Authors' reply to interactive comment posted by Kabir Rasouli regarding the ESSD Discussion paper "Long-term weather, hydrometric, and water chemistry datasets in high-temporal resolution at the La Salle River watershed in Manitoba, Canada"

Dear Dr. Rasouli,

We appreciate your comments and suggestions to strengthen the manuscript. Please find below the answers to your comments.

General comments

Reviewer: *This manuscript presents hourly meteorology, daily streamflow, and weekly water quality data for a watershed in Manitoba, Canada. This is a useful dataset contribution, providing a valuable set of observations, which can be very useful for high resolution hydrological modelling in cold regions. The manuscript is well-organized and could be improved by providing more validation datasets and a better representation of seasonal and monthly variability. I recommend publication in Earth System Science Data as a regular article in the data section after a moderate revision.*
Authors: The suggested revisions have been addressed in the specific comments below.

Specific comments

1. Reviewer: *I would recommend authors to add wind direction, ground/soil temperature (if available),and soil moisture data and also data for model validation including snow water equivalent, snow depth, and groundwater elevation, which are important for a comprehensive modelling study of water budget.*
Authors: We agree with the reviewer that the variables mentioned above are crucial for assessment of hydrological model simulations. However, most of the variables requested are not available from the data used to derive the dataset. For example, soil water content (SWC), snow water equivalent (SWE), and ground water elevation (GWE) are not available. Recent hydrologic simulations in the watershed by Cordeiro et al. (2017) utilized the Cold Regions Hydrological Model (CRHM) platform in the La Salle watershed. However, assessment of model performance against volumetric SWC was based on estimates from the National Drought Model (Chipanshi et al., 2013) due to the lack directly measured SWC data. Likewise, assessment of SWE for this effort was based on values derived from depth of snow on ground and assumed snow density. GWE data is also not available for this watershed. Wind direction is the only variable collected at close proximity (i.e. Portage La Prairie). However, most of the

records (56%) are missing and the correlation with the closest station in Winnipeg is poor (R^2=0.25), which makes it difficult to gap-fill the time series. The objective of the authors is to provide a robust dataset which can be used with confidence for hydrological modelling; however, the authors are of the opinion that the wind direction variable does not meet the quality criteria since most of its records would be infilled and could not be properly validated. We note in the revised manuscript that wind direction data is available from Environment and Climate change Canada weather data in Portage La Prairie, but that 56% of records are missing.

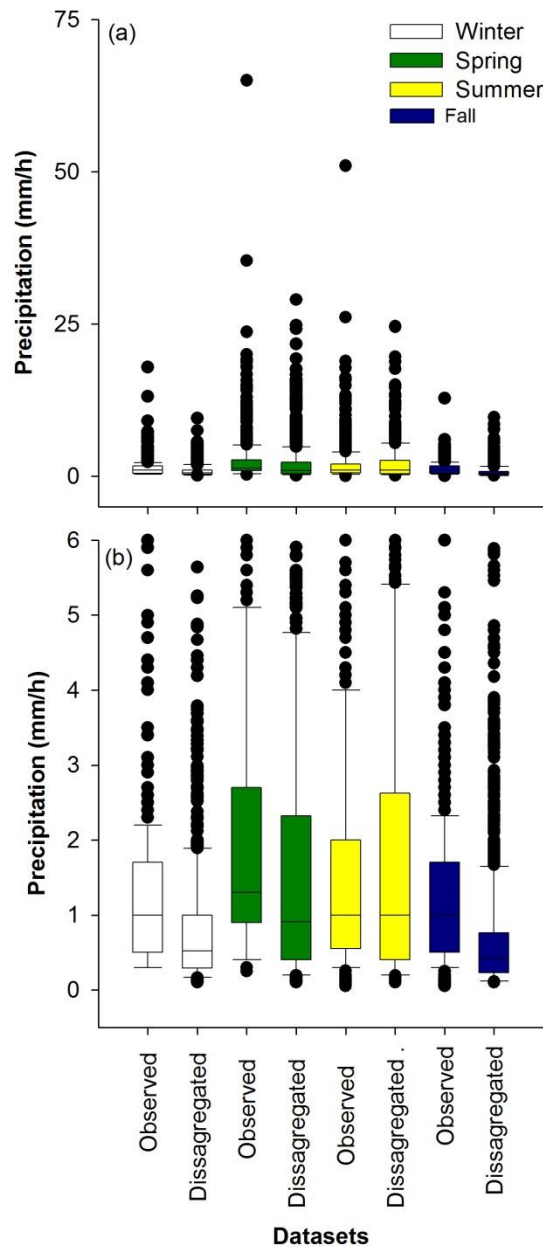
2. Reviewer: *Tables 1-3 need to be reorganized or merged into one summary table. A table that summarizes variables name, current sensors, location, sensor height, mean water year value, data interval, and period of record will be very useful for data users.*
    Authors: A description of station, equipment, and operation parameters has been included in Table 1. Tables 1 through 3 report distinct types of data from different sources and could not be merged into a single table due to the differences in dimensions. For example, Table 1 pertains to information about weather stations, while Table 3 refers to hydrometric data. Likewise, Table 2 summarizes the entire dataset for a single weather variable (i.e. relative humidity) seasonally, while Table 3 summarizes hydrometric (i.e. stream discharge) data annually. Merging these tables together could be confusing for the reader.

