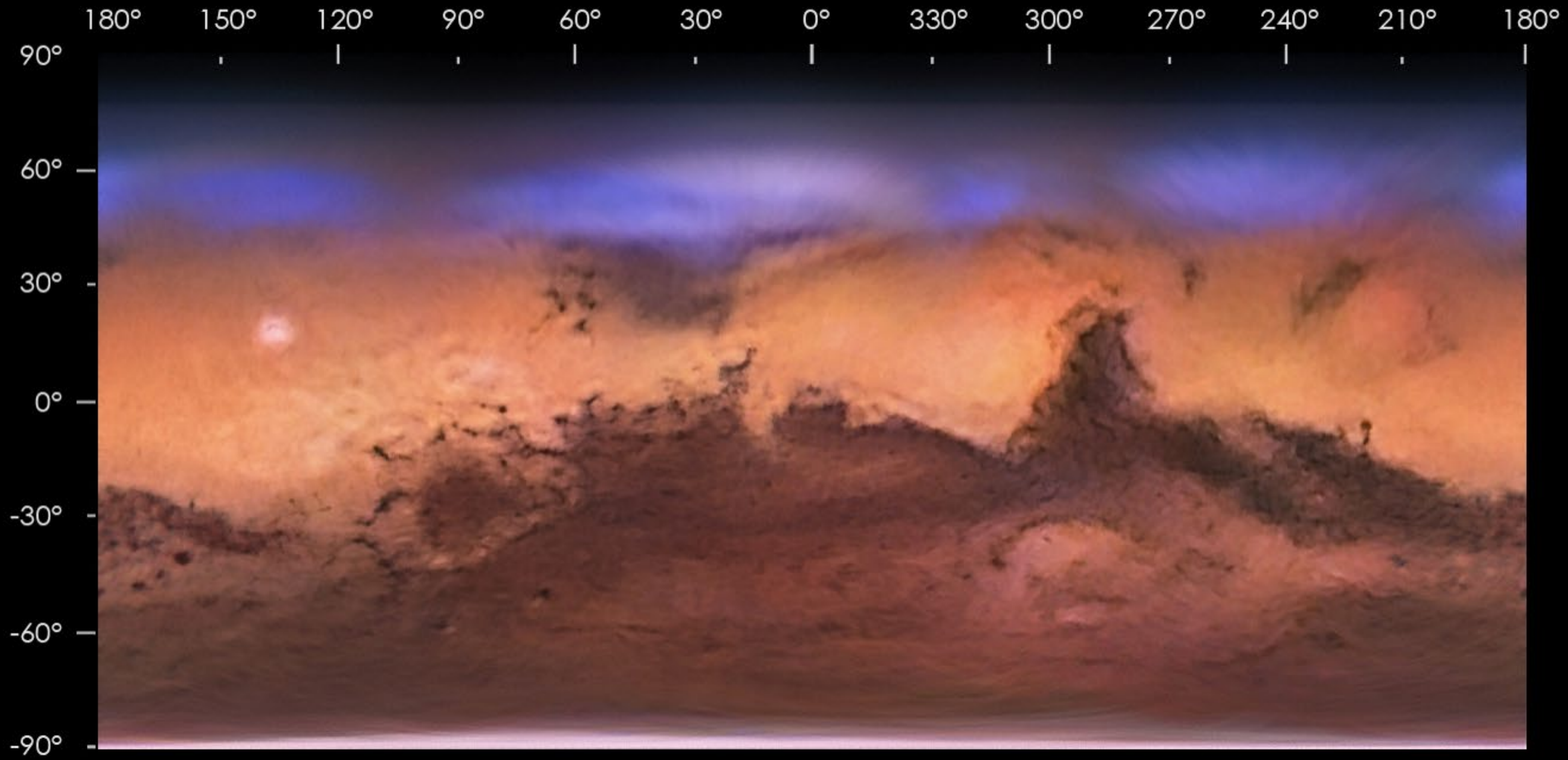
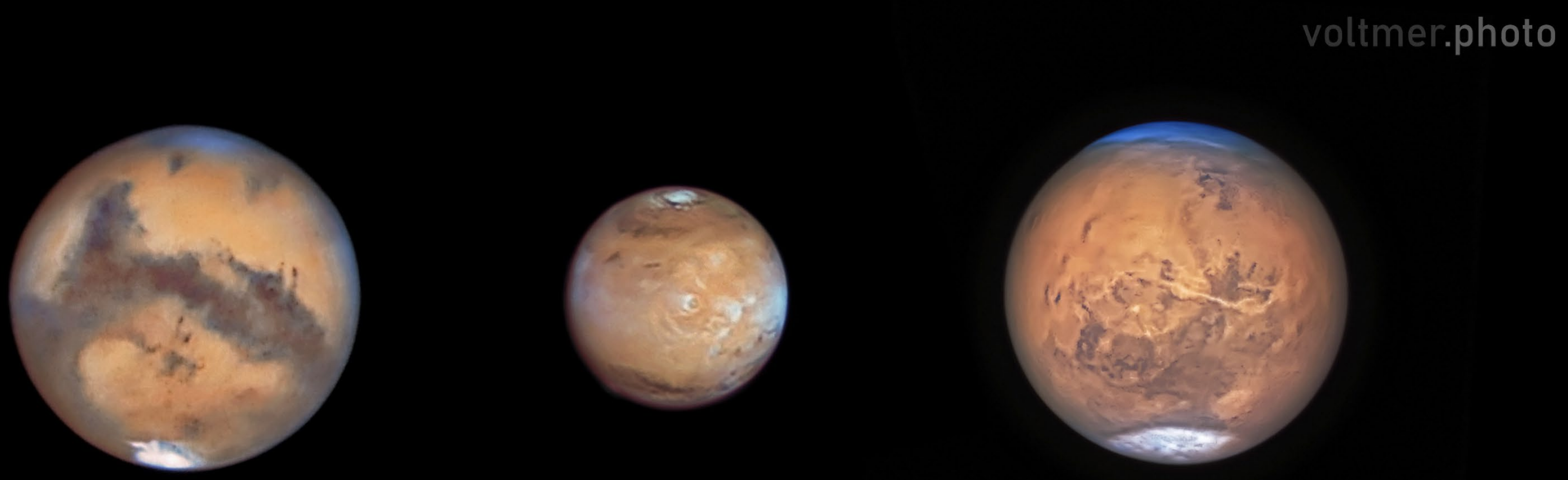
Creating a detailed Mars Map

Sebastian Voltmer



Mars review



2003 2012 2018

Creating a detailed Mars Map

Sebastian Voltmer

a) Location (Namibia)
b) Capturing frames
c) Stacking
d) Sharpening
e) De-rotation
f) RGB-combine
g) Creating the Map
h) Animating the Map

Location

Namibia 2018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Namibia 2018

The Gamsberg road

The small hut on Gamsberg mountain.


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Capturing frames

28“ Newtonian
(IAS Gamsberg)

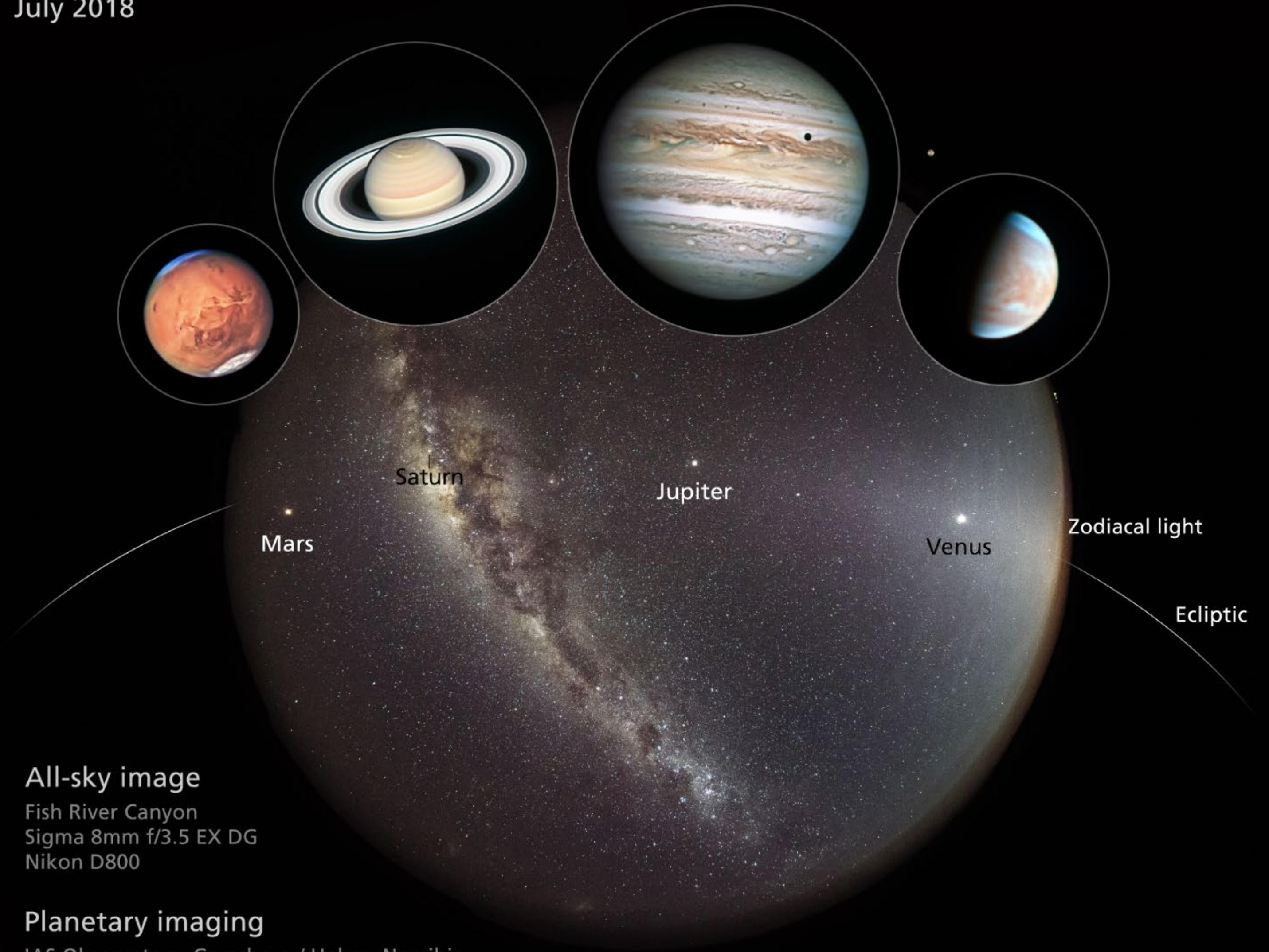

camera
filters
ADC
Baader FFC
ToupTek
G3M287M

100 FPS

6000 frames / minute

The Planets

Namibian Night Sky
July 2018

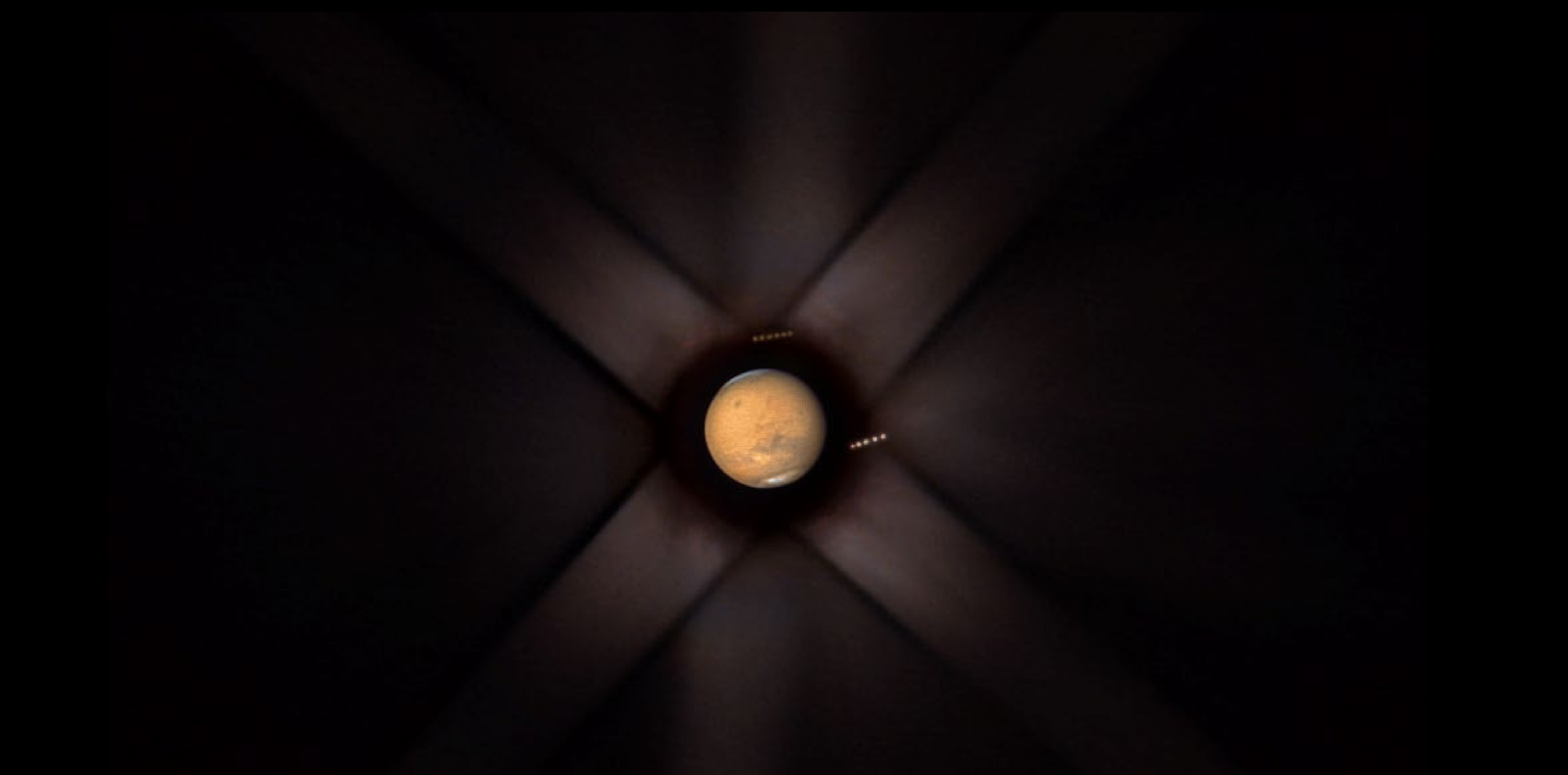


All-sky image

Fish River Canyon
Sigma 8mm f/3.5 EX DG
Nikon D800

Planetary imaging

IAS Observatory, Gamsberg / Hakos, Namibia
28" Newtonian (3120mm, f/4.4)
20" Keller Cassegrain (4500 mm, f/9)
ZWO ASI290MM / ToupTek G3M287M
Baader Fluorit Flatfield Converter
Baader U, IR Pass, RGB, CH4, Schuler UV
Image processing: AutoStakkert!, WinJupos, PixInsight, PS CC



Mars, Phobos and Deimos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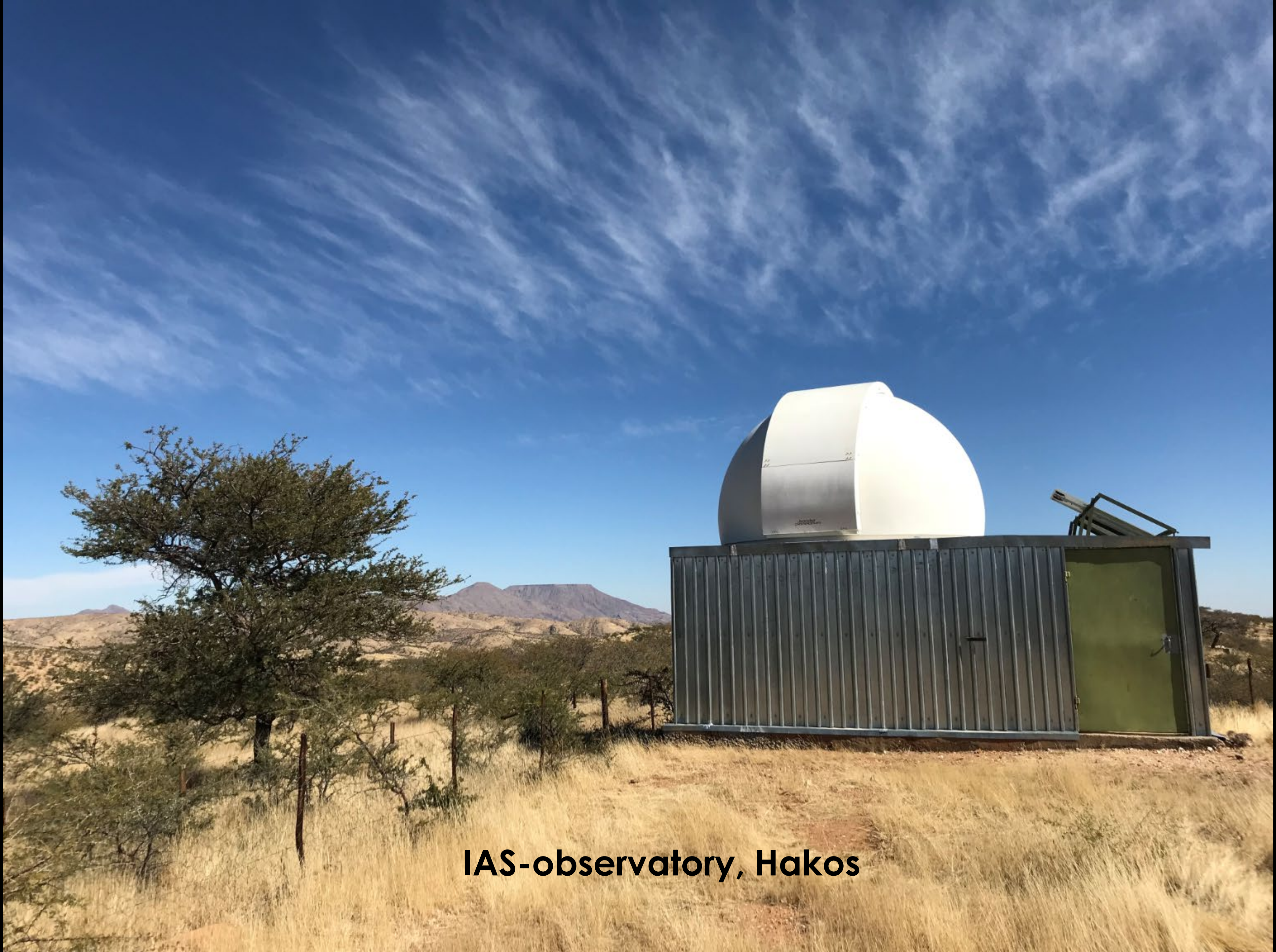
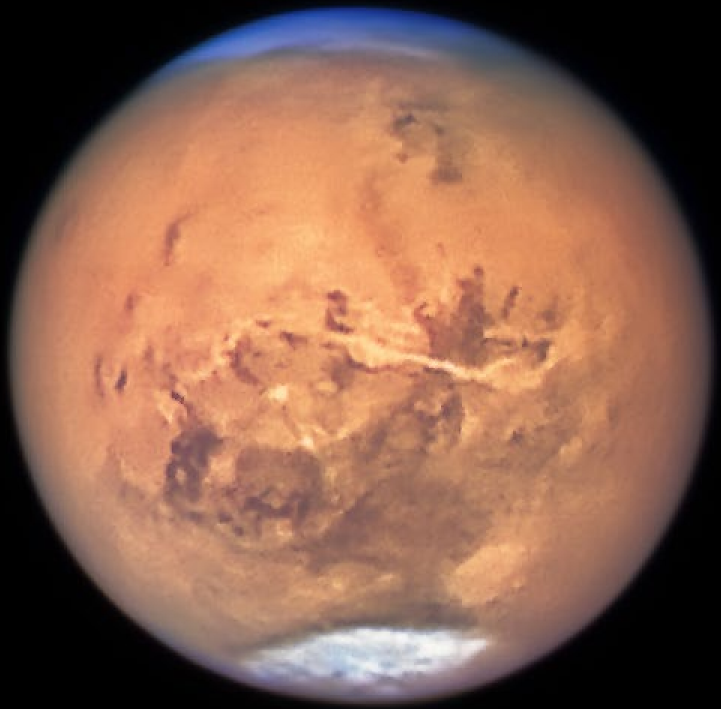


