

## ***Interactive comment on “Some fundamentals of handheld snow surface thermography” by C. Shea and B. Jamieson***

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General Comments:

Shea and Jamieson present an overview of ground-based high resolution snow surface temperature measurement techniques. The paper presents the practical advantages to snow thermography, while elaborating on a few potential limitations. Novel applications include revealing processes of snow surface and substrate crystalization, grain growth, and structural changes such as warm crown fractures. This overview paper has merit for a broad spectrum of snow science, including avalanche forecasting, but also many others not mentioned by the authors.

Specific Comments:

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- i. The authors should include other potential applications of snow surface thermography...think outside the avalanche community.
- ii. The authors might also mention Tomography more prominently as a technique that would nicely complement thermography, such as in the "motivation" section. ie. Schneebeli
- iii. It might strengthen the impact of this paper by briefly discussing the implications of thermography for validation of aircraft, balloon, or satellite based remote sensing of snow surface temperature?
- iv. The paper is missing an aspect/process affecting snow surface morphology that may be detectable by thermography: wind pumping. ie. Colbeck, S. C. 1989. Air movement in snow due to windpumping. J. Glaciol., 35(120), 209-2 13. and for Greenland: Albert, M.R., McGilvary, W.R., 1992. Thermal effects due to air flow and vapor transport in dry snow. Journal of Glaciology38, 129.
- v. This paper does promote interest in thermography applications in snowy environments and should be publishable after minor revisions that motivate broader appeal.

Technical Corrections:

- a. p. 1468: line 24, please rephrase, small-scale refers to a relatively large area, replace small-scale with sub-pixel scale or higher resolution or microscale.
- b. p. 1470: line 2, to closer than..., replace closer with less than...
- c. p. 1470: line 9, again the word choice of small-scale is misleading to those with background in geospatial analysis, please replace with high resolution or similar.
- d. p. 1471: line 14, thermal imagers have significantly reduced (NOT lessened) in price, just a suggestion.
- e. p. 1471: line 27, what is a pixel-type sensor...do you mean CCD-type sensor; a pixel is generally thought of as the smallest detectable square feature on an image.

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Interactive comment on The Cryosphere Discuss., 4, 1467, 2010.

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