Seasonal albedo changes as derived from OMEGA/MEX RGB global maps

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obal seasonal RGB composite maps have beer mputed by mosaiking OMEGA orbits

- from #228_0 to #751_1, corresponding to the northern hemisphere **spring season** (Sola Longitude Ls = 0°-90°) for Martian Year (MY) 27.
- From #886_0 to #1513_5, corresponding to the northern hemisphere **summer season** (S Longitude Ls = 90°-180°) for MY 27.
- from #1523_0 to #2037_5, corresponding to the northern hemisphere **fall season** (Solar Longitude Ls = 180°-270°) for MY27.
- From #2039_0 to #2579_1, corresponding to the northern hemisphere **winter season** (S Longitude Ls = 270°-360°) for MY 27.

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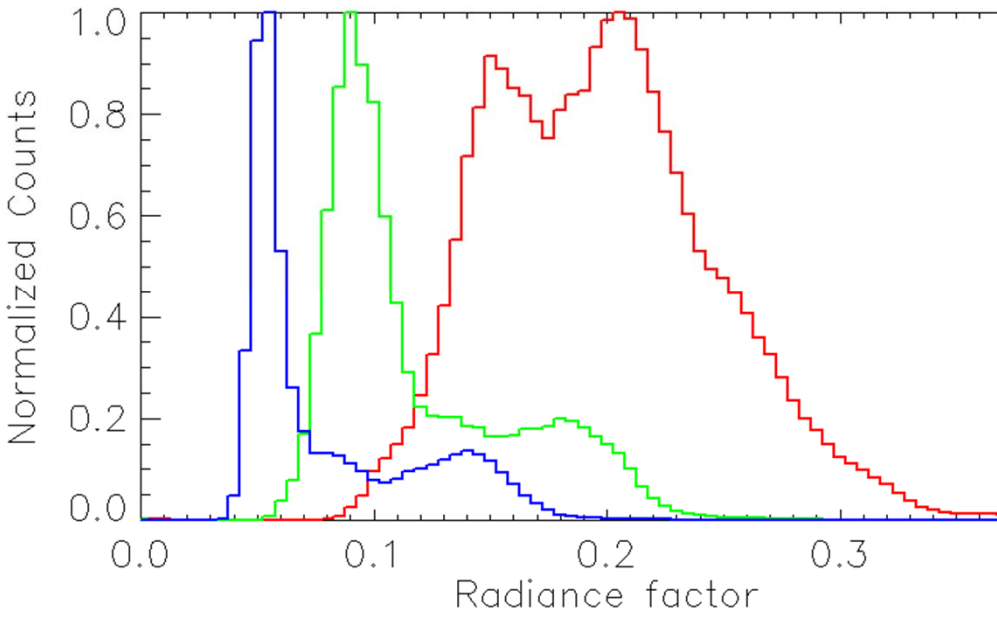
OMEGA/VNIR RGB channels

	λ (μm)	Lower Limit (Rad. Factor)	Upper Limit (Rad. Factor)
R	0.588	0.09	0.33
G	0.514	0.05	0.20
B	0.439	0.03	0.15



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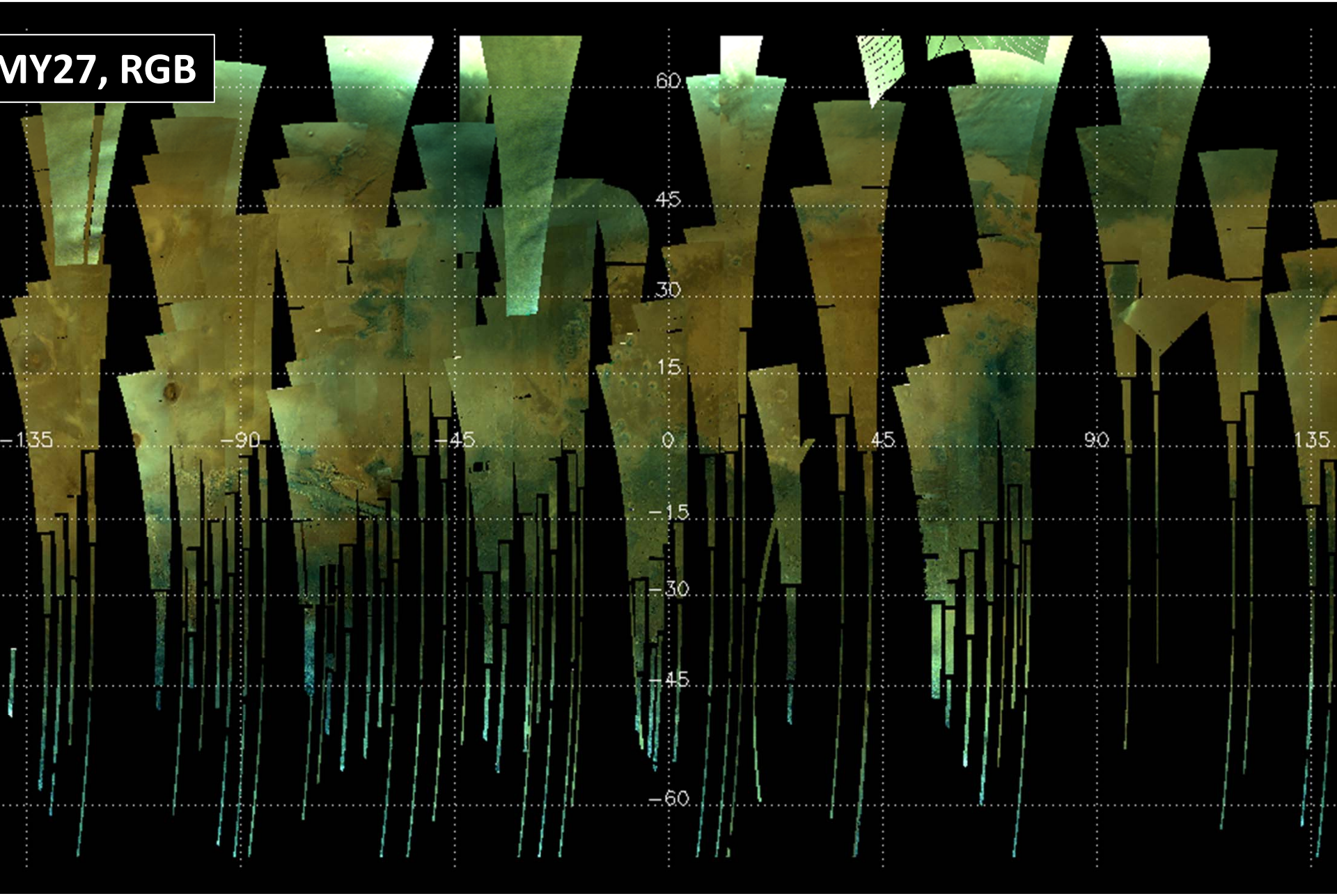
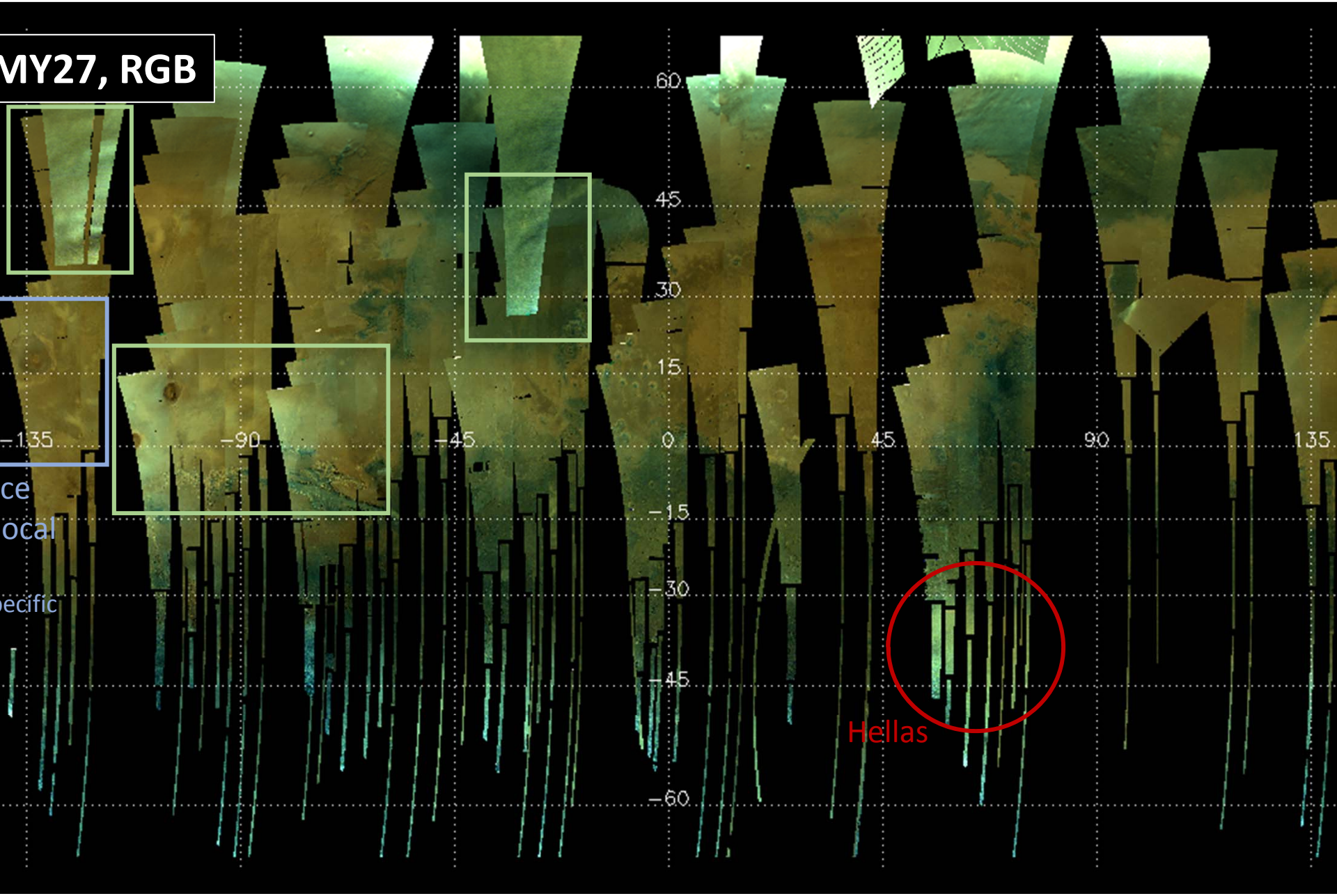
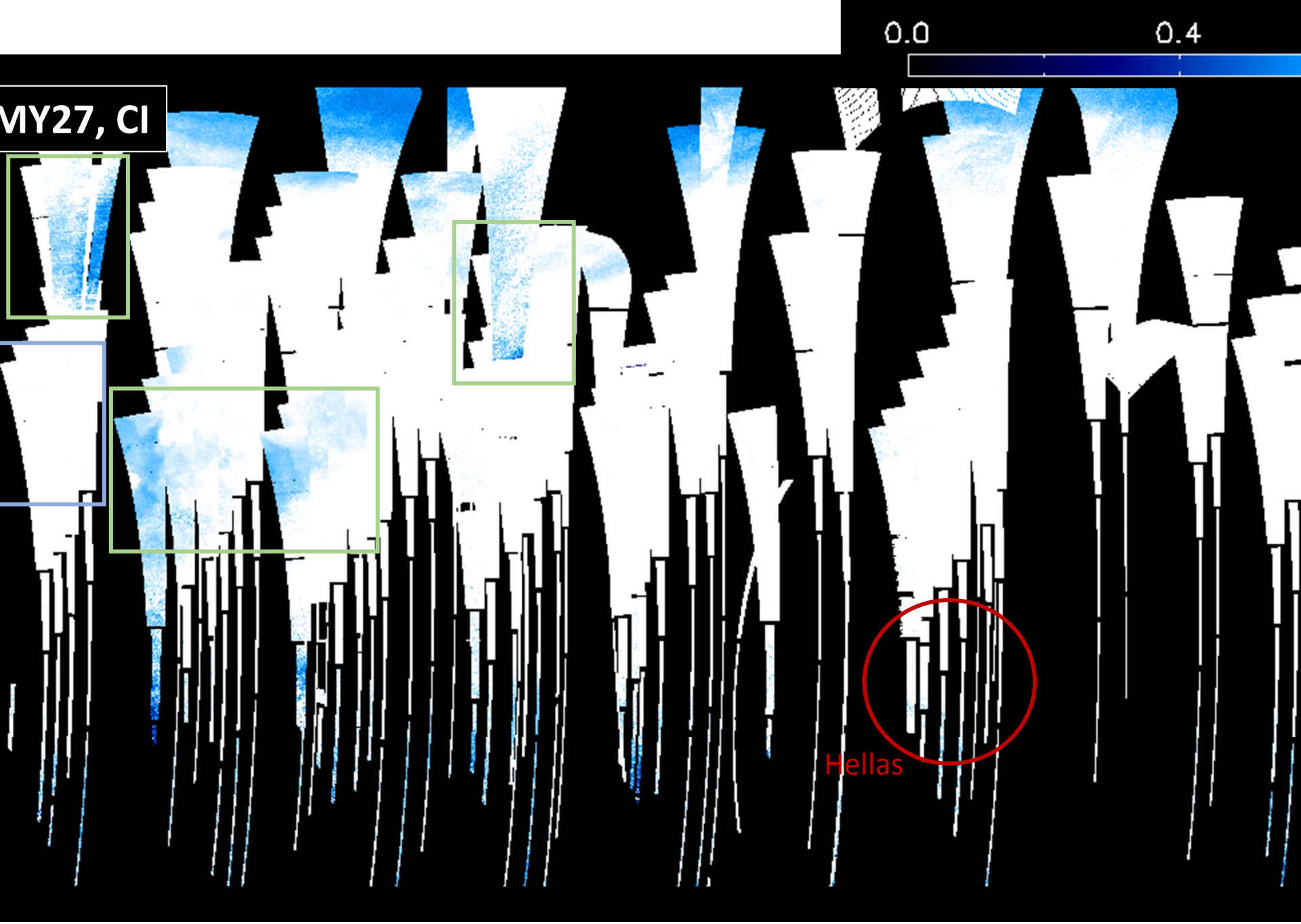
each season we also computed

