The Lunar Observer

A Publication of the Lunar Section of ALPO

David Teske, editor
Coordinator, Lunar Topographic Studies Section Program

August 2023

In This Issue

Online readers, click on images for hyperlinks

Lunar Reflections

Hoping all of out readers have had a positive month. As I write this, The ALPO has just finished up another great Zoom conference. Though all of us rather long for an in person conference, this fourth year of virtual conference shows that we can get attendees from across the globe that we could not have with an in person conference. It was really great to see ALPO members, some nearby and some far-flung during the conference. All of the talks were very interesting. The lunar section of ALPO was well represented with talks from Alberto Anunziato about observing wrinkle ridges, Tony Cook about imaging in near IR and myself about observing lunar swirls. Many thanks to all who contributed to the ALPO conference.

I hope that you enjoy this current issue of *The Lunar Observer*. Inside, you will see lunar topographic expeditions by Alberto Anunziato and Rik Hill, along with a study of the Theophilus and Mare Nectaris region by Jeff Grainger. KC Paul of Hong Kong presents a fascinating article about Plato and its shadows. As always, Tony Cook presents interesting articles about Lunar Geologic Change and Buried Basins and Craters. Along with that, there are many beautiful images and drawings of lunar topography contributed by 14 observers across the planet. Many thanks for all who contributed.

Please remember to follow the future Focus-On topics and gather observations of these features. Next up is the very interesting Floor-Fractured Craters. Observations are due to Alberto and myself by August 20, 2023.

August 2023 brings two Full Moons (Blue Moon!) plus the supermoon! Lunar Observers, be ready for silly questions!

Clear skies,
-David Teske

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Lunar Topographic Studies

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Observations Received

Name	Location and Organization	Image/Article
Alberto Anunziato	Paraná, Argentina, SLA	Article and images *The Topography of a Nameless Wrinkle Ridge in Mare Imbrium, The Three Central Peaks of Letronne (In the Center or Dorsa Rubey) and Rima Hyginus in the Terminator.*
Jairo Chavez	Popayán, Colombia	Images of Copernicus, Tycho, Waxing Gibbous Moon (4), Full Moon, Waning Gibbous Moon, Waxing Crescent Moon (2) and First Quarter Moon.
Maurice Collins	Palmerston North, New Zealand	Images of Tycho, Aristarchus, Full Moon (2), Theophilus, Abenezra, Agrippa, Ariadaeus, Janssen, Lacus Mortis, Plinius, 6.5-day old Moon (2), 16-day-old-Moon, 18-day old Moon 8.6-day old Moon, Aristoteles, Sinus Iridum, Millichius, Plato, Gassendi and 10.6-day old Moon.
Massimo Dionisi	Sassari, Italy	Images of Atlas (2), Fracastorius, Yerkes, de la Rue, Sinus Amoris, Cauchy (2), Posidonius, Mons Pico, Montes Teneriffe, Plato, Rupes Recta, Clavius, Aristarchus and Reiner Gamma.
Nick Evetts, FRAC	Bedfordshire, UK	Image of the waxing gibbous Moon.
István Zoltán Földvári	Budapest, Hungary	Drawings of Manilius, Montes Caucasus, Mons Hadley, Guericke, Flammarion, Anaximander, Cavendish, Gassendi, Palmieri and Mons Hansteen.
Jeff Grainger	Cumbria, UK	Article and 9 images Theophilus Nectaris Region Overview
Marcelo Mojica Gundlach	Cochabamba, Bolivia	Image of Gassendi.
Rik Hill	Loudon Observatory, Tucson, Arizona, USA	Article and image *Nectarian Nectar*.

Many thanks for all these observations, images, and drawings.

Lunar Topographic Studies

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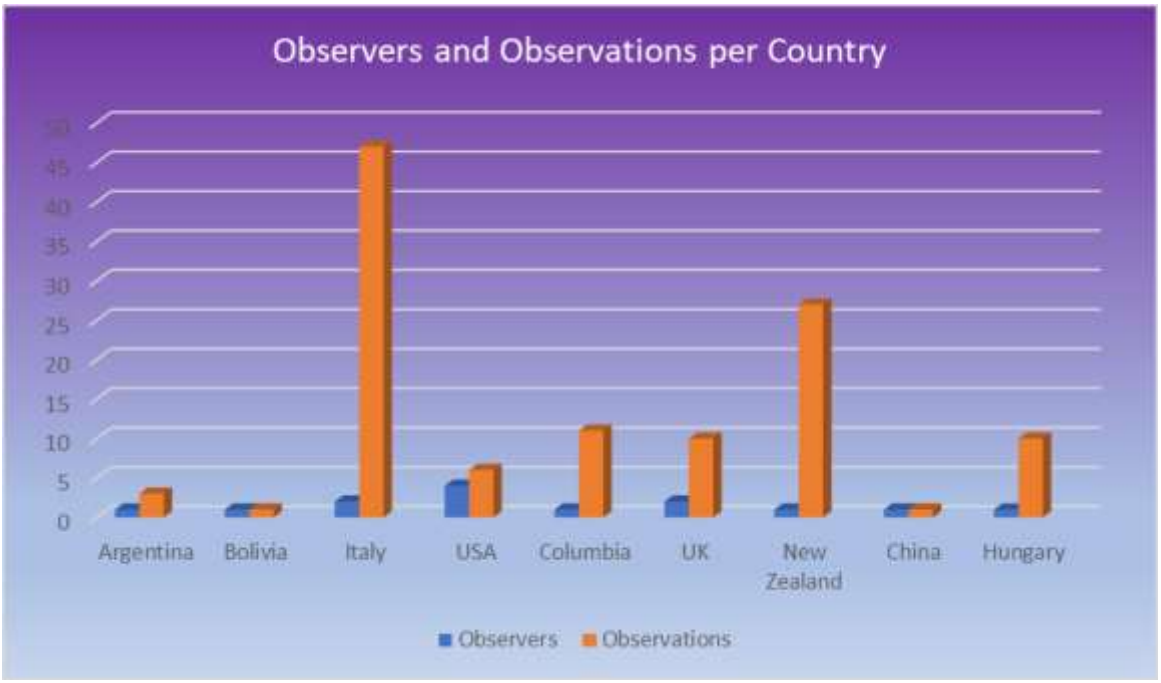
Observations Received

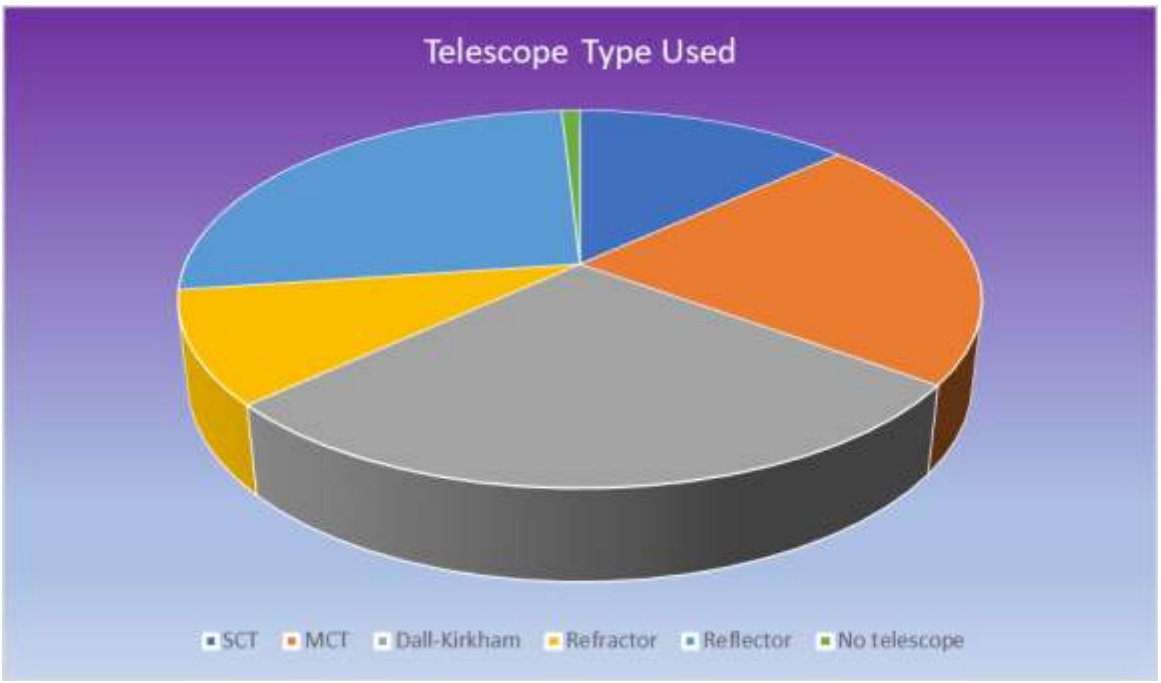
Name	Location and Organization	Image/Article
KC Pau	Hong Kong, China	Erratum and article *Plato Hook Shadow is Real.*
Gregory Shanos	Sarasota, Florida, USA	Image of Montes Apenninus.
David Teske	Louisville, Mississippi, USA	Image of Gassendi.
Larry Todd	Dunedin, New Zealand	Images of Kepler, Clavius, Schiller, Mare Frigoris and Gassendi.
Fabio Verza	Milan, Italy, SNdR	Images of Cassini, Eratosthenes (2), Lassell, Flammarion, Archimedes, Mons Pico, Plato (2), Rupes Recta, Ptolemaeus, Boussingault, Aristoteles, Albategnius, Janssen, Mons Piton, Maurolycus, Montes Caucasus, Piccolomini, Mare Vaporum, Reichenbach, Theophilus, Meton, Bullialdus, Clavius, Copernicus (2), North Pole, Nonius, Pitatus
Paul Walker	Middlebury, Vermont, USA	Images of Tycho and Clavius, Eastern Mare

Many thanks for all these observations, images, and drawings.

August 2023 *The Lunar Observer*
By the Numbers

This month there were 116 observations by 14 contributors in 9 countries.





Lunar X and V Visibility 2023

Submitted by Greg Shanos

Table 4.3 Lunar X and Lunar V Visibility Timetable

	2023
Jan	29; 00:37
Feb	27; 15:02
Mar	29; 04:59
Apr	27; 18:10
May	27; 06:28
Jun	25; 18:02
Jul	25; 05:07
Aug	23; 16:07
Sep	22; 03:26
Oct	21; 15:27
Nov	20; 04:23
Dec	19; 18:16

Note: The dates and times listed are based on calculations made with the Lunar Terminator Visualization Tool (LTVT) by Jim Mosher and Henrik Bonda. This useful freeware program may be downloaded from https://github.com/fermigas/ltvt/wiki.

The Topography of a Nameless Wrinkle Ridge in Mare Imbrium

Alberto Anunziato

It has been a very cloudy winter in my region, I think that I have not been able to observe the Moon for almost two months, so there is nothing left but to enjoy the images of better times. In IMAGE 1 we have the complete panorama of the region, from Mare Imbrium to the vicinity of the North Pole. The wrinkle ridge that we are going to analyze is in the area marked by a red circle, it can be seen that it is not so prominent. Wrinkle ridges are not usually prominent in widefield images, and when we got this image, it wasn't the selenographic feature we had in mind to portray (it was probably Plato). But when the camera is good, it is possible to enlarge the image, in this case by focusing on the area enclosed by the red circle, we can distinguish the morphological components of this nameless wrinkle ridge. IMAGE 2 is a detail of IMAGE 1. We can clearly see the delicate structure of the wrinkle ridge, the two superimposed components: a broad elevation, the arch, and a steeper, narrower elevation, the ridge.

Image 1, Dorsa in Mare Imbrium, *Alberto Anunziato, Oro Verde, Argentina, SLA. 2016 September 10 23:12 UT. Celestron 11 inch Edge HD Schmidt-Cassegrain telescope, QHY5-II camera.*

Image 2, Dorsa in Mare Imbrium, *Alberto Anunziato, Oro Verde, Argentina, SLA. 2016 September 10 23:12 UT. Celestron 11 inch Edge HD Schmidt-Cassegrain telescope, QHY5-II camera. This is a close-up of image 1.*

IMAGE 3 is an enlargement of IMAGE 2 in which we made some notes about two of the wrinkle ridge segments. The red arrows mark the beginning of the arch of the wrinkle ridge, the area in which the slope is gentler, while the blue arrow marks the steep slope, which casts shadows, at the top of which is the crest or crenulated ridge (brightest) and that migrates from one end of the arch to the other in both se comments. The crest is indicated with an orange line, while the arc limits are marked in red.

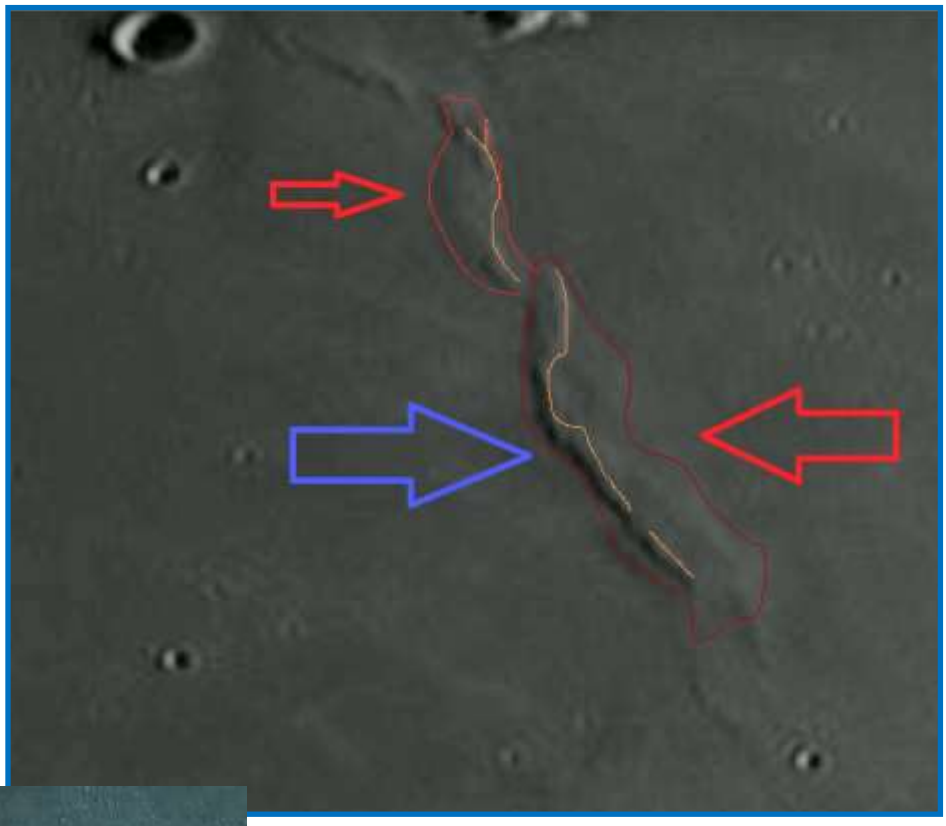
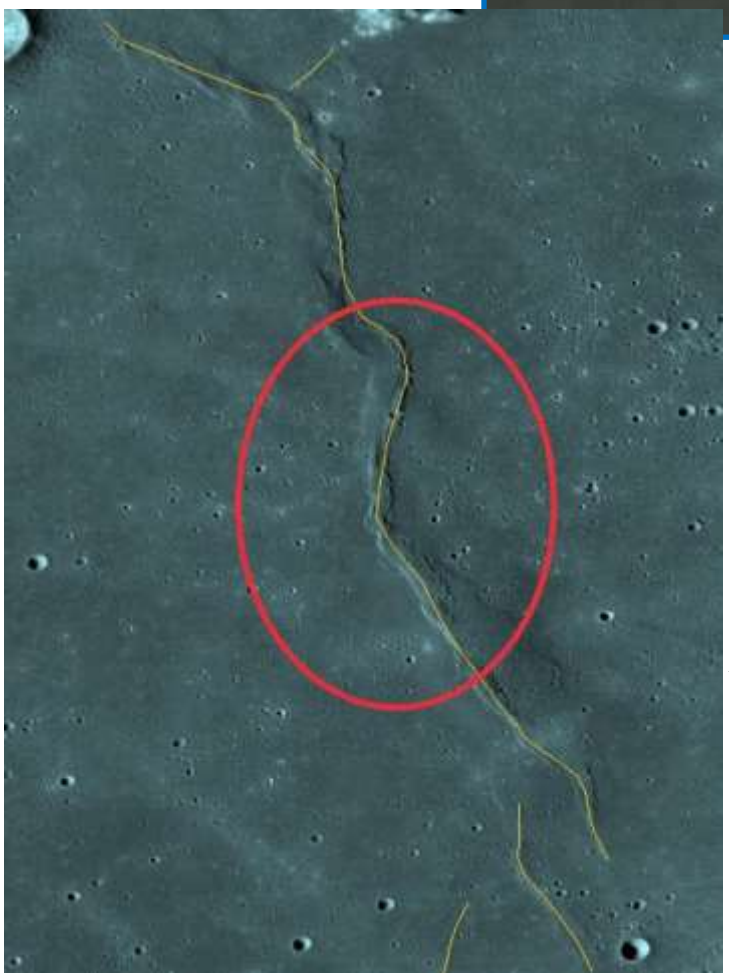


Image 3, Dorsa in Mare Imbrium, *Alberto Anunziato, Oro Verde, Argentina, SLA. 2016 September 10 23:12 UT. Celestron 11 inch Edge HD Schmidt-Cassegrain telescope, QHY5-II camera. This is a close-up of image 1.*



If we turn to the LRO Quickmap, more precisely to its "Map of lunar wrinkle ridges", we see IMAGE 4, which is the area with the marked wrinkle ridge, and IMAGE 5, which allows us to see in detail the two segments that we will analyze. IMAGE 6 is the relief of the second segment, the southern segment, using the LOLA Lunar Orbiter Laser Altimeter of the LRO Quickmap. We see that there is a difference between the two contact zones of the wrinkle ridge with Mare Imbrium, the left (west) shore is lower than the right (east), the west slope is steeper, and we can see the relief of the ridge in its upper part, while the slope on the right is much smoother.

Image 4, Dorsa in Mare Imbrium*, LRO Quickmap Map of lunar wrinkle ridges.*

Lunar Topographic Studies
The Topography of a Nameless Wrinkle Ridge in Mare Imbrium

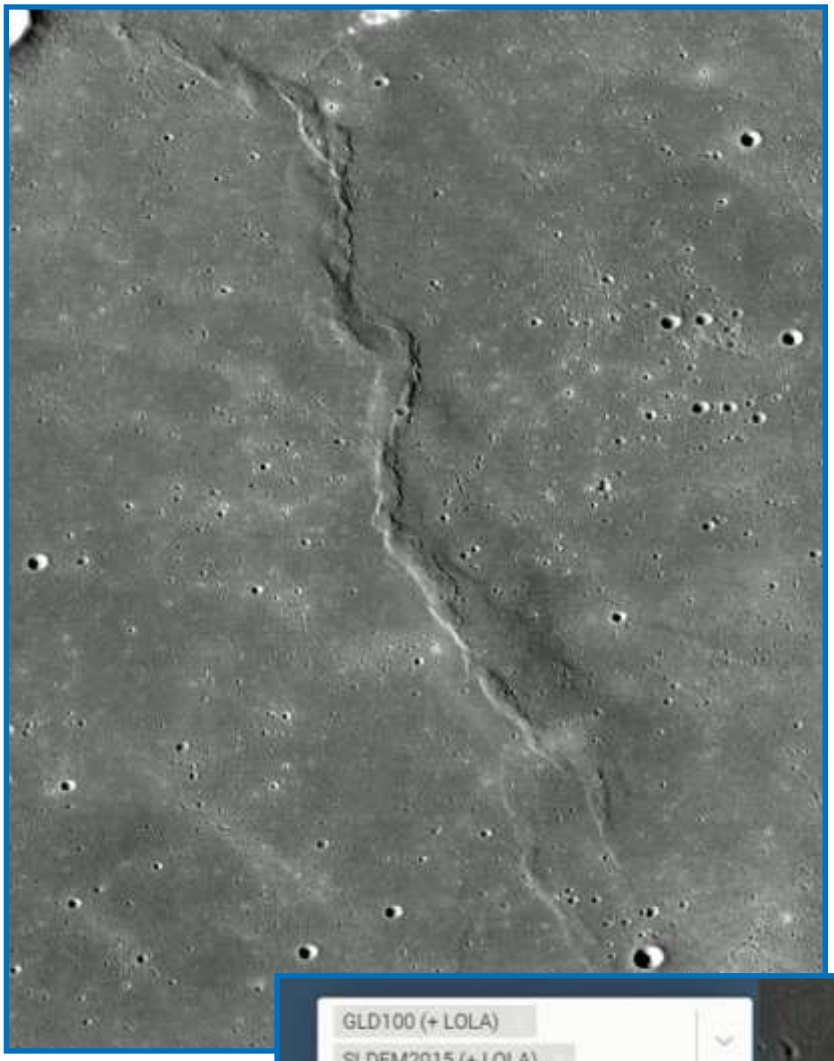


***Image 5, Dorsa in Mare Imbrium**, LRO Quickmap Map of lunar wrinkle ridges.*

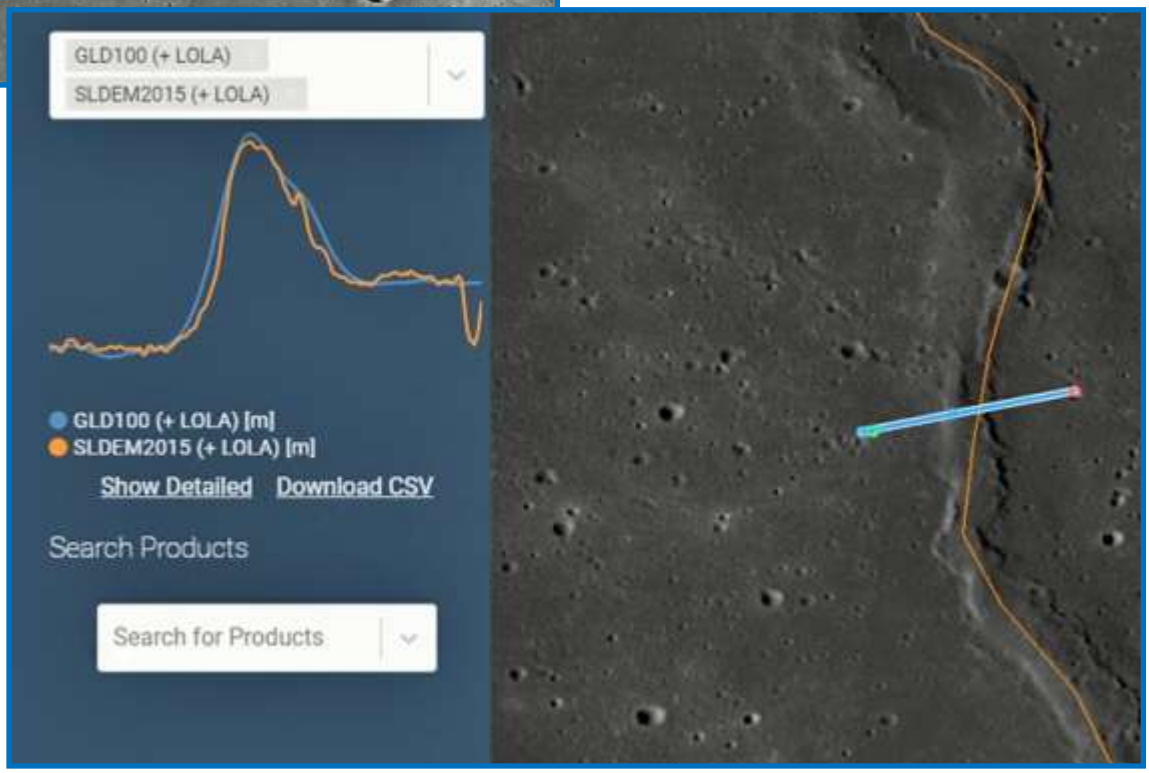


***Image 6, Dorsa in Mare Imbrium**, The relief of the second segment, the southern segment, using the LOLA Lunar Orbiter Laser Altimeter of the LRO Quickmap.*

Lunar Topographic Studies
The Topography of a Nameless Wrinkle Ridge in Mare Imbrium

The Three Central Peaks of Letronne (In the Center of Dorsa Rubey)

Alberto Anunziato

Browsing through Kwok C. Pau's Photographic Lunar Atlas for Moon Observers is always a delight, I was doing so to find examples of complex wrinkle ridges typologies, intended for my presentation at the 2023 ALPO Conference. IMAGE 1, a clipping from page 354 of Volume 2, impressed me immediately, for the same reason it will have impressed you: three bright areas casting long shadows in the center of a ridge. My first, slightly wild, hypothesis is that it could be an example of an unusually high crest, or rather, three areas of the crest that would have a second crest superimposed on the first. Let us remember that the components of a wrinkle ridge are superimposed platforms: a wide arch on which a steep and high crest appears and, in this case, a second crest on top of the first, which would have been in three areas of the first crest. Well, it was a mistake, the product of concentrating attention on what I was looking for (crest on crest) instead of looking at the whole in perspective. My first step was to go to the Lunar Reconnaissance Orbiter Quickmap to do a height measurement, and I come across IMAGE 2, the orange lines are the segments marked by the Map of Wrinkle Ridges. We see that they exclude the three heights, which would not be part of Dorsa Rubey, so, as I confirmed by going to the wonderful Lunar Astronautical Charts, especially the LAC Chart 75 Letronne, IMAGE 3 is a detail, they are not the highest points of the crest but heights similar to what remains of the walls of the flooded Letronne crater.

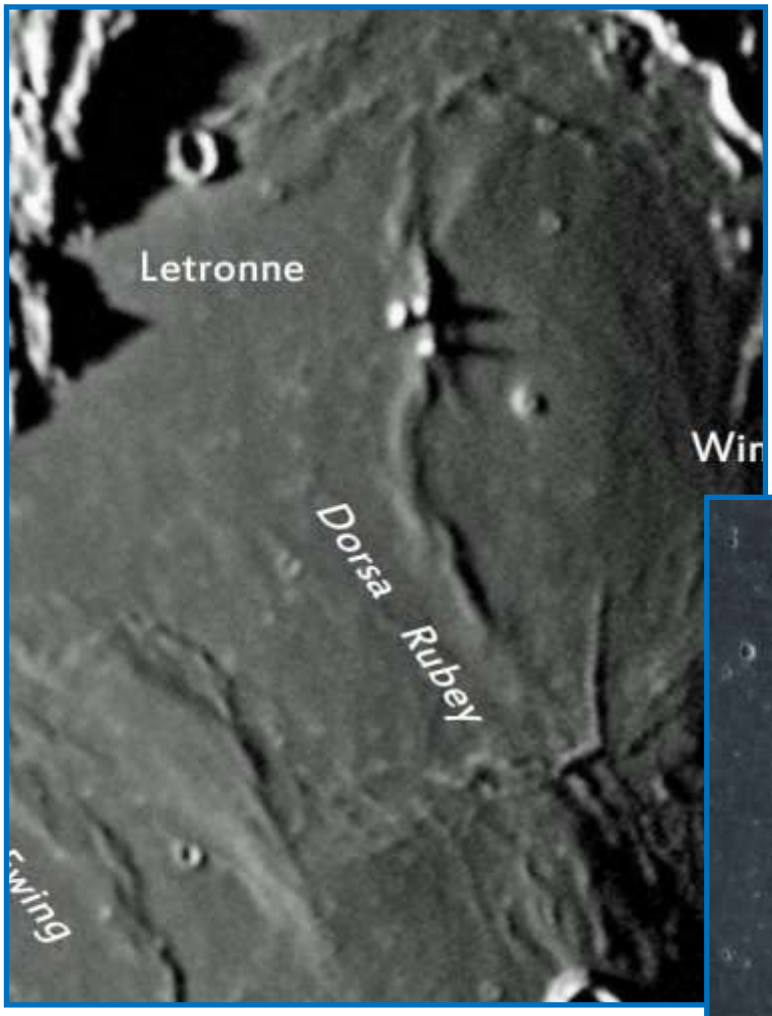


Image 1, Dorsa Rubey, *from Photographic Lunar Atlas for Moon Observers, Volume 2, page 354 by Kwok C. Pau. North is down, west is right.*

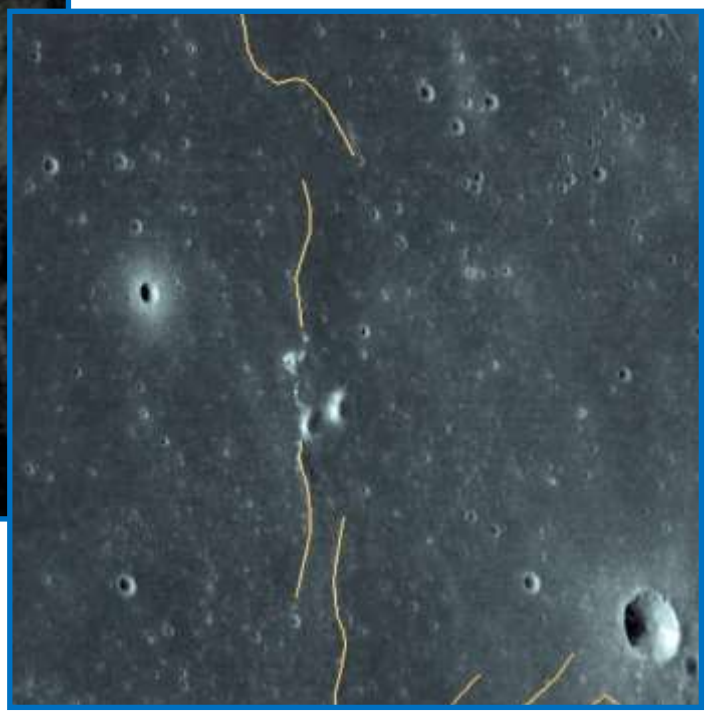


Image 2, Dorsa Rubey, *LRO, Map of Wrinkle Ridges.*

***Image 3, Letronne and Dorsa Rubey**, LAC chart 75.*

And if we go to the bibliography, we confirm that "Dorsa Rubey (100 km), a component of which reaches across the mare to the small group of hills that arcs the remnants of the central elevation of Letronne (119 km)" (Peter Grego, The Moon and How to Observe It, page 187). Well, if I had read Grego or another author, I wouldn't have bored you, but I found it interesting to tell you about my search, always based on observation (which is a faculty that is trained in this way). Letronne is located in a fascinating area but it deserves more detailed observation, in a quick search I found only two images in which Dorsa Rubey appears, although in both Gassendi is the lighthouse that dazzles the observer with its beauty, so only the images of David Teske and Marcelo Mojica allowed us to enlarge them and have a certain image of the three central peaks of Letronne (or what remains of them) in the center of Dorsa Rubey. In David Teske's IMAGE 4 our area appears almost in the exact center, the detail is IMAGE 5, in which we see Letronne, a kind of bay shaped by what was left of the crater after the lava flood. The crater in the lower right of Letronne is Letronne B (7 km diameter). The bright spot that we see to the left of the central peaks is a small crater, the name of which I have not been able to find, and which must be very recent. Now, don't you think that the peak on the right, that is, the one to the east, looks like a crater?

***Image 4, Gassendi**, David Teske, Louisville, Mississippi, USA. 2021February 24 01:49 UT, co-longitude 52.3°. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI120mm/s, seeing 8-9/10.*

Lunar Topographic Studies
The Three Central Peaks of Letronne (In the Center of Dorsa Rubey)

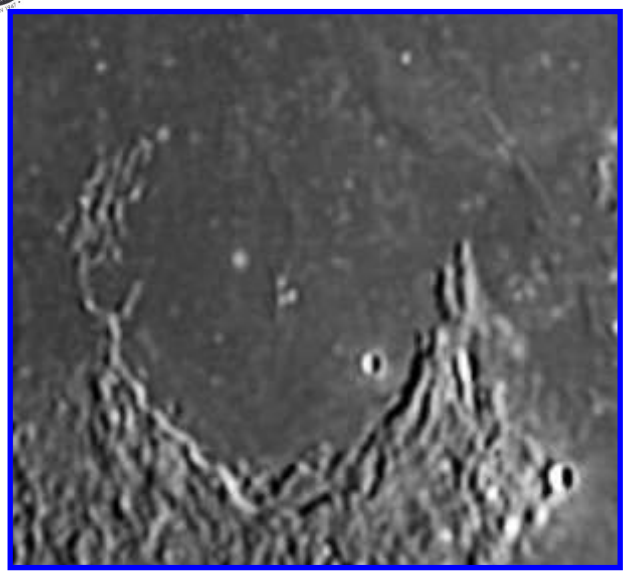


***Image 5, Gassendi**, David Teske, Louisville, Mississippi, USA. 2021February 24 01:49 UT, colongitude 52.3°. 4 inch f/15 refractor telescope, IR block filter, ZWO ASI120mm/s, seeing 8-9/10. Close-up of image 4.*

In the other image of the area, which is by Marcelo Mojica, IMAGE 6, our area is on the left edge. If we go into detail (IMAGE 7), the sensation is the same: there is a pareidolia of a crater, a not so unusual phenomenon, favored by the shadow in the lower area of the eastern peak, which does not have a simple explanation, since the shadow is towards the opposite side, like the other two peaks and even on the eastern peak itself. Checking the LRO Quick Map, with the data from the LOLA altimeter, I did not find any difference in relief in the area that would explain the anomalous shadow. It would be interesting to visually observe this area.

