increased cloudiness in the tropics reduces the availability of clear-sky retrievals, causing the IASI global mean to be cooler.” – i.e. some observable global anomalies are just a result from differences in sampling due to differences in cloud occurrence, rather than observed temperature anomalies. We are seeing less warm pixels in El Niño years, not a cold anomaly. I think this should be highlighted as a key finding/limitation in the “Conclusions/ discussions”.

The following sentence (in red) has been added to this paragraph in the conclusion:

“Over the ocean, inter-dataset biases are smaller than over land and generally remain below 1 K, with RMSE near ~1 K. Discrepancies increase toward high latitudes, where cloud detection, sea-ice contamination, and reduced thermal contrast degrade infrared retrieval sensitivity (Whitburn et al., 2022). A further caveat concerns clear-sky sampling: the stronger negative IASI anomalies during the 2020–2022 La Niña partly reflect reduced clear-sky retrieval availability under increased tropical cloudiness, rather than a true surface cooling — a reminder that global-mean anomalies from clear-sky-filtered T_{skin} records can be modulated by cloud occurrence and sampling changes, and should be interpreted with this in mind when used as a climate indicator.”