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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Recent Changes to the Hydrological Cycle of an Arctic basin at the Tundra-Taiga Transition" *by* Sebastian A. Krogh and John W. Pomeroy

Anonymous Referee #1

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The paper shows the changes occurred in climate, vegetation and hydrology of a small basin located in the Canadian Arctic. This is one of first studies that make a very complex analysis and modeling of the global change impacts on the hydrology of an arctic catchments, and it is a nice contribution for a journal as HESS. The paper is well written and, in general, the methodology is clearly explained. The authors have need to combine different data sources in order to be able to analyze the changes in the long-term (going back to the 60′s). This can be the source of some uncertainty, but I also think that this is the only way possible to study global change processes in remote areas, and the main results should not be affected by the used data. Following, I enumerate a number of questions (mostly minor issues) that authors can consider for preparing a re-

vised version of the paper. 1- In the abstract change is shown in absolute units, I think they can also be presented as a % to get a faster idea of the magnitude of the change. 2- When shrub expansion in the arctic is mentioned, I miss the reference to Sturm et al 2011. doi:10.1038/35079180. 3- Were vegetation changes determined by aerial photographies? I have not found this information. 4- I would like to see a very brief description of the method to disaggregate daily into hourly precipitation (even when references are provided). 5- What is the advantage of using a "normal year" compared to use detrended series of historical climate?. 6- It results a bit confusing the statement that there are not significant trends in seasonal precipitation, but all of them show break points. I think this is because the breakpoints in most of the cases occur at the beginning of the study period and it prevents affecting the trend analysis. Is this the reason? It could be mentioned in the discussion or when presenting the results. 7- Are the changes in DOY of peak discharge statistically significant? 1.5 days per decade do not seem a very big change. 8- A reduction in melt rates due to warmer temperatures was also presented by López-Moreno et al., 2012. DOI: 10.1002/hyp.9408 9- A figure showing the mean annual hydrograph for control, changing climate, changing vegetation and changing climate and vegetation might result illustrative. 10- When hydrological resilience is discussed in pag. 16, the use of change in P and Q in % (in addition to mm) would help. Probably the use of the term "mild resilience" is a bit unclear. 11- I would include the changes in P as % in Tables 1 and 2. 12- I would show al the trend values but just highlighting the statistically significant ones (as in Table 5) 12-Title of Table 5, change bolt by bold. 12- The Labels of the X-axis in Figure 8 overlap.

I hope my comments will result useful.

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