Dear authors,
Thank you for submitting your revised manuscript. The revisions have improved the manuscript. I will be pleased to accept it for publication subject to a small number of minor corrections required. These include typographical/figure errors, and some minor issues with passages that were significantly revised in the last review. In all cases, the latter can be addressed with simple edits to the text, for which I have provided suggestions.
We thank the editor for taking the time to provide another round of detailed and very helpful comments.

Several new errors have arisen with each revised version, which should have been identified with proofreading. Please undertake more careful proofreading before submitting the revised version. This includes checks for typographical/figure errors, that citations are correct (e.g. dual author versus et al.), and that all citations are included in the reference list.
We updated the reference list and proofread again.

My most substantive comment pertains to Section 5.1.2: (containing content about gullies that has been particularly queried by previous reviews)
(1) It would be better to name this section 'Trends in aspect for cirque-like alcoves, and implications for cirque initiation'. The examples you show are not gullies according to the strict Martian definition (having alcove, chute, and depositional fan, and typically being rather young features), but you can use gullies as an example of aspect-dependent hillslope processes to comment on potential mechanisms for cirque initiation. The specific reference to gullies also breaks the flow of the argument, since it comes before the comparisons to GLF distribution which are more central to the analysis.
We have changed the name of the section, though in Fig. 12b, we have also added an example of a gully mapped by Noblet et al., (2024) along the same mesa edge.

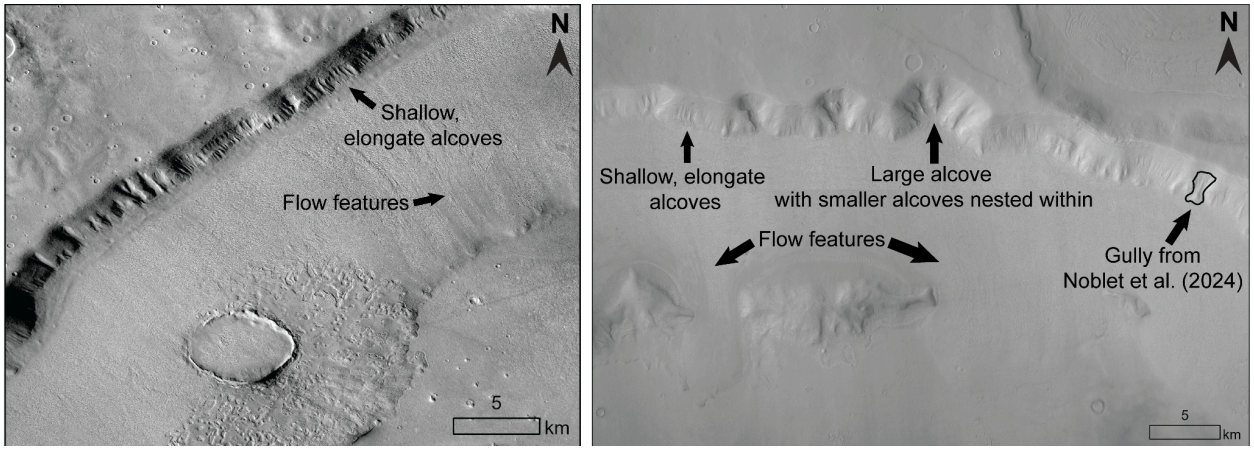


Figure 12: Examples of mesa slopes with shallow alcoves, larger alcoves, and adjacent ice. (a) Shallow alcoves may indicate ice-associated erosion all along the mesa sidewall. Flow features indicate the downslope direction of ice flow. Centered at 41.06°N, 17.88°E in CTX image D04_0288880_2193_XI_39N342W. (b) Shallow alcoves may indicate ice-associated erosion while larger alcoves with multiple smaller alcoves nested within may represent a later stage of development. Gullies (Noblet et al., 2024) may also act as initiation points for alcoves. Flow features indicate the downslope direction of ice flow. While the larger alcoves in this figure were mapped as alcoves, they were not classified as simple alcoves (and as a result, not cirque-like alcoves) because they have interior ridges (Appendix B). Centered at 40.02°N, 23.20°E in the CTX mosaic (Dickson et al., 2018). HiRISE data credit: NASA/JPL/University of Arizona. CTX data credit: Caltech/NASA/JPL/MSSS.