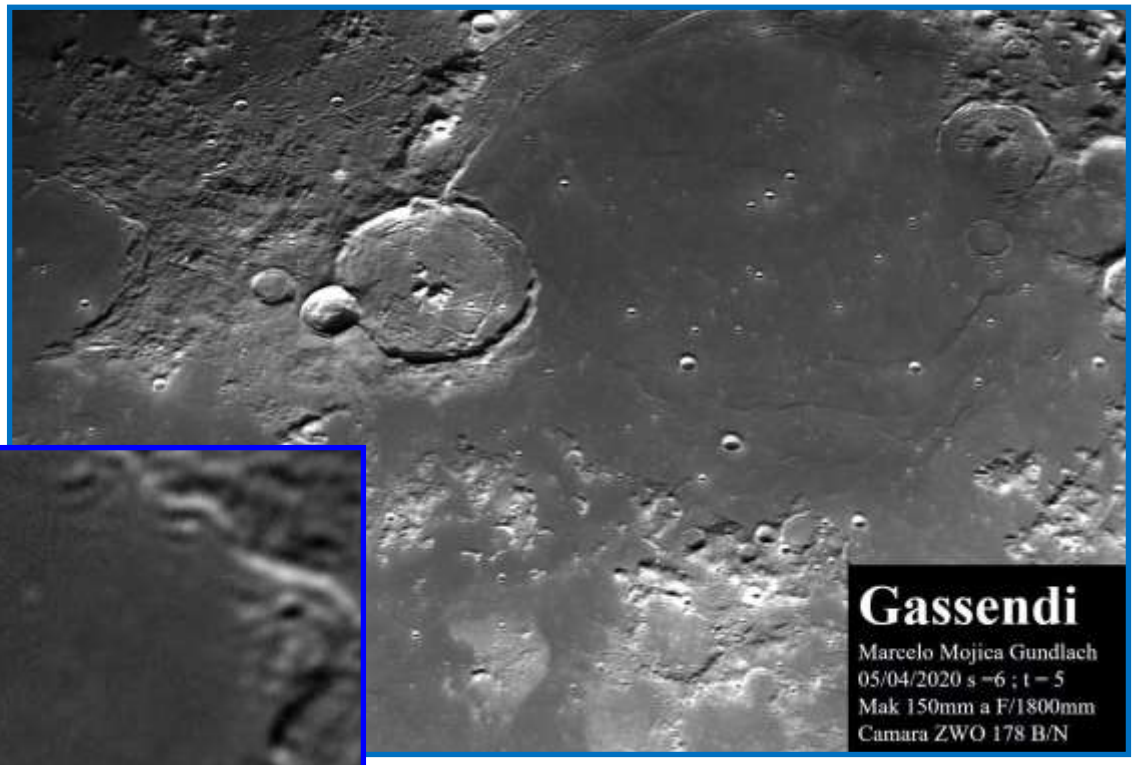


***Image 6, Gassendi**, Marcelo Mojica Gundlach, Cochabamba, Bolivia. 2020 May 04 23:30 UT. 150 mm Sky Watcher Maksutov-Cassegrain telescope, ZWO ASI178 B/W camera. Seeing 6/10, transparency 5/6. North is left, west is down.*

***Image 7, Gassendi**, Marcelo Mojica Gundlach, Cochabamba, Bolivia. 2020 May 04 23:30 UT. 150 mm Sky Watcher Maksutov-Cassegrain telescope, ZWO ASI178 B/W camera. Seeing 6/10, transparency 5/6. North is left, west is down. This is a close-up of image 6.*

Lunar Topographic Studies
The Three Central Peaks of Letronne (In the Center of Dorsa Rubey)

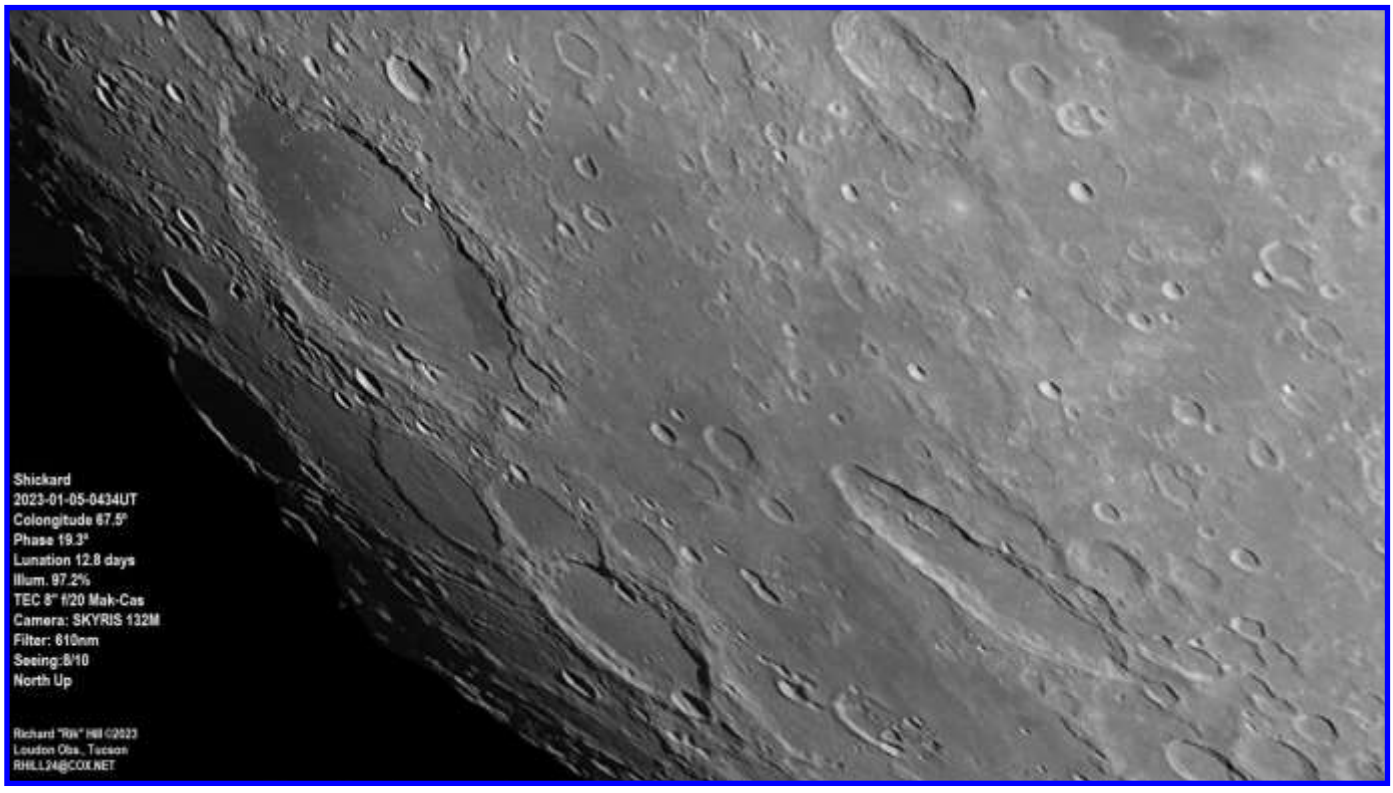
Nectarian Nectar

Rik Hill

The grand crater to the upper left from center is Shickard (184 km dia.) the largest crater in this image, what we used to called "walled plains". It is a very ancient crater of "pre-Nectarian" age some 3.9-4.5 billion years old. Another crater is on the opposite side of the image, in the lower right looking like a giant footprint. This is Schiller (179 x 71 km), a little younger than Shickard being "Nectarian", 3.85-3.92 billion years old. It is the combination of at least two impacts with a curious ridge running down the center of the north half. There is a beautiful flyover video from Lunar Reconnaissance Orbiter online that shows these features in startling detail. I recommend it to all lunar aficionados.

But this region boasts several more magnificent craters. At the top of this image is another odd "crater" the pear-shaped crater Hainzel (70 km) formed from several overlapping impacts. The northernmost and sharpest crater is Hainzel A with strange terracing on its inner walls almost to the center of the crater. The smaller lobe -like feature to the south is Hainzel C with flooding to the north where it shares a border with Hainzel A. Hainzel itself is the large depression on which these two sit. It is best seen below the first two craters and is much older (Nectarian) and heavily eroded by the younger impacts.

Below center is the large walled plain, Phocylides (117 km) another Nectarian crater but look at the odd plateau just above it. This is the crater Wargentin (87 km) also Nectarian (seeing a pattern here?) that filled with lava after it had cooled and then that solidified as well. But why this did not happen at other craters nearby that are the same age is an intriguing question that still has not been answered.



Schickard, *Richard Hill, Loudon Observatory, Tucson, Arizona, USA. 2023 January 05 04:34 UT, colongitude 67.5°. TEC 8 inch f/20 Maksutov-Cassegrain telescope, 610 nm filter, SKYRIS 132M camera. Seeing 8/10.*

Rima Hyginus in the Terminator

Alberto Anunziato

Rima Hyginus is one of the most beautiful selenographic features, there is no doubt. It is a wonderful example, visible with small telescopes, of surface phenomena related to volcanism on the Moon. The singularity of the observation that I share is the unusual appearance that this area presents when the terminator passes close by, more exactly on the left edge of IMAGE 1. Unfortunately, the drawing does not do justice to the observation, so I will try to be a little more specific. The whole area was very dark, but there were clearly different shades in the shadows. The Rima was very lightly hinted at, with a very muted glow. Of course, the resolution of my telescope was not enough, with shadows, to observe the secondary craters.

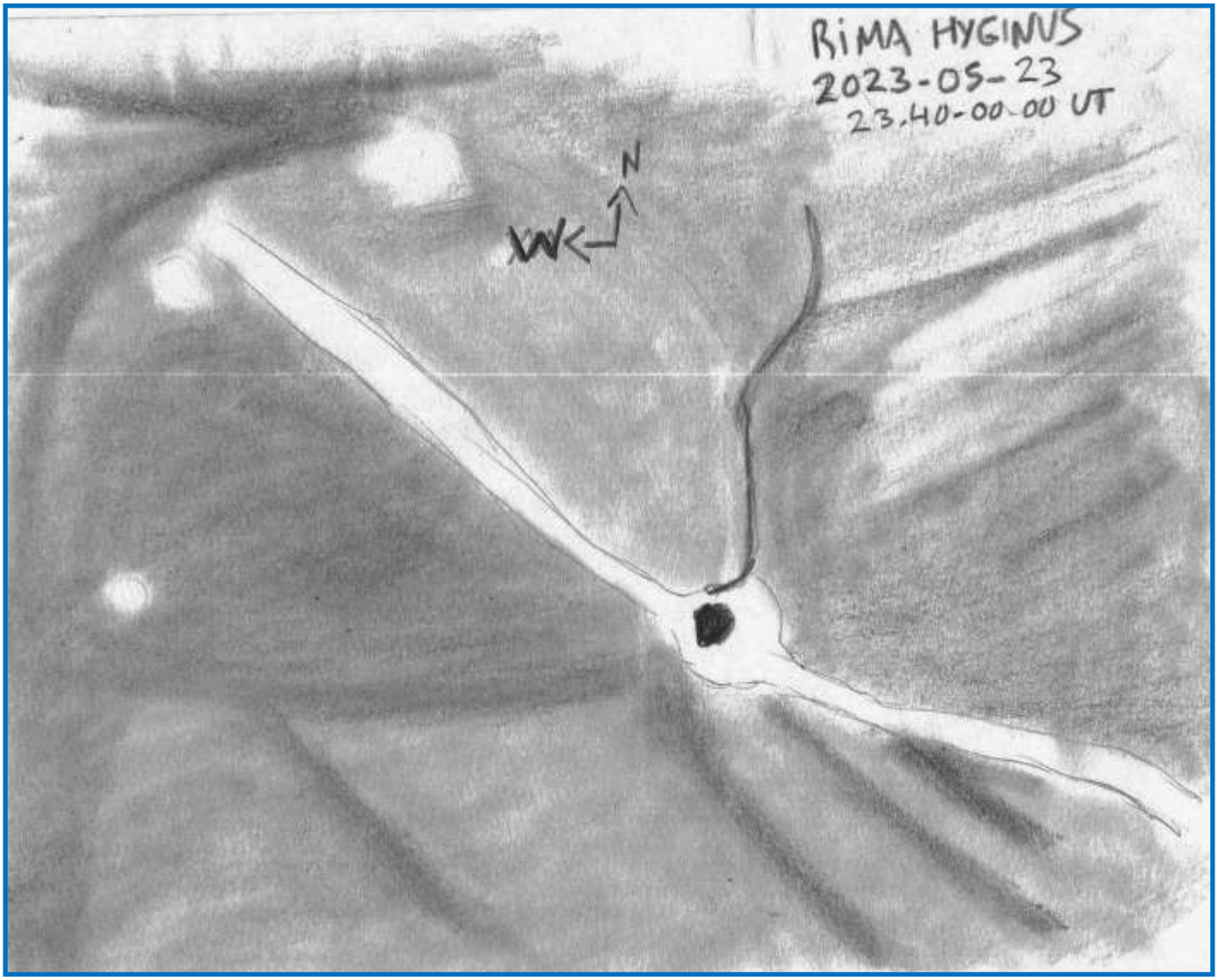


Image 1, Rima Hyginus, *Alberto Anunziato, Paraná, Argentina, SLA. 2023 May 23 23:40-00:00 UT. Meade EX105 Maksutov-Cassegrain telescope, 154x.*

The only bright areas were the contour of Hyginus and three points to the west which, if we look at IMAGE 2 (taken from the LRO Quickmap), would be high areas of the relief close to the area of Rima Hyginus itself. What is truly interesting is that the area seemed to be located in a concavity of the terrain, like a hollow, to the south there seemed to be some darker shadows, shadows upon shadows, which could be elevations, to the northeast the terrain became clearer as we moved away from the Rima Hyginus seemed to be the center of a quadrant, divided by rhyme. The northeast area gave the impression of being a small elevation, a slight slope, the southeast area had the shadows that I already mentioned, the northwest area was much lighter than the southwest area, between the northwest and southeast quadrants there seemed to be some kind of separation, as a more defined elevation. Now, if we look at IMAGE 2, nothing I'm describing is discernible. Pretty frustrating. But, once again, Charles Wood came to the rescue (with his "The Modern Moon"): "Peter Schultz, while still a graduate student at the University of Texas, suggested that Hyginus may in fact be a volcanic caldera or collapsed crater (…) Schultz also pointed out that Hyginus is in the center of a 100 km-wide saucer-like depression about 1.5 km. A bottom. Some volcanoes on Earth are similarly centered on broad sags that result when subterranean magma reservoirs empty during volcanic eruptions. But if Hyginus formed by subsidence, where are its volcanic products? One possibility is that an irregular dark patch, seen around the crater at full Moon, consists of volcanic ashes deposits" (pages 58/59). The vision of the whole, behind the eyepiece (although the execution of the drawing failed) was that of a hollow, which does not appear in the images that I know of Rima Hyginus, but which is there, as we see in IMAGE 2, which contains the data of the LOLA altimeter. It is strange that according to LOLA the area to the southwest of Hyginus is shallower than the area to the southeast, but my observation shows that the former is darker than the latter. It is interesting how visual observation with oblique lighting can distinguish features of the relief, especially hollows (or "saucer-like depression") and higher areas, even more clearly than in photography, when the eye gets used to the observation. And it is fascinating to check with theory what was observed in practice. It should have been a little more constant in the observation, and more precise, to try to verify if there really are more pronounced differences in level in the southeast and northeast quadrants.

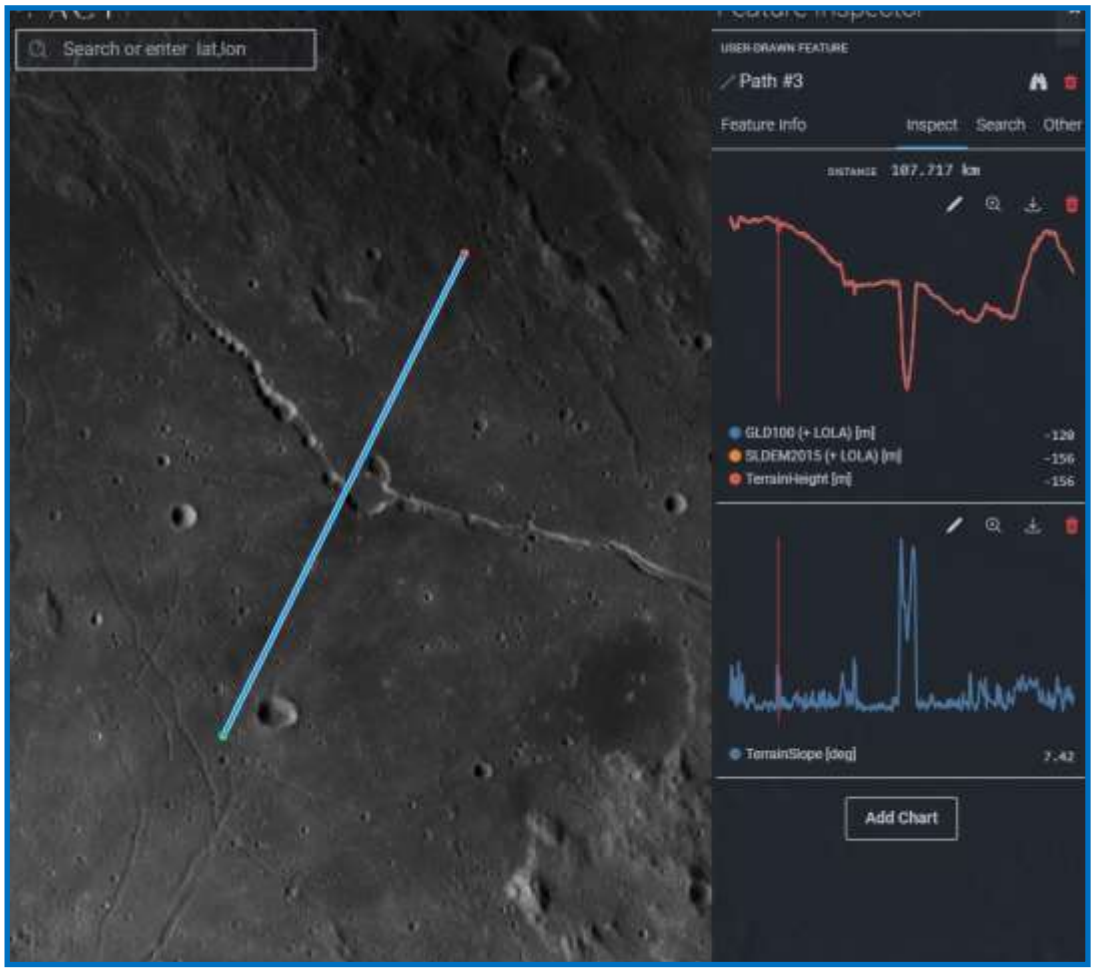
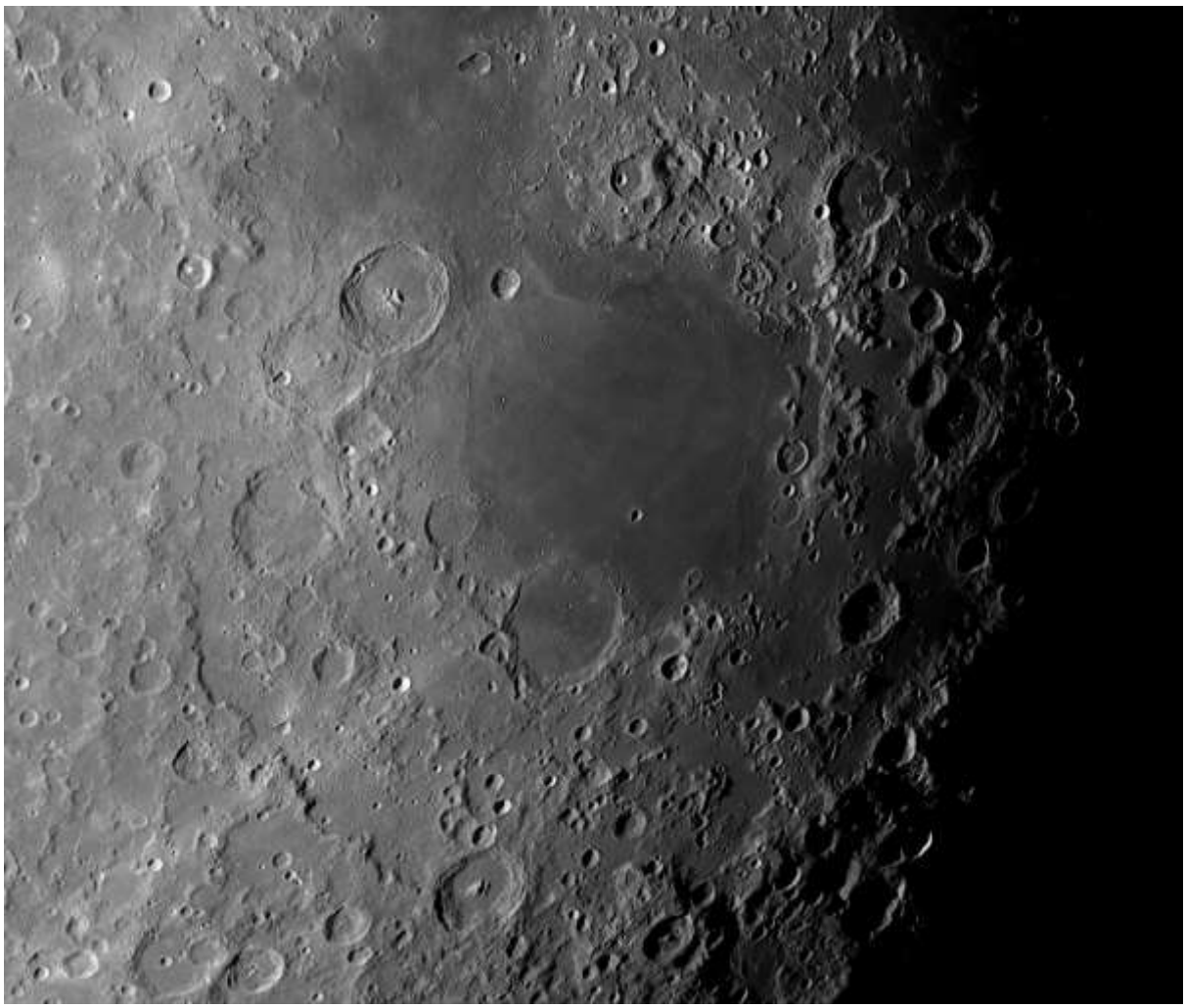


Image 2, Rima Hyginus, *LROC QuickMap.*

Theophilus Nectaris Region Overview

Jeff Grainger

The Mare Nectaris is one of the smaller lunar maria, with a diameter of only ~ 350km (around 200 miles). But it's a spectacular area – one of my favourites – especially because of the crater and mountain structures on the rim of the impact basin.



Nectaris basin: 17.71 days 01.20 UT September 14 2022 [22]

[Altitude: 43*56' Azimuth: 143*58' Libration: 6.5* @ PA 76*]

	Major Craters	Diameter (km)	21C	Duplex	Moore
Theophilus	99	7 C9	13	617	
Cyrillus	98	6 B1	13	161	
Catharina	99	6 B3	13	133	
Fracastorius	121	6 E4	13	224	

Theophilus Nectaris

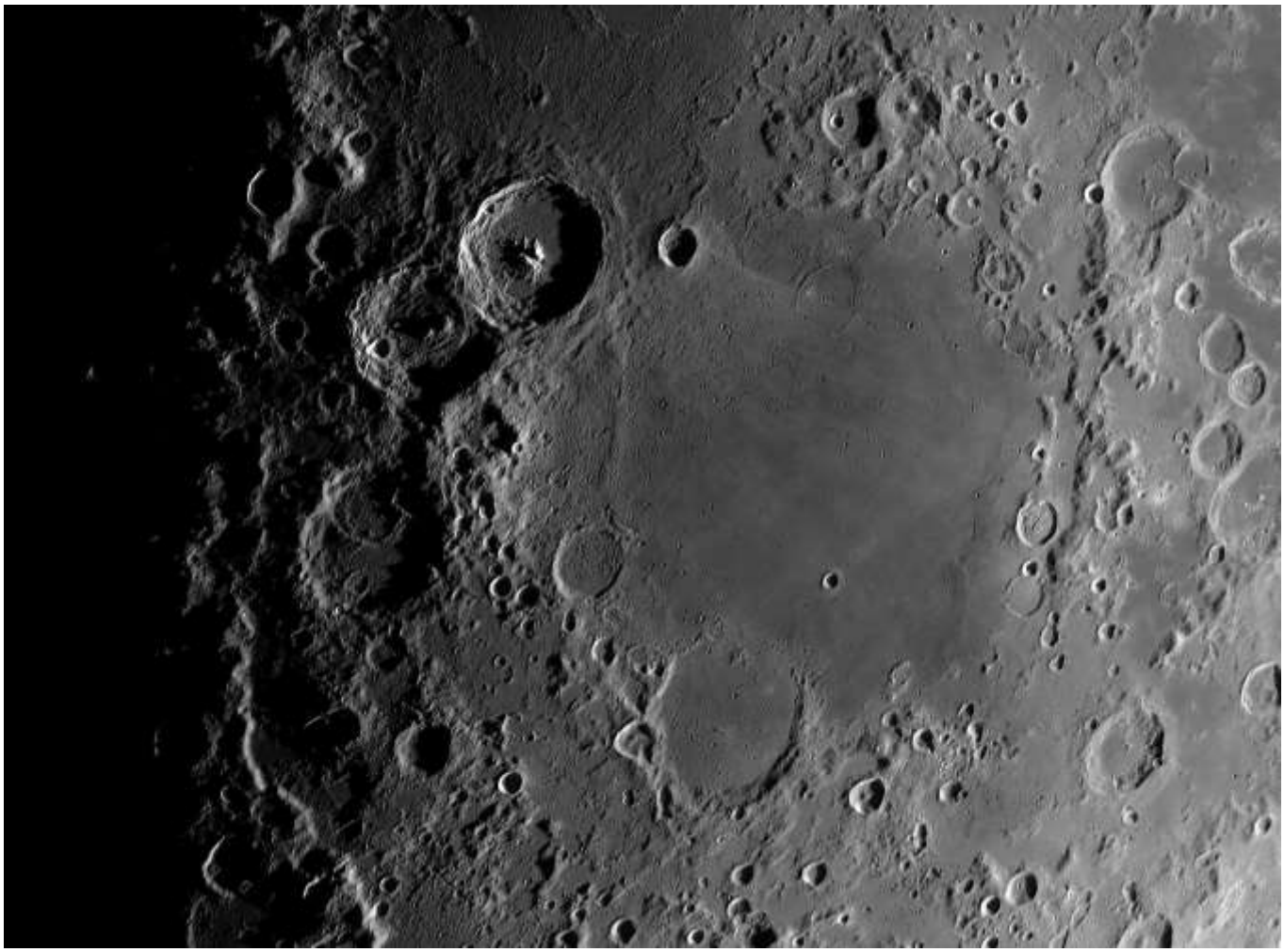
Jeff Grainger

Fellow astronomers who know of my observing/imaging obsession with the Moon have occasionally asked me "what is your favorite part of the lunar surface?" Now that is a VERY tough question to answer as I love exploring around Plato, Archimedes, Clavius and Tycho ….all the usual suspects. But I'd say that, more often than not, my response is "the Mare Nectaris region, especially with the mighty trio of Theophilus, Cyrillus and Catharina".

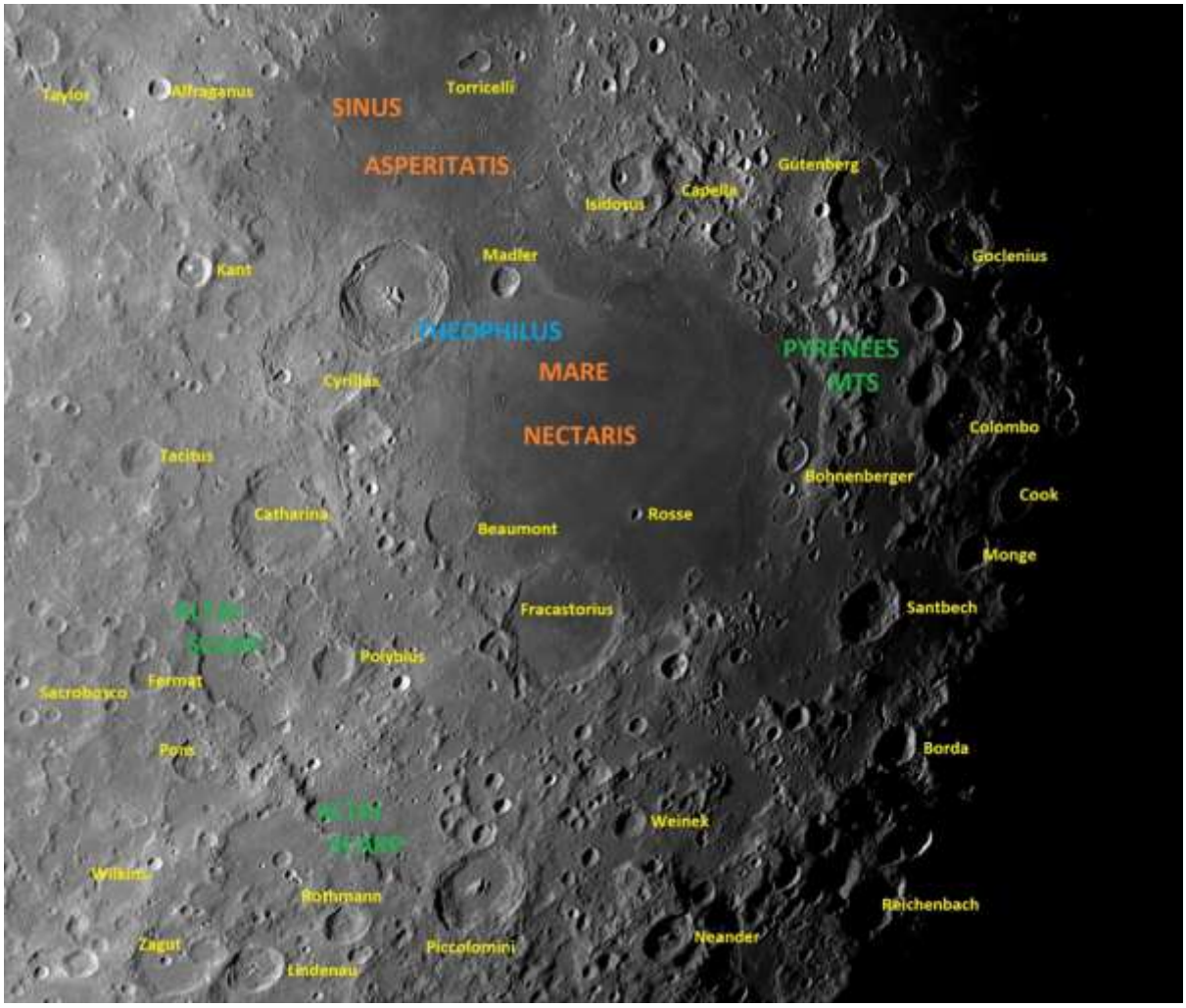
So, here's my take on the Theophilus-Nectaris region over the past year.

All images were taken with a Celestron Edge 11, at principal focus f = 2800mm (f 10) with an ASI 290MM monochrome camera. A 685nm IR filter was also used.

My observatory is in south Cumbria, UK at latitude 54° N. The UK is notably cloudy, but the seeing has been consistently good over the many imaging sessions shown here, with resolution frequently below 1" (craterlets of 1km diameter usually visible).



Lunar Topographic Studies
Theophilus/Nectaris Region Overview



"Jeff 100" {J100}

Theophilus crater

Altai scarp

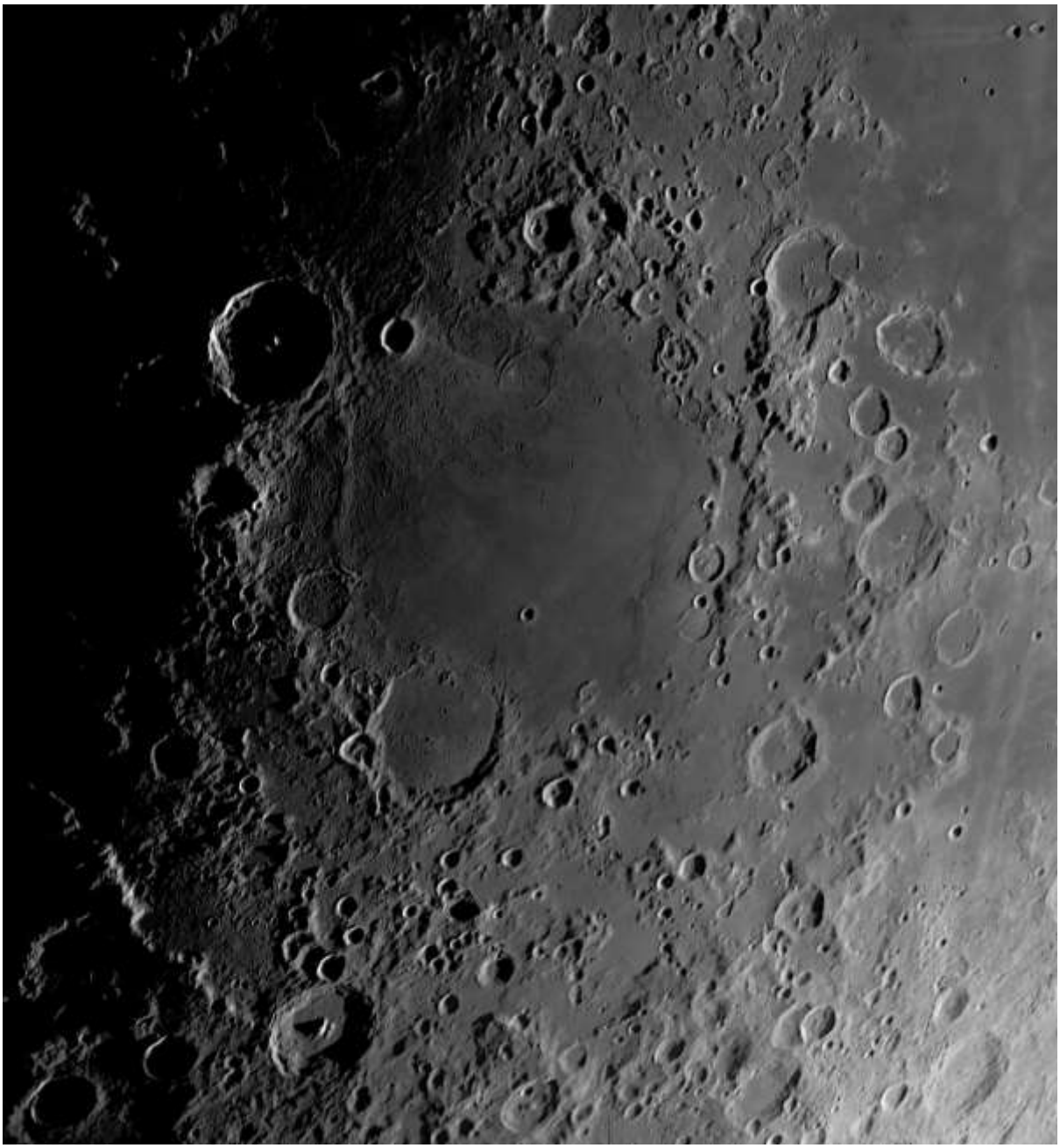
Fracastorius rille

Next page: Theophilus at sunrise, moon's age around 5 days……

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Nectaris Region 1

Mare Nectaris: Diameter ~ 340km Lunar Quadrant: SE Moore ref: FOM 89



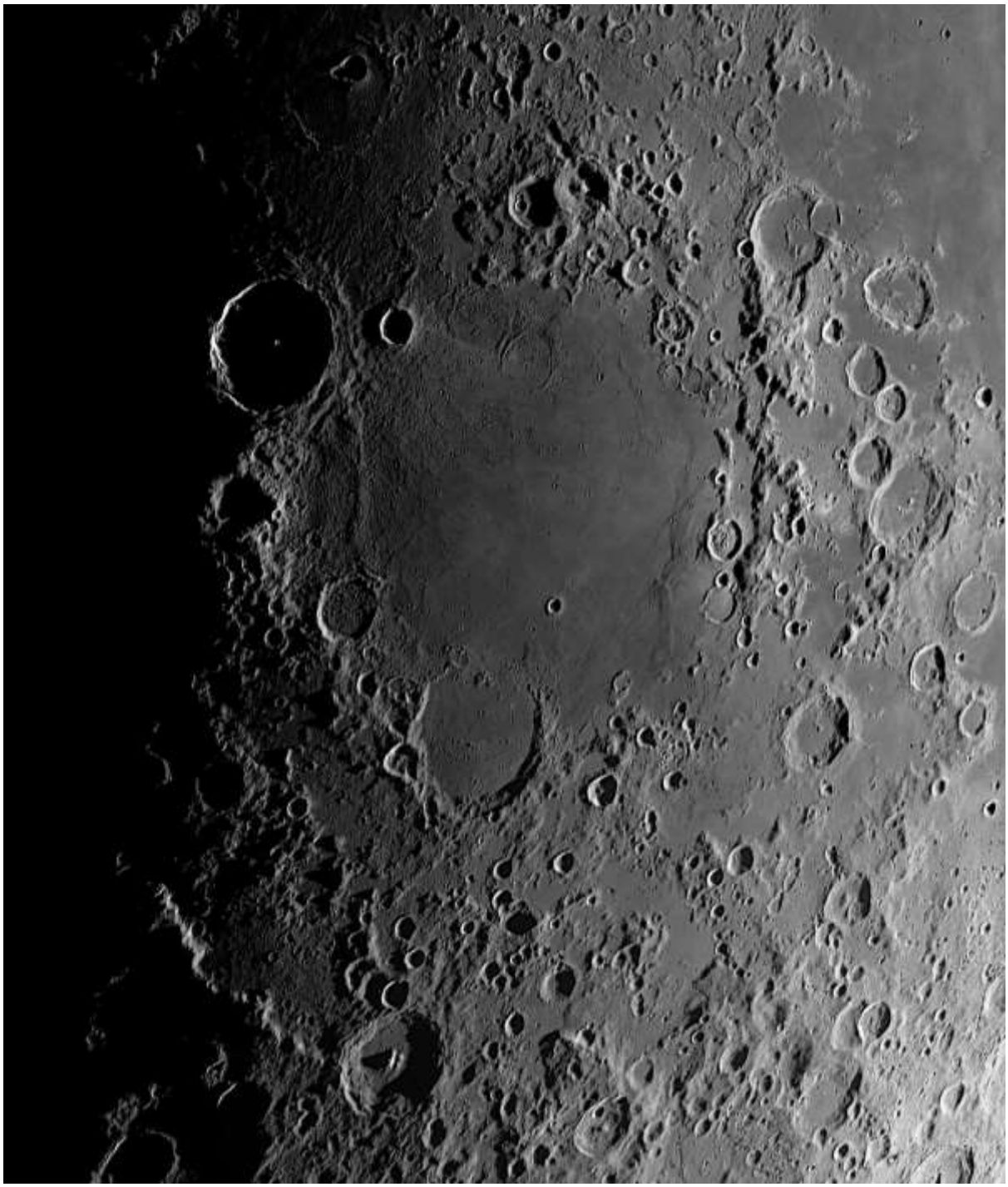
Theophilus and Mare Nectaris: 5.51 days 19.24 UT February 25 2023 [139]

[Altitude: 44*05' Azimuth: 233*00' Libration: 6.8* @ PA 99*]

Theophilus group just emerging from the morning terminator. The ~ 99km diameter Theophilus is around 4.2km deep with a central peak rising to 2.8km [Moore COM 617].