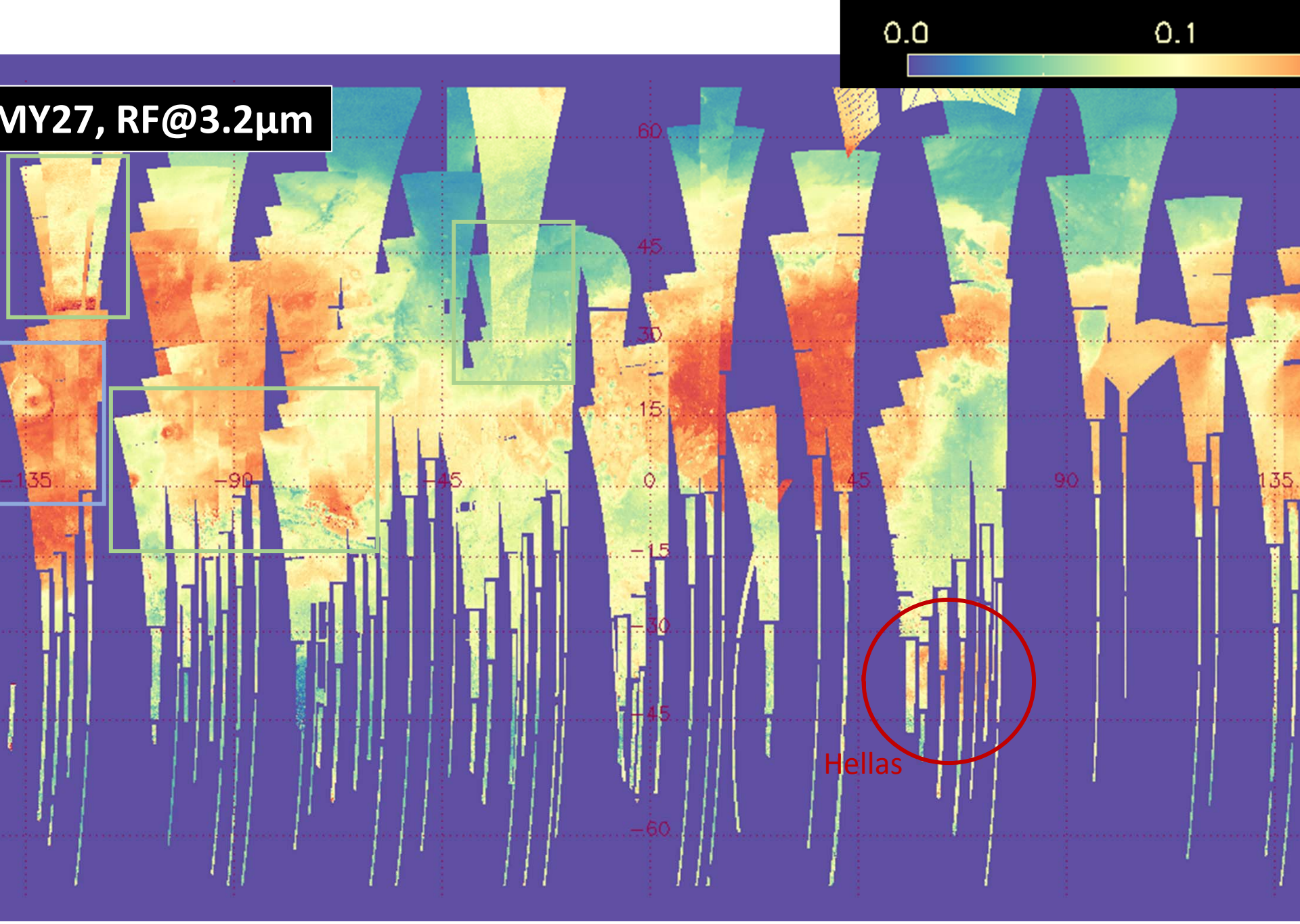
- Cloud Index (CI, Langevin et al., 2007) as the ratio Reflectance Factor RF@3.40µm/RF@3.52µm
- RF@3.2µm
- Equalized RGB images

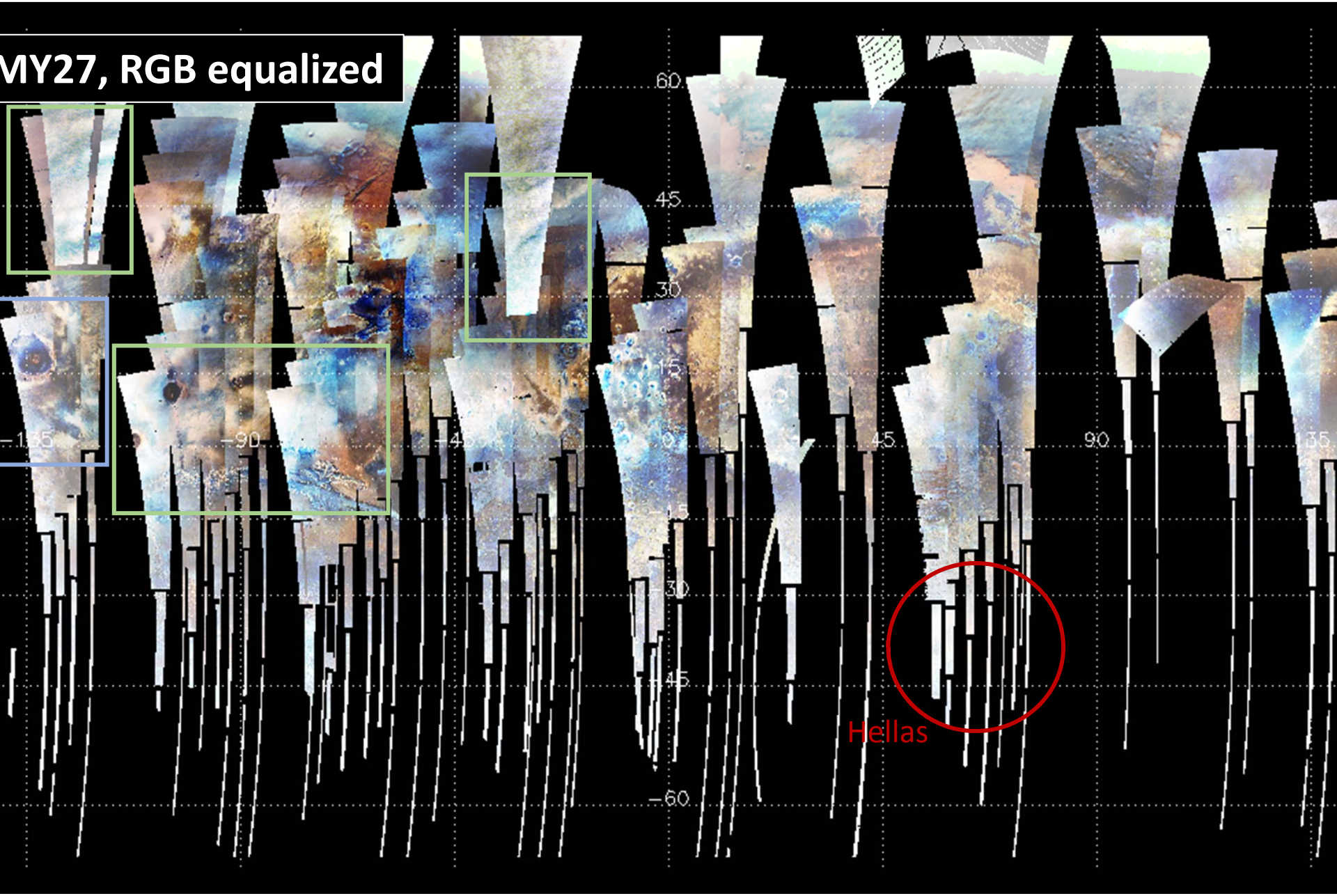
MY27

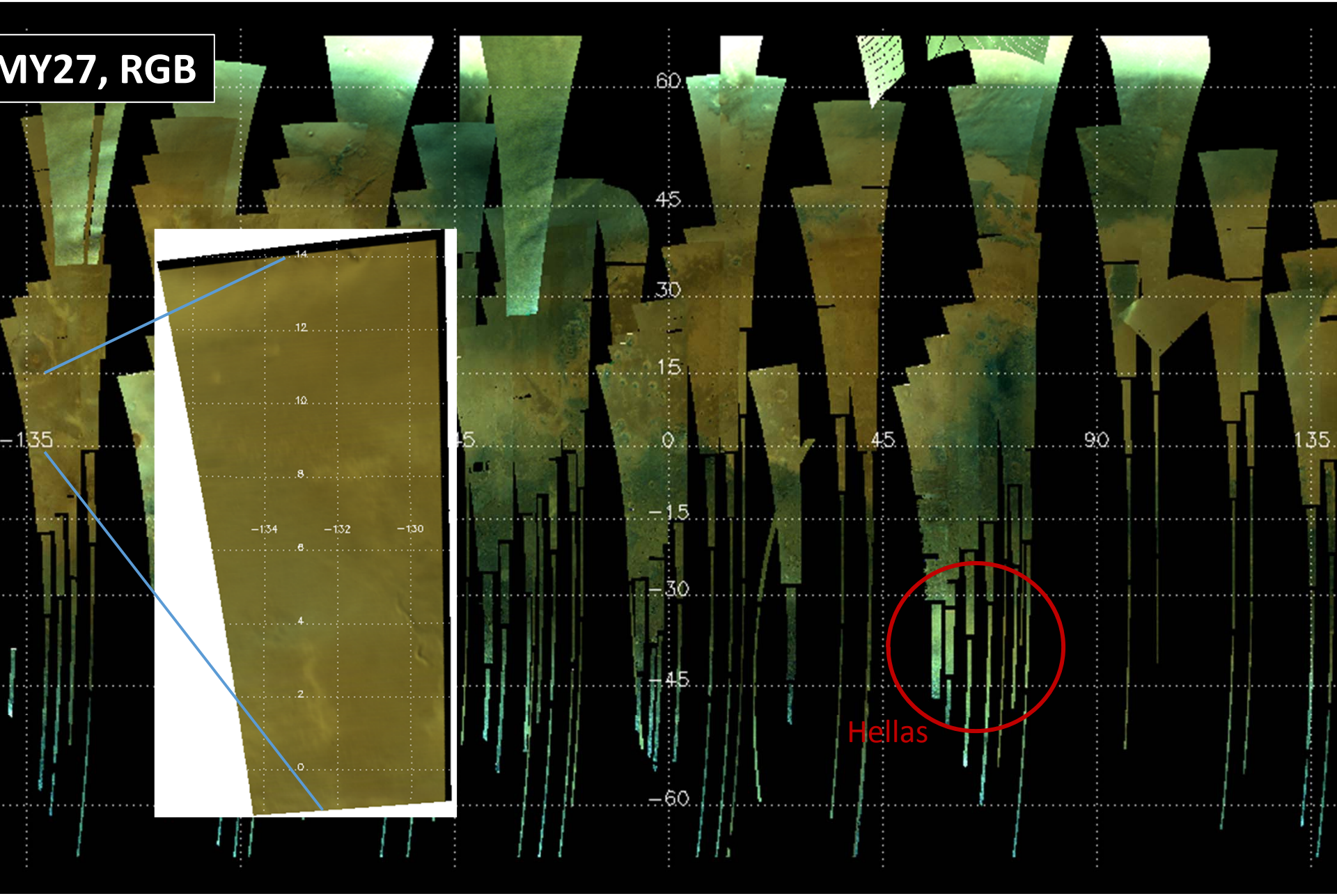

MY27, RGB
60
45
30
15
-135
-90
-45
0
45
90
135
-15
-30
-45
-60


MY27, RGB
60
45
30
15
0
−15
−30
−45
−60
−135
−90
−45
0
45
90
135
ce
ocal
ecific
Hellas


