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Hydrology and Earth System Sciences
Discussions

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

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Congratulations on this great piece of work, which can have many applications.

I tried out the R-package and it works smooth for the HS series I have. However, you should state somewhere, that the code should be run separately per hydrological year (I initially tried it with a 30 year period, and it was very very slow).

Regarding your manuscript, I miss some structure. Methods, results, and discussion are all mixed together. It might be worth to split at least methods from results&discussion, and the methods into your describing the delta snow, and the rest

that you have done.

Regarding your methods, I have to advise against your approach of splitting into calibration and validation by odd/even years. Such a procedure should always be fully randomized. Given your rather limited amount of data, I strongly suggest to apply a cross-validation approach instead of pre-defining two subsets. Also an 80-20 split might be the better option to have more data available for training (and then run it 5 times, to have each observation used for both training and testing, reducing selection bias). And then, if you want, but I definitely can recommend it, you could repeat this whole procedure (randomly splitting data, training, validating) 100 (or better 1000) times, in order to get an estimate of the uncertainty introduced by your data set. This concerns especially the uncertainty on your calibration parameters and validation estimates. Another benefit would be that estimates are more robust (when it come to generalizing) with such a fully randomized approach.

Unfortunately, you did not have the chance to validate your model against the thermodynamical ones. Would love to see an intercomparison of the existing models, both ERM and thermodynamical. Maybe for another study...

Otherwise, well done and looking forward to applying your model!

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