

Interactive comment on “Extracting recent short-term glacier velocity evolution over Southern Alaska from a large collection of Landsat data” by Bas Altena et al.

Anonymous Referee #2

Received and published: 6 June 2018

This article presents algorithms to postprocess the time series of velocity data. The proposed postprocessing algorithm mainly consists of filtering and smoothing. In filtering, the authors presented voting system based on fuzzy Hough transform to select inlier. For the smoothing, Whitacker approach, accompanied by procedure by Garcia (2010) was used after making the sample space to be isotropic in both spatial and temporal perspective.

In my opinion, this methodology has unique way of approach in postprocessing the stack of spatiotemporal velocity data. The algorithms are well described, however, the article has some issues that needs to be revised. Moreover, some points claimed in

C1

the article are not clear to me. So here I would like to provide some feedback to the authors as below:

Major concerns:

Fig. 2, right: That was the most confusing figure in this article. I think that was because I did not have enough sense about what I am looking at while I was following the article (from the beginning) and started looking at the figure. - The most confusing part is that I see 'x1' and 'x2' in horizontal/vertical axes, but I see "displacements" I suggest to revise the figure which makes the symbols more intuitive. - One thing I can suggest is to change the order of figure 2 and 3, along with the associated description. In specific, it looks like Figure 2 is more suitable to section 3.2 (voting), and Figure 3 is more suitable to section 3.1 (temporal network configuration). - In addition to this, I also suggest to move the vertical line for $d_{0,32}$. As far as I understand, $d_{0,32}$ was deviated to the right because it is outlier (as mentioned in P5, L5-6). But its position makes me confusing that the end of the line $d_{0,64}$ ends at $d_{0,32}$ in axis x1.

Figure 12: I think this figure does not sufficiently provide the information for the validation. First, I am not sure about how the Figure 12(a) and (b) would support to see how well the algorithm have worked. In specific, the distribution of the displacement or “qualitative similarity” between GoLIVE and Vote just supports the vote result “makes sense,” but they cannot support how the algorithm has improved the result. Maybe the plot of displacement difference between (GoLIVE - RapidEye) and (Vote - RapidEye) might make more sense for this purpose. You can ignore this suggestion if those plots are actually the displacement difference mentioned above (but I cannot find any reason to assume they are the difference plot). Also I would suggest the authors to provide statistics about the difference. Second, I was expecting qualitative correlation between the data plotted in Figure 12(c) and (d), provided that the RapidEye velocity data is working as a reference. I think providing correlation coefficient between the data (i.e. RapidEye vs GoLIVE and RapidEye vs voting) might help supporting the validation result.

C2

Questions / Suggestions: Figure 6: Does GoLIVE data provide any error information of the measured velocity? If so, I suggest estimating the error as well and provide that.

Figure 6(b): Based on Figure 5(a), Figure 5(b), and Figure 6(a), it looks like the up-glacier of Hubbard glacier (L) is over-smoothed, maybe because of stationary regions surrounding that. Any thoughts about this?

Figure 9(a): 1. Is the speed profile come from the raw GoLive data or filtered/smoothed result? 2. In either case, I suggest showing the time-series profile plot for both before and after the postprocessing, so that we can tell how effective the suggested algorithm was useful to investigate the glacier. 3. I don't have much knowledge about Klutlan glacier, but it looks like the 20~50km sector of the glacier has suddenly slowed down in sometime in August-September 2016, and again suddenly accelerated after then. Is the slow-down in summer usual in glaciers in Alaska? Or is that implicates that Klutlan glacier is surge-type glacier?

Minor glitches: P2, L6: Therefor: maybe a typo? P7, L20: Figure 2 - If my understanding is correct, "three image pairs" are actually "pairs from three images"? Figure 12(d): Suggest replacing "GoLIVE" with "voting": It causes confusion with subpanel (c).

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-66>, 2018.

C3