(2) I agree with the reviewers' earlier concerns that you are not actually showing gullies in the figure (and thereby not explicitly supporting gullies as potential initiation points), which still causes some weakness in the argument here. This is a simple fix, requiring only light modifications to the text to focus more explicitly on the shallow, elongate alcoves you observe and show in the figure as follows:

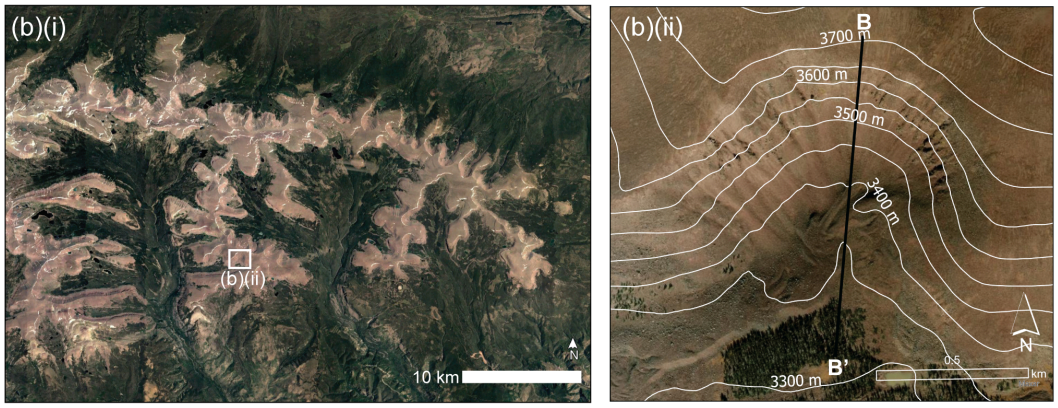
We thank the editor for taking the time to provide the suggested modifications. We have followed the suggestions, and also updated Fig. 12b to include a previously mapped gully by Noblet et al. (2024).

• Make the suggested section title change in (1).

We have accepted the suggested section title change.

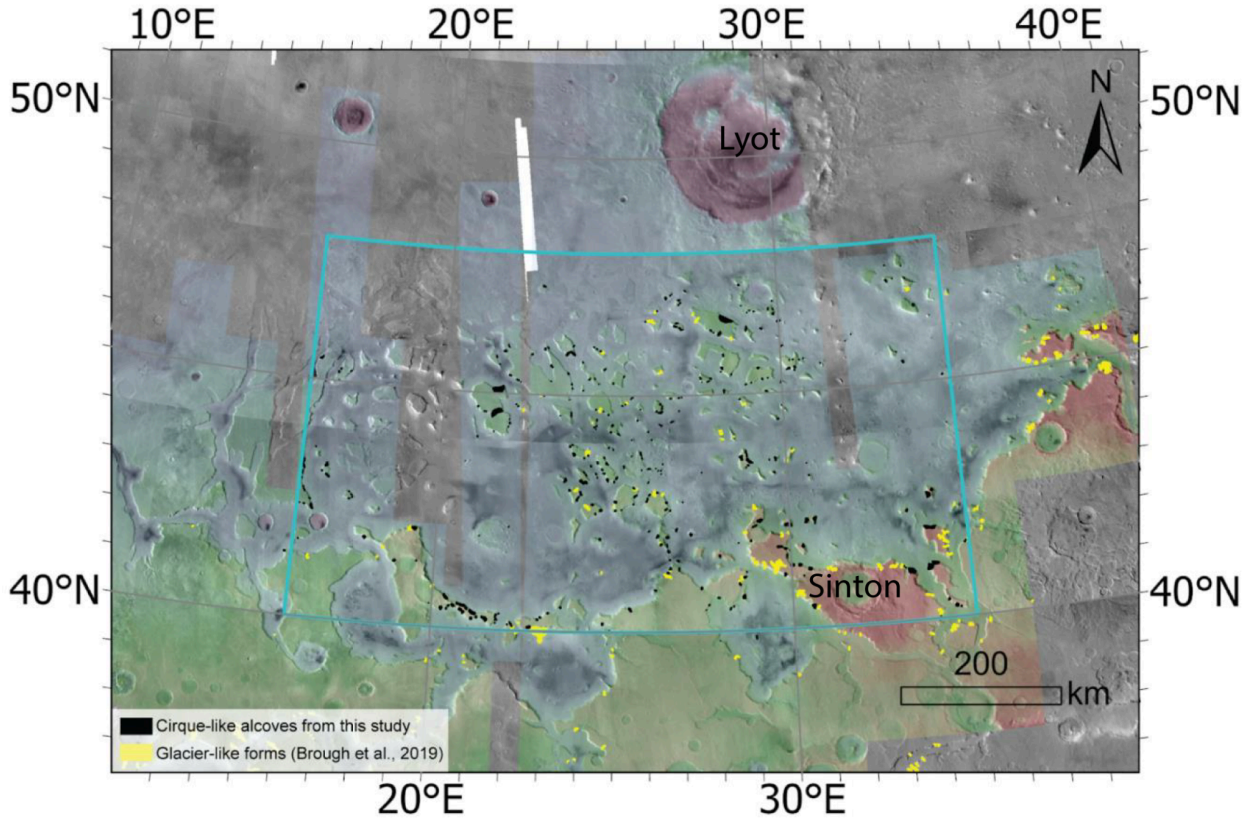
• Before 'Regardless of how gullies are initiated', add a sentence, referring to the figure, which specifically states that shallow elongate alcoves exist on hillslopes adjacent to

