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Interactive comment on "The GAMDAM Glacier Inventory: a quality controlled inventory of Asian glaciers" *by* T. Nuimura et al.

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Nuimura et al (2014) have completed a detailed inventory (GGI) of the glaciers in the High Mountains of Asia. The inventory relies on Landsat imagery during the 1999-2003 period. This paper focusses on a comparison of the results of this inventory with other inventories, particularly the Randolph Glacier Inventory (RGI). The paper discusses the method in exemplary detail. However the key to understanding the validity of the methods and the resulting issues of differences with RGI is not just with the overall data presentation and description, but can be best exemplified with clear visual comparison of results depicted directly on imagery. We are at a point where an endless supply of glacier inventories based on satellite imagery is emerging. The results of each are quite different between each in areas of overlapping coverage indicating that though

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inventories can be valuable the accuracy and precision of each needs great attention or the value will not exist. Further that a single inventory is only useful if it can be later replicated to identify glacier change. Hence, the methods have to be repeatable. This paper as a comparison of several important inventories is a valuable step in understanding why inventories differ. There is an opportunity to sharpen identification of the difference to the image classification level visually versus primarily a data comparison. This is an important paper, I am not suggesting the authors redo any portion of the inventory, just provide a visual comparison to stand with the detailed data comparison. This comment is focussed on this bigger issue, not on specific detailed comments throughout.

1) GGI identifies more glaciers than RGI, give us a visual example of where this occurs and that can help explain why. Figure 1 is in the Zanskar region and is not specifically recommended but just a typical area that would be useful in looking at differences in area and number of glaciers where steep slopes are not an issue, yet the glacier count is not straightforward.

2) The GGI despite more glaciers has much lower glacier area. Part but not all of this result from using imagery of differing dates. Again provide a visual example indicating how RGI and GGI deal with glacier boundaries in a specific location that has steep avalanche slopes that GGI does not typically classify as a glacier. This comment contains three figures that illustrate the level of visual detail needed for an adequate comparison. Figure 10 and S1 currently serves that role, but there are too many examples with too poor resolution in each. Figure S1 does not compare RGI versus GGI for a specific area. Figure 10 has too many examples and does not provide the detail needed, or supporting tabular results. The steep slope example does not adequately portray which approach is better given the nearly complete snowcover. Figure 2 and 3 in this comment use Digital Globe and Landsat imagery looking at same area to point out specific locations where steep slopes could be differently interpreted. This is the level of detail needed to delineate the ability of the method chosen and contrast it with

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the RGI. The output from a specific glacier or watershed comparing GGI and RGI in tabular form is needed. You could focus on a single glacier, such as the Durung Drung Glacier shown in these figures.

2807-25: Be more precise here since all inventories rely on satellite imagery, what imagery did RGI use beyond China that would lead to this?

2811-14: Given the completed inventory value is as a baseline, authors should comment on how easily the inventory can be replicated with Landsat 8 imagery in the near future.

Table 3: Does not add value beyond that of Table 2. Are the Bolch et al (2010) numbers different than RGI? Instead or in addition to this a table for a specific watershed such as in Figure 1 where the count, area and boundaries of glaciers could be shown and reported from GGI and RGI.

Figure 4: The contours detract from actually seeing the colored elevation depiction.

