Report on

Near surface snow particle dynamics from particle tracking velocimetry and turbulence measurements during Alpine blowing snow storms

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The reviewer really appreciates efforts made by the authors to improve the manuscript by adding new references, new graphs and data allowing generalization of the results. The main points raised have been answered.

Discussions concerning wind characteristics and more particularly the quadrant hole analysis are a prime example: conclusions are now convincing but lead to new comments. Why did the authors choose a fifteen minute average to calculate the mean wind speed and the friction velocity and what influence does this choice have on the quadrant hole analysis (Figure 4).

My main other comments are still in regard to the limit between creep and saltation. The authors cannot hide behind the arguments: “the arbitrary height is not a threshold, it was chosen to illuminate the subtle difference in particle transport and the continuum of motion…”. This argument can be admitted for 3.3 Turbulent flow and Figures 9. But in order to calculate the ratio of the sum of momentum in the creeping population to that lost to the surface from impacting high-energy particles capable of splash, the authors need to be very precise as to the method used and to explain as clearly and in as much details as possible the reasons leading to the values 3 and 4 mm. In such a way, similar experiments with different hardness can be conducted in the future and compared with the results presented in this paper. P28 it is written that this choice is made according the high and low-energy saltating grain populations theory proposed by Ho et al, 2014. I would like to recall the conclusions drawn by Ho et al., 2014:

As a result, two different populations can be identified but using a criterion that differs from that of Bagnold:

(i) the low energetic saltating particles lying below 2zf and hardly influenced by change of the flow strength
(ii) the highly energetic ones saltating above 2zf sensitive to increase of the flow intensity.

On what figures or zf values do the authors base the choice of the threshold 3 or 4 mm ?

Moreover the method used for calculating Crp/Spl is a little ambiguous for the reader and need to be clarified. The low-energy population at the surface is identified as the difference of the two collections of particles vector (P 29 line 5). As far I understand, this implies that the high-energy population (particles capable of splash) is identified to be twice of particles vector for upper region height bands. If not the total impacting high-energy snow grain momentum will be wrong. But later (p35 line 24) the authors wrote « the momentum present in the slow surface transport was often larger than that found **in the upper region high energy grains** as can be seen by crp/Spl>4.” It is really confusing because it seems in this sentence that only particles in the upper region have been taken into account. For clarity it will be helpful to give an example showing a horizontal particle velocity histogram for near surface and upper regions and the corresponding histogram for creeping population and particles capable of splash.

A few minor errors have been made:

Figure 6 d-f) Friction velocity versus particle velocity gradient
Figure 6 g-i) Friction velocity versus particle slip velocity
Figure 9-b) Mean horizontal particle velocity for three height band
And some graphs are still not enough clear.

P32 line 4 / At 9 s, the number of particles tracked in the upper regions increased as particles tracked near the surface decreased. From my point of view it is not visible in the graph. It will be probably useful to zoom in on the concerned area.