

The authors have invested significant effort into this work, making it an interesting read. The recently released SWAT-GL model effectively addresses key limitations of the traditional SWAT model in glaciated mountainous catchments. Efforts to expand its applicability in such environments are significant. The inclusion of a glacier mass balance module, based on the degree-day approach, and the delta-h (Δh) parameterization for dynamic glacier retreat represents a valuable improvement. Benchmarking the model against USGS Benchmark Glacier Project glaciers is a decent approach.

Certain aspects of this article would benefit from clarification and adjustment. More clarity in the methodology and case study explanations is needed. The results section lacks coherence, affecting the storytelling. The article also reads as overly lengthy, which complicates readability. The article would benefit from being more concise by removing sections that do not directly contribute to the objective. The work is fantastic! Incorporating the suggestions, where appropriate, will enhance the article and improve the clarity of its contributions. Detailed comments are provided below for further guidance.

General Suggestions:

The article uses certain words excessively or without appropriate context, leading to disjointed sentences. Terms such as "however," "in addition to," "in summary," "in contrast," "in detail," "in general," "as mentioned," "moreover," "furthermore," "although," "is not beaten by," and "in greater detail" often serve as sentence starters that do not connect with the preceding sentences. This disrupts the flow of the text and create confusion, as these phrases appear without sufficient context or relevance to the main text. It is advisable to remove these terms or use them where appropriate.

Figures:

It is suggested that the figures be adjusted to use the same x-axis and y-axis extents for comparison. Having different scales on the axes makes it difficult to compare the graphs effectively. Utilizing consistent x-axis and y-axis ranges will enhance clarity and facilitate a more accurate interpretation of the data. **For example, Figure 5**

Section 3.4:

This section discusses the MK-Test, WRS and Pettitt test; however, the purpose of conducting these statistical tests on observed and simulated values is unclear. It would be helpful to explain their necessity and whether they provide meaningful insights or are merely an application of statistical tools. Table 5 contains many 0 and 1 values for all glaciers for the Pettitt test, MK test, and WRS. Clarifying what these values represent—such as p-values, h-values, or K statistics—and why they are presented as integers would be beneficial. Much information seems to be missing from the table, making it difficult to derive any logical conclusions.

Section 3.6:

Discharge is now being incorporated in the calibration, despite earlier statements indicating that this variable was used exclusively for validation. What is the rationale behind this? While using discharge is an interesting idea, it raises questions about why it wasn't included from the beginning.

Minor corrections:

Line 76: sentence incomplete. "A trend which is

Table 1: The row "All glaciological Basin mean" is not clear.

Line 97: "Homogeneous data processing methods" maybe mention method names and reference

Figure 1: For me personally the figure legends are not up to the mark. Use star for watershed legend instead of square black box. Maybe place them horizontally instead of fitting them inside the figure.

Line 171: The author mentioned "years from 1972-1992 had to be chosen". Please explain the reason.

Line 172: The author mentioned "we can see a tendency" mention where? Refer to table or figure.

Line 252 – Line 263: This paragraph needs to be rewritten properly.

Line 274: This line is not clear.

Line 324: Check if the sentence is correct.

Line 338: Why GLMFMX is substituted by TLAPS, any justification?

Figure 5: Different X and Y axes make comparison difficult. It is suggested to keep the axes consistent for all four figures and divide them into four quadrants based on any specific μ^* and σ values. This will simplify the identification of which quadrant represents the more sensitive parameters.

Line 343 – Line 347: Needs to be rephrased. Mention names of four most important factor's name

Line 349: The statement is not, right? Please verify.

Line 369: "An exception exhibits here" Not clear

Line 410- Line 411: These lines can be removed as they are already covered in the previous section.

Line 426- Line 429: These lines can be removed as they are already covered in the previous section.

Line 507- Line 514: These lines need to be rewritten.