Supplement comments on the manuscript “The coupling between hydrology, the development of the active layer and the chemical signature of surface water in a periglacial catchment in West Greenland” by Johan Rydberg, Emma Lindborg, Christian Bonde, Benjamin M. C. Fischer, Tobias Lindborg, and Ylva Sjöberg

Special issue: Northern hydrology in transition – impacts of a changing cryosphere on water resources, ecosystems, and humans (TC/HESS inter-journal SI)

To: Johan Rydberg, corresponding author

From: Svetlana Stuefer, handling editor

November 5, 2025

The authors have made significant progress in restructuring the manuscript. The reviewers still have concerns about typographical and grammatical errors. I encourage the authors to focus on improving readability and presentation quality and offer a few suggestions that could help with that.

1) Data use and availability: Consider improving the presentation of various datasets, their purpose, time periods, and data citations. I recommend adding a summary table (Supplemental File) that clearly lists each dataset (both used and produced), along with corresponding time periods, data availability (including data citation with DOI), and the purpose of each dataset for this study (e.g., field observations, model forcing, model calibration/validation, model outputs, statistical analysis). This table will enhance the readability of relevant sections (data, method, results, and discussion) and help ensure consistency. It will also assist others in replicating analyses and applying findings reported in the manuscript to future research.
2) Snowmelt period: The research objectives largely focus on the snowmelt period and snowmelt water; however, the data on snow water equivalent, snow ablation, and snowmelt rates are minimal in the current version of the paper. What are the implications of relying on snowfall data only? Multiple studies have shown that snowfall measurements are extremely problematic in windy treeless locations. Snow sublimation can be quite significant. Please clarify the use of winter precipitation and snow water equivalent data for estimating overland flow and direct runoff during snowmelt.
3) Conclusions: Consider framing your conclusions within the context of other northern hydrology studies and clearly highlight the unique contributions of your research in a broader context.

Specific comments:

Line 24: The term 'hydrological active season' – could you clarify what exactly is meant by this? Are you referring specifically to the month of September?

Line 44: Should it say “depends”?

Lines 116–119: Could you clarify question 3? What specific 'other important factors' are you referring to? Are you referring to factors such as groundwater, biological activity, or atmospheric deposition?

Line 179: How were snow ablation and the associated snowmelt rates represented in the model?

Line 222: How did you measure snow ablation during snowmelt? Did you conduct snow surveys?

Line 296–297: Was snow sublimation considered here?

Figure 2 and Figure 4: Figure 2B shows precipitation as snow and rain. Please add 'Snowmelt rates (mm/day)' to Figures 2B and 4C to indicate how much water leaves the snowpack daily.

Figure 3: Replace the comma with a period after Figure 3. The same comment applies to Figure 5.

Figure 3: Please use capital letters for the horizontal axis labels (Jan, Feb, Mar, etc) to ensure consistency with the labels in Figure 4.