Hydrology and
Earth System
Sciences
Discussions

Interactive comment on "Assimilation of citizen science data in snowpack modeling using a new snow dataset: Community Snow Observations" *by* Ryan L. Crumley et al.

Anonymous Referee #1

Received and published: 8 December 2020

The article is interesting and innovative. The use of data measured by the community is a contribution to the simulation of snow distribution and a way of bringing the community closer to snow science and hydrology.

The scientific quality of the article is good; however, the article could improve the analysis on some topics described below.

First, despite mentioning that the distribution of snow by the wind is important, the article do not present results or analysis in this regard.

Snowmodel allows you to export the results of wind redistribution. Showing these results would be a contribution to the analysis and discussion. Also, a comparison with

a simulation without wind redistribution (Windtrans off) would be a way to measure the improvement of using this tool.

Secondly, the assimilation in Snowmodel is highly depending of swe point location, in addition to timing. It is important to consider in the analysis where the data used are located. And if they agree in time and place with the validation dataset.

if the SWE data used for assimilation are located close to the validation point. Logically the result will be very similar to the validation point measure since the model correct the precipitation or fusion to obtain a value close to the given one. For this reason, it is important to know how close is the CSO data the field work data. If these two data are very close in time and location it does not make sense to use the field work data for validation.

Finally, the article should include a comparison between the data used: RS, CSO and field work data. The objective is to check if the data are consistent with each other and if they are very similar in time and location. Also, the article should include include a comparison between the densities estimated to convert the CSO data to snow water equivalent and the densities measured in the field work.

Some specific comments:

0) Figure 1 and 3 should be next to each other or join them to be able to compare the distribution of the data used for assimilation and validation

1) Point 3.2.5 Snow depth to snow water equivalent conversion. Add the uncertainty in the snow density estimation

2) Point 6 why the Sugarloaf Mountain station is not used to validate the results?

3) Point 6.2 The location or spatial distribution of CSO measurement used for the assimilation is as important as the number and should be and it should be analyzed here or elsewhere.

4) Line 459 (Figure 9 a,b,d,e)

C3