RESPONSE TO ANONYMOUS REFEREE #1

We sincerely thank Anonymous Referee #1 for the constructive comments on our manuscript (Reference # ESSD-2018-45). We fully recognize and appreciate the reviewer's efforts in providing this informative report on our hydrometeorological dataset for the Cariboo Mountains of British Columbia (BC). Indeed, these insights will undoubtedly lead to an improved paper through this online discussion and ensuing revision process. We are thus taking into full consideration all of the comments from Anonymous Referee #1 and are preparing detailed responses to these as well as information on how the paper is being revised according to the referee's suggestions. A complete and detailed response document will be submitted once a decision has been made on our discussion paper. In the meantime, we provide here a general overview of our responses to the comments submitted by this referee in the following paragraphs.

Thank you for your general positive overview of our manuscript. We acknowledge the need to review the text carefully to improve grammar and punctuation (e.g., inserting commas where appropriate) throughout the manuscript including the abstract. We agree this mesonet plays an important role in filling a major observational gap in the otherwise poorly monitored Cariboo Mountains and surrounding areas of BC. Given the remote and often harsh environment in which the Cariboo Alpine Mesonet (CAMnet) weather stations are deployed, maintaining homogeneous and high-quality time series remains particularly challenging. Nonetheless, every effort is made in maintaining the integrity and homogeneity of the dataset and assessing its quality.

A concern raised by this referee is on the nature of the quality of the CAMnet data. First, we wish to point out that the equipment used is sourced from Campbell Scientific and its suppliers, and is considered the 'industry-standard' with high accuracy and extended operating ranges (please see Table 2 in the discussion paper). This equipment is also commonly used by various hydrometeorological networks across Canada including federal and provincial/territorial ministries (e.g., Environment and Climate Change Canada) and beyond.

Second, as outlined in Section 4.4 of the paper, data quality control and analysis is performed on all hydrometeorological data collected using a combination of automated procedures (e.g., codes in R) and visual observations. Recently downloaded data files are first checked to verify they have the total number of timestamps expected over the period of interest with missing ones in-filled with "NA". Otherwise, data values that are obviously in error are flagged and highlighted in yellow in the Excel spreadsheets archived on Zenodo. The variable with perhaps the most recurring data quality issues is snow depth as the data recorded by the sonic rangers are often spiky in nature due to interference of the acoustic waves with precipitation, birds, insects, etc.

CAMnet data compare favorably with measurements from independent meteorological networks such as those collected by Environment and Climate Change Canada, the BC Ministry of Environment, and the BC Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNRORD). As an example, monthly air temperature and precipitation collected at the BC Ministry of FLNRORD Likely Aerodrome weather station (52°36'54"N, 121°30' 48"W, elevation 1046 m a.s.l.) correspond well with data from the CAMnet Quesnel River Research Centre (QRRC) weather station (52°37'06"N, 121°35'24"W, elevation 743 m a.s.l.)

with differences of only 0.45°C and 22% (117 mm) during 2014, respectively. Figures R1 and R2 show the temporal evolution of monthly air temperature and precipitation, respectively, recorded at the CAMnet QRRC weather station in Likely and at the BC Ministry of FLNRORD Likely Aerodrome weather station 5.2 km away. The evolution of both quantities matches very well. In response to this comment, we will add additional information on the quality control of the CAMnet hydrometeorological data and examples of comparisons with independent data such as those from the BC Ministry of FLNRORD.

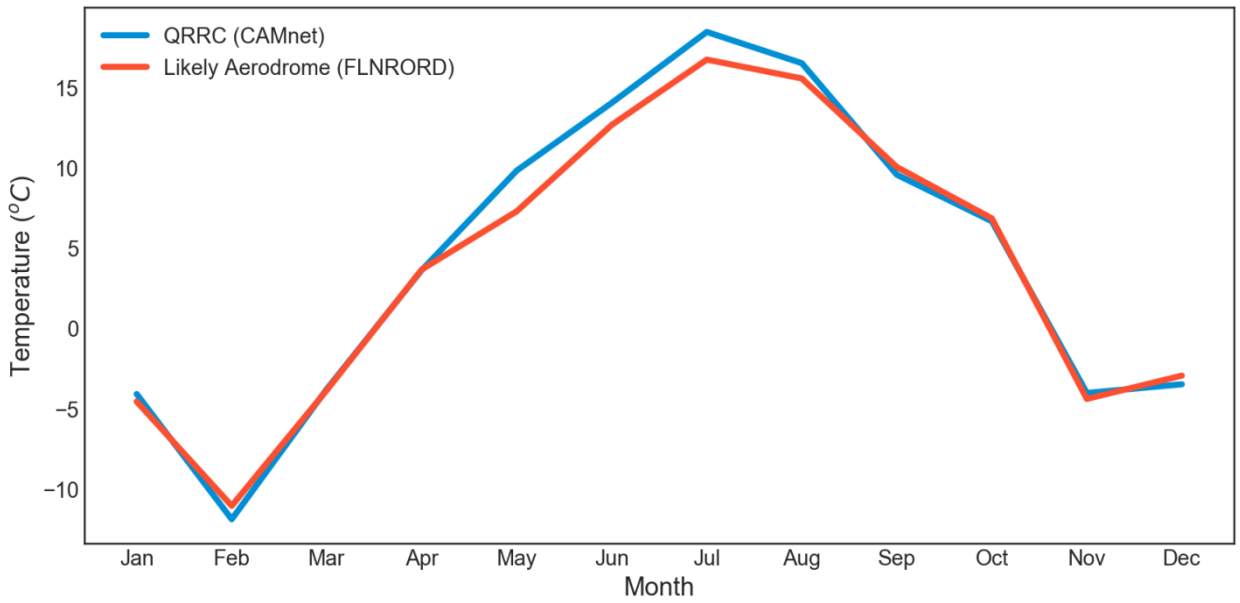

Figure R1: Mean monthly air temperature at the CAMnet QRRC and at the BC Ministry of FLNRORD Likely Aerodrome weather stations in 2014.

