

## ***Interactive comment on “Low-cost, on-demand aerial photogrammetry for glaciological measurement” by K. Whitehead et al.***

**Anonymous Referee #1**

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This article details the acquisition and analysis of two DEMs acquired by unmanned aerial vehicle (UAV) and by photography from helicopter. With the article focus on “low-cost”, perhaps the authors could comment on their actual cost and the relative cost versus alternatives given their study area is not cheaply accessible by plane and helicopter.

### **2. Study site and methodology**

Line 4: “Until recently it was believed that this glacier had changed little in recent years.” ... this is much too vague – please give a date, and back up with a reference

Line 5: “However, Wainstein et al. (2008) showed that the terminus region has thinned by approximately one meter per year since 1982.”

C1202

After the previous sentence this implies that other researchers on this glacier had failed to observe any change. However previous research has indicated no change 1982-96 but retreat since then. Hence the ‘one meter per year’ must be a coarse average with 0m/yr 1982-96 and ~2m/yr 1996-2008 ?

### **2.1 UAV survey**

P3046, line 15-16: these two sentences can be joined, i.e. ...camera, with a retractable lens P3047, line 9: Impho software – provide more info, who is the supplier ? Line 20: no need to mention Impho again ...

3048, line 12: using a nominal -> with a nominal

### **3. Results**

There are a number of issues of clarity and explanation in this section Line 11-12: ‘Although the differences appear small at the scale shown’ ... the differences (>2-2.5m for one year) are surely sizeable, and how is ‘the scale shown’ relevant - would the differences somehow appear greater at a larger scale ? ...

Line 12: significant loss of ice occurred in regions A and B .... Why are A, B and C the only ‘significant’ occurrences of loss – they are not even visible as higher loss on fig 3b. and what does ‘significant’ mean in this context ? .. what prevents the areas of highest loss (e.g. > 2.0m) from being worthy of ‘significance’ ? The word significant is thus overused in both lines 17 and 18 ... (choose an alternative)

Line 22; where are the moraine regions that are referred to – I don’t see them in fig 3b (with regards to ‘small amounts of thickening’)

Line 24-25: large amounts of thickening reflect actual changes to the proglacial icing; these are hardly distinguishable due to the clipping of the DEM close to the edge of the glacier – are there more DEM data beyond the glacier to make this point clearer ?

### **3.1 Ice flow**

C1203

Figure 3c gives a clear image of rate of ice flow, but the reader has no context relative to other arctic glaciers. Can any articles be cited to give flow rates from other comparable studies ?

### 3.2 Accuracy estimates

Line 12-13. Remove the duplicative sentence: "In each case . . . check points"

### References

lines 28-30 and 36-38: The articles by Wainstein et al, and Whitehead et al (2010) are inadequately referenced without page numbers; 2010 appears three times in each citation, including the cryptic 'GEO2010 Calgary Organizing Committee'.

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Interactive comment on The Cryosphere Discuss., 7, 3043, 2013.

C1204