Dear Dr. Liz Bagshaw,

Thank you very much for your positive feedback and thoughtful suggestions on our revised manuscript. We greatly appreciate your recognition of our work's novelty and applicability to high mountain glaciers. We have carefully addressed all your suggestions and revised the manuscript accordingly. Please find our detailed responses below.

We believe that these revisions have improved the clarity and scientific quality of our manuscript. Thank you again for your time and valuable guidance that helped us further refine our paper. We look forward to your further consideration.

Sincerely,
Longjiang Xie
(On behalf of all co-authors)

L93: 'According to our regular meteorological, hydrological, and mass balance observations (June to August) starting in 2002, the Qiyi Glacier has suffered from an obviously increasing ice melting trend since 2016 (Chen et al., 2024)'.

Rephrase: 'we have undertaken regular meteorological, hydrological, and mass balance observations on Qiyi Glacier from June to August since 2002, which have demonstrated an increase in melt, particularly since 2016 (Chen et al. 2024).'

Response: Thank you for the suggestion. We have rephrased the sentence as:
"we have undertaken regular meteorological, hydrological, and mass balance observations on Qiyi Glacier from June to August since 2002, which have demonstrated an increase in melt, particularly since 2016 (Chen et al., 2024)."

I have some concerns about your response to the reviewer on their query of mean and median. This may be a translation issue, but mathematically, mean and median are both averages. I would like assurance that your statement 'Reply: The term "mean" is used to denote the average value. We have replaced "averages" in the text (line 209 and 214).' Is correct, and that you do report mean.

Response: Thank you for your careful attention. We sincerely apologize for the confusion caused by our earlier wording. We confirm that in our study, all reported "mean" values indeed refer to the arithmetic mean. Both mean and median are forms of averages. The term "averages" was used in the initial draft due to translation inconsistency. We have carefully checked the entire manuscript to ensure accuracy and clarity.

L317: 'of great importance' is a very subjective statement without evidence. Please rephrase to 'significant', 'useful' or something more circumspect.

Response: Thank you for pointing this out. As recommended, we have revised this phrase to "significant" to maintain objectivity.

L340: grammatical improvement: 'In regions without UAV data, deriving the channel gradient derived from lower resolution DEMs (e.g., 30 m GDEM, SRTM) requires careful evaluation'

Response: We have made the suggested changes.

L342: ‘commercial optical satellite imagery at a centimeter resolution’ – are there commercial satellites with a single centimetre resolution? Instead suggest ‘at centimetre scale resolution’

Response: Thank you for your suggestion. We have revised the sentence as: “can be obtained using commercial optical satellite imagery at centimetre scale resolution.”

L367: ‘These results indicate that, although spatial extrapolation uncertainty is the dominant error source, it does not affect our finding that channel geometry can be used to estimate glacier runoff.’ I find this statement a bit vague. Instead, could you give an idea of the practical change in discharge estimates with your maximum error? I know this is in the boxplots, but it would be useful to see an example value in the text.

Response: We appreciate this helpful suggestion. We have calculated the specific error value of runoff estimation under maximum error conditions to illustrate the practical influence of maximum uncertainty:
“Under the maximum uncertainty scenario (20%), when compared with the original models without additional errors, the mean absolute error (MAE) for both stepwise and NLS methods remained very small (0.092 and 0.109 × 10^6 m^3). The RMSE increased slightly from 0.097 and 0.122 × 10^6 m^3 to 0.117 and 0.146 × 10^6 m^3, while the nRMSE rose from 10.60% and 12.87% to 19.68% and 17.06% (Fig. 9), showing reasonable robustness of the two current regression methods. These results indicate that although spatial extrapolation uncertainty is the dominant error source, it does not affect our finding that channel geometry can be used to estimate glacier runoff.”

L392 ‘However, the applicability of this approach is limited for some other glacier types. For example, on maritime glaciers with extensive crevasses and relatively stronger subglacial hydrological processes (e.g., in the southern Tibetan Plateau and the Greenland Ice Sheet), some supraglacial rivers often terminate in crevasses or moulins, which makes our regression model less suitable for estimating glacier runoff. Similarly, temperate glaciers, debris-covered glaciers, and glaciers with strong surface structures are likely too complex to be represented without substantial modifications to the model’
To me, this discounts quite a significant proportion of glaciers! Could you rephrase this paragraph to highlight the glaciers it can do, rather than those it can’t? For example: ‘this approach is very well suited to polythermal or cold-based glaciers with limited subglacial hydrological activity or surface structures. However, it is likely to struggle in regions with large crevasses or numbers of active moulins, such as….’

Response: We fully agree with your suggestions. Following your advice, we have rewritten the paragraph to emphasize the glacier types where our approach performs well:
“Thus, we infer that this approach is well suited to polythermal or cold-based glaciers with limited subglacial hydrological activity or surface structures. However, it may be less applicable to maritime glaciers with large crevasses or numerous active moulins, such as those on the southern Tibetan

Plateau and the Greenland Ice Sheet."

L414: 'five-point moving filtering' should there be a 'mean' or 'average' in this sentence?

Response: You're absolutely correct. We have added "average" to clarify that the method used is "five-point moving average filtering".

Technical corrections in File validation

1) Table and figure numbering of the supplement are independent from each other. Hence, please renumber the single table to "Table S1" (instead of "Table S2")

Response: We have renumbered the supplementary table as Table S1.

2) Please ensure that the colour schemes used in your maps and charts allow readers with colour vision deficiencies to correctly interpret your findings. Please check your figures using the Coblis – Color Blindness Simulator (https://www.color-blindness.com/coblis-color-blindness-simulator/) and revise the colour schemes accordingly. --> Figs. 5, 6, 7

Response: The colour schemes in Figs. 4–7 have also been revised after checking with the Coblis – Color Blindness Simulator to ensure accessibility for readers with colour vision deficiencies.