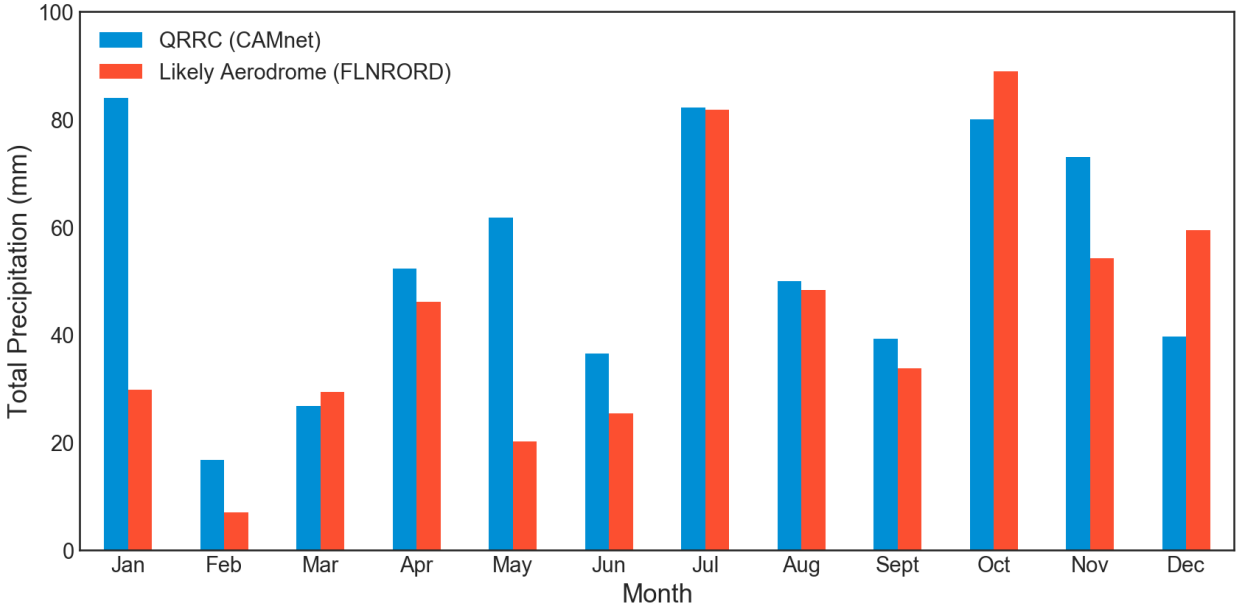

Figure R2: Total monthly precipitation at the CAMnet QRRC and at the BC Ministry of FLNRORD Likely Aerodrome weather stations in 2014.

Additional comparisons of monthly mean minimum and maximum air temperature between the gridded ANUSPLIN dataset (McKenney et al., 2011) and the independent air temperature data at four CAMnet weather stations are reported in Sharma and Déry (2016). Their Table 2 shows high correlation values ($r \geq 0.97$, $p < 0.05$) and relatively low root mean square and mean absolute errors (≤ 2.3°C), with differences attributed in part to elevation disparities between the gridded and (in situ) point data. Of note, the QRRC, Browntop Mountain, Spanish Mountain and Upper Castle Creek stations all display coherent air temperature variability with ANUSPLIN data, suggesting the quality of CAMnet is well in line with other available products such as the widely used ANUSPLIN dataset.

Another point raised by the referee is the potential to add a climatology of air temperature and rainfall at the CAMnet weather stations. Despite the potential usefulness of the addition of climatological results to the paper, this would be beyond the scope of the present effort and the journal's purview. Instead, we refer the reader to other studies that have reported some statistics on the hydrometeorological variables collected at CAMnet stations (e.g., Déry et al., 2010; Sharma and Déry, 2016). A future effort will develop a comprehensive climatology of hydro-meteorological conditions recorded at all CAMnet weather stations and will be reported in a separate paper.

Finally, Zenodo does commit to permanently archive data stored on its platform but additional copies of the database are also stored on a computer server at UNBC. Zenodo's website states: "In the highly unlikely event that Zenodo will have to close operations, we guarantee that we will migrate all content to other suitable repositories, and since all uploads have DOIs, all citations and links to Zenodo resources (such as your data) will not be affected."

References:

Déry, S. J., Clifton, A., MacLeod, S., and Beedle, M. J., 2010: Blowing snow fluxes in the Cariboo Mountains of British Columbia, Canada, Arctic, Antarctic and Alpine Research, 42(2), 188-197.

McKenney, D. W., Hutchinson, M. F., Papadopol, P., Lawrence, K., Pedlar, J., Campbell, K., …, Owen, T. (2011). Customized spatial climate models for North America. Bulletin of the American Meteorological Society, 92(12), 1611–1622. doi:10.1175/2011BAMS3132.1

Sharma, A. R. and Déry, S. J., 2016: Elevational dependence of air temperature variability and trends in British Columbia's Cariboo Mountains, 1950-2010, Atmosphere-Ocean, 54(2), 153-170, doi: 10.1080/07055900.2016.1146571.