

Interactive comment on “Image GeoRectification And Feature Tracking toolbox: ImGRAFT” by A. Messerli and A. Grinsted

Anonymous Referee #2

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In my view the paper presents very useful tool not only for glaciers velocity and mass balance measurements, but for many other Natural processes related to moving masses (solifluction, permafrost development/degradation, land slides, etc.). There can be many technical questions to the authors. However, since there is supposed to be a manual on-line, I am, personally quite satisfied by the present technical details and support publishing the paper in *GID* and later in *GI*.

The problems I have and can expect from other readers are as the following:

1. I do not see clearly what are the “features” automatically recognized by the package and used as the reference “points” for velocity estimations. A lot is described about the shadows, crevasses, and so on – but would be useful to see closer (enlarged

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area from the photographs) example(s) of a “point” (rock) on a glacier surface with corresponding area around, and how same looks like at a next image. There is also additional transformation of such recognized “features” into “spaced grid”. How this transformation looks like relative to the actual features (rocks) at the glacier surface? The reason for asking this is to give possibility to a reader to evaluate if such image processing procedures can be useful in his particular application, not necessary related to a glacier surface change. Figure 3 does not allow this.

2. The vectors of such “points” movements are the results of vertical (melting) and horizontal (glacier flow) displacement. Both results in change of the shapes around reference “points”. Some scheme/example of this multi-step transformation from a distance calculated from the images to the surface velocity of the glacier would also be helpful (with the same aim as in 1). Logically this are the procedures between “Rock template match” and “Template match ice” at Figure 2 – the most important part of the paper for a glaciologist.

3. I understand the complexity of defining velocity for such calculations. It shown in Table 1 that the velocity was calculated always comparing image b with image from 17 Jul 2013 (this is “Master image”). Not clear how all the images listed in Table 1 are related to the August 25 DEM (are they?). Also, it is not stated but look like we cannot compare, say, image from 22 Jul 2013 and 27 Jul 2013. Quite a limitation, because the velocity can change day by day.

In conclusion: The technical details of image processing can be cleaned up infinitely. I would not be surprised if in couple years the routines of an updated version of ImGRAFT would be very different from what is described now. However, for successful use of the software by others, at least in the first paper describing the suite, there should be some simple illustrations in “human eye” language of what can be used from the images as reference points and what can be expected limitations.