Interactive comment on "Spatially distributed water-balance and meteorological data from the rain-snow transition, southern Sierra Nevada, California" *by* Roger Bales et al.

Anonymous Referee #1

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General Comments

The study by Bales et al. presented an 8 to 14 year meteorological and hydrologic data record for 4 nested catchments in the rain-snow transition in the southern Sierra Nevada, California. The record contains hourly measurements of snow depth, soil moisture and soil temperature for 8 years (2009-2017) and quarter-hourly streamflow and meteorological data for 14 years (2003-2017). The record is unique because (1) this is first ever long-term hydrologic and meteorological data set from the rain-snow transition; and (2) the measurements of some variables were made at two elevations, different aspects (north facing, south facing, and flat), and from a suit of networks. The

record is complete, with gaps filled adequately. The record is of particular interests to hydrologists, meteorologists, ecologists, and even geologists inside and outside the CZO and hydrologic communities, who may be interested in studying hydrologic processes and climate change effects at the sites or conducting comparative or integrated studies with other sites across the world. The data quality seems to be very good. The manuscript was also well written. I think it is suitable for publication at ESSD and recommend to accept it after a minor to moderate revision.

Specific Comments

(1) I strongly suggest to have a section and discuss data QA/QC and how the data gaps were filled. This has been mentioned a little here and there, but an independent section would strengthen the case.

(2) The value and perspectives of how the data set may be used for were not addressed sufficiently. Yes, different users may use the record differently, but something that is obvious out there should be discussed. For example, the diurnal fluctuation of streamflow is evident during the snowmelt period and ET period, which may be used to calibrate snowmelt model/module and calculate ET following Kirchner's approach.

(3) It think it is arguable to claim the Providence catchments (elevation range 1500-2100 m) entirely at the rain-snow transition. The rain-snow transition is about 1500-2500 m in Sierra Nevada. The elevations of those catchments should be considered lower portion of the rain-snow transition. Authors' statement is not incorrect but just not accurate. If the Bull catchments (up to 2700 m) are included, that would cover the entire rain-snow transition.

Technical Corrections (P for page and L for line number)

P1/L15: Suggest to change to "Providence Creek is the long-term study site co-operated by".

P1/L17: Round up to 5 not 4-km2 (see Table 1 and also P3/L9).

P3/L22: Add "Creek" after "Providence".

P5/L16: Change "later" to "longer".

P5/L18: Add "water" before "year".

P7-9: Some references are missing based on text. Check carefully.

Table 1: Change the catchment area from ha to km2. Metric units were used for other parameters in the tables and in the text as well.

Table 3: Dink Creek (D102) was briefly mentioned in the text and the data from D102 were not actually presented. Suggest to delete it from this table.

P12/Table 3: Also annotate sensor types for P301 sensor network as done for other sites in the table.

P14/Figure 1: Specify sensor types in the caption. Explain "north", "south", and "flat" in the caption. Change "watershed" in the legend to "catchment".

P15/Figure 2: Is this an example of sensor nodes? If so, say so in the caption and mark sensors by names on the picture (e.g., snow, soil, and air).

P15/Figure 3: Are those daily or hourly data? How do they differ from those on Figure 4? If it is used for displaying details, this should be mentioned and it may be shown after Figure 4 (depends what you use for).

P16/Figure 4: Missed "content" after "volumetric soil water" in the legend. Suggest to move legend of g panel toward blank area on right. Right vertical axis for a, c and e: What does "cm in top 1 m" mean? I thought you used percent for volumetric soil water content.

P17/Figure 5: Unclear which station precipitation data are from.