Authors' response to Interactive comments on "Spatially distributed water-balance and meteorological data from the Wolverton catchment, Sequoia National Park, California" by Roger C. Bales et al.

Author response: We appreciate the time and consideration of this review from Referee #2, Dr. E.H. Bair. We have responded to individual comments and made changes as indicated below.

E.H. Bair (Referee)

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Received and published: 22 September 2018

General comments:

This is a nice contribution of ten years of hourly model-ready measurements from several high-altitude sites in Seqouia National Park. I appreciate the inclusion of daily and hourly continuous measurements. It's helpful that the authors have provided the Level 0 through Level 2 data to clarify where the data were cleaned and gap filled. I only have a few minor points to suggest, and recommend publication after they are addressed. If the authors have any questions, I encourage them to contact me at nbair@eri.ucsb.edu.

Lidar data are mentioned throughout the text and shown in Figs. 1 & 2, but not provided. I see that the lidar data are provided in Harpold et al. (2014) so I understand that they are accessible via FTP, but the lidar data are not part of this dataset. Fig. 2 is ok because it provides an overview of the site, but I suggest removing Fig. 1.

> *Response*: While the the snow-on and snow-off lidar data available through Open Topography are not currently part of the DOI for the field data, they are relevant to the dataset. Multiple papers using the field measurements for this data have also used the lidar data. The dataset was included in the reference list, and we added citations to the first mention of the dataset in the introduction, as well as to the caption of Figure 1.

Other than a few sentences on gap filling, the manuscript does not address many of the potential biases in the measurements. Here are some questions on measurement bias:

1) How was precipitation undercatch from wind accounted for? What type of wind shield was used on the precipitation gauge?

> *Response*: Precipitation records shown in Figures 3a and 3b are from the nearby NOAA cooperative station at Lodgepole, which has a manual, unshielded weighing gauge. We have clarified the source of the data in the figure captions. We have also added text to Section 5 about biases in the precipitation measurements.

2) According to Campbell Scientific's website, the TE525MM operating range is 0 to 50 deg C, not ideal for measuring snowfall. Thus, I assume a heater was used on this tipping bucket? Heaters cause sublimation when set too high. Likewise, clogging occurs during snowfall when heaters are set too low. Since there were no other tipping buckets in the area, regression cannot be used to fill gaps. Please comment on these potential sources of bias.

> *Response*: While a heated precipitation gauge would have been ideal, we were not able to make that installation. As noted above, we have presented precipitation from Lodgepole, which is operated by Sequoia and Kings Canyon National Parks and attended to daily by the rangers. We made changes to captions for Figures 3a and 3b, and to the text in Section 5 about the data.

3) What are the problems with the net radiation measurements? For example, it's difficult to imagine that the snow surface was perfectly level. A properly leveled radiometer will then be sensing the sun at a different angle than that of the snow surface, leading to erroneous net radiation measurements.

Response: Net radiation is measured at the met station which is sited on flat ground. We did not measure the evolution of snow surface slope, but have that information for the ground surface and vegetation. We also added the sensors mentioned in Table 1 to the text in Section 3.

Specifics:

There is a "Net_radiation_ws_correction(W/mˆ2)" column which is not explained anywhere. The authors should check their headers for misspellings, for example, "Air_teperature. . ." in "daily_wy2007_2016_wolverton.csv."

Response: Typos in the headers and in the variable names list file have been corrected. The windspeed correction for the net radiation sensor follows guidance from the sensor maker. We have added language to the metadata provided with the data to explain the correction.

The datasets at DASH (DOI: 10.6071/M3S94T) and at the website (https://eng.ucmerced.edu/snsjho/files/MHWG/Field/SEKI/Wolverton) are different. For example, the website contains flow data while DASH does not. Programs for the dataloggers are also available on the website, but not at DASH. It seems that the website is more comprehensive. Thus, is it possible to just point the DOI to the website, or mirror the contents of the website at DASH?

Response: There were a few reasons for this decision. The server at DASH has long-term support plans and has a curated set of data with metadata. The website library mentioned here (the Wolverton folder on the Sierra Nevada San Joaquin Hydrologic Observatory, or SNSJHO) can have unstable links through modification of the file structure; and it has data from multiple graduate students and technicians, including backups of test projects, in some cases with inadequate metadata. Upon review, the flow data have proven questionable and we have decided not to use the data in publications. Thus we did not believe the quality was adequate for inclusion in this published dataset. The well and stream levelogger data could be included as raw data but have not yet had QA/QC conducted for the entirety of the dataset. We will add the datalogger collection programs to the DASH dataset when QA/QC is done.

L 1, p 5, what are "level-logger issues?" L 2 p 5, "snowpack" and "snow pack" are used. I suggest "snowpack" here and elsewhere.

Response: "Level-logger" issues should have read simply "logger"; this has been corrected. Snow pack was changed to snowpack here and at the end of the introduction.

Table 1 - I suggest adding "m" to the installation height column headers and removing the inconsistently used "m" from each row. "W mˆ-2" is also truncated under units.

Response: The unit "m" was added to the installation height column headers and removed from each row. The table format was adjusted and the "W mˆ-2" unit is now all on one line.

Figure 2 – If the Worldview data were acquired using a NextView license (i.e. free use for federally funded research), then DigitalGlobe has very specific instructions for captions, e.g. "® 2018 DigitalGlobe NextView License."

Response: The imagery was acquired through Esri's ArcMap, and was cited according to the imagery source at that scale and location. We have updated the citation to full citation recommended by Esri for the entire layer and corrected the "DigitalGlobe" name by removing the space.

References:
Harpold, A. A., Guo, Q., Molotch, N., Brooks, P. D., Bales, R., Fernandez-Diaz, J. C., Musselman, K. N., Swetnam, T. L., Kirchner, P., Meadows, M., Flanagan, J., and Lucas, R.: LiDAR-derived snowpack data sets from mixed conifer forests across the Western United States, Water Resour. Res., 50(3), 2749-2755, doi:10.1002/2013WR013935, 2014.