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Nectaris Region 2



Theophilus and Mare Nectaris: 5.67 days 20.18 UT April 25 2023 [158]

[Altitude: 44*27' Azimuth: 254*46' Libration: 6.4* @ PA 156*]

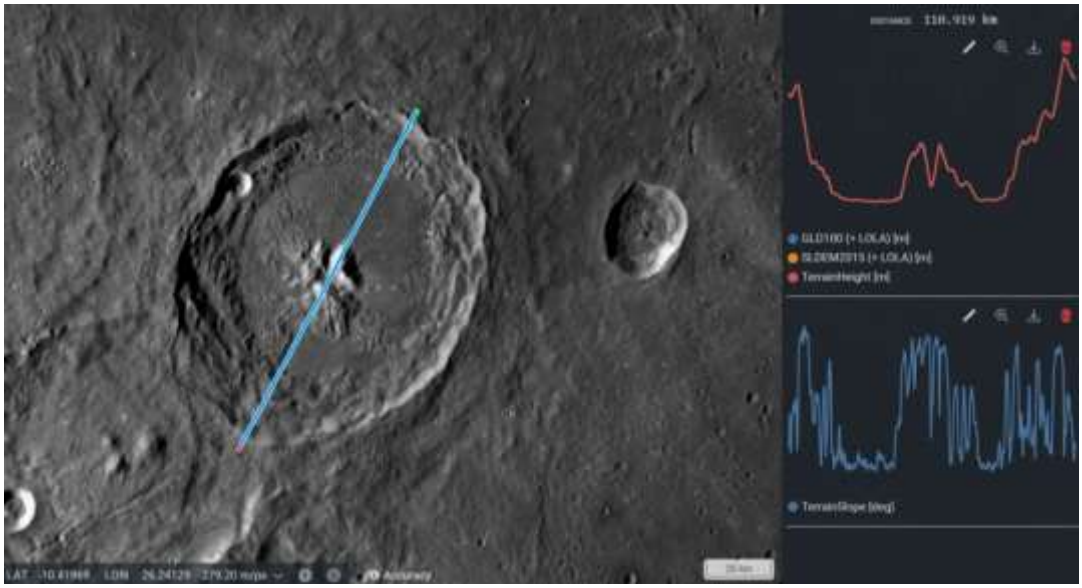
This image is very similar to the one on TNR 1, at near-identical ages, though the shadows are slightly longer here and less of the Theophilus central peak is visible. Caused by the slightly differing librations between the two.

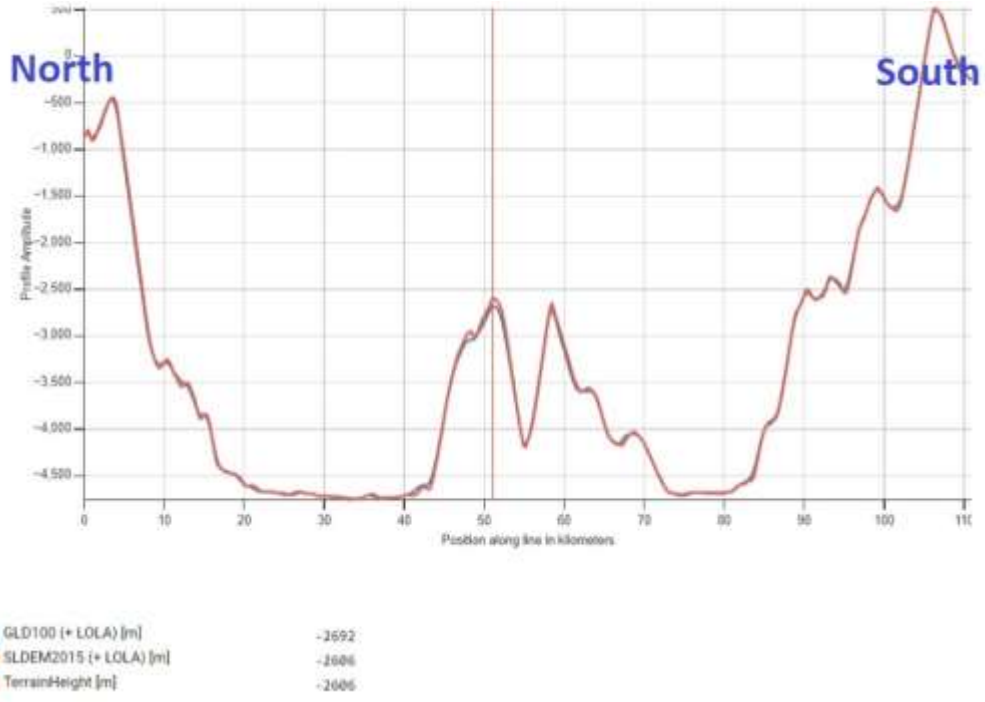
Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Crater Profile:

Using the LROC QuickMap tool developed by Arizona State University (asu.edu), based on LRO laser altimetry data, it's possible to "interrogate" the topography of the region.

Here's a profile of Theophilus, from North to South:

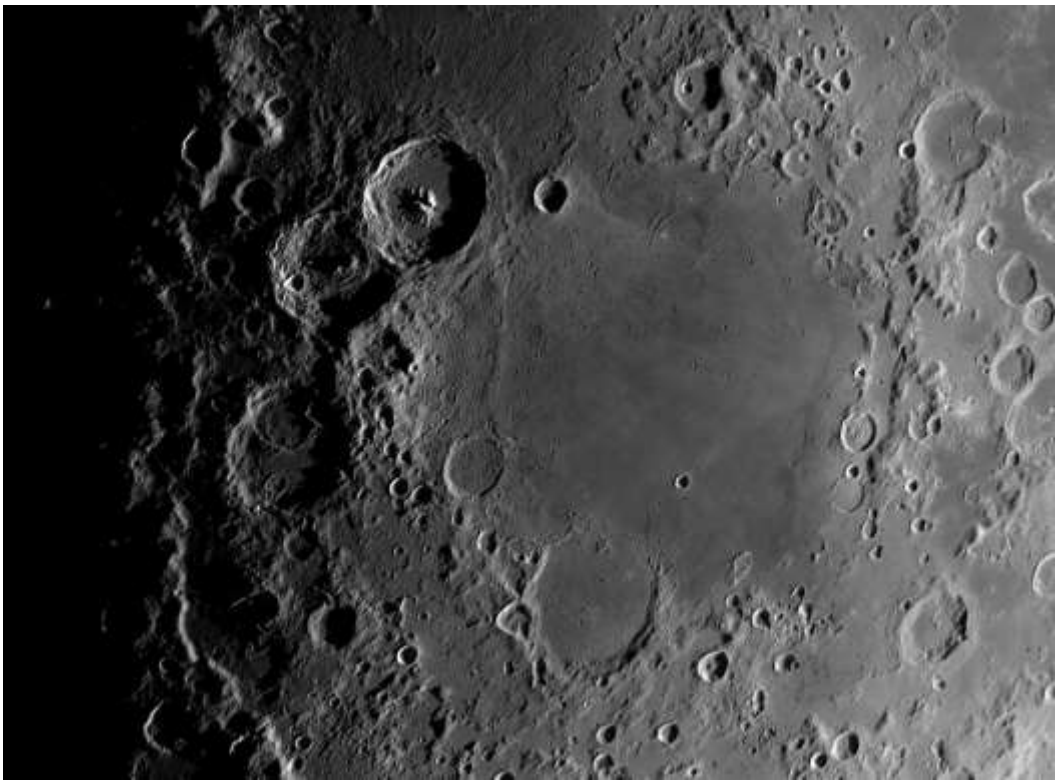




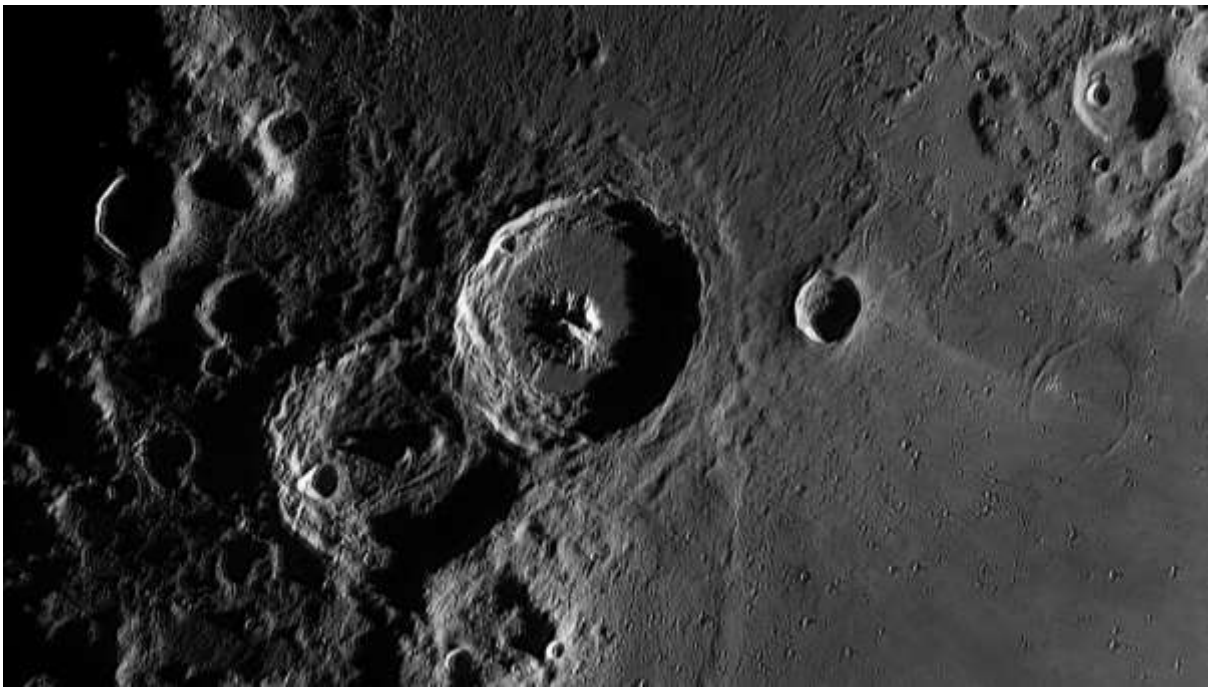
An informative confirmation of the depth of this spectacular crater and the height of its central peak system!

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Nectaris Region 3



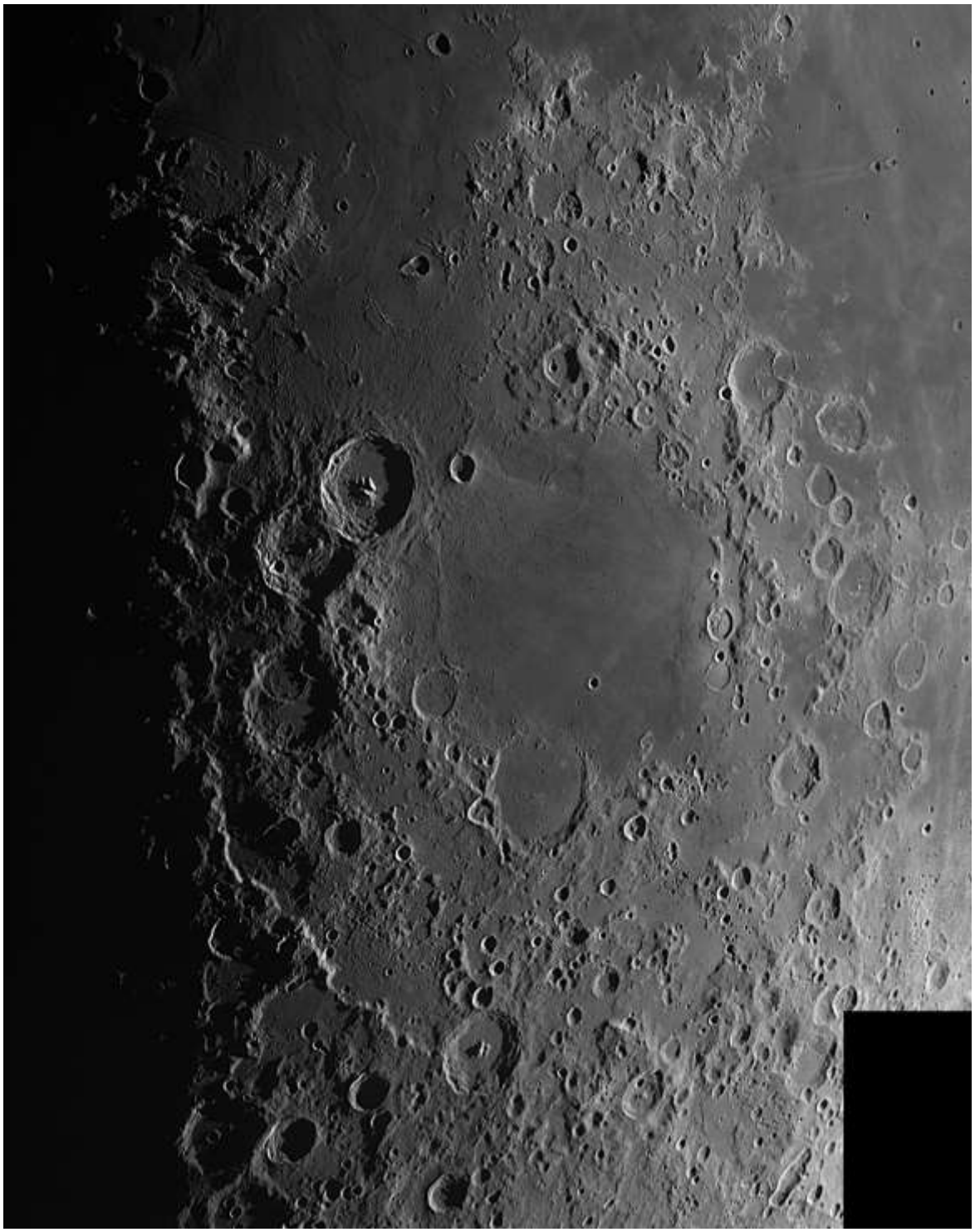
Nectaris with Rupes Altai to the west (left): 6.07 days 19.00 UT March 27 2023 [142]



Close-up of the Theophilus-Cyrillus region from the previous image. [143]

[Altitude: 56*37' Azimuth: 224*56' Libration: 6.6* @ PA 134*]

Theophilus Nectaris Region 4



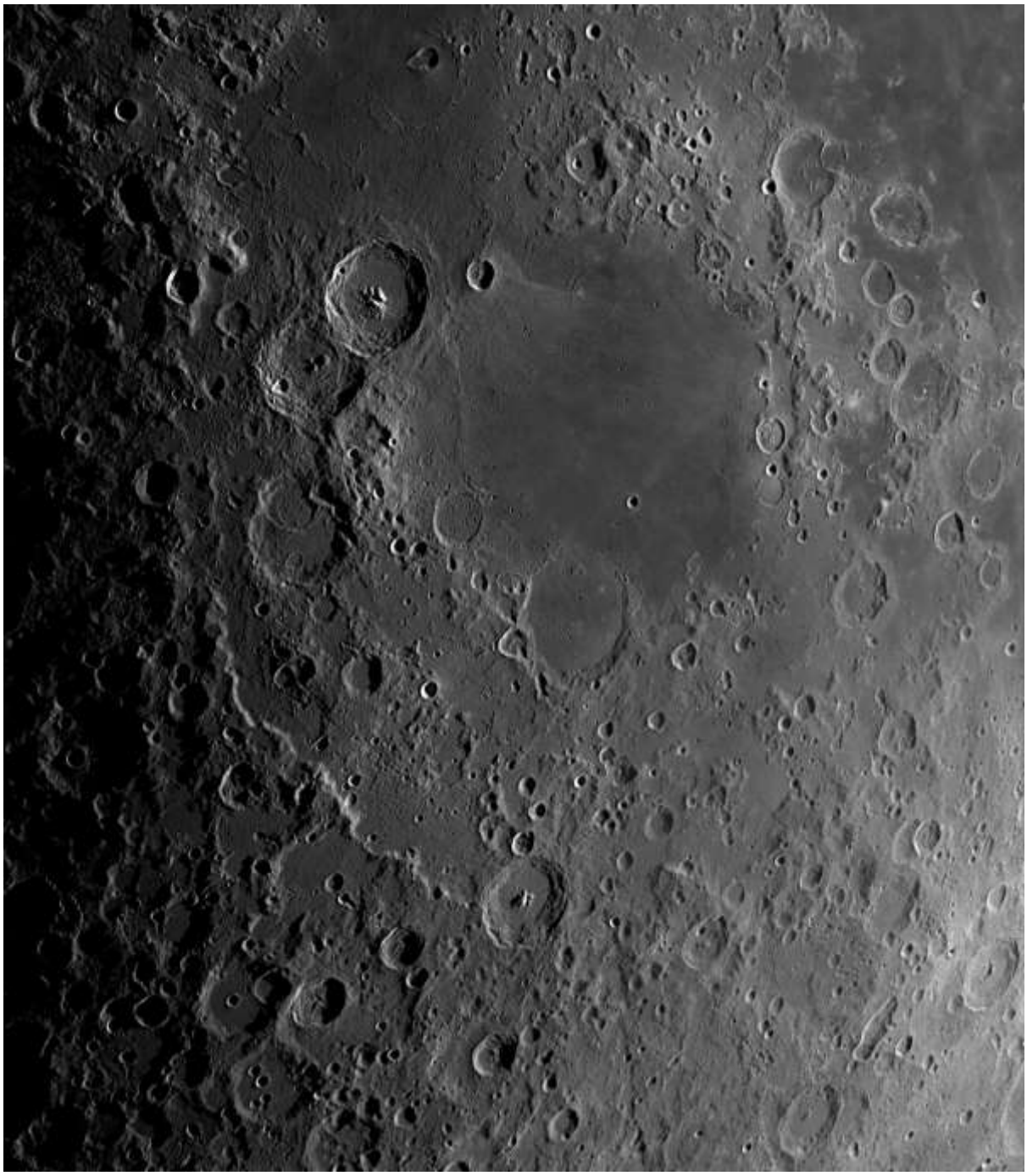
A slightly wider view of Theophilus and Mare Nectaris:

6.19 days 20.18 UT May 25 2023 [181]

[Altitude: 41*37’ Azimuth: 245*09’ Libration: 6.0* @ PA 186*]

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Nectaris Region 5



Theophilus group and Mare Nectaris: 6.64 days 19.40 UT April 26 2023 [161]

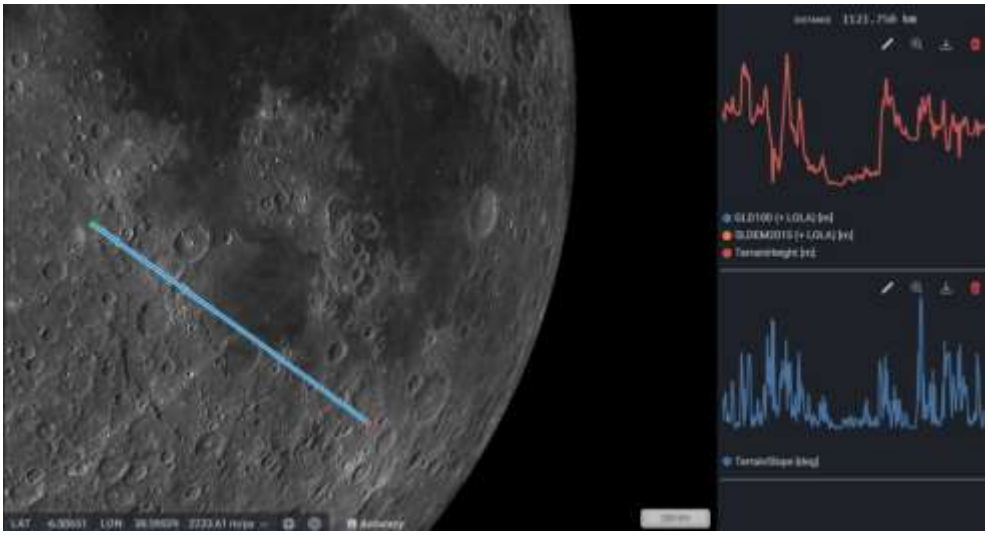
[Altitude: 54*33' Azimuth: 228*52' Libration: 6.5* @ PA 165*]

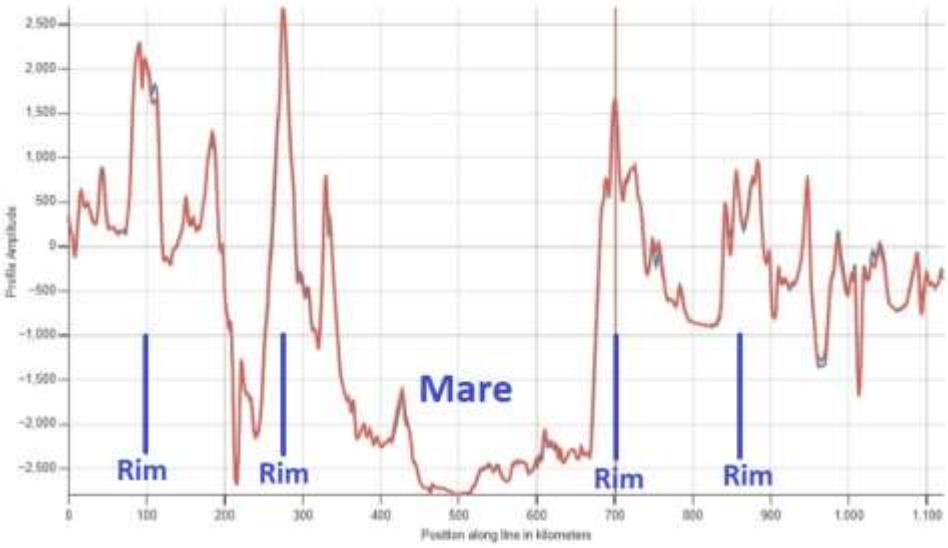
The whole of the Nectaris Basin is now visible, with the western approaches to the Altai Scarp now in sunlight and only the eastern slopes of Theophilus retaining shadow.

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Mare Nectaris Profile:

Using the same LROC QuickMap tool as previously, an altitude profile generated in a roughly NW to SE direction across the Nectaris region produces this….

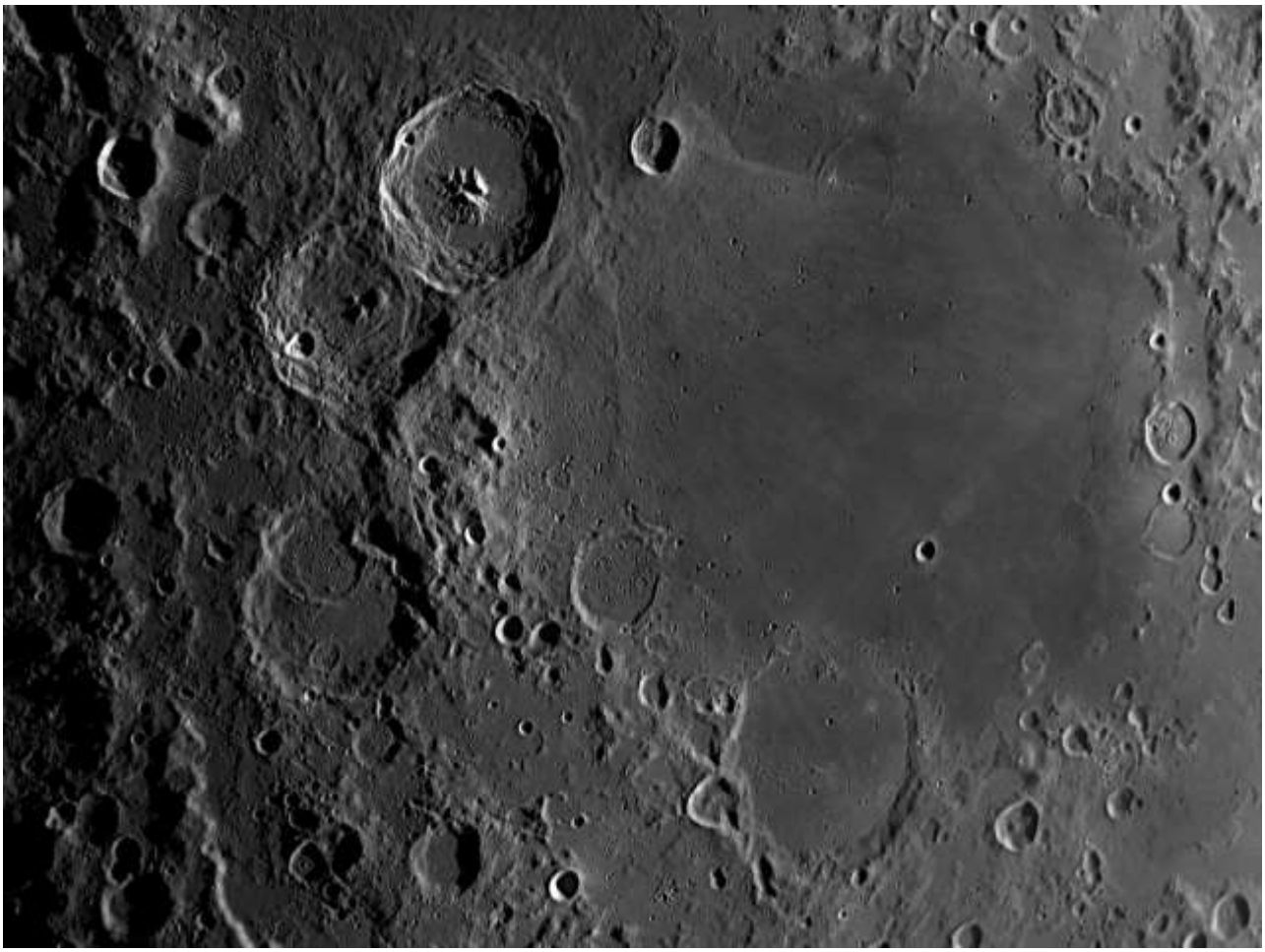




GLD100 (+ LOLA) [m]	1549
SLDEM2015 (+ LOLA) [m]	1591
TerrainHeight [m]	1591

Clear indications of a symmetrical arrangement of impact-basin rims as we move across the profile.

Theophilus Nectaris Region 6

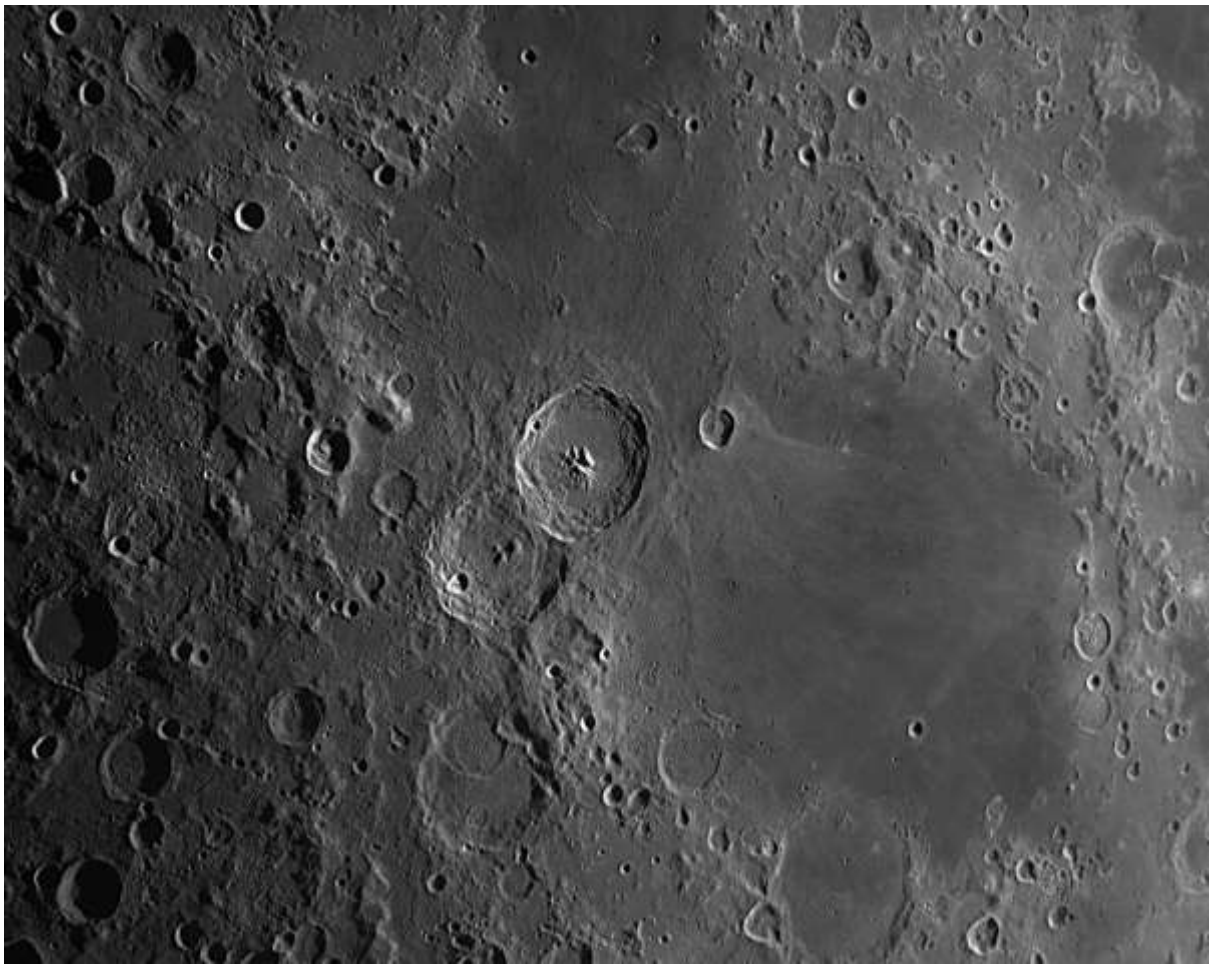


Theophilus group: 6.64 days 19.40 UT April 26 2023 [162]

[Altitude: 54*33' Azimuth: 228*52' Libration: 6.5* @ PA 165*]

A closer view of the "mighty Trio". N0te the ghost crater Daguerre at the North end of Nectaris, the rille traversing Fracastorius and the apparent tilt to the floor of Fracastorius: the Northern walls are non-existent and the Southern wall is higher than those on the East and West sides.

Theophilus Nectaris Region 7

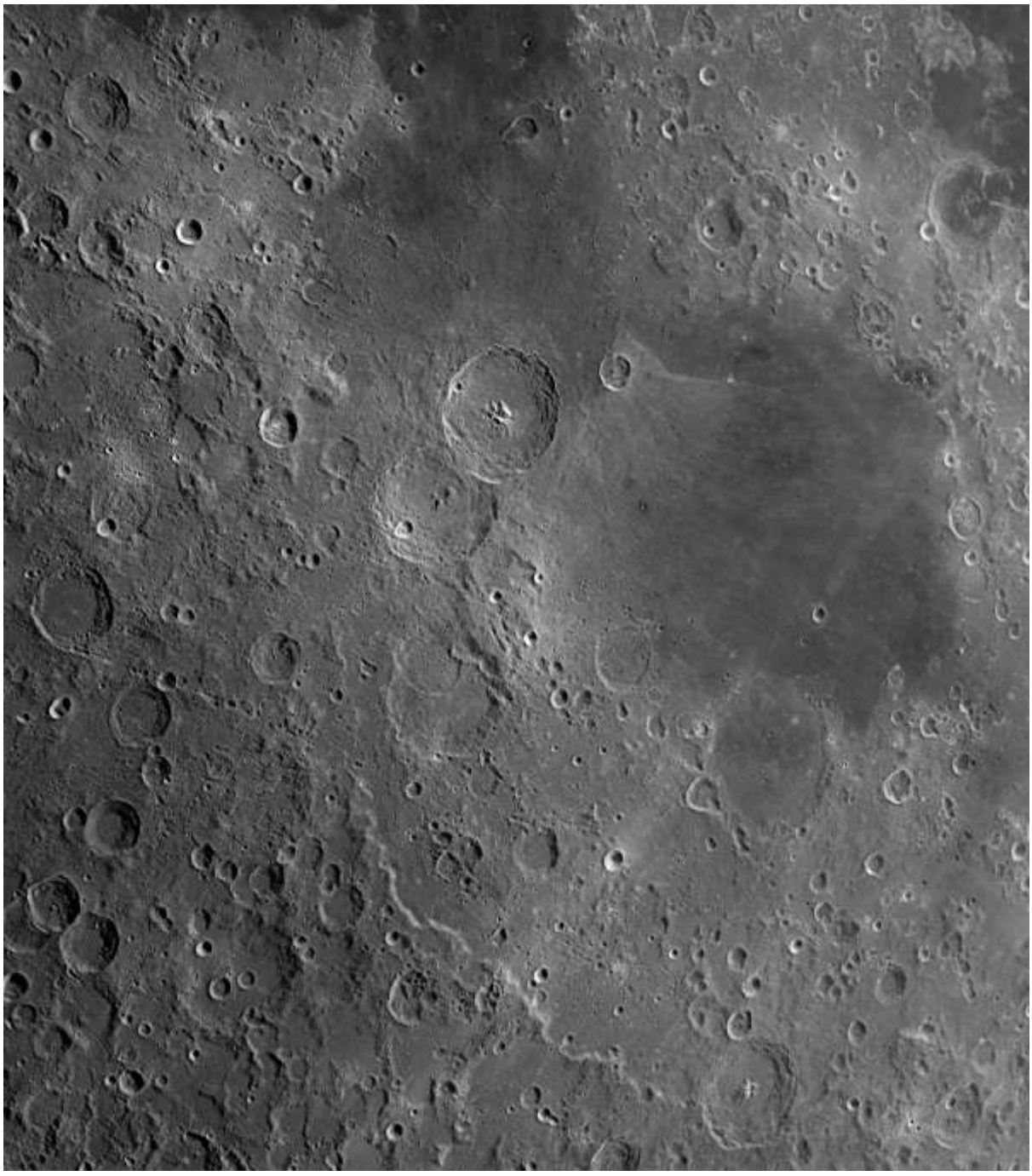


Advancing another half a day, shadows lessen in Theophilus and the Abulfeda crater chain becomes prominent to the west….