IAS-observatory, Hakos

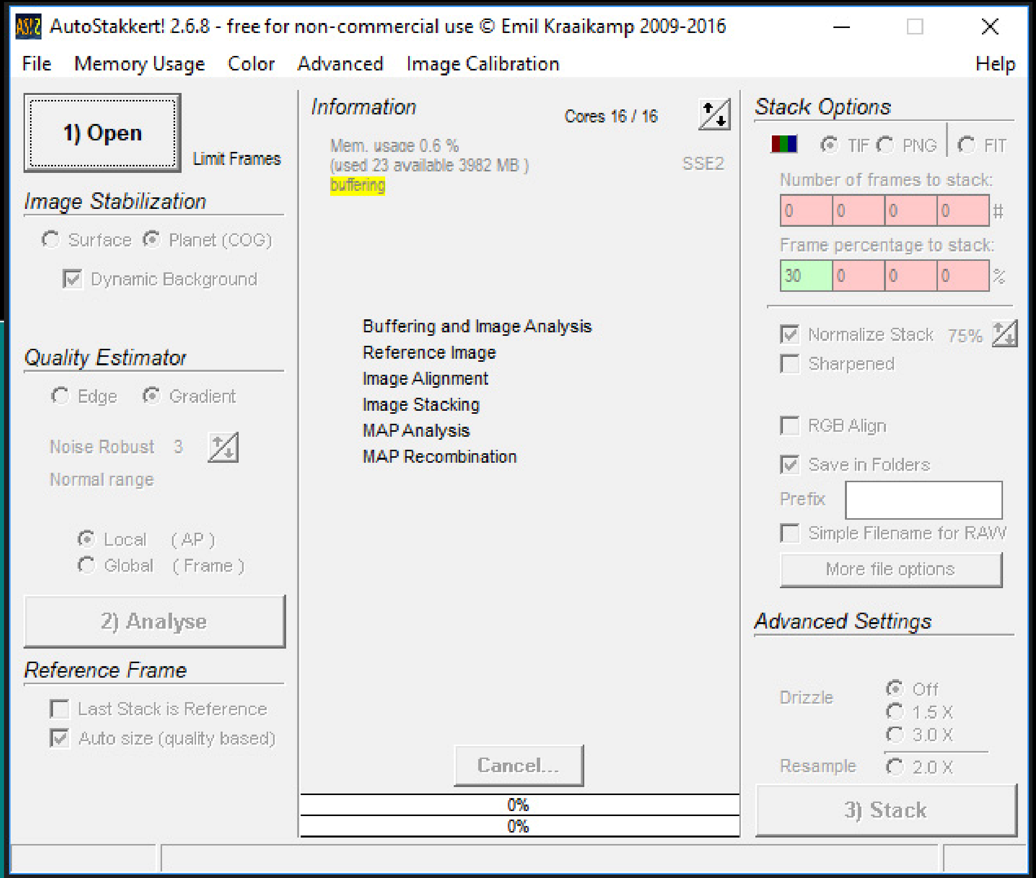
Keller Cassegrain 20“ (IAS Hakos)



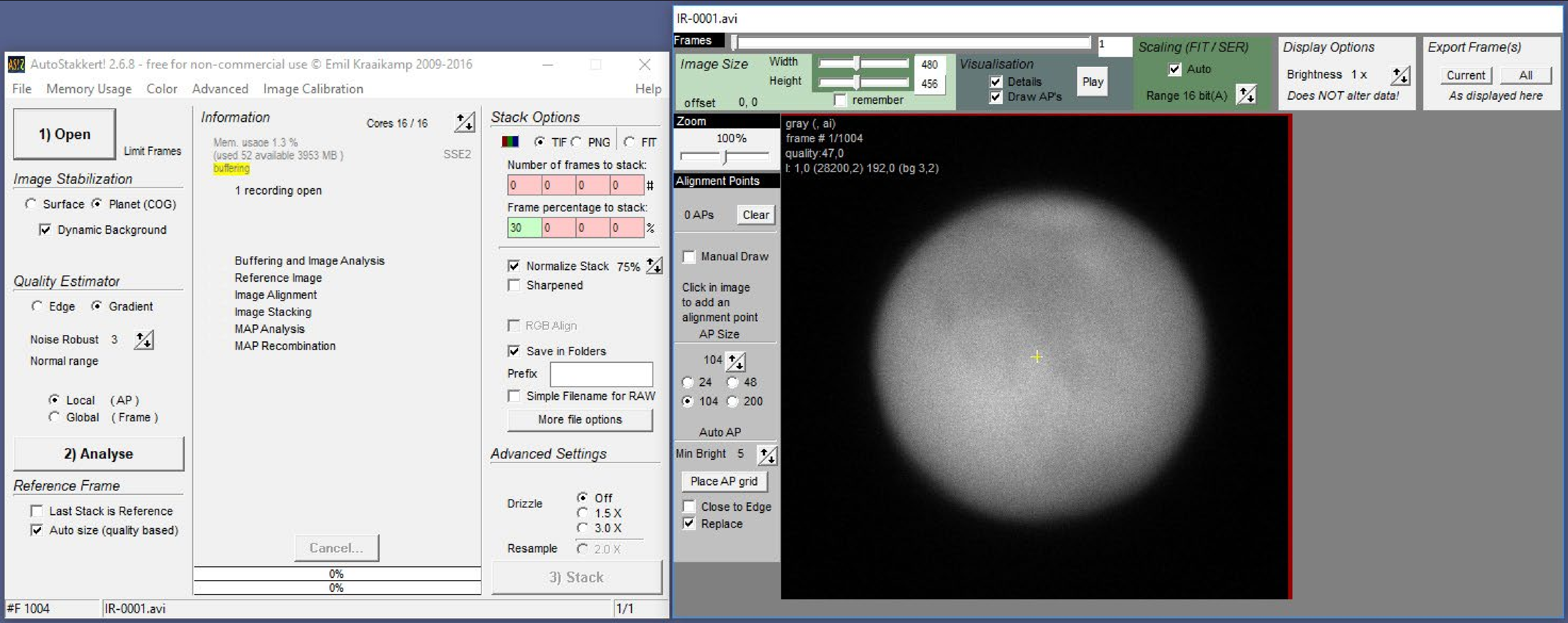
July 24, 2018

Stacking

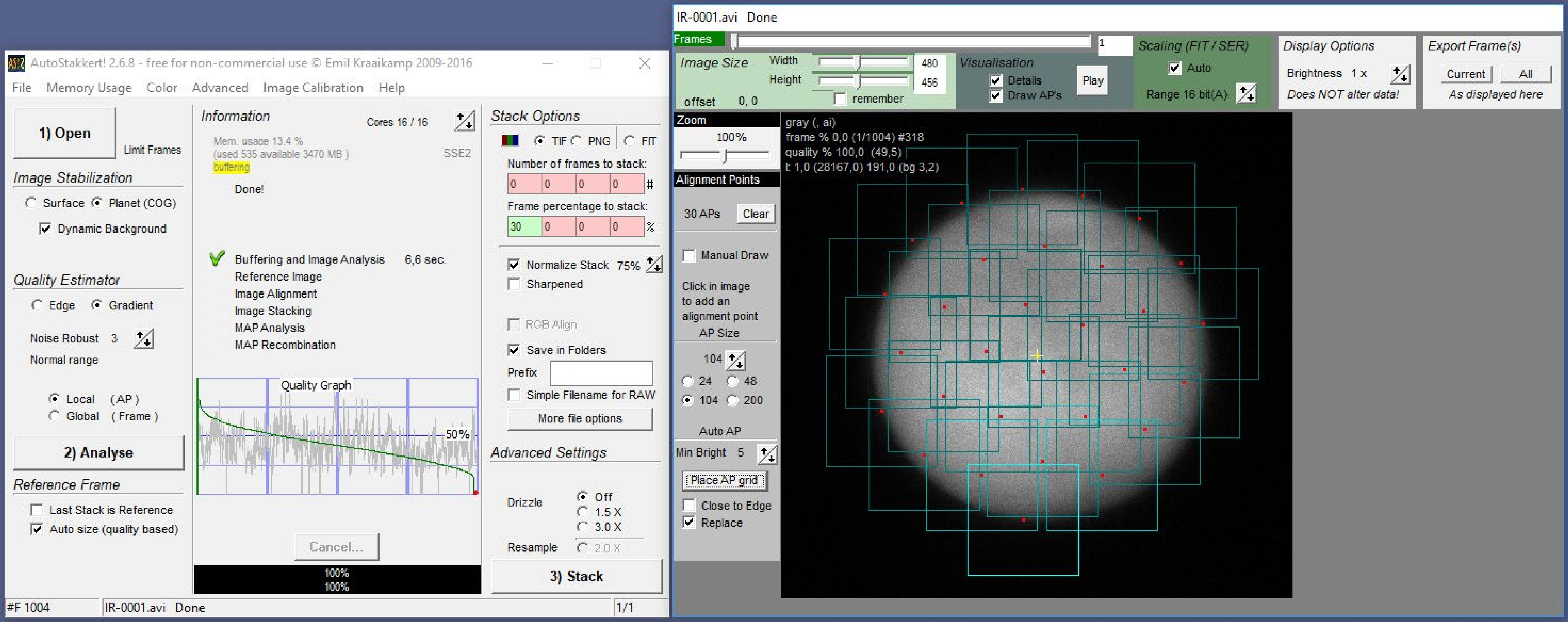
Stacking and selection software



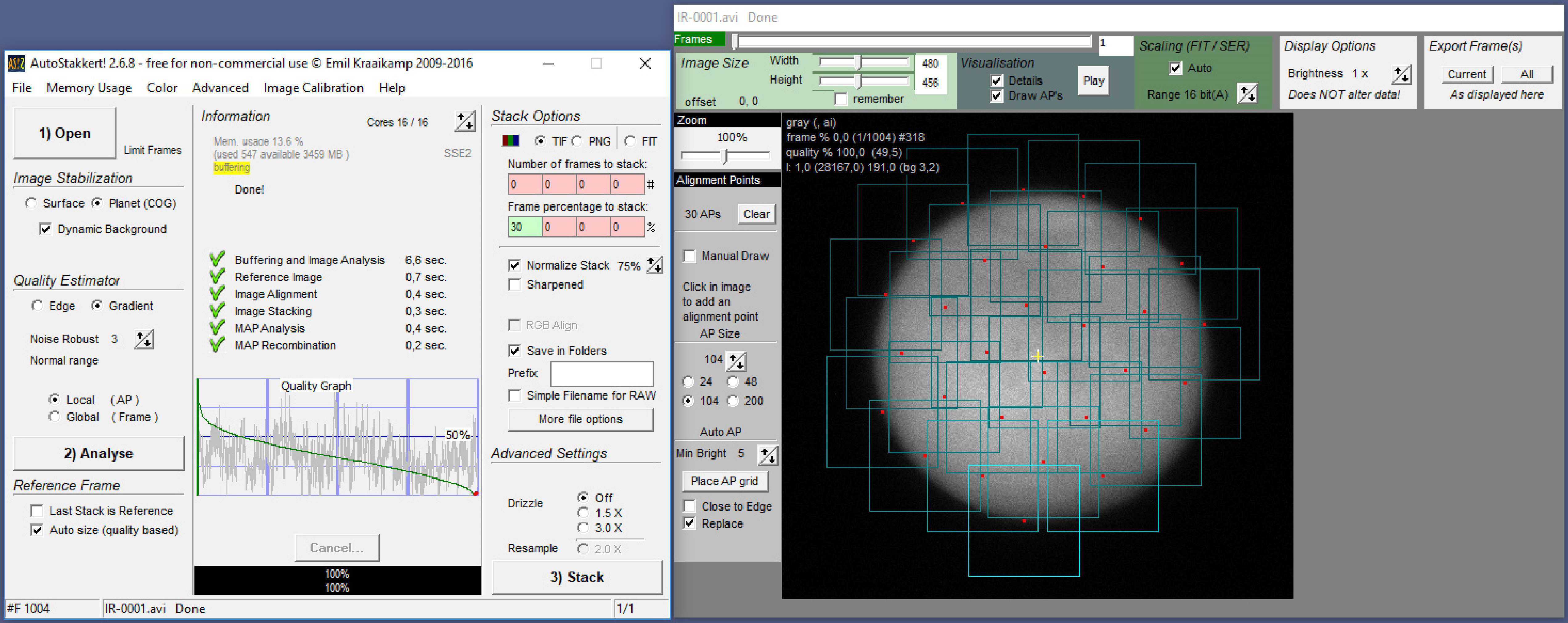
Stacking with AutoStakkert!

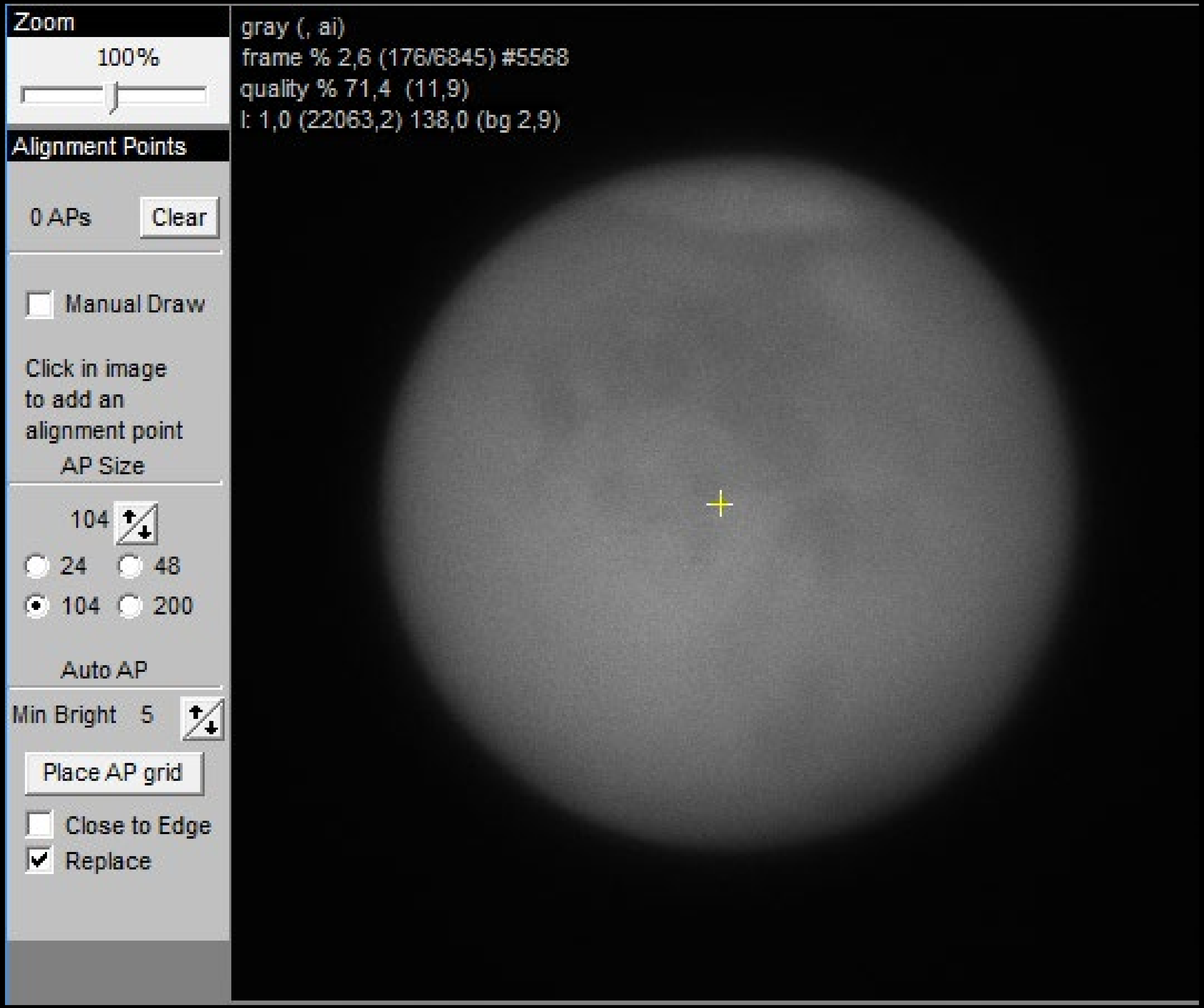


Stacking with AutoStakkert!

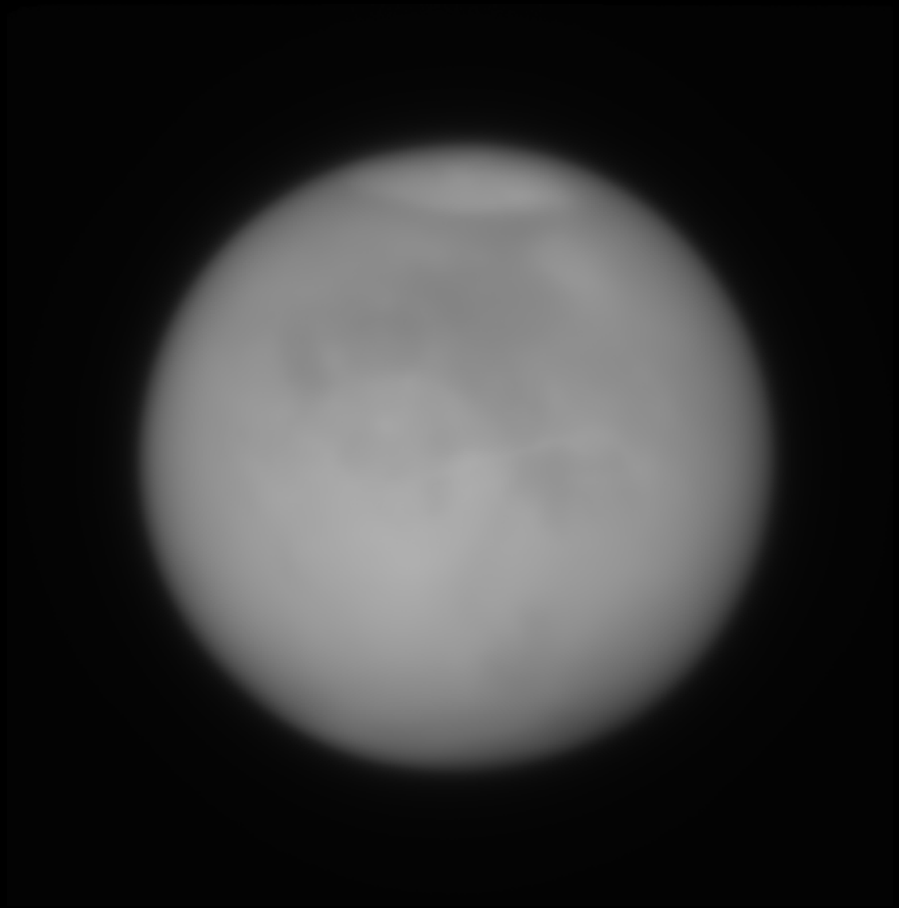


Stacking with AutoStakkert!




