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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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Andreassen et al. describe the shrinkage of the glaciers of Jotunheimen between the 1930s and 2003, and note that the rate of shrinkage, which is of the order of -0.3pct per year, is quite strongly dependent on the initial size of the glacier.

This paper joins a growing number of regional studies of shrinkage rates, and is particularly valuable for its thorough discussion of the difficulty of glacier delineation and of matching glacier units from different inventories. It also joins a much smaller number of studies in which the dependence on initial size is examined in some detail.

I urge Andreassen et al. to supplement Table 2 of the paper with a table giving rates in percentage per year, rather than just magnitudes of change in square kilometres. Because the time spans differ, ranging from 1966-2003 to 1983-2003, this will require a separate calculation for each glacier before the results are assigned to size classes.

This supplementary table would be worthwhile because it would increase the amount of information bearing on a problem which is only beginning to be recognized, namely that in some glacierized regions the shrinkage is strongly size-dependent while in others it is not. The Alps (Paul 2002; Paul et al. 2004; Citterio et al. 2007) are the prime example of the former case, western North America (Granshaw and Fountain 2006; de Beer and Sharp 2007) of the latter. There is no good reason to doubt the general validity of any of these findings.

When scaled up, the ambiguity identified here leads to a large uncertainty in the global average rate of shrinkage. I estimate crudely that this rate could be as high as 2600-2800 sq km per yr if the strong size dependence seen in the Alps, and now in Jotunheimen, is typical. On the other hand, if the lack of such dependence which is seen in western North America is typical, the global average rate could be as low as 500-700 sq km per yr.

This large uncertainty is undesirable in itself, but it also has an impact on calculations of the recent contribution of glaciers to sea-level rise, and on initialization of models of the future contribution. It will be necessary to find out why regional behaviours are so different, but clearly a good first step will be to increase the stock of relevant information, as recommended here.

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