Theophilus group: 6.64 days 19.40 UT April 26 2023 [190]

[Altitude: 54*33’ Azimuth: 228*52’ Libration: 5.8* @ PA 198*]

Theophilus Nectaris Region 8

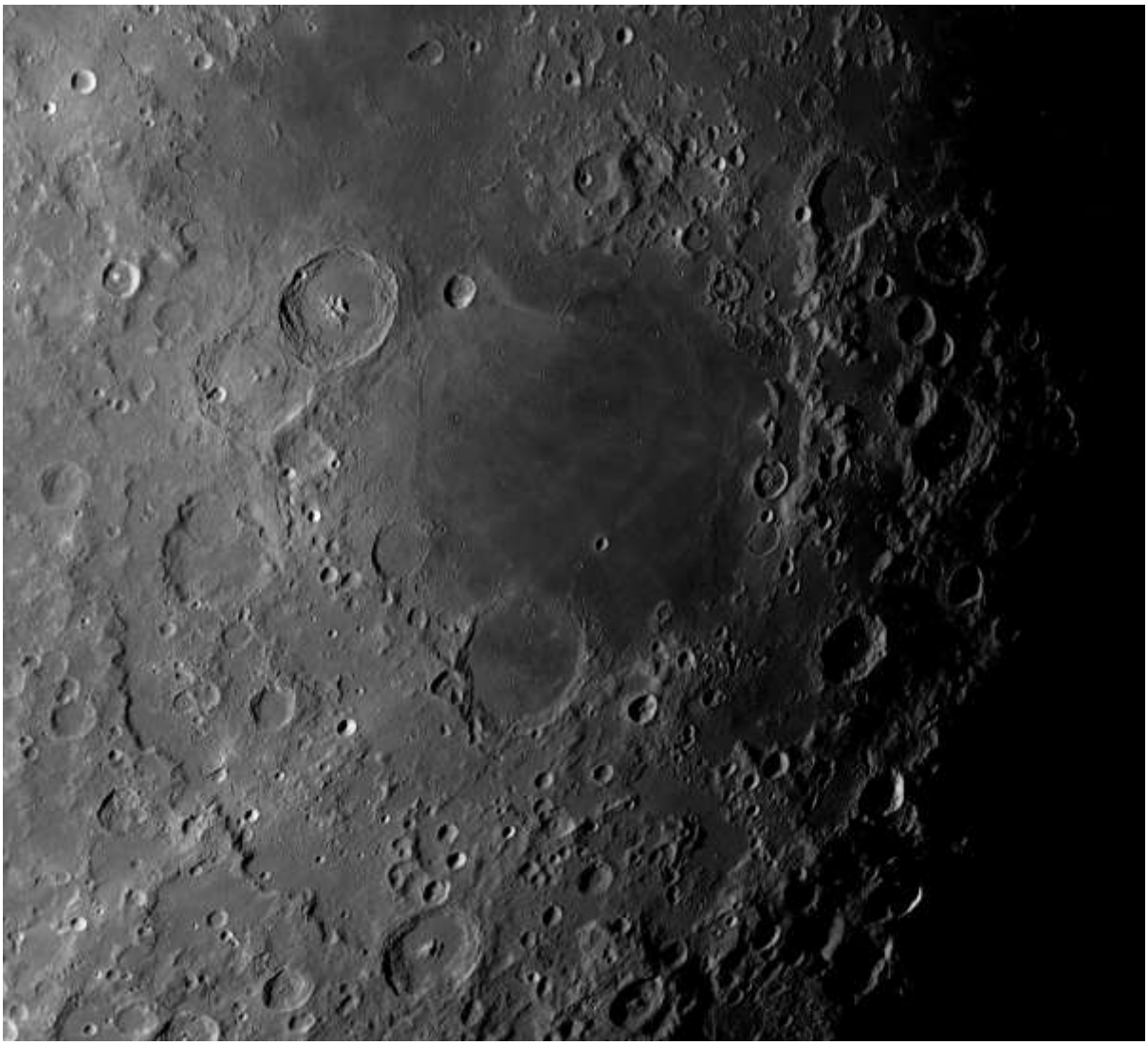


Nectaris basin well away from the terminator: 8.66 days 20.00 UT April 28 2023 [164]

[Altitude: 54*31’ Azimuth: 197*34’ Libration: 6.1* @ PA 185*]

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Nectaris Region 9



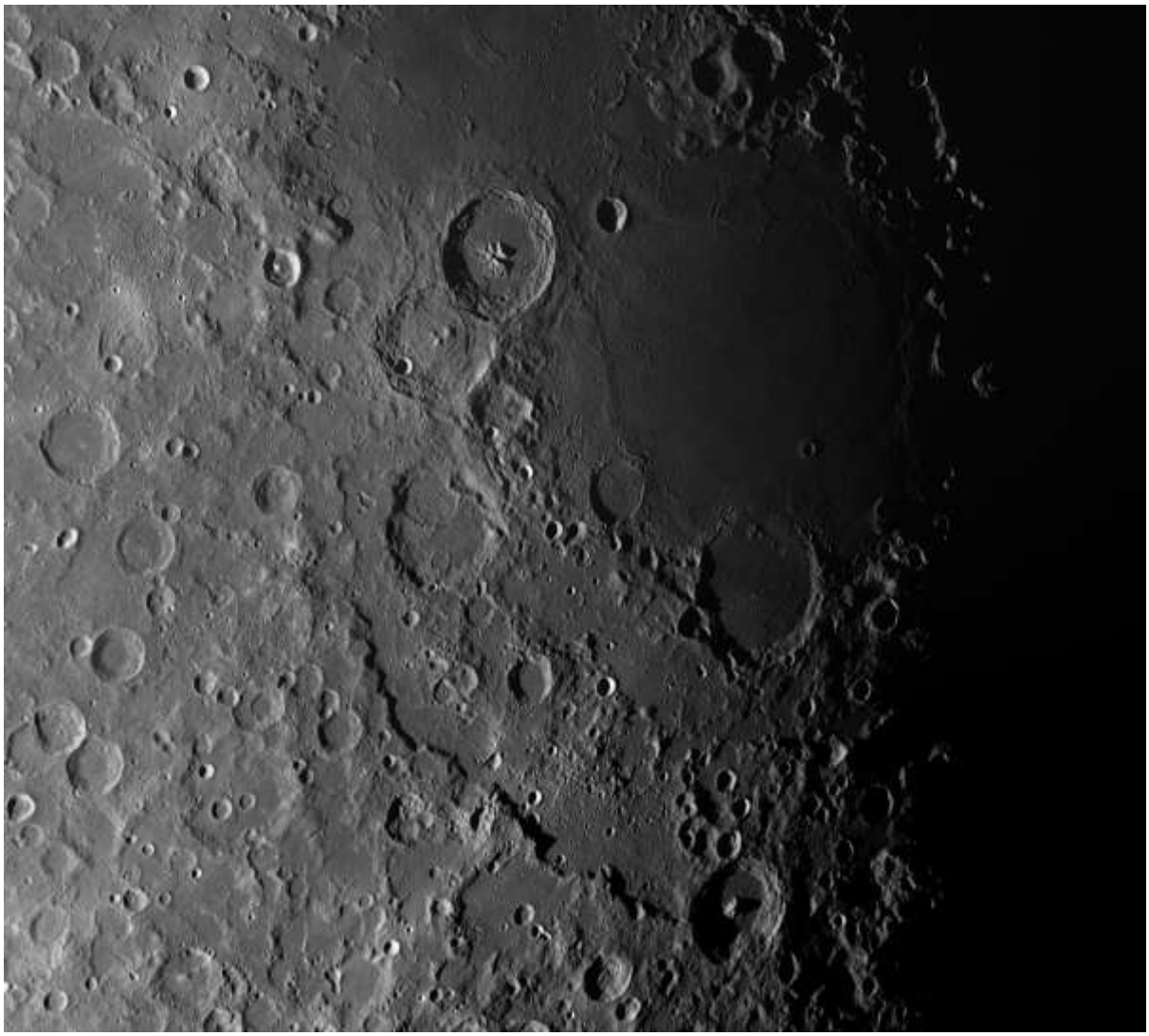
The entire Nectaris basin: 17.71 days 01.20 UT September 14 2022 [22]

[Altitude: 43*56' Azimuth: 143*58' Libration: 6.5* @ PA 76*]

Remarkably, the 3 craters in "The Trio" – Theophilus, Cyrillus and Catharina are almost identical in size: 99/98/99km [Moore COM 617/161/133], though of greatly different ages.

The Rupes Altai (aka Altai Scarp) has an average elevation of around 2.4km, with a maximum height of ~ 3.0km to SW of Catharina [Moore FOM 276]. It represents part of one of the "rings" formed during the original impact that created the basin over 3 billion years ago.

Theophilus Nectaris Region 10



Nectaris basin: 18.66 days 02.36 UT November 13 2022 [75]

[Altitude: 60*05' Azimuth: 148*41' Libration: 5.6* @ PA 172*]

This image is around a day later than the previous one and the level of shadow in the craters has increased.

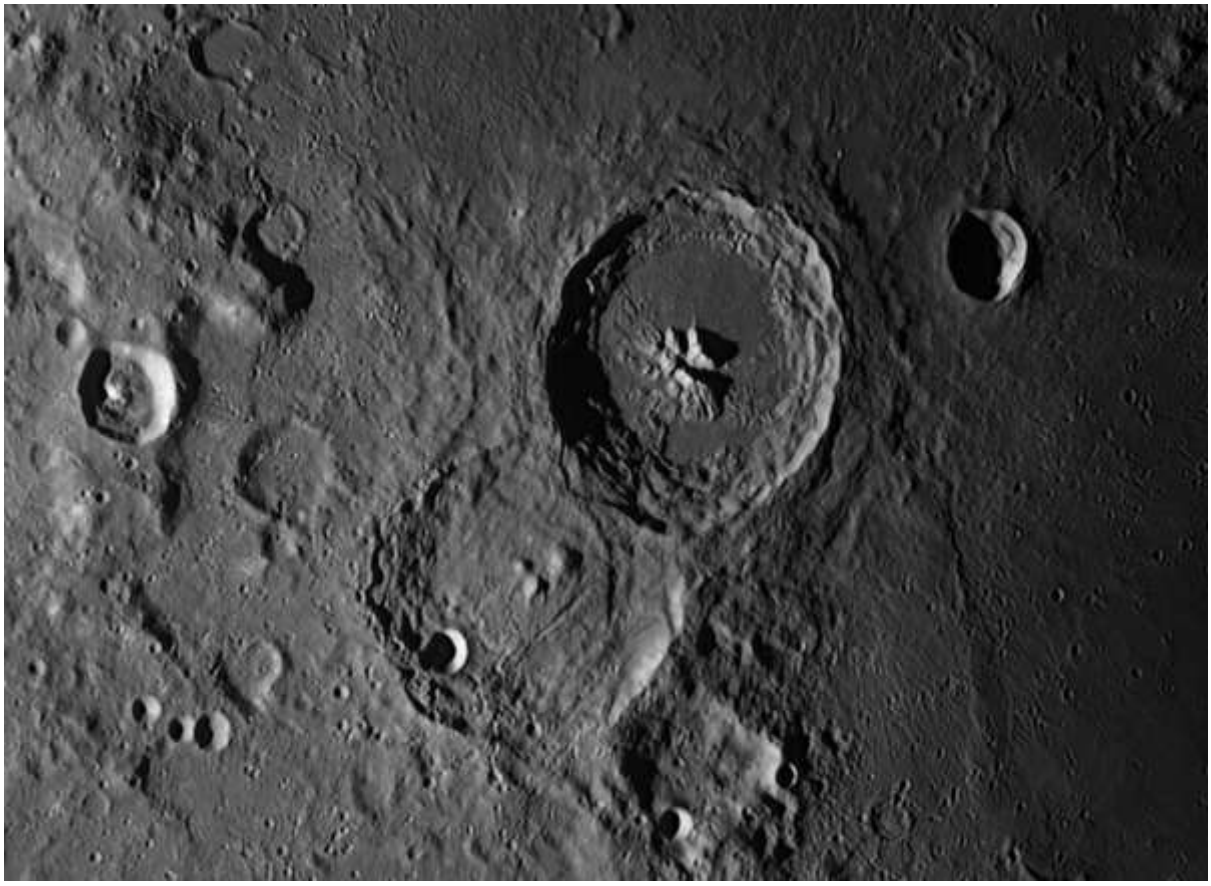
The lower sun angle emphasises ridges in the main mare surface and the rille in Fracastorius is more prominent.

Piccolomini, 88km in diameter, 4.2km deep with its central peak complex rising to 2.5km [Moore COM 494] is very prominent at the southern end of the Rupes.

The following page shows a close-up of Theophilus and Catharina. Compare with the image taken at 6.07 days under a waxing moon…

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Theophilus Nectaris Region 11



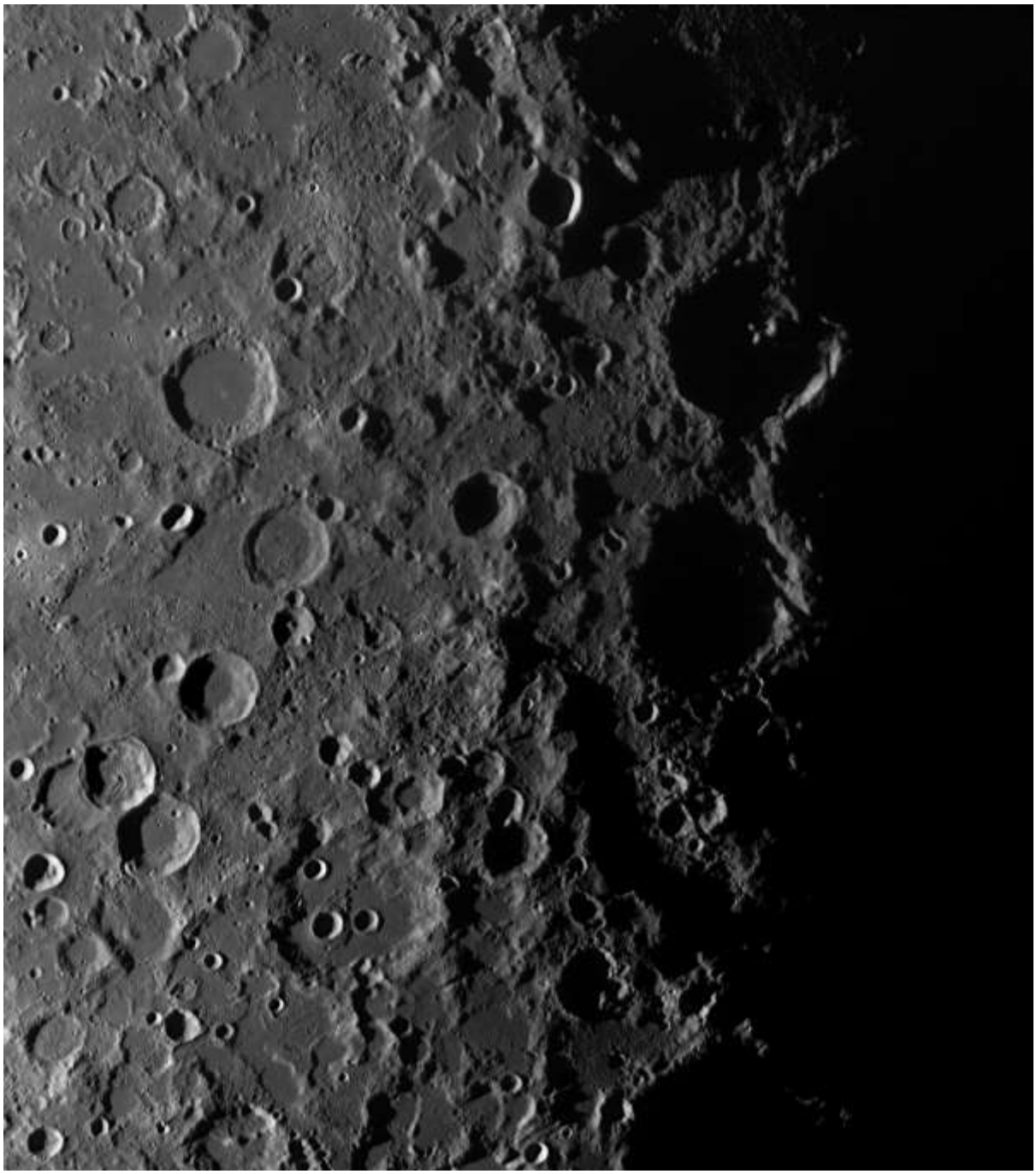
Nectaris basin: 18.66 days 02.36 UT November 13 2022 [76]

[Altitude: 60*05' Azimuth: 148*41' Libration: 5.6* @ PA 172*]

Enlarged view of Theophilus-Cyrillus from the previous image.

The spectacular nature of the multiple-central-peak of Theophilus is very evident, as well as the terracing in the crater walls.

Theophilus Nectaris region 12



Sunset on the Trio: 19.71 days 01.25 UT September 16 2022 [31]

[Altitude: 41*48' Azimuth: 112*56' Libration: 5.5* @ PA 105*]

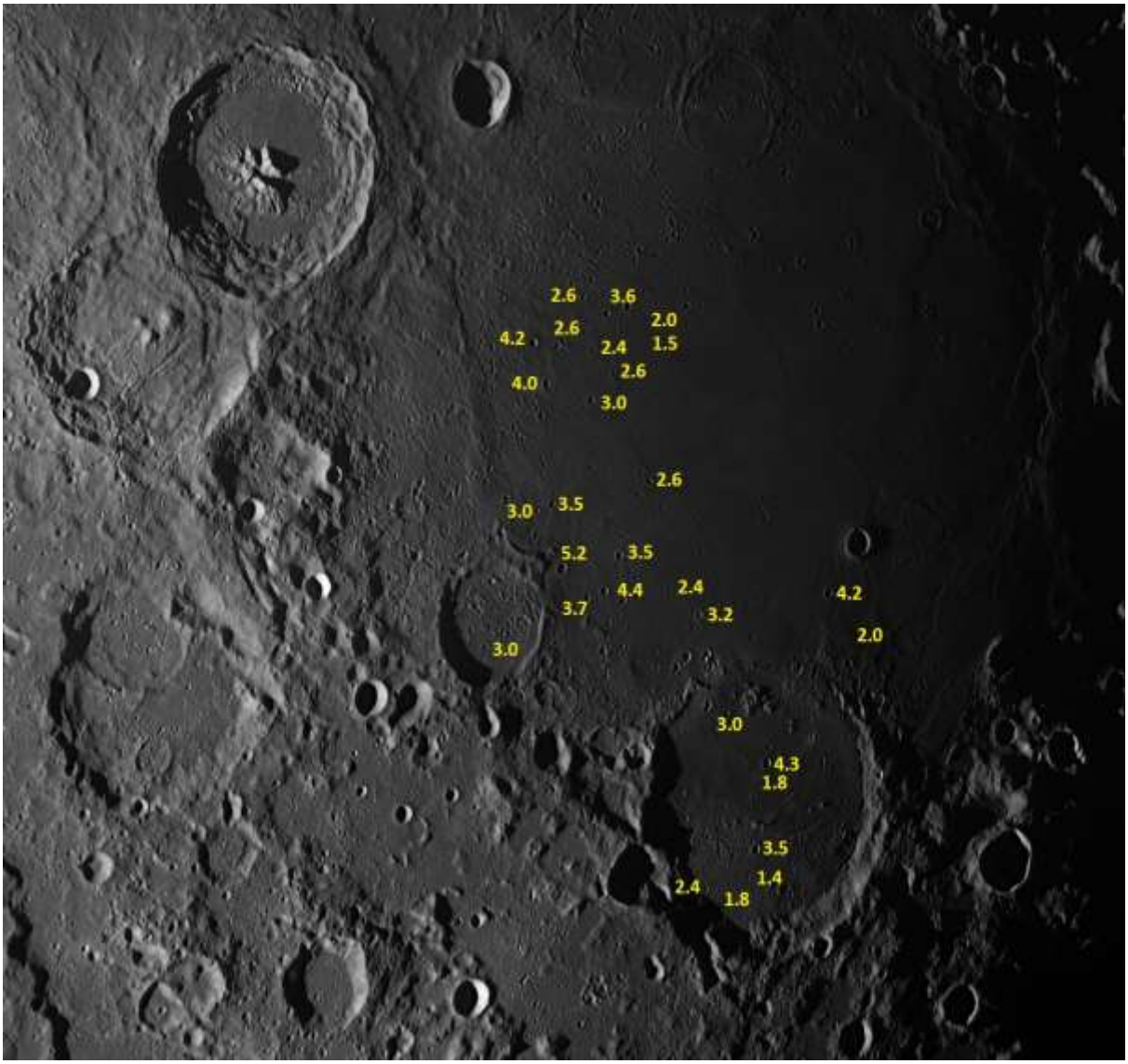
Aside from the very noticeable shadows in the Trio, with Theophilus almost out of sight, the crater chain extending from Abulfeda in an ESE direction towards Catharina is conspicuous.

Catena Abulfeda extends for 210km [Moore FOM 6].

Lunar Topographic Studies
Theophilus/Nectaris Region Overview

Nectaris Craterlets: Nectaris region 13

Data taken from the Cambridge Photographic Lunar Atlas – potentially useful for assessing the quality of the seeing and/or image resolution [Image is 75cr, as on page TNR8].



[75cr]

Plato Hook Shadow is Real

KC Pau

Plato hook shadow is one of the most controversial topics in moon observing. Since Percy Wilkins and Patrick Moore published their Plato hook shadow drawings made on April 3, 1952, whether the hooked shadow really existed or not is still in argument. Another controversial point is whether the Gamma Peak is responsible for the hook shadow or the complex hill at the base of the south-eastern rim. In these years, a lot of papers had been written about this shadow hook and the upsurge had been quiet down recently.

As an amateur moon observer and photographer, I still have a great interest to observe the shadow cast by the Gamma Peak. Whether it is a hook shadow or not, it is an unforgettable experience to watch its long needle-shaped shadow in the early morning and then it recedes to a small triangular shape when the sun is getting higher and higher. Moreover, it is a good chance to hone my observation skills.

Few days ago, when I read through the section on crater Plato of my «Photographic Lunar Atlas for Moon Observers», I noticed there is a peculiar shadow in one of the many photos about Plato. The shape of the shadow led me to recall the article written by Giancarlo Favero and others. The title of this article is "The nature of the hook-like shadow on Plato's floor observed by Wilkins and Moore in 1952" and was published in "The Strolling Astronomer" Volume 43, No.3, Summer 2001. I will not discuss the content of this article but only pick out one of its figures to compare with my above-mentioned photo and Wilkins's drawing (Fig. 1).

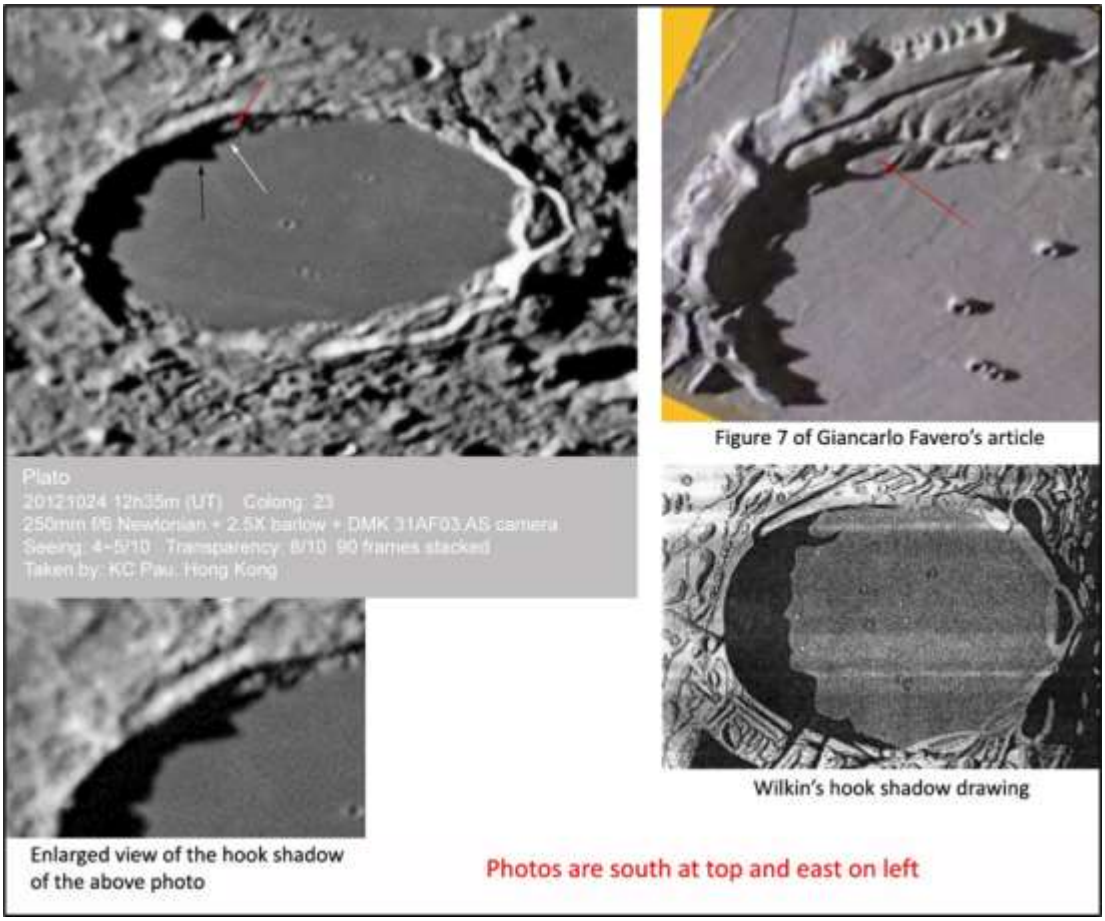


Fig. 1 Comparison of hook shadow with my own photo with that of Favero and Wilkins

The top leftmost photo caught my attention when I read my «Photographic Lunar Atlas ». The black arrow indicates the shortened and triangular shadow cast by Gamma Peak when the sun was already high in the local sky. The white arrow indicates a shadow cast by an unknown peak (at least, unknown to me) or part of the rim close to the Gamma Peak. This shadow curves around a detached part of the complex and elongated hills at the foothill of the south-eastern rim of Plato and appears as a small hook with its sharp end slightly curving to the south. This hook shadow immediately reminds me that of the Copernicus Alpha. The scenario of hook shadow development may be very similar for both Plato and Copernicus (refer to my article published in LSC May 2022 issue). For the Plato case, the hook shadow seems to be the combination of the shadows from the unknown peak and the detached part of the complex hills. Timing is a very critical factor to see the hook. Readers can compare my photo with Figure 7 (which is a simulated view) in Giancarlo Favero's article. The red arrow indicates the detached part of the complex hills that had played part to produce the hook. However, Giancarlo commented his Figure 7 as following "The gamma peak's shadow would combine with the complex and elongated hill's shadow only for a Sun's azimuth of 80° and 10° Sun's height. Only thus the model would be similar to the 1952 drawings, but this azimuth is impossible". In his article published in "The Strolling Astronomer" Volume 42, No.3, July 2000", he already stated that "We suggest that the hook-like shadow is cast by an elongated hill present on Plato's floor, at the foot of the south wall…..". With reference to my photo, he would be partly correct but he had neglected the shadow cast by the unknown peak or the rim.

As usual practice, I need to dive into my moon photos archive to look for more photos to show the development of the hook shadow and thus to prove the hook is real, not an illusion effect. After a long time searching, eventually I can collect a series of photos to demonstrate the development of the hook shadow (Fig. 2).

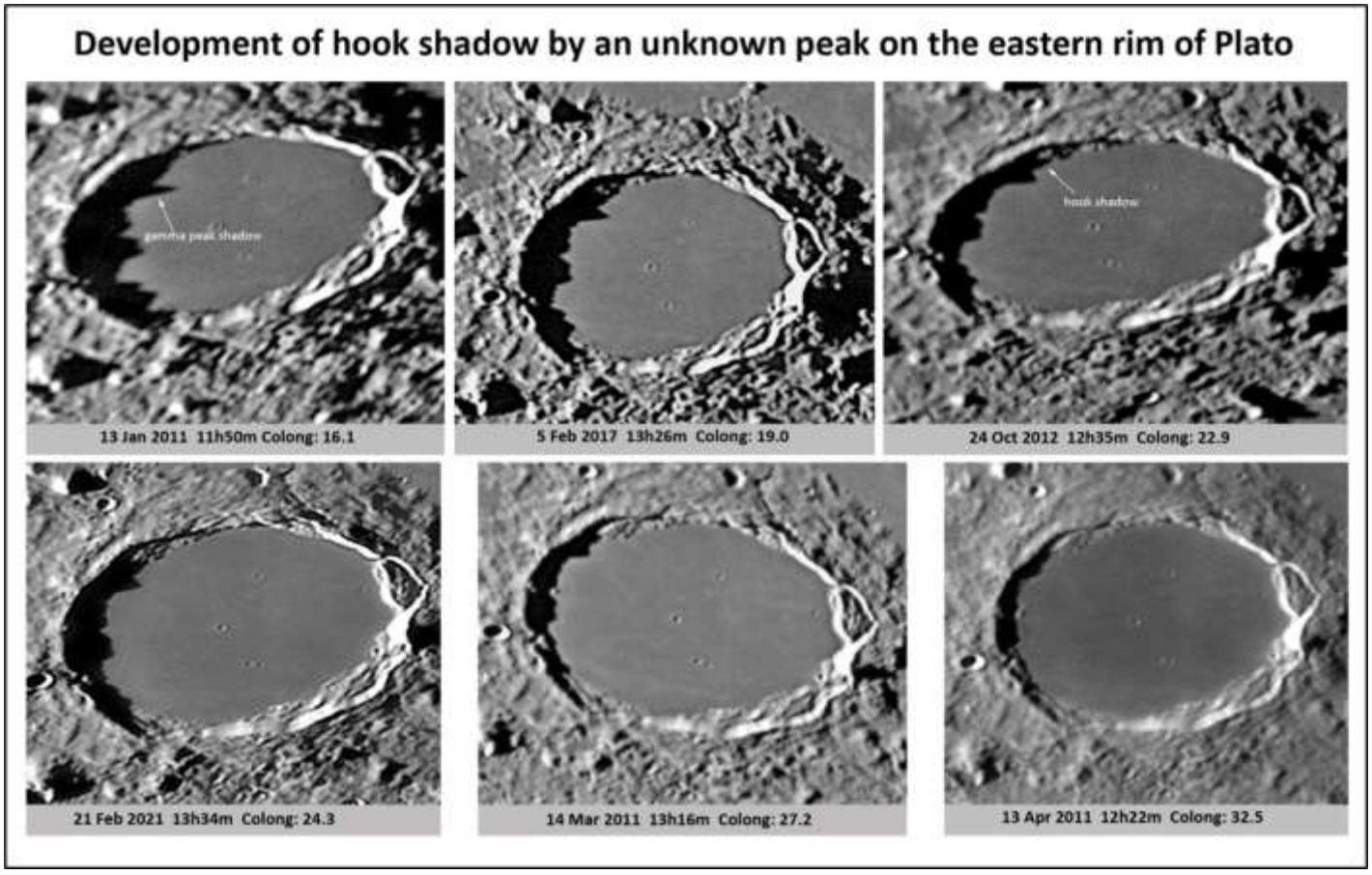
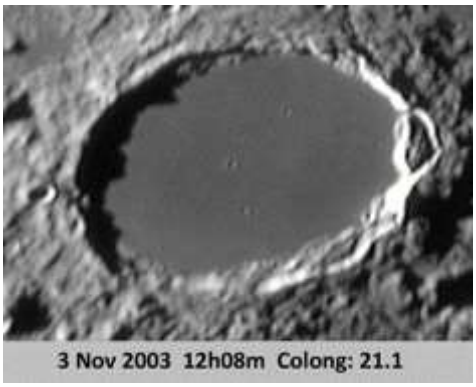
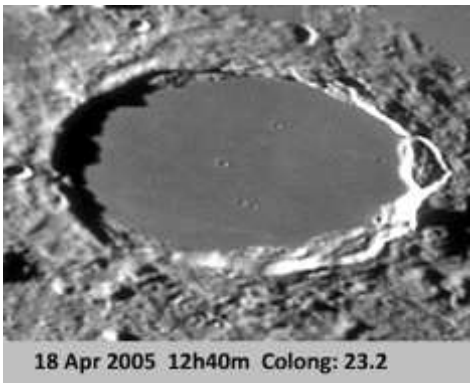


Fig. 2 A series of photos to show the development of the Plato hook shadow

From the above photos, it is obviously shown that the hook shadow is not formed by the Gamma Peak. It is formed with the combination of shadows from the unknown peak or crater rim close to the Gamma Peak and the detached portion of the complex hills. Moreover, the hook shadow is best seen between colongitude 22.9~24.3°. The degree of curvature is not as distinct as Wilkins's drawing and I thought he had exaggerated the curvature. The curvature of the hook may also be affected by libration. The hook shadow is certainly not an illusion and also not a one-time phenomenon. It will be recurring when lighting condition is met. As I mentioned above, timing is a very critical factor to see the hook as it may be only last one hour or so. In the two photos below, the hook shadow also shows up very clearly on the other dates.





Now, I can conclude this study of the Plato hook shadow with my personal points of views. The views are not based on any scientific means but on my own judgments from the data of my moon photos. Therefore, I may be wrong in some way or other. I would be much appreciated for comments and feedback from the LSC or TLO readers for further discussion.

1. The Plato hook shadow appeared in Wilkins's drawing in 1952 is true but it is not cast by the Gamma Peak. From the information that I had, he had neither mentioned about the hook nor the hook was produced by the Gamma Peak in his report. However, the date and time of his observation is certainly mistakenly recorded. It is impossible for him to see the hook with the time and date he stated as the hook had not yet formed with the colongitude of 16.2°(see Fig. 3). To see the hook, he had to wait for 13 hours later, that was about 10 o'clock in the morning next day (4 April 1952). I don't think he would observe the moon in the daytime. Therefore, his observation of the hook must be on the other date and time.

