

# ***Interactive comment on “Snow Ensemble Uncertainty Project (SEUP): Quantification of snow water equivalent uncertainty across North America via ensemble land surface modeling” by Rhae Sung Kim et al.***

## **Anonymous Referee #3**

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The authors present a highly interesting and relevant study assessing snow modelling uncertainties across the North American region with (among others) the goal of providing information about global snow observation needs. The study comprises four different land surface models and three forcing data sets, resulting in an ensemble of twelve members. The results show that the uncertainty represented by the ensemble spread varies across the study domain, with for instance high uncertainty in the simulation results for mountainous and forested regions. The authors conclude that for these regions high-resolution observations are needed to capture the high spatial vari-

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ability in snow water equivalent. Overall, the article is very well written, easy to follow and from the technical perspective ready for publication in my opinion. Nonetheless, the current manuscript only provide rather shallow information about what snow observations are required in order to reduce the uncertainty seen in the simulation results. What variables should be measured and on which spatial and temporal resolution? For example, the need for high-resolution observations in mountains to capture the high spatial snow water equivalent variability has been recognized a long time ago. However, for very large domains, we still lack observations with sufficient quality as well as high enough spatial and temporal resolution, and this may not change soon either. Providing some more details, foremost more quantitative, about the observational needs to constrain the model uncertainties would make the paper even more interesting to read.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2020-248>, 2020.

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