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Interactive comment on "Glacier area and length changes in Norway from repeat inventories" *by* S. H. Winsvold et al.

Anonymous Referee #2

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1. General comments:

This study is a detailed inventory of glacier change for the southern, central and northern parts of mainland Norway (i.e. excluding Svalbard) over 3-4 time periods, combining multiple data sources - printed maps (1900-85) and Landsat imagery (1988-2006), along with the national DEM, which is used to identify basins, divides, centerlines and flow direction. Glacier extents from three earlier periods (∼1900, ∼1950 and ∼1990) are compared to the ∼2000 inventory compiled and published in 2012. The methodology is clearly described and the results very well illustrated in tables and figures – though the fine print in figures 5-10 test this reviewer's eyesight to its limits ! Assessing the rate of changes between the three time ranges: 1945-85, 1988-97 and 1999-2006 is challenged by the length of each range, which are affected by the maritime location

and thus limited availability of cloud-free imagery, as well as the initial time taken for national mapping coverage.

Overall results are stated for 'the past 30 years' but it's not immediately clear at first reading which time range this refers to, unless the 'Gln50' is set to 1970 for the 1945-85 period. Table 1 gives the mean time span as 32 years, but then the 326 sq km change would correspond to 10 sq km per year, rather than 11. Perhaps I am missing something in interpreting the results ? Are they perhaps weighted for each glacier by the time span between mapping and Landsat imagery which can range from 14-54 years ? Table 1 gives mean time spans of 17 and 12 years respectively for the two epochs (time intervals) studied, but Table 4 suggests that to calculate the change per year they used 14 and 11 years respectively (199/14 and 55/5). It's not clear to me then how these values were derived.

2. Specific comments:

The numbering of figures and tables does not match their citation in the text: figures 6 and 7 are referenced before figures 3,4,and 5; tables 7 and 5 are referenced before tables 3,4 and 6. p3075, line 7: Landsat imagery is used rather than SPOT/ASTER due to larger swath width, but surely it is also due to availability, as SPOT/ASTER were not available for most of the time periods. line 27: the authors used the TM 3/5 ratio (Red/MIR)... perhaps they might state why this is preferred over TM 4/5 or indicate a previous reference where this is stated. p3077, lines 14 and 17: the threshold values are given as 2.8 to 2.4 and then 2.0 to 2.4 - is there a reason why these are not consistent (smaller value first) In the references, page numbers are given where each reference occurs, but they partially conceal the date of the publication ... is this a new Cryosphere standard ? I don't see this in other discussion papers.

3. Technical issues: typographic corrections:

3069, l10: totally -> total 3071, l7: vast -> extensive 3072, l20 Norway -> Mainland Norway l23: numbers -> number 3078, l1: on screen -> onscreen 3080, l6: In case

of ... -> In the case of ... l7: is -> are l12: each outlines -> each set of outlines l19: achieved -> acquired 3082, l2: due to the fact that -> because l28: to -> into 3083, l6: is -> are 3085, l26: in -> of 3086, l3: show mean -> shows a mean ... l4: satisfying -> in agreement l5: the for -> for l16: do also change -> impact l17: makes -> make 3087, l10: Totally -> In total 3087, l10: 'retreated' is also used to state change in length . . . perhaps here you could replace retreated with 'decreased' ? 3091, l13: terminus -> termini 3092, l1: beginning of -> the l2: remove 'very large' l15: opens -> open

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Interactive comment on The Cryosphere Discuss., 8, 3069, 2014.