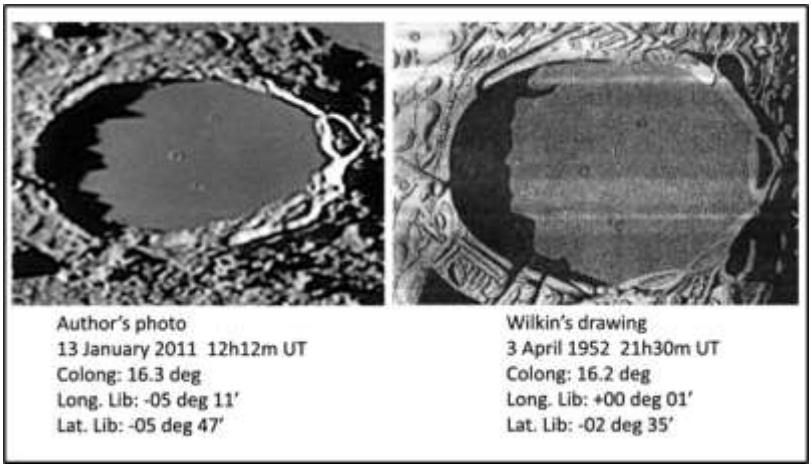


Fig. 3 Comparison of my photo with Wilkins's drawing with almost similar colongitude

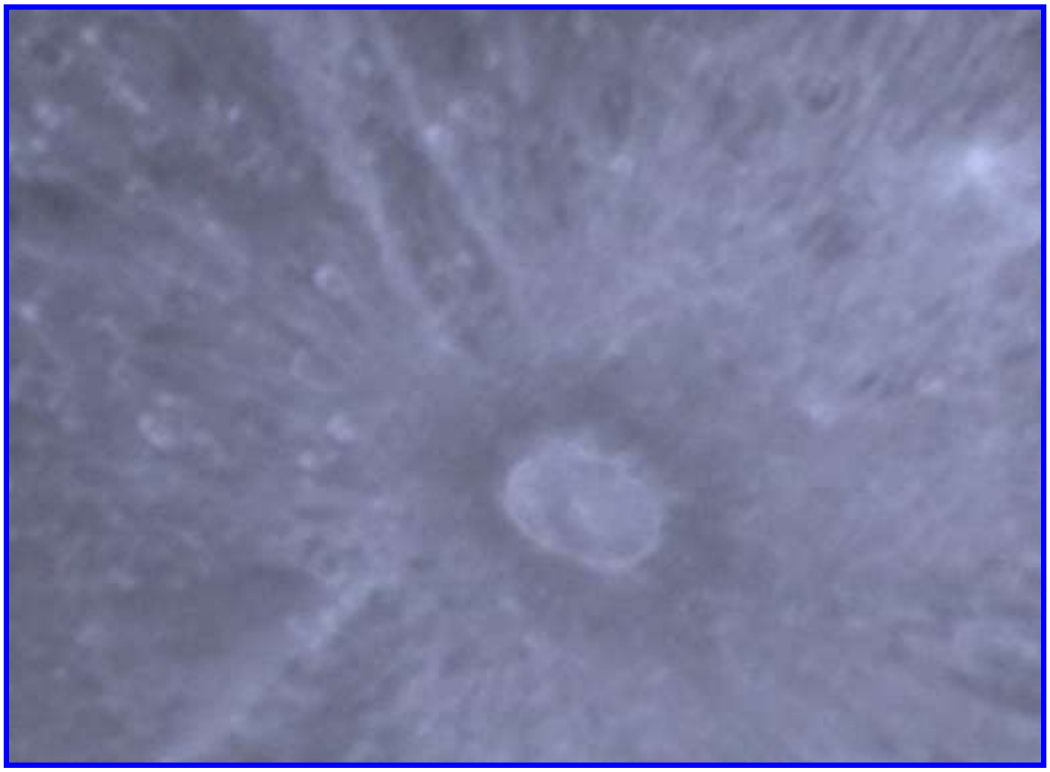
2. In the past years, many observers including myself may make a wrong assumption that the hook shadow is coming from the Gamma Peak and neglect it may come from other sources. Thus, we are all misled to focus on the wrong target.

3. Amateur moon observers can play an important part in studying the moon even in the space age nowadays. Long-term high resolution moon photography project at different phases will make a great contribution to moon study. With high quality lunar images, we can supplement what the space moon photos have neglected in some area. Moreover, these images may also help to solve the mystery recorded in the past observations or to rectify any observation errors in the past observation reports.

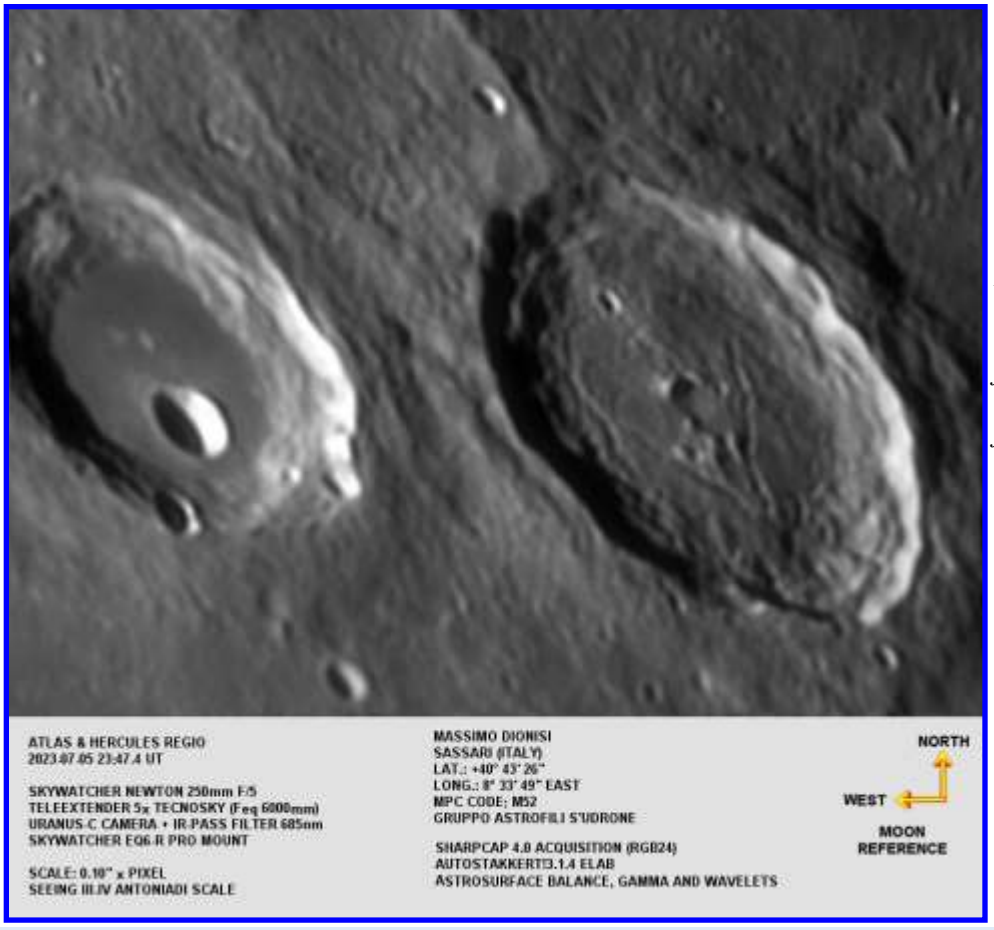
Erratum

In accordance to the nomenclature of IAU, the following statements "*Unfortunately, this name has been abandoned by the IAU. For convenient communication, I will call it Rima Beer I (not IAU official name). Not far away and north of Rima Beer I, ……. particularly visible as if they have been missing. The whole length is about 35 km. I name it Rima Beer E (not IAU official name). Both Rima Beer I and Beer E are running parallel to each other (Fig. 1).*" in my article "**Two new rilles are found near crater Beer**" which is published in TLO July issue are rephrased as: "Unfortunately, this name is not in current use by IAU and a new designation of a group of 5 rilles as Rimae Archimedes is now used instead. Not far away and north of Rimae Archimedes, ……. particularly visible as if they have been missing. The whole length is about 35 km. I name it Rima Beer E (not IAU official name). Both Rimae Archimedes and Beer E are running parallel to each other (Fig. 1)."

KC Pau

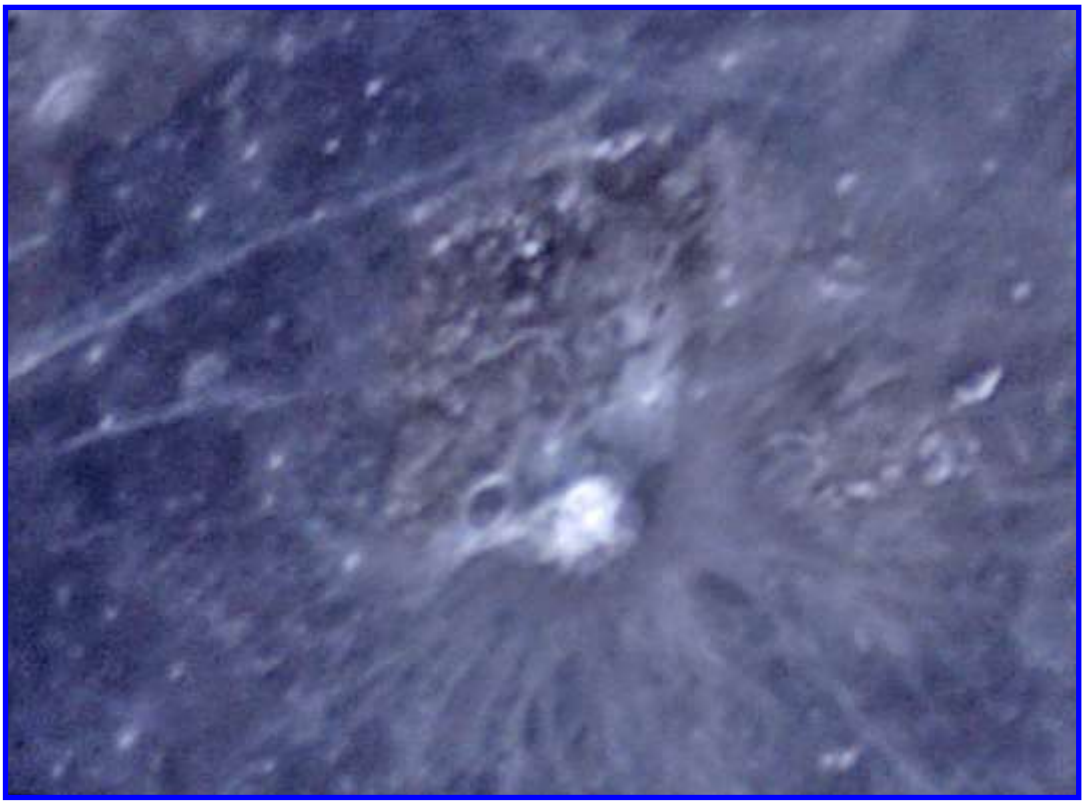


Tycho, *Maurice Collins, Palmerston North, New Zealand. 2023 July 03 10:56 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHY-III462C camera. Maurice adds: "*The sky cleared just as I was about to think about going off to bed, but I wasn't tired so decided to brave the cold and get some images with my ETX-90/RA. The old telescope (25 yrs now) has no "brain" ie tracking, I removed the circuit board as the battery contacts were continuing to badly corrode and put metal flakes inside the base, not good. So as to avoid any mechanical issues, I just removed the whole circuit board. It is now fully manual as an equatorial un-driven telescope. But that seems to work just fine, it turns more freely for some reason and these images are the first test of it without tracking. I had no problems processing the images with my new PC. They all stacked first attempt."



Atlas and Hercules, *Massimo Dionisi, Sassari, Italy. 2023 July 5 23:47 UT. Sky Watcher 250 mm f/5 reflector telescope, 5x teleextender, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III-IV Antoniadi scale.*

Recent Topographic Studies



Aristarchus, *Maurice Collins, Palmerston North, New Zealand. 2023 July 03 10:54 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*

Mare Frigoris, *Larry Todd, Dunedin, New Zealand. 2023 June 30 06:47 UT. OMC 200 Maksutov-Cassegrain telescope.*

Recent Topographic Studies

Full Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 03 10:38-10:45 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera. North is down, west is right.*

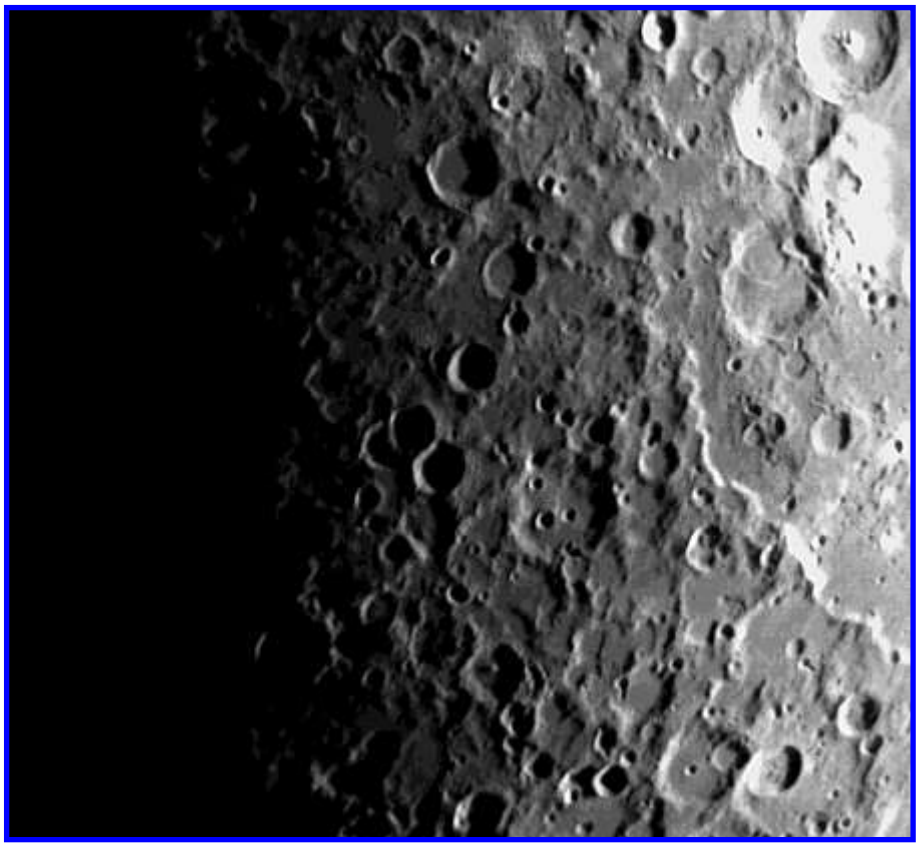
Kepler, *Larry Todd, Dunedin, New Zealand. 2023 June 30 06:59 UT. OMC 200 Maksutov-Cassegrain telescope.*

Recent Topographic Studies

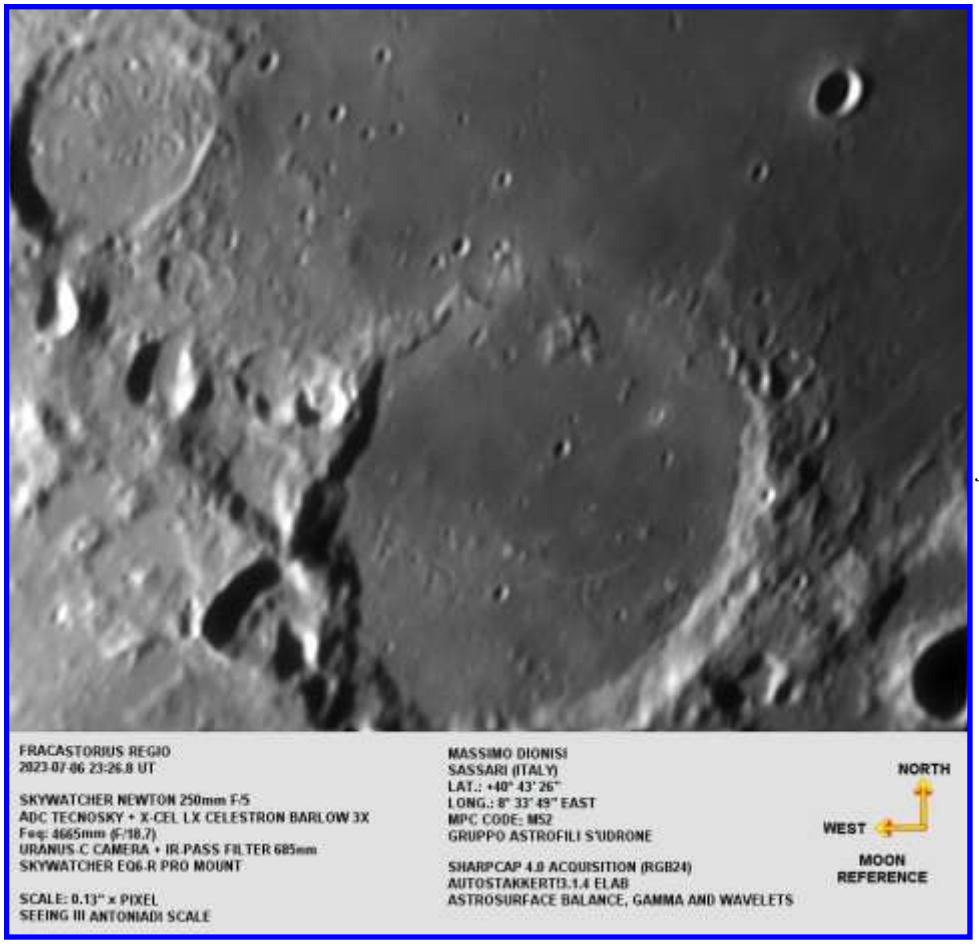
Full Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 03 10:47 -11:06 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera. North is down, west is right.*

Atlas and Hercules, *Massimo Dionisi, Sassari, Italy. 2023 July 6 23:39 UT. Sky Watcher 250 mm f/5 reflector telescope, 3x X-cel Celestron barlow, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Recent Topographic Studies

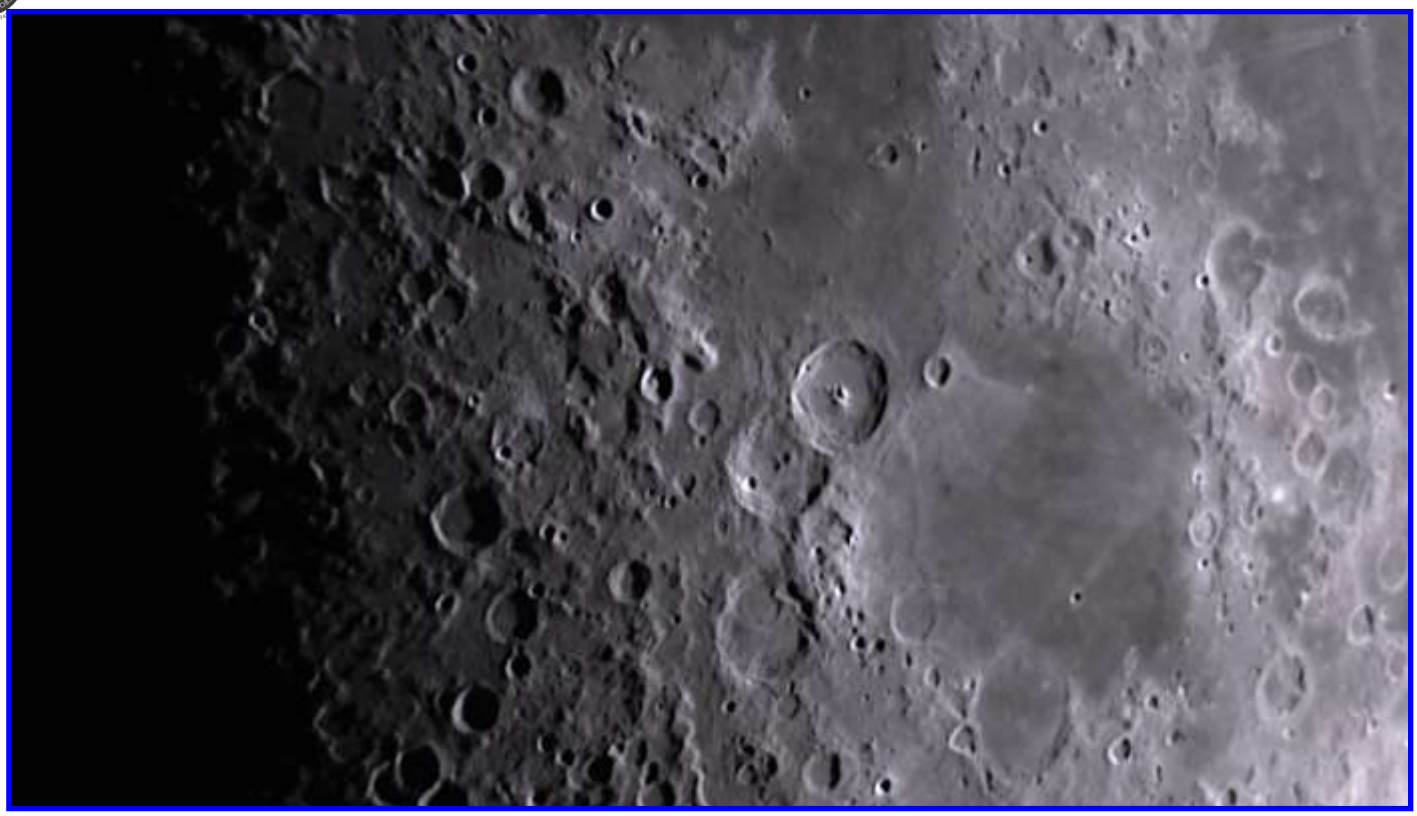


Abenezra, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:33 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*



Fracastorius, *Massimo Dionisi, Sassari, Italy. 2023 July 6 23:26 UT. Sky Watcher 250 mm f/5 reflector telescope, 3x X-cel Celestron barlow, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Recent Topographic Studies



Theophilus, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:35 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*

Clavius, *Larry Todd, Dunedin, New Zealand. 2023 June 30 06:54 UT. OMC 200 Maksutov-Cassegrain telescope.*

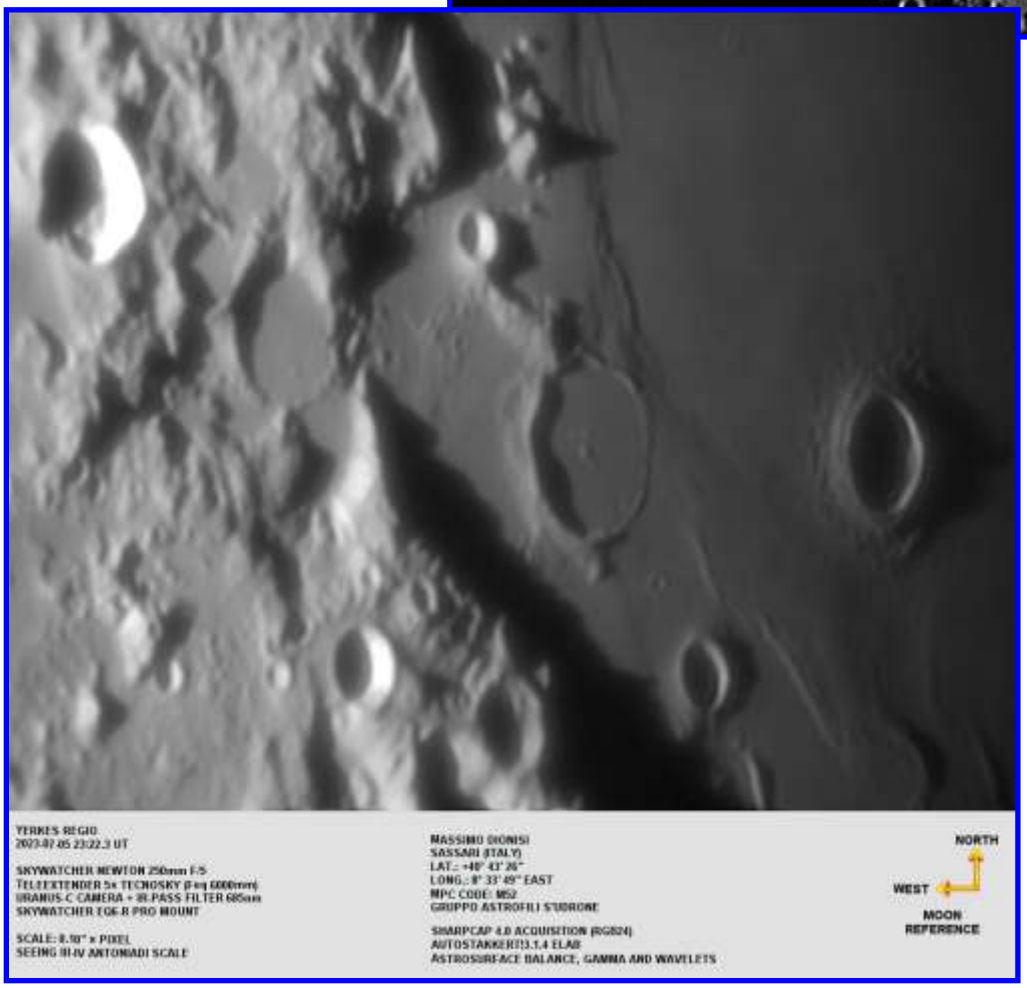
Recent Topographic Studies

Agrippa, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:15 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*

Copernicus, *Jairo Chavez, Popayán, Colombia. 2023 June 27 23:56 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is right, west is up.*

Recent Topographic Studies

Ariadaeus Rille, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:15 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*



Yerkes, *Massimo Dionisi, Sassari, Italy. 2023 July 5 23:22 UT. Sky Watcher 250 mm f/5 reflector telescope, 5x teleextender, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III-IV Antoniadi scale.*

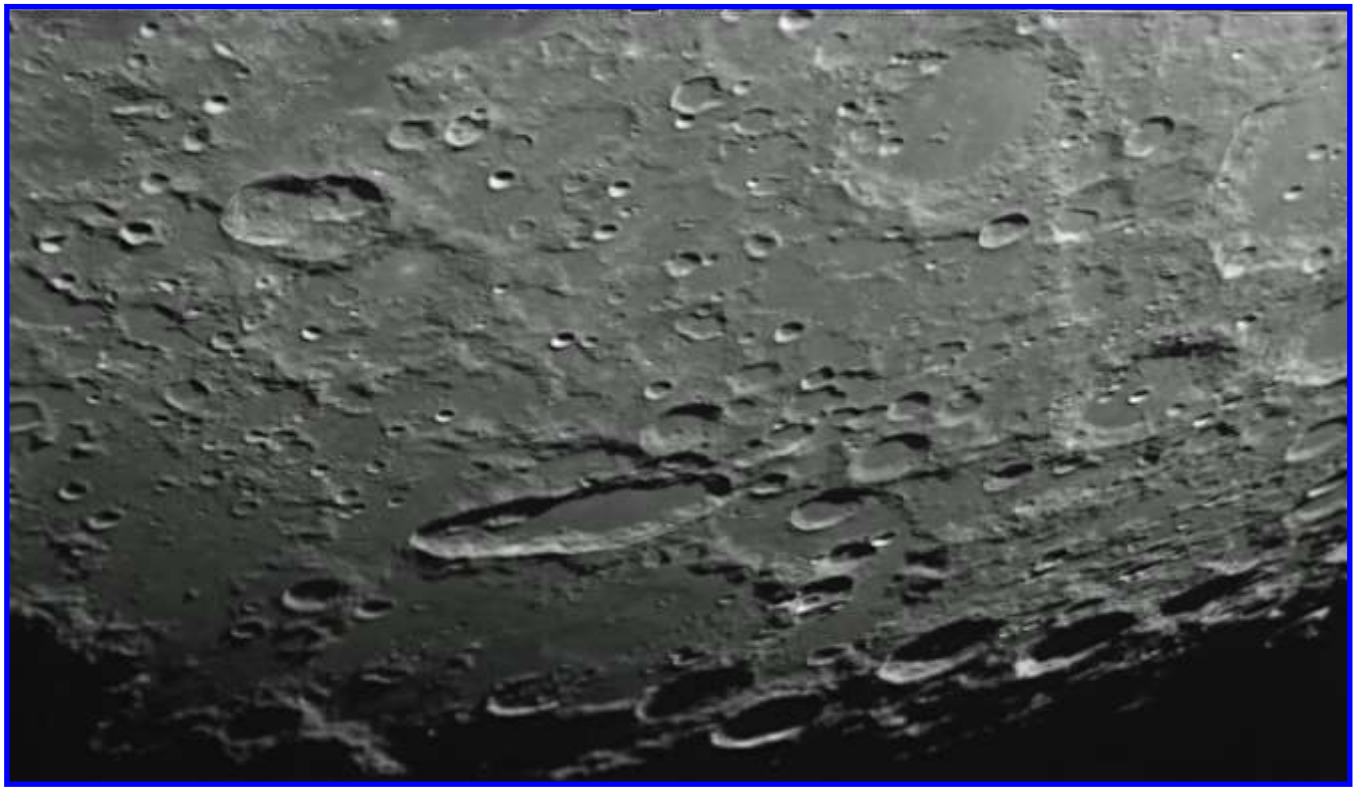
Recent Topographic Studies

Janssen, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:17 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*

Montes Caucasus, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:40 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Recent Topographic Studies

Lacus Mortis, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:13 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*



Schiller, *Larry Todd, Dunedin, New Zealand. 2023 June 30 10:26 UT. OMC 200 Maksutov-Cassegrain telescope.*

Recent Topographic Studies

Plinius, *Maurice Collins, Palmerston North, New Zealand. 2023 June 25 06:34 UT. Celestron 8 inch Schmidt-Cassegrain telescope, QHYIII462C camera.*

De la Rue, *Massimo Dionisi, Sassari, Italy. 2023 July 5 23:59 UT. Sky Watcher 250 mm f/5 reflector telescope, 5x teleextender, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III-IV Antoniadi scale.*

Recent Topographic Studies

16-day-old Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 04 08:48-09:00 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*

Recent Topographic Studies

Mare Humorum and Gassendi, *Larry Todd, Dunedin, New Zealand. 2023 June 30 07:03 UT. OMC 200 Maksutov-Cassegrain telescope.*

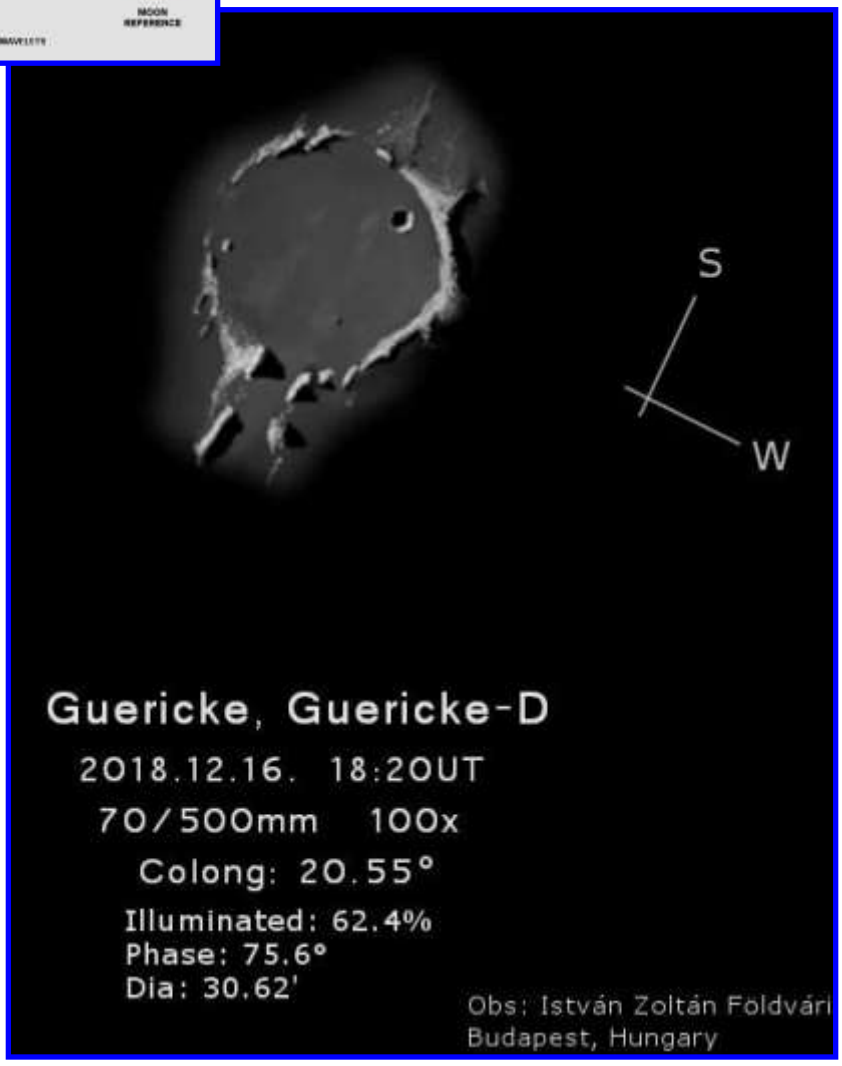
Manilius, Manilius β and Mare Vaporum, *István Zoltán Földvári, Budapest, Hungary. 2018 October 31, 00:05-00:31 UT, colongitude 171.47°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 7/10, transparency 6/6.*

Recent Topographic Studies

18-day-old Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 06 10:49-10:53 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHY-III462C camera.* ***Below****, the setting Waning Gibbous Moon from New Zealand.*

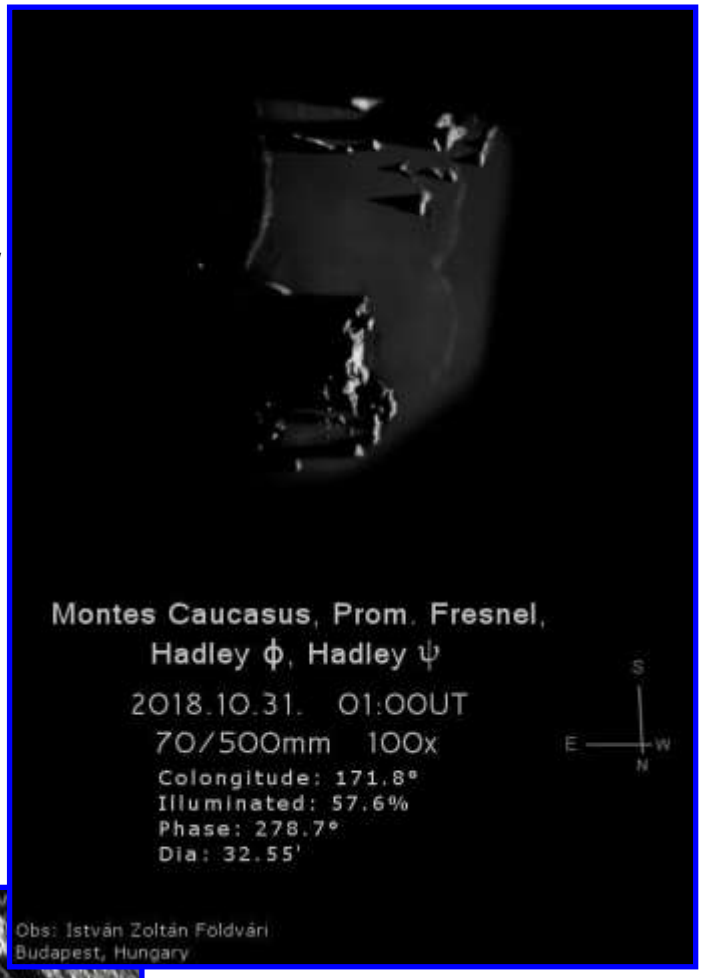
Recent Topographic Studies

Sinus Amoris, *Massimo Dionisi, Sassari, Italy. 2023 July 6 23:52 UT. Sky Watcher 250 mm f/5 reflector telescope, 3x X-cel Celestron barlow, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

