

General and specific comments

This discussion paper deals with an important question (how forests influences net snow precipitation at different altitudes and canopy densities). The site study seems well performed and well documented. Modeling of the surface energy balance (EB) is also performed with several assumptions, and the paper would be improved if the effects of these assumptions were discussed and additional comparisons with other studies were made.

Would, for example, the simulation result be approximately the same if a different formulation of the roughness length, forest floor albedo, canopy temperature, transfer coefficients etc. were used? Can you e.g. expect the same relationship between forest and air temperature forests with different SVF? The Pomeroy and Gray (1990) study regarding threshold wind velocity for saltation of snow refer to wind velocity at 10 m, are you using the same measurement height? Unloading of snow from the branches does not seem to be discussed. The study sites were chosen with regard to slope aspect. What about curvature, which also might influence the accumulation? Snow courses were performed from open areas into forested areas. Were measurements at the forest edges avoided? Otherwise prevailing wind direction might influence the accumulation pattern there. The open sites had less than 20% canopy cover; did the cover differ between the open sites? If so, how might this have influenced the results?

The paper would also be improved if studies from maritime snowy Japan and Spain were cited (see below) and the early studies by Leaf from the Rocky Mountains who discusses the effect of wind on canopy interception.

I would also appreciate clear information about how events with mixed rain/snow were separated from pure snowfall events.

The paper should be checked to assure consistent use of notations.

Suggested additional references and technical corrections

References

Possible publications from maritime Japan and from Spain are listed below and other publications by these authors could also be relevant.

López-Moreno, J I., and J. Latron. "Influence of canopy density on snow distribution in a temperate mountain range." *Hydrological Processes* 22.1 (2008): 117-126.

- López-Moreno, J. I., et al. "Sensitivity of the snow energy balance to climatic changes: prediction of snowpack in the Pyrenees in the 21st century." *Climate Research* 36.3 (2008): 203-217.
- López-Moreno, J. I., S Goyette, and M Beniston. "Impact of climate change on snowpack in the Pyrenees: Horizontal spatial variability and vertical gradients." *Journal of Hydrology* 374.3 (2009): 384-396.
- Nakai, Y. et al. "Energy balance above a boreal coniferous forest: a difference in turbulent fluxes between snow-covered and snow-free canopies." *Hydrological Processes* 13.4 (1999): 515-529.
- Nakai, Y et a l. "The effect of canopy-snow on the energy balance above a coniferous forest." *Hydrological processes* 13.14-15 (1999): 2371-2382.
- Ohta, T., et al. "Characteristics of the heat balance above the canopies of evergreen and deciduous forests during the snowy season." *Hydrological Processes* 13.1415 (1999): 2383-2394.
- Lundberg, A, et al. "Snow accumulation in forests from ground and remote-sensing data." *Hydrological Processes* 18.10 (2004): 1941-1955.

Long wave radiation, wind effects and aerodynamic resistance formulation (roughness length) could e.g. be compared with the studies by:

- Niemelä, S., P Räisänen, and H Savijärvi. "Comparison of surface radiative flux parameterizations: Part I: Longwave radiation." *Atmospheric Research* 58.1 (2001): 1-18.
- Pomeroy, J. W., and K. Dion. "Winter radiation extinction and reflection in a boreal pine canopy: measurements and modelling." *Hydrological processes* 10.12 (1996): 1591-1608.
- Leaf, C.F., "Watershed management in the Rocky Mountain subalpine zone: the status of our knowledge" (1975). *Aspen Bibliography*. Paper 5098.
http://digitalcommons.usu.edu/aspens_bib/5098
- Beljaars, ACM, and P Viterbo. "The sensitivity of winter evaporation to the formulation of aerodynamic resistance in the ECMWF model." *Boundary-layer meteorology* 71.1-2 (1994): 135-149.
- Montesi, J, et al. "Sublimation of intercepted snow within a subalpine forest canopy at two elevations." *Journal of Hydrometeorology* 5.5 (2004): 763-773.

Technical corrections

A list of used notations would improve the paper, and the paper should be checked to assure consistent use of notations,

- height above snow surface is sometimes noted with Z and sometimes with z and
- air temperature is sometimes noted with T_a and sometimes with T_{air} etc.

Typographical corrections etc..

P1 L13 remove the word *on*

P2 L15-16. Missing text ?; range from to

P3 L12-15. Clarify how total amount of snow accumulation can alter time of onset and melt rate! Can it?

P5 L15 Substitute the word *radius* with diameter

P8 L2 Remove *amount of*

P8 L21 add unit for C_e (-)

p12 L 17. By the word complex? Do you mean multilayer?

Figures

Fig 2. Add information about used years!

Fig 3. Cm SWE or cm height?

Fig. 5. The figures would be easier to interpret in the zero degree line was added. This cannot be mean monthly air temperature; it has to be a boxplot of air temperatures. Is the same type of plot used for all sites and is the same number of years used for all sites?

Figure 6. The shaded areas are not gray. I assume the range is over the day - not over the study duration?

Tables.

Table 1. Is the ablation rate given in snow height or SWE?

Table S2. Remove unnecessary brackets!