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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Model simulations of the modulating effect of the snow cover in a rain on snow event" *by* N. Wever et al.

Anonymous Referee #2

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Interactive comment on "Model simulations of the modulating effect of the snow cover in a rain on snow event" be N. Wever et al.

The paper describes a modeling approach to understand the interaction and impact of an existing snowpack to generate melt and snowpack discharge during a rain on snow event. This type of investigation certainly leads to a better understanding of potential flood risks in regions where the occurrence of rain on snow events can lead to catastrophic impacts downstream. Field investigations of these events are difficult and are problematic, which leaves a modeling approach as the most feasible avenue for an evaluation of snowpack processes. The authors implement a physically based energy balance model to simulate snowpack accumulation and melt during a rain on snow event in the Swiss Alps.

While the technical aspects of the paper appear sound there are improvements that need to be made to the written structure and organization of the paper. Language and descriptions need to be concise, clear and well organized. The current structure of the paper seems somewhat random and results in poor "flow" for the reader. Also throughout the paper present and past tenses are used – typically past tense is used throughout a paper.

Specific Comments:

ABSTRACT The abstract is too lengthy and goes into too much detail. The structure of the abstract should be brief using 2-3 sentences to describe problem, 2-3 sentences to describe what was done, 2 sentences the most significant results and 1 sentence to summarize the impact of the results. Please eliminate the multiple paragraph structure.

4973-1: use of the word "probably" infers that you have not answered this part of your question

INTRODUCTION 4973-24: Why is the stored rain water "important"? consider removing the "important" 4973-25: I believe you would like the word "extent" not "extend" 4973-27: remove "is getting" and change to "becomes"; remove "wet" – isothermal describes the "wet" state of the snowpack 4974-11: remove "was bringing" replace with "brought" 4974-12: use of the word "roughly" – please be precise 4974-13: What is meant by "decayed" – choose another word

METHODS AND DATA The complexity of describing a modeling exercise makes it difficult to provide the reader with the information they need to understand your approach. The "Methods" section needs to be structured to describe each component of the work. I would suggest you follow this structure:

2.1 Brief overview of what the methods 2.2 The model: describe the model and the required inputs 2.3 Station data and development of input data for the model 2.4 Describe the event you are going to model 2.5 Modeling result evaluation

The methodology in its current structure is too difficult to follow and confuses the reader.

Specific line comments: 2.1 The description of the sites and locations is extremely important. Please include a map of the regions and location of the stations you are using. Also include a table for the stations and the sensors that are available for each location.

4980-17:20 – This sentence is confusing and needs more explanation in your approach of using other station data and why you are doing so.

RESULTS AND VERIFICATION The results section contains descriptions of methodology. Move the event description to methodology.

Specific line comments: 4983-3: Figure 2 and 3 are repetitive 4983-10: Use of the word "tiny" – "tiny" should not be used as comparative adjective, be specific 4683-18:19: Please refer to the figure – "curve getting steeper (Figure XX.)" 4685-1:3: Identify why the boundary conditions result in errors

4989-19: change "was having" to "had" (or similar)

CONCLUSIONS The Conclusions section is well organized and points to the proper data to support the remarks. Consider integrating the information in the final paragraph in the lead paragraph of the conclusions section.

Specific line comments: 4989-20:23 – this sentence is too long and "It was crucial" is awkward 4989-23:25: This sentence appears as a conclusion, but it seem like it should be stated clearer as a hypothesis 4990-6: The "Note" is not needed, it is inferred as you are drawing on only modeling for conclusions. You can address this in the previous sentence

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 4971, 2014.