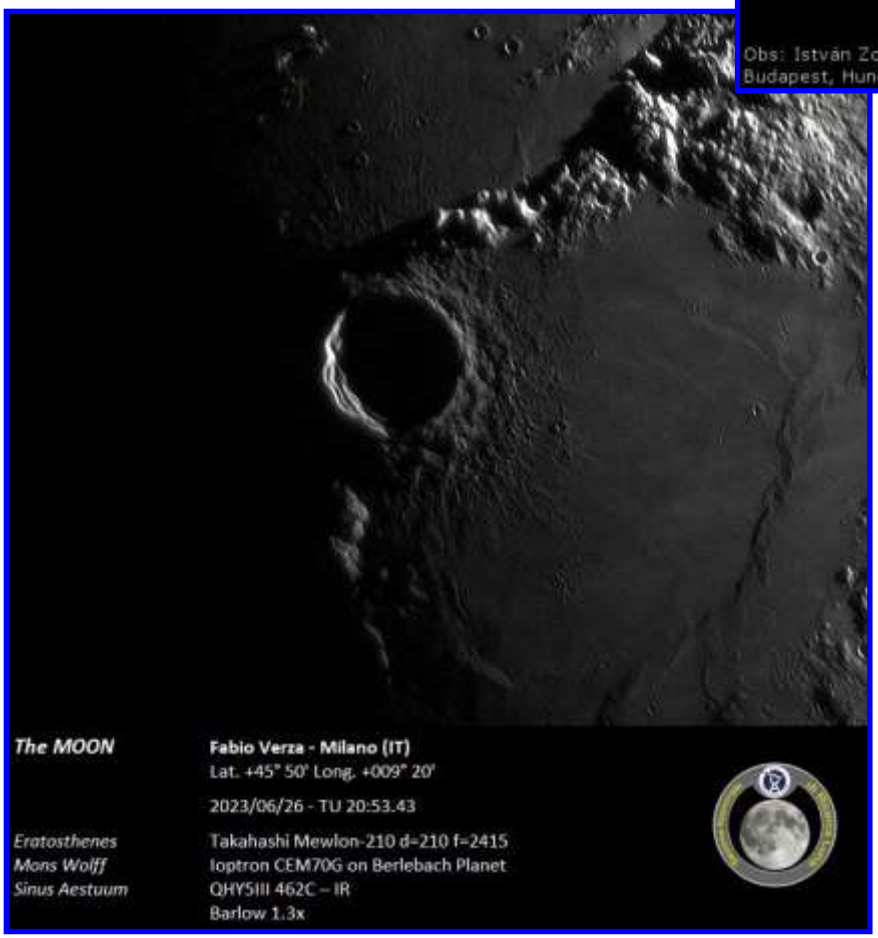


Guericke and Guericke D, *István Zoltán Földvári, Budapest, Hungary. 2018 December 16, 18:12-18:34 UT, colongitude 20.55°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 6/10, transparency 3/6.*

Recent Topographic Studies



Montes Caucasus, Promontorium Fresnel, Hadley ϕ and Hadley φ, *István Zoltán Földvári, Budapest, Hungary. 2018 October 31, 00:50-01:14 UT, colongitude 171.8°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 6/10, transparency 6/6.*



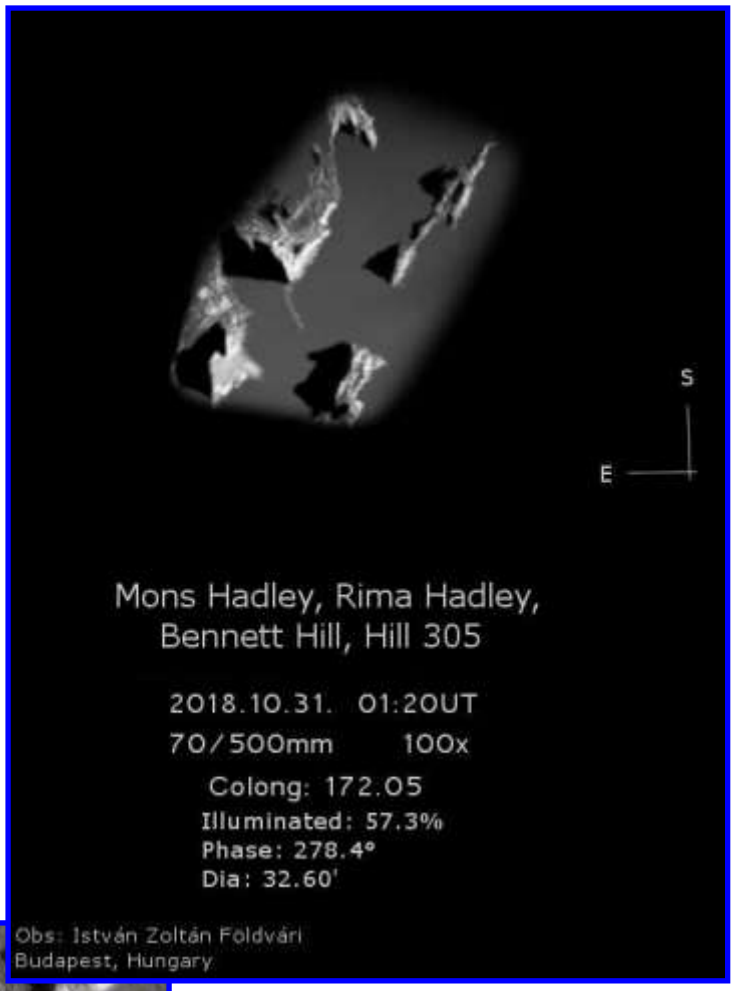
Eratosthenes, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 20:53 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Recent Topographic Studies

Cauchy (north), *Massimo Dionisi, Sassari, Italy. 2023 July 6 23:57 UT. Sky Watcher 250 mm f/5 reflector telescope, 3x X-cel Celestron barlow, Uranus C camera, IR pass filter 685 nm filter, Sky-watcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Anaximander D, *István Zoltán Földvári, Budapest, Hungary. 2019 February 16, 19:35-19:56 UT, co-longitude 55.2°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 8/10, transparency 4/6.*

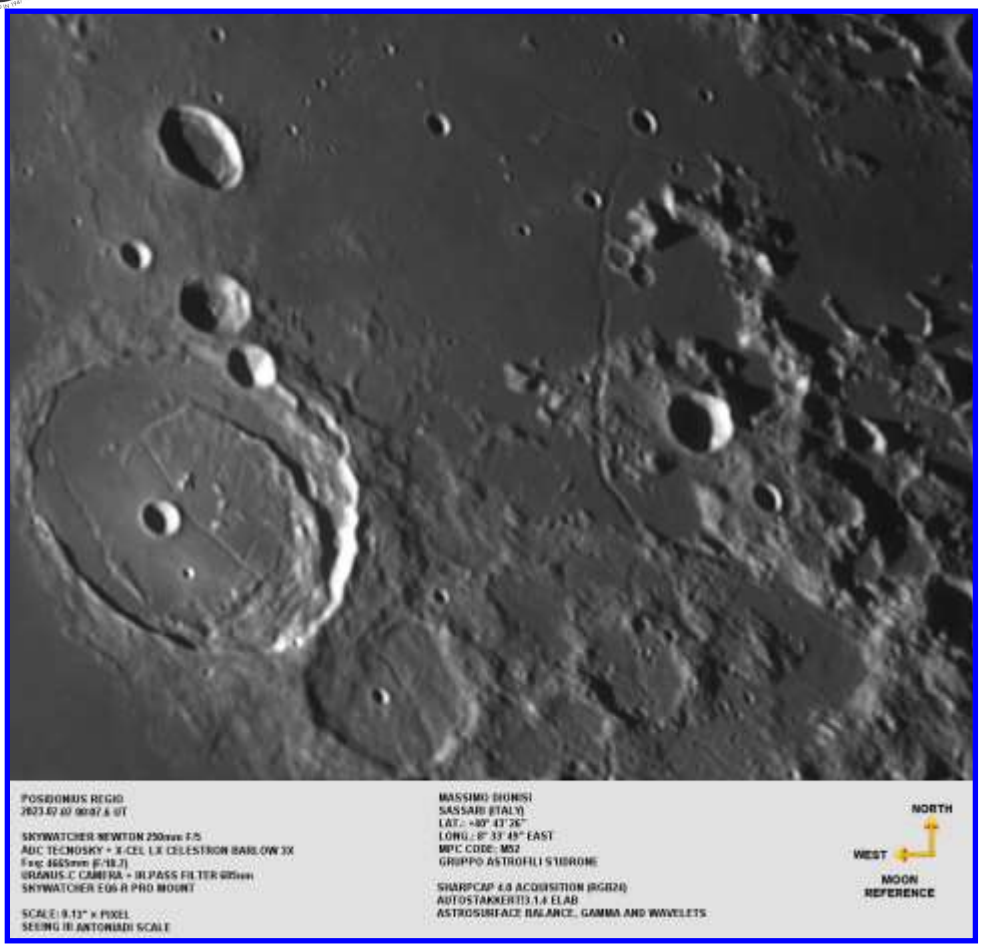
Recent Topographic Studies



Mons Hadley, Rima Hadley, Bennett Hill and Hill 305, *István Zoltán Földvári, Budapest, Hungary. 2018 October 31, 01:14-01:40 UT, colongitude 172.05°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 7/10, transparency 6/6.*

Cassini, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 21:08 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

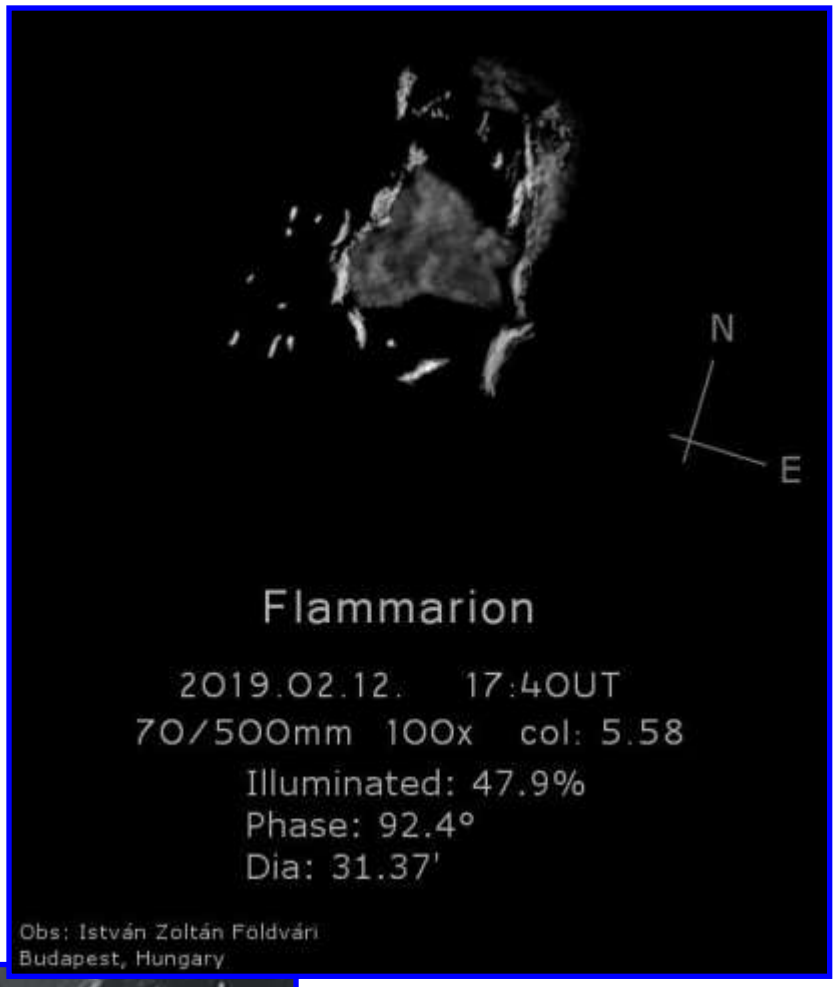
Recent Topographic Studies



Posidonius, *Massimo Dionisi, Sassari, Italy. 2023 July 7 00:07 UT. Sky Watcher 250 mm f/5 reflector telescope, 3x X-cel Celestron barlow, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Lassell, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 19:52 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Recent Topographic Studies



Flammarion, *István Zoltán Földvári, Budapest, Hungary. 2019 February 12, 17:39-18:00 UT, colongitude 5.5°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 6/10, transparency 3/6.*

Mons Pico, *Massimo Dionisi, Sassari, Italy. 2023 July 11 01:27 UT. Sky Watcher 250 mm f/5 reflector telescope, Tecnosky Teleextender 5x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Recent Topographic Studies

Cavendish, Cavendish A,E, F, *István Zoltán Földvári, Budapest, Hungary. 2019 February 16, 19:56-20:13 UT, colongitude 55.3°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 8/10, transparency 5/6.*

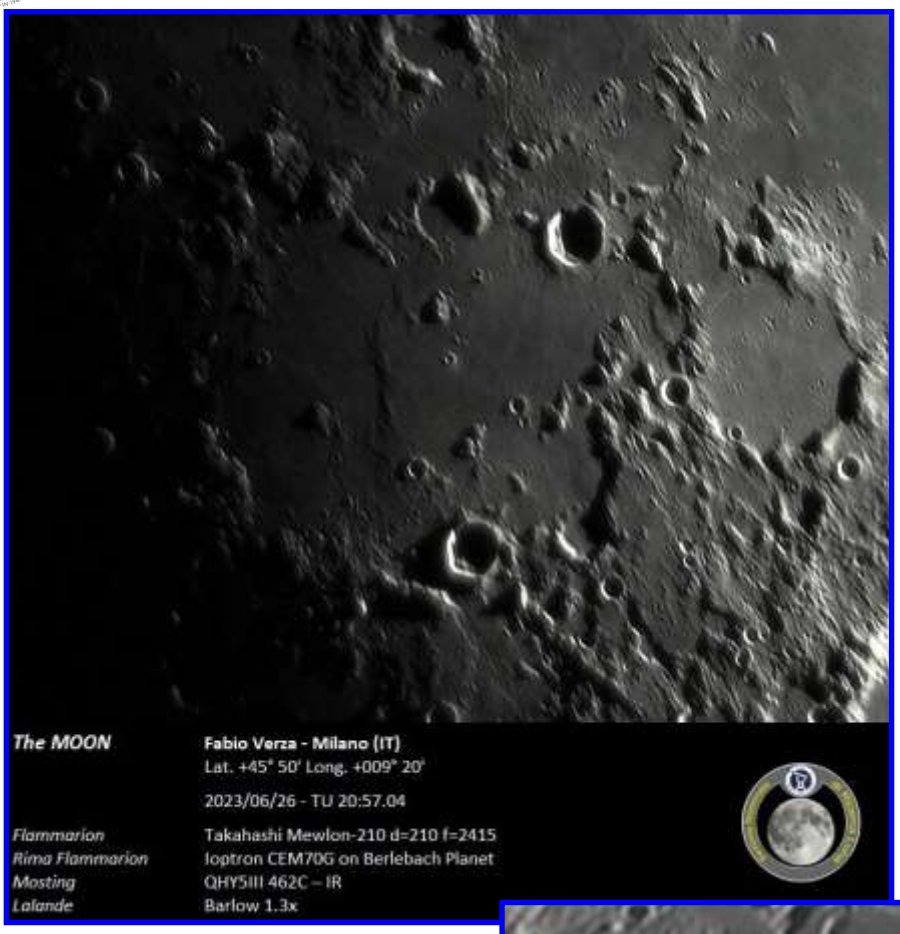
Archimedes, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 20:49 UT. Takahashi Mewlon 210 mm Dall -Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Recent Topographic Studies

Gassendi, *István Zoltán Földvári, Budapest, Hungary. 2019 February 16, 20:13-20:37 UT, colongitude 55.4°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 8/10, transparency 5/6.*

Mons Pico, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 21:11 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Recent Topographic Studies



Flammarion, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 20:57 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

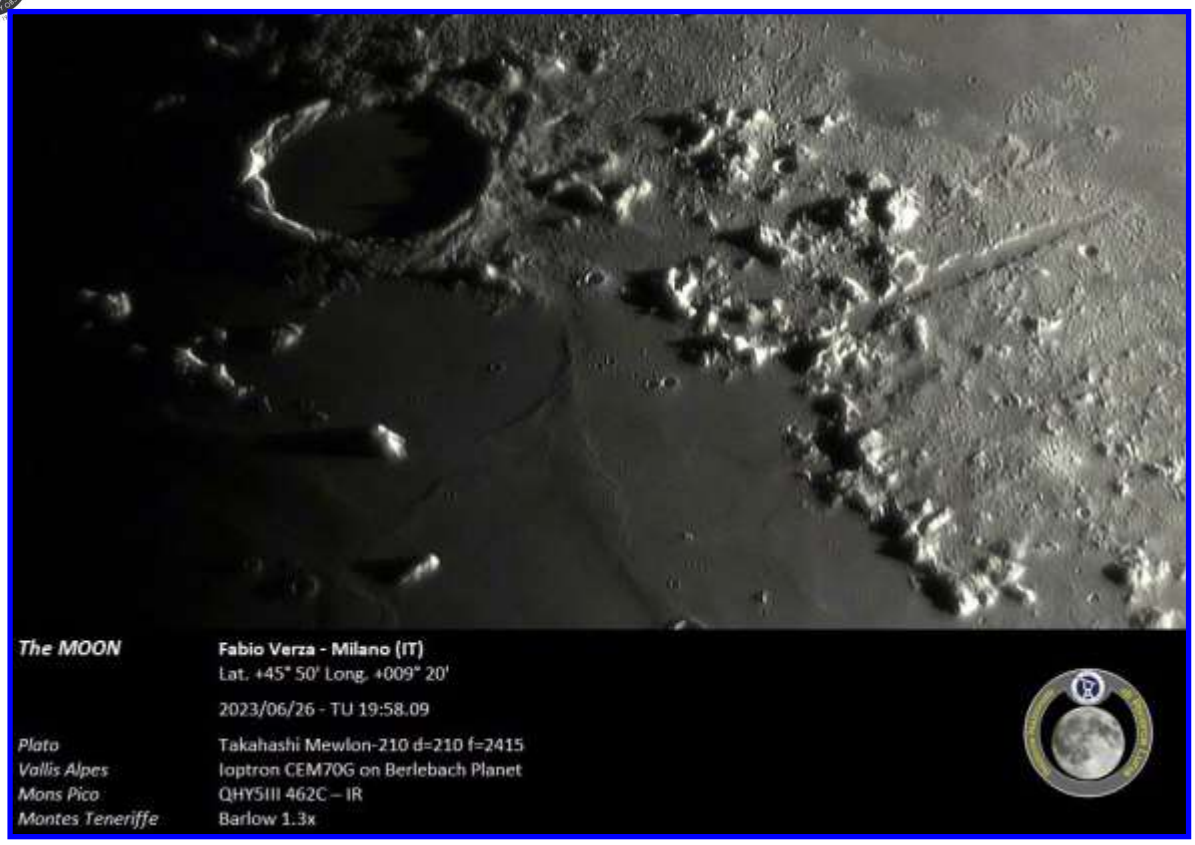
Montes Teneriffe, *Massimo Dionisi, Sassari, Italy. 2023 July 11 01:24 UT. Sky Watcher 250 mm f/5 reflector telescope, Tecnosky Teleextender 5x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Recent Topographic Studies

Aristoteles, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:27 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

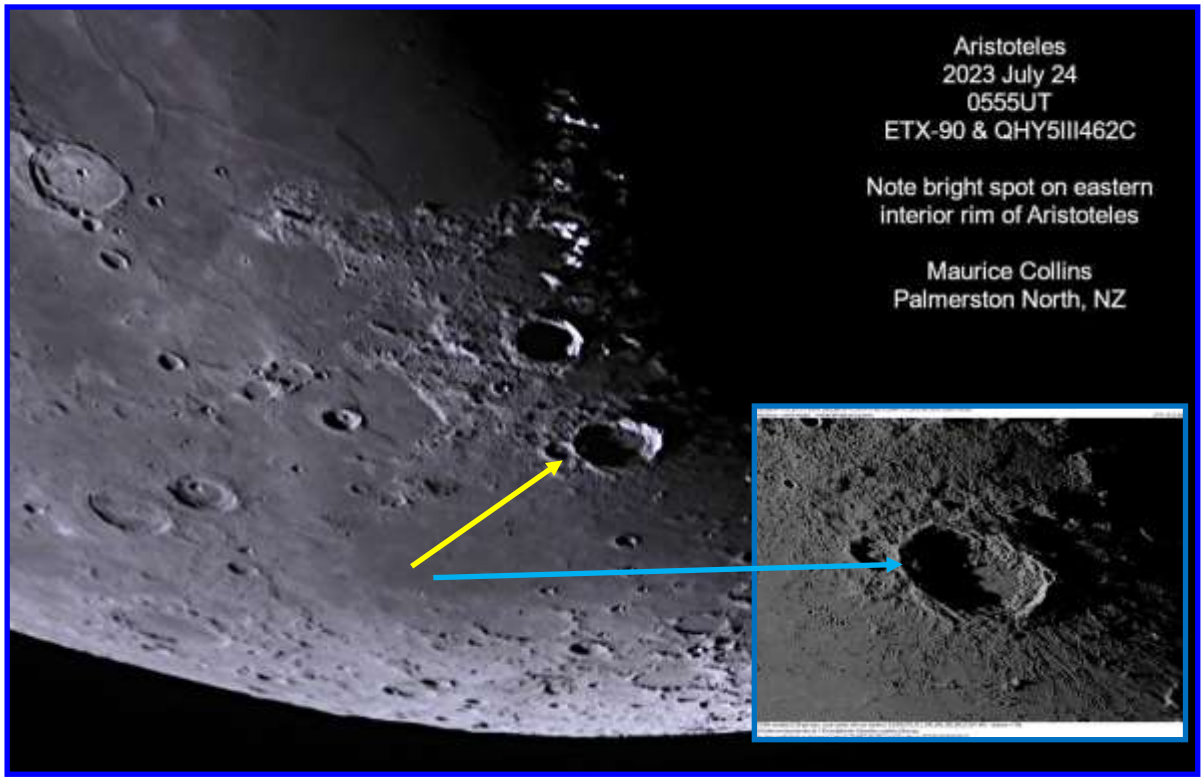
Plato, *Massimo Dionisi, Sassari, Italy. 2023 July 11 01:11 UT. Sky Watcher 250 mm f/5 reflector telescope, Tecnosky Teleextender 5x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Recent Topographic Studies



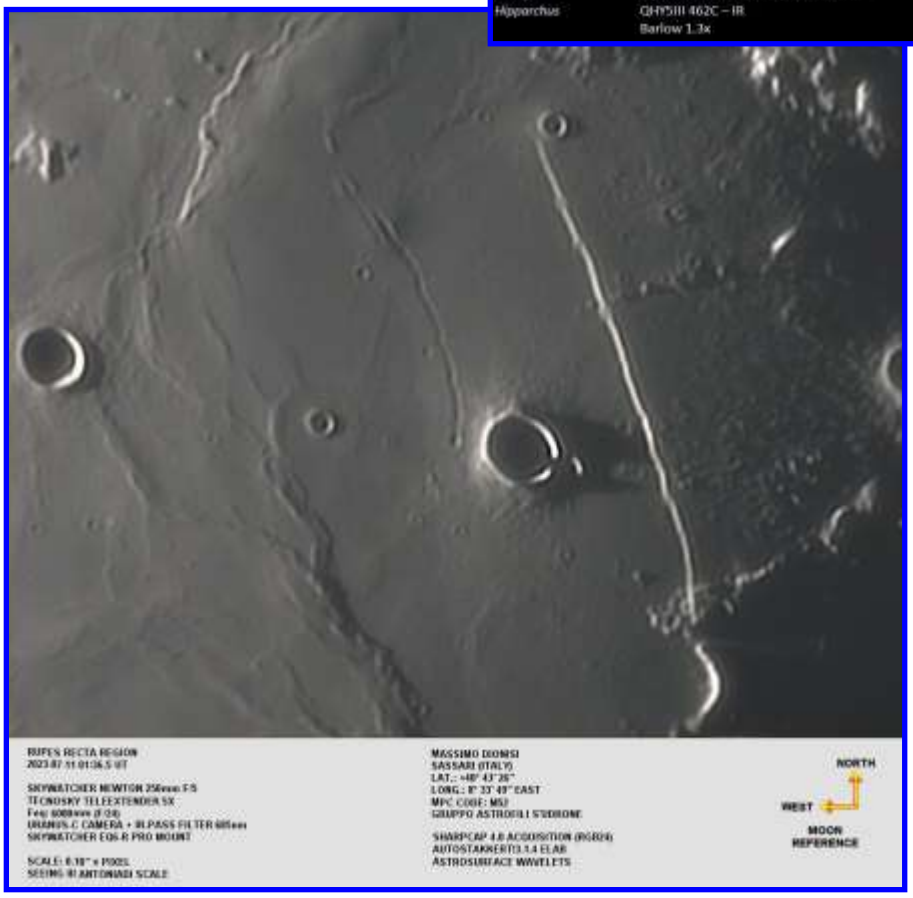
Plato, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 19:58 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Aristoteles, *Maurice Collins, Palmerston North, New Zealand. 2023 July 24 05:55 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera. North is down, west is right. Insert is Aristoteles LTVT image. Note the bright spot on eastern limb. Maurice adds: "*I had a look at the point of light on Aristoteles eastern rim using LTVT and it shows as just a part of the wall being higher and lit by the sun. It was more obvious to the eye at the telescope than in my image. No TLP or mystery, just normal sunrise. The most magnification I had on the ETX-90 was 100x (12.5mm eyepiece)."



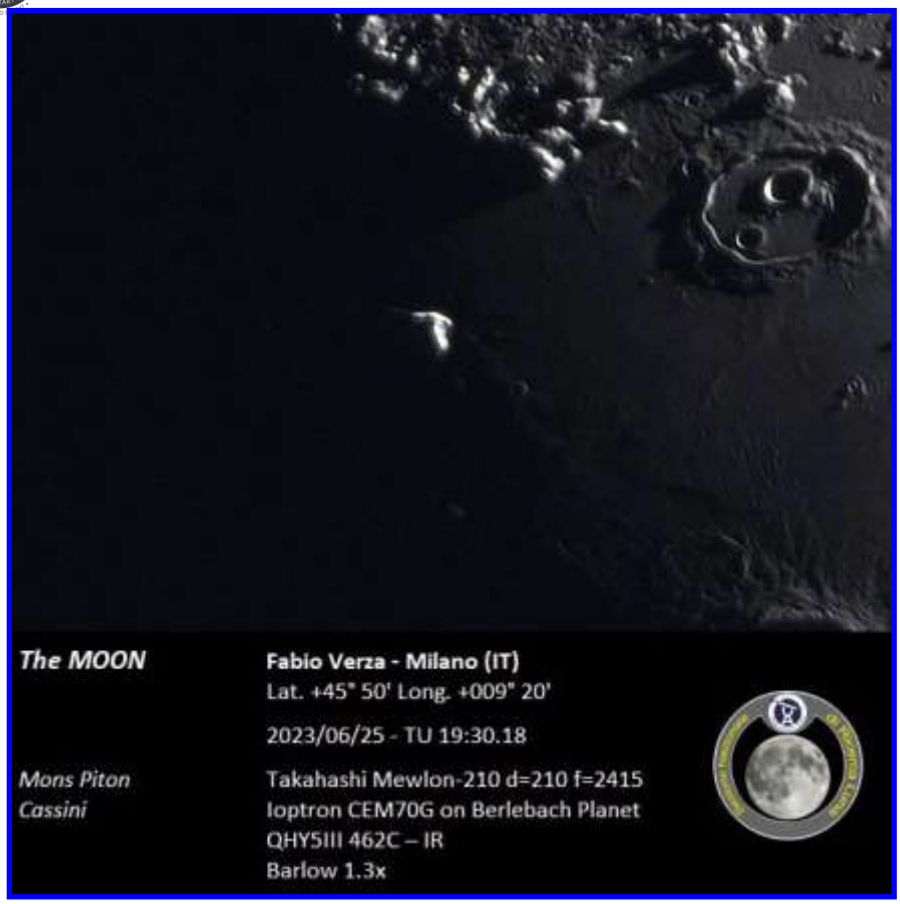
Recent Topographic Studies

Albategnius, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 20:09 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*



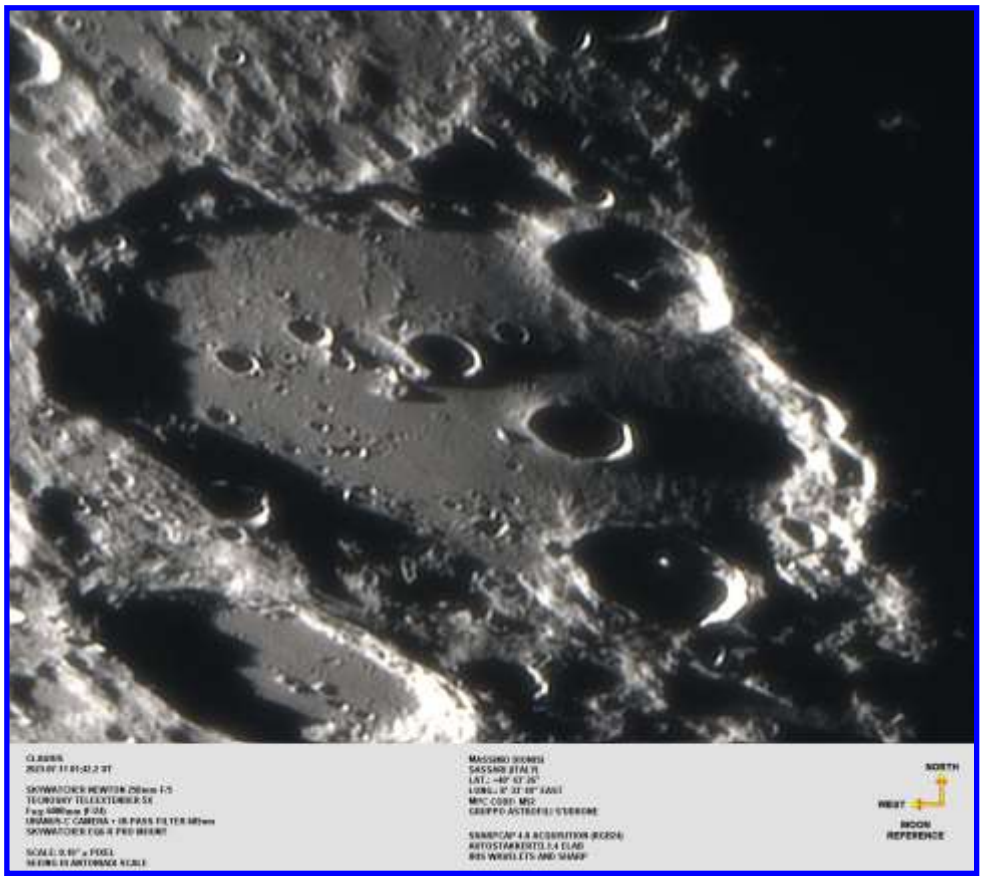
Rupes Recta, *Massimo Dionisi, Sassari, Italy. 2023 July 11 01:36 UT. Sky Watcher 250 mm f/5 reflector telescope, Tecnosky Teleextender 5x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Recent Topographic Studies



Mons Piton, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:30 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Clavius, *Massimo Dionisi, Sassari, Italy. 2023 July 11 01:42 UT. Sky Watcher 250 mm f/5 reflector telescope, Tecnosky Teleextender 5x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

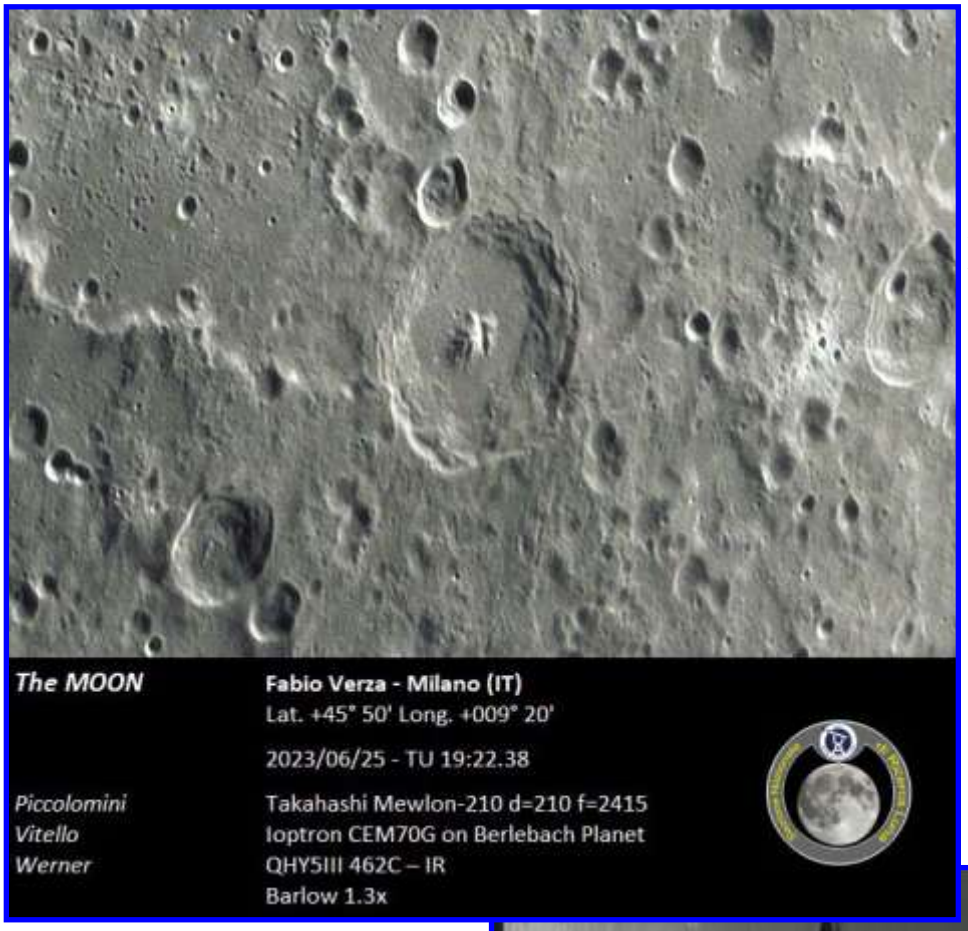


Recent Topographic Studies

Maurolycus, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:55 UT. Takahashi Mewlon 210 mm Dall -Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Aristarchus, *Massimo Dionisi, Sassari, Italy. 2023 July 14 03:26 UT. Sky Watcher 250 mm f/5 reflector telescope, Celestron X Cel LX Barlow 3x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III-IV Antoniadi scale.*

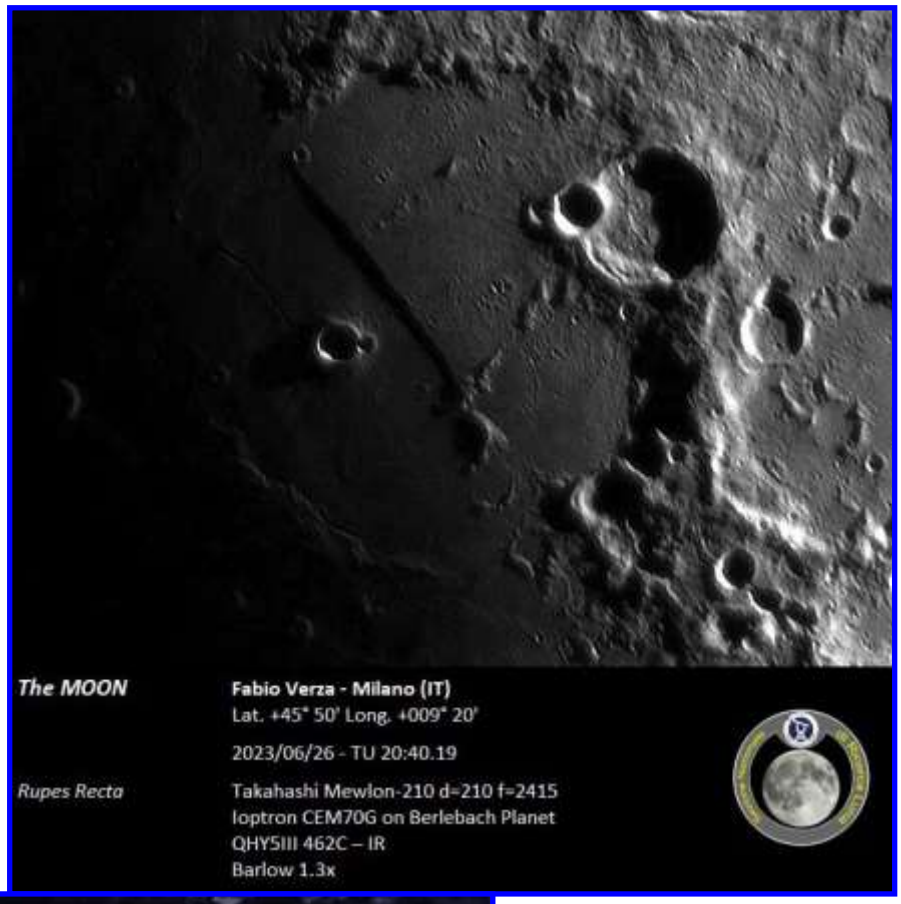
Recent Topographic Studies



Piccolomini, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:22 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Reiner Gamma, *Massimo Dionisi, Sassari, Italy. 2023 July 14 03:32 UT. Sky Watcher 250 mm f/5 reflector telescope, Celestron X Cel LX Barlow 3x, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III-IV Antoniadi scale.*

Recent Topographic Studies



Rupes Recta, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 20:40 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Tycho *Jairo Chavez, Popayán, Colombia. 2023 June 27 23:58 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is right, west is up.*

Recent Topographic Studies

Eastern Mare Imbrium, *Paul Walker, Middlebury, Vermont, USA. 2023 March 31 00:41 UT, colongitude 19.8°. 10 inch f/5.6 Newtonian reflector telescope, Meade 2x barlow, Canon Rebel T7i, HD video. Paul adds: "*This image has 3 areas I like to check out whenever I get the chance, the floor of Plato (trying to spot the craterlets there), Vallis Alpes and Rima Hadley (lower left) I find it surprising how hard it is to see even the largest of the craterlets in on Plato's floor. The 3 in this image are 2.22, 2.44 and 2.09 km (from top to bottom). A 0.97 Km craterlet just below (West) of the 2.22 Km one is not visible. Visible in the original image (this image is down sampled to 70%) but not in this version is a 1.76 Km crater on the bottom (West) edge of Plato.

