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Interactive comment on "The Environment and Climate Change Canada solid precipitation intercomparison data from Bratt's Lake and Caribou Creek, Saskatchewan" *by* Craig D. Smith et al.

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General comment:

This paper provides an overview of a hydrological experiment in Saskatchewan, Canada, together with a description of the data sets that are being made publicly available on a Canadian federal government web site (Environment and Climate Change Canada). The experiment was aimed at the comparison of winter precipitation measurements (primarily snow) using alternative instrumentation and wind-shelter sys-

tems. Measurements were made over four successive winters at two contrasting sites in the boreal forest (regenerating jack pine) and on the open (treeless) prairie. The context for the research is that conventional designs for measuring precipitation have been found to substantively underestimate the input of moisture by snow, especially in open and windy environments. Overall, the paper is clearly written, and I appreciate the efforts of the authors to facilitate the sharing and archiving of data from this important experiment. In my specific points below, I have offered some comments and suggestions that are mainly aimed at 1) making the work more accessible to an international readership and 2) increasing the usefulness of the presented results.

Specific points on the manuscript:

P1 Abstract: For an international readership, I think it would be helpful to start the abstract with one or two sentences highlighting the rationale for conducting these experiments, i.e., the problem of snow undercatch by conventional precipitation guages in windy environments, and the need for specialized instrumentation systems and/or models to address this problem. Also, the abstract seems rather detailed in its description of methods, whereas I see no reporting of results or their implications. Having said this, I recognize that I am not familiar with what is normally expected for papers such as this that are primarily focused on the publication of data sets.

P3 L30: I recommend defining acronymns such as "SWE" (Snow Water Equivalent) when they are first mentioned.

P6 L10: Awkward sentence structure. I suggest re-wording to something like "Although this precipitation amount cannot be distributed to specific times during the outage, it is retained.."

P6 L20, "It is strongly suggested that precipitation data with a Flag=1 (see above) not be adjusted as..": I would just say "Precipitation data with a Flag=1 (see above) were not adjusted because..".

P6, section “4 Precipitation summaries”: This reads like a Results section but it seems rather cursory and brief (see also my comments below on Table 2 and on Figures 5 and 6).

P7 L6-9: The results reported here are interesting and appear to be important, i.e., the transfer functions overestimated winter precipitation at the forested site but give underestimates at the prairie site. Would it be worth adding a sentence or two on the broader implications of these results? Or alternatively, is there another paper from this study that could be cited for readers who may wish to explore these issues further?

P12 Table 2: For the CCR site in 2014/2015 and 2016/2017, the reported measurements of seasonal precipitation are of little value for making comparisons because they cover different time periods. It would be more useful to report on precipitation totals over the seasonal period each year when all three systems were operating. The authors might also consider reporting the seasonal totals for the Geonor Bush and Geonor SA systems as a percentage of the totals obtained using DFAR.

P15 Figure 5: I expect that some of the accumulated precipitation was rain rather than snow, especially in October and April-May. Given that the problem of precipitation undercatch is (likely) greater for snow than for rain events, the authors might consider adding a horizontal bar or vertical dotted lines showing the winter period when the predominant source of precipitation was snow.

P 16 Figure 6: This figure shows SWE measurements for one of the two sites (Caribou Creek). Is there any comparable data from the other site, Bratt’s Lake? Also, it is not clear to me how these data were used in the analysis of snow catch efficiency for the different precipitation measurement systems.

Comments on the external link containing the data set

I successfully accessed the web page containing the data set, at: http://data.ec.gc.ca/data/climate/scientificknowledge/saskatchewan-solid-

precipitation-inter-comparison-experiment-spice-data/

The web page provides a good overview of the experiment, including the general location of the two sites and the measurements included in the data set.

A map server shows the general region of Saskatchewan where the two sites are located; however, the actual site locations are not shown on the map.

On this web page, there is also a hyperlink to the Metadata, but when I attempted to access it I received a message saying “Connection refused”. Thus, I am not able to provide feedback on this material.

However, under the “Resources” section of the web page, there are two MS Word files (in English and French) that provide the at least some of the information I would expect to find in a metadata file, including a description of the study, with specific site locations, methods of quality control, and a description of each variable in the data set.

The data files also include 16 comma-delimited “.dat” files containing half-hourly measurements of precipitation and seasonally accumulated precipitation using the alternative instrumentation systems, along with wind speed and air temperature. As a test, I imported one of these “.dat” files into MS Excel and the formatting appears to be sound and easy to understand. In addition, there are two MS Word files (in English and French) that provide tabular summaries of the snow survey data sets from the Caribou Creek site, along with some graphics showing snow densities and snow water equivalents.

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