0.0
0.4
MY27, CI
Hellas


0.0
0.1
MY27, RF@3.2µm
60
45
30
15
0
−15
−30
−45
−60
−135
−90
−45
45
90
135
Hellas

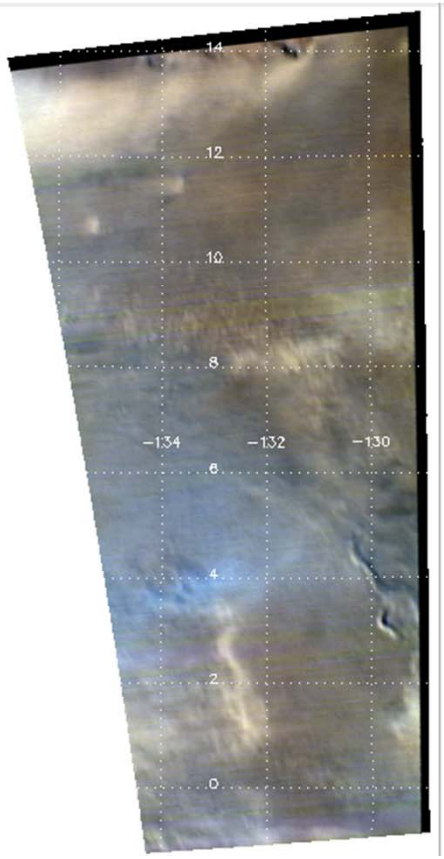

MY27, RGB equalized
60
45
30
15
0
-15
-30
-45
-60
-135
-90
-45
45
90
135
Hellas


MY27, RGB
60
45
30
15
0
−15
−30
−45
−60
−135
45
90
135
14
12
10
8
−134
−132
−130
6
4
2
0
Hellas

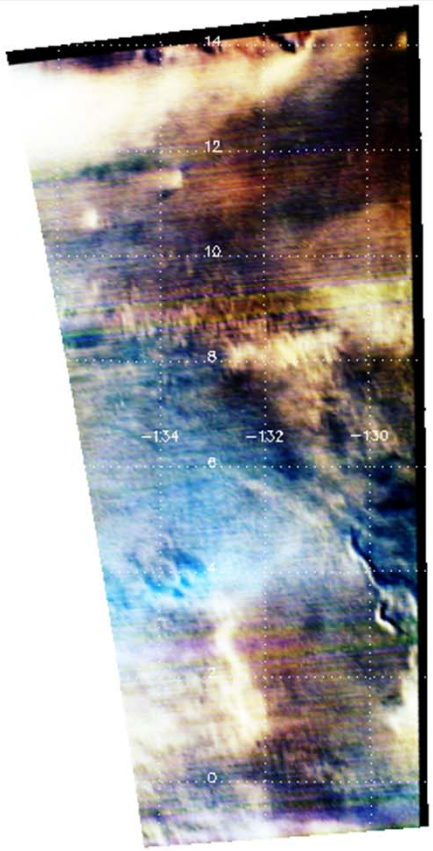
Session

and
s

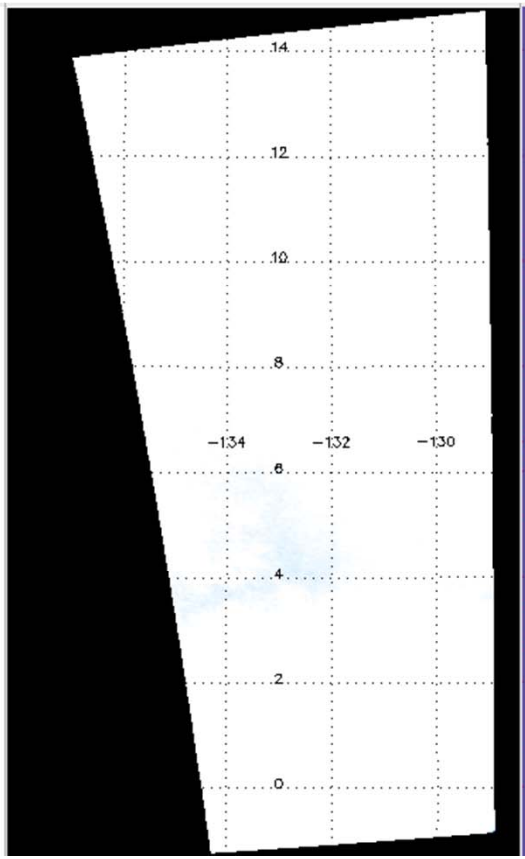
RGB
Session Optmized
Upper and Lower Limits



