

***Interactive comment on “Comparison of
MODIS-derived land surface temperatures with
near-surface soil and air temperature
measurements in continuous permafrost terrain”
by S. Hachem et al.***

Anonymous Referee #1

Received and published: 8 July 2011

General comments:

The paper compares satellite-derived (MODIS) Land Surface Temperatures to ground-measured air and shallow soil temperatures in Northern Alaska and Arctic Canada. The topic is highly relevant and promising. However, I have a few major issues and a list of more specific comments that should be considered before the paper can be published

Major comments:

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Introduction section: define LST in relation to GST and AirT. What about snow, vegetation etc? This must be introduced before you start discussing it in the discussion section(cf. p. 1603 line 20.)

Results section: There is poor connection between figures/tables and text which makes the results section very confusing. This is particularly valid for table 5 and figs 2-5. For example, fig 5 is first mentioned in the discussion section at page 1603. This must be significantly improved. Figures/tables must appear in right order and all figures/tables must be addressed in the text.

Discussion section: I miss a more general discussion on the wide implications (context) of this work (suitability of MODIS as LST provider, overall accuracy assessment, comparison with existing literature...). This should be included for the paper to be published.

Specific comments:

p.1585, line 21. Do not use textbook as reference here

p.1590, line 11: Section 2.2: What is the accuracy of the temperature loggers used? You use two decimals when giving temperatures throughout the paper (except on p.1600, line 2). This is most probably too precise regarding the accuracy of the loggers.

p.1592, line 5-12: This paragraph does not fit to the section head

p.1595, line 23: ‘morning (LST day)’ and ‘evening (LST night)’ is confusing. When were the data acquired?

p.1596, lines 11-20: should be in the methods section

p.1596, line 14: ‘depth’ instead of ‘deep’

p.1596, line 24: ‘table 5’ instead of ‘table 4’

p.1596, line 25-26 and p 1597 line 1-3: I do not understand these numbers in relation

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to table 5. What are the data behind the mean differences and correlations?

p.1597, line 1: A difference cannot be 'cold' or 'warm'

p.1597, line 4: colder than daytime or colder than the LST?

p.1598, line 8: you should discuss fig 2 before figure 3.

p.1598, lines 8-9: according to fig 3 differences are larger in winter than in summer, not the opposite

p.1598, lines 13-15: should be in the methods section

p.1598, lines 19-25: I do not understand what are the different R values and MDs for eg. Terra daytime? Shouldn't it be one R and MD value for Terra daytime, one for Aqua daytime etc? This is absolutely not clear to me

p.1599, line 1: 'orange' instead of 'red'

p.1599, line 6-8: Are you comparing LST day with LST night or with Tair? If you compare LST day with LST night it would be better to plot these in the same axes.

p.1599, line 24: 'lower' instead of 'smaller (colder)'

p.1600, line 5-6: mean daily temperature from ground station or MODIS-derived?

p.1601, section 4.1: three heading levels are not necessary since level 2 has only one section.

p.1602, line 24: Fig ??

p.1603, lines 6-11: this info should come much earlier, in the methods section

p.1604, line 17-27: Why do you discuss soil temperatures in the air temperature sub-section?

p.1605, line 8. What about the effect on thawing and freezing indices (which you mention in the conclusion section) calculated from MODIS LST?

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Figures: Figs 2, 4, 5 are difficult to understand/not properly explained. It took me too long time to discover the small station IDs in the lower panels. Figure text is too small. Right panels: y-axes should be adjusted for display of the differences in R (a range from 0.8 to 1.0 would be more appropriate).

Figs 6-7: what are the black lines?

Good luck with the resubmission!

Interactive comment on The Cryosphere Discuss., 5, 1583, 2011.