

## ***Interactive comment on “MODIS snow cover mapping accuracy in small mountain catchment – comparison between open and forest sites” by J. Parajka et al.***

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Author response to review 1

We would like to thank Dr. Dery for his positive, constructive and very helpful comments on the manuscript. We have addressed his comments as follows (our response is in italics):

This paper is generally well-written and provides interesting results. It should therefore be published in Hydrology and Earth System Sciences following some minor revisions. My detailed report on the paper follows:

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General Comments:

1) Have the authors considered using the MODIS fractional snowcover product in place of the binary one (e.g., Salomonson and Appel 2004)? Not in this study. *We plan to look at the sub-grid variability of snow (including fractional snowcover) in our next investigations.*

2) Additional climatic information of the study site would provide better context for the study. For example, information on mean annual air temperature, total precipitation, snow depth, etc. could be reported under “study area”. *In response to this comment, we have added information on mean annual air temperature, precipitation and runoff.*

3) How does the accuracy of the MODIS snowcover mapping vary over time? Are there greater uncertainties in the MODIS data during the ablation period rather than the accumulation period? *The profile measurements do not allow a robust comparison between accumulation and ablation phase, as they are biased towards periods of maximum snow storage in the catchment and subsequent snowmelt. In response to this comment, we have extended Results section and added the seasonal performance for forested sites. Indeed, we believe that existing Figures already clearly indicate the mapping performance during snowmelt period.*

Specific Comments:

1) P. 4073: The title of the article should be changed to read “: : in a small mountain catchment: : :” *Corrected.*

2) P. 4074, line 3: Instead of “grassy sites” perhaps use the term “open sites”? *Corrected.*

3) P. 4076, lines 19 and 20: These two sentences should begin with “The”. *Corrected.*

4) P. 4076, line 23: Rewrite as “a national park”. *Corrected.*

5) P. 4077, lines 25-28: The wording here could be improved. *We reworded the sen-*

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tence as follows: "... MODIS sensor is onboard of two satellites, Terra and Aqua, which started the observations in February 2000 and July 2002, respectively. Both satellites use the same type of MODIS instrument ...."

6) P. 4079, lines 21-22: The precision of snow cover mapping accuracy index should be consistent, either no decimal figure or one decimal figure. *In response to this comment we have revised the accuracy to one decimal figure.*

7) P. 4083, lines 11-15: Has a 7-day filter also been tested in assessing the accuracy of the MODIS data? *No, because we already found a good agreement with the 2 -day filter. It is indeed a good idea, which we plan to test in the future.*

8) P. 4084, line 23: The journal should end with "Sensing". *Corrected.*

9) P. 4085, line 18: Note the spelling mistake in "moisture". *Corrected.*

10) P. 4087, Table 1: Are the sites for the snow measurements exactly at 100 m intervals of elevation? It might be useful to provide a graph of the timing of the snow measurement campaigns rather than just the total numbers. *Yes, the profiles are supposed to be situated exactly at 100m interval. We would prefer to retain the Table as it is. It would be difficult (messy) to add the timing to a table. The dates of snow campaigns are easily identifiable from the assessments figures (Fig.4, 6 and 8).*

11) Pp. 4089-4091, Tables 3-5: Instead of the column header "Snow OK", please use "Snow True". *Corrected.*

12) P. 4093, Figure 2: Can you please add a scale to this figure and the cardinal directions for the maps? *With respect to this comment, we have added the cardinal direction to the figure. The scale was already presented. For clarity, we have somewhat increased the font size of the scale.*

13) P. 4094, Figure 4: This figure can be deleted since it does not provide more information than the maps in Figure 3. *Figure 4 shows the agreement between MODIS and SWE measurements and Figure 3 shows in detail the neighbourhood around Cervenec*

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*station. We agree that the Fig 3. shows the same area as is already presented in Fig.2, but we prefer to retain both figures, because Fig.3 clearly demonstrates the sub-pixel variability of land cover.*

New references: Salomonson, V. V. and I. Appel, 2004: Estimating fractional snow coverage from MODIS using the Normalized Difference Snow Index (NDSI), Remote Sensing of Environment, 89:351-360.

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