Comments on Smith et al. – "Imporving Semi-Automated … in Central Asia"

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General Comments

The new version of the manuscript submitted by Smith et al. shows significant improvements than the old versions. I suggest that it is now acceptable, but a minor review still needed to solve the following problems I have addressed. Also see specific comments.

1. The authors provide some comparisons with previous studies on the classification of debris-covered glaciers. Although it seems enough for describe the improvements made by the algorithm presented in this manuscript, it would be better to give some direct comparisons on which kinds of area were committed or omitted by the authors' method or by other methods, because the descriptions of those methods can mostly be easily followed and applied in the study region or even in a small region. This kind work can show more details on the improvements made by this paper, and further promote the scientific significance of this paper. However, this is totally depending on the authors' choice.

2. From my view, too many figures were used in the new version manuscript (totally 15). Some of them, which belong to same groups (like Figure 2-8 that describe the processing steps, and Figure 10-12 that illustrate the elevation distribution of glaciers and their comparison to other glacier outlines), can be merged into one figure (mark as a, b, c, etc). Some of the figure captions can also be simplified and shortened, leave the descriptive words in main text. Besides, the acquisition date for Landsat images shown as background in Figure 2, 5-8, 14, 15 should better to be explicitly marked on the figure, or described in the caption, for the conveniences of reader's check.

3. Although the authors have done very hard works and processed large number of Landsat scenes (totally 62), it is difficult to find the related results in the Results and Discussion section (they only describe some comparisons with existing glacier inventories, and the manual control dataset created by authors that around 2000 and 2011) for most scenes. From my view, the number of Landsat scenes processed is not important comparing to the efficiency and accuracy of the algorithm. So I suggest that the author revise the data source section and shorten the Table 1, only keep the Landsat scenes whose results were introduced in the Results and Discussion section.

Specific Comments:

Line 7: The citations for the data and following paper are both needed for the second Chinese glacier inventory (for here and also other places).

Guo, W., Liu, S., Xu, J., Wu, L., Shangguan, D., Yao, X., Wei, J., Bao W., Yu, P., Liu, Q., and Jiang, Z.: The second Chiniese glacier inventory: data, methods and results, J. Glaciol., 226, 957-969, doi: 10.3189/2015JoG14J209, 2015.

Line 13: "~1-2 pixels of Landsat Enhanced Thematic Mapper …", it is nessary to mention the panchromatic band of Landsat ETM+;

Line 17: "multi-spectral" is better here.

Line 43-46: there's no nation name in Figure 1, so it is inconvenient to readers with less knowledges on Central Asia. The WWD and Siberian High also with same situations. See comment on Figure 1.

Line 111: "spectrally-derived", maybe a further description should better to be presented here (I mean clean-ice, maybe in parenthesis).

Line 120-123: how the elevation threshold of low elevation area was determined? Is it determined by substract certain value from the average value of clean-ice areas? It should also to be clarified here.

Line 207: "as well as both clean and debris-covered", "clean-ice" is better here.

Line 262-272: Although the normalized distances can show the general distribution of the bias along the glacier outline, it should be better to give some summaries on the common statistics of the vertex biases, like the maximum and mean distance of all validated vertex pairs. Besides, how the distances were normalized also need more details, e.g., were all distances normalized to one maximum distance? Or different glaciers have different maximum distances? If the first case, what is the maximum distance of all vertex pairs? Without such details, the normalized distances have very less sense on describe the vertex distance distribution.

Also see comments on Figure 13.

Line 285: Generally the configuration of the computer (e.g., CPU, physical memory, operating system) need to be provided if you give a processing time.

Table 1: The data source should better to be simplified and shortened, leaves only the images whose results were shown in the Results and Discussion section.

Figure 1: From common sense, It is better to show the nation names on the map, maybe by showing the national boundaries and names in the main map. Besides, the Winter Westerly Disturbances (WWD) and the Siberian High are also need to be shown on the map, maybe by labelled arrows.

Figure 2-8: these figures can be merged into one figure and marked as a), b), c), d), etc, corresponding to the processing step. The figure captions should also be shortened and simplified.

Figure 10-12: these three figures can also be merged into on figure which shows the elevation distribution of the algorithm extracted glaciers and their comparisons to other source of glacier outlines (spectral, manual and CGI V2).

Figure 13: It is suggested to give more details on the distances of all validated vertex pairs, like the maximum and mean distances of all validated vertex pairs if all distances were normalized to one maximum distance, or maximum and mean distances of each glacier if different glaciers have different maximum distances.