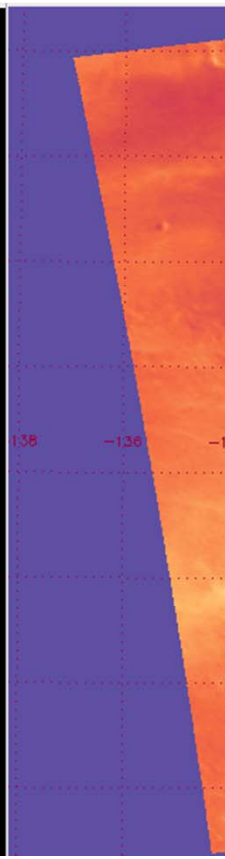
RGB
Equalized



CI



RF@



Session

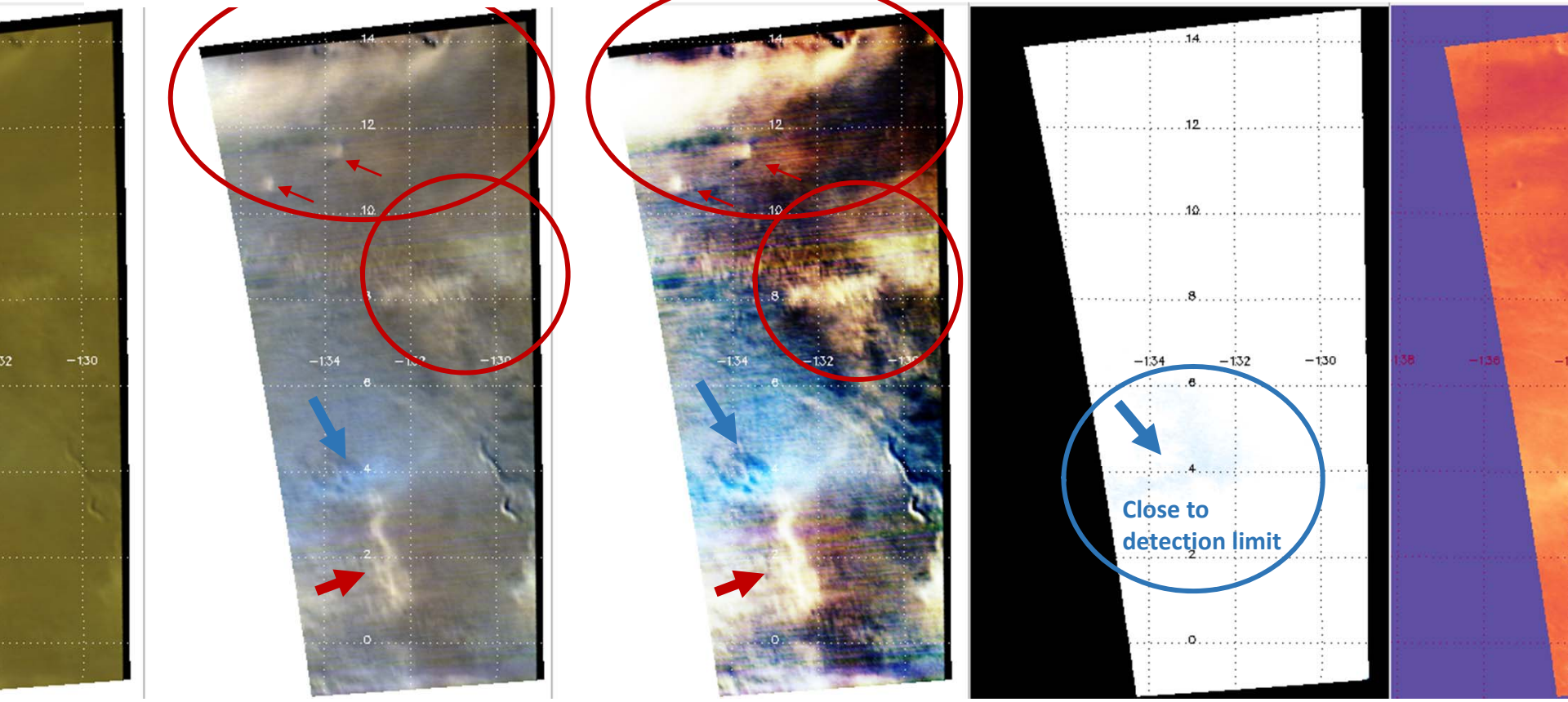
and
s

RGB
Session Optmized
Upper and Lower Limits

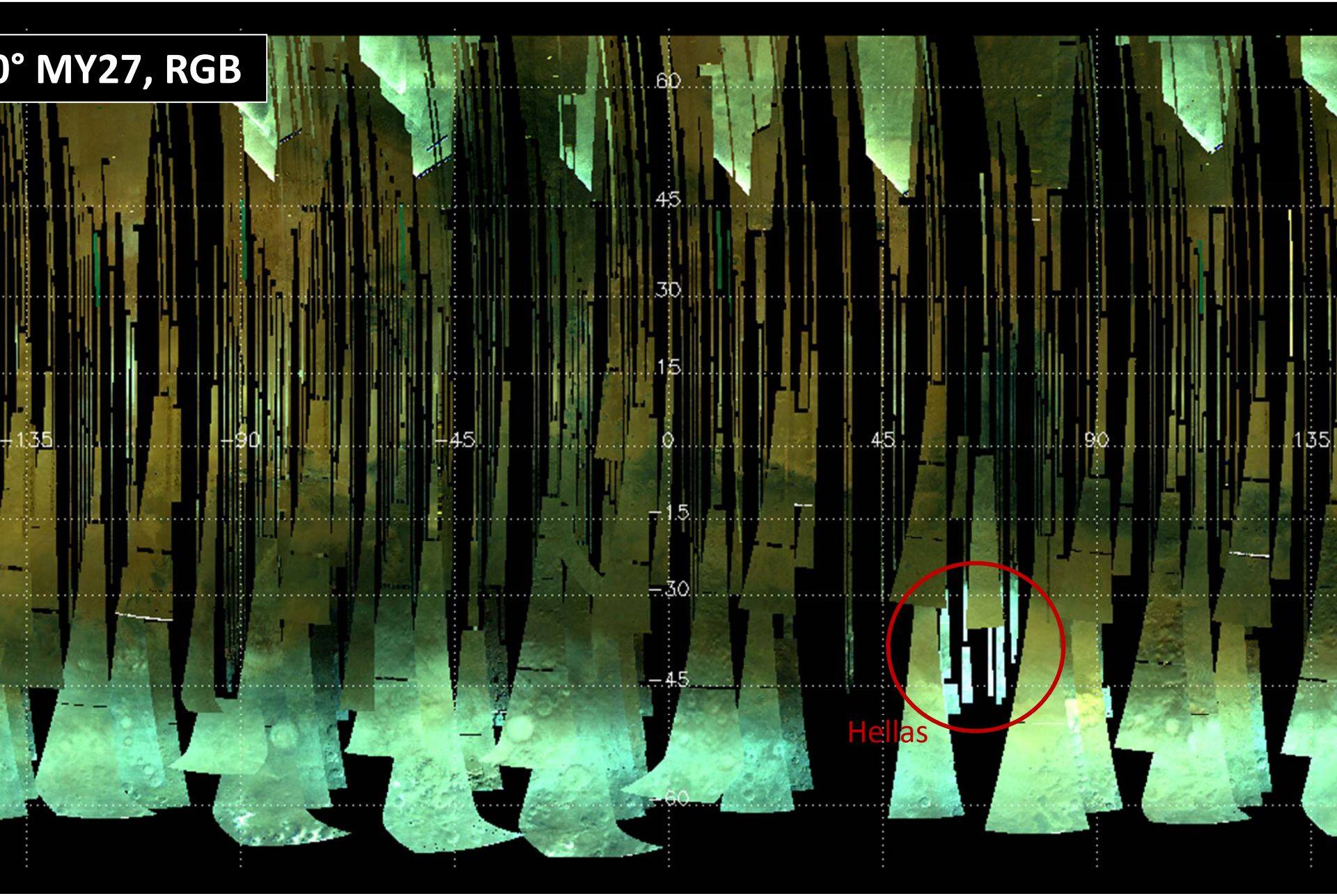
RGB
Equalized

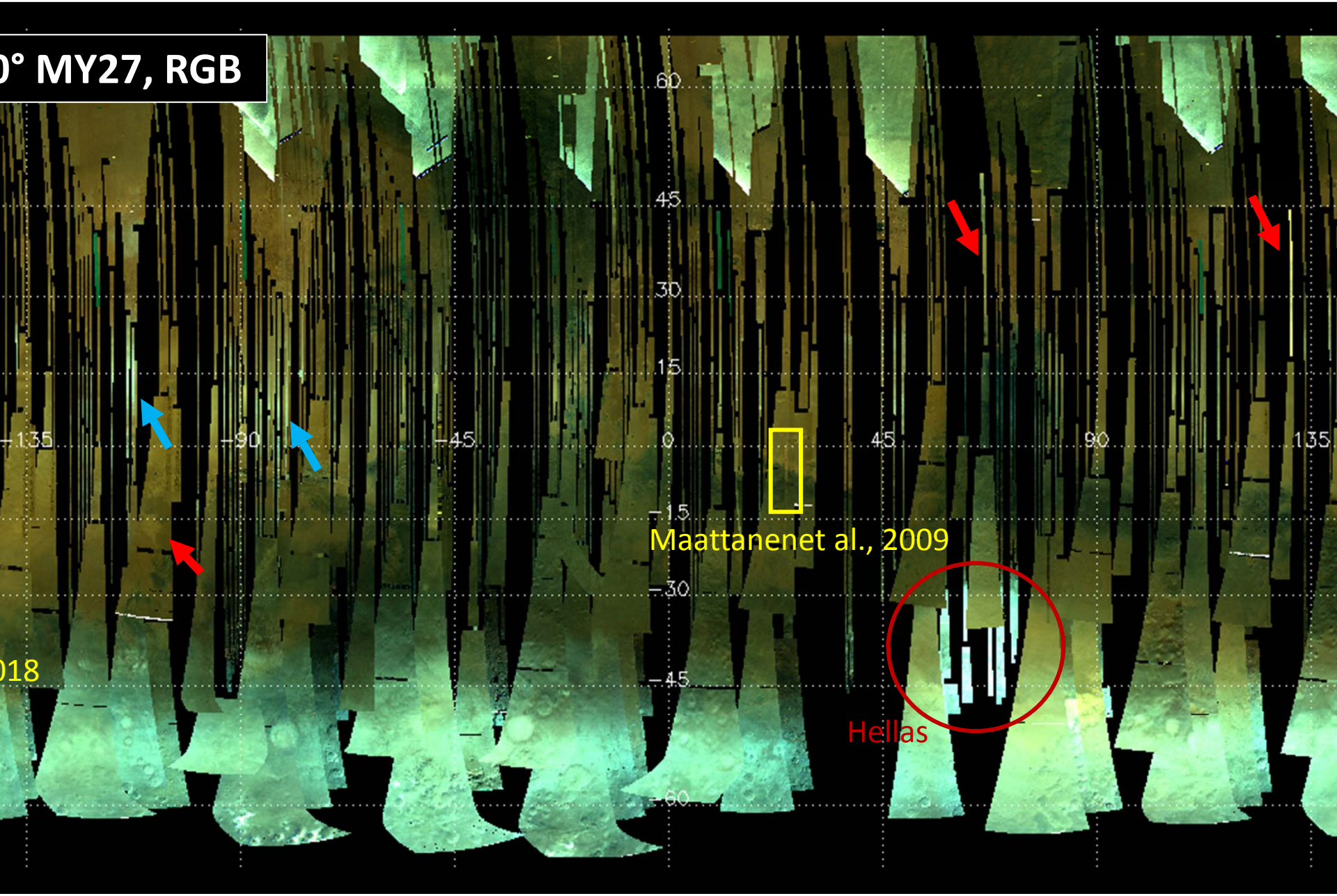
CI

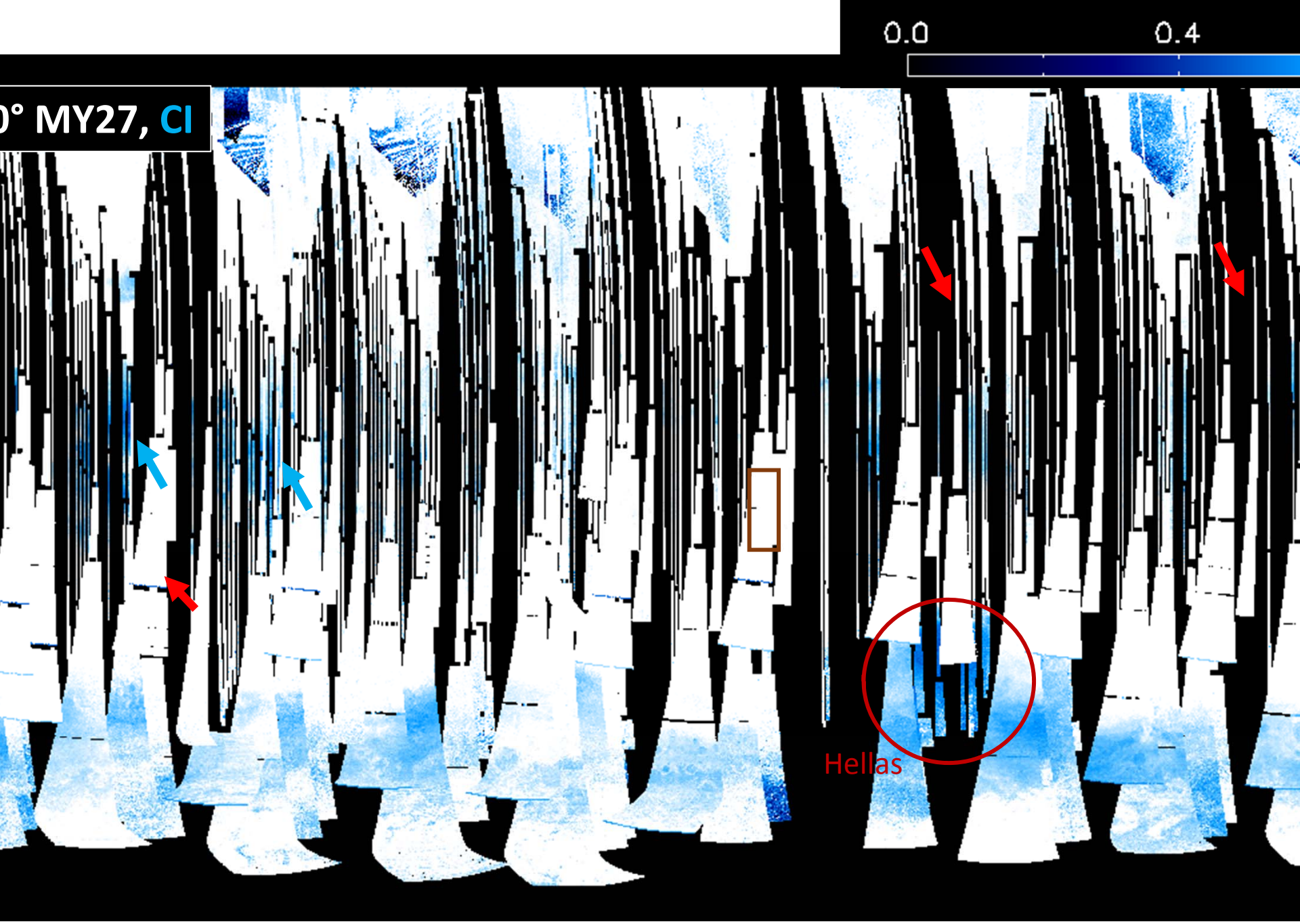
RF@

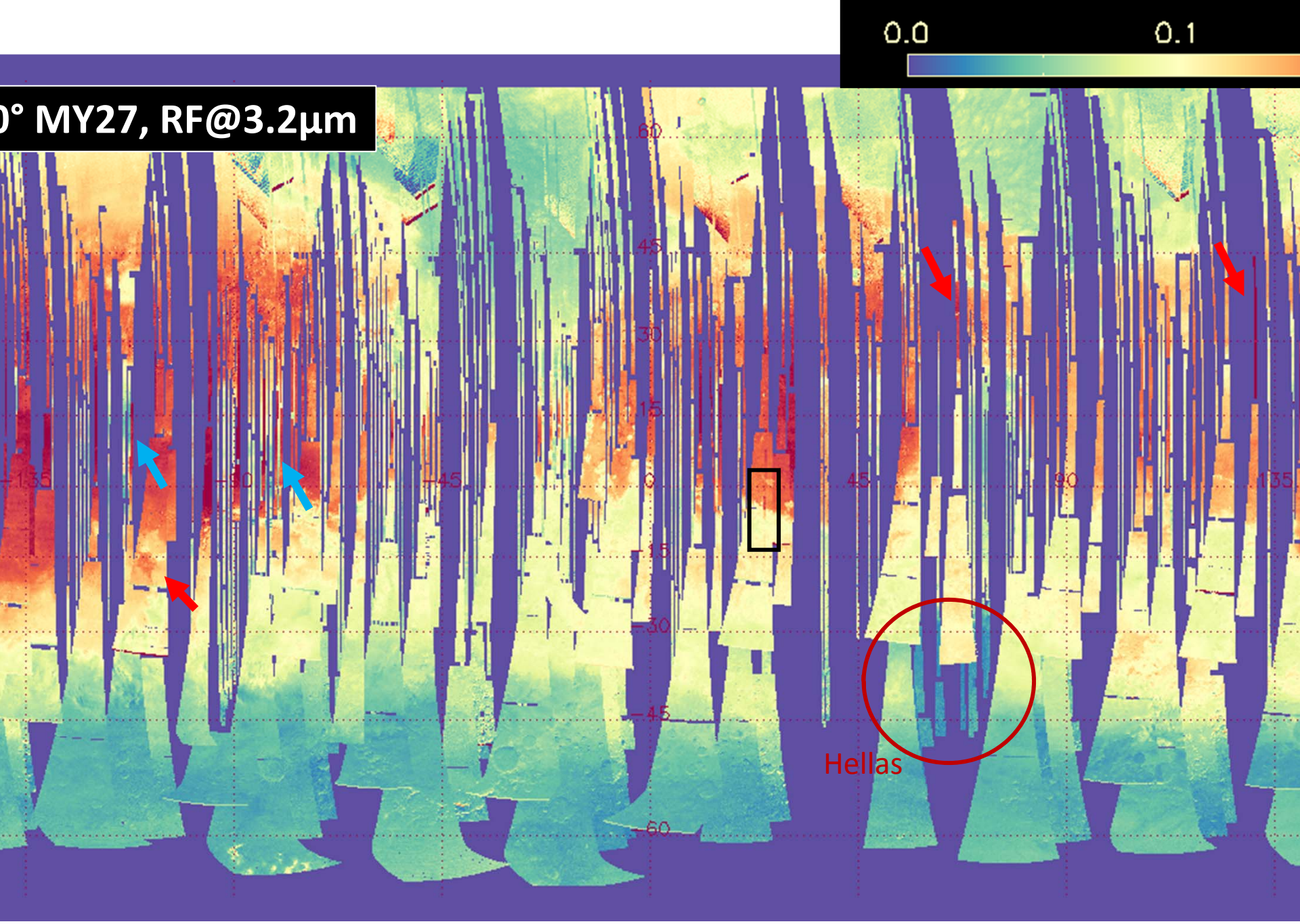


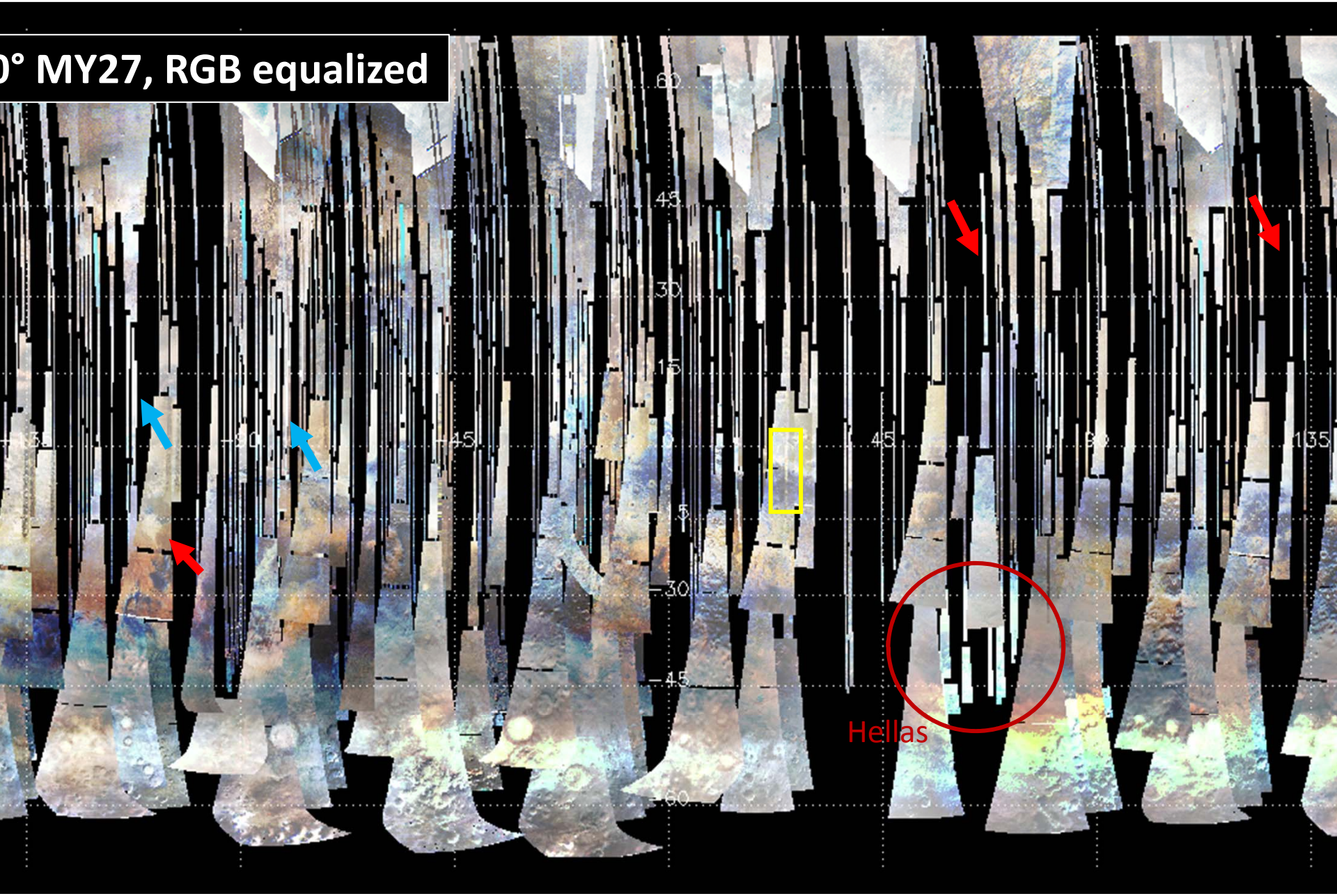
0° MY27


0° MY27, RGB
60
45
30
15
-15
-30
-45
-60
-135
-90
-45
0
45
90
135
Hellas


0° MY27, RGB
60
45
30
15
0
-15
-30
-45
-60
-135
-90
-45
