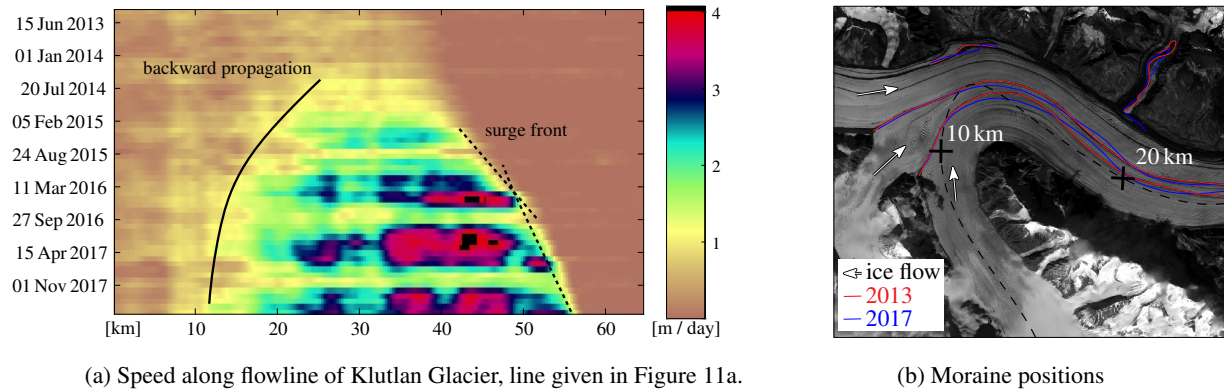


For the surge of Klutlan Glacier, the dataset shows the evolution of its dynamics, as can be seen by some velocity time stamps in Figure 11. The surge initiation seems to happen in the central trunk of the glacier, and the surge front progresses downwards from there (with steady bulk velocities around four meters per day). The surge also propagates upwards mainly into the westernmost basin. The eastern basin does increase in speed, but to a lesser extent, while the middle basin of this glacier system does not seem to be affected significantly. The up-glacier velocity increase is limited and does not reach the headwalls of any basin. In Landsat imagery of late 2017, there is no indication of any heavily crevassed terrain in the upper parts of these basins, which supports the hypothesis of a partially developed surge.

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**Figure 12.** The speed over the central flowline of Klutlan Glacier. The markings of this flowline are shown in figure 11a. In Figure 12b the convergence of different basins of the Klutlan glacier is shown, data is from a RapidEye acquisition on the 5<sup>th</sup> of September 2013 and at the 23<sup>rd</sup> of September 2017. For comparison the 2013 image is overlain with the two moraine positions.

When looking at the velocities over the flowline of the Klutlan glacier, as in Figure 12a, both the extension downstream as well as the upstream progression of the surge can be seen. Most clearly, the surge front seems to propagate downwards with a steady velocity, but appears to slow down around the 50 km mark (see dashed line in Figure 12a), as shown by the break in slope. Here, the glacier widens into a lobe at the terminus. This can suggest ice thickness is homogeneous here or ice thickness does not seem to play an important role in surge propagation.

At the end of the summer of 2016 the tributary just north of the 20 kilometer mark of Klutlan Glacier seems to increase in speed. This can be confirmed by tracing the extent of the looped moraines, as in Figure 12b. In the same imagery the medial moraines of the meeting point of all basins are mapped as well. Here, the moraine bands before and after the event align well at the junction, indicating a steady or similar contribution over the full period, or an insignificant effect, as the surge has not been developing into very fast flow. In contrast, the lower part of this glacial trunk has moraine bands that do not align.