

The Cryosphere

Brief communication: Tropical glaciers on Puncak Jaya (Irian Jaya/West Papua, Indonesia) close to extinction

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Dear Editor,

thank you for inviting us to submit a revised version of our manuscript. For this response, we added the actual changes made in the revised manuscript (red). Changes made in our revised supplement are mentioned in the last section.

Thank you very much.

Sincerely,

David Ibel, Thomas Mölg, Christian Sommer

I. Author's response to Editor's remarks

Give the comments of Reviewer 2, please consider presenting the uncertainties in Table 1.

Response: We added uncertainties to Table 1 (Line 201).

Likewise, following the comments of Reviewer 2, please consider adding a sentence in the conclusion about the uncertainties in attribution. While the current manuscripts discuss possible causes and support these with citations, part of the value of a brief communication is to encourage additional work on a subject. Thus, I believe explicitly bringing to light this knowledge gap in the conclusion would increase the value of the manuscript.

Response: We added a sentence in the conclusion: "A detailed attribution of this glacier recession to climatological causes beyond the more general factors (outlined in Sect. 4) will, however, require additional studies (and in-situ data acquisition) due to the well-known scale problem for mountain regions (Mölg and Kaser, 2011)." (Line 250).

Ln 249-> I am a bit surprised by the fact that average daily temperatures are rarely below zero. While this statement is cited, can you confirm this? This comment is likely a reflection of my surprise, rather than an actual scientific matter.

Response: We added two sentences to Section 4, containing more information about this statement (Line 234-237). The information about near-zero probability of daily average temperatures dropping below freezing point at ~4400m a.s.l., cited from Permana et al. (2019), is in line with other works on tropical glaciers, e.g. by Nicholson et al. (2013), who found daily average temperatures to fall slightly below 0°C at ~ 4900 m a.s.l.

Ln 254-> Consider moving the sentence starting with “However” to the end of the paragraph. This may highlight the large point of this paragraph.

Response: We moved this sentence to the end of the paragraph.

II. Further enhancements

Line 64: Corrected “glacier” to “Glacier”

Line 82: Replaced “modern” with “extensive”

Line 152: Added “RMSE” acronym

Line 201: Changed colouring in Table 1 to grayscale, as requested by Copernicus Editorial Office; Corrected transmission errors in cell East Northwall Firn/2018 and in the last row

Line 207: Corrected transmission error, changed “0.247” to “0.228”

Line 252-254: Enhanced wording of sentence to “Considering the increasing prevalence of small (tropical) glaciers due to climate change, high- and highest-resolution optical imagery will become more important for surveying glacier extent in the future in comparison to medium-resolution imagery”

Changed thousands separator to “,” throughout the whole manuscript.

III. Supplement changes

Table S1: Changed “glacier” to “Glacier” throughout the first column

Image S1: Changed title from “Supplementary Image S1” to “Supplementary Figure S1”, as requested by Copernicus Editorial Office.

References:

Nicholson, L. I., Prinz, R., Mölg, T., and Kaser, G.: Micrometeorological conditions and surface mass and energy fluxes on Lewis Glacier, Mt Kenya, in relation to other tropical glaciers, *The Cryosphere*, 7, 1205–1225, <https://doi.org/10.5194/tc-7-1205-2013>, 2013.

Permana, D. S., Thompson, L. G., Mosley-Thompson, E., Davis, M. E., Lin, P.-N., Nicolas, J. P., Bolzan, J. F., Bird, B. W., Mikhalevko, V. N., Gabrielli, P., Zagorodnov, V., Mountain, K. R., Schotterer, U., Hanggoro, W., Habibie, M. N., Kaize, Y., Gunawan, D., Setyadi, G., Susanto, R. D., Fernández, A., and Mark, B. G.: Disappearance of the last tropical glaciers in the Western Pacific Warm Pool (Papua, Indonesia) appears imminent, *Proceedings of the National Academy of Sciences of the United States of America*, 116, 26382–26388, <https://doi.org/10.1073/pnas.1822037116>, 2019.