45
90
135
Maattanenet al., 2009
Hellas
018


0.0
0.4
0° MY27, CI
Hellas


0° MY27, RF@3.2µm
0.0
0.1
60
45
30
15
0
-15
-30
-45
-60
-135
-90
-45
0
45
90
135
Hellas

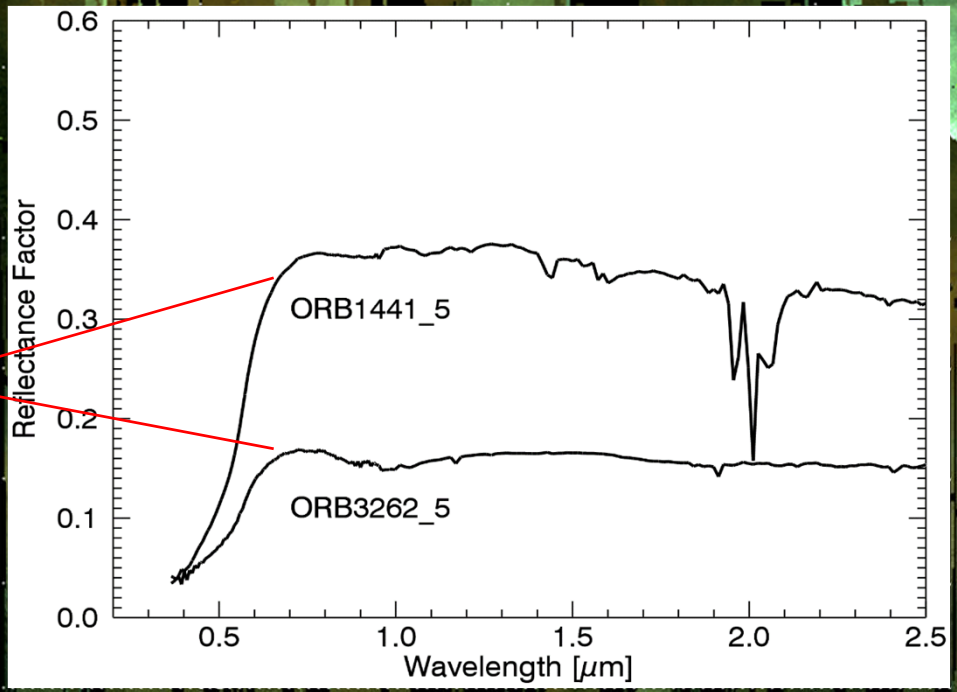

0° MY27, RGB equalized
60
45
30
15
0
-15
-30
-45
-60
45
135
Hellas

0° MY27, RGB

on # 1141_5

018

Session # 3262_5

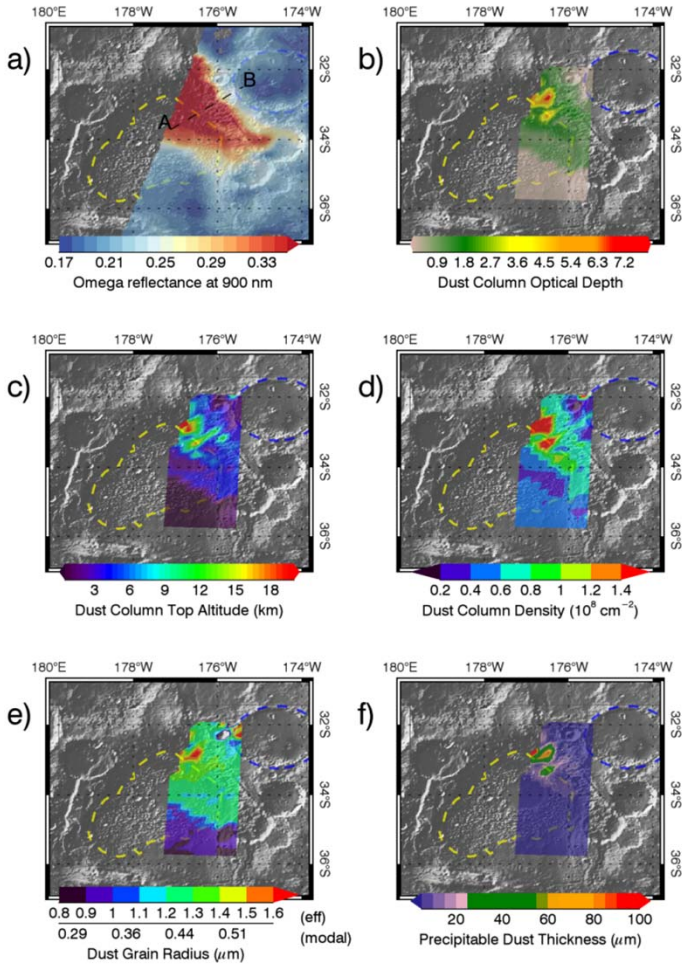


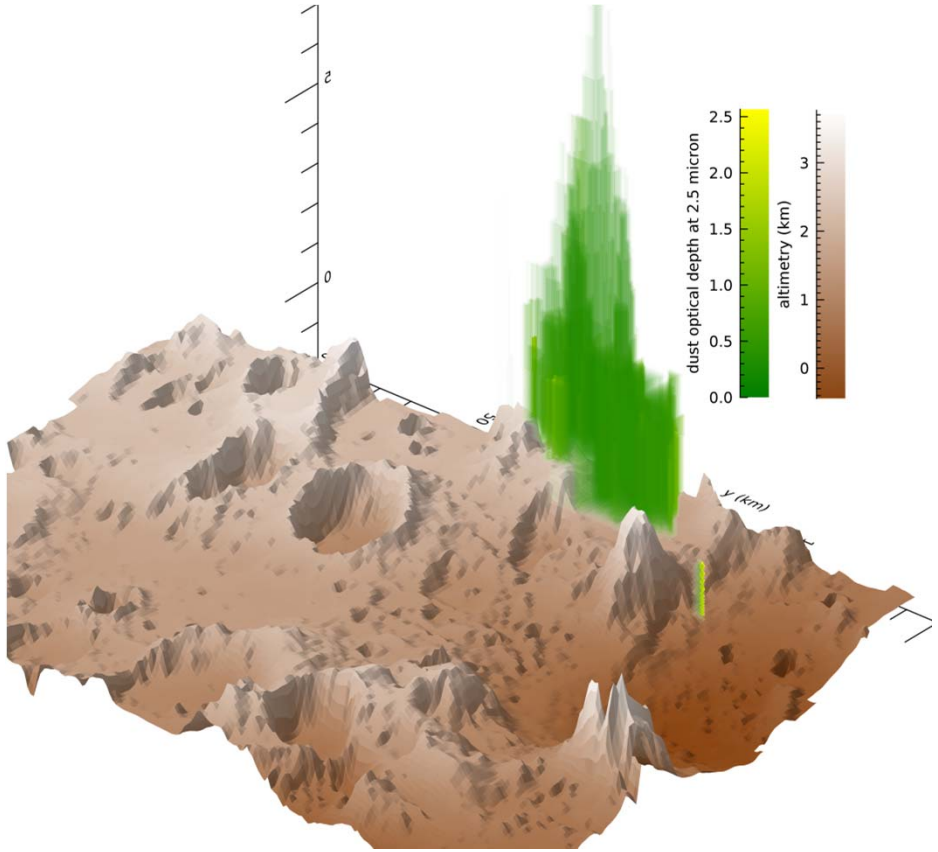
30
45
60
135

Session

is dust storm, identified in southern winter RGB maps in Atlantis Chaos, has been udied in Oliva et al. (2018).