Zoom
100%
Alignment Points
0 APs
Clear
Manual Draw
Click in image to add an alignment point
AP Size
104
24
48
104
200
Auto AP
Min Bright 5
Place AP grid
Close to Edge
Replace
gray (, ai)
frame % 2,6 (176/6845) #5568
quality % 71,4 (11,9)
l: 1,0 (22063,2) 138,0 (bg 2,9)

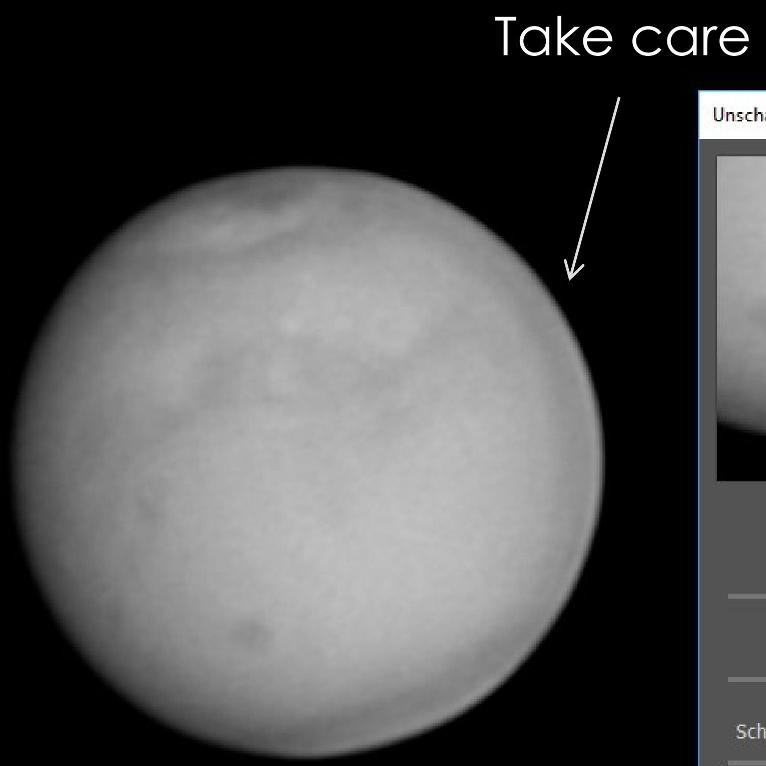
Stacking with AutoStakkert!

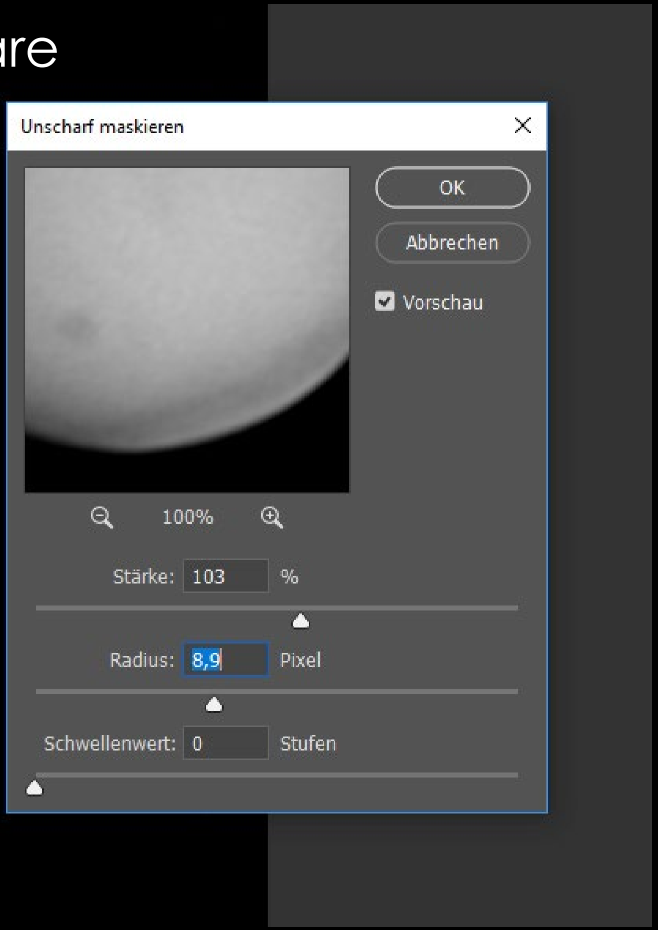


1200 stacked frames (20% of 6000)

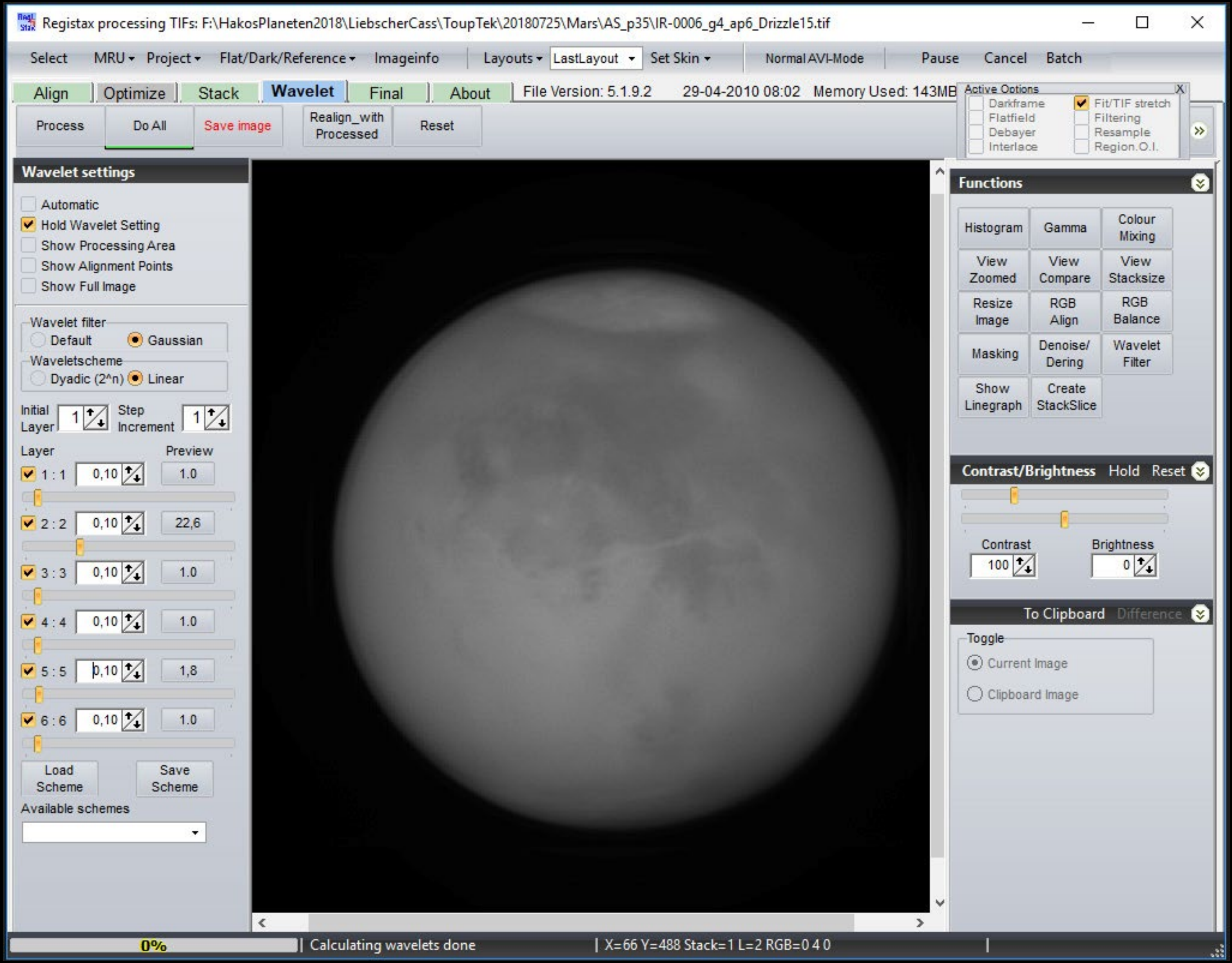
Sharpening

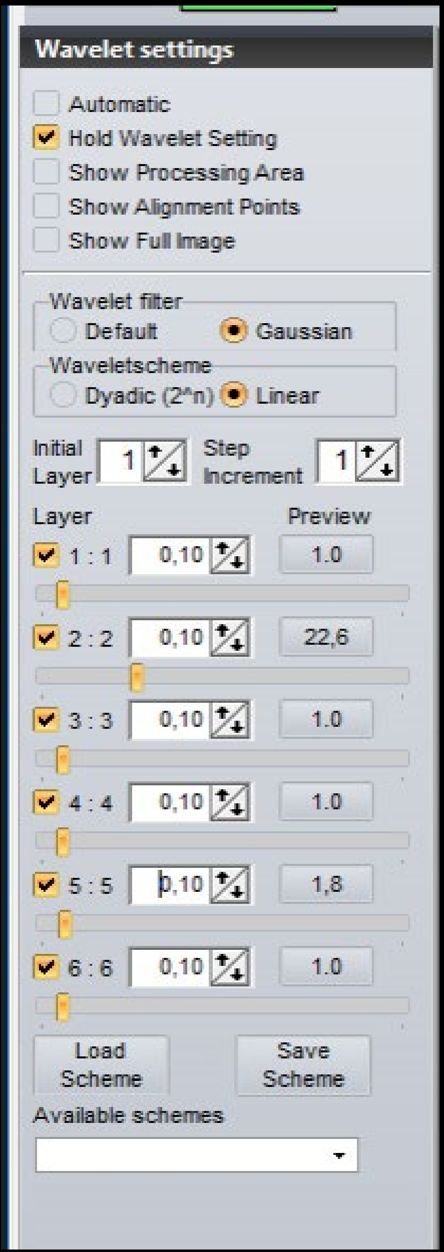
Unsharp masking



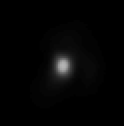


Wavelet filter





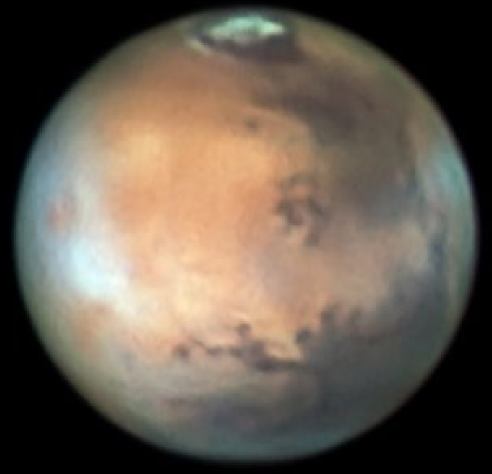
Point Spread Function



Spica (PSF)

C11 EdgeHD + Baader FFC + Skyris 618 Mono

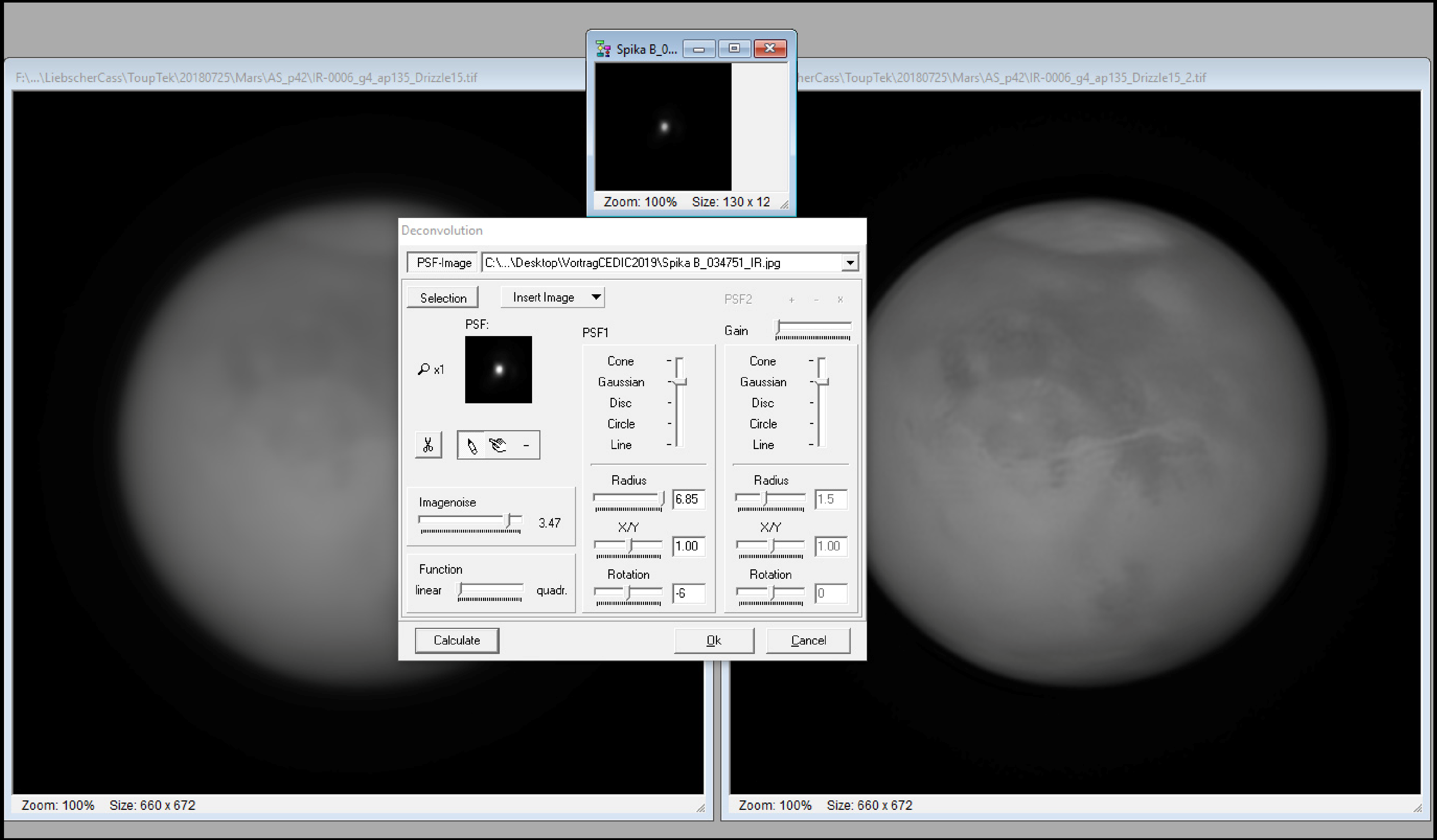
Point Spread Function



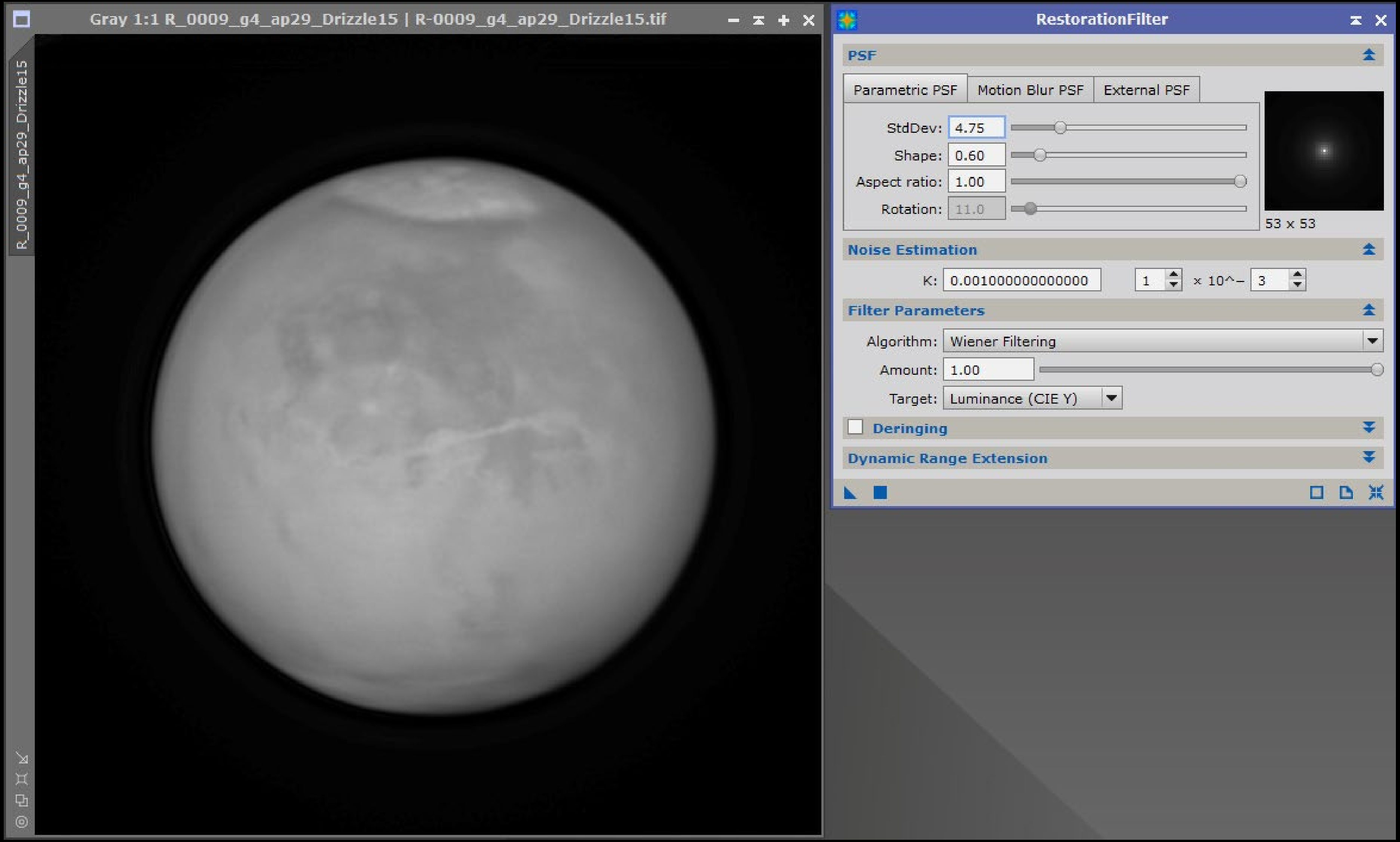
Mars 2014 sharpened with PSF (Spika)

