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The Cryosphere Discussions

Interactive comment on "The new Landsat-derived glacier inventory for Jotunheimen, Norway, and deduced glacier changes since the 1930s" *by* L. M. Andreassen et al.

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First, we would like to thank the two anonymous referees and M. Pelto and J. Cogley for their comments and kind remarks on the manuscript. Below we reply to their suggestions to the manuscript.

Referee #1

-On comments to Table 1-2: Table 1 already includes percentage change. Table 2 will be extended with an additional column showing percentage change.

-Regarding aspect: True that the mean aspect cannot be derived directly from the Aspect grid. We have, however, avoided this by calculating mean aspect through sep-

arating the aspect grid in a sine and cosine grid. Zonal statistics is thereafter used to calculate the mean values from both and finally a Fortran programme is used to get the correct mean aspect in the 0-360 degrees range as well as the corresponding sector. The routine is further documented in Paul (2007). We will add a sentence to this in the revised manuscript to make it clearer.

Referee #2

- Table 2 will be extended with an additional column showing percentage change. The other minor comments/small changes will all be taken into account.

J. Cogley

- Table 2 will be extended with an additional column showing percentage change. - With regard to the remark concerning the different rates of change in the Alps and North America, this might be due to differences in interpretation of (perennial) snow banks as they vary in the different studies. However, from Fig. 3 in the study by Granshaw and Fountain we got the impression that they also found a strong dependence of area changes on glacier size.

M. Pelto

1. The causes of the mass balance fluctuations is beyond the scope of this paper, but the main reason of the mass surplus in the West is due to an increase in winter precipitation in this region (Andreassen et al., 2005).

2. The paper by Kääb et al. 2002 showed first results from the Swiss Alps. Later more detailed results have shown that a minimum size of about 0.05 km2 is suitable with a 25 m sensor resolution (Paul et al., 2003). A difference between the Swiss Alps and Norway is that in the Swiss Alps the smallest glaciers are often situated in cirques and covered by debris and are thus difficult to map. In Jotunheimen the smallest glaciers are typically located at ridges. In our study we excluded glaciers below 0.01 km2 as a starting point for the further identification. All polygons above this size were then

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investigated before an ID was assigned. Finally, only polygons with visible bare ice were assigned an ID and included in the inventory.

3. We agree that expanding Table 2 will be a valuable addition, and we will include it in the revision of the manuscript. Expansion of Table 3 would mean adding three more columns to an already long table and these values can be calculated from the other columns. We would thus like to stay with the current version.

4. Illustrating the performance over surface water is not the scope of Figure 2 and was therefore not included in the legend.

5. The glaciers covered by the map sheets mapped in 1983 have decreased their size, however, we should rather have used North/NorthEast instead of NorthWest for these parts and will change this in the revised manuscript.

6. Figure 10 is a methodological one showing the difference between two methods. We certainly agree that more figures could be added, but we chose the combination of Figures 1-10 and Tables 1-4 to illustrate the methods and results. The results of N50 to L2003 are included in Table 2 and Figure 7.

References

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