

Reply to Anonymous Referee #2

Original review in gray italic.

Response as black standard text.

The manuscript by Nuth et al. presents a valuable glacier data set for Svalbard, and adds to the growing body of literature addressing issues of change reporting from multitemporal glacier inventories. The inventories, based on maps for the early inventory and satellite imagery for the latest, are well described, and the change analysis is well depicted in the informative figures. The authors make excellent use of color in the figures, which are all rich in information. In general I recommend this manuscript for publication in this journal. However, the following comments should be addressed first.

Many thanks for the constructive suggestions of this review which helped point out many of weaker formulations in the text. We have generally accepted and revised all suggestions provided which has enhanced the clarification of various aspects of this inventory paper.

General comments:

- I would like to see a clearer description of glacier mapping methods, summarized clearly for each inventory.

Have added a paragraph to Section 3.2 that describes explicitly how the raw glacier outlines were created.

On page 2495, line 18, it isn't clear where exactly the "1990 outlines" come from.

The paragraph above should have made this clearer now. Also, the data for the 1990 outlines is described in section 2.1.

And to do the manual trimming or reshaping as described in Section 3.2, what is the basis for the reshaping? Is it simply visual interpretation of a false-color IR image? Is any algorithm, such as contrast stretching or band ratioing, applied to the image to aid in the interpretation?

Added a sentence, "The basis of the outline reshaping is visual interpretation of the satellite optical images using contrast stretching to aid the distinction between glacier front and surrounding debris."

- Some of the headings could be clearer. For example, there is Section 4.2, "Comparison between H93 and GI00s", and Section 4.3, "Comparison of the digital glacier inventories". Are H93 and GI00s not digital inventories? It should be clear at a glance what the difference is between the sections, but currently it is not.

We have adjusted the headings of Section 4.2 and 4.3 to "Comparison of complete glacier inventories (H93 vs. GI00)" and "Comparison of multi-temporal glacier inventories (GIold vs. GI90 vs. GI00)", respectively. The point here is that H93 is not digital (in a GIS sense of the word) since the raw border information is not available to compare, but rather just the total areas of each glacier in tabular form. This has now been specified in section 2.1.

- A better description of the calculation of change rates is needed, given the various timestamps on the different glaciers. Is the exact year known for each glacier in all three inventories? If so, state that clearly.

Yes, the exact year is known for each glacier in all three inventories. A paragraph is added to discuss the time stamps in section 3.4.

- Conclusions: One of these data sets has been ingested into GLIMS; the text should

be updated to reflect this.

The text has been updated.

Specific comments (numbers are page.line)

2502.1-6 Discussion of changes is a bit confusing. For example, "number of glaciers with mean length changes less than -40 m/a has increased". Does that mean "more negative"?

Yes, this means “more negative”. This sentence has been revised and simplified.

2506.5 Define "earlier".

This sentence has been revised according to advice from M. Pelto.

2524 Clarify the last sentence in the caption, particularly the different between "glacier mean aspect" and "glacier DEM aspect".

Changed sentence to, “The distribution of mean aspect per glacier suggest a dominance of north-facing glaciers; however, histograms of all glacier DEM pixel aspects show a uniform distribution with aspect. The histogram thus reflects the dominance of small glaciers facing northward.”

Comments accepted as is:

2490.3 or -> covering

2490.4 glaciated -> glacierized

2490.5 summed -> total

2490.5 glaciated -> glacierized

2490.24 did -> does

2491.1 border -> outline

2491.9 and elsewhere: glaciated -> glacierized

2492.10 manual photogrammetry? What about "optical analog photogrammetry"?

2500.4 represent -> were derived

2501.22 Change "...changes are an integrated length change reduced from area changes that include also lateral losses" to "...changes are an integrated change that also includes lateral losses".

2501.27 I think it's better to separate the expressions for average and median: "with average of -40 m/a and median of -30 m/a for both epochs."

2503.24 less then -> less than 2503,2504,2528 Replace "Student-t distribution" with "Student's t-distribution".

2503.8 Add period after "cancelled".

2504.15 Add "based on spectral appearance" after "delineating glaciers".

2505.18 infer -> imply

2505.23,24 Change to read, "Changes in glacier area and length reflect the glacier's total response (Oerlemans, 2001)."

2506.7 Check spelling of "Le Fauconnier".

2519 Table caption, change last sentence to "All area estimates have unit km²"

2508.10 Update this text to state that the GI00s is in the GLIMS database.

2525 Size-proportional is by area, not radius, right? Please state which.