the larger alcoves. Mention that they are not necessarily gullies according to the narrow morphological definition of Martian gullies in the literature.
Corrected.
• Then, 'Regardless of how shallow alcoves of any kind are initiated (be they gullies or other types of hillslope depressions), they may act as cold-traps where snow could accumulate (e.g. Dickson et al. 2023) and initiate formation of cirque-like alcoves.
Corrected.
• Then, in what follows, just refer to shallow alcoves as a more general category (I think it will be ok to retain the 'shallow alcoves or even gullies' statement you currently use towards the end).
Corrected to "For example, shallow alcoves and gullies could provide the initial concavity for a later cirque-like alcove to develop when glaciation occurs (Fig. 12), which is consistent with gully heads that have been proposed as initiation points for cirques on Earth (Derbyshire and Evans; 1976)."
Specific comments:
L23: Moraine-like ridge repeats
Corrected.
L24: 'the mantling deposit, an ice-rich unit' > an ice-rich mantling unit
Corrected.
L27: alcoves > alcove formation
Corrected.
L27: After wet-based erosion rates, add 'Assuming a mean annual temperature of -20°C (compared to present-day temperatures of ~-60°C)'
Edited to 0°C (instead of -20°C) for the wet-based erosion rates.
L29: Should also state the same temperature assumption is used for this.
The sentence was edited to read as follows: "In contrast, using a temperature assumption of -50 to -68℃, cold-based erosion rates are only consistent with the older ages of lobate debris aprons."
L61: For the mid-latitudes, models show glaciation at obliquities >35. >45 is associated with equatorial glaciation
Corrected.
Figure 2, panel b(i). I have flagged this issue several times previously but it still remains. The label for the extent indicator in panel b(i) should read b(ii), not c(ii)
The panel has been updated to b(ii).



L153-154: The features aren't labelled in the figure

Corrected.



L197-198: Since this assumes the cirque is an oblong, it should really be 'we approximate the total cavity volume…', and caveat that it likely overestimates true volume.

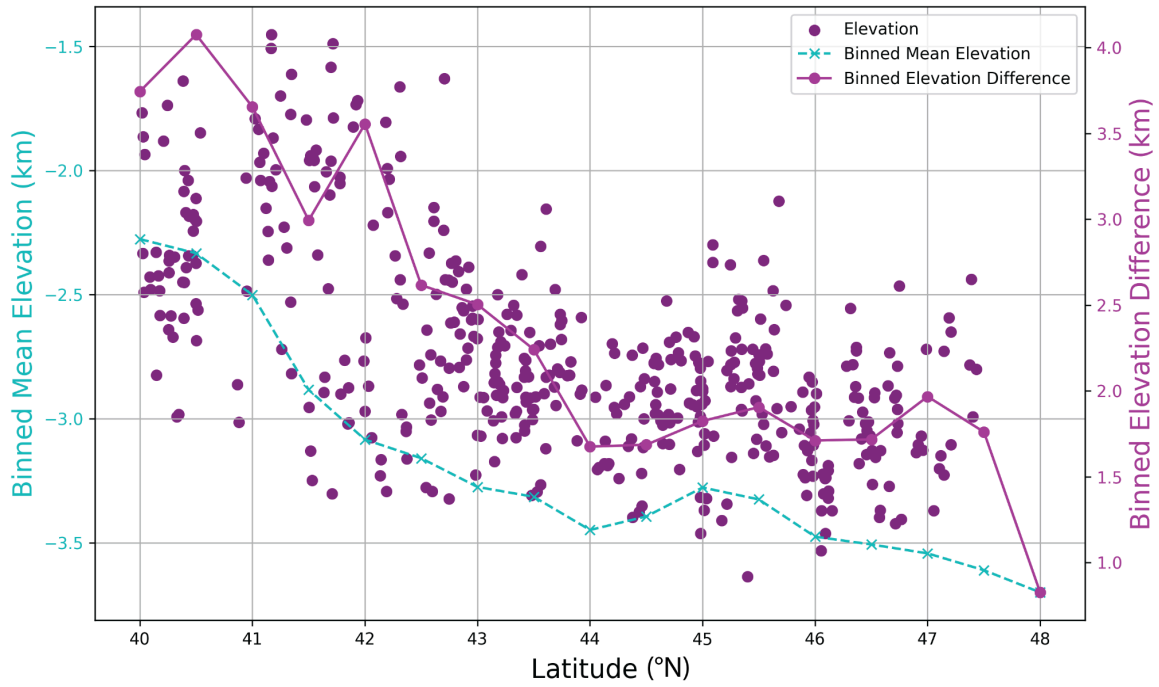
We edited it to read "approximate…" In addition, we edited the following sentence to include the caveat: "Here we find the total cavity volume of the alcove as a proxy for the maximum amount of ice that an alcove may have contained, which is likely an overestimate since it assumes the alcove is round."

