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The Cryosphere Discussions

Interactive comment on "Evaluation of Greenland near surface air temperature datasets" *by* J. E. Jack Reeves Eyre and Xubin Zeng

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The study brings together a large set of climate modeled surface air temperature output and compares the data with in-situ field observations at monthly temporal resolution.

The writing is clear.

major comments a.) The fact that the AIRS data are clear-sky means biases the more cloudy the all-sky retrieval is, as represented by field data. How large is that bias? It's seasonal range is low bias in summer and how large is the bias in winter, deg. C units?

b.) "Two regional data sets are also included", the the study neglects to compare field data with the Box (2013)* data that are worthy to compare because the 1.) span decades earlier than compared data; 2.) are in similar class of compared data GIS-

TEMP, BEST. 3.) p. 9 line 25 "the benefits for SAT of RCM downscaling are not clear" comparing with Box should help since Box mimics RACMO2.

The Box data are available at:

http://research.bpcrc.osu.edu/~jbox/Box_2013_Reconstruction_data/Box_Greenland_Temp 2014_5km_cal_ver20141007.nc

* Box, J. E. 2013. Greenland ice sheet mass balance reconstruction. Part II: Surface mass balance (1840-2010), Journal of Climate,Vol. 26, No. 18. 6974-6989. doi:10.1175/JCLI-D-12-00518.1

Along this line, the paper should compare these data along side the those in Figure S2.

p. 8, line 1 could include the Box data next to these others.

c.) Figure 3; selected sites are 3/4 W Greenland. Comparison more meaningful to select 1 site from NE Greenland, 1 SE, 1 Central, one SW or NW. So, recommend to keep Swiss Camp, use a KPC_ site, use a TAS site, use Summit, may be also use a THU_ site.

recommendation: Figure 3, scatter plots are desirable with dots represented by the month name

d.) you compare AIRS SAT retrievals, but why not also MODIS MOD11 as in the Hall et al work? You could justify not comparing with in-situ data because Hall et al already did. Then again, if you're after a comprehensive comparison and 'beauty contest', would be worth knowing which were more accurate AIRS SAT or MOD11.

e.) for more impact, seems worth more analysis of July or June through August temperatures since the headline-grabbing melt issue is more strongly tied to this part of the year. In discussion and conclusions, what novel melt season findings you deduce could get some attention through the frame of Greenland melting as a societal risk

factor.

f) try to more clearly distinguish spurious trends from real trends in 20CR and ERA 20C vs long term coastal DMI observations

minor comments

more clearly introduce NANSENSAT; appears abruptly p 7 line 14 without introduction

p. 3, line 26 remove "heavily"; adverbs are vague and unnecessary 4, line 17 remove "around"; unnecessary p. 7, line 7... “we are interested in changes in bias”... please more clearly frame why that is in your methods section. p. 11, line 6 “improved performance”; quantify that statement with a number, i.e. an x % reduced MAE and/or a x increase in correlation and/ or x reduction in bais. consider to rank tabulated MAE values to more clearly display which datasets are most accurate

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