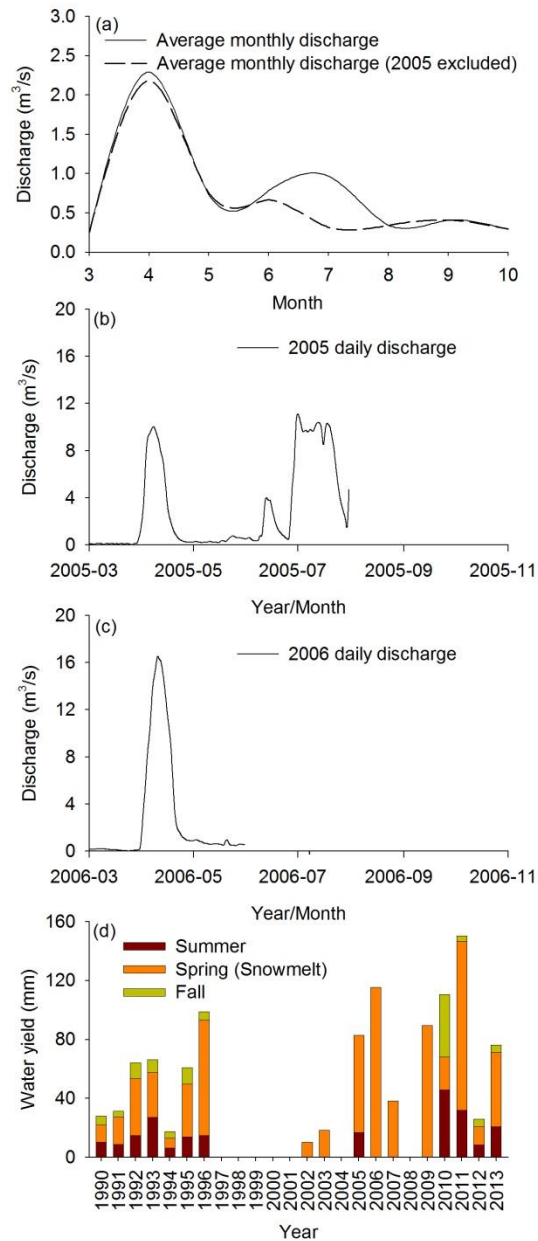
3. Reviewer: *A wind rose, which shows the prevailing wind direction in addition to wind speed can be quite useful for snow redistribution and sublimation processes.*
    Authors: Although there is not sufficient wind direction data available to create an accurate wind rose for this study area as discussed in question #1, the authors have included a description of the prevailing wind direction in the revised manuscript. Wind speed has already been discussed through bar plots and trend lines.

4. Reviewer: *Trends (smoothed curves) shown in the figures are redundant as they are not statistically significant. I suggest removing all the insignificant trends from the figures.*
    Authors: Insignificant trend lines removed, as suggested.

5. Reviewer: *Figure 2: For comparison purpose, subplots b, c, and d can be plotted in one plot to assess the interannual variability of temperature ranges. Smoothed curved in this figure has never been explained in the text. Also, it is not clear what LOESS stands for.*

Authors: The authors experimented with a single plot for the original submission and decided on the multiple plots to avoid clutter. The current layout was the most effective balance between clarity and ease of comparison. An explanation for the smoothed lines has been added to the text, as well as the definition of the LOESS (locally weighted smoothing) method for calculating the smoothed lines.

6. Reviewer: *Figure 6 is not informative, I suggest adding either monthly precipitation similar to Figure 5 or annual and seasonal box-plots similar to Figure 4. It is not clear how smoothed curve in Fig 6c has been obtained.*
   Authors: Figure 6 has been modified in the revised manuscript, as suggested, and now includes box-plots showing the seasonal precipitation patterns. The revised figure has been pasted below for reference.

7. Reviewer: *It is hard to follow the source of water yield in Figure 7d as in some years there is no annual water yield. I suggest showing it in a stacked bar plot that can show both water yield from snowmelt and on top of that water yield from the rainfall.*

Authors: No water yield indicates missing data in the source dataset, as indicated in the text. This information has been included in the figure caption. Figure 7 has been modified as suggested and is shown as a stacked bar plot in the revised manuscript. The revised figure has been pasted below for reference.