L198: Suggest size > ‘size’
Corrected.
L199: full stop after citation.
Period was added.
L199: find > use
Corrected.
L200: of alcove > of the alcoves
Corrected.
L204: typical L/W > typical cirque L/W
Corrected.
L211-212: on Mars > in Deuteronilus Mensae, Mars
Corrected.
L286: ‘correspond to slopes of 20-25 degrees’: careful here. If you are referring to slopes within cirques, this should be 'have slopes of'. Correspond to implies they occur *on* slopes of this angle (i..e that you measured the generalised slope around the cirque)
Corrected.
Table 5 Column 3: State in caption what N/A means (doesn’t mean 0%, means images likely too low resolution to identify)
We added the following to the caption: “‘N/A’ in the third column means the CTX images have too low of a resolution to identify the feature.”
L384: more frequent > more (or more frequent): Given longer timescales, events could have had same frequency, but there could simply have been more of them.
Corrected.
L421: ice accumulation and melt on the landscape > ice accumulation on the landscape, including the possible role of past melting.
Corrected.
L426: here and in the figure I'd avoid the use of the term channels - immediately invokes flowing water. You could say large alcoves with multiple smaller alcoves nested within?
Edited to “large alcove with smaller alcoves nested within” as shown in the figure at the beginning of the response.
L426: add a label for the simple alcove to the right of the shallow alcoves in b? Presumably this made it into your cirque-like alcove database? If so, point it out. If not, explain whether it fell into one of the more complex categories.

The caption (at the beginning of the responses) now explains why those alcoves were not classified as simple alcoves.

Fig 13: Latitude (rounded) presumably only applies to the plotted lines, not the points. Take out of axis label and put instead in the relevant part of the caption.

The figure was updated as follows:



The caption now reads: "**Figure 13: Scatterplot of mean elevation for the 435 cirque-like alcoves versus latitude (magenta points). The magenta solid line and teal dashed line are binned from 41,618,659 elevation scatter points from the mosaicked HRSC DEM, which were found using the raster to point tool in ArcGIS Pro. The binned mean elevation (magenta line) represents the mean elevation value of all the HRSC DEM scatter points rounded to each half degree of latitude in the study region. The binned elevation difference (teal dashed line) was calculated based on the difference between the mean of the highest 10,000 points and the mean of the lowest 10,000 points rounded to each half degree of latitude.**"

L493-500. This paragraph is somewhat improved, but is still confusing. I suggest deleting. The observed moraines are well outside the alcoves, which doesn't seem to be the best configuration for subsequent cirque erosion (which is driven by rotational slip, and therefore somewhat requires that the glacier front is at least partially constrained at the alcove edge). That doesn't seem to be the case in these examples. 'moraine-like ridges may reside…' is also very speculative, and not actually observed.

