General Comments:

This manuscript, titled "Recent trends and variability in river discharge across northern Canada", summarizes interdecadal trends and interannual variability in river discharge for 42 principal rivers draining northern Canada over a 50-year period. The research focused on the science question "whether or not river discharge in northern Canada shows a continued decrease in the twenty-first century as first reported in the leading author's previous publication". Also, the effects of flow regulation and climate variability are both considered in the manuscript. The leading author has much experience on the similar topic. Also, the manuscript is clearly written. Therefore, the reviewer would recommend this manuscript for publication.

Moreover, the reviewer would suggest the following specific comments to improve the clarity of the paper.

Specific Comments:

1) In northern Canada, there are substantial gaps in the time series of river discharge. The authors used a two-step process similar to Déry et al. (2005a). However, the streamflow timing change was not considerd in this gap filling strategy. As indicated in the manuscript, the gap-filling process can influence the magnitude of MKT trends. Therefore, the uncertainty resulting from streamflow timing change should be included in Section 5 (Discussion).

2) For some river basins affected by seasonally frozen soils and permafrost in northern Canada, there are significantly increased groundwater to river discharge due to the thawing of seasonally frozen soils and permafrost. For their contribution in trends and variability of river discharge, the authors mentioned in the text but without further discussion. Also, the related references are from 1986 (Woo) to 2007 (Walwoord and Striegl), which need to be updated and be consistent with your analysis period.

3) Although the effects of flow regulation and climate variability were both discussed in the manuscript, their effects were not split clearly in the analyses. It would be helpful to use the modelling tool and separate their effects as part of your future work. Please discuss this in Section 5.