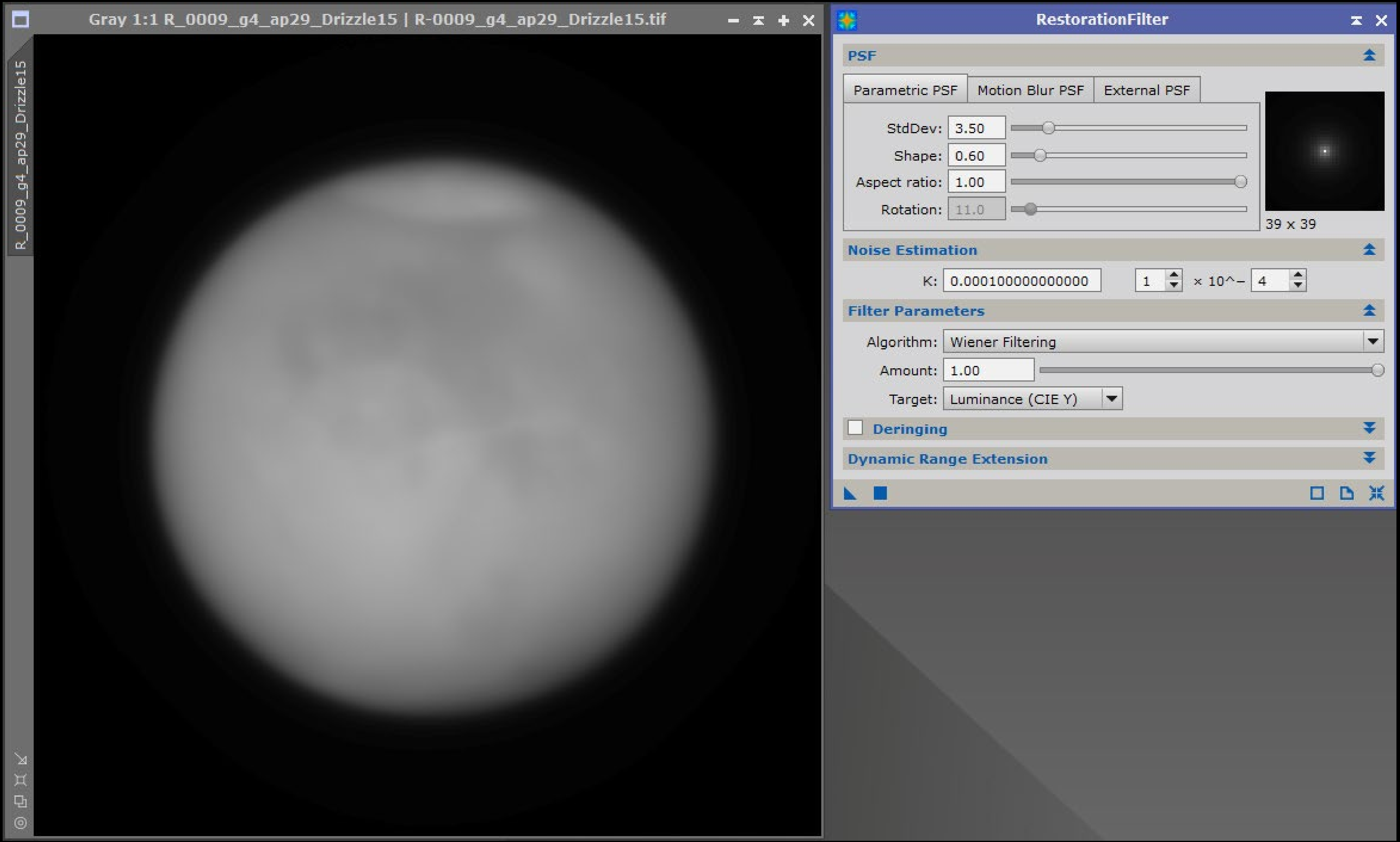
C11 EdgeHD + Baader FFC + Skyris 618 Mono

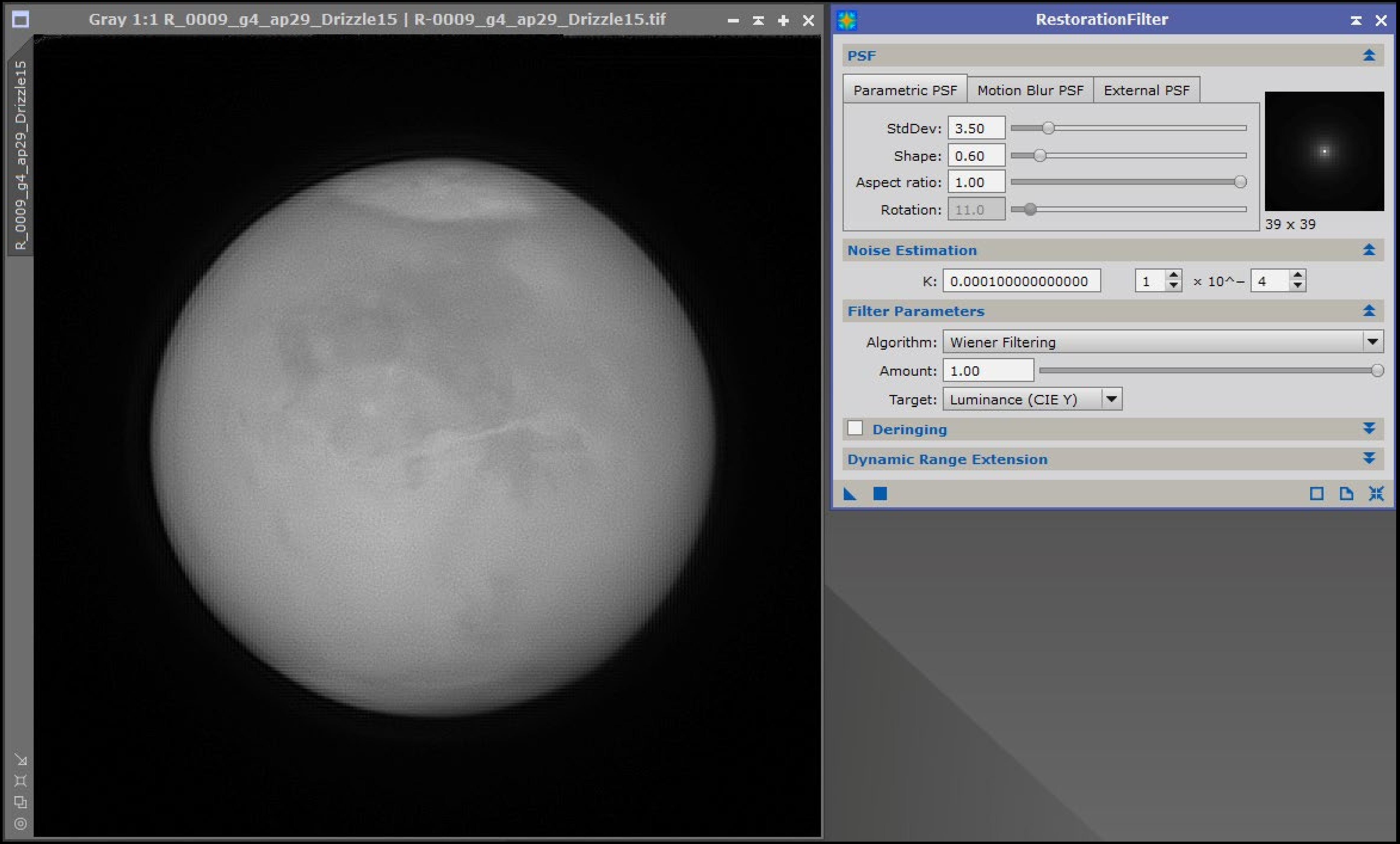
Sharpen with PSF (Fitswork)

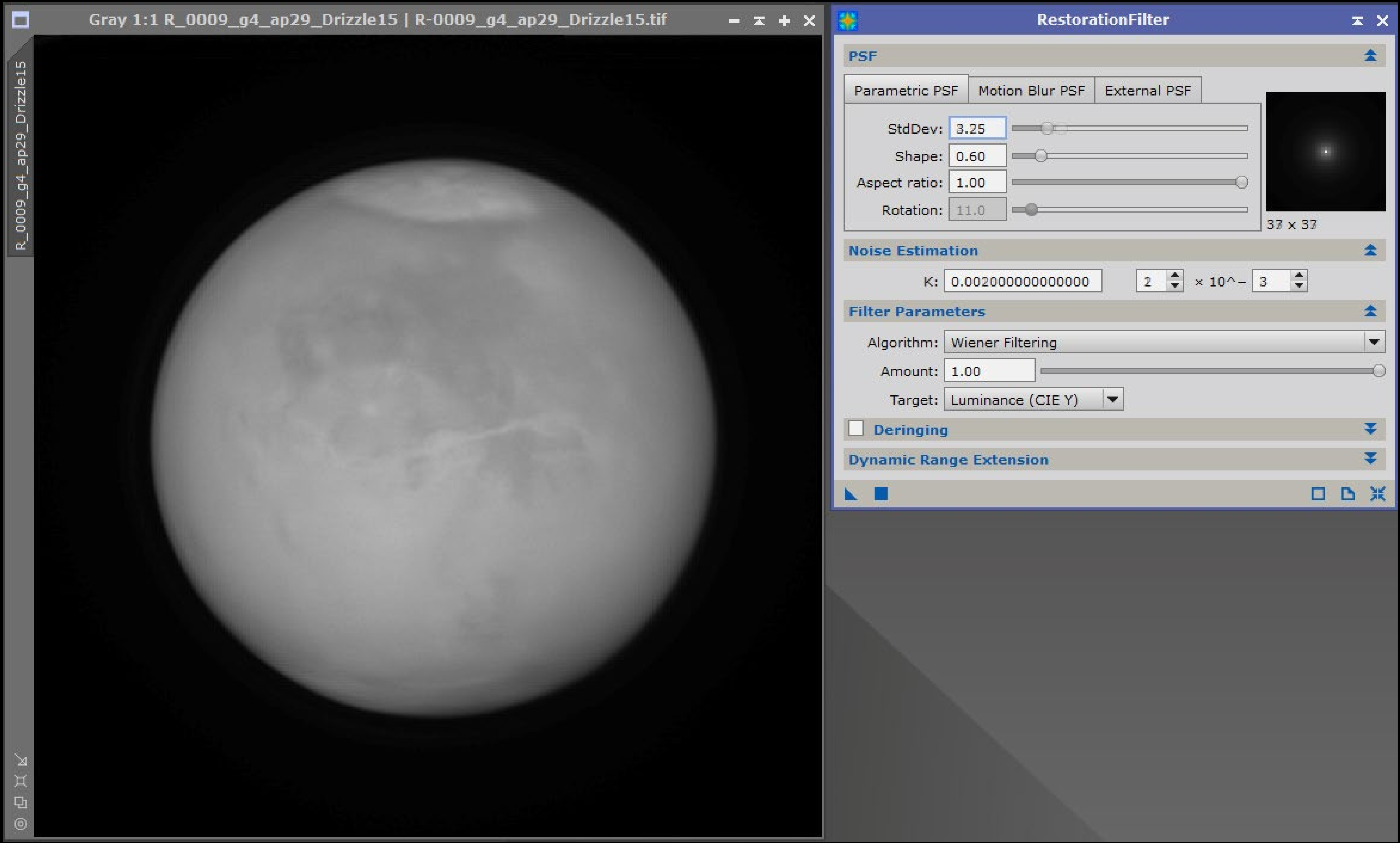


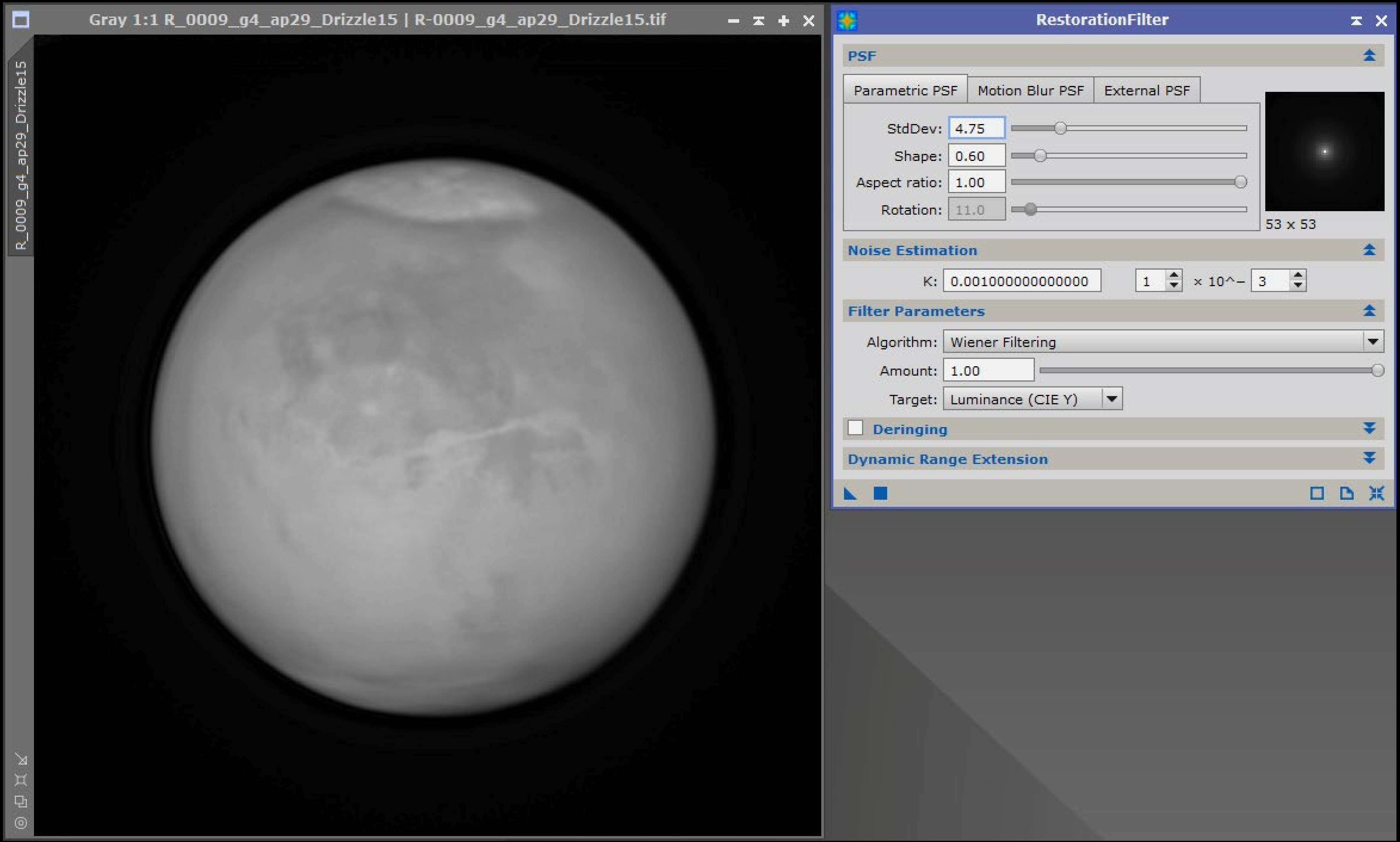
Sharpen with PSF (PixInsight)



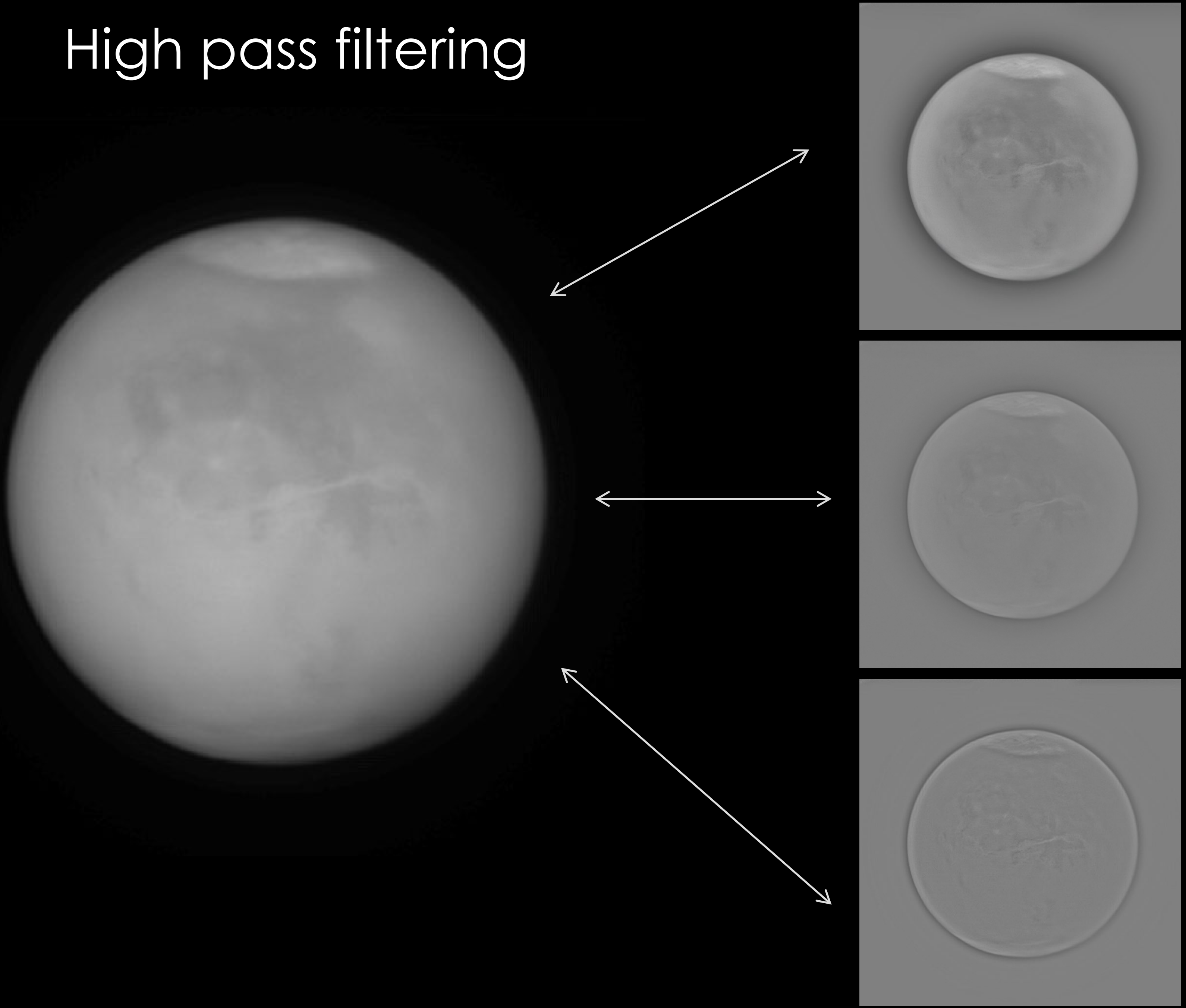

Gray 1:1 R_0009_g4_ap29_Drizzle15 | R-0009_g4_ap29_Drizzle15.tif
R_0009_g4_ap29_Drizzle15
RestorationFilter
PSF
Parametric PSF
Motion Blur PSF
External PSF
StdDev: 3.50
Shape: 0.60
Aspect ratio: 1.00
Rotation: 11.0
39 x 39
Noise Estimation
K: 0.000100000000000
1
× 10^−
4
Filter Parameters
Algorithm: Wiener Filtering
Amount: 1.00
Target: Luminance (CIE Y)
Deringing
Dynamic Range Extension


Gray 1:1 R_0009_g4_ap29_Drizzle15 | R-0009_g4_ap29_Drizzle15.tif
R_0009_g4_ap29_Drizzle15
RestorationFilter
PSF
Parametric PSF
Motion Blur PSF
External PSF
StdDev: 3.50
Shape: 0.60
Aspect ratio: 1.00
Rotation: 11.0
39 x 39
Noise Estimation
K: 0.000100000000000
1
× 10^−
4
Filter Parameters
Algorithm: Wiener Filtering
Amount: 1.00
Target: Luminance (CIE Y)
Deringing
Dynamic Range Extension


Gray 1:1 R_0009_g4_ap29_Drizzle15 | R-0009_g4_ap29_Drizzle15.tif
R_0009_g4_ap29_Drizzle15
RestorationFilter
PSF
Parametric PSF
Motion Blur PSF
External PSF
StdDev: 3.25
Shape: 0.60
Aspect ratio: 1.00
Rotation: 11.0
37 x 37
Noise Estimation
K: 0.002000000000000
2 × 10^− 3
Filter Parameters
Algorithm: Wiener Filtering
Amount: 1.00
Target: Luminance (CIE Y)
Deringing
Dynamic Range Extension


Gray 1:1 R_0009_g4_ap29_Drizzle15 | R-0009_g4_ap29_Drizzle15.tif
R_0009_g4_ap29_Drizzle15
RestorationFilter
PSF
Parametric PSF
Motion Blur PSF
External PSF
StdDev: 4.75
Shape: 0.60
Aspect ratio: 1.00
Rotation: 11.0
53 x 53
Noise Estimation
K: 0.001000000000000
1
× 10^−
3
Filter Parameters
Algorithm: Wiener Filtering
Amount: 1.00
Target: Luminance (CIE Y)
Deringing
Dynamic Range Extension

