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Interactive comment on "Snow Water Equivalents exclusively from Snow Heights and their temporal Changes: The $\Delta_{\mathrm{SNOW.MODEL}}$" *by* Michael Winkler et al.

Michael Winkler et al.

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Dear Michael Matiu,

Many thanks for your comment on our publication. In the following we will answer to it step-by-step.

(1) R-package: This is addressed in the description of the function *nixmass* which comes with the package. The code is very slow if more than one year of continuous snow depth data is used as input. This is due to predefined matrices of the snowpack with all possible layers and days. In a future implementation this will be significantly

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speeded up by iterating always only over two days, thereby avoiding pre-allocation of matrices.

(2) Structure: This criticism overlaps with comments of anonymous reviewers #1 and #3. It will be carefully considered in the revised paper.

(3) Validation method: In general we agree with your suggestion for a more sophisticated validation approach. On the one hand, this would provide uncertainty estimates for each parameter. On the other hand, one could not arbitrarily choose parameters within the validated ranges, because optimized parameters interrelate. The parameter estimates would not benefit from a cross validation approach, where you end up with a likely range for each parameter. Which parameter values should one choose for running the model? We do not see a real benefit for the application of the model, since you have to use a set of optimized parameters.
An uncertainty assessment of more practical use is already presented in the study. We show the sensitivity of simulated SWE values to changes of input parameters. Not least, a cross-validation procedure as suggested by you, requires about one week of optimization time. We argue, that it is not worth the effort and will not implement this recommendation.

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