On the right (south) side of Plato about the 2:30 position and between Plato and Pico C (5 km) is a very faint linear feature (not visible in the image here but should be on the image in the ALOP gallery). Lunar Reconnaissance Orbiter (LRO) images it show it to be a series of craterlets of a collapsed lava tube. At the 3:30 position, on the outside slope of Plato is a dark (shadowed) linear feature, which also appears to be of volcanic origin. As I was looking at this particular area on the LRO imagery what I took to be a moderate sized crater at the 3:00 position on the edge of the debris flow, looks more like a large volcanic vent. But maybe it is a pre-existing crater that was heavily modified by the creation of Plato? On to Vallis Alpes (upper left). The rille going down the middle of it is just visible in this image. I have yet definitely to see this rile visually.

The more I study this image the more features I see that I was not aware. I just noticed a Rima Plato II (as labeled on the Lunar Astronautical Chart (LAC) #12), a very narrow rile about 2/3 of the way from the top (East) side of Plato to the West end of Vallis Alpes. Not to be confused with the prominent rille labeled as Rima Plato I on the LAC. A bit more of Rima Plato II is visible on the original of this image. You will have to download the linked image from the APLO gallery for a better view. (upper right) Most of Rima Hadley is visible in this image as is most of the Rima Fresnel system (lower right). I don't have the whole of the two new rilles near Beer crater that KC Pau talks about in his article on page 16 of the July "The Lunar Observer" but I do have the "Catena Beer" craterlet string and the crater farther out that "Rima Beer" goes through. I don't have "Rima Beer E" but I do have the two craterlets to the East (up) that appear to be associated with it.A little left of center, 5:00 from Piazzi Smyth, a 22Km crater, I spotted the small crater Piazzi Smyth V. It is a very elongated grazing impact crater that should be visible in most telescopes. It is ~4.6

Recent Topographic Studies

Ptolemaeus, *Fabio Verza, SNdR, Milan, Italy. 2023 June 26 21:01 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

6.5-day old Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 24 05:51-0057 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera. North is down, west is right.*

Recent Topographic Studies

Mare Vaporum, *Paul Walker, Middlebury, Vermont, USA. 2023 March 31 02:52 UT, colongitude 20.9°. 10 inch f/5.6 Newtonian reflector telescope, Meade 2x barlow, Canon Rebel T7i, HD video. Paul adds: "*Here we have the southern 2/3's of Mare Vaporum on the far left, Rima Hyginus to the upper right of that, Triesnecker crater and the Triesnecker rille system left of center and a little above center. Sinus Medii is bottom center with Rima Oppolzer faintly visible off it's right side. A little to the upper right of this (lower right of Seeliger crater) we have Rima Reaumur. In the upper right corner is the barely noticeable Hipparchus crater It is the large roundish flat area, that in this image looks like a heart on it's side with the top to the right an the prominent fresh crater Horrocks sitting squarely in the bottom of the heart.

Throughout this area in the higher terrain are broad eroded striations aligned with each other and with Mare Imbrium indicting they were recreated by material blasted out by that impact that created Imbrium. The sun angle was clearly not optimal for the smaller rilles. However, this same night I visually concentrated on the Triesnecker Rille system and was able to see what is visible in this image using an 8" f/6 Dobsonian with binoviewers at 244x. Rima Hyginus is about 4 Km wide per the Virtual Moon Atlas (VMA) and easy to see. It is even visible at Full Moon. The rilles in the Triesnecker Rille system vary considerably in width and depth making some parts very hard to detect. The VMA lists Triesnecker as 2 km wide. Measuring the widest parts from my original image (0.20"/ px, 0.38 Km/px at the Moon's distance at the time) I get more like ~2.7-3.1 km. For the narrower parts I get ~1.5-1.9 km. Rima Oppolzer is listed at 2 km wide (VMA) but from my image I measure it to be more like 3.8 km. Using the Lunar Reconnaissance Orbiter 500MB Mosaic (LROM) I find that Oppolzer in it's wider parts is about 1.5x wider then Triesnecker. Rima Reaumur is about 1.5 km wide (VMA). From my image I measure it to be about 2.3-2.7 km. Using the LROM Reaumur is about 0.8x Triesnecker's widest parts."

Recent Topographic Studies

Boussingault, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:52 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Waxing Gibbous Moon, 98%, *Jairo Chavez, Popayán, Colombia. 2023 June 03 03:08 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is down, west is right.*

Recent Topographic Studies

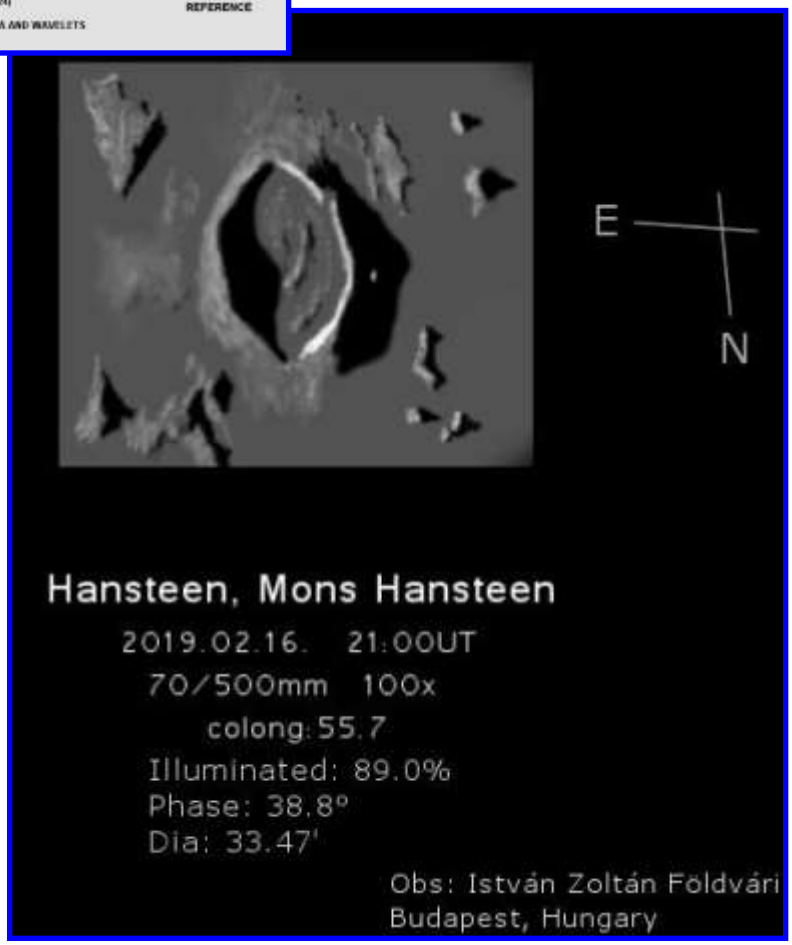
Theophilus, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 20:05 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Full Moon, *Jairo Chavez, Popayán, Colombia. 2023 June 04 03:00 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera.*

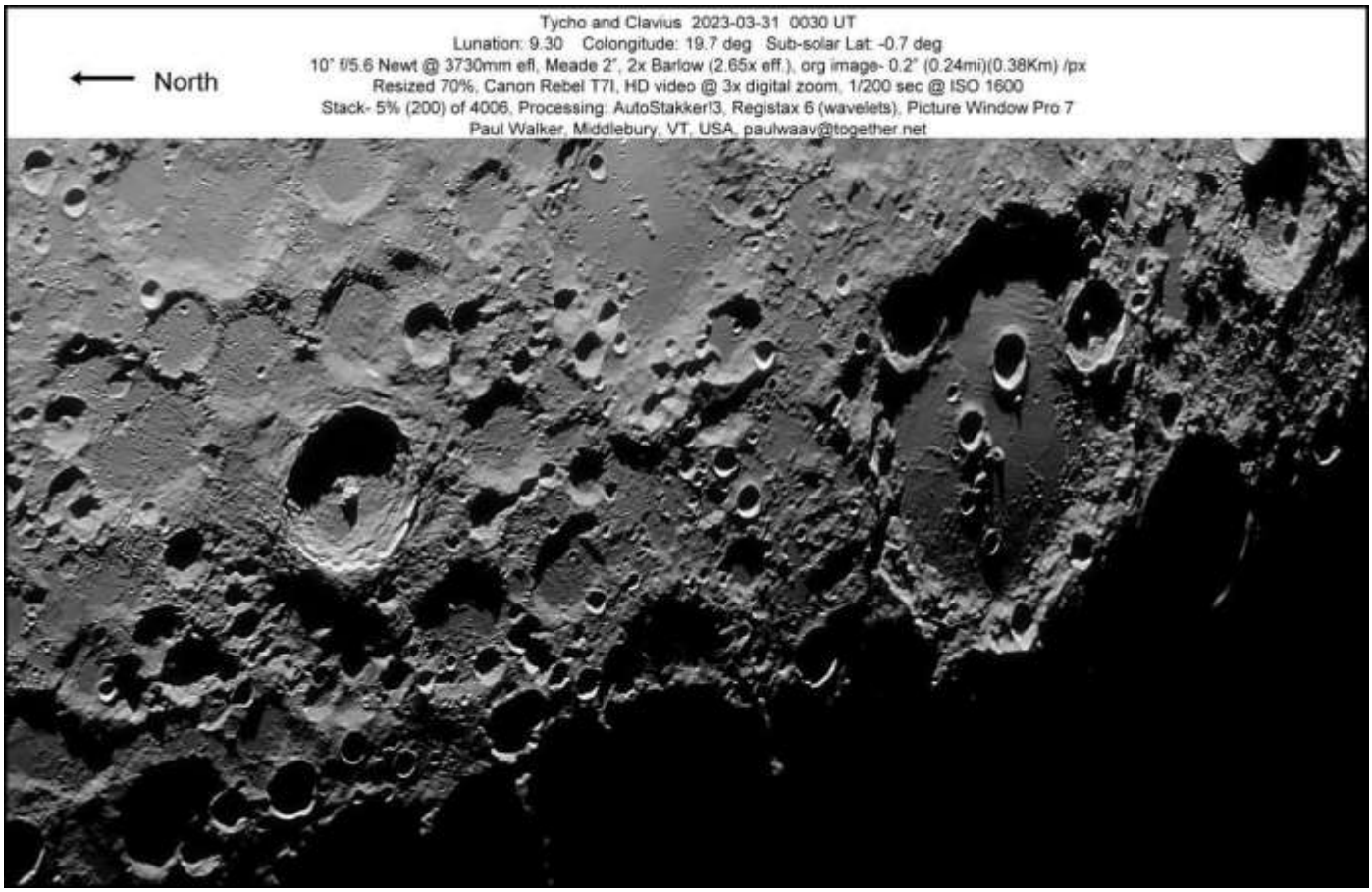
Recent Topographic Studies

Cauchy (south), *Massimo Dionisi, Sassari, Italy. 2023 July 6 23:59 UT. Sky Watcher 250 mm f/5 reflector telescope, 3x X-cel Celestron barlow, Uranus C camera, IR pass filter 685 nm filter, Skywatcher EQ6 Pro mount. Seeing III Antoniadi scale.*

Hansteen and Mons Hansteen, *István Zoltán Földvári, Budapest, Hungary. 2019 February 16, 20:57-21:28 UT, colongitude 55.9°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 8/10, transparency 5/6.*

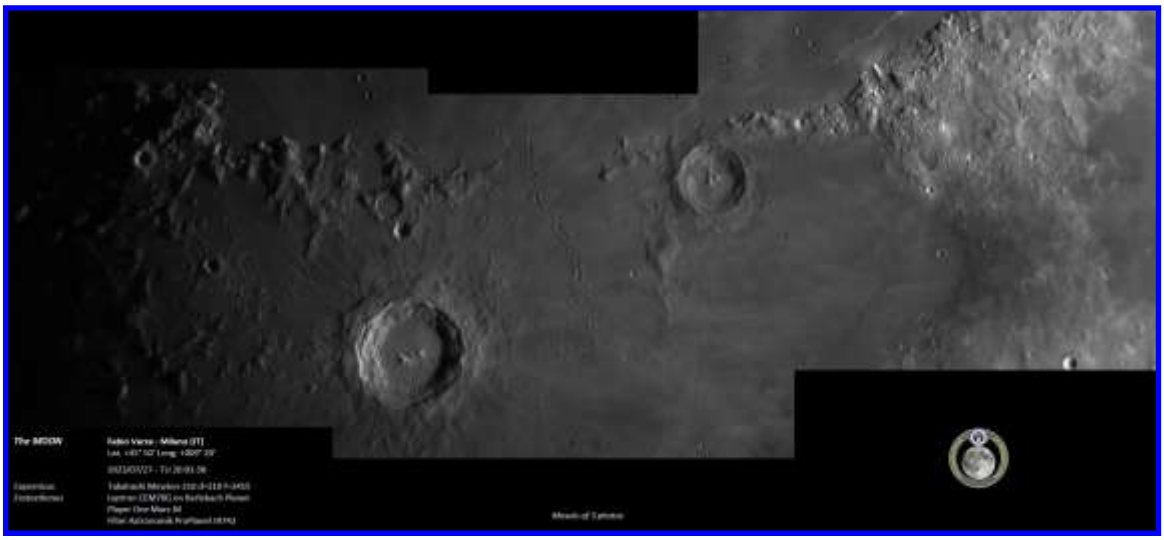


Recent Topographic Studies



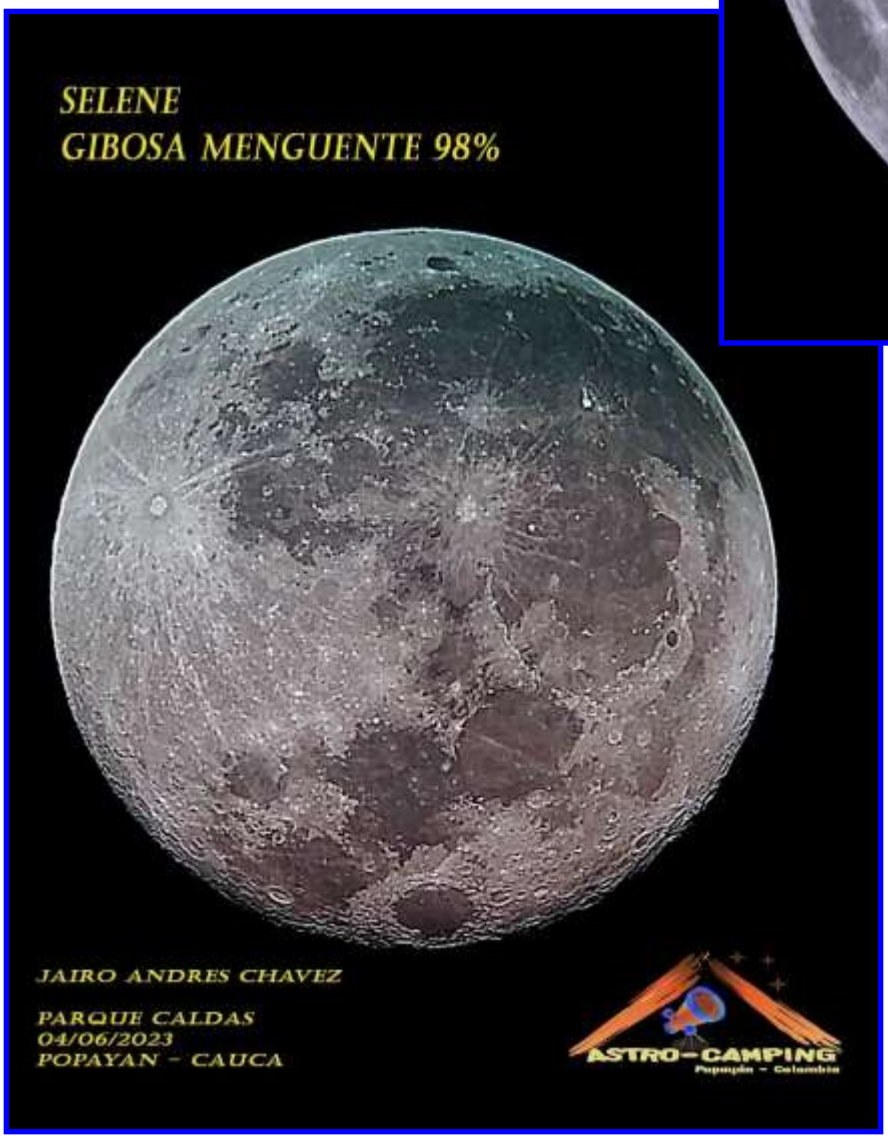
Tycho and Clavius, *Paul Walker, Middlebury, Vermont, USA. 2023 March 31 00:30 UT, colongitude 19.7°. 10 inch f/5.6 Newtonian reflector telescope, Meade 2x barlow, Canon Rebel T7i, HD video. Paul adds: "*Notice the particularly smooth patches above (East) and left (North) of Tycho. No doubt this is debris from the impact that created Tycho. It is interesting that even looking at spacecraft images that there does not seem to be similarly smooth patches in other directions, though material flowed out in all directions. There are also many dozens of very small craters surrounding Tycho. Most are probably secondary craters from the impact as the density of small crater drops off quite quickly."

Copernicus *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 20:03 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*



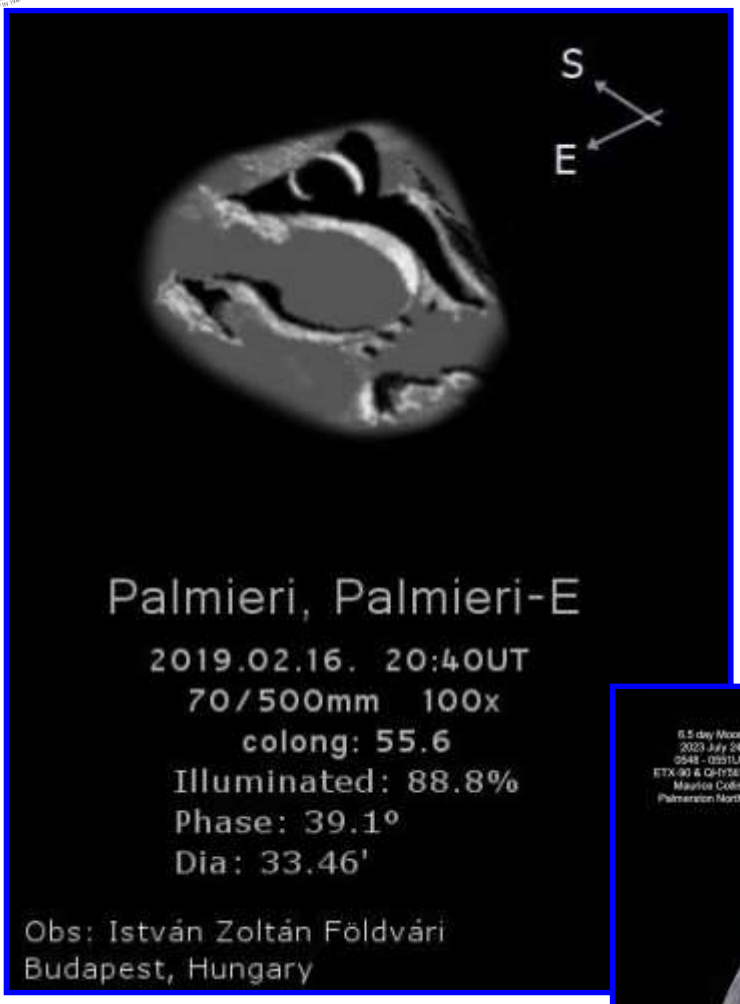
Recent Topographic Studies

8.6-day old Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 26 09:36-09:40 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera. North is down, west is right. Maurice adds: "*Once again it was clear last night, but the seeing was poor (A-IV). I took lots of videos but only some were usable. The seeing settled down for this sequence enough to be usable just at the very end of my session. It was bitterly cold out so wasn't sure if I would go out. But glad I did."



Waning Gibbous Moon, 98%, *Jairo Chavez, Popayán, Colombia. 2023 June 05 02:41 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is right, west is up.*

Recent Topographic Studies



Palmieri, *István Zoltán Földvári, Budapest, Hungary. 2019 February 16, 20:38-20:58 UT, colongitude 55.6°. 70 mm refractor telescope, 500 mm focal length, 100x. Seeing 8/10, transparency 5/6.*

6.5-day old Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 24 05:48-00:51 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera. North is down, west is right.*

Recent Topographic Studies

Janssen, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 20:01 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

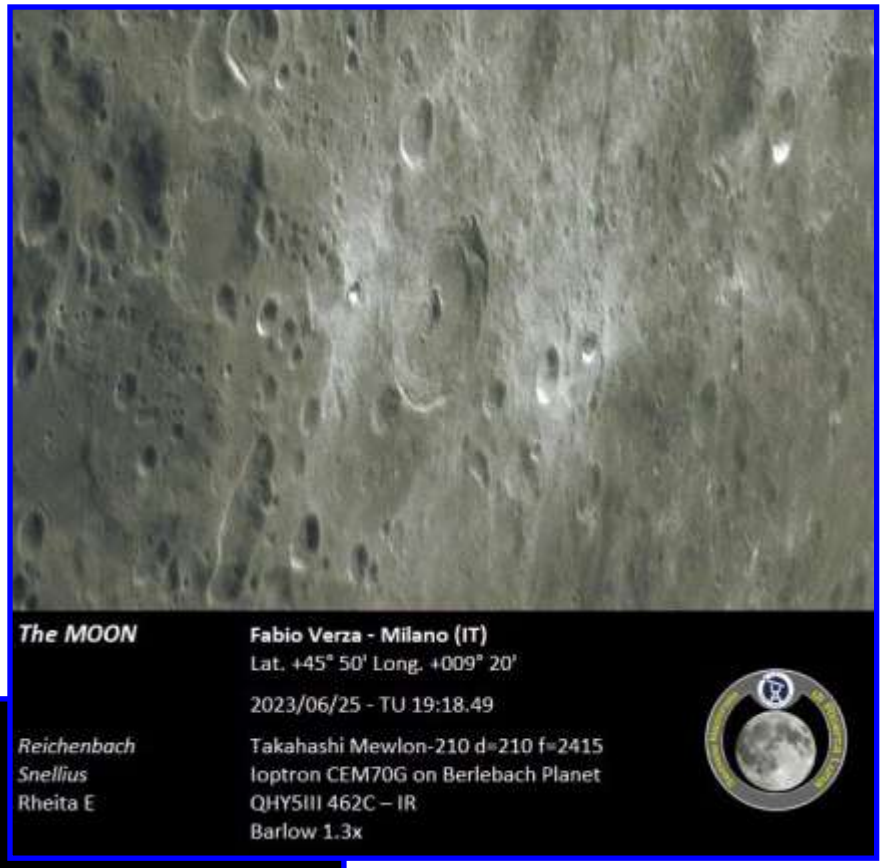
Waxing Crescent Moon, 4%, *Jairo Chavez, Popayán, Colombia. 2023 June 19 23:37 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is right, west is up.*

Recent Topographic Studies

Mare Vaporum, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:47 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Lunar North Pole, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 19:40 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*

Recent Topographic Studies

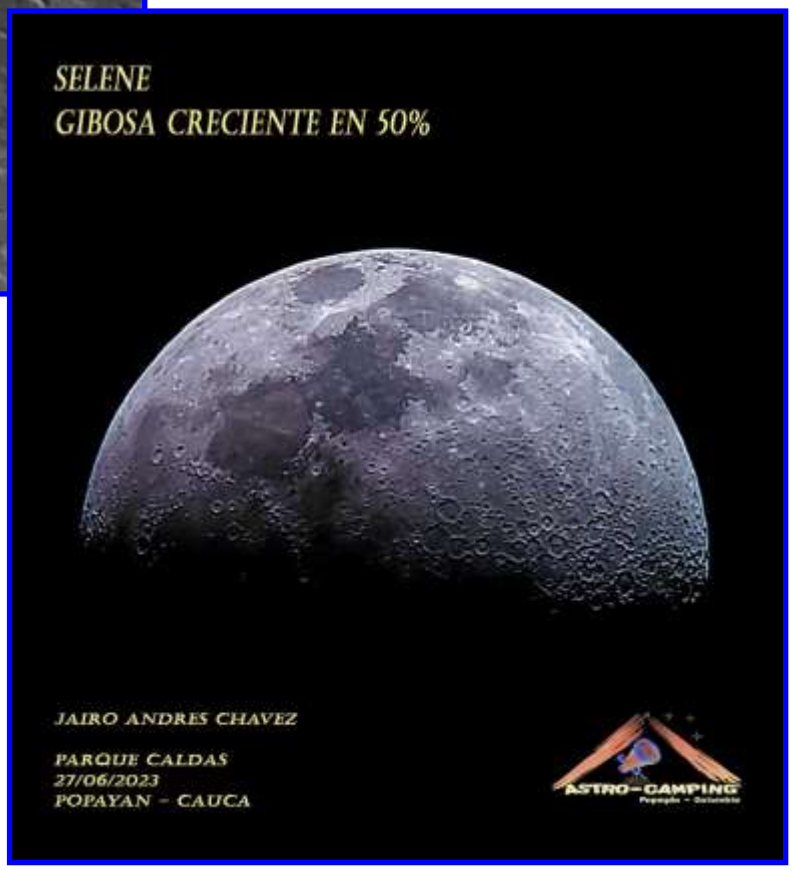


Reichenbach, *Fabio Verza, SNdR, Milan, Italy. 2023 June 25 19:18 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, 1.3x barlow, QHY5III462C camera, -IR filter.*

Waxing Crescent Moon, 23%, *Jairo Chavez, Popayán, Colombia. 2023 June 24 01:31 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is right, west is up.*

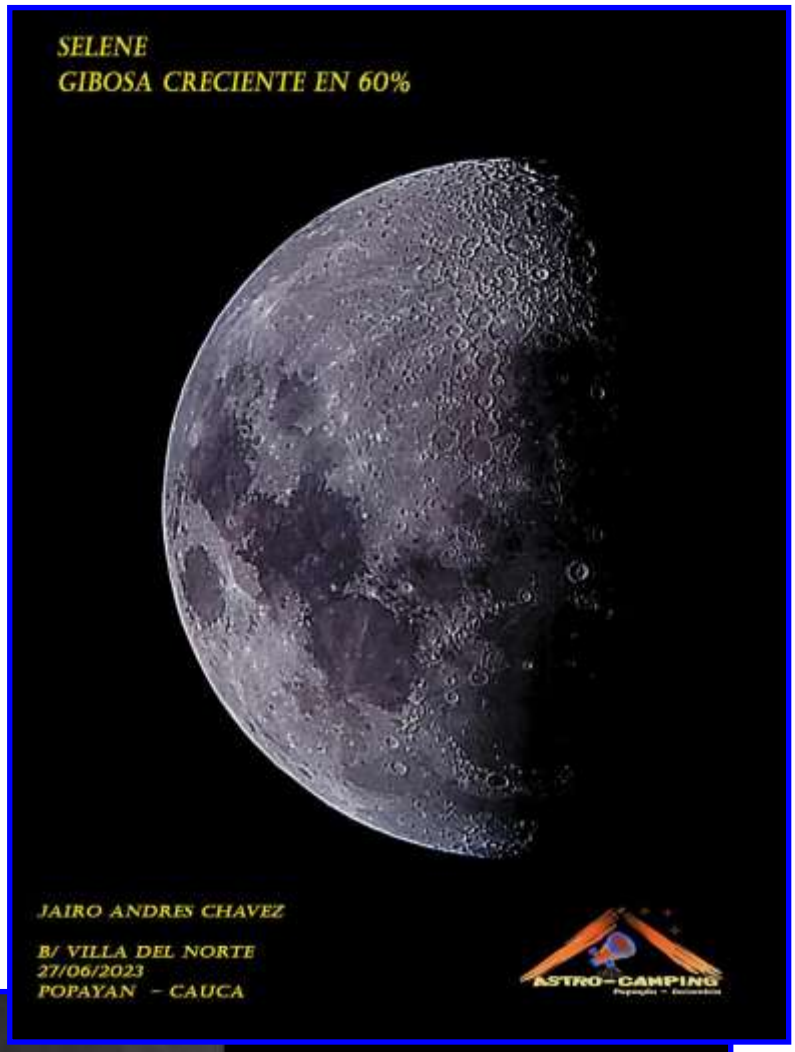
Recent Topographic Studies

Montes Apenninus, *Gregory Shanos, Sarasota, Florida, USA. 2023 July 10 07:57 UT. Meade 10 inch LX200 f/10 Schmidt-Cassegrain telescope, IR cut filter, Optec 66.2 focal reducer, ZWO ASI178mm camera. Seeing 8/10, transparency 4/10. Greg adds: "*Wanning 47% phase Moon on July 10, 2023 at 7h 56.7m UT (3:57 am local time). Seeing was 8/10 very good however transparency 4/10 was below average with haze and passing cloud banks. Image was taken with a Meade LX200GPS 10-inch SCT, a ZWO ASI 178MM with an IR cut filter and Optec f6.2 focal reducer. The rayed crater Copernicus (left) and Eratosthenes (center) are clearly visible. The mountain range Montes Apennini-nus is illuminated on one side. The three craters on the upper right of the image are Archimedes, Autolycus and Aristillus. Image by Gregory T. Shanos."



