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Interactive comment on "A 7-year dataset for driving and evaluating snow models at an arctic site (Sodankylä, Finland)" *by* R. Essery et al.

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GENERAL COMMENTS

This nicely written paper presents in a concise way data sets that can be used to drive and evaluate snow-cover models in an Arctic environment. In addition, above-canopy radiation and wind measurements have been modified in a separate set to also account for below-canopy conditions. This makes the sets particularly valuable but also shows that carefully evaluated procedures based on long-term records are required to do so, which may not be fully the case regarding wind speeds. Another example is the scaling applied to snowfall that would not be as convincing if applied to one or two winters only. In my view, however, the weakest point is the comparison of measurements with model simulations. While the scatter plots of Figure 10 may give the impression of a fair

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correlation between those two, a look at the supplementary material shows that there is still work to do. But one has to take in account that quantitative comparisons of simulations with measurements are still quite difficult to perform.

I therefore recommend accepting the paper after the authors addressed the minor issues below.

SPECIFIC COMMENTS

p. 1, line 11: Is “bulk” needed here? Snow depth and snow water equivalent are intrinsically related to the snow-cover as a whole anyway.

p. 1, line 25: I wonder whether it would be better to cite the data set directly? WSL Institute for Snow and Avalanche Research SLF: Meteorological and snowpack measurements from Weissfluhjoch, Davos, Switzerland, Dataset, doi:10.16904/1, 2015 [first cited in: Wever, N., Schmid, L., Heilig, A., Eisen, O., Fierz, C. and Lehning, M.: Verification of the multi-layer SNOWPACK model with different water transport schemes, The Cryosphere, 9(6), 2271–2293, doi:10.5194/tc-9-2271-2015, 2015.]

p. 4, line 14: Equally important would be to know whether the instruments are ventilated.

p. 4, line 20: How far are AWS and radiometer tower apart? It may also be nice to mark the tower in Figure 1a.

p. 5, line 25: Do you apply any undercatch correction to precipitation data? From Table 1 it also appears the height of the precipitation gauge is surprisingly low (1 m) compared to WMO standard (1.5 m). Is there a reason for it?

p. 7, line 3: The increase in longwave radiation does not seem to be that substantial given the canopy. Can you comment on that?

p. 7, lines 11-12 : But wind adjustment will influence turbulent fluxes, will it not? Is this negligible?

p. 7, line 17: Are turbulent fluxes at FMI-ARC never directed towards the snow cover?

p. 8, lines 20-21: ‘supported on a stick’ It would be nice to know how the thermistors are mounted though. Maybe you could cite another publication, as this paper is not the place to describe that design in detail. A photograph showing the depression in the snow cover could suffice too?

p. 8 line 25: The air will affect pit temperatures at all heights. Why is the base that different?

p. 8, line 26: What volume? What cutter type is used?

Figure S1: Change ‘density’ to ‘temperature’ in caption

Figures S1 S2: I’d label the ordinate (y-axis) as ‘Height’ rather than ‘Snow depth’, which is total snow height.

Figures S1 S2: Reverse order in supplement

***** NOTE: The name of Marie Dumont is misspelled in the author list appearing on the web

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