Editorial comments

1. Reviewer: *The text needs a proof-reading for grammar corrections (e.g., check grammar in lines 14, 19, 52, 60, 80, 160 and 182 ("Similar to" not "Similarly to"), 162 (concentrated).*
   Authors: The grammar has been revised in the lines mentioned above and throughout the manuscript.

2. Reviewer: *Change "Basin" to "basin" all over the text (e.g., line 47 and 61), except for the cases you have a name before "Basin".*
   Authors: Change made, as suggested.

3. Reviewer: *The word "data" is plural. Check the text to change single verbs after "data" to represent this appropriately; e.g., line 69. 124, 136, 237, 238, 286, ...*
   Authors: A check was performed throughout the manuscript.

4. Reviewer: *Line 115: remove comma before physically-based and add "and".*
   Authors: Change made, as suggested.

5. Reviewer: *Abstract and Line 119-121: For consistency authors need to report annual and seasonal temperatures only for the study area and not for both study area and Prairie Ecozone and explain the discrepancy between values reported in the previous reports and values presented in this manuscript.*
   Authors: The dataset is only compared to data from the broader La Salle River watershed, and not to the entire Prairie Ecozone. The sentence in lines 119-121 has been modified in the revised manuscript for clarity and now reads: "The watershed is located in the Prairie Ecozone and has mean annual temperature around 2.5°C, mean summer temperature of 16°C and mean winter temperature of -13°C…". The small difference between the presented dataset and reported values has also been discussed.

6. Reviewer: *Line 186: replace "parameter" with "variable".*
   Authors: Change made, as suggested.

7. Reviewer: *Line 203-204: replace "from a research station located at The Point" with "from the Point research station"*
   Authors: Change made, as suggested.

8. Reviewer: *Line 206: replace "from the station at The Point" with "from the Point station"*
   Authors: Change made, as suggested.

9. Reviewer: *Line 214: modify as to read: "as precipitation data were recorded daily..."*
   Authors: Change made, as suggested.

10. Reviewer: *Line 215: modify to read as" Once gaps were filled, daily data were disaggregated into hourly data."*
    Authors: Change made, as suggested.

11. Reviewer *Line 230: add reference after "annealing-simplex method".*
    Authors: Reference added.

12. Reviewer: *Avoid incomplete sentences such as once completed (line 215) and once estimated (line 231).*
    Authors: The suggestion has been accepted and the changes made.

13. Reviewer: *Line 252: replace "periods of elevated flow" with "highflow events".*
    Authors: Change made, as suggested.

14. Reviewer: *Line 259: rewrite the sentence.*
    Authors: The sentence has been rewritten in the revised manuscript and now reads: "Samples were filtered (0.45µm pore size) on arrival at the laboratory (within 4 days of collection) and the particulate material collected on the filter was analyzed for dissolved N and P."

15. Reviewer: *Line 267: what does "AAFC" stand for?*
    Authors: The acronym stands for Agriculture and Agri-Food Canada. This information has been included in the revised manuscript.

16. Reviewer: *Line 334: replace "trends for" with "ranges in"*
    Authors: Change made, as suggested.

17. Reviewer: *Line 337: rewrite the sentence.*
    Authors: The sentence has been rewritten in the revised manuscript and now reads: "The majority of the 210,383 records (i.e. 95.0%) corresponded to dry hours (i.e. no precipitation recorded)."

18. Reviewer: *Line 357: rewrite the following sentence: "An odd peak discharge occurred in July, ...".*
    Authors: The sentence has been rewritten in the revised manuscript and now reads: "An unusual peak discharge occurred in July…"

19. Reviewer: *Line 439 in the conclusions: Shouldn't it be "daily precipitation data need to be disaggregated into hourly..."?*
    Authors: The reviewer is correct. The sentence has been modified and now reads: "Due to the lack of hourly data that met the quality criteria, daily precipitation data had to be disaggregated into an hourly time step using a Poisson-cluster model."

Chipanshi, A. C., Warren, R. T., L'Heureux, J., Waldner, D., McLean, H., and Qi, D.: Use of the National Drought Model (NDM) in Monitoring Selected Agroclimatic Risks Across the Agricultural Landscape of Canada, Atmosphere-Ocean, 51, 471-488, 10.1080/07055900.2013.835253, 2013.

Cordeiro, M. R. C., Wilson, H. F., Vanrobaeys, J., Pomeroy, J. W., Fang, X., and The Red-Assiniboine Project Biophysical Modelling, T.: Simulating cold-region hydrology in an intensively drained agricultural watershed in Manitoba, Canada, using the Cold Regions Hydrological Model, Hydrol. Earth Syst. Sci., 21, 3483-3506, 10.5194/hess-21-3483-2017, 2017.