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Interactive comment on "Optimization of over-summer snow storage at mid-latitude and low elevation" *by* Hannah S. Weiss et al.

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General comments:

The paper presents over-summer snow storage at mid-latitude and low elevation. The tests were performed in Vermont, USA. The goals of the research (according to the statements in the introduction) was to: 1) Determine the melt rate. 2) Infer the environmental factors that most influence snow melt. 3) Suggest an optimized insulation strategy based on the data. I would have liked to see clear responses to all these questions in the conclusions section.

The climate in Europe is warmer than in North America at a similar latitude. A comparison between actual weather data from other over-summer snow storages with warm

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summer climate (for example in Europe, Russia and South Korea) would have been desirable.

Specific comments:

The results should be discussed and explained more in detail. For example, what do we see in Figure 4? How much did the temperature change between the different test methods? The scaling in the figures is not so clear so this is obvious just by looking at the figures. I think the results are very interesting but a detailed comparison of foam with and without reflective cover, how much the temperature changed in the “between-foam-spot” etc. would have given more depth to the study. Similar for figures a and b as well as e and f. How much lower was the temperature above the concrete curing blanket if you compare e and f? In figures 4 c and d, the temperature on the snow seems to be much higher than 0°C in the end of the experiments. Is this due to some measurement error? Or how do you explain this temperature increase?

The PSD and the results in Figure 8 needs to be explained more in detail. What is the PSD? How do you calculate the PSD? What do we actually see in the figures?

I would suggest to enlarge and develop the discussion section. Discuss the three goals with this research and compare them to other studies. Are there for example other studies where the melt rate has been studied and how do your results relate to these? Which were the environmental factors that most influenced the snow melt and how did you reach this conclusion?

âĂČ Comments from the text:

Page 6, # 15: How do you conclude that larger piles using an optimized insulation strategy allow for efficient over-summer snow storage from these experiments? For sure this is possible, it has been done at places with warm climate (for example in Sochi, Russia and Pyeongchang, South Korea).

Page 6, # 30: The planned snow storage for the summer 2019 is interesting, but not

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relevant for this presented study and experiment.

Page 7, # 20: Conclude answers to your three research questions. Also, conclude and point out that based on your experiments and from the different experimental setups you tested, the three layer insulation was the best. Scaling up from 200 m3 to 7000 m3 will increase the remaining amount of snow, but this is not a conclusion from the performed tests in this study. Scaling up to any larger volume will render a larger remaining volume of snow, but this is not a relevant conclusion from the tests performed in this presented study. However, in the discussion section I would suggest that you mention the fact that larger volumes of snow will increase the efficiency of snow storage, as have been seen in previous studies, and as you have mentioned in #25 and 30 on page 6.

Technical comments:

Page 4, # 5: “man-made” snow should be changed to “machine-made snow”.

Page 4, # 35: Were the sheets of plastic and wood chips removed from the whole pile or just from the 1 m2 test area?

Page 5, # 5: It says that the humidity remained high, but how high is a high humidity? A number would have been interesting.

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