High pass filtering

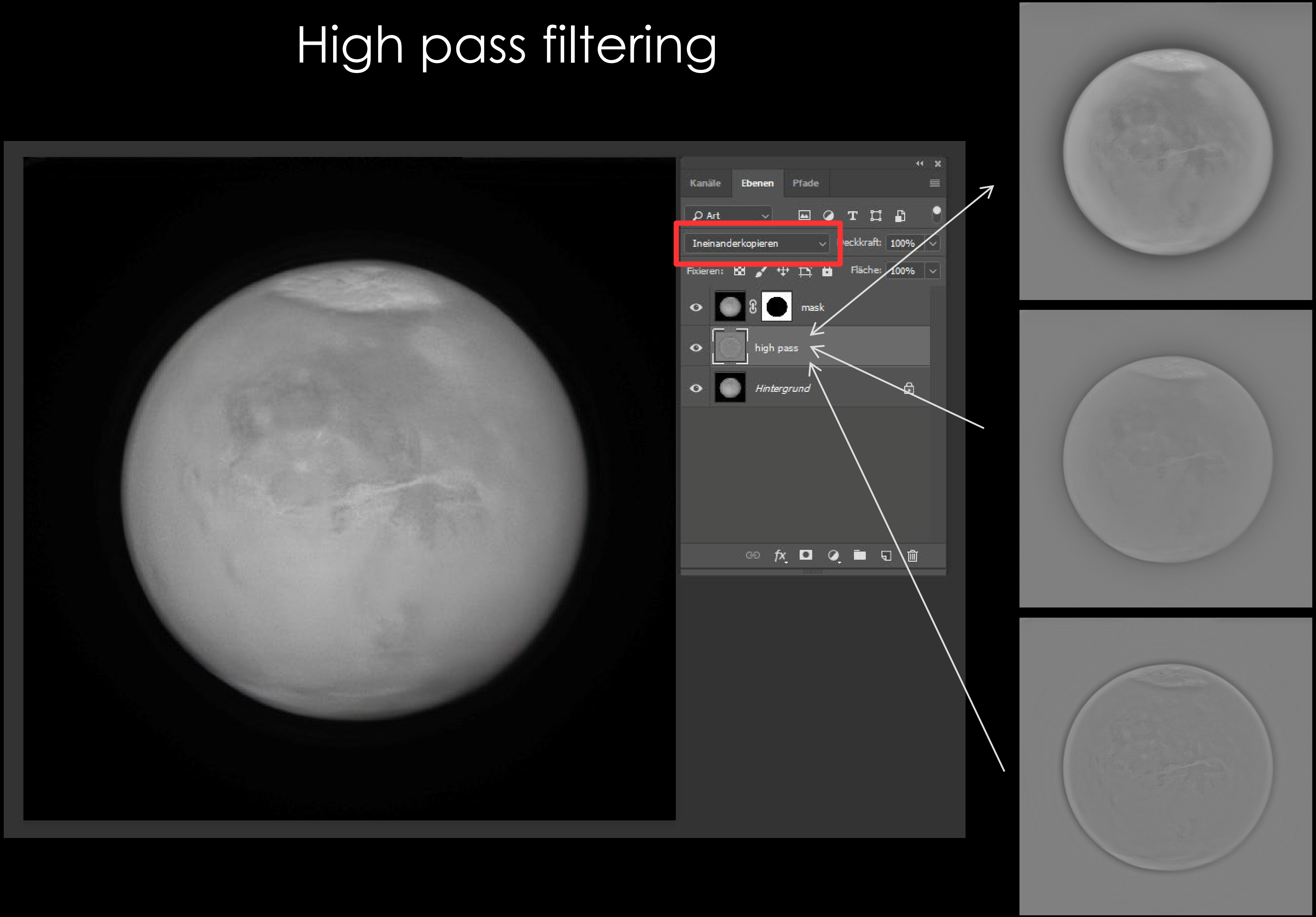


Layer 1

Layer 2

Layer 3

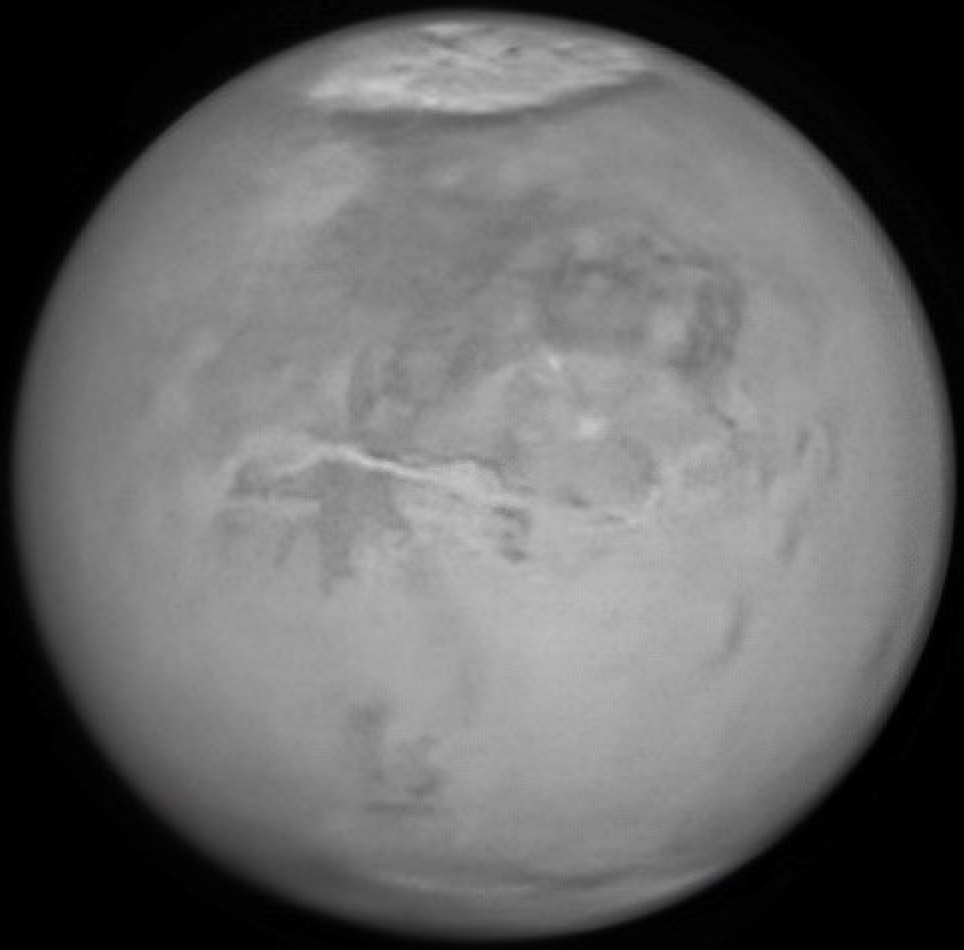
High pass filtering



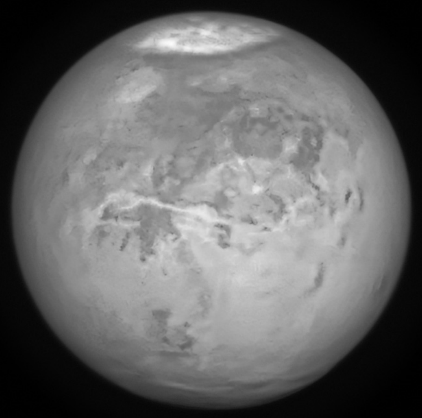
Layer 1

Layer 2

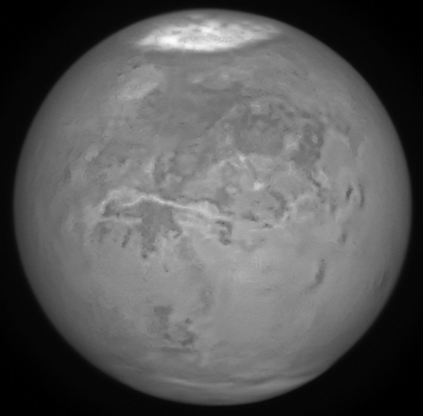
Layer 3



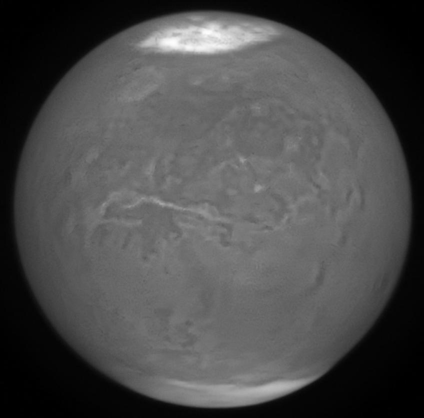
Stacked and sharpened
Red channel



Red



Green

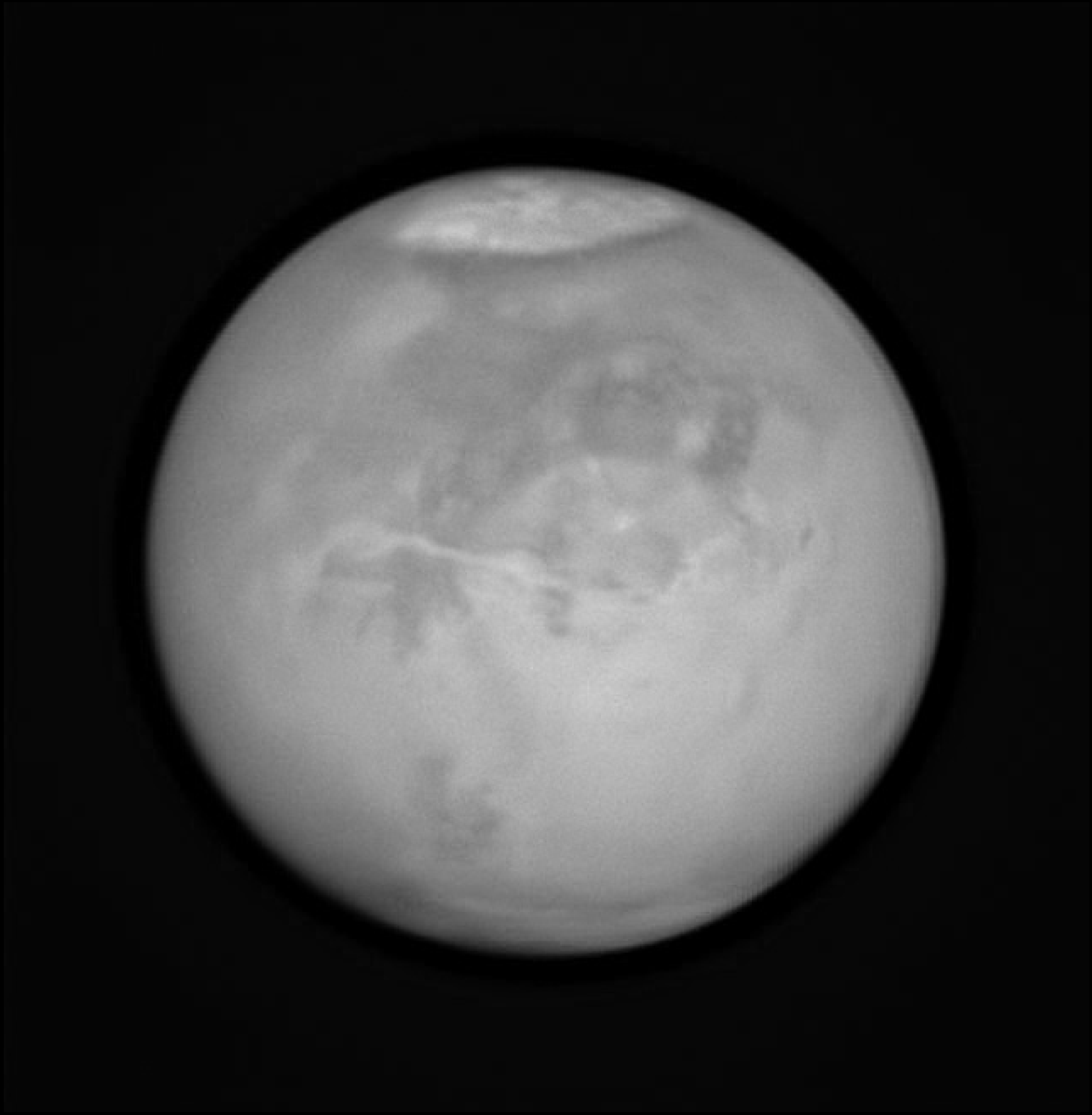


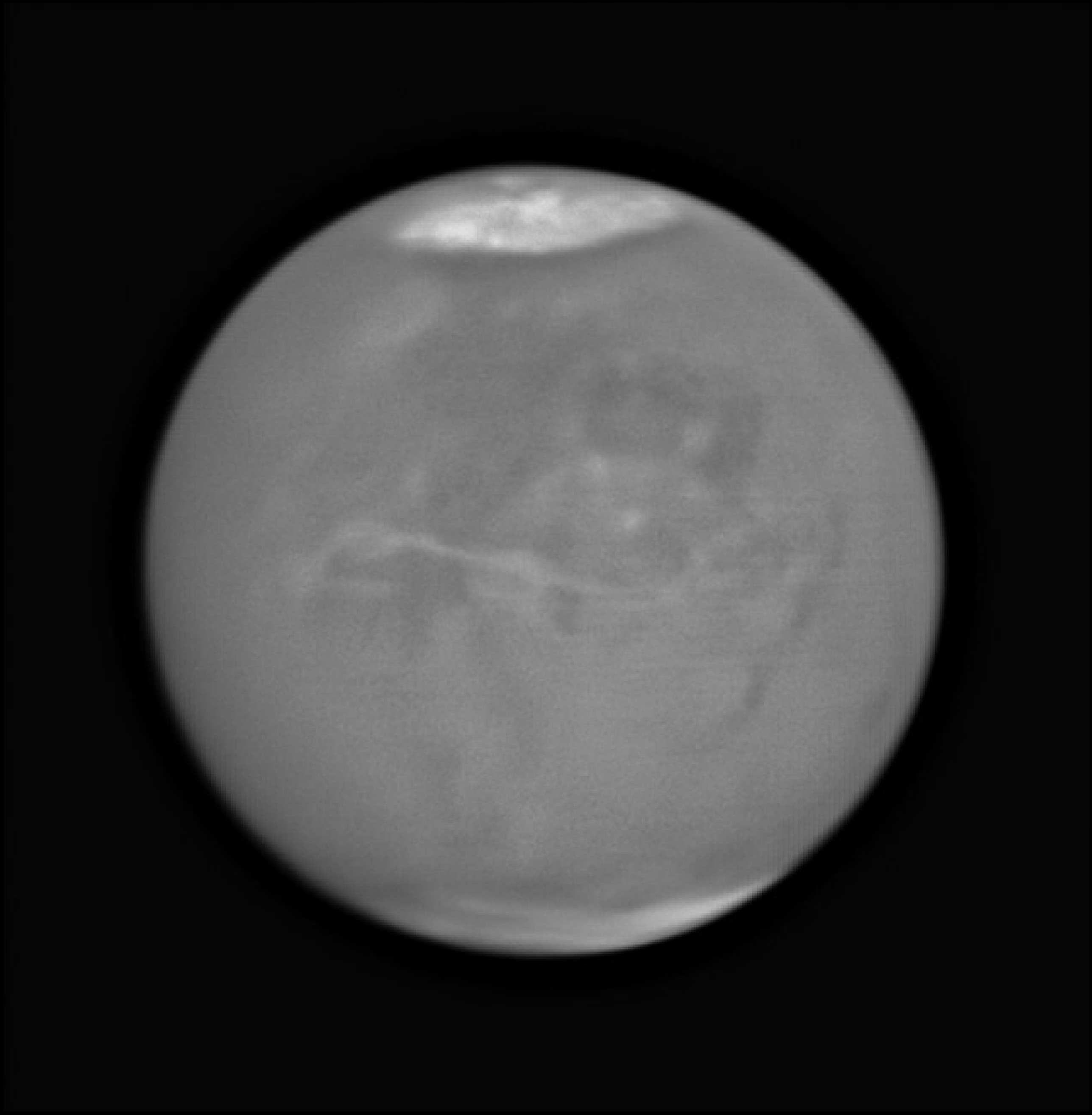
Blue

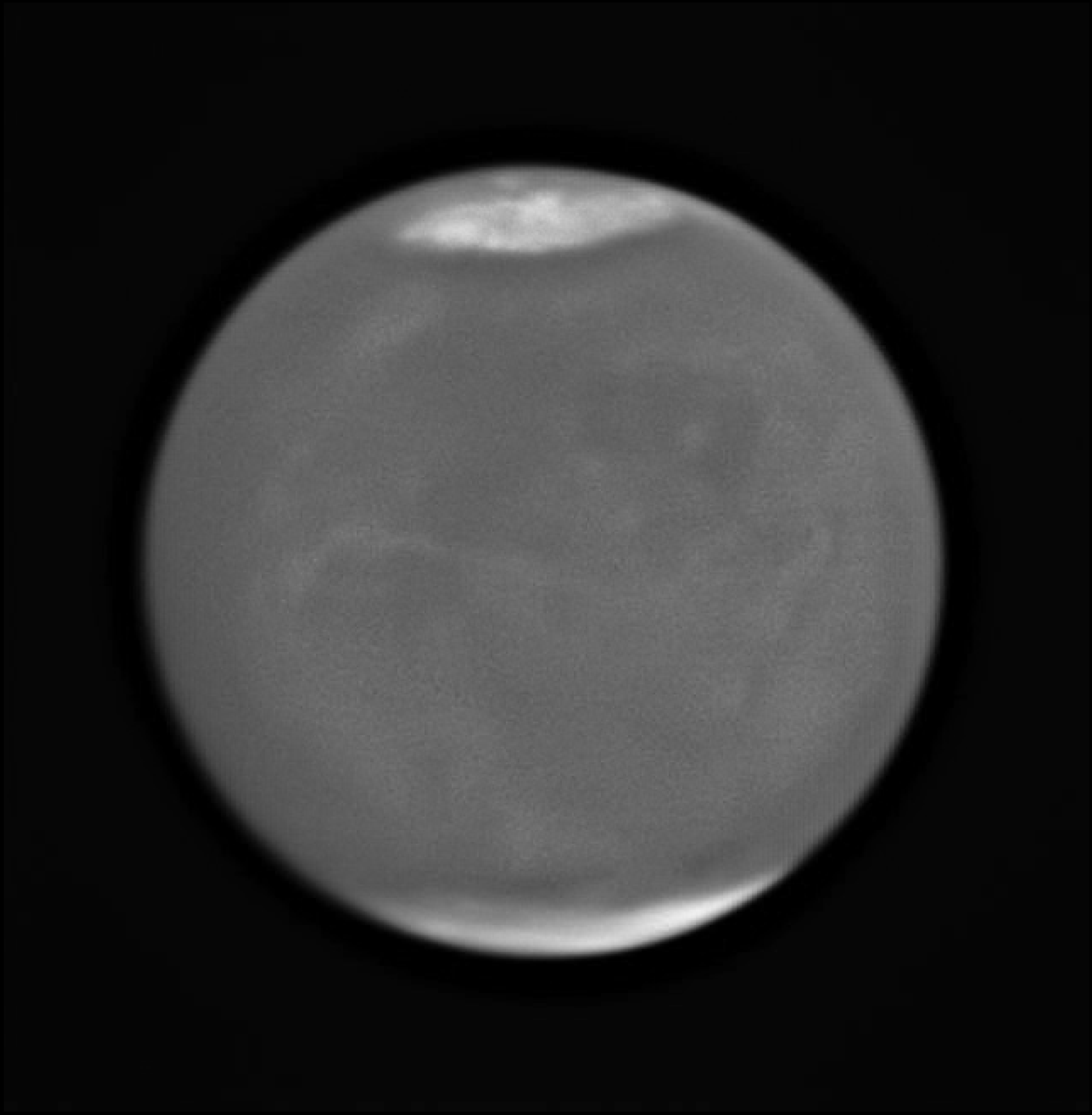
Further processings with the action bundle *LS-Mars* by Sebastian Voltmer