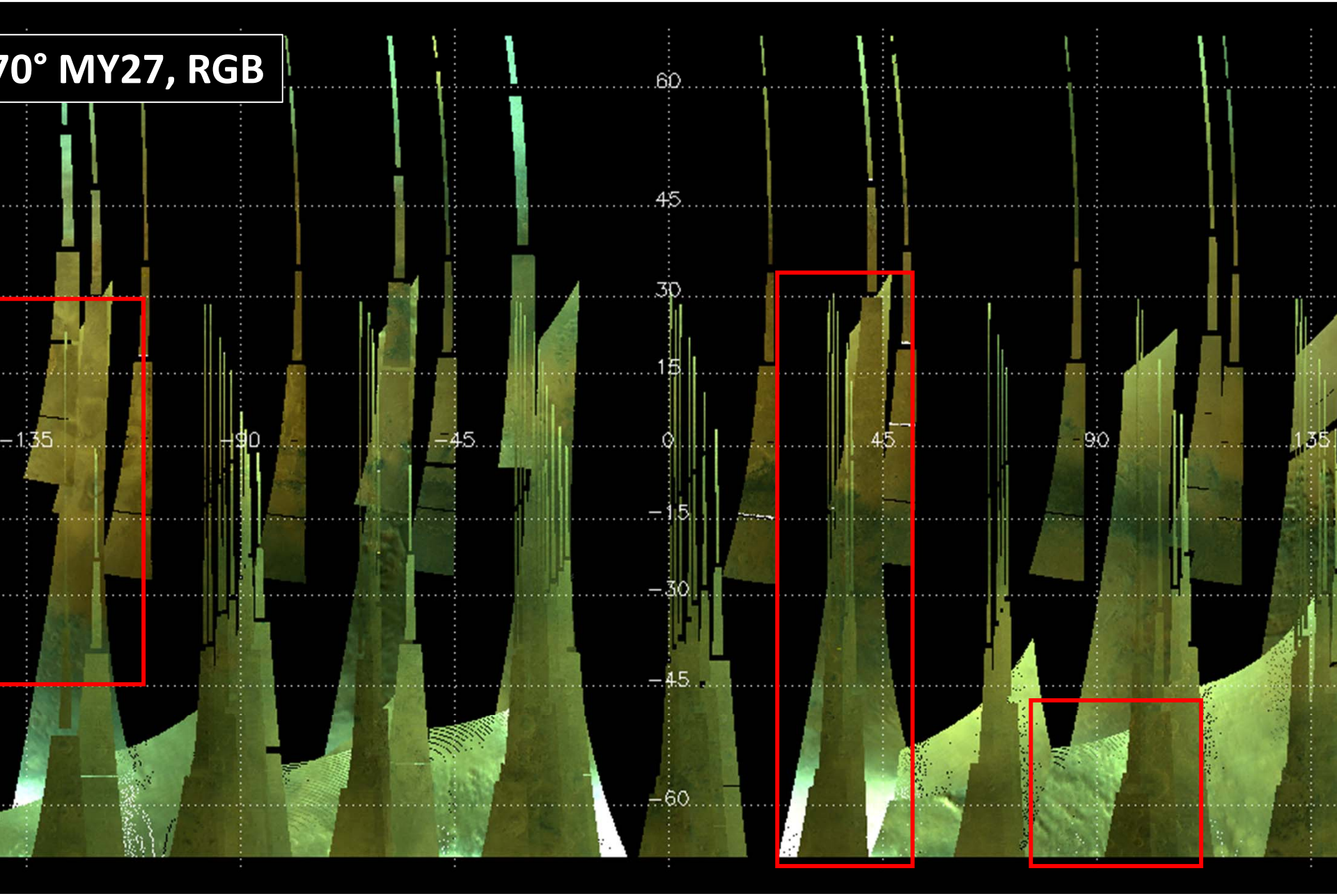
ust properties (grain size and optical depth) and top altitude have been retrieved to hieve a 3D reconstruction of the storm event.

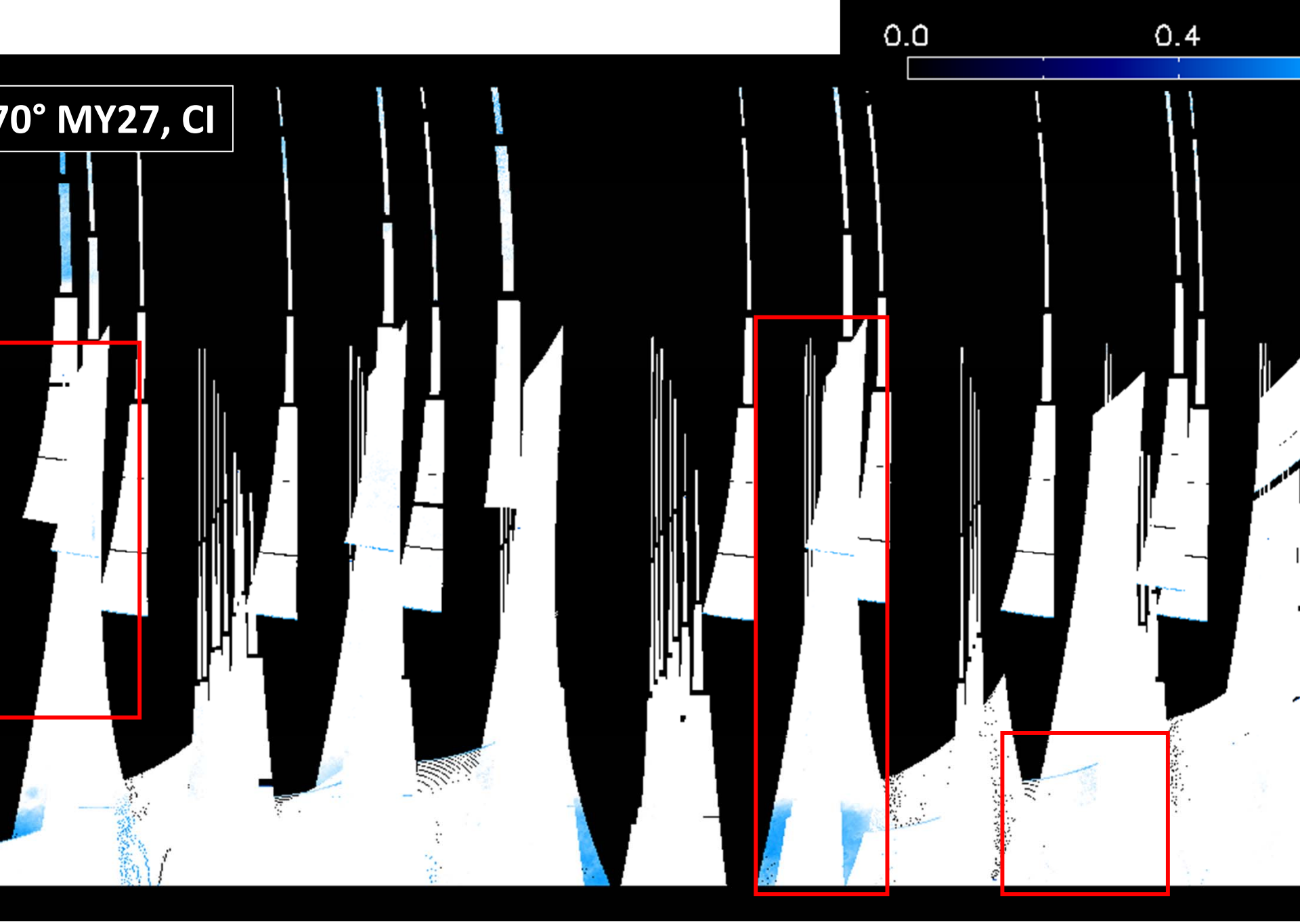


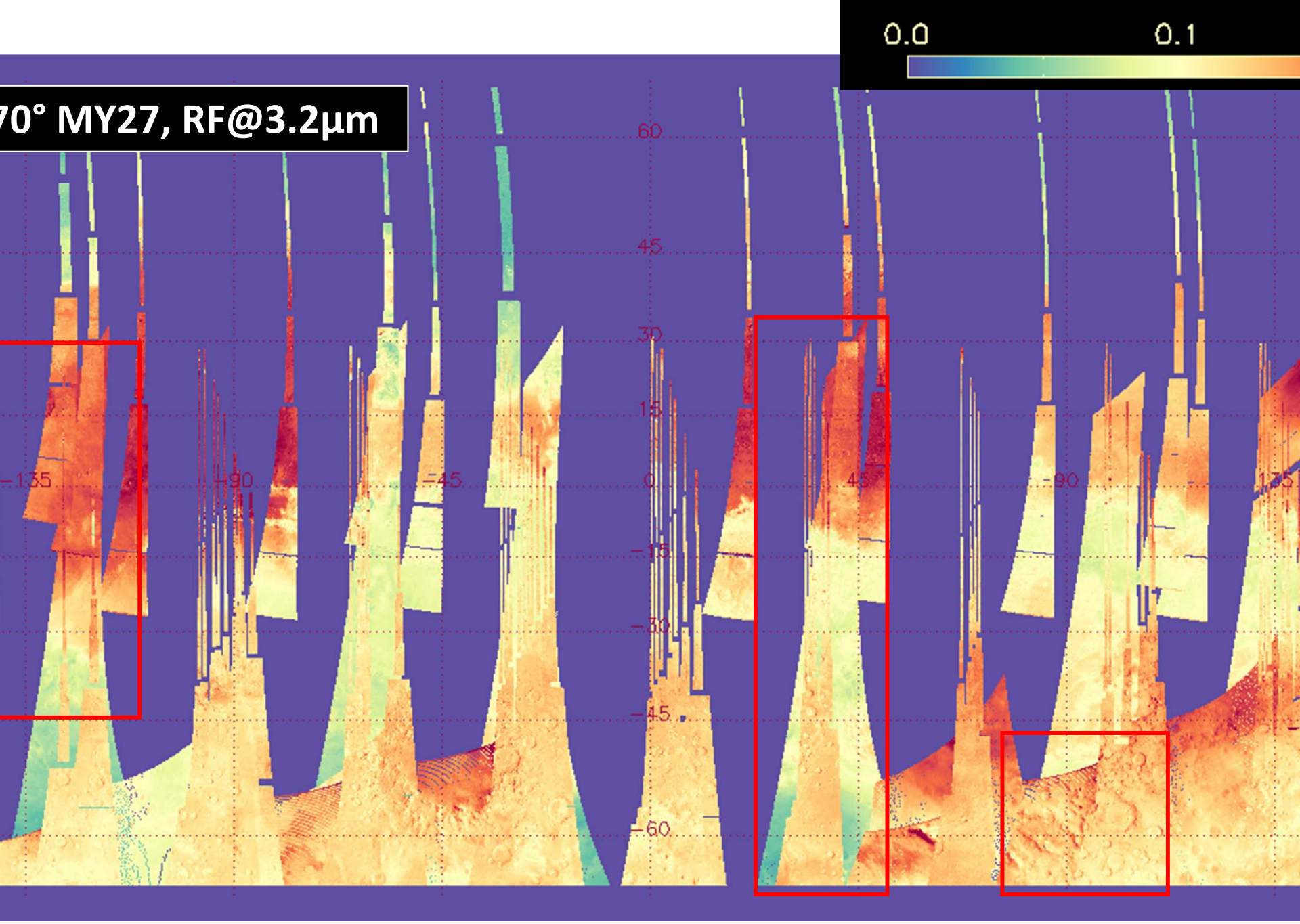


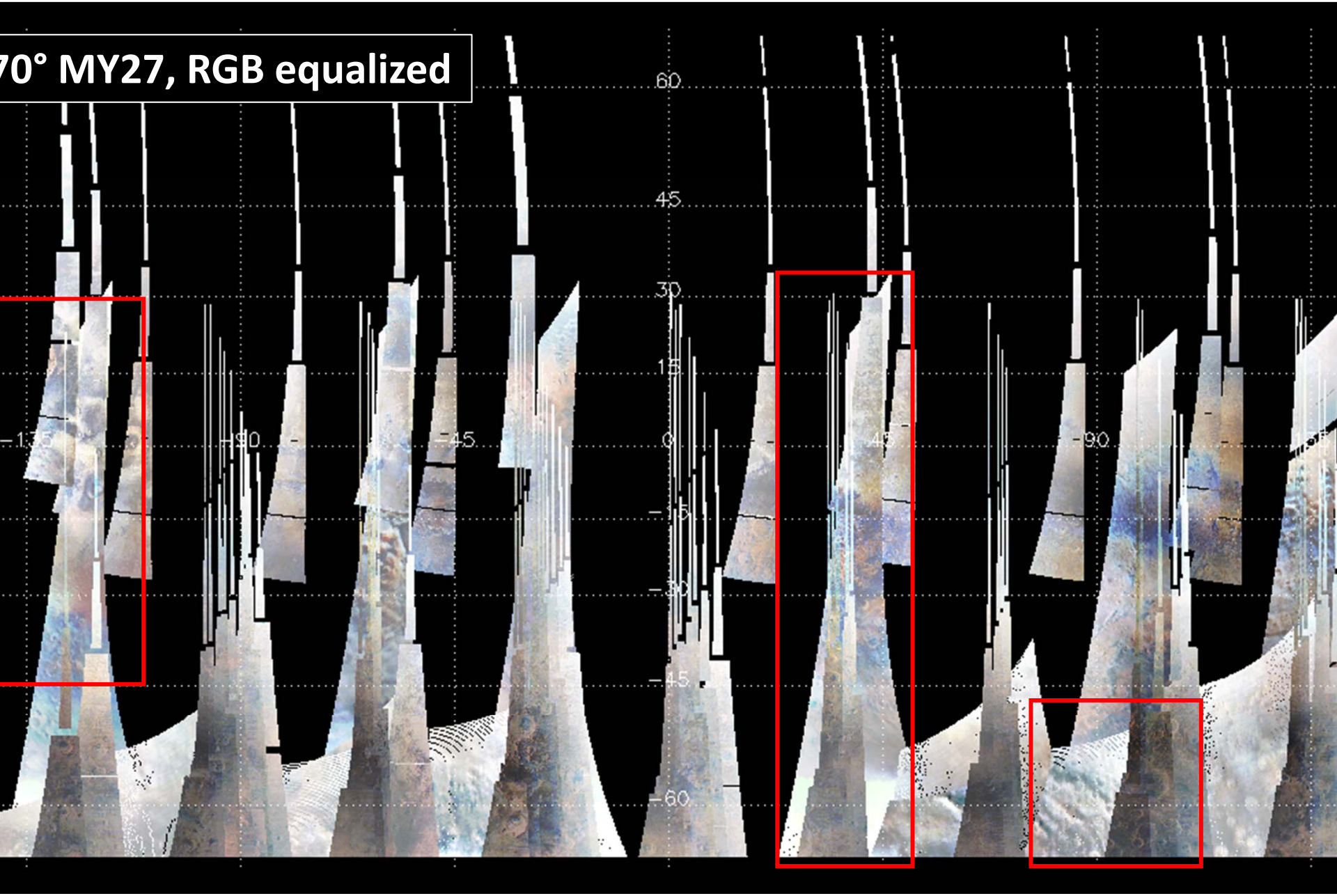
shed in Oliva et al. 2018 (Icarus,300,1)

