

Interactive comment on “In situ observed relationships between skin temperatures and 2 m air temperatures in the Arctic” by Pia Nielsen-Englyst et al.

Anonymous Referee #1

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This is an excellent paper and it was a pleasure to review. In this paper, the authors provide detailed data and discussion about the differences between T_{skin} and 2-m surface temperatures over a variety of Arctic surfaces. They have done a thorough literature review and their work builds on previous work and fills in many important gaps. They quantify differences in temperature under different cloud cover conditions and in different seasons. The authors correctly state that this information is very important to understanding satellite-derived surface temperatures in the Arctic.

There are a few issues that can be addressed a bit better. Please see below.

p.1, line 9 I would put a comma after the word ‘satellites’ p.1, line 11 North Alaska

C1

should be re-stated as northern Alaska here and elsewhere in the paper p.2, lines 7-9 Casey et al. (2017) showed that, due to calibration issues with the Collection-5 MODIS data in some bands, the darkening of the GrIS has been exaggerated in previous work such as Box et al. (2012) which is referenced. After taking into account the corrected calibration, there is very little decrease in albedo that can be measured using MODIS data. Please re-phrase after considering this information, including the Casey et al. (2017) paper. p.4, line 22 I suggest changing the word ‘is’ to ‘was’ p.5, line 17 Campbell should be Campbell here and elsewhere in the paper p.5, line 19 Please use all caps for TARA and spell out the acronym p.5, line 25 provides should be provided p.5, line 30 radiations should be radiation p.6, 6th line from bottom: Barrows should read Barrow p.9, line 15 delete the word ‘anyway’ p.9, line 26 delete the initial “W.” p.10, line 12 neither should be either p.11, line 4 please re-phrase the first sentence for clarity p.13, line 4 indicated should read indicate p.13, line 19 Similar should read similarly p.15, line 9 tend should read tends p.21, line 11 warmer should read higher p.23, line 22 suggest “... (2017) who find larger...” p.23, line 22 the word ‘are’ should be ‘is’ p.23, line 32 Hall et al. (2012) show monthly maps from MODIS and discuss the fact that the monthly average temperatures (from satellites) are likely lower than the true monthly average temperatures. p.24, line 6 please delete the hyphen in the words ‘cold bias’ p.24, lines 15-16 please re-phrase sentence starting with The extensive data... for clarity

References

The Adolph et al. (2017) paper has been published in The Cryosphere. The reference shown in the paper is for The Cryosphere Discussions. Please update it.

Adolph, Alden C., Mary R. Albert, and Dorothy K. Hall. "Near-surface temperature inversion during summer at Summit, Greenland, and its relation to MODIS-derived surface temperatures." *Cryosphere* 12, no. 3 (2018).

p.26, line 15 Metop should be MetOp

Was the following reference published in HESS vs HESSD? Pérez Díaz, C. L.,

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Lakhankar, T., Romanov, P., Muñoz, J., Khanbilvardi, R. and Yu, Y.:

Additional References to consider:

Casey, K.A., C.M. Polashenski, J. Chen, and M. Tedesco, 2017: Impact of MODIS sensor calibration updates on Greenland Ice Sheet surface reflectance and albedo trends, *The Cryosphere* 11(4):1781-1795.

Hall, D. K., J. C. Comiso, N. E. DiGirolamo, C. A. Shuman, J. R. Key, and L. S. Koenig, 2012: A satellite-derived climate-quality data record of the clear-sky surface temperature of the Greenland ice sheet, *J. Clim.*, 25(14):4785–4798.

Interactive comment on *The Cryosphere Discuss.*, <https://doi.org/10.5194/tc-2018-150>, 2018.

C3