General Comments:

In this paper the authors present a case study of the thermal regime of ponds in the Canadian High Arctic. Their study site is Nanuit Itillinga, formerly Polar Bear Pass, Nanuvut, Canada, and the data spans almost a decade (2007 – 2015). The data presented includes seasonal data of pond temperatures, cumulative relative frequency of pond temperatures, pond water specific conductivity, and frost table depths. This study is an important addition to expanding our knowledge of year-to-year variability of pond temperatures in the Arctic. Studies like these are rare, and crucial to document to expand our knowledge about Arctic tundra ponds and the climate change impact on Arctic landscapes. I don't see any major problems with this paper. Below are some suggestions for improvement.

Specific Comments:

Line 54-63: I would like a couple of more sentences added to this section from information that is in Table 1. For example, "We studied X number of ponds, that ranged a surface area spanning from X-X".

Thank you for your comments. We made Table 1 a Supplementary Table, and we added additional details to it. We also added more information about the ponds in the main text of the paper.

Line 180: add "Medium" after "East".

Thank you, we fixed this.

Line 193: The Croft reference in the reference list is 2011, not 2013 as stated in the text.

Thank you, we corrected this.

Line 204-205: Wouldn't you want to compare this for a similar time period? I am not sure you can compare between years if you are not using the same time period. I might be wrong on that, so ignore this comment if that is the case.

Thank you. We did this (compared across similar time frames) and have revised the diagrams (added box plots) and added some additional comments in the main text of the paper.

Line 234-239: Any thoughts on why r values are lower in 2009 compared to 2008?

Thank you for observing this. We really don't have a specific reason for these correlations being higher in 2008 than in 2009, and we have noted this in the paper.

Line 261: Any reason why the data isn't shown in paper? I guess you don't have to show it, but it would be nice to see that year's data too.

Thank you. We did not add it, as noted in the paper, the pattern was similar to other years.

Line 282: What is the temperature difference between the "cool" and "warm" season? Any idea on why there is such a big difference in specific conductivity? Is it tied to the temperature difference?

Thank you. I indicated the temperature difference in the paper, and added some additional information in the text.

Tables

Table 1: This is a lot of information, and not much of this is mentioned in the text. It is a bit hard to envision how this will show up in print, but this table is currently three pages. Would this be better placed in the Supplemental? I am fine either way, so I will leave this to the editor. There is a parenthesis missing for the bulk density unit in year 2009 (Line 80-81). There are dates listed in some of the fields (Line 86-87) and not the others. Perhaps better to stay consistent throughout the table?

Thank you, we have decided to move Table 1 to a Supplementary Table 1. I also clarified the wording around maximum frost table and frost table thaw during a specified period in the text. I also provided

information about the span of information for the different years in the Table title and in the text of the paper.

Figures

Figure 1: It is a bit confusing with the naming "a, b, and c". There is no letter assigned to the top left figure. One option is changing top left to "a": "Location of the PBP catchment on Bathurst Island, Nunavut (a) with the red outlined area zoomed in and shown in (b)." and so forth. Can you also add a scale bar to some of these figures? I understand this might be difficult for c (seeing as it is a picture), but it should be possible for the other images. Could lat and long be added to at least one of these maps? Is it possible to include the pond locations and numbers (e.g., Pond 1, Pond 2, and so forth)? This would give a visual on where these ponds are located.

Thank you. We have improved Figure 1, and I have added a photo, which indicates most of the central ponds.

Figure 2: The different thickness of the lines makes this figure (and other figures in the manuscript) a bit difficult to read. Is the inset needed? Also, why is the y-axis in bold letters? This comment is for all figures.

Thank you. We were initially following after HESS rules for our line diagrams (colour blindness) but will explore more options to improve readability. We have double-checked on the y-axis in bold letters.

Figure 3: There is an overlap of 01-Jun with y axis. Remove? Add parenthesis for °C.

Yes, thank you. We have corrected the Figure.

Figure 4: The discussion in the text is about comparing the data for location and each year. Would it be better to split these figures into years (2007, 2008, and 2009) rather than location?

Yes, thank you. We have rearranged the Figure by year.

Figure 5: This figure is a bit difficult to decipher with the different symbols (too small?), and some seem to overlap. Is there any other

way this can be displayed? Maybe it is better presented in a table? In the legend, the Dranga et al. reference states it is from 1979-2009. I am only seeing one symbol in the graph for 2009. This might be because of an overlap of symbols. In the legend it says that the Croft, 2011 is unpublished. The reference shows this as a MSc thesis. So published?

Thank you. We have corrected this diagram. We had to remove the Dranga et al. reference, as from reading the paper initially, we thought that they were specifying the average July pond temperature but they were only reporting the average pond temperature over that time period for all of their pond data 1979-2009 (see Table 3 – Dranga et al. 2017). We also corrected Croft 2011.

Figure 8: Can you please add the date the picture (a) was taken? Also, you can add that to the graph in b. You have used dates in prior figures, should you use dates here as well to stay consistent? This same comment applies to the other figures using Jday.

Yes, thank you. We have corrected the figure, put in the date for the photo and have added all of the dates to the diagrams instead of Jday.

Figure 11: The y-axis are overlapping between a, b, and c (you can't see 0 in b and c). I suggest that you add spacing between figures. Do you have to have a negative sign for y-axis? I suggest removing the "-". Also, why are there symbols? It could be a lot cleaner if lines were used instead.

Thank you. We have corrected the diagram, added some spacing and used lines for the frost tables instead of symbols.

Figure 12: Similar comments as Figure 5. The symbols are small, and it is difficult to read this figure. Add space between figures because of overlapping symbols.

Yes thank you. We have corrected the figure.

Figure 13: remove units in legend. Units are in the y-axis. Instead of "Temp" and "SpCond" in legend, write "Temperature" and "Specific Conductivity". There is plenty of room to add that in the legend.

Yes thank you. We have corrected the figure.