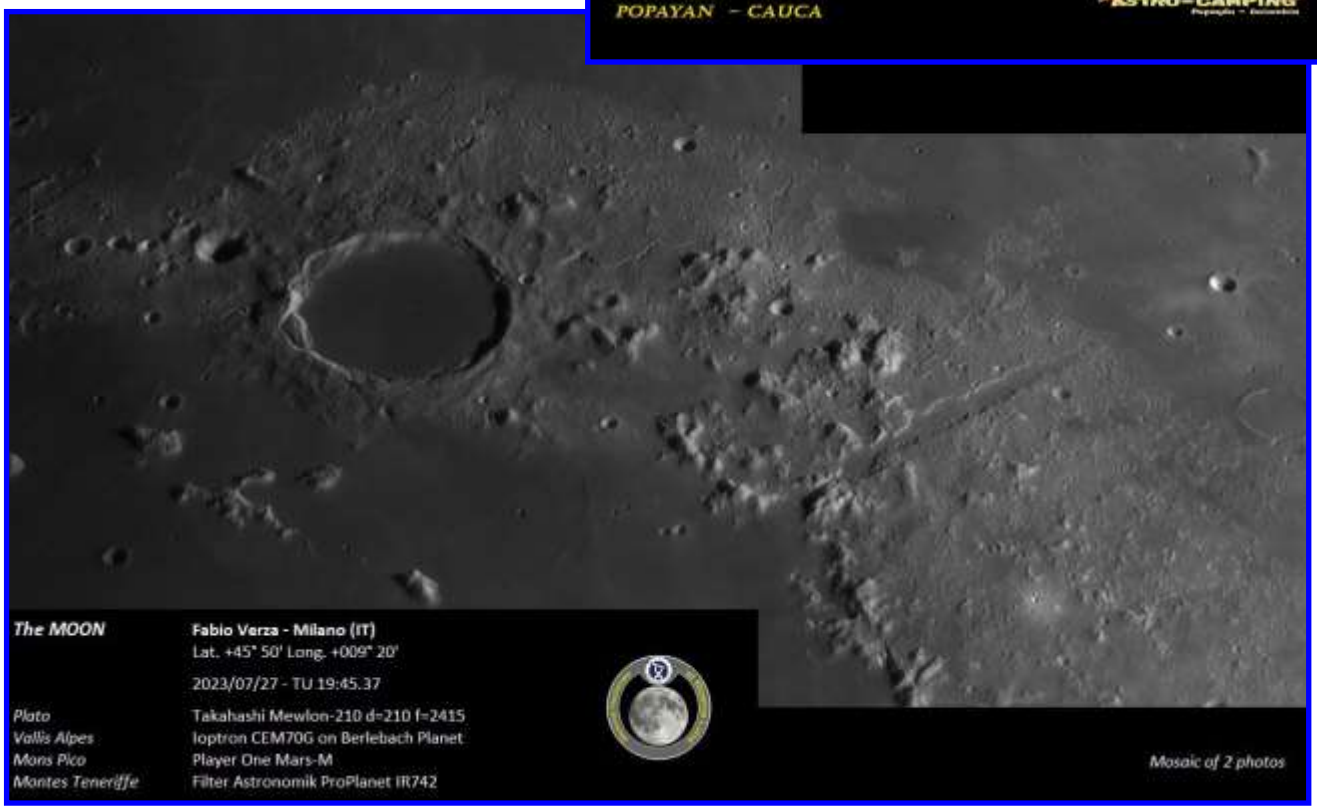
First Quarter Moon, 50%, *Jairo Chavez, Popayán, Colombia. 2023 June 27 01:19 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is left, west is down.*

Recent Topographic Studies

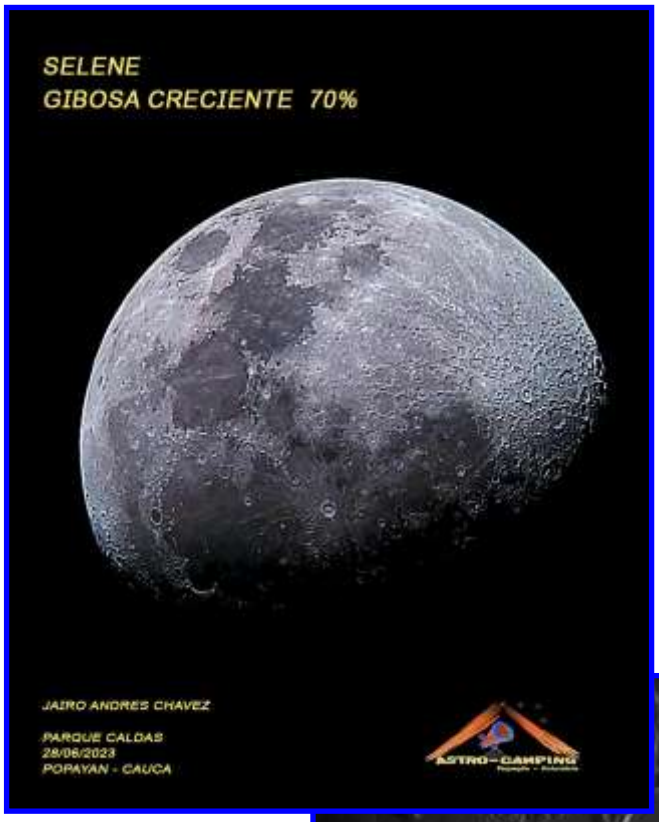


Waxing Gibbous Moon, 60%, *Jairo Chavez, Popayán, Colombia. 2023 June 27 23:49 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is down, west is right.*

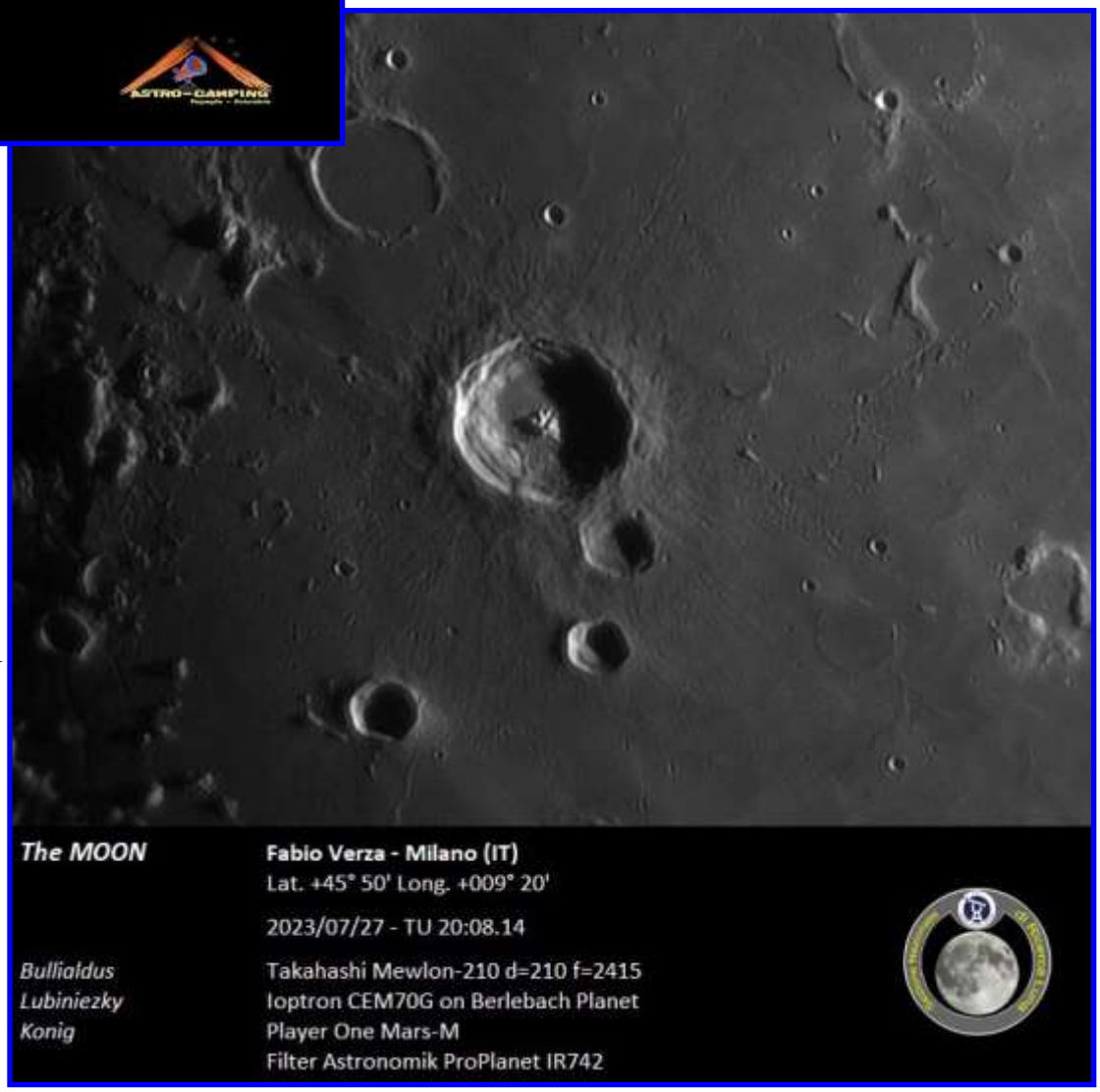
Plato, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 19:45 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*



Recent Topographic Studies

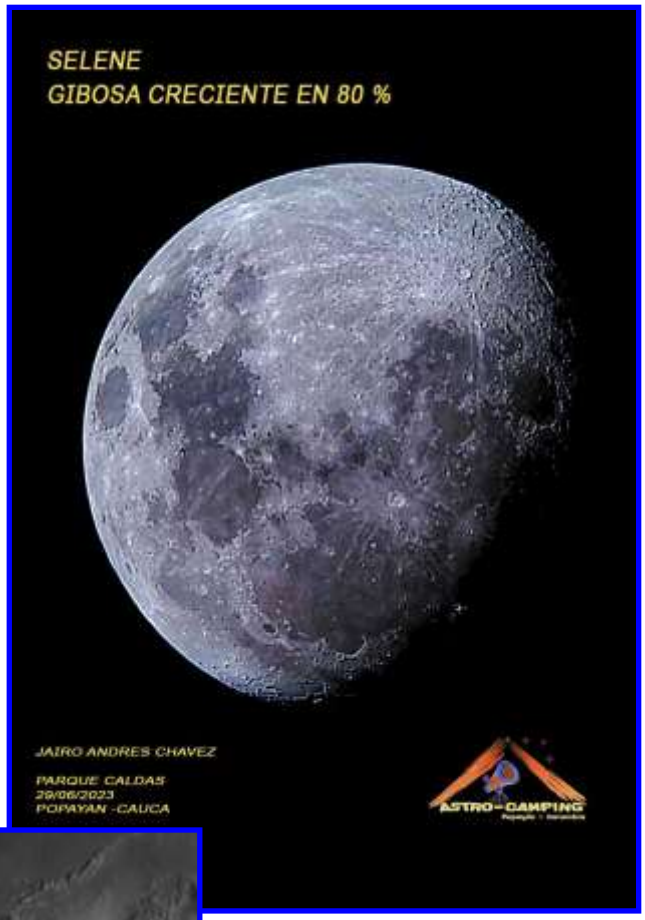


Waxing Gibbous Moon, 70%, *Jairo Chavez, Popayán, Colombia. 2023 June 29 02:34 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is left, west is down.*

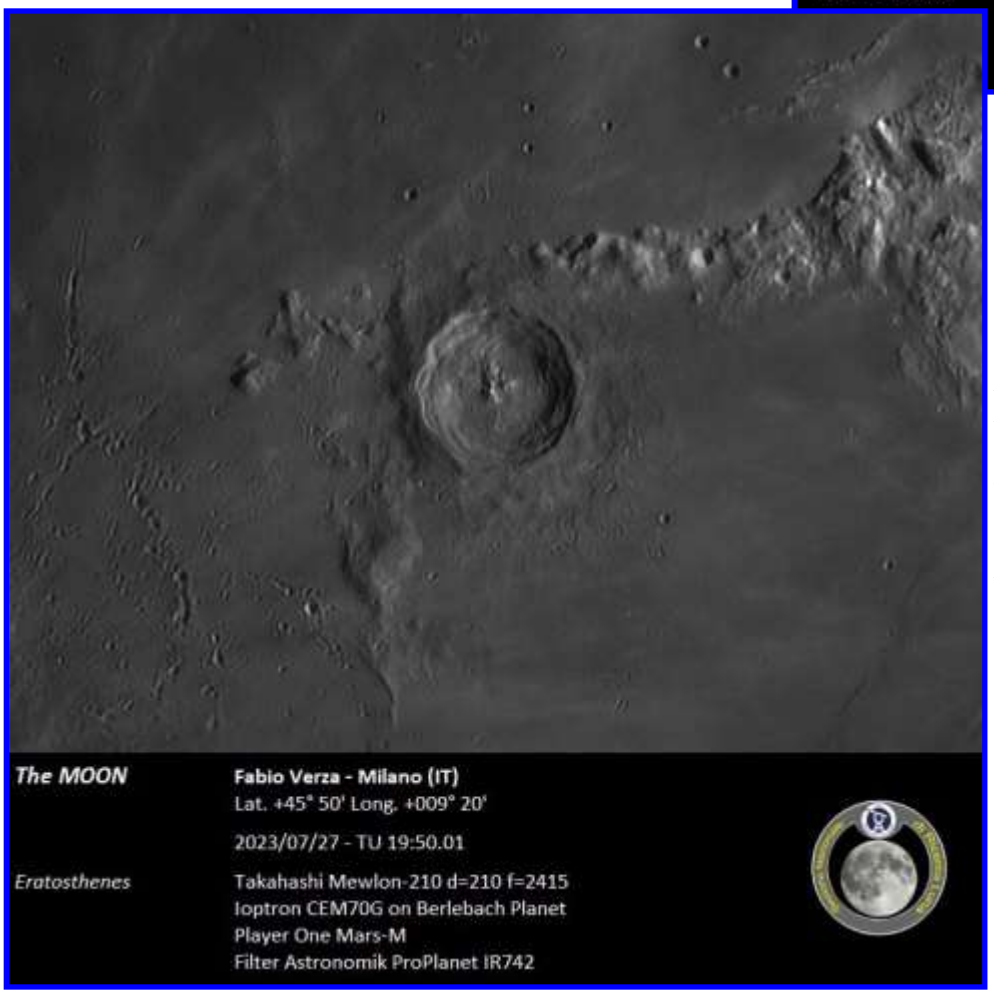


Bullialdus, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 20:08 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*

Recent Topographic Studies



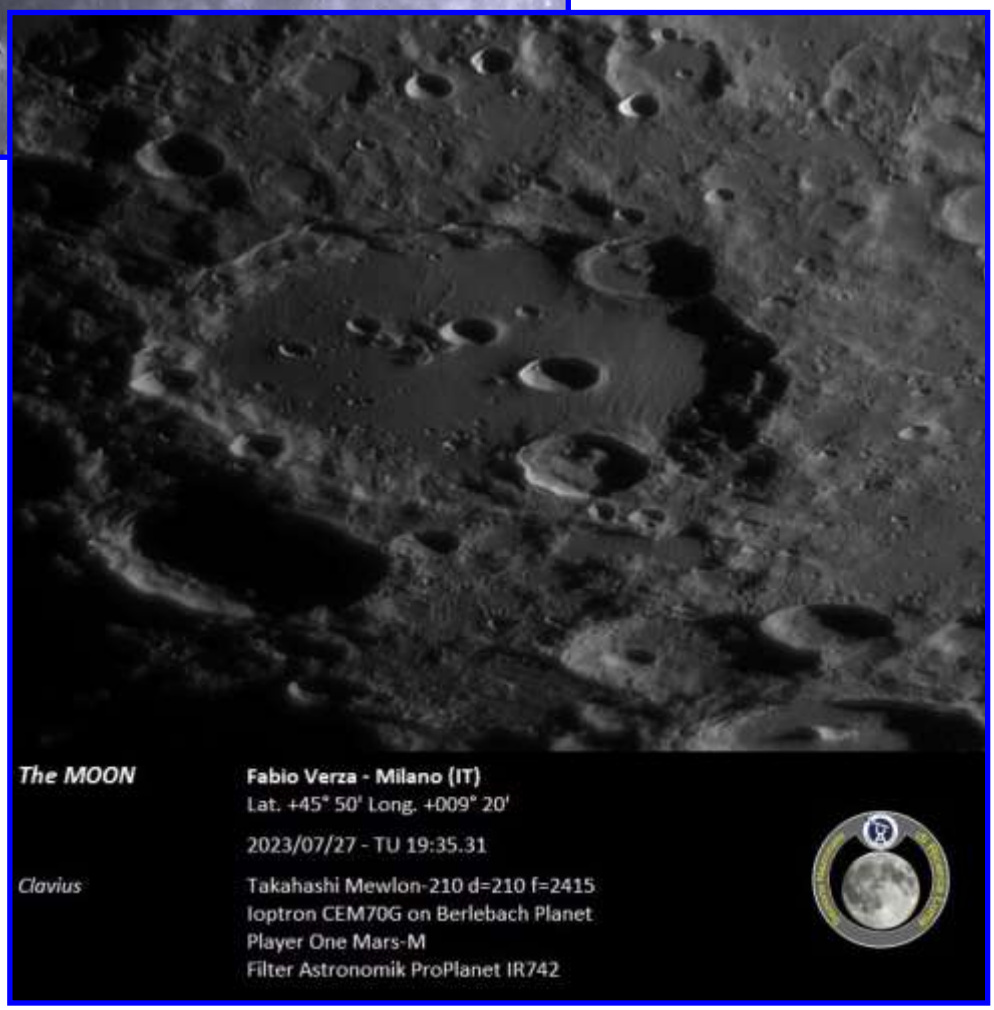
Waxing Gibbous Moon, 80%, *Jairo Chavez, Popayán, Colombia. 2023 June 30 01:51 UT. 311 mm truss tube Dobsonian reflector telescope, MOTO E5 PLAY camera. North is down, west is right.*



Eratosthenes, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 19:50 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik Pro-Planet IR742 nm filter, Player One Mars-M camera.*

Recent Topographic Studies

Sinus Iridum, *Maurice Collins, Palmerston North, New Zealand. 2023 July 28 09:25 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*



Clavius, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 19:35 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*

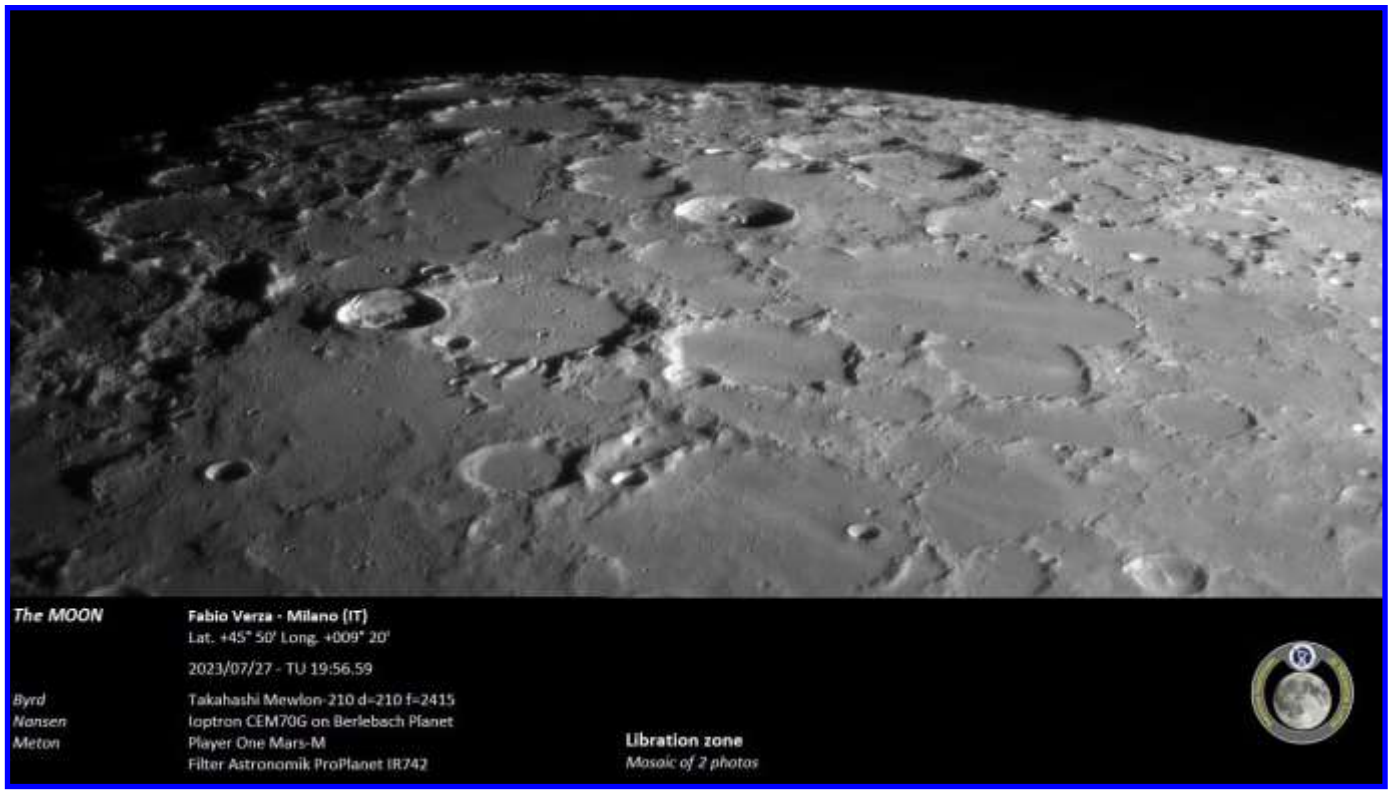
Recent Topographic Studies

Millichius domes and Kepler, *Maurice Collins, Palmerston North, New Zealand. 2023 July 28 09:25 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*

Pitatus, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 20:11 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik Pro-Planet IR742 nm filter, Player One Mars-M camera.*

Recent Topographic Studies

Plato and the Alpine Valley, *Maurice Collins, Palmerston North, New Zealand. 2023 July 28 09:23 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*
Meton, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 19:56 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*



Recent Topographic Studies

Gassendi, *Maurice Collins, Palmerston North, New Zealand. 2023 July 28 09:25 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*

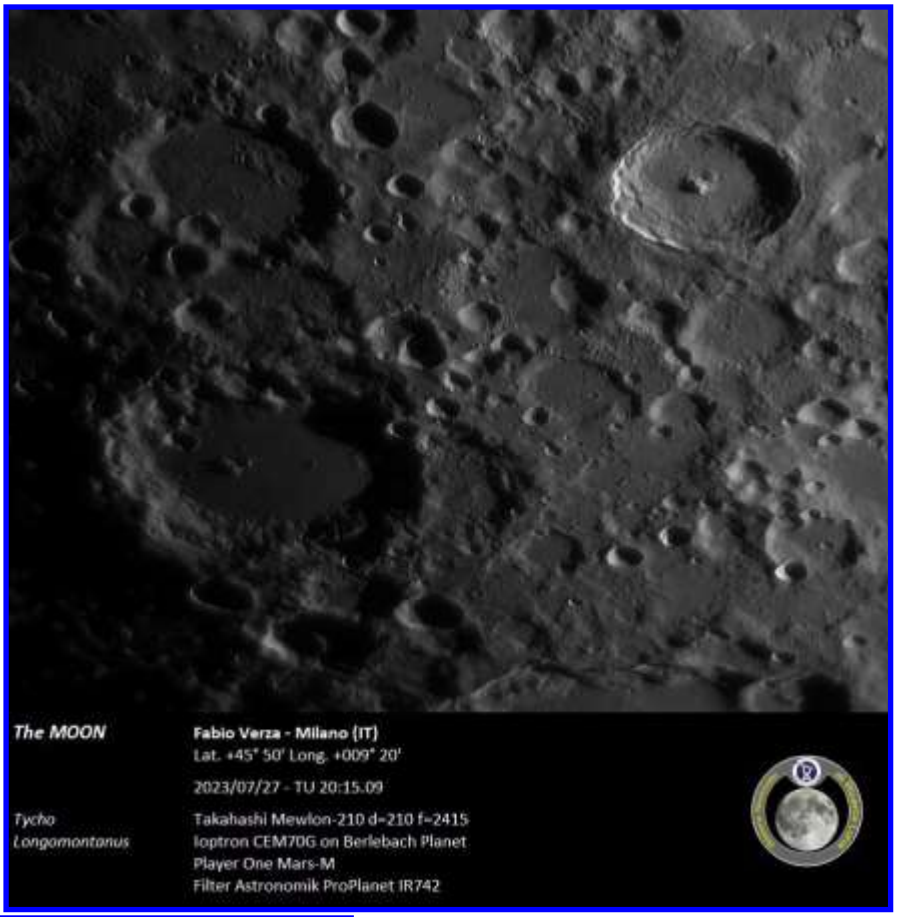
Copernicus *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 19:52 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik Pro-Planet IR742 nm filter, Player One Mars-M camera.*

Recent Topographic Studies

10.6-day old Moon, *Maurice Collins, Palmerston North, New Zealand. 2023 July 28 09:26-09:39 UT. Meade ETX90 Maksutov-Cassegrain telescope, QHYIII462C camera.*

Nonius, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 20:19 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik ProPlanet IR742 nm filter, Player One Mars-M camera.*

Recent Topographic Studies



Tycho, *Fabio Verza, SNdR, Milan, Italy. 2023 June 27 20:15 UT. Takahashi Mewlon 210 mm Dall-Kirkham telescope, iOptron CEM70G mount, Astronomik Pro-Planet IR742 nm filter, Player One Mars-M camera.*

Waxing Gibbous Moon, Nick Evetts, FRAC, Bedfordshire, UK. 2023 July 29 22:19 UT. Slooth Canary Two CDK 17 inch Corrected Dall-Kirkham telescope, Pico del Teide, Observatory code G40, FLIPL16803 camera.

Recent Topographic Studies

Lunar Geologic Change Detection Program

Coordinator Dr. Anthony Cook- atc@aber.ac.uk
Assistant Coordinator David O. Darling -DOD121252@aol.com

2023 August

LTP Reports: No impact flash observations have been received since the last newsletter, nor any LTPs reported.

Routine reports received for June included: Jane Clark (Risca, UK - BAA) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: Abenezra, Agrippa, Janssen, Lacus Mortis, Plinius, Rima Ariadaeus, Theophilus and several features. Anthony Cook (Newtown & Mundesley, UK – ALPO/BAA) imaged/videoed: several features & earthshine in the Short-Wave IR and in visible light. Cervoni Maurizio (Italy – UAI) imaged Montes Teneriffe and observed Stöfler. Luigi Zanatta (Italy – IAU) imaged: Eudoxus and Stöfler.

Analysis of Reports Received (June):

Montes Teneriffe: On 2023 Jun 23 between 19:58 and 20:44 UT UAI observers: Fabio Verza and Cervoni Maurizio imaged this crater according to the following lunar schedule request:

BAA Request: please image this area as we want to compare against a sketch made in 1854 under similar illumination. However, if you want to check this area visually (or with a color camera) we would be very interested to see if you can detect some color on the illuminated peaks of this mountain range, or elsewhere in Mare Imbrium. Features to capture in any image (mosaic), apart from Montes Teneriffe, should include: Plato, Vallis Alpes, Mons Pico and Mons Piton. Please note that we are especially interested in the appearance of the individual peaks of the Montes Teneriffe, when the Moon is at a low altitude e.g., flaring and colors seen. Any visual descriptions, sketches or images should be emailed to: a t c @ a b e r. a c. u k

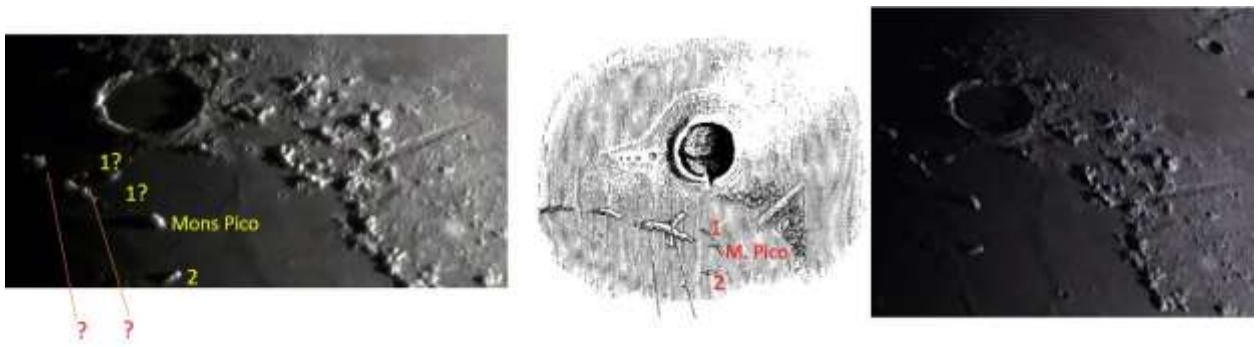


Figure 1. *Plato orientated with north towards the top approximately. Note that annotation in red and yellow has been added.* ***(Left)*** *An image taken by Fabio Verza (UAI) on 2023 Jun 23 UT 19:58.* ***(Center)*** *A sketch about the 1854 LTP observations by Robert Hart (RAS) from p164 of the Monthly Notices of the Royal Astronomical Society, Vol 15.* ***(Right)*** *An image taken by Cervoni Maurizio (UAI) on 2023 Jun 23 UT 20:44.*

We have covered this 1854 LTP report many times before in the: 2018 Jun, 2019 Feb, 2020 Aug & Dec, 2021 Jan, 2022 Dec and 2023 Apr newsletters. What appears to have happened is that Robert Hart made their observation, then tried to locate the positions of the LTP in another sketch made on another day, when more of Montes Teneriffe was visible. Although I can recognize Plato, Vallis Alpes, Mons Pico and the mountain just to its south, inaccuracies in the sketch (Fig 1 Center) make it difficult to identify the mountain to the NW of Mons Pico. In Fig 1 (Left) I have depicted two possible locations of that latter mountain peak and also tried to add a couple of lines to show where Hart may have seen their LTP – but much of this is uncertain. However, because of the cartographic inaccuracies I don't think we can get any further in this study and so will remove this from the Lunar Schedule website. It will however be kept on the repeat illumination website, with a footnote to observe only when the Moon is very low in order to see if we can replicate the colors seen on the peaks – assuming this was due to atmospheric spectral dispersion and seeing conditions?

Eudoxus: On 2023 Jun 24 UT 21:53-22:33 Jane Clark (BAA) imaged the whole Moon, some 7 min after the following repeat illumination observing window:

On 1969 Jul 20 at 22:50-23:15UT Jean Nicolini (Sao Paulo, Brazil, 12" reflector x430, S=II.5-III.5) saw a weak reddish area on the north west(east?) wall of Eudoxus crater. An English Moon Blink device showed it dark in blue and opaque in red. Reddening remained unchanged while comparing it to adjacent region and Aristotles. Color index was toward dirty orange. Color most apparent in the good moments of seeing and disappeared in the poorer moments of seeing, Cameron says that this is opposite to what was expected if the effect was atmospheric in origin and no color was seen in Aristotles. Apollo 11 watch. Cameron 1978 catalog ID=1177 and weight=3. The ALPO/BAA weight=3.

Figure 2. *Eudoxus crater captured in monochrome by Jane Clark on 2023 Jun 24, from a larger mosaic obtained during 21:53-22:33UT. Eudoxus is just below the center of the image. North is towards the top.*

Although Jane's image (Fig 2) is in monochrome, it is nevertheless a useful context image for what that part of the Moon would have looked like to Nicoloni back on 1969 Jul 20 - though the libration would have been different.

Descartes: On 2023 Jun 25 UT 06:14-06:35 Maurice Collins (ALPO/BAA/RASNZ) imaged the whole Moon, but under similar illumination to the following report:

On 2010 Apr 20 sometime between UT 22:00 and 23:00 I. Bryukhanov (Minsk, Zeiss Refractor at the Minsk planetarium) observed an orange-brown tint a little to the west of Zollner and Kant craters. Apparently, images were obtained. ALPO/BAA weight=1.

Figure 3. *Descartes at the center of this image as captured by Maurice Collins on 2023 Jun 25 UT06:14-06:35. This has been color normalized and then had its color saturation increased to 5.0 using GIMP image processing software. The image is orientated with north towards the top.*

No tint of orange can be seen here (Fig 3). We shall leave this report at a weight of 1 as no other information was provided on whether the observer in Minsk checked for chromatic aberration effects in the refractor that they were using.

Stöfler: On 2023 Jun 25 UAI observers Fabio Verza and Luigi Zanatta (technically Luigi was slightly outside the time slot) imaged and Cervoni Maurizio observed visually for the following Lunar Schedule request:

BAA Request: Images or sketches of this crater needed. We are trying to see if a curious gray band is visible across the crater floor as seen by T. Smith on 2020 Nov 22. Any sized scope can be used from 5" or upwards. All images should be sent to: a t c @ a b e r. a c. u k

General Information: For repeat illumination (and a few repeat libration) observations for the coming month - these can be found on the following web site: http://users.aber.ac.uk/atc/lunar_schedule.htm . By re-observing and submitting your observations, only this way can we fully resolve past observational puzzles. If in the unlikely event you do ever see a LTP, firstly read the LTP checklist on http://users.aber.ac.uk/atc/alpo/ltp.htm , and if this does not explain what you are seeing, please give me a call on my cell phone: +44 (0)798 505 5681 and I will alert other observers. Note when telephoning from outside the UK you must not use the (0). When phoning from within the UK please do not use the +44! Twitter LTP alerts can be accessed on https://twitter.com/lunarnaut .

Dr Anthony Cook, Department of Physics, Aberystwyth University, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, WALES, UNITED KINGDOM. Email: atc @ aber.ac.uk

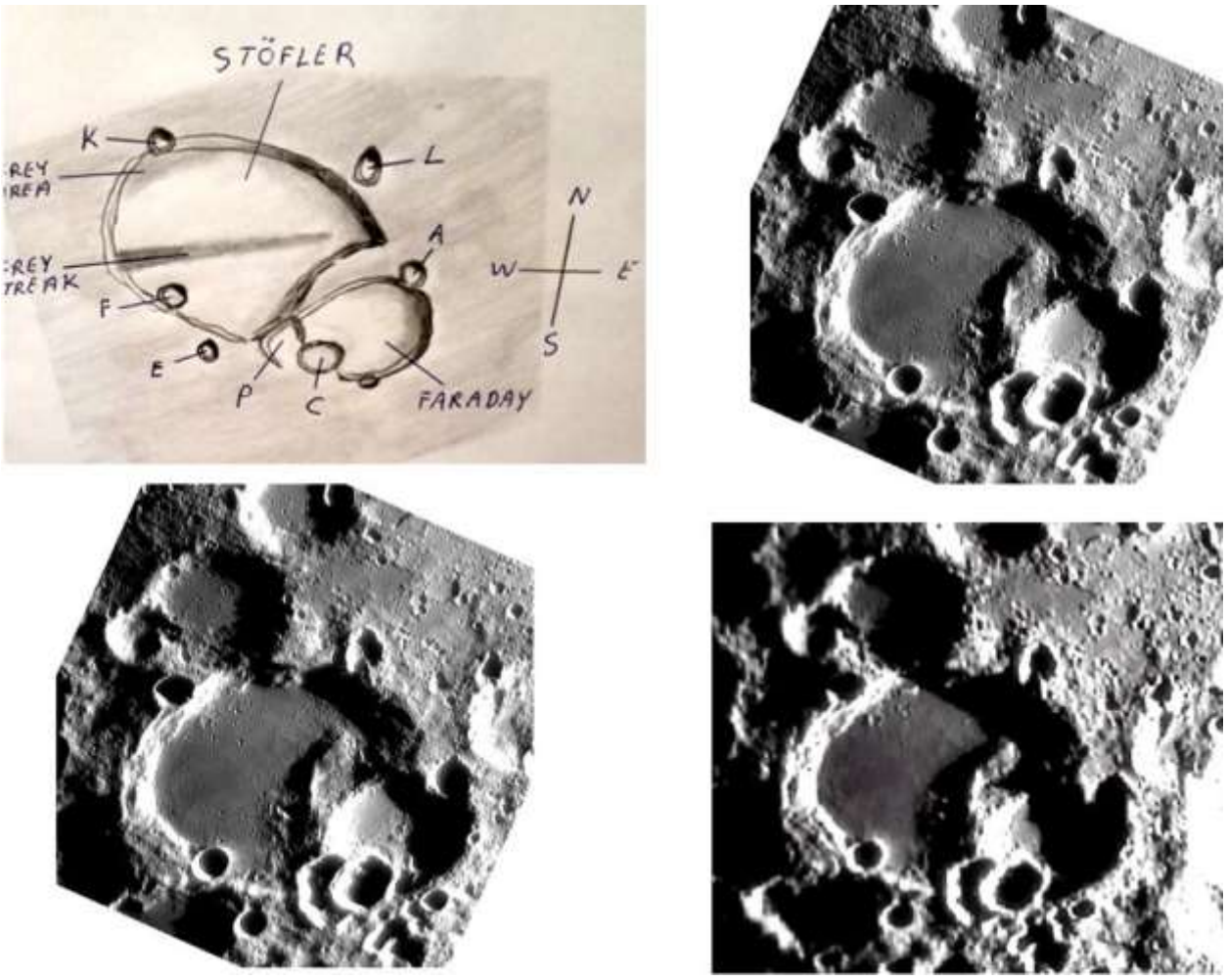


Figure 4. *Stofler orientated with north towards the top.* ***(Top Left)*** *A sketch by Trevor Smith (BAA) from 2020 Nov 22 UT 18:15-18:45.* ***(Top Right)*** *An image by Bill Leatherbarrow (BAA) taken on 2020 May 29 UT 19:57.* ***(Bottom Left)*** *An image by Fabio Verza (UAI) taken on 2023 Jun 25 UT1955,* ***(Bottom Right)*** *An image by Luigi Zanatta taken on 2023 Jun 25 UT 20:06.*

When Trevor made his initial report in 2020 (Fig 4 -Top left), Bill Leatherbarrow (BAA) commented *"I am pretty certain that you saw is a normal albedo variation on the floor of Stofler, although it appears to have been particularly obvious under the conditions of your observation. It shows up on many of my own images of this crater, and can be discerned on the