We recognize that the way the paragraph was previously phrased was confusing. We have rewritten it for clarity as follows:

"As with moraines on Earth, the position of the moraine-like ridges on Mars reveal the extent of glaciation relative to the cirque-like alcoves. Moraine-like ridges extend either directly from (Fig. 11a) or downslope of cirque-like alcoves (e.g., Fig. 11b, Fig. 5). The moraine-like ridges that extend directly from cirque-like alcoves (Fig. 11a) are akin to terminal moraines formed by terrestrial cirque glaciers that only remain within their cirque basin. Moraine-like ridges further downslope (Fig. 5) reflect a stage where the glaciers grew beyond the cirque-like alcoves.

Similar to Arfstrom and Hartmann (2005), the moraine-like ridges in Fig. 11b reflect the glacial erosion and deposition of mesa material sourced from their corresponding upslope alcoves. In Fig. 11b, only two of the alcoves are well-developed and have morphometrics corresponding to the criteria we set for cirque-like alcoves. The rest of the alcoves remain underdeveloped and require further glacial erosion to qualify as cirque-like alcoves."

L539-542: There are repetitions about knowledge of temperature here. Revise and tighten.

We have deleted these sentences and updated the calculations and temperatures to correspond to -50 to -68℃, as well as using values from Parsons and Holt 2016 instead of a rock glacier from Earth:

"For finding U_{surf}, surface velocities of glacier-like forms on Mars are not well constrained and may have included short, warm periods that allowed for melting (Hubbard et al., 2014). For a lower bound surface velocity for cold-based glaciers on Mars, recent modeling using a mean annual present-day surface temperature of -63 ℃ and found a maximum surface velocity of 20×10^{-6} m/yr for a thin (<100 m) viscous flow feature on a steep slope (Butcher et al., 2024). On the other hand, Parsons and Holt (2016) find a surface velocities ranging from 0.05-20 mm/yr for ice at -68 ℃, with the lower velocity of 0.05 mm/yr corresponding to 200 Myr ice and 20 mm/yr corresponding to 200 kyr ice. We include 20 mm/yr as an upper bound for cold-based surface velocity (Table 8). For the wet-based case, we use a surface velocity of 2 m/yr (based on a polythermal glacier in Broggerbeen, Svalbard; Table 1 of Cook et al., 2020)."

L539-542: While we don't know the past temperature, we do know the present average temperature for the mid-latitudes, so this should be stated, as comparison to the values you have chosen.

As mentioned above, we have edited the text to correspond to the new temperatures. In addition, we have edited the following about the *A* parameter:

"For the *A* parameter, since it is unknown how much the temperature of ice on Mars has fluctuated throughout the Amazonian, we use both a warm and cold ice scenario. For the warm ice, we use 0 ℃ (Table 8). For the cold ice, -50 ℃ is the coldest temperature for *A* from Cuffey and Paterson (2010) that approaches the mean annual present-day surface temperature of -63 ℃ (e.g., Forget et al., 1999; Butcher et al., 2024)."

L539: 'Approximately the same' – what are the actual values? It is a little odd to pick the warmer one since the colder one might be the more conservative estimate for Mars, but if you can explicitly show that they really are similar (and that any difference doesn't amplify by propagation through to required timescales), this would be more robust.

As mentioned above for an earlier comment, we have edited the text to use only surface velocities modeled for Mars for the cold-based case, as well as *A* corresponding to -50 ℃. In addition, we added the table below to show the values corresponding to the calculations:

Table 8. Overview of the constants, values, and results used for age calculations of cirque-like alcoves on Mars. "*" indicates values that were calculated in this work. "-" indicates that the value was not used for that column.

	Wet-based glaciation	**Cold-based glaciation**	
n, flow-law exponent	3		-
ρ, ice density	917 kg/m^3		-
g, gravitational acceleration	3.71 m/s^2		-

α, ice surface slope	5° (typically 2-8° for glacier-like forms on Mars; Brough et al., 2019)			-
h, ice thickness	130 m for glacier-like forms on Mars (Brough et al., 2019)			-
Temperature	0 ℃	-50 to -68 ℃		-
A, temperature-dependent ice softness parameter	$24 \times 10^{-25} s^{-1} Pa^{-3}$ (Cuffey and Paterson, 2010)	$2.6 \times 10^{-27} s^{-1} Pa^{-3}$ (Cuffey and Paterson, 2010)		-
U_{surf}, surface velocity	2 m/yr (polythermal glacier in Broggerbeen, Svalbard; Table 1 of Cook et al., 2020)	20×10^{-6} m/yr (estimate for present-day debris-covered ice on Mars; Butcher et al., 2024)	20×10^{-3} m/yr (estimate for 200 kyr debris-covered ice on Mars; Parsons and Holt, 2016)	-
U_S, basal sliding velocity*	2.0 m/yr	20×10^{-6} m/yr	20×10^{-3} m/yr	-
K_G, bedrock erodibility constant	10^{-4} (Cook et al., 2020)			-
l, erosion exponent	0.69 (empirical estimate from Cook et al., 2020)			-

