

### COMMENTS TO REFEREE #3

The authors analysed snow accumulation and melt cycles in four winters to determine the representative snow depletion curves which were then applied in an energy based snow accumulation and melt model. Model validation showed that the approach resulted in a reasonable reproduction of snow depth variability in an environment characterized by frequent accumulation-melt events. I am not sure that the approach which was not validated for more and larger control areas is so easily transferable to larger scales, e.g. a catchment. However, the manuscript is inspirational and I agree with its publication after modifications considering the following comments:

First, we would like to thank Referee 3 for the comments and suggestions made to our work. All Referees in fact point out the applicability of results beyond the local scale in their remarks, and we hope to have succeeded in justifying the interest and potential of our work regarding this, as explained in the previous responses and the new text included in the revised version of the manuscript.

**- Please write what is the resolution and accuracy of snow depth values estimated from the photographs and snow poles.**

The snow depth measurements obtained by this technique are the results of a 3-step procedure: a) snow pole detection in the images, b) transformation between pixel- $h_{ref}$ , and c) transformation between  $h_{ref}$ - $\bar{h}$ . In each step, different error sources must be considered (rod resolution, number of pixel on the pole, topography, transformations, etc.). During the first year analyzed, we performed some in-situ direct measurements on one of the poles to assess this. An error of  $\pm 30$  mm was found for the  $h_{ref}$  values from the comparison with these in-situ measurements. This error includes the two first sources of error. The third error source is very difficult to determine since there are no distributed snow depth measurement over the study area; to overcome this, as explained in the text, we adopted the simplifying hypothesis of a horizontal top surface of the snowpack along the cross section of the pole area, and assumed that the error stemming from this transformation is included in the resulting value of the determination coefficient ( $R^2$ ) in the fitting step. With all, we estimated an accuracy of  $\pm 45$  mm in the snow depth measurements.

**- Equation 2 describes the relationship between  $h_{ref}$  and  $h$  (for the whole control area). However, two snow poles are mentioned in data description. It is not clear if data from both poles were used in calculation of  $h$  and how.**

Only data from one pole were used in the analysis. The second one was a control test for the horizontality hypothesis adopted in the calculation of  $\bar{h}$ . To avoid confusion, we have rewritten this description (see p. 5, lines 25-27, in the revised version).

**- Please correct the error in the last two lines of table 2; do they not give "mean duration", but total number of days with snow accumulation and snow melt in particular winters, respectively (this corresponds to the mean values given on p. 7, l. 16).**

We apologize for this error, which has been corrected in Table 2 and the body of the text (see Table 2 and p. 7, lines 21-24, in the revised version).

**- Caption of Fig. 5 b and elsewhere in the text (e.g. page 8, line 5; p. 10., l.2) - the curve for snow accumulation (Curve 0) should not be called "depletion" curve, because the snow covered area is not decreasing, but increasing**

We fully agree with the Referee and, following this remark, we have changed the expression into ADCs, that is, accumulation/depletion curves, throughout the revised text.

**- Table 3 - please add a column with number of points (days) which were available for fitting in each cycle - Quality of Fig. 5 is not good, especially Fig. 5b is not readable**

Following this suggestion, a new column has been added to Table 3 and Figure 5 was replaced by a higher resolution version in the revised manuscript.

**- p. 9 l. 19 - Please change formulation of the sentence simulation of snow cover FRACTION should not have ME, MAE and RMSE in millimeters.**

We apologize for this, which has been corrected (see p. 10, line 3, in the revised version).

**- Fig. 8 - adding measured precipitation and air temperature to the figures would aid explanation of the mismatches mentioned in the Discussion (p. 10., l. 24-32).**

Following this, we have added the information into Figure 8 in the revised version.

**- The Discussion could also compare the results of presented approach with other works devoted to incorporation of subgrid distribution into snow models.**

Following this, we have expanded the Discussion regarding this issue (see page 12 lines 1-14 in the revised text).