70° MY27

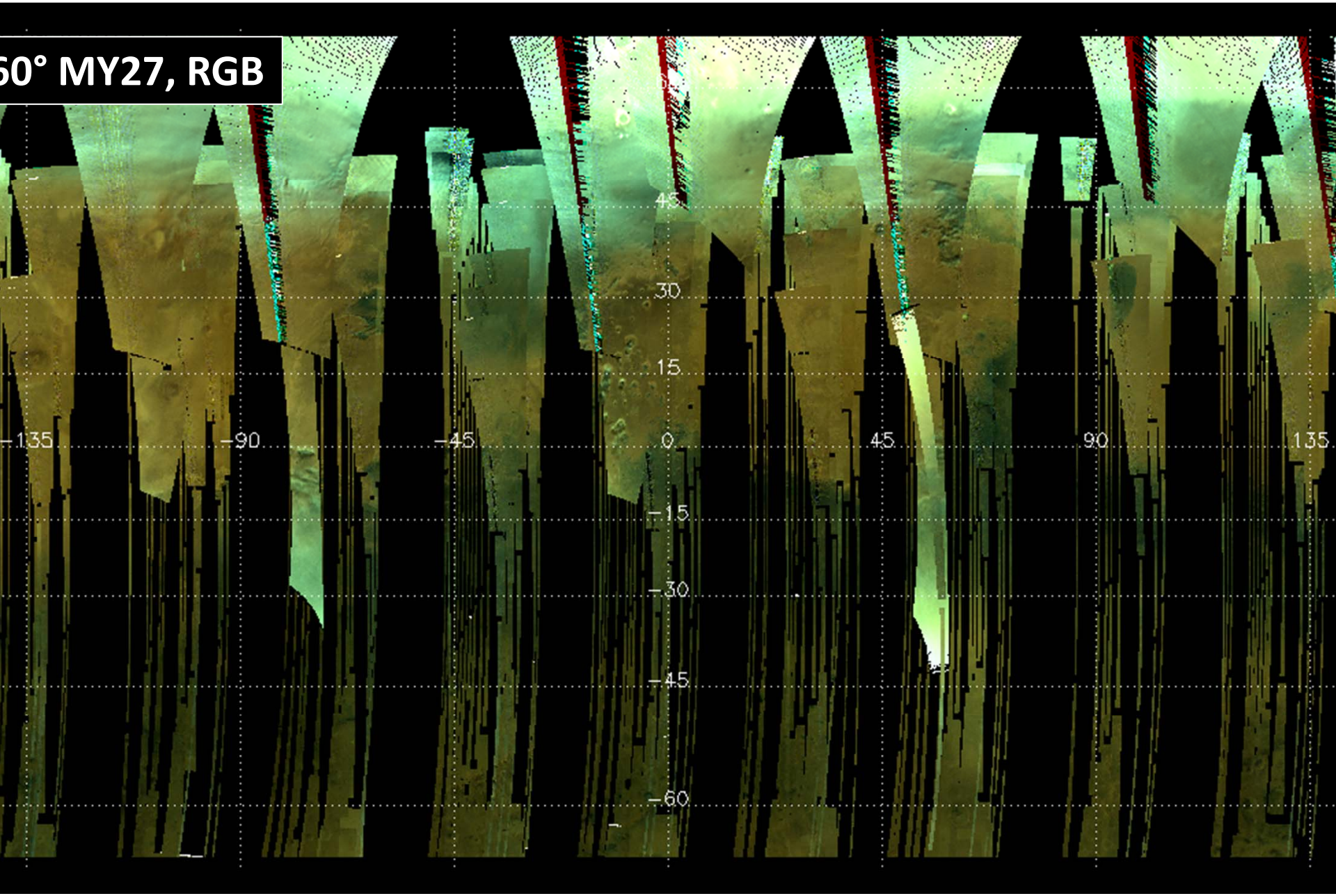

70° MY27, RGB
60
45
30
15
0
−15
−30
−45
−60
−135
−90
−45
45
90
135

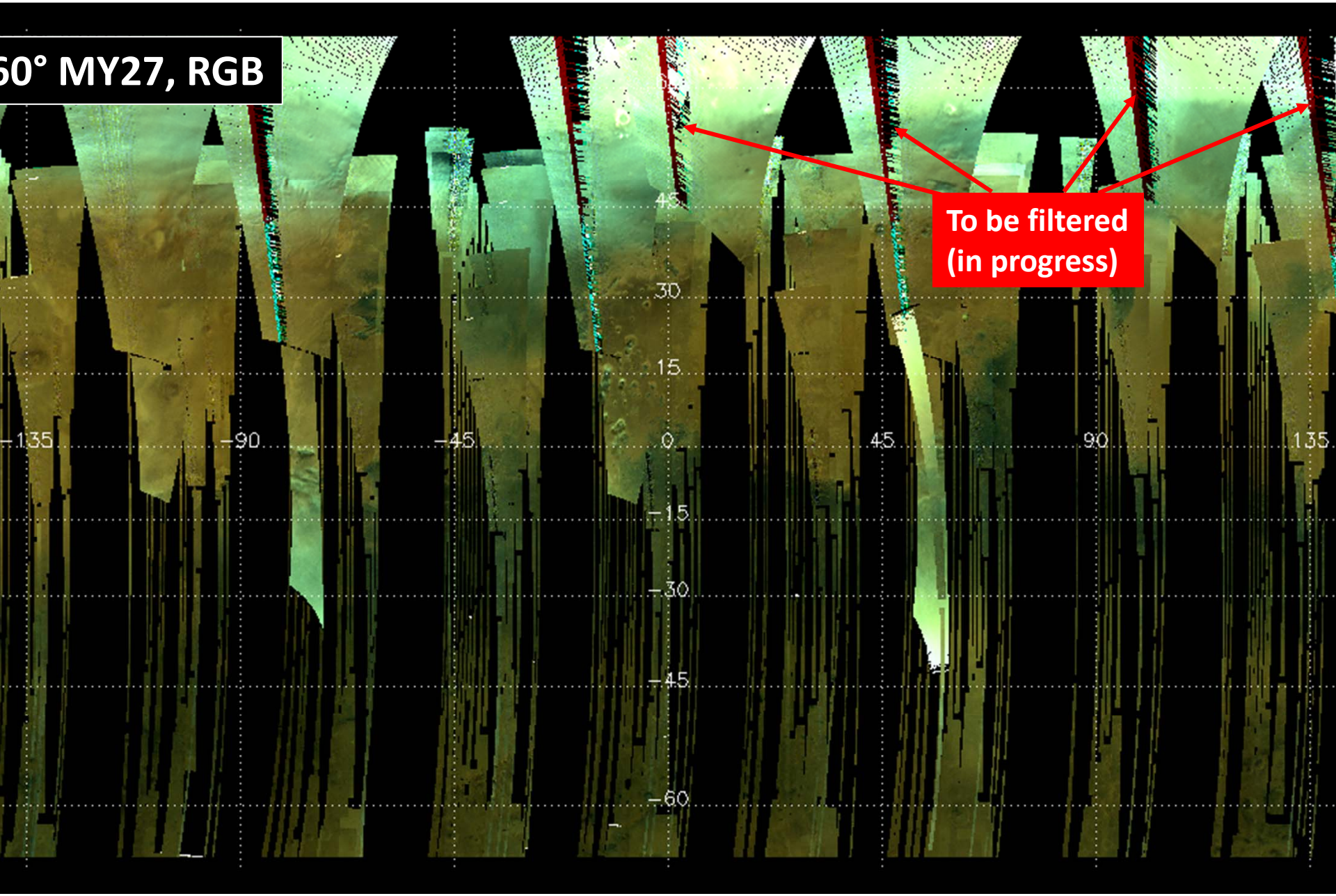

0.0
0.4
70° MY27, CI

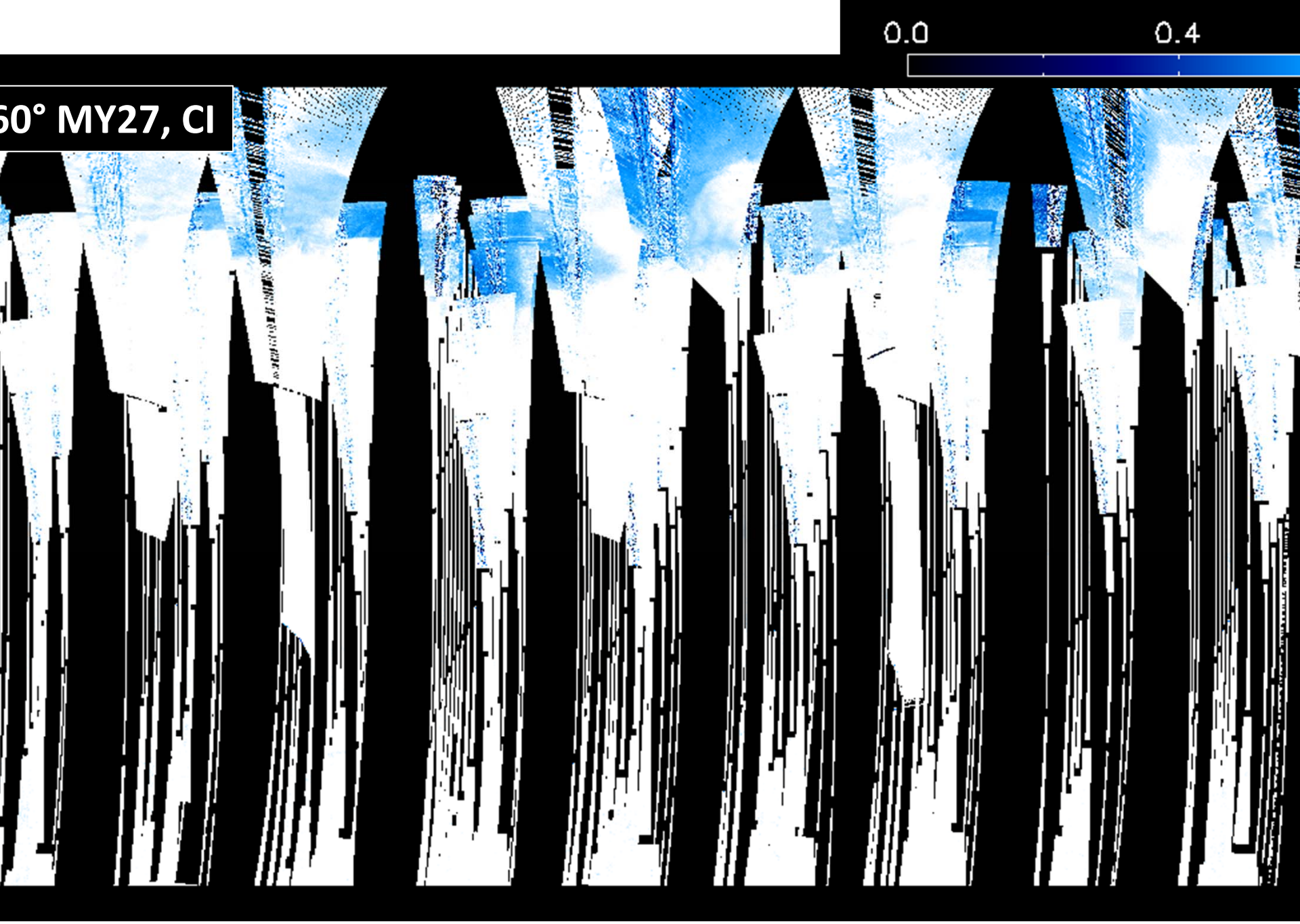

70° MY27, RF@3.2µm
0.0
0.1
60
45
30
15
0
-15
-30
-45
-60
-135
-90
-45
45
-90
135

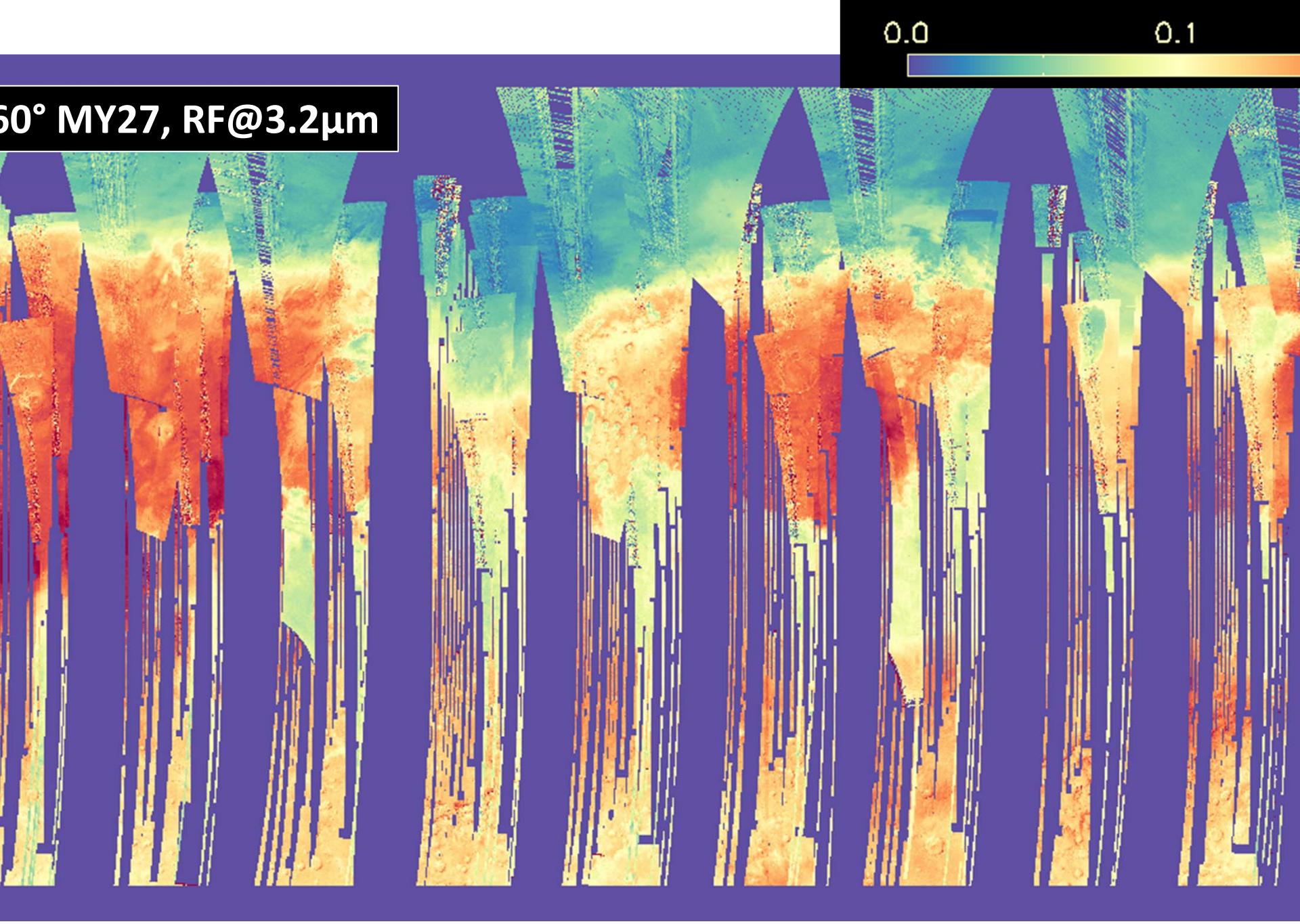

70° MY27, RGB equalized
60
45
30
15
0
-15
-30
-45
-60
-90

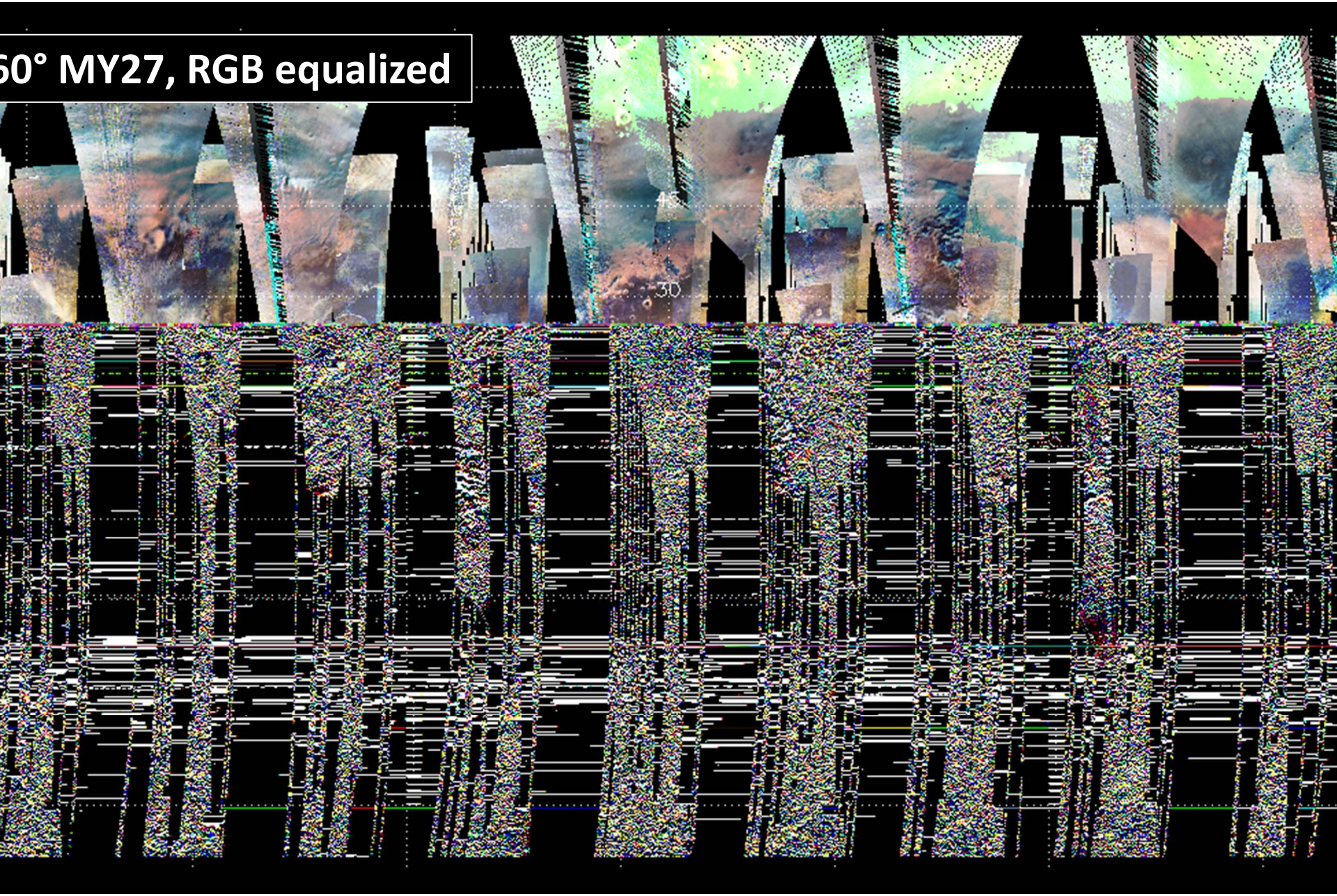
60° MY27

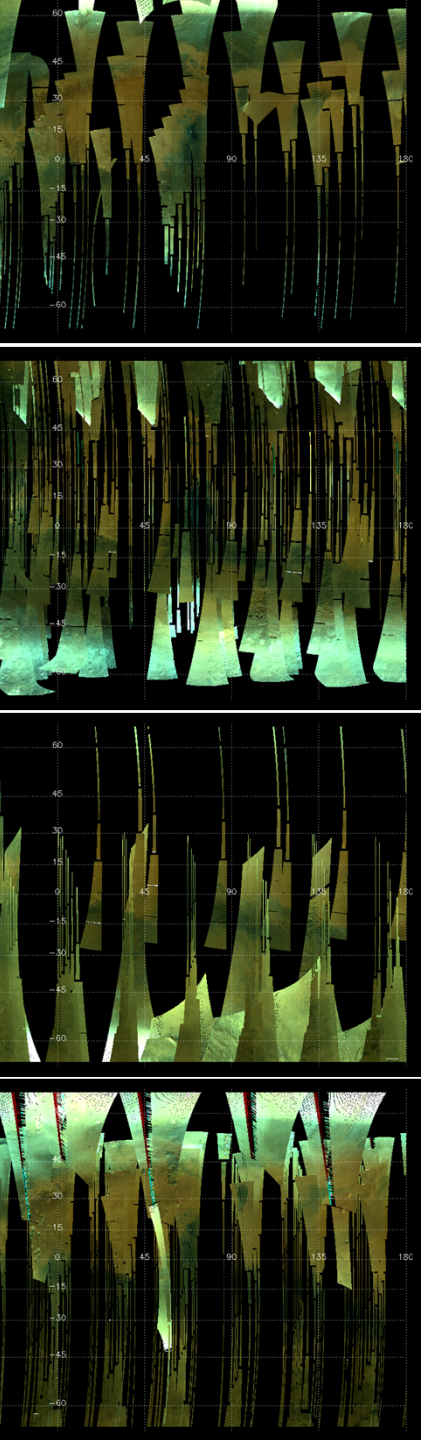

60° MY27, RGB
45
30
15
−135
−90
−45
0
45
90
135
−15
−30
−45
−60


60° MY27, RGB
To be filtered
(in progress)
45
30
15
-135
-90
-45
0
45
90
135
-15
-30
-45
-60


0.0
0.4
60° MY27, CI


0.0
0.1
60° MY27, RF@3.2µm