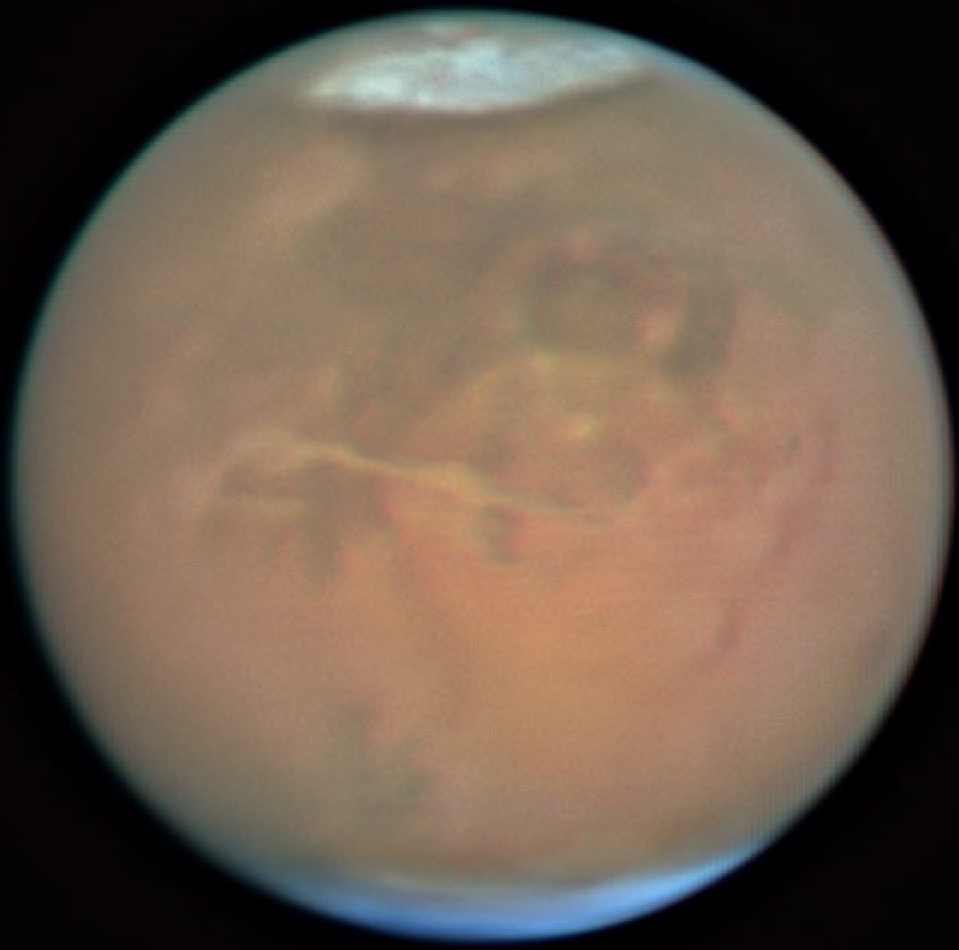
See also: www.lichtenstern.company/multimedia/software/