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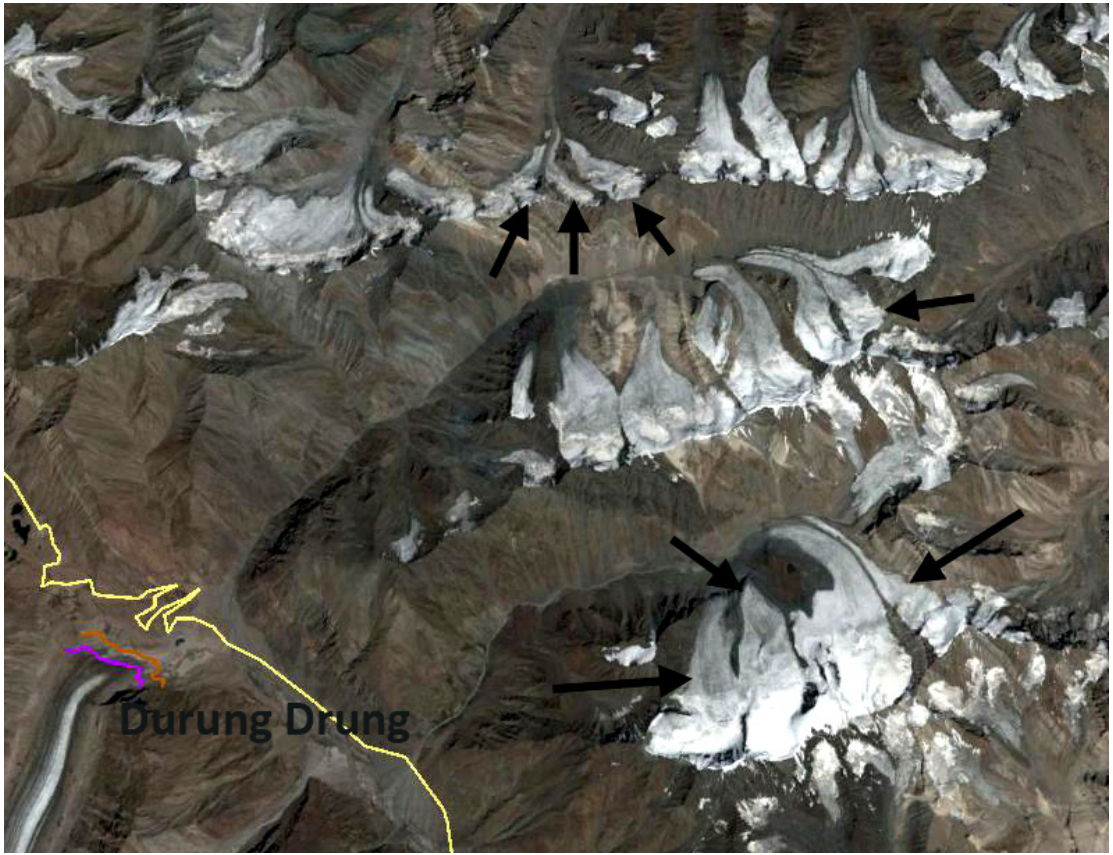

Fig. 1. Digital Globe image of glaciers in a Zanskar, India watershed. Black arrows indicate glaciers where both area and number count could differ and would be a good visual comparison of RGI and GGI.

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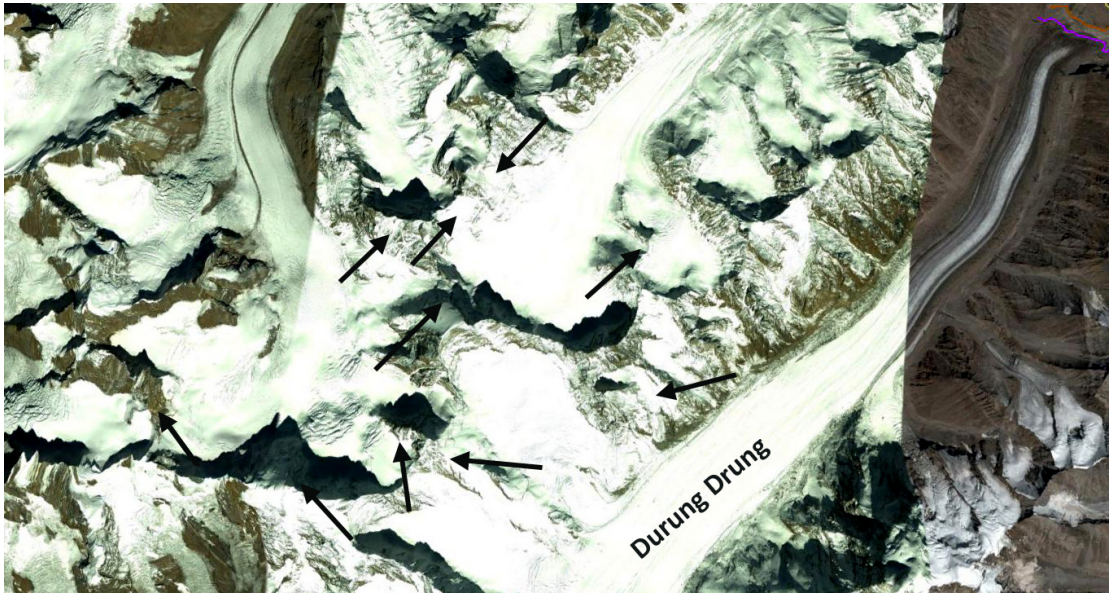

