Hydrology and Earth System Sciences Discussions

Interactive comment on "Topographic control of snow distribution in an alpine watershed of western Canada inferred from spatially-filtered MODIS snow products" *by* J. Tong et al.

Anonymous Referee #3

Received and published: 6 October 2008

The authors applied the products of current remote sensing technology to obtain information on snow distribution in a large catchment with complex features which would not be easy to obtain from standard networks. The paper extends knowledge on the concrete catchment and presents an approach that can be (and is) used in other studies. I recommend publication of the paper.

Specific comments:

1. Please clarify briefly the role of daily snow cover maps MOD10A1 in your study. The use of MOD10A1 is mentioned on page 2351, line 12, but without more detailed

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information.

2. "Seeming" accuracy - does it make practical sense to use the numbers in tenth or hundredths considering the existing uncertainties? For example, 0.63 days, 0.89 days, 1.04 days practically mean 1 day and the difference is only "mathematical". The DEM used in the study DEM has resolution of 1 km. Documentation on the DEM states the following: "...Vertical accuracy varies by source materials used in GLOBE. Values may range from 10 meters to 250 meters (and in rare cases, to over 500 meters in elevation)..." Therefore, calculation of standard deviations of SCDs for 10 m elevation band gives only more numbers for the statistics and Fig 7; the accuracy is just apparent. I think it would be fairer to work with 100 m elevation bands. The accuracy of spatial filter was validated using only 3 ground-based observations. I assume there were no more ground-based observations available. But then again, does it make practical sense to say that the accuracy is, e.g. 82.72% (hundredths of percents)? The numbers should correspond to uncertainties. It was found out that at altitudes below 1000 m a.s. l., about 2.5% of snow cover is indicated in summer which is not realistic. This is perhaps (the least) uncertainty which should be kept in mind.

3. Page 2355, line 19. The authors say that "...;the north-facing areas have always the lowest SCF from September to March."; Fig. 5 shows that it should perhaps be south-facing areas (in September, October, November and March for slopes between 5 and 15 degrees and in September, October and March for slopes above 15 degrees).

4. Could you explain why the standard deviations of snow cover duration above 2000 m a.s.l. decrease in the onset season?

Technical comments

1. Readability of figures. It would be good to change color scale for elevations in Fig. 1 (less classes, higher contrasts among classes). Otherwise the elevations are not much recognizable even in color version (the black and white version would be unreadable at all). Figs 3 and especially Figs. 5 and 7 would benefit from longer y-axes, Fig. 6 could

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be bigger. Please think about using more contrasting symbols in Fig. 7.

2. The paper is subjectively sometimes not easily readable due to many abbreviations. Abbreviations such as SCE, SCD, SCF, SF can be useful. However, perhaps it would be good to use full names for the terms which are not so frequent in the paper, e.g. standard deviation.

3. Page 2360, line 15; publication Hall and Riggs, 2007 is not mentioned in the main text of the paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2347, 2008.

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