The Cryosphere Discussions

The Cryosphere Discuss., referee comment RC2
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Comment on tc-2021-38

Christopher J. Merchant (Referee)

Referee comment on "Deriving Arctic 2□m air temperatures over snow and ice from satellite surface temperature measurements" by Pia Nielsen-Englyst et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-38-RC2, 2021

General Comments

This is an exceptionally well-written contribution; if only all papers were so clear. The datasets collected seem very comprehensive, and the careful attention to uncertainties in satellite estimates is a strength, as is the good practice of independent validation of both the data and the data uncertainties. The value of this observational effort (compared to just taking re-analysis outputs) is demonstrated. The conclusions are well supported by the discussion.

Specific Issues

8.5 - Why should surface melting situations necessarily be excluded? How common is the situation of the (wet) skin temperature being > 5 deg compared to it being a wrong observation? I guess this is explained more in the reference, but perhaps a little more comment here would be justified.

Figure 4 includes open ocean areas, so this presumably is the SD of any surface present not of specifically ice surfaces, despite the wording of 8.12?

"Daily mean" surface air temperature data from weather stations are often actually the mean of the daily max and daily min reported. Is that the definition applied to the in situ data in section 3.1 here?

Technical / editorial

1.10 - unnecessary hyphen after weather
1.11 - meter -> metre and also throughout eg 8.25 etc; reserve "meter" for an instrument
2.23 - micron -> micrometre
Figure 4 caption: not totally unambiguous what calculation this is, but I think it is the SD for the named month of each year, then averaged over years?
12.3 -- explain "theoretical shortwave radiation" -- is this top of atmosphere to give seasonality?