E, erosion rate*	160 m/Myr	0.0572 m/Myr	6.73 m/Myr		10 m/Myr (Levy et al., 2016)
Cirque-like alcove height*	Median: 300 m		Median: 300 m	Maximum: 1735 m	Maximum: 1735 m
Time required to erode*	1.86 Myr	5.24 Gyr	44.6 Myr	258 Myr	174 Myr
Total time required* (accounting for obliquity and cirque erosion occurring at the beginning/ end of glacial periods)	9.30 Gyr	26.5 Gyr	223 Myr	1.29 Gyr	868 Myr

L541: Beacon valley…on Earth.

Corrected.

L549: Cook citation missing from ref list. Please carefully (a) check all citations are in the ref list, and (b) state here what example such a velocity is based on (Earth warm-based glacier? where?)

(a) We have added Cook et al. and checked all citations are in the reference list.

(b) In parentheses for the wet-based case, we added the following: "(based on a glacier in Broggerbeen, Svalbard; Table 1 of Cook et al., 2020)."

L564: could have been eroded *from* a cirque like alcove

Corrected.

L570-571: reiterate that this is for the wet-based case

We have reiterated as follows:

"On Earth, cirques are presumed to be mostly eroded at the beginning and the end of glaciations (e.g., Barr et al., 2019), so assuming that the cirque-like alcoves only have 20 kyr of erosion time during every 100 kyr period, or 20% of the total time passing by, it would take ~9.3 Myr of total time to erode a median height cirque-like alcove using wet-based glacial erosion rates (Table 8). This timescale is consistent with previous estimates of the age of certain populations of glacier-like forms (Hepburn et al., 2020), which means that at least some of the glacier-like forms could have eroded the cirque-like alcoves which they currently occupy if they had wet-based glacial erosion rates and that at least some of the empty cirque-like alcoves could have hosted glaciers in the past tens of millions of years."

L578: The Conway estimates are interpreted as wet-based rates, so perhaps confusing to state here. Delete.

Deleted.

L579-580: LDA and CCF not defined.

We have edited to read as follows: "By including obliquity variations and using an erosion rate of ~6.7 m/Myr, a median height cirque-like alcove would require ~220 Myr to erode (Table 8). For a maximum height cirque-like alcove, an erosion rate of ~6.7 m/Myr would yield a total age of ~1.3 Gyr (Table 8), which is slightly longer than the ~500 Myr (Fassett et al., 2014) to 1.1 Gyr (Berman et al., 2015) timescales of when lobate debris aprons and concentric crater fills were estimated to have formed."

L584: Somewhat repeats earlier LDA/CCF points. Tighten up. You only need to make this point once (suggest removing the LDA/CCF statement).

The sentence on LDA/CCF was based specifically on a prior reviewer's comment, but we deleted it.

L586-605: This paragraph is confusing in its structure. It is unclear how the conclusion in the first sentence is drawn, having not yet been justified by the discussion further down the paragraph. I suggest moving this after the quantitative discussion further down the paragraph, and instead starting the para with the discussion of maximum erosion depths. There is some repetition with the previous paragraph – tighten this up. See also comments below about removing reference to erasure of alcoves by hillslope wastage.

The reference to erasure of alcoves was also removed. We reordered the paragraph and tightened it up, as seen below, by moving the quantitative information up to the prior paragraph:

