

## Replies to Reviewer #1

We thank the reviewer for their comments and suggestions. Their comments regarding figure captions and interpretation are particularly helpful. Our replies to specific comments are provided below in blue text.

### Specific Comments

Line 426-437: Why does your model (and other models) over-predict during August – October? Any hypotheses as to why there is this seasonal variability? What is it about the permafrost catchments that makes their deviation over time greater?

We hypothesize the dynamic nature of the active layer, as it increases in thickness through a summer, is a large driver in the increasing model error during August-October due to the shifting catchment soil storage and subsurface runoff processes. We have added to the text to clarify this point.

Figures: There are 10 figures. Could some figures be consolidated/combined or placed in a supplement?

We believe that all of the figures provide valuable context or representation of the data to assist the reader in interpreting the analysis and results. It would be difficult to combine any of the current figures without adding difficulty or confusion in interpretation.

Figure 7 is a hard to interpret. Please provide a description either in the caption or in the text to help the reader interpret.

Additional text has been added to the figure caption to assist the reader in its interpretation.

Figure 9 is also hard to interpret. Could you provide an explanation of how to interpret? Why do some of the regions in the diagram not have a value? Because they are negative?

Some additional text providing examples has been added to the figure caption. The last sentence of the caption specifies that negative values are omitted from the diagram.