

## ***Interactive comment on “Simulation of wind-induced snow transport in alpine terrain using a fully coupled snowpack/atmosphere model” by V. Vionnet et al.***

### **Anonymous Referee #2**

Received and published: 15 September 2013

Review of paper by Vionnet et al submitted to TCD, tcd-7-2191-2013

The paper by Vionnet et al presents a new scheme to simulate wind-induced snow transport. The model, probably intended for operational use, is the first model directly coupled to a meso-scale model.

The model is presented in great detail, and as such clearly explained. The validation of the model is rather superficial. Jus on event is shown, with no quantitative statistics.

It is pointed out (p2196, l 16) that Meso-NH can be used up to 10 m resolution. Why is the model not run also at this resolution to compare to measurements?

C1778

On p 2208, l 13 ff, it is mentioned that "intensive measurement campaigns have been performed..." Why are these data not used to evaluate model performance?

The section "Results and discussion" is difficult to read, and mostly results. I expect from a "Discussion" that the results are put into context to previous work. This is mostly missing. I suggest that this section is completely restructured, and results and discussion put into separate sections. I also would expect that the model compares its improved (?) performance to other models.

The model evaluation is illustrated by comparing what the authors call "an indirect comparison". the results of Fig. 7 are impressive (also a quantitative statistic is missing). But how compare these number to the integrated results and true distribution? The section is also very qualitative, what the authors consider "satisfactorily" (p 2212, l 9), "well" (p 2212, l 23) has to be cast into statistical terms.

In fact, it remains unclear if the data shown are at all connected to the text, as in the text they write "the event of 22-26 February 2011", and in the figure they write "snow depth difference measured by TLS at a horizontal resolution of 1m between 28 February 2011 and 17 February 2011" (which seems to be more than a typo by the reviewer).

Smaller remarks

p 2194, l 15 The word "interactively" is used in an unusual way. Probably you mean "coupled". I could not see any interaction by a user of the model.

p 2194 l 24 The sentence "These studies ..." and following is very wordy, but does not mean much. Probably you mean: We understand now the importance of the main processes (which) to simulate blowing snow in mountains.

p 2197 l 1 What is the importance of the sentence "Previous versions..."? Just a reference?

p 2199 l 5 Sentence is not understandable to the reviewer.

C1779

p 2204 | 11 use -> uses

p 2207 | 11 correct: of a smaller timestep

p 2208 | 7 The sentence is quite meaningless

p 2208 | 13 ff The following paragraph is out of context

p 2210 Please split Results and Discussions in two separate sections.

p 2211 | 14 area -> areas

General: there is an enormous amount of studies cited. often as a list of 2-3 authors. Do I have to read all? Is there some importance? Please restrict yourself to the most important, and explain why this reference is relevant.

References All references have at the end a meaningless number (first paper: 2214) correct

Figures The fontsize of most figures (5, 7,9, is just at the edge of being legible, too small in general.

Fig. 5: What is the meaning of the color bars?

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Interactive comment on The Cryosphere Discuss., 7, 2191, 2013.