"On the other hand, if we assume cold-based conditions for glaciers that occupied the cirque-like alcoves, then the erosion rate estimated is ~0.057 to 6.7 m/Myr. However, the lower bound of 0.057 m/Myr is unrealistically low because a median cirque-like alcove would take longer than the age of Mars to erode (Table 8). However, the upper bound of ~6.7 m/Myr falls within the previous wide-ranging estimate of 0.1-10 m/Myr for cold-based viscous flow features on Mars (Levy et al., 2016). Using an erosion rate of 6.7 m/Myr, a total glacier occupation time of ~45 Myr would be required for median cirque-like alcoves to form without accounting for obliquity variations. By including obliquity variations and using an erosion rate of ~6.7 m/Myr, a median height cirque-like alcove would require ~220 Myr to erode (Table 8). For a maximum height cirque-like alcove, an erosion rate of ~6.7 m/Myr would yield a total age of ~1.3 Gyr (Table 8), which is slightly longer than the ~500 Myr (Fassett et al., 2014) to 1.1 Gyr (Berman et al., 2015) timescales of when lobate debris aprons and concentric crater fills were estimated to have formed. If instead the upper-end erosion rate of 10 m/Myr for cold-based glaciers is applied from Levy et al. (2016), then all heights of the cirque-like alcoves could have formed via cold-based glacier erosion within ~870 Myr (Table 8). Given the upper timescale limit of ~1.1 Gyr for viscous flow features, it is likely that cirque-like alcoves had erosion rates higher than 6.7 m/Myr.

Since debris from the cirque-like alcoves often superposes the lobate debris aprons (e.g., Baker and Carter, 2019), this means that the process eroding the cirque-like alcoves has continued after when the ice in the lobate debris aprons formed. The supraglacial debris covering the lobate debris aprons is likely <10 m (Holt et al., 2008; Plaut et al., 2009) and a major fraction of the debris was sourced as rockfall from the mesas (Baker and Carter et al., 2019). In order to remove the debris, cirque-like alcove erosion has occurred either concurrently or after lobate debris apron formation. On Earth, the chronology of cirque formation is difficult to constrain (e.g., Turnbull and Davies, 2006), and estimates for total glacial cirque erosion time range from 125 kyr (Larsen and Mangerud, 1981) to a few million years (Andrews and Dugdale, 1971; Anderson, 1978; Sanders et al., 2013)."

L591: 'averages 25m'. Not strictly what that paper says. The debris PLUS superposing ice-rich mantling likely has thickness LESS THAN 25m. Suggest linking to radar papers e.g. Holt, Plaut, Petersen which show the debris layer on VFFs in general is likely <10m

Corrected as follows: “The supraglacial debris covering the lobate debris aprons is likely <10 m (Holt et al., 2008; Plaut et al., 2009) and a major fraction of the debris was sourced as rockfall from the mesas (Baker et al., 2019).”

L592: Baker et al. 2019 > Baker and Carter 2019. Please check all references and citations carefully.

Corrected.

L594: Sentence beginning: ‘Otherwise the erosional process’... I'm not sure this is true. The debris layer is only thin, but removal of cirque alcoves of sizes >100s metres would require large volumes to be eroded. Delete, and instead just use the argument stated previously that debris from the alcoves superposes the VFFs

Deleted.

L603: Sentence referring to Butcher et al. velocities. Now that this is incorporated earlier, I think you can delete this statement from here. It refers to present-day climate so isn't a good comparison.

Deleted.

L607: Kyr > kyr (Kyr would be Kelvin years)

Corrected.

L608-610: restate the assumed surface temperature, and how this differs from the contemporary mean annual surface temp

We edited as follows: “Our estimates here find that a median height cirque-like alcove in Deuteronilus Mensae would take ~9.3 Myr to form if occupied by a wet-based glacier at 0 ℃ with an erosion rate of 160 m/Myr. For the cold-based case, using a very low surface velocity from Butcher et al. (2024) and present-day temperature of -60 ℃ yields an unrealistic age for the cirque-like alcoves that is older than the age of Mars. However, if a faster surface velocity is applied from Parsons and Holt (2016), then a median cirque would require ~220 Myr if occupied by a cold-based glacier at -50 to -68 ℃ with an erosion rate of 6.73 m/Myr. Since cold-based erosion rates may vary by up to two orders of magnitude, maximum cold-based erosion rates closer to 10 m/Myr would allow for timescales of hundreds of millions of years. Thus, if the glaciers were cold-based during their entire evolution, the erosion timescale is longer and therefore the alcoves must be much older than if they evolved during periods of wet-based glaciation. Whether the cold-based erosion rates on Mars were more similar to what has been observed at Meserve Glacier in Antarctica at ≤3 m/Myr (Cuffey et al., 2000) or at much higher values closer to 10 m/Myr (Levy et al., 2014) remains unknown.”

L623: previously repeats

Deleted the second “previously.”

L624: Typo in deuteronilus

Corrected.

L624: Delete ‘in the past’ – covered already with ‘formerly’

Deleted.

L627: Moraine-like ridges repeats

Deleted the second “moraine-like ridges.”

L628: see rewording suggested in earlier comment

Corrected to “an ice-rich mantling unit.”

