

Interactive comment on “Hourly mass and snow energy balance measurements from Mammoth Mountain, CA USA, 2011–2017” by Edward H. Bair

Anonymous Referee #3

Received and published: 23 November 2017

Review of Bair et al.

General comments

The paper summarizes data, data quality, and data cleaning and interpolation methods from sites operated by the University of California Santa Barbara on Mammoth Mountain, CA. Data from 2011 through 2017 is presented including a continuation of snow energy balance component measurements at the long-running “CUES” site. Coupled with newer intensive measurements of snow depth and density, in particular daily new snow depth and SWE hand measurements, make this a unique and valuable dataset. Figure 8 and associated discussion are particularly valuable contributions.

The manuscript contains much useful information, particularly in the methods section,

C1

and it would benefit from a thorough editing to trim unnecessarily wordy sections and clarify meaning. Examples are mentioned in the technical correction section. Further, I found the organization of the Datasets section confusing. The first section is on energy balance components, while the second section focused on data filtering and processing. It would be better if the organization were by measurement type (energy balance components, and snow measurements) with methods for data processing and cleaning included under these general headings. Specific headings for each measurement type would also help guide the reader (wind speed / direction, temperature, albedo, etc).

Specific comments

- 1) Please justify using climatological averages to gap fill temperature, RH, and air pressure data. It seems that this would create steps in the data and impose periods of average conditions during periods when the climate was likely not average (and hence went off-line). Why not use linear regression with other sites in the area for gap fill periods greater than 12 hours?
- 2) The CUES site is on the north aspect of Mammoth Mountain. Does this topography impact the measurement of direct and diffuse radiation? If so, what is the timing and magnitude of the impact relative to a site without substantial topographic shading?
- 3) How was the WS600 data used to fill gaps in RM Young 5105 time series (regression, replacement, other)?

Technical corrections/comments:

Minor comment: Figure 3 would be more effective if it were side-by-side with a snow-off photo and/or with arrows pointing to the instrumentation referenced in the caption.

Section 1 Introduction. I suggest replacing “tedious and nontrivial adjustments that are only possible by those intimately familiar . . .” be replaced with something like “substantial and nontrivial adjustments that require detailed information on measurement location characteristics”. This is an important subject for all folks in the business of

C2

collecting environmental data.

Section 2.1 and 2.2. Each section would benefit from an introductory paragraph describing the measurements at the site included in the dataset. It is difficult to sort through what is and is not in the dataset. Separating them would help.

Section 3.2.2 Albedo calculation. This is an important section that would benefit from some reorganization, specifically an introduction paragraph that outlines the overall process (e.g. "To calculate albedo, we did 1,2,3,4,5 etc").

Section 4.1 Moving the description of the data and mention of Figure 4 to the first couple of sentences would greatly clarify this section. Subsequent description of other years outside of the dataset then are placed in context.

Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2017-114>, 2017.