

Interactive comment on “Using SAR satellite data time-series for regional glacier mapping” by Solveig H. Winsvold et al.

Anonymous Referee #2

Received and published: 25 October 2017

1. Does the paper address relevant scientific questions within the scope of TC? -> Yes; it does without question.
2. Does the paper present novel concepts, ideas, tools, or data? -> The innovation is the application and interpretation of time series of Sentinel SAR data in conjunction with Landsat 8 optical and RADARSAT SAR to five scenarios for Glacial morphological analysis. As such, it presents a benchmark for future analysis of any one or a combination of time series scenarios. The important contribution is the layout of the procedure for as well as the assessment of different approaches to mapping glacier morphology and process from satellite time series.
3. Are substantial conclusions reached? -> Whereas comparable assessments of new imaging technology might conclude with a ‘capability’ type of assessment, in this

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study there is clearly a considerable depth of knowledge in the derivation, assessment and interpretation of the results that lends considerable confidence to the rigor of the conclusions. One would like to see more discussion of the results, given the insight learned, but this would result in a considerably longer paper. I hope the authors will pursue such work for the individual scenarios.

4. Are the scientific methods and assumptions valid and clearly outlined? -> Yes, well written and supported by prior literature. My only question is the use of parametric statistics, particularly the Spearman r correlation, for what might be a non-normal and probably not-independent sample (eg. Figure 6c). I believe the authors need to justify this.

5. Are the results sufficient to support the interpretations and conclusions? -> Yes. I do not see any interpretations that are not supported with the reported analysis and appropriate caveats.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? -> There is a great deal of analysis bound in this work and I have not traced all of the background references and their references. I believe that the literature cited will allow appropriate traceability.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? -> yes

8. Does the title clearly reflect the contents of the paper? -> The title is short and could benefit from the mention of the five scenarios which is a major contribution.

9. Does the abstract provide a concise and complete summary? -> Yes.

10. Is the overall presentation well structured and clear? -> Yes

11. Is the language fluent and precise? -> Some suggested corrections are provided below.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? -> Yes

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? -> No

14. Are the number and quality of references appropriate? -> Yes

15. Is the amount and quality of supplementary material appropriate? -> Yes

Page 2, line 21, "...1980's have been..."

Page 7, line 24, "The TSL migration up-glacier is dependent..."

Page 8, line 8, "...in the ablation area of, for example, on..."

Page 8, line 10, "On addition, in a different example from..." (suggestion as 'yet' does not convey anything here)

Page 8, line 19: I suggest that "3% lower altitude" does not mean much as a percentage will change with absolute altitude. 3% of x scale or an absolute change of height would provide more clarity.

Page 10: Section 5.3 is a particularly strong contribution, in my opinion.

Page 14, line 20 "...at the days and time-of-day of SAR..." is awkward syntax. There may be a better construction.

Page 14, line 27, "... but be of help..." perhaps should be "...but can be of help..."?

Page 15, line 29, I suggest that the authors mean "Winter rain events" as opposed to "Winter weather events" of which there are many in the Arctic and includes a wide range of precipitation types.

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