

## ***Interactive comment on “Verification of forecasted winter precipitation in complex terrain” by M. Schirmer and B. Jamieson***

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Schirmer and Jamieson present an evaluation of winter precipitation forecasts in complex terrain using measured accumulation on the ground to avoid well-known problems with under-catch of solid precipitation in gauges. Interestingly, they provide an economic analysis for actions based on forecasts. I think that the abstract should make it clearer, as the main text does, that the example action given is the implementation of an avalanche warning service at large cost. It seems fairly obvious that an action of that sort would be more likely to be based on the climatology of a region rather than cumulated forecasts, and forecasts can still be highly valuable in preparing for individual extreme events.

Some corrections, questions and comments follow, identified by page and line numbers  
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in the discussion paper.

page 5728, line 19 “the question of how much snow”

5728, 24 NWP models were not initially developed with adequate spatial resolutions for complex terrain, and there are few such even now.

5729 Note that the “double penalty” affects a feature that is correctly forecast in magnitude but spatially offset from observations. The illustration in Ebert et al. (2008) uses a radar-based precipitation product on a 5 km grid; I don’t think that it could be so readily identified for the coarser and irregularly spaced weather stations here.

5729, 11 “which cause regular verification metrics”

5730, 5 “a snow storm on 12 February 2000”

5732, 24 “the question of how well”

5733, 15 CaPA has been operational since 2011, so why were 2012/13 data not available?

5733, 25 How large are the differences between model and station elevations?

5734, 11 The term “snow harp” (a device developed by SLF) will not be meaningful to most readers.

5734 Is it either snow depth or snow water equivalent measurements that are used at each site and never both? How do the numbers of non-precipitation events compare for sites where both measurements are available?

5736, 4 What criteria were used to identify observations as outliers?

5736, 14 “greater than specific thresholds”

5737, 16 “the decision maker suffers a certain loss”

5737, 18 “based on the empirical frequency”

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5738, 6 “economic loss relative to decisions”

5739, 5 This point would be a little more clear if the same vertical scales were used in figures 2 a and b.

5740, 6 Yang et al. is missing from the references

5740, 23 “The values for CaPA are shown”

5740, 27 “both the NWP models”

5741, 26 The WMO SPICE programme could provide the suggested independent measurements <http://www.wmo.int/pages/prog/www/IMOP/intercomparisons/SPICE/SPICE.html>

5742, 24 “a subset of the same stations”

5742, 28 Should be  $(a+c)/n$ ? I’m not clear what “the baserate of the categories” means.

5743, 6 “, but the parameterization was done”

5743, 21 “The high resolution GEM-LAM in the winter”

5743, 24 “in both the verification data sets”

5744, 23 “these measures should not rely on a precipitation forecast alone”

5745, 16 “we want to give an example”

5748, 14 “underestimation by the NWP models”

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Interactive comment on The Cryosphere Discuss., 8, 5727, 2014.