This compact paper describes a rasterized dataset of meteorological variables with high spatial and temporal resolution for the Reynolds Creek Experimental Watershed (Idaho, USA). The dataset was derived from operational station measurements using various spatial interpolation and modeling techniques and is available for download. It provides a valuable basis for a wide range of potential quantitative investigations of processes in the atmospheric boundary layer and land surface hydrology, particularly snow hydrology, for which the dataset was originally developed.

The paper is written in very good English and is a pleasant read. I agree with all the comments and suggestions for improvement made by the first reviewer (RC1); these have obviously been incorporated into a second version of the manuscript (which, however, is not available to me). From my perspective, only a few minor points remain that I would address prior to publication of the manuscript.

Thank you for taking the time to review our manuscript and for your invaluable comments. We will address each comment below in red text.

What would be desirable is a paragraph about the code (which is also available) used to calculate the new dataset. Would it be possible to use this code to generate a comparable dataset with, for example, lower spatial (e.g., 100 m) and temporal (e.g., 3-hourly) resolution, or to apply it to a different area? Absolutely! A good deal of thought was put into deciding the optimal spatiotemporal resolution for RCLT dataset. Ultimately, we decided to produce the highest resolution we felt was possible from both disk storage/file access and scientific application perspectives. Coarsening the dataset could be achieved in two ways: (1) the simplest approach would be to resample the 10-meter, hourly grid to the desired coarser resolution using an appropriate method for each variable; (2) the more rigorous and accurate method would be to produce a new basin topo file (DEM, mask, vegetation parameters) at the coarser resolution and then alter a few options in the yearly SMRF configuration file. We are now including a sample configuration file in the supplementary materials based on this comment. It would be an additional benefit of your paper if you write a few explanatory sentences about this in a short dedicated paragraph. We have added a paragraph explaining how this dataset can be customized to various use cases in Section 7 (Data Availability).

Minor technical corrections and revisions for improvement:

86: " … differing levels of accuracy, which are not reported here": Could you at least provide some basic experiences by the "full-time staff of technicians tasked with the calibration and servicing of each sensor deployed in the RCEW" to give the user of the dataset an idea if the station recordings of a certain variable are less or more reliable?

Because the data record was so long and there were so many measurements, it became apparent that compiling a comprehensive list of sensors was going to be nearly impossible and would result in a very lengthy description. Furthermore, field notes on when sensors were serviced, calibrated, and replaced are sparse prior to the year 2000. We have added the text "but are available upon request" to the sentence on not reporting the levels of accuracy.

Are the types of sensors used documented somewhere (if yes, a reference would be helpful)

Yes, there is detailed documentation going back to the year 2000 on the different sensors located on our internal RCEW wiki page. Readers and dataset users that are interested in these details are encouraged to contact the Northwest Watershed Research Center to find more information on site-specific sensors. Unfortunately, US government policies prohibit us from publishing this wiki page publicly at this time.

Figure 2: I would recommend to extend this table with the units of the single variables and with their very basic statistics (e.g., annual min, mean, max for the 4 decades covered?)

Thank you for this suggestion. We have added units to this Figure, though rather than adding statistics to the figure, we opted to list them in the text towards the end of the Section 4 variable subsections.

Figure 3: the x-axis does not show the period covered by the data. Can you adjust it as true time line so that it correctly covers the time-period 1 October 1983 - 30 September 2023 with correct length of months and years, ticks positioned at the beginning/end of a year, and year inscriptions positioned between these ticks?

Thank you for your feedback on this figure. We went through iterations of how to best convey the measurement time series information succinctly. The figure x-axis label was misleading, and it now reads "Water Year" to convey that the tick marks coincide with the beginning of the water years (1 October). In other words, the minor grid lines depict the start (1 October) and end (30 September) of a water year.


Air Temperature (n=35)
Relative Humidity (n=35)
Wind Direction (n=29)
Wind Speed (n=29)
Incoming Solar (n=23)
Precipitation (n=25)
RC.012
RC.031
RC.043B
RC.049
RC.057
RC.076
RC.095B
RC.098C
RC.116C
RC.124
RC.124B
RC.125
RC.127
RC.128
RC.138D03
RC.138I23
RC.138J10
RC.138L21
RC.144
RC.145
RC.147
RC.155
RC.163
RC.166B
RC.167
RC.167B
RC.174
RC.176
RC.176B
RC.BST
RC.JDT1
RC.JDT2
RC.JDT2B
RC.JDT3
RC.JDT3B
RC.JDT4
RC.JDT4B
RC.JDT5
RC.RMSP
RC.URT
1985
1990
1995
2000
2005
2010
2015
2020
Water Year

Also, the caption was not clear on the measurement gaps for each station variable. The colored horizontal bars indicate individual water years that had over half of the hours in that year where station data was able to be used in the gridded interpolation (per variable). What it does not show is each individual data gap over the 40-year period. We initially plotted each data gap but found that it was too difficult to view when considering all station variables (n=176) and across 350,640 hours. The figure caption has been revised to read:

"Annual water year measurement record used in SMRF gridded interpolation from the 40 individual sites within RCEW from 1 October 1983 to 30 September 2023. The horizontal bars for each variable indicate station observation data present for over half of a water year, however smaller data gaps are not shown. Some sites measure all six variables required by SMRF to produce the twelve gridded hydrometeorological forcing variables, though many are instrumented to measure fewer variables. For example, five stations solely measure precipitation (RC.049, RC.057, RC.116C, RC.147, and RC.155)."

Figure 4: again, the x-axis should be a true time line and add the day to the given year/month

Because this figure only concerns a single sample water year (2009), we changed the tick labels on the x-axis to read "1-Oct, 1-Nov, etc." We hope this resolves your comment.

Figure 4/caption: „... observed versus modeled maximum daily incoming solar **radiation** (Sin) at three sites ..."

Thank you. This was addressed.

4.6.3: Density of New Snow: can you at least say what new snow densities the lookup table approach produces for typical snowfall conditions in the RCEW?

Yes, snowfall in the RCEW typically occurs between -5 C and 0 C, so the new snow density falls between 75 kg/m3 (at -5 C) and 250 kg/m3 (at +0.5 C) corresponding to the values presented in the table on page 2007 of Susong et al., 1999. We added these sentences to Section 4.6.3:

"These lookup table values are distributed in a stepwise fashion between -5°C and +0.5°C with values ranging between 75 kg/m^3 and 250 kg/m^3, respectively. Snowfall occurring below -5°C, which rarely occurs in the RCEW, is assigned a new snow density of 75 kg/m^3."

4.6.4: does „mixed phase" precipitation mean that certain fractions of snow/rain occur, depending on precipitation temperature between -0.5°C and +0.5°C? How is the transition shaped?

Yes, mixed phase precipitation is defined linearly between -0.5 C and +0.5 C. We have edited Section 4.6.4 to better describe this:

“The relationship between precipitation phase and wet bulb temperature is linear such that 0°C results in a 0.5 snow fraction, -0.5°C is 100% snow, and +0.5°C is 100% rain.”

Fig. 5a in the legend: „Accum season storms“: better do not abbreviate. Again, convert the x-axis to a true timeline (see comment to figure 3).

Thank you for this suggestion. We altered the figure legend to state “Accumulation season storms. As for the x-axis, the data points represent the water year average rain-snow transition elevations. Therefore, each plotted data point is assigned to a water year value (1984-2023) rather than a date. This is similar to Figure 3.