RGB combine





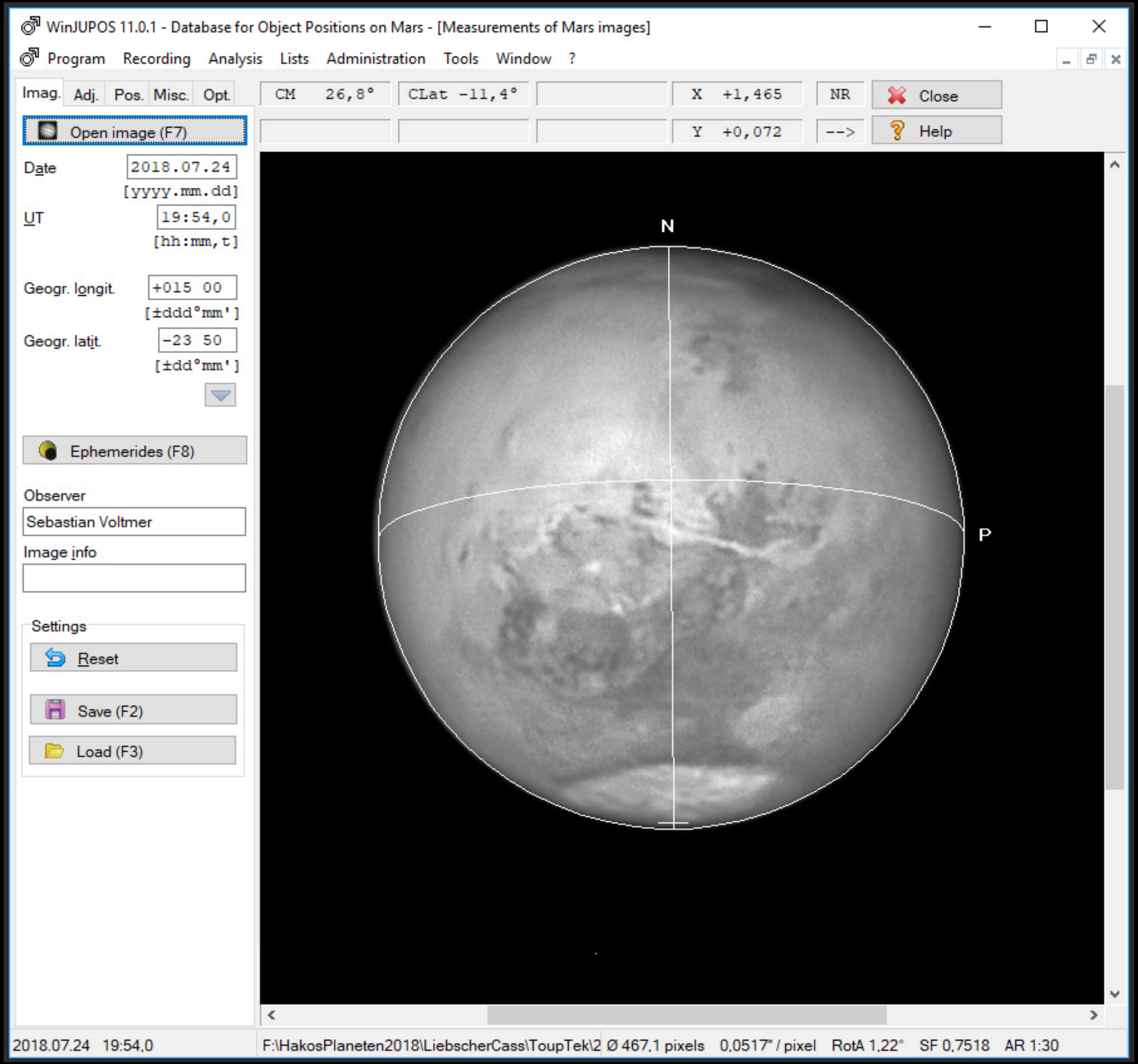




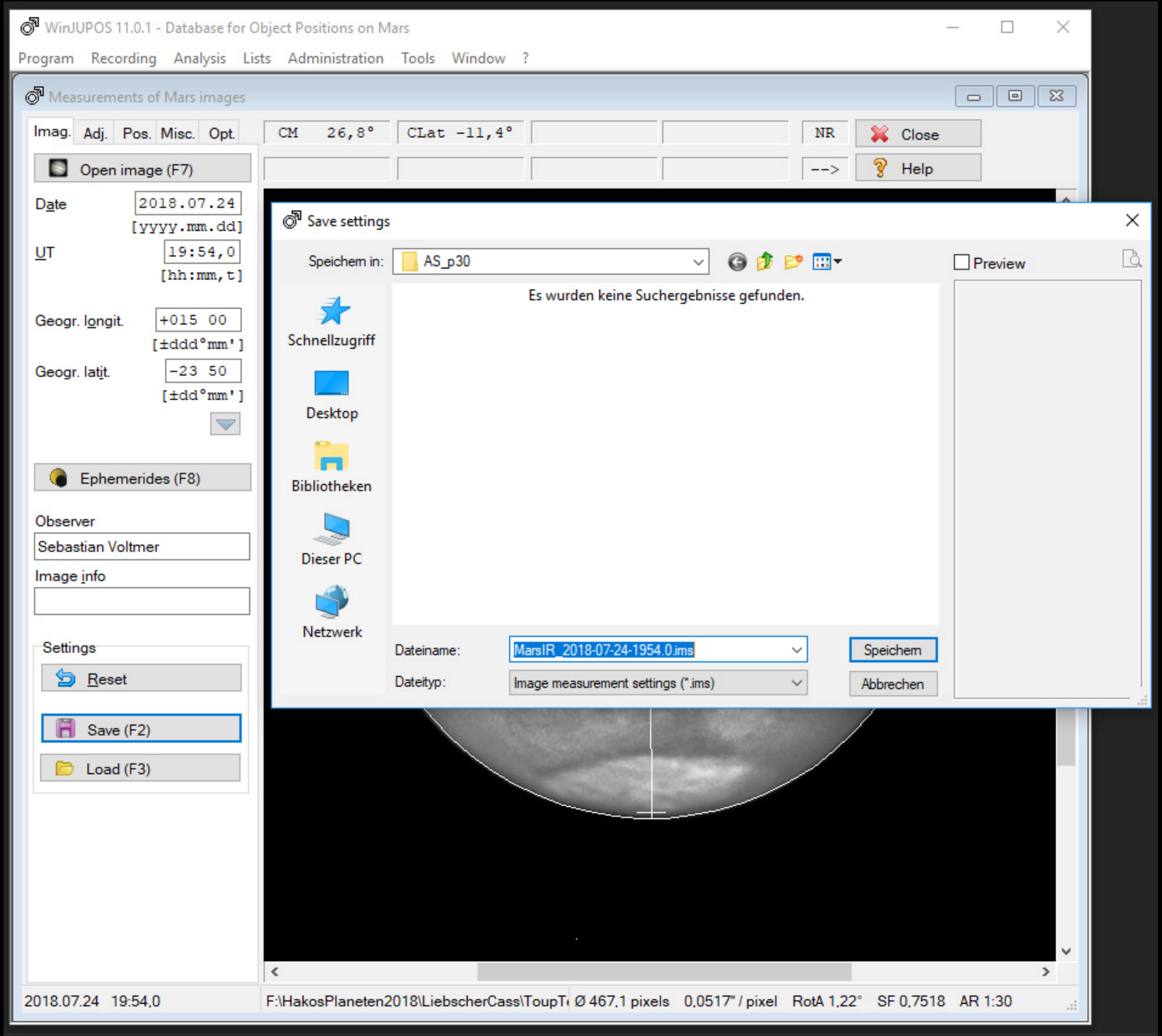
RGB-motion blur

De-rotation

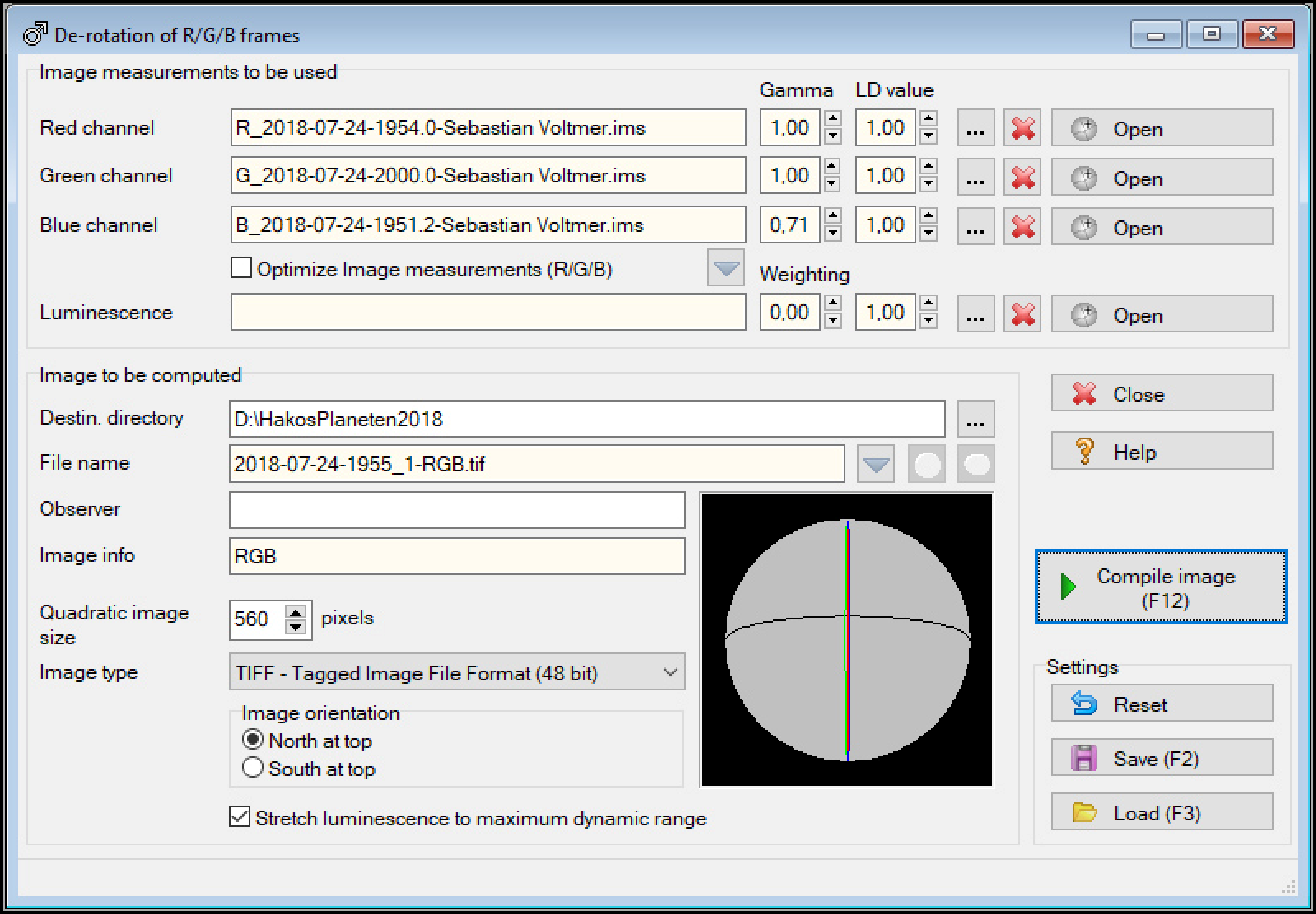
De-rotation with WinJupos



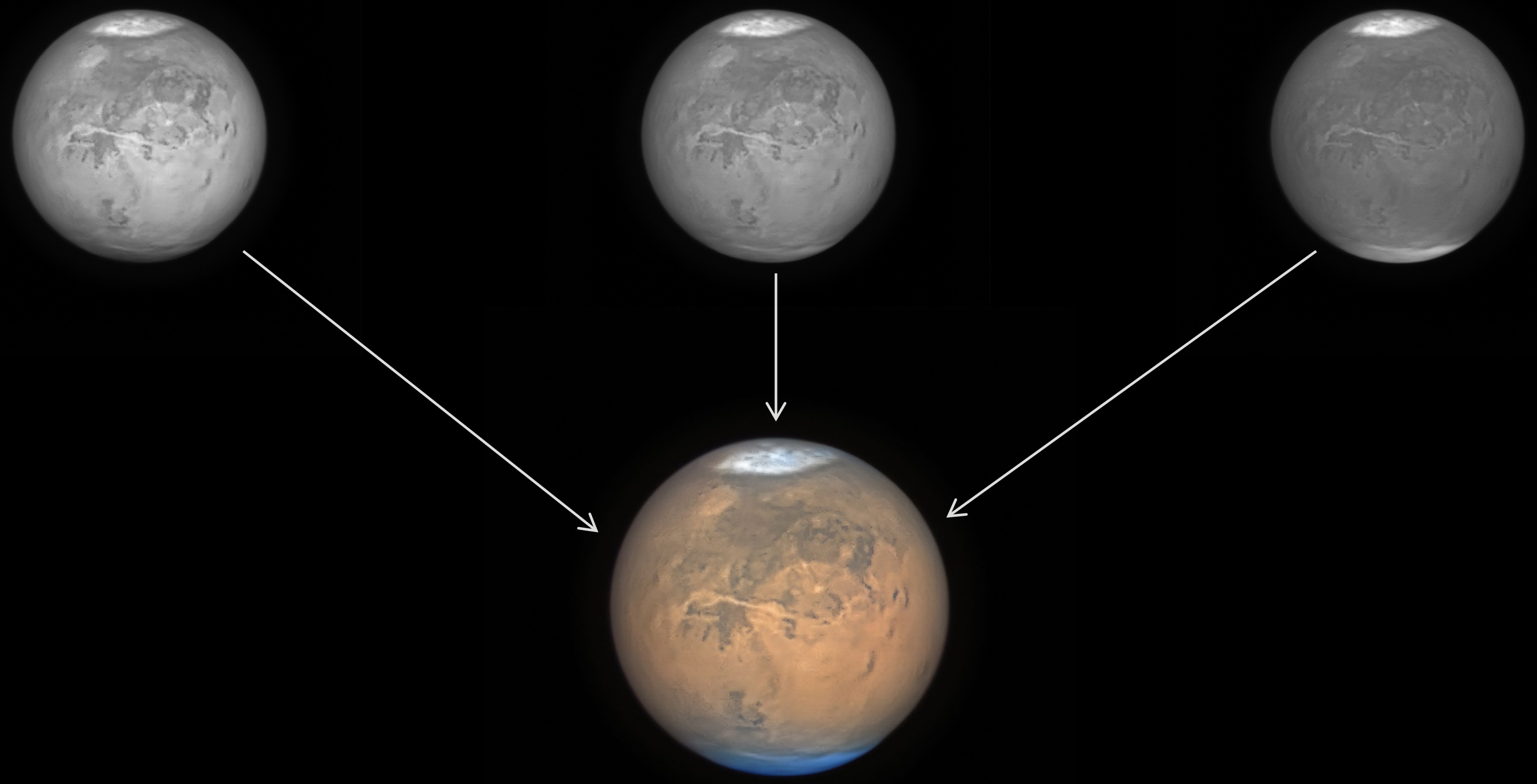
De-rotation with WinJupos



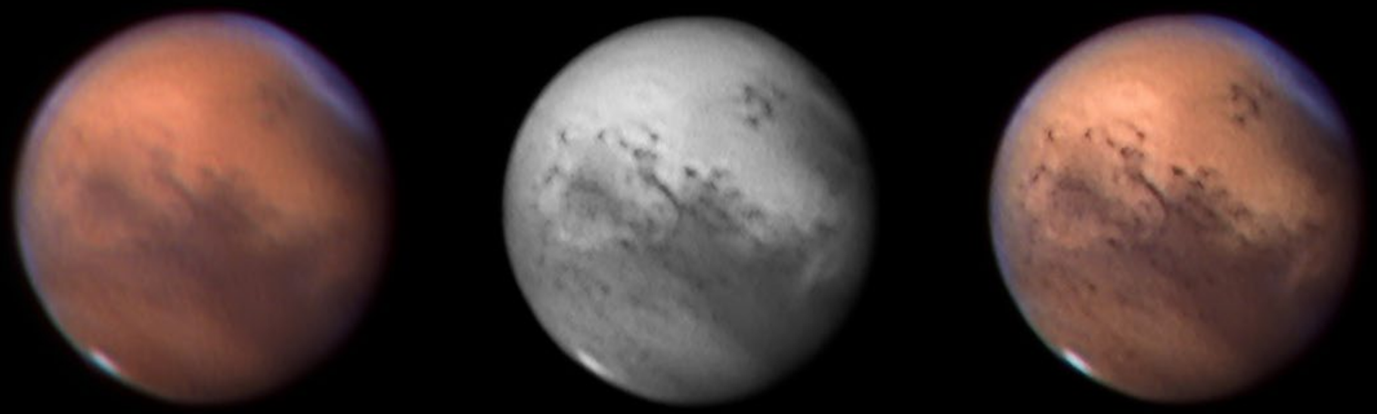
De-rotation with WinJupos



RGB combine



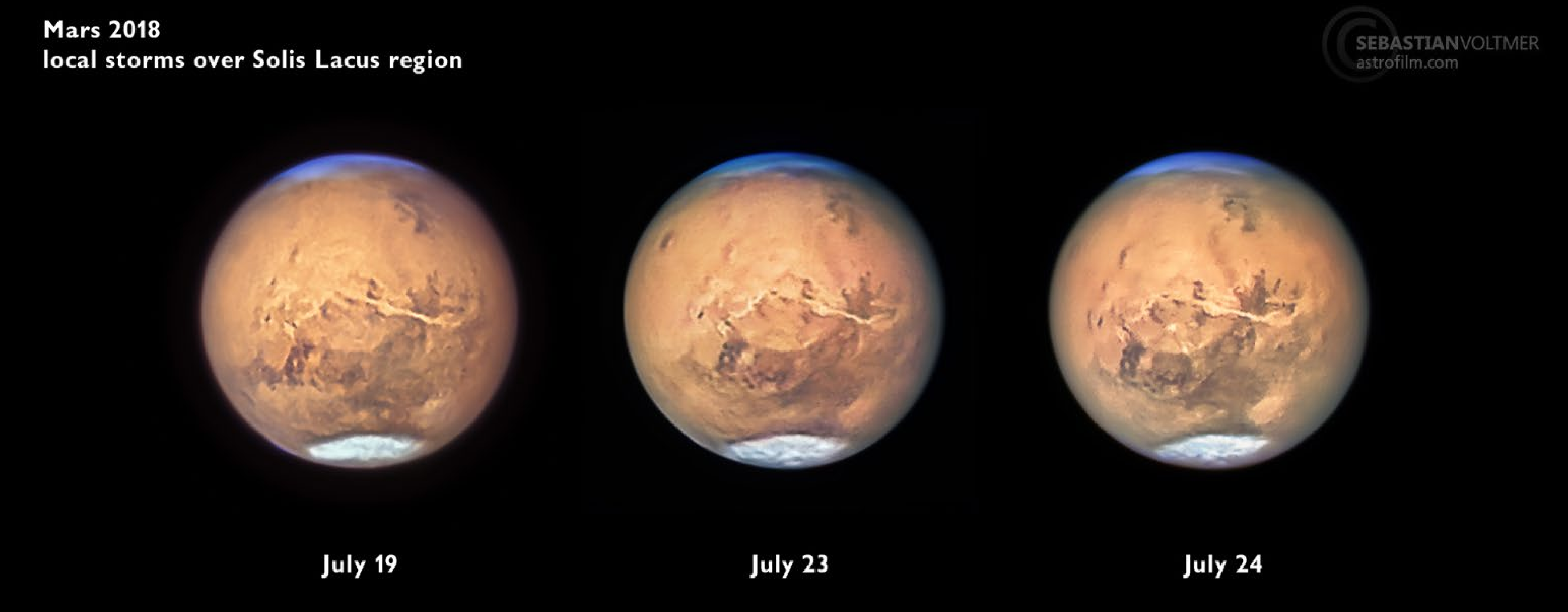
IR-RGB combine

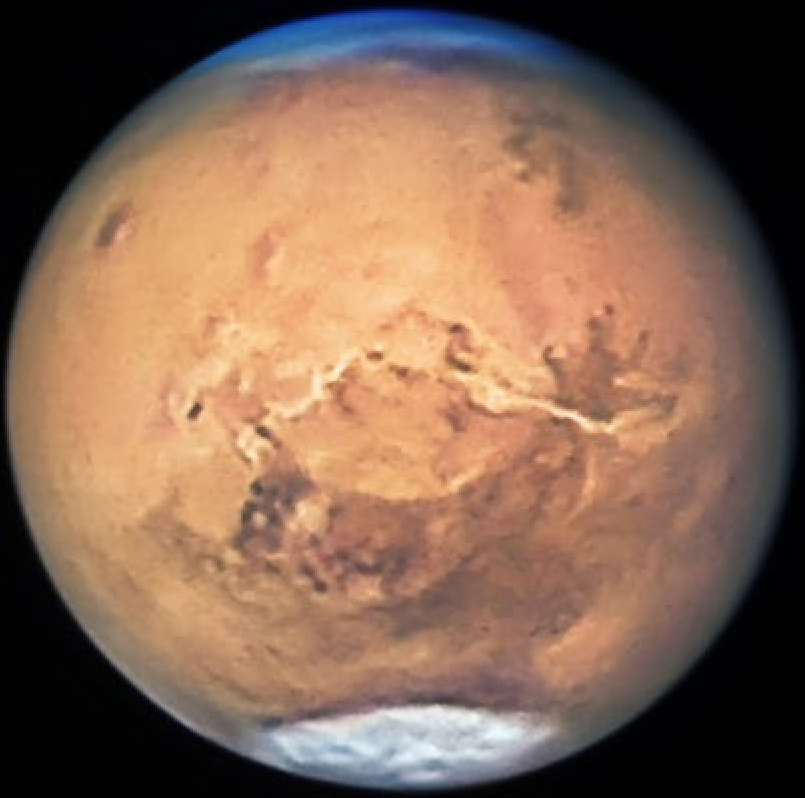


RGB IR pass IR-RGB

Old footage from 2005

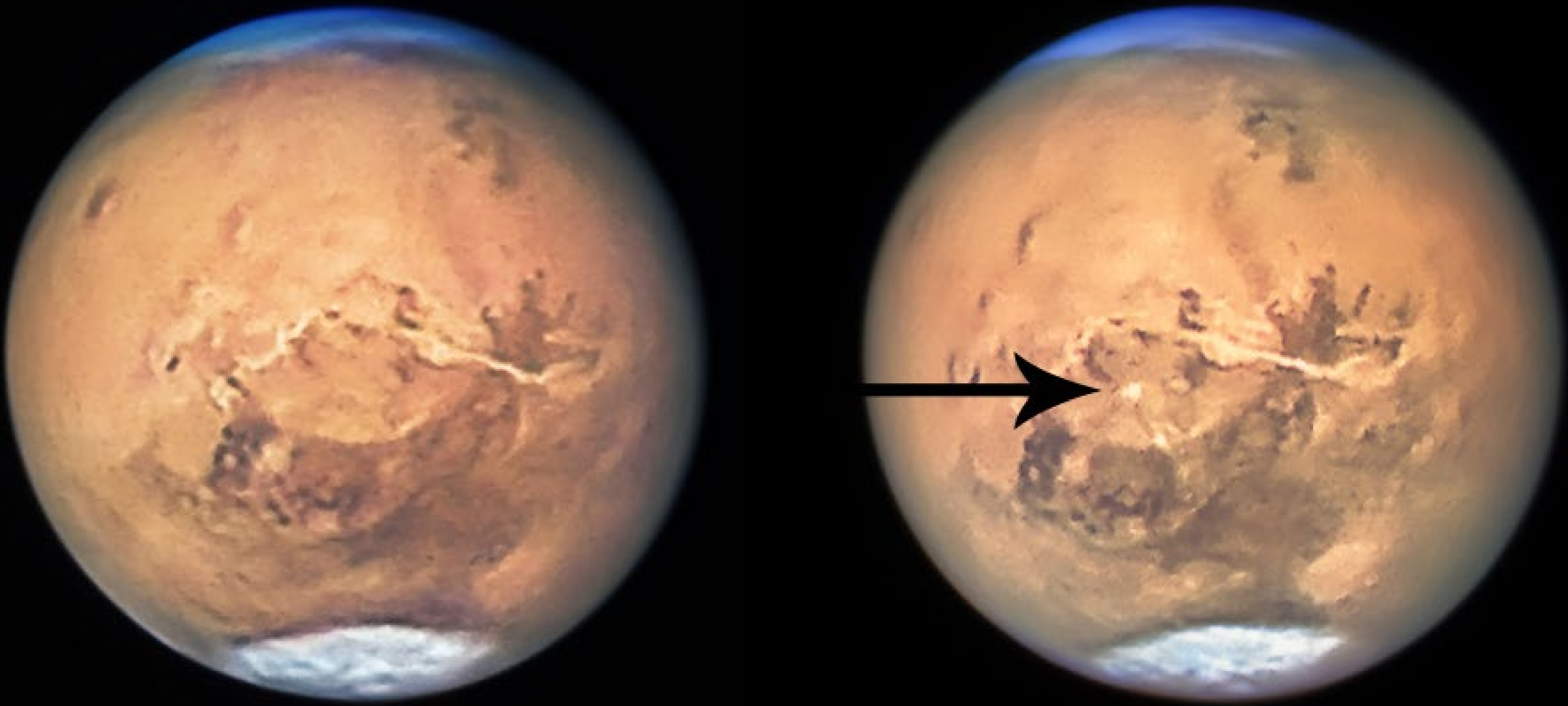
Analysis


Mars 2018
local storms over Solis Lacus region
SEBASTIANVOLTMER
astrofilm.com
July 19
July 23
July 24



July 23

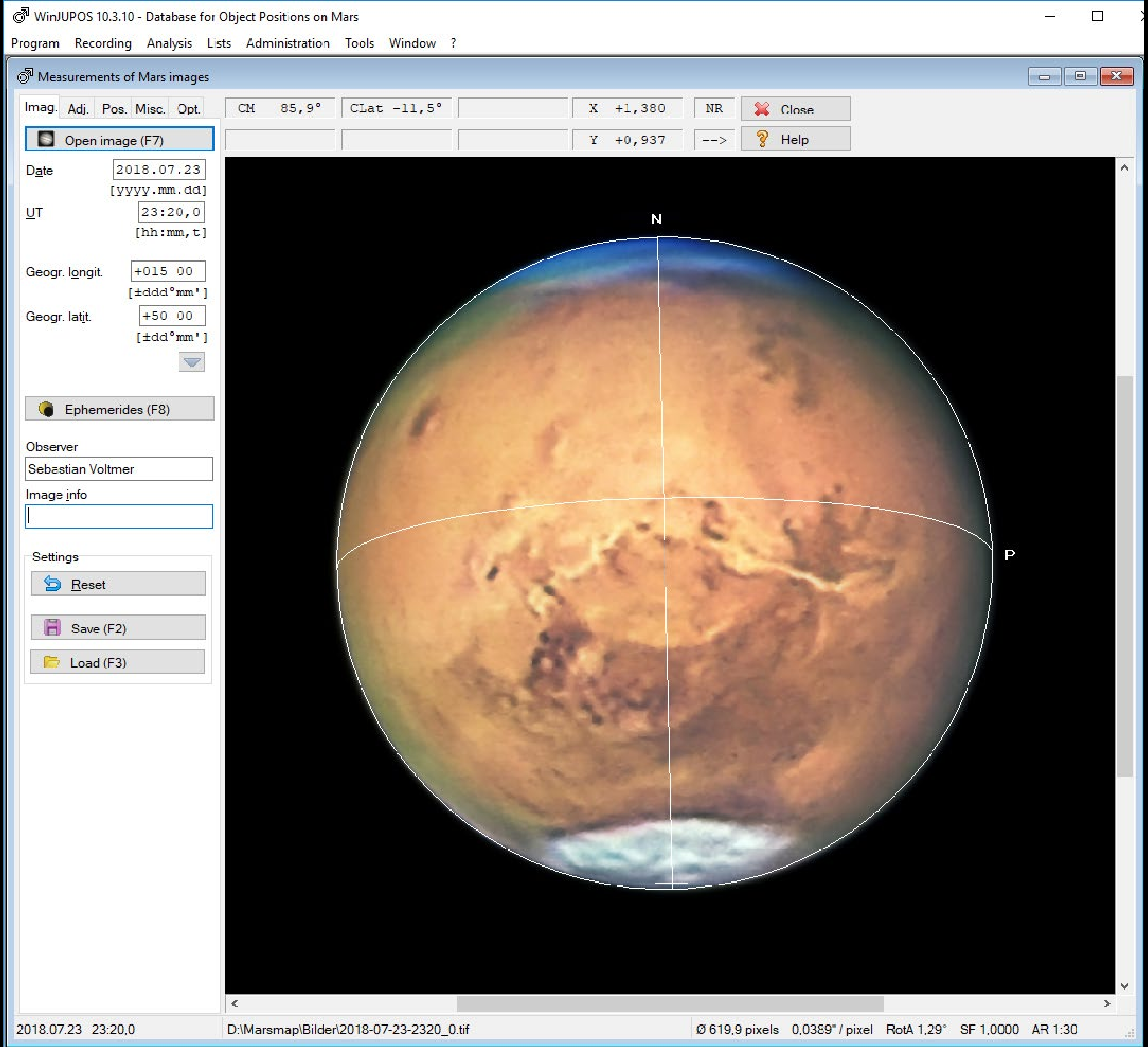
July 24

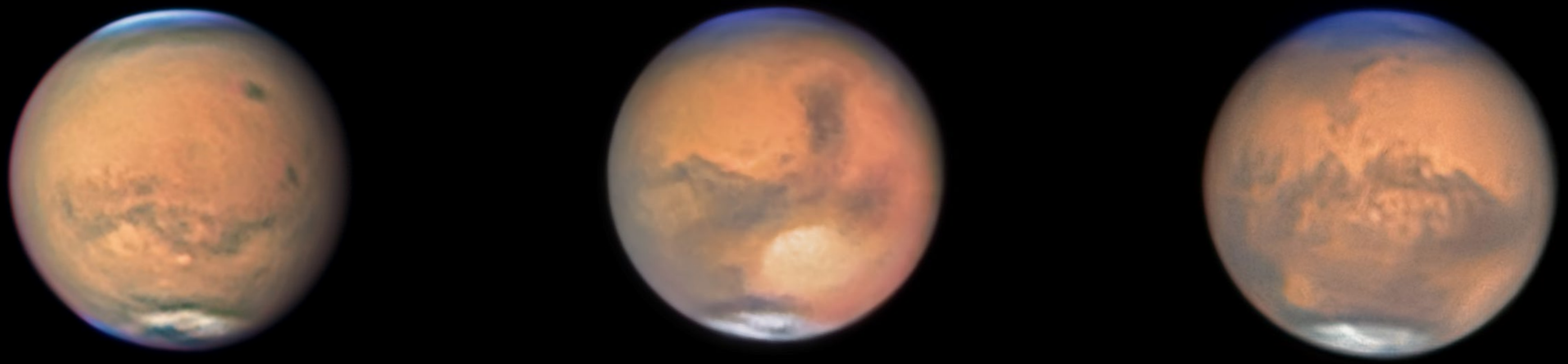


July 23

July 24

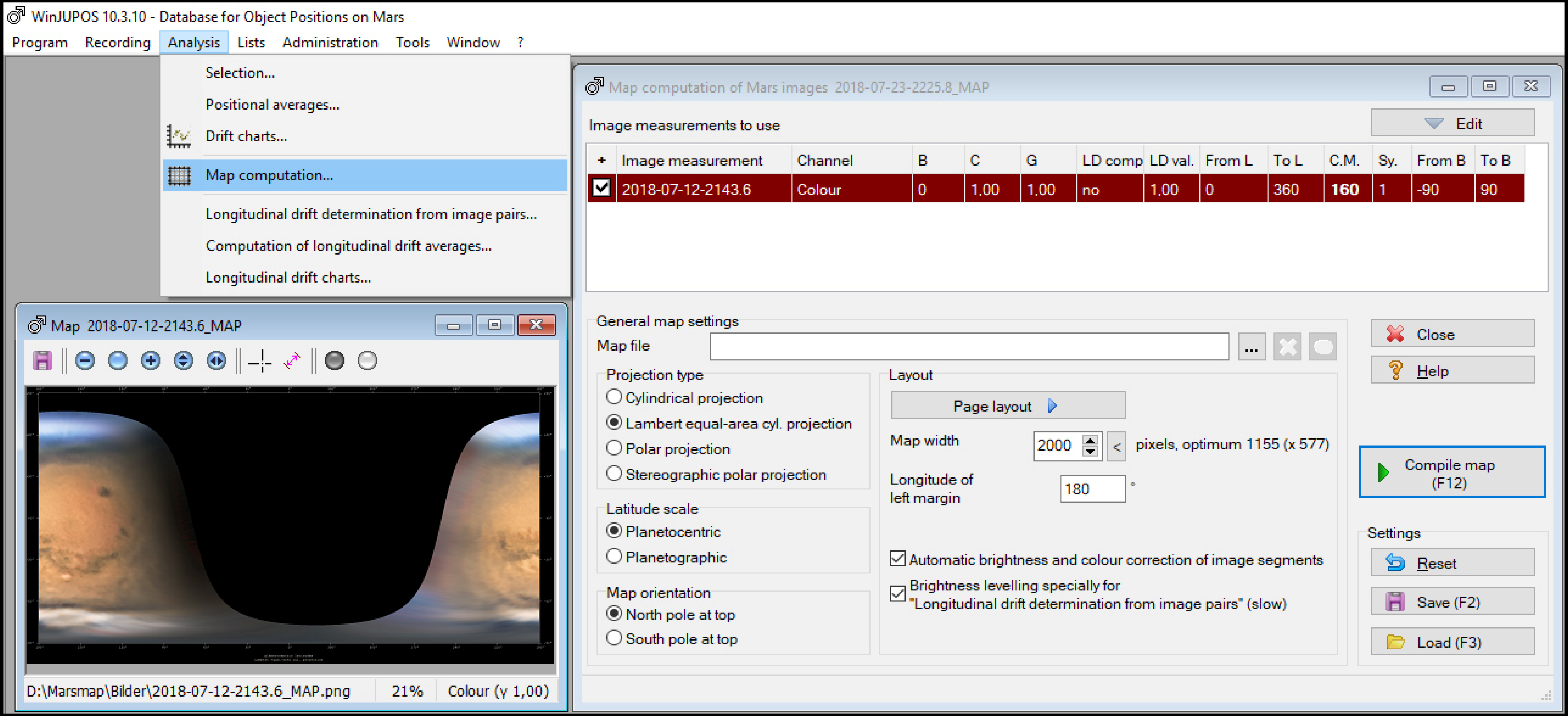
Creating the Map


WinJUPOS 10.3.10 - Database for Object Positions on Mars
Program Recording Analysis Lists Administration Tools Window ?
Measurements of Mars images
Imag. Adj. Pos. Misc. Opt.
CM 85,9°
CLat -11,5°
X +1,380
Y +0,937
NR
-->
Close
Help
Open image (F7)
Date 2018.07.23 [yyyy.mm.dd]
UT 23:20,0 [hh:mm,t]
Geogr. longit. +015 00 [±ddd°mm']
Geogr. latit. +50 00 [±dd°mm']
Ephemerides (F8)
Observer
Sebastian Voltmer
Image info
Settings
Reset
Save (F2)
Load (F3)
N
P
2018.07.23 23:20,0
D:\Marsmap\Bilder\2018-07-23-2320_0.tif
Ø 619,9 pixels 0,0389" / pixel RotA 1,29° SF 1,0000 AR 1:30

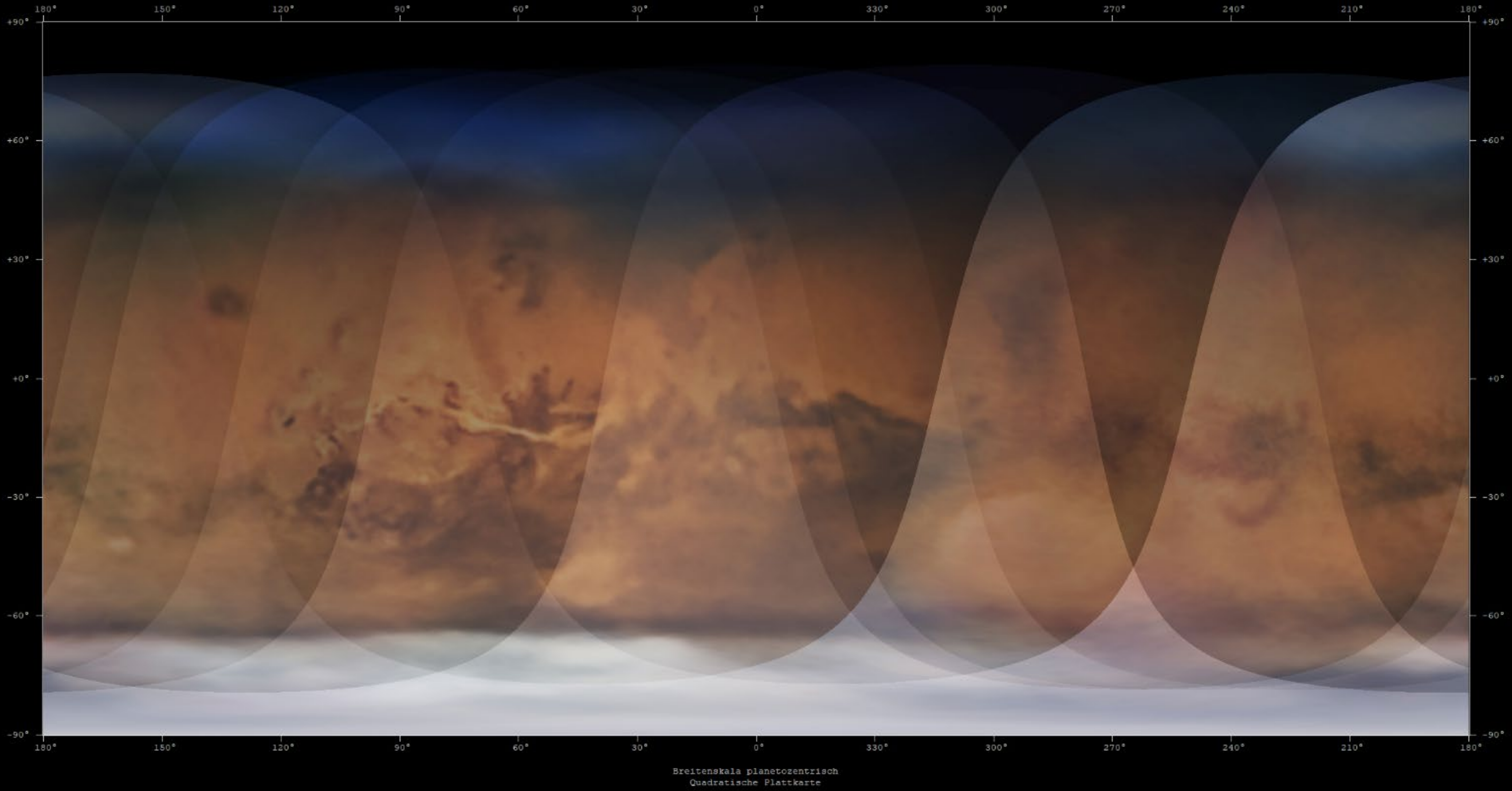


Other important Mars views (July 2018) for the Map.

