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Interactive comment on "Surge dynamics and lake outbursts of Kyagar Glacier, Karakoram" *by* V. Round et al.

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This is a very well written and interesting paper documenting most of a surge cycle of Kyagar Glacier in the Karakoram. While it is known that this mountain range has surge-type glaciers, it remains very under-studied and this paper adds a wealth of information. The satellite data coverage is amazing and allows the deduction of both elevation changes and the velocity evolution during the lead-up two a two-phase surge. The paper is essentially free of errors and well-written and could basically be published as is. I have a few small comments that should be considered for final revision:

The PDD analysis is a bit of a side-line to this paper. I do like something like it, because the availability of melt water is an important part of the story. A few more details would help: 1) It is stated that PDD is calculated from hourly data. Are the hourly data used to

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calculate a daily average, or are these actually 'positive degree hours'? 2) What is the meaning of calculating PDD at one point? If the weather station is at the terminus than a day with very low positive temperatures would presumably cause melt at the very lowest part of the glacier tongue only, whereas a high degree day would cause melting over large parts of the glacier. So this measure would be a very non-linear measure of melt? 3) Does the PDD contribute more to this paper than simply a temperature graph?

Could you say a bit more of the relative role of the three tributaries to the surge? The elevation change figures indicate that perhaps all tributaries are involved in the surge? Is that also borne out in velocity evolution? In Alaska, there is distinctly different behaviors of tributaries (leading to the famous looped moraines, e.g. Clarke, 1991, J.Glac.). For a reader like me it would be interesting to know whether tributaries here play a similar role or not.

Eisen et al. (J.Glac., 2005) discuss surge initiation by a hydraulic switch that depends very sensitively on basal stress (p. 404/405). This discussion seems very relevant to this paper as well, and I recommend consulting it.

p.9, l.14/15: This is a detail, but what you're discussing is not really an error, is it? You're simply deriving the horizontal component of the velocity vector. The way you describe it you would assume that the velocity vector is surface parallel.

p.11, l.11: delete ',' (unless this involves sticking tongues into glaciers :))

p.12, l.22: The speed-up is not really uniform over the glacier tongue: the gradient gets much larger. An interesting feature is an apparent hinge point a little less than 1 km from the glacier terminus (Fig. 6). Does that correspond to something obvious on the ground?

Fig. 12: The depression in the Dec. 2015 profile is very interesting. Do you think it could be the result of a subglacial lake drainage? Sometimes these are quite recog-

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nizable in surface crevasse patterns.

p.23, l.24/25: You state that only the glacier tongue participated in the surge. This is based on the obvious velocity signature. But the elevation changes clearly show that the whole glacier is involved in the surge cycle.

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