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Discussions

Interactive comment on "Using MODIS land surface temperatures and the Crocus snow model to understand the warm bias of ERA-Interim reanalyses at the surface in Antarctica" *by* H. Fréville et al.

Anonymous Referee #2

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In this paper, MODIS standard land surface temperatures (LSTs) were processed to 25-km resolution, for 2000 – 2011 at an hourly time step. The authors conclude that the accuracy of the MODIS LSTs is good, and they provide uncertainty measurements in the form of bias and RMSE values as compared to data from AWSs. They then use the LSTs in the ERA-Interim reanalysis and find that the model shows a warm bias ranging from +3 to +6 C. They also compare with the Crocus snowpack model, forced by ERA-Interim data and conclude that the warm bias may be due to an overestimation of the surface turbulent fluxes in stable conditions.

In general I found the paper to be focused and clear. I think the authors have done an excellent job of assessing the MODIS LSTs and utilizing them in the models. However I did find some of the Discussion section confusing. I would like to see a clear distinction in that section, between the different models and the impacts of using the LSTs in them. The last sentence of the Discussion section really was enlightening, and a good summation of the importance of the work. Perhaps this point should appear in the Abstract as well.

It seems that the authors sometimes refer to the MODIS-derived surface temperature as Ts and at other times they refer to LST. Please be consistent in the terminology throughout the paper.

Abstract Please spell out all acronyms including MODIS, BSRN, ERA and HadCRUT4. AQUA should be Aqua throughout the paper; it is not an acronym and should be lower case. TERRA should be Terra throughout the paper; it is not an acronym and should be lower case.

Introduction p.57, line 1 – replace word decline with "melt" on this page and throughout the paper, ice sheet should not be hyphenated p.57, line 24 – should read . . .remotely-sensed. . . p.58, line 2 - should read . . .space-borne. . . p.58, line 5 – it is unclear to me how you could run the model at hourly time steps since the MODIS data are not hourly; was this accomplished by interpolating the LST values? p.58, line 19 – replace the words at most with the words "at least" p.59, line 3 - . . .to retrieve Ts for each MODIS. . ." p.60, lines 19-24 – this is an excellent point and we have noticed the same effect p.62, line 13 – has SURFEX been spelled out? p.65, lines 13 – has IFS been spelled out? p.65 – I found the first paragraph of the Discussion section to be somewhat confusing p.67, line 17 – I think that the sentence beginning on this line should be re-written for clarity p.67, line 24 – has HTESSEL been spelled out? p.71, line 4 – has ABL been spelled out? p.70 – 71 – paragraph starting on line 24 (p.70) – the readability of this paragraph could be improved; perhaps the authors should consider breaking it into two separate paragraphs, with the second paragraph starting on p.71, line15 at

the word "According. . ." In the Reference list, I am confused about the numbers at the very end of each reference; please explain or delete them. Fig. 2 caption – change the word overpassing to "overpasses"

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