

Interactive comment on “Utility of late summer transient snowline migration rate on Taku Glacier, Alaska” by M. Pelto

Anonymous Referee #2

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General The author provides excellent information and results from his field seasons on the Taku Glacier. Such systematic, well-documented measurements are invaluable. However I would like to see this work put into the larger scheme of things for the publication of this paper. The author should emphasize the overall reasons for doing the work and discuss, briefly, how the work fits into other glaciological research, other climate-change work and the long-term measurement program at JIRP. Some of this is addressed already but it should be stated succinctly in the Introduction and Conclusions and a shorter version should appear in the Abstract. A good discussion of the significance of the work in the Introduction will set the stage for presenting the results.

There is a lot of detail in the tables and this is very good. There is also a lot of detail in the text, but much of this detracts from promoting the central points of the paper.

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Therefore I suggest that some of the detail in the text be removed and the reader referred to the tables. And the information and details could be summarized in a more-digestible fashion in the write-up.

To calculate the accuracy of the MODIS (500 m) measurement of the TSL, as compared to Landsat (30 m), one could easily determine the elevation of the TSL on MODIS and on Landsat on the same dates, and compare the differences in various years to calculate the mean errors in measuring the TSL using the (poorer-resolution) MODIS relative to using Landsat TM. Then one could use MODIS as a surrogate for Landsat, when Landsat is not available, and show the error bars. This should be quite easy to do, and would add a lot.

Some of the acronyms are not spelled out and at least one is spelled out in the Conclusion but not earlier (AAR). Please spell out the following when they are first introduced: MODIS (not spelled out in the Abstract), DEM, ELA and AAR. (There may be others, too.)

Specific Title: I suggest the following, “Late summer transient snowline migration rate of the Taku Glacier, Alaska.”

The Abstract could be streamlined and shortened for readability. Also in the Abstract it is important to put the work into a larger perspective and say why it’s important beyond being important glaciologically.

p.1366 line 2 – “. . . is used to quantify. . .” 5-6 – please rephrase 8 – “. . . imagery for 31 dates between 2004 and 2010 on Taku. . .” 9-10 – “. . . consistency of the rate of rise of the TSL and its usefulness. . .” 10-12 – please state what the TSL rose from?? 17 – “. . . rate of rise being relatively. . .” 18 – delete word “final” 19 – “. . . July to mid-September, the. . .”

Introduction, line 25 – My suggested wording is the following: “A glacier consists of an ablation area and an accumulation area; within the accumulation area there is a max-

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imum of three facies (wet snow, percolation and dry snow) (Benson, 1962). However all of the facies are not visible from space using visible and near-infrared satellite imagery (Williams et al., 1991). The transient snow line (TSL) is simply the demarcation between snow and bare ice and can often be measured from space (Ostrem, 1975). The highest elevation of the TSL in a given melt season is coincident with the ELA.

p.1367, line 15 – “in the ablation season. However, the 500-m resolution of data from most of the MODIS bands precludes the study of many small glaciers.”

p.1368, lines 7 – 27 – this paragraph is too long, unfocused and unreadable. I suggest to start a new paragraph on Line 13 at “For this study...”

line 23 – “. . .availability of high-resolution TM satellite . . .” (Note to author: MSS data have been available since 1972 so it’s important to include this.)

p.1371 – regarding Figure 5 – the TSL lines at A,B,C&D do not show up well at all, though if they did it would be a very nice graphic. I suggest zooming to the Taku Glacier and making the TSL lines different colors, so that they will stand out. Also please explain this in the text and in the caption. It took me a while to figure it out.

PI1373 – lines 5 – 10 – New information should not be introduced in the Conclusions – this should be moved earlier in the paper.

12 – 13 – this is a good concluding sentence.

References line 10 – delete period after Geografiska Larsen et al. is cited in the text but the reference is not provided in the reference list. Please add Benson (1962) reference

Fig. 3 caption – delete words “Should be” Fig. 5 image and caption – see my previous comment

Interactive comment on The Cryosphere Discuss., 5, 1365, 2011.