L643-655: I’ll leave this up to your discretion, but personally, I would merge these to discuss a southeastward bias, and then explain south + east in the same paragraph. the reader could interpret the first point as facing due south and the second point as facing due east, which seems contradictory when detached from the results

Corrected and merged into one paragraph.

L661: -‘and temperature’: 20 degrees is used, which isn’t Mars’ current mid latitude temperature.

We edited this sentence as follows: “We estimate the time required for cirque-like alcove formation in Deuteronilus Mensae using Mars' surface gravity, obliquity models, and assume an ice temperature of -50 to -68 ℃ (Section 5.3).”

L677: ‘are provided’. Where? Please provide either a link to a repository, or a reference to the relevant supplementary material. I cannot see it included presently.

The spreadsheet of the cirque-like alcoves mapped in this study is attached to Appendix C and the description is below. We include only the spreadsheet because it is allowed as a table in the Appendix, but other files can only be included as a repository.

Appendix C: Spreadsheet of cirque-like alcoves

The spreadsheet for the 435 cirque-like alcoves identified in this work is attached.

Table C1: Parameters and their corresponding descriptions and units for columns in the spreadsheet of 435 cirque-like alcoves.

Parameter	Description	Unit
OBJECTID	Unique ID for each cirque-like alcove entry	-
lda_lvf_ov	Overlap with LDA or LVF of Levy et al. (2014), 1 = yes, 0 = no.	-
Lat	Longitude coordinate in decimal degrees	o
Long	Latitude coordinate in decimal degrees	o
Type	Classified type (all 1 for cirque-like alcoves)	-

L	Length of median axis of cirque-like alcove	m
W	Maximum, at right angles to axis, through cirque centroid	m
L/W	Length over width ratio of cirque-like alcove	-
Perimeter	Perimeter of cirque-like alcove	km
A_2D	2D (map) area as defined in Li et al. (2024)	km^2
A_3D	3D (surface) area as defined in Li et al. (2024)	km^2
Circular	Circularity index, defined in Li et al. (2024)	-
DEMresolut	DEM resolution	m
Easting	Easting (x coordinate) of the cirque centroid point	km
Northing	Northing (y coordinate) of the cirque centroid point	km
H	Height: Z_max-Z_min	m
CS	Cirque-like alcove size: the cubic root of L×W×H	m
L_H	L/H ratio	-
L_W	L/W ratio	-
A3D_A2D	3D area/2D area ratio	-
Slope_mean	Mean slope of cirque-like alcove	o
Slope_max	Maximum slope of cirque-like alcove	o
Slope_min	Minimum slope of cirque-like alcove	o
H_W	H/W ratio	-
Slpgt33	Percentage of area with steep slopes of >33°	-
Slplt20	Percentage of the area with gentle slopes of <20°	-
Slp20to33	Percentage of the area with slopes between 20° and 33°	-
Aspectmean	Vector mean aspect of all points within the cirque-like alcove	o
Aps_east	Sine value of Aspectmean	-
Asp_north	Cosine value of Aspectmean	-
Z_min	Minimum elevation cirque-like alcove	m

Z_max	Maximum elevation of cirque-like alcove	m
Z_median	Median elevation of cirque-like alcove	m
Z_mid	Middle elevation of the cirque-like alcove: (Z_max+Z_min)/2	m
Hypsomax	Highest mode of cirque-like alocve elevations	m
HI	Hypsometric integral.	-
Prof_clos	Difference between maximum and minimum slope within the cirque-like alcove	o
SubCat	Sub-category notes: a-boulders, b-layers in mesa, c-lineations/streaks, d-slumping debris, e-ridge-like features, f-unclear debris, g-glacier-like form nearby/neighbor, h-dunes, i-scalloped terrain, j-bumpy texture terrain, k-paintbrush-like headwall, l-rubbly, m-pasted-on terrain, n-flow features, o-alcove doesn't reach top of mesa, q-crusty texture, p-transverse ridges, r-layered deposits, s-moraines, t-polygonal terrain	-

Please also note the four points that were raised by the review file validation.
We have reviewed the four points and made the corresponding edits to add appendices and remove a reference. All text is in black. Previously, the supplementary material was the only location to upload a response to the editor (in addition to a reviewer) and that has been removed for this round.
I do not think that these revisions will be onerous, so I look forward to receiving the revised manuscript soon.

Many thanks
Frances Butcher
Associate Editor