

**Instituto Argentino de Nivología,
Glaciología y Ciencias Ambientales**

Av. Dr. Adrián Ruiz Leal s/n - Parque Gral. San Martín - Mendoza – Argentina
Domicilio Postal: C.C. 330, (5500) Mendoza, Argentina
Tel. 54 261 524 4200 – Fax: 54 261 524 4201
E-mail: ianigla@mendoza-conicet.gob.ar <http://www.mendoza-conicet.gob.ar/institutos/ianigla>



I A N I G L A

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U. N. C U Y O
G O B I E R N O
D E M E N D O Z A

Dear Regula Frauenfelder
Handling Editor
The Cryosphere
Manuscript #TC-2022-264

Thank you very much for your decision. Please find enclosed the second revision of the manuscript entitled “Annual to seasonal glacier mass balance in High Mountain Asia derived from Pléiades stereo images: examples from the Pamir and the Tibetan Plateau” by Daniel Falaschi, Atanu Bhattacharya, Gregoire Guillet, Lei Huang, Owen King, Kiti Mukherjee, Philipp Rastner, Tandong Yao and Tobias Bolch. The revised file is a marked-up document showing all changes, including your editorial comments which we took carefully into account and a number of minor amends to the main text. Please find our response to your specific comments below. We further provide missing ORCID numbers below for some authors that are missing in the MS record. Thank you very much for your assistance and we hope to hear back from you soon.

1. Following up on the respective comment by R#3 and your response, I would still like to encourage you to reconsider your usage of this term and whether it might increase comprehensibility if you would replace it – at least in ambiguous cases – with e.g. the term "mountain-wide".

L30 and throughout the manuscript: we are the opinion that the term “mountain-wide” is misleading. As we want to refer to the whole study area in contrast to individual glaciers, we either used the term “global mean”, omitted the term or clarified that we refer to the study regions.

2. Following up on the comment by R#3: please rephrase: glacier ice in the context of sqkm is not precise. Either you have xx cubic km of ice (volume) or you have xxx sqkm of glacierized area.

L126: We replaced glacier ice with glacierised area

3. Formatting in figure panel: - please move "Muztag Ata" to the right, to have the same space between the word and the left coordinate line as the title has in "Western N..."-panel.- In the "WN..."-panel, please move the (b) to the left, in order to have the same space between (b) and the right coordinate line as the (a) has in the "MA"-panel.

Figure1: We uploaded a new version with the requested title alignment

4. I agree with the comment by R#1 that this passage is not super clear. Even though the sentences are - as you rightly state - grammatically correct, I still suggest some amendments in order to increase comprehensibility.

L238-242: The use of the term snowbound was indeed problematic. To clarify this paragraph and the seasonal snow conditions on the 30 September and 6 October 2021 Pléiades image in the Western Nyainqêntanglha, we now state: “According to ERA5-Land daily data (Muñoz-Sabater et al., 2021), 3 cm of fresh snow fell between the acquisition of the 30 September and 6 October 2021 Pléiades and Sentinel-2 images in the Western Nyainqêntanglha range. Because seasonal snow is present in the 30 September Pléiades scene, the overall seasonal snow conditions appear nevertheless consistent among the two scenes”.

5. acquisition of the



L239 Corrected accordingly

6. This contradicts your response to this point in your author response, where you state that the metric used by Nuth and Kääb is the MEAN. You also state in your response that you have tried the approach by Berthier et al., who use the MEDIAN.

L267: You are correct, Nuth and Kääb (2011) use the mean difference in elevation change over stable terrain for coregistration purposes. We have now replaced median with mean in the manuscript.

7. If this method is originally by Berthier, you should either reference the original paper, or at least rephrase. For example, "... (by E. Berthier, as described e.g. in Falaschi et al., 2023)".

L273: After double-checking with Etienne Berthier, we confirm that the bias correction tool using the spline fit was used (or published) for the first time in Falaschi et al. (2023)

8. Applies to entire table: please center all the numbers in all columns except in the time period column.

In Tables 2 and 4 we used a centred alignment as requested.

9. Even though this will enlarge paper size: please "blow up" this figure to the full-page width, in order to enhance its readability.

The size of Figure 2 was increased to full page width.

10. Along the line of your response to this point by R#1, please add 1-2 sentences justifying your choice of this method, as opposed to other potentially applicable methods like the one by Maussion et al (2014)

L431: We included a brief text in which we justify the selection of the Glacier Index over other available methods to assess glacier accumulation regimes such as Maussion et al. (2014): "Although other applicable methods to assess glacier accumulation regimes in High Mountain Asia exist (e.g. Maussion et al., 2014), they are often based on climate reanalyses that have showed large disparities amongst them (Wortmann et al., 2018). More so, with the Glacier Index we intend to use a validation method fully independent from reanalysis data to validate our geodetic estimates".

11. Along the line of your response to this point by R#2, please add 1-2 sentences explaining why you used Landsat imagery and not S-2 imagery.

L451: We included a brief text to explain the use of Landsat imagery over Sentinel-2 in the Glacier Index: "In the methodology developed by Huang et al (2022), the spatial resolution of the Sentinel-1 scenes is resampled to 30 m to reduce the speckle effect on SAR images, which may affect the firn and snow identification. Whilst 10 m spatial resolution Sentinel-2 images are available from Google Earth Engine, the method uses 30 m resolution Landsat images to match the resampled SAR images".

12. Please mention which authors this applies to by adding their initials (as used in the Author contribution section).

L829: TB is the only person from the autor list to be part of TC editorial board.

13. To thank the two anonymous reviewers as well, would be standard courtesy

L840: All three reviewers are now acknowledged accordingly.

14. Missing "the"

L844: Corrected accordingly.

ORCID numbers:

Daniel Falaschi 0000-0001-9232-2813

Lei Huang 0000-0003-1797-5667

Owen King 0000-0001-9232-2813

Kriti Mukherjee 0000-0001-9232-2813



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Dr. Daniel Falaschi
IANIGLA CONICET - CCT Mendoza
C.C. 330 - 5500 Mendoza, Argentina
E-mail: dfalaschi@mendoza-conicet.gob.ar