Creating the Map with WinJupos

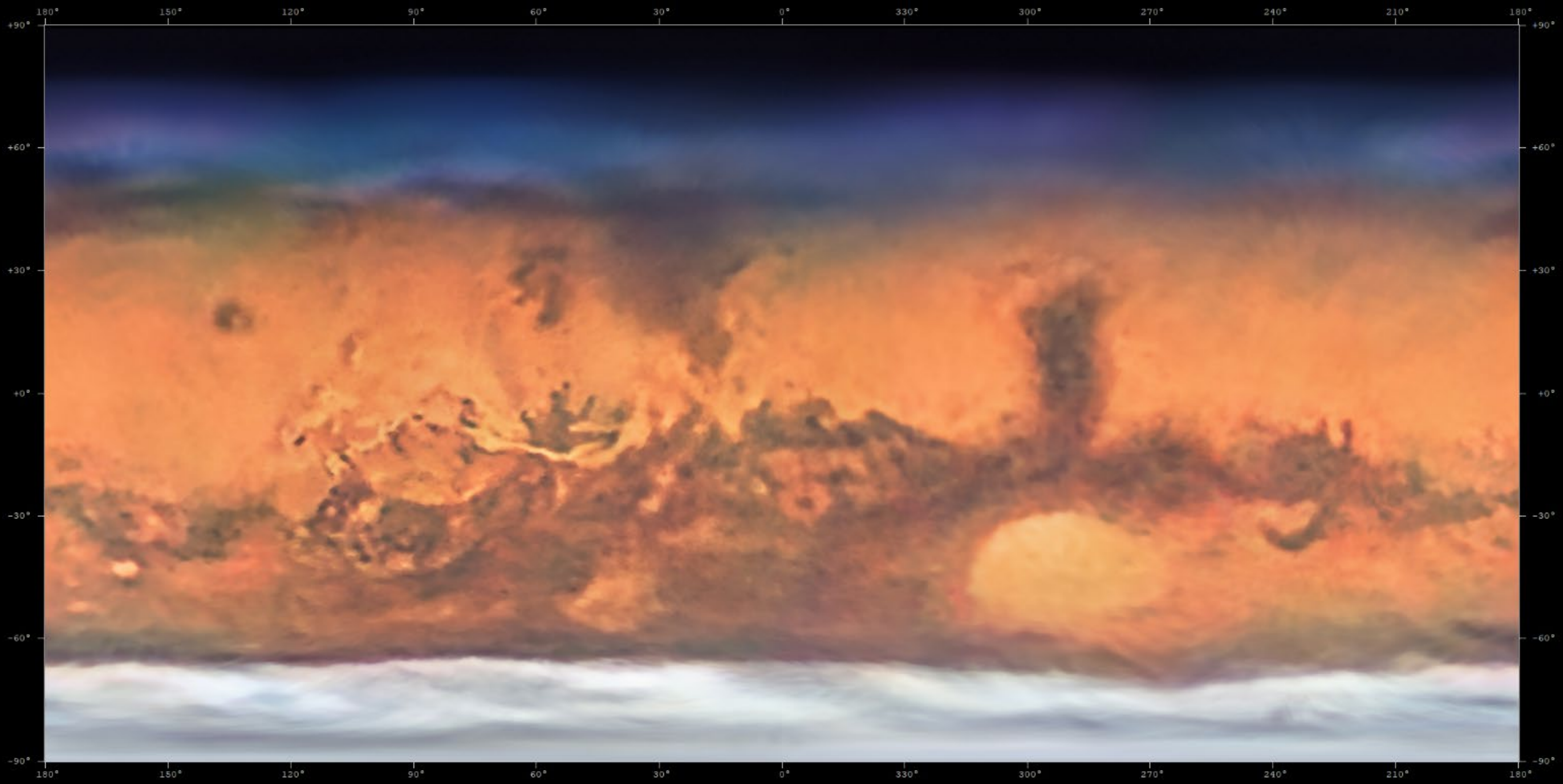


Creating the Map



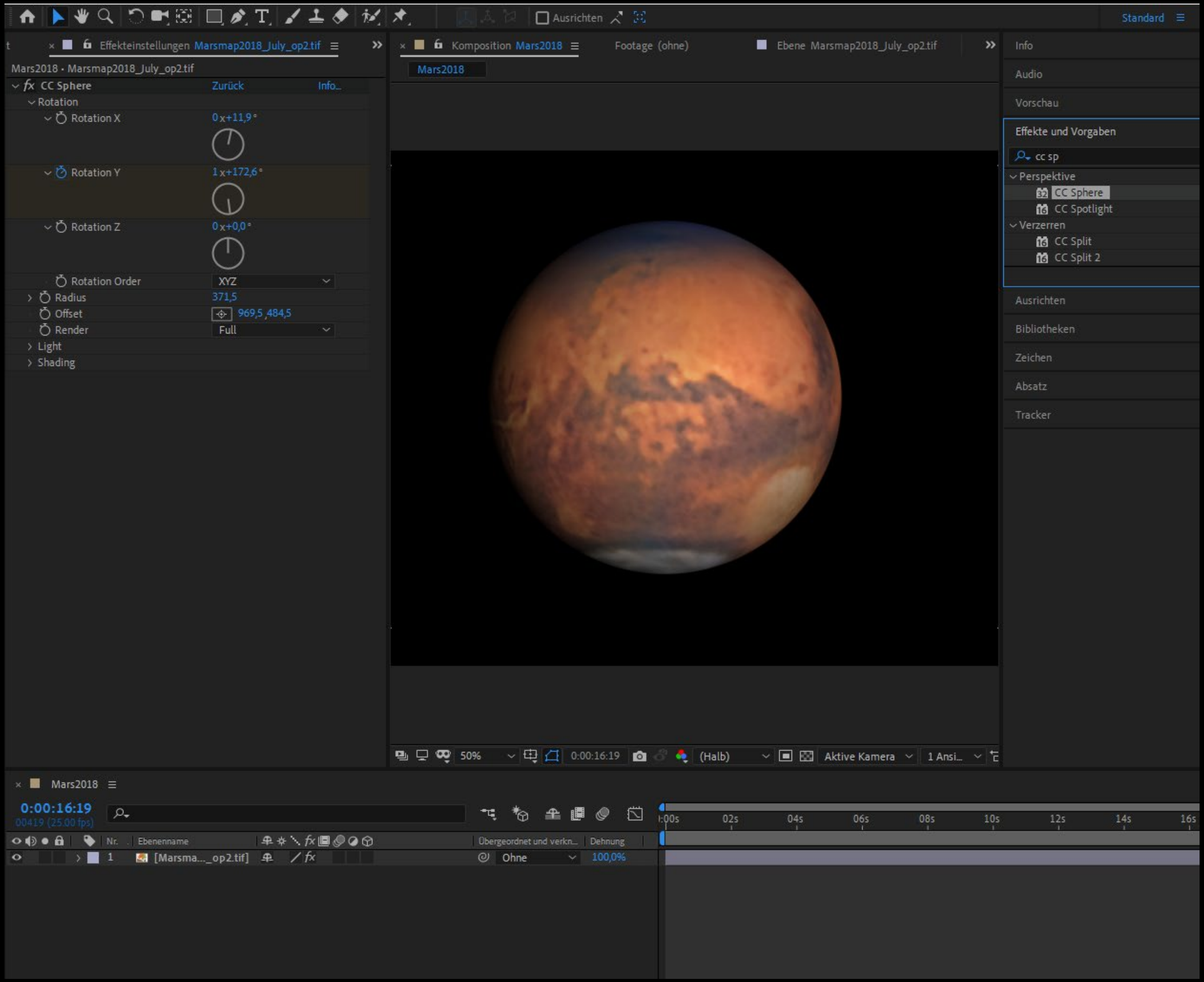
Creating the Map

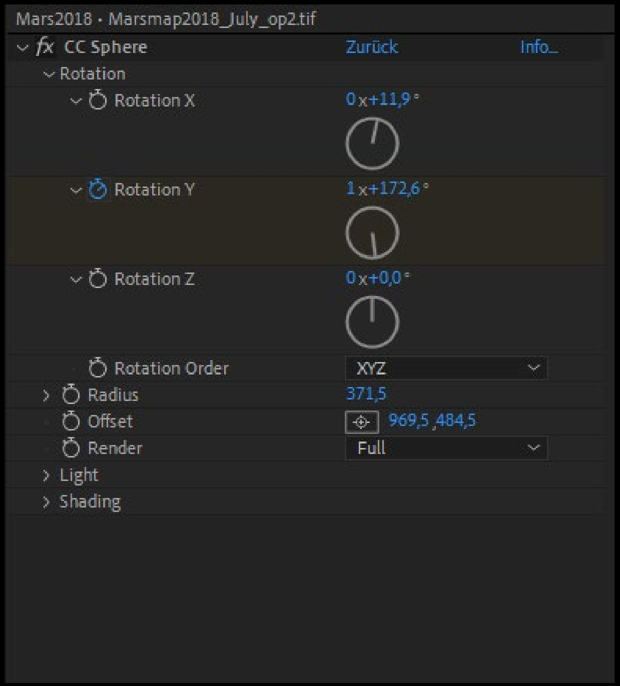
Final Mars Map, July 2018



Animating the Map

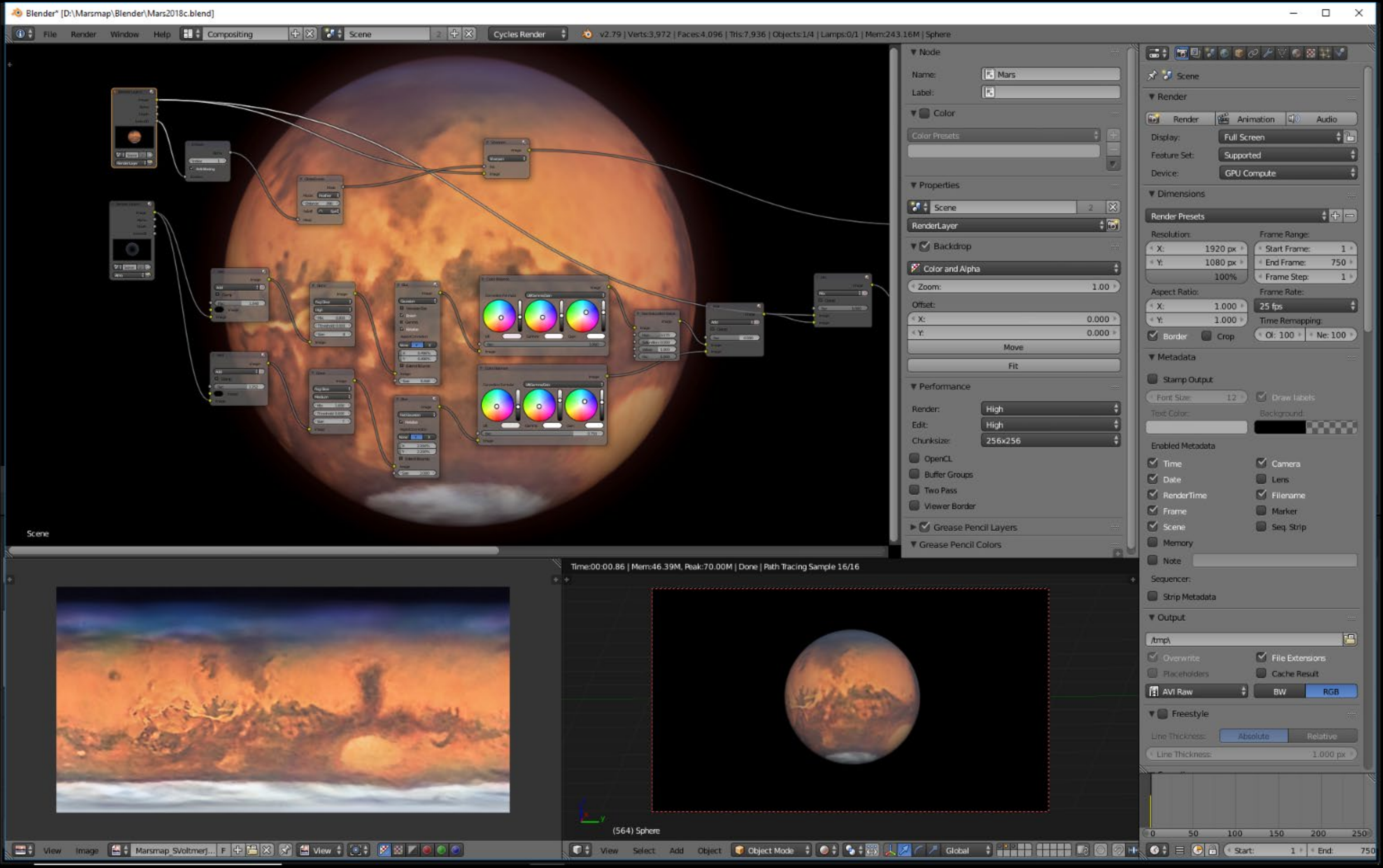
Animating the Map



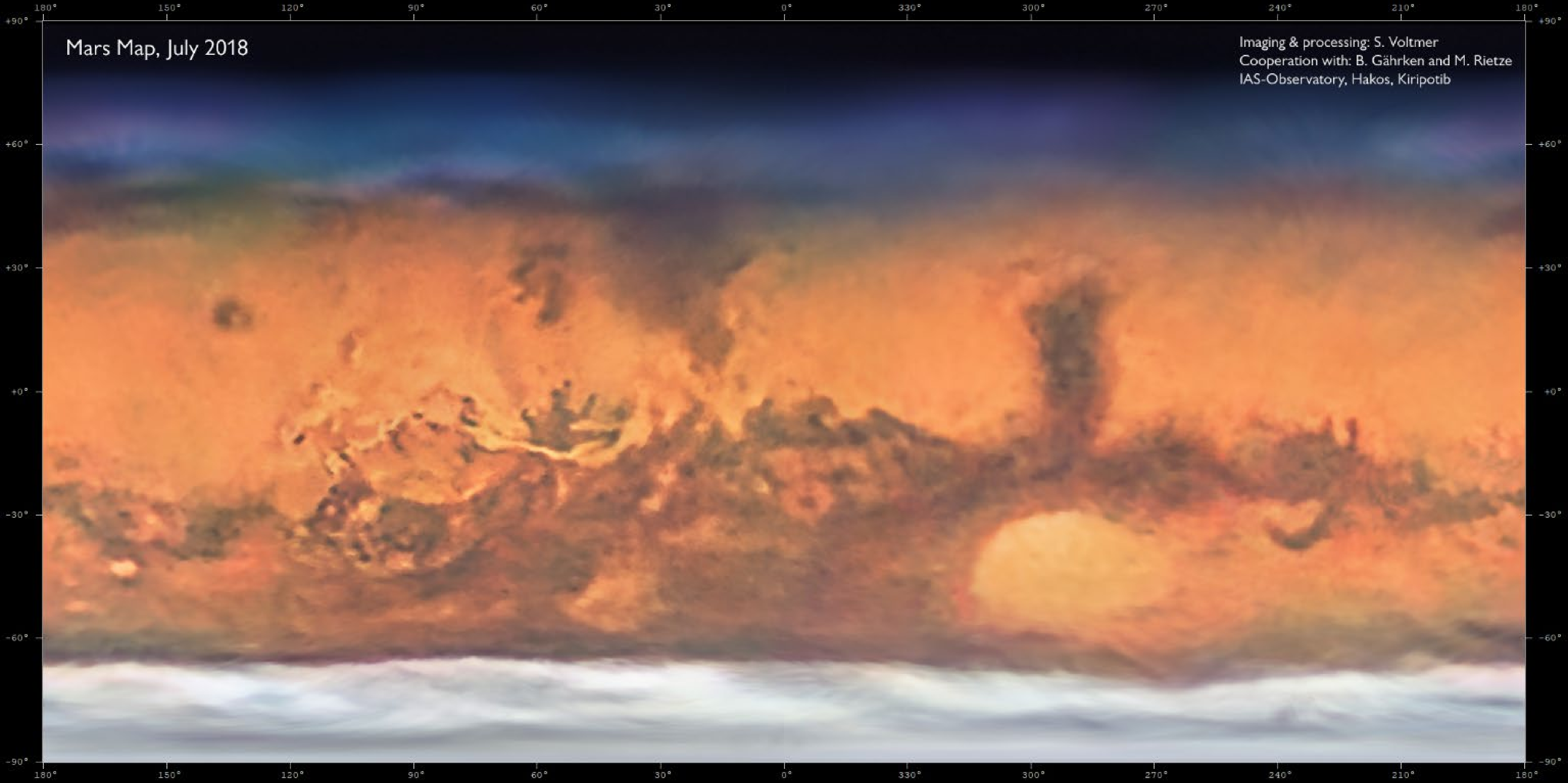


Effect CC Sphere

Animating the Map



Animating the Map


Mars Map, July 2018
Imaging & processing: S. Voltmer
Cooperation with: B. Gährken and M. Rietze
IAS-Observatory, Hakos, Kiripotib
180° 150° 120° 90° 60° 30° 0° 330° 300° 270° 240° 210° 180°
+90° +60° +30° +0° -30° -60° -90°

www.astrofilm.com

www.space-movie.com

www.weltraum-atelier.de