

Reviewer 2:

The paper is much improved and ready for publication. One minor suggestion is to avoid the word "outstanding" in conclusion 3. Something like "satisfactory" would be more appropriate.

Thank you for this comment, this was changed accordingly.

Reviewer 1:

1. The authors are encouraged to provide a brief review in the Introduction regarding the added value of high-resolution soil datasets. While the present study emphasizes the importance of using high-resolution soil data, numerous previous works have already demonstrated this point, albeit in other regions (e.g., US (Singh et al., 2015), south America (Maertens et al., 2021), China (Ji et al., 2023)). A concise summary of these existing efforts would help better position the current study within the broader literature and strengthen the motivation.

Singh, R. S., Reager, J. T., Miller, N. L., & Famiglietti, J. S. (2015). Toward hyper-resolution land surface modeling: The effects of fine-scale topography and soil texture on CLM 4.0 simulations over the Southwestern U.S. *Water Resources Research*, 51(4), 2648-2667.

Maertens, M., De Lannoy, G. J. M., Apers, S., Kumar, S. V., & Mahanama, S. P. P. (2021). Land surface modeling over the Dry Chaco: The impact of model structures, and soil, vegetation and land cover parameters. *Hydrology and Earth System Sciences*, 25(7), 4099-4125.

Ji, P., X. Yuan, and Y. Jiao, 2023: Synergistic effects of high-resolution factors for improving soil moisture simulations over China. *Water Resources Research*, 59, e2023WR035513.

Thank you for this comment, we added a sentence to the introduction describing the vast impact of these studies in this field.

2. I still feel it is important to include the ERA5 reanalysis product (soil moisture, SWE) in the evaluation to support the superiority of HydroBlock simulation in Fig. 9, 10, 13, 15. Without such a comparison, it remains unclear whether the apparent advantages of HydroBlock are truly significant or simply reflect differences in resolution and forcing data. Adding ERA5 as a benchmark would provide a more rigorous and fair assessment of HydroBlock's added value. Moreover, if the authors claim that the high-resolution HydroBlock simulation is a key contribution of this study, then a direct comparison against a widely used and readily available product like ERA5 is necessary to justify why users should adopt HydroBlock over existing reanalysis datasets. Otherwise, one might reasonably ask: why not simply use ERA5 directly?

Thank you for this comment. In previous works, HydroBlocks' ability to model soil moisture has already been demonstrated (Chaney et al. 2021, Vergopolan 2020), in this work we are applying it over Finland. We agree that higher resolution is one key contribution of this study. However, we feel that comparing ERA5 soil moisture is not the main purpose of the paper at the moment, but it could be considered in future work. The comparison is also challenging because, ERA5 for example applies the Hydrology Tiled ECMWF Scheme for Surface Exchanges over Land (H-TESSEL), which uses a variety of soil texture classes, as does widely used SoilGrids data, which cannot adequately represent Finnish soil, as we demonstrated in our paper that global soil models lack details of the post glacial soils in Northern Europe. We demonstrated how using Finnish soil data base expectedly improves the modelling results, which is the main contribution of this study. In addition, instead of using a readily available output dataset, such as ERA5, the user of HydroBlocks can also adopt different input datasets and modelling options based on the purpose of one's study.