I found the paper interesting, as it tries to generate high-resolution SWE using statistical learning and produces a 4 km SWE product.

However, I have several concerns regarding the methodology.

First, you apply bias correction between the climate model outputs and the University of Arizona SWE dataset. Since climate models are not phase-synchronized with observations at daily scales, I suggest more clarification regarding the bias-correction framework. In particular, how can the authors ensure that the statistical relationships derived during the historical period remain valid under future climate conditions? Additionally, the limitations associated with applying stationary bias-correction methods to non-stationary future climates should be discussed more. Although, the manuscript discusses non-stationarity effects using a single GCM example. It remains unclear whether signal preservation is consistent across all 14 GCMs and scenarios.

You have cited the following paper; it is not clear why the WUS-D3 dataset was not considered as an additional benchmark for evaluation.:

Rahimi, S., An overview of the Western United States Dynamically Downscaled Dataset (WUS-D3), Geosci. Model Dev., 17, 2265–2286, 2024.

WUS-D3 provides dynamically downscaled SWE at relatively high spatial resolution and could be as an independent benchmark for comparing the proposed product. Including a comparison with the WUS-D3 product would strengthen the paper, as researchers who have already worked in this region are familiar with that dataset and its performance.

This is also important, as I didn't find the validation be independent, most of the validation is on the dataset that is trained, Arizona dataset which also contain in situ data itself this dataset. I mean you compare with SNOTEL, but you don't consider this point that Arizona SWE dataset directly integrates the SNOTEL dataset into its model. Please add more independent dataset also consider compare with satellite data perhaps not for SWE, but you can get snow cover from satellite like MODIS and convert your SWE to snow cover and compare with it.

Another concern is the use of Random Forest for future projections. RF models and in general most of learning based models are generally known to have limited extrapolation capability and may perform poorly when future climatic conditions extend beyond the training range. The manuscript would benefit from a discussion of this limitation. I know you acknowledge this, but I suggest being more specific and find out in which days RF couldn't work.

I also suggest testing the method separately for wet and dry years, and also more extreme years in terms of having and not having snow. Such an evaluation would provide additional insight into model robustness under contrasting hydroclimatic conditions. Furthermore, Figures' captions could indeed be clearer. It is difficult to interpret figures but just looking at them and you need to read whole part to be able to do. Please make figures captions more clear by adding, more information, like which model, which dates,…. .

The use of separate accumulation and ablation RF models is an interesting approach. However, does the need for two independent models indicate limitations in the ability of a single RF model to represent the full seasonal SWE cycle? A more detailed discussion of this point would be useful. For example, I can see one point that if in your training the climate variables was also included maybe one model was enough.

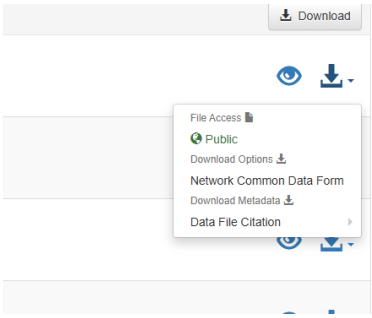
Finally, comparing mean SWE alone is not sufficient. The manuscript would be significantly strengthened by demonstrating how well the method reproduces SWE evolution throughout an entire water year, including the timing of accumulation, peak SWE, and snowmelt. I mean for a snow product, reproducing the hydrograph-like seasonal evolution is critical.

Regarding the dataset itself, I was able to view the data only through the web interface, and the preview loading time was quite long despite having a high-speed internet connection.

I was able to open the data in Avast and not in Chrome. However, I had to wait a long time, despite having a very high-speed internet connection, to view the data preview.

```
User-agent: *
Disallow: /
User-agent: Googlebot
User-agent: soscan (+https://dataone.org/)
Allow: /$
Allow: /dataset.xhtml
Allow: /sitemap*
Allow: /api/datasets/:persistentId/thumbnail
Disallow: /dataverse/*?q
Disallow: /dataverse/*/search
Disallow: /file.xhtml
Disallow: /dataset.xhtml?*&version=&q=
Disallow: /api/access/datafile/
Disallow: /
Disallow: /api
Disallow: /api/*
Crawl-delay: 100
Sitemap: https://dataverse.harvard.edu/sitemap_index.xml
# Created initially using: http://www.mcanerin.com/EN/search-engine/robots-txt.asp
# Verified using: http://tool.motoricerca.info/robots-checker.phtml
```

More importantly, during my review, I was unable to identify a way to download the dataset for independent evaluation and comparison with other products. Additional guidance on data access may be helpful. Please see below the download option is not working.



Without direct access to the data, it is difficult to fully assess the quality. Therefore, at this stage, I do not feel that I have sufficient information to provide a comprehensive evaluation of the dataset.