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Interactive comment on “Hydrological response unit-based blowing snow modelling over an alpine ridge” by M. K. MacDonald et al.

Anonymous Referee #2

Received and published: 10 April 2010

Review: Hydrological response unit-based blowing snow modelling over an alpine ridge

General comments:

The presented paper deals with snow transport over an Alpine ridge. A model concept for representing snow transport within Hydrological Response Unit's (HRU's) is used. The paper is well written and has a logical structure. Nevertheless, it seems to be a little unbalanced. The model description is very detailed with lots of formulas. This part should be shortened and some well-known formulas should be excluded and the original literature should be cited instead. The chapters 4, 5, 6 and 7 on the other hand should be extended a little bit and it should be proofed if some of these sections can be combined.

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Chapter 2.2 describes some features that were measured. It would be good for the general understanding if the authors would provide some information about the scope of the measurements. “A shrub count was performed for diving the roughness of the surface....” for example. Furthermore, is it true that the snow survey is followed the modeled transect (1173 line 6)? Or are the HRU’s (and therewith the modeled transect) defined over the findings of the field campaign?

Chapter 4: I think this chapter is essential for understanding the model concept. Hence, the reader should precisely understand in which way the different HRU’s were defined. I think the authors should extent this part a little bit. What does e.g. “is located from 127 to 243m” mean? What exactly is the criterion that defines if a new HRU is needed or not? Is it just the SWE (of 07/08 or 08/09 or of both years?) or also vegetation, topography and so on?

The chapters 5 and 6 are pretty short. Can you combine 5 and 6 and probably the first part of 7, were you just describing the results? I think you could probably shift the content of chapter 7 from 1187 / line 1 to 1187 / line 22, to 6.

Chapter 7: It should be very clear if you discuss model results or observations or if you discuss model results with respect to observations. This is sometimes a little bit confusing. I think this chapter should be extended and overworked. The HRU concept was mentioned as an important factor for an enhanced model performance and it is mentioned that the results are satisfying. Nevertheless, there are some simplifications. The authors use a fixed sequence for the transport of snow from one HRU to another for example. They also give the answer that this concept works out well. However, a discussion how and if a negligence of different wind directions and therefore transport directions is influencing the results would be beneficial.

Specific comments

Side 1169, line 5: The snow cover can also isolate the ground and does therefore not necessarily cool the ground.

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Side 1171, line 5-11: I would suggest splitting up this one sentence into 2 or more sentences.

HESSD

Side 1171 and side 1172: Figure 1 should be cited here.

7, C458–C460, 2010

Side 1172, line 26: I would exclude 2006/2007.

Side 1173, line 1-2: There are Please specify

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The caption of the tables is very short. One should understand the table without reading the text. So, can you please extent the caption?

I would suggest the acceptance of the article after moderate revision.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1167, 2010.

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