

Interactive comment on “Assessing the performance of a distributed radiation-temperature melt model on an Arctic glacier using UAV data” by Eleanor A. Bash and Brian J. Moorman

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We would like to add an additional response, regarding the time frame for the modelling (comments 3-25, 6-9, 7-1) and effects of grid resolution. With the availability of AWS data between July 13 and August 2 we chose to split the data into a training period and validation period. Data from the period July 13-July 21 as training data for the ETI model, while data from July 21-August 2 is used to as validation for the model. Even though the main focus of the work is on the comparison with distributed data from Bash et al. (2018), the opportunity exists for a longer comparison period at the AWS. We felt that this strengthened the examination of the model, rather than simply looking at the

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short time frame where distributed measurements are available.

The ETI formulation based on distributed model inputs was used over the entire grid, which includes the AWS location. Although the distribution of temperature and radiation is based on measurements at the AWS, modelled values for radiation and residual temperature differ due to slight differences in the DSM cell containing the AWS and the true orientation of the instruments (i.e. the radiometer is levelled, but the grid cell is not completely level). For this reason we also included the modelled radiation in Figure 2.

We will make this decision clearer in the text of the manuscript.

Finally, regarding the suggestion of investigating the effects of resolution on the model results - we agree that this would be interesting and potentially useful, but feel it is outside the scope of the present study, which is focused on the comparison to melt derived from UAV imagery. The effects of resolution have been investigated in detail by:

Irvine, T. D., Hanna, E., Barrand, N. E., Porter, P. R., Kohler, J., & Hodson, A. J. (2014). Examination of a physically based, high-resolution, distributed Arctic temperature-index melt model, on Midtre Lovénbreen, Svalbard. *Hydrological Processes*, 28(1), 134-149.

Hopkinson, Chris, et al. "The influence of DEM resolution on simulated solar radiation-induced glacier melt." *Hydrological Processes: An International Journal* 24.6 (2010): 775-788.

Arnold, Neil, and Gareth Rees. "Effects of digital elevation model spatial resolution on distributed calculations of solar radiation loading on a High Arctic glacier." *Journal of Glaciology* 55.194 (2009): 973-984.

We can include a discussion of the potential influences of resolution on our results in the context of previous work on the subject of resolution.

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