60° MY27, RGB equalized
30



Conclusions

- OMEGA RGB seasonal maps

can be used to monitor changes in albedo induced by aerosols and make an inventory of regional dust events

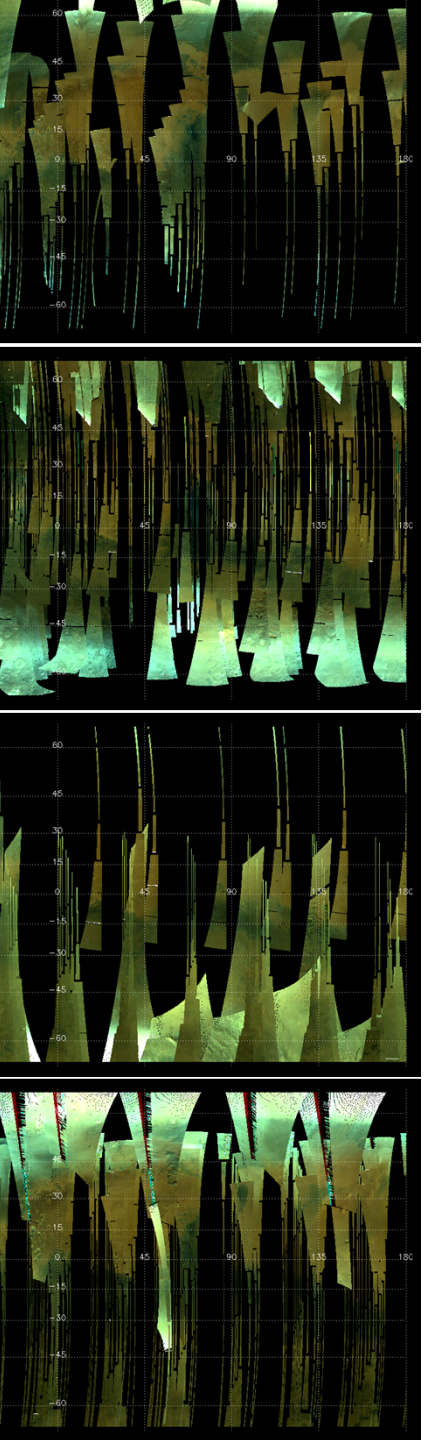
(delivered to ESA PSA for MY27)

- OMEGA single session optimized/equalized RGB images

can be used to detect and map very thin water ice clouds and local dust event

(very informative data products for ESA PSA: they provide the coverage and a preliminary assessment of aerosols content for each OMEGA session)

THANKS UPWARDS!!!



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Specific questions:
francesca.altieri@iaps.inaf.it

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