Fig. 2. Digital Globe imagery across a region around the Durung Drung Glacier, India indicating steep slopes where interpretation of boundaries could differ with method and imagery used.

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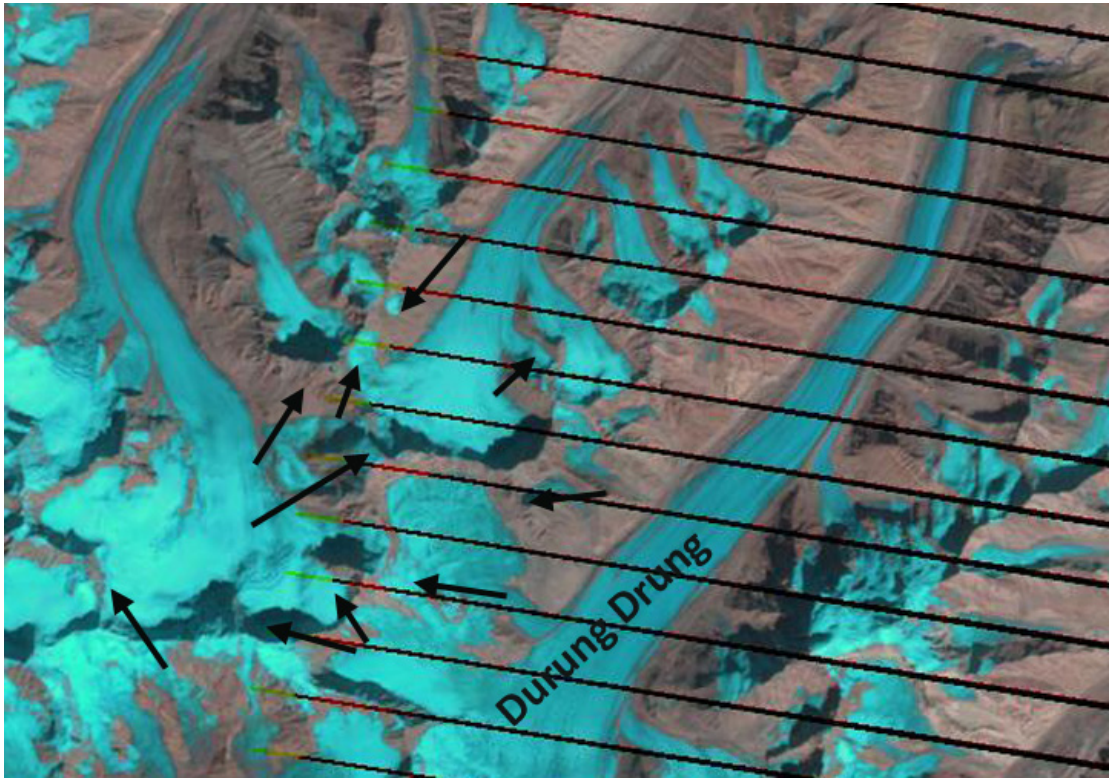

Fig. 3. Landsat 2013 image of the same area around Durung Drung Glacier, India black arrows indicating steep slopes. RGI and GGI evaluation of glacier boundary on steep slopes would be comparable.

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