

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2021-333

Anonymous Referee #2

Referee comment on "Optimization of snow-related parameters in the Noah land surface model (v3.4.1) using a micro-genetic algorithm (v1.7a)" by Sujeong Lim et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-333-RC2>, 2022

Comments on the Manuscript ID gmd-2021-333, entitled "Optimization of Snow-Related Parameters in Noah Land Surface Model (v3.4.1) Using Micro-Genetic Algorithm (v1.7a)"

This study worked on determining the optimal parameter values in the snow-related processes – snow cover fraction, snow albedo, and snow depth – of the Noah LSM, using the micro-genetic algorithm and the in-situ surface observations and remotely-sensed satellite data. The study area was South Korea. This manuscript does not have sufficient elements on the model development, it is rather a study of applying a certain optimization algorithm to calibrate the model parameters. I have doubts about the novelty of this manuscript and its suitability for consideration for publication in Geoscientific Model Development. Below are some comments which I hope could help improve the manuscript.

- Short Introduction and unclear novelty of this study. The introduction is rather short and the novelty of this study is not explicitly stated.
- Insufficient details on the methods/procedures. Section 2.2 and Table 2 miss necessary details on the selected parameters and settings for the different experiments.
- I advise the authors to add more figures to show the comparison, via scatter plot, time series plot to show the modelling results in different perspectives. Besides the RMSE value, what about the performance of the model in terms of other commonly used metrics such as R or R2 value?
- Results need more description and particularly figures. I advise adding more figures on the modelling results, and particularly representing the spatial patterns of modeling results. The author studied South Korea, readers are interested in the spatial distribution of model performance.
- Discussion is completely missing. The current manuscript has no discussion. I strongly

advise the authors to compare their findings with existing literature. In addition, what are the limitation of the study? And any potential solutions for future studies? What are effects of some settings or input on the modelling results? Lots of aspects need to be discussed.