

Interactive comment on “Near-Surface Snow Particle Dynamics from Particle Tracking Velocimetry and Turbulence Measurements during Alpine Blowing Snow Storms” by N. O. Aksamit and J. W. Pomeroy

Anonymous Referee #1

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This manuscript introduces the measurements of the blowing snow with the Particle Tracking Velocimetry (PTV) and tries to investigate the particle motions near the snow surface. I appreciate very much for the author's effort to apply the PTV technique in the field and successful observations. The attitude should be highly evaluated. However, as far as I read through the manuscript, I have got the impression that the data shown here is not always valuable for both the drifting and blowing snow research community, in particular, for the accurate modeling. PTV recordings shown in Figure 2 probably involve the meaningful information, however, I am afraid the surface bed is far from flat and the height difference amounted to 5 mm. It gives the substantial effect on both

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particle speeds and the wind velocities shown in Figure 3. It is quite plausible that the reason why the wind speed showed the maximum at 2 to 7 mm and why a zero wind velocity zone above the saltation layer exists is related to the bed surface undulation. Bagnold's focal point is hard to refer under such conditions. Further, the friction velocity of 0.08 m/s at Rec. #2 is extremely low; under such conditions the blowing snow, never breaks out and keeps going, even though we take into account the turbulence effect. On the contrary, at Rec. #3, u^* is extremely high. Under such conditions, I suppose the particle concentration near the surface increases largely and it makes hard to distinguish individual particle, that is, no precise particle tracking is available. In fact, I cannot agree with you more that the turbulences including ejection and sweep intermittent structures are key factors to initiate the snow particle motion, rather than the time averaged friction velocities, not only in the mountain area but on the flat snow surface. However, when you would like to set your focus on these issues, you need more specific and detailed analysis based on the high frequency data. Although the quadrant analysis has been tried, the explanation of the outcome is superficial, more detailed analysis related to the particle motion are essential. Presumably 1m distance between the PTV and the anemometer makes the quantitative comparison difficult? Further, the descriptions in the discussion and conclusion parts are mostly qualitative and look nothing but a pile of well known and predictable issues. More firm conclusions based on the more quantitative analysis are essential. I strongly recommend, first of all, the authors to reexamine the obtained data again and uncover the hiding useful ones. Further, an accumulation of more data will be preferable; in actual, saltation of 400 to 1000 μm diameter graupel is a very exceptional case. I cannot believe that such large particles kept saltation under the friction velocity of 0.08 m/s at Rec. #2r. At this stage, I regret to say that this manuscript has not been matured for the TC publication.

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