

## ***Interactive comment on “Meteorological, soil moisture, surface water, and groundwater data from the St Denis National Wildlife Area, Saskatchewan, Canada” by Edward K. P. Bam et al.***

### **Anonymous Referee #3**

Received and published: 2 January 2019

#### General comments

The data set for St Denis NWA is very useful as it represents an unusually complete set of variables for the region. The atmospheric data are at high frequency, and include variables such as the turbulent fluxes, which are rarely found. The many researchers who laboured to collect the data are to be thanked for their hard work, as are the authors who have collected and presented the data sets.

Unfortunately, the writing is marked by vagueness and colloquialisms. The following terms need to be fixed:

By “average” you are usually referring to mean values.

C1

Use of the words “high” and “low” is colloquial, unless you mean some type of elevation. You are referring to things which are either “large” or “small”

Comparative words like “colder”, “higher”, or “greater” imply that you are comparing a value to another value, which in many cases is not specified. This needs to be fixed.

#### Specific comments

Page 1

Line 21

“ground elevations (datum) used”. The term “elevations” is plural; “datum” is singular.

Line 29

“dominated by glacial till, as well as coarser grained fluvial deposits,” This implies that the fluvial deposits are coarser than the till.

Page 2

Line 2

“ponds that annually dry out” A better phrasing would be “ponds that dry out annually”

Line 3

“Farming practices over the past century include widespread artificial wetland drainage in some portions of the region.” This statement should be backed up by a reference.

Line 6

“The site was selected because it was primarily a cultivated...”

A better phrasing would be

“The site was selected primarily because it was a cultivated...”

Line 12

C2

“No wetland drainage has occurred on the site since 1968.” Did any drainage occur before this year?

Line 27

“The area is hummocky” Which area? This is a poor word to use, as “area” has a mathematical meaning. Do you mean the general region, or the NWA?

Line 28

“for which detailed Lidar elevation data are available.” Is this dataset available to other researchers? I don’t see it in the provided data sets.

Page 3

Line 1

“In the past 50 years” Would be better to replace “In” with “Over” as the activity continues to the present.

Line 11

As there are 2 stations, the word “oldest” should be replaced by “older”

Line 20

Insert the word “energy” after “turbulent” as the carbon fluxes are also turbulent. Insert the word “solar” after “net” to identify the type of radiation. Also, insert a dash between “all” and “component”

Line 24

The manufacturer of the logger is specified in Line 26, so it should be included here, too.

Line 26

According to Table 1, and to the headers of the .csv files, the “precipitation” data are

C3

actually tipping bucket rainfalls – why would they be corrected for the effects of wind speed on snowfall? Please insert a complete description here of the data. Referring this data as “precipitation” is very confusing.

Page 4

Line 7

Replace “second” with “other” before “snow survey”, as the other snow survey site was not numbered.

Line 27

“Generally, monitoring typically” Pick one, either “generally” or “typically”.

Page 5

Line 4

“in (Conly et al., 2004)”, should be “by Conly et al. (2004)”

Line 19

“For the wetlands” This is not required – delete.

Page 6

Line 2

“During soil freezing the dielectric constant of ice is much lower than that of liquid water, so the instrument is likely to give a reasonable measure of the liquid water content”

This sentence is problematic. It is unclear whether you are referring to the liquid water phase in frozen soils or to the completely unfrozen soils. It needs to be re-written.

Replace “lower” with “smaller”

Insert “more” between “is” and “likely”

C4

Line 3

What does the number in “229 probes” refer to? Is it the number of probes that were installed, or is it a model number?

Line 14

“shallow high permeability weathered till layers”

I think that it is important to indicate that the high permeability is relative to other types of till, so it would be a good idea to insert the word "relatively" before "high"

Line 27

“Stables” should be “Stable”

Page 8

Line 4

“There is little lag in net radiation” What does this mean? What it is lagging with respect to? Are you saying that there is little seasonal lag between the incoming short-wave radiation and the net all-wave radiation?

Line 6

“Wind speeds average ...” Over what time periods? Are these daily values?

Line 20

“Wetlands 1, 50 and 109 are representative of prairie wetlands” What do the other ones represent, mountain wetlands?

Line 28

What is the “freeze back”? I am not familiar with this term.

Line 29

C5

“The saturated water content at freeze-up is usually 0.5” What does this mean? What is the saturated water content 0.5 of? Do you mean that the saturation fraction is 0.5?

Figures

Figure 1

The soil moisture profile points near Pond 109 are so large that they overlap, so it is hard to see them all. It would be better to use smaller markers.

Figure 2

This figure is not referenced in the text.

Which set of air temperatures is plotted, the 2m or 5m? Please include the elevation, or the name of the site in the y-axis label. Also, include the time-step of the values plotted, i.e. either daily or monthly.

If you are going to refer to a value as a flux (the evaporation and precipitation) then it needs to have the units of a flux, i.e. as a mass (or depth) per unit time. It looks like you are plotting values which are accumulated over a time period.

The axis title in the bottom-right plot is confusing. As it states "Month", it implies that monthly values are plotted. It might be better to title it as simply "Date", as these are daily values. You could indicate the date format as "(Year-month)", if you like.

Figure 3

The blue line is the mean value. The use of the word "average" is confusing as a) it is incorrect and b) the individual SWE values are actually weighted averages.

Figure 4

“Hydrograph” should be plural.

Data sets

C6

The headers of the isotope .csv files contain non-ASCII characters, which are problematic for many programs to read, particularly as there is no indication as to how the files are encoded. It would be a good idea to change these characters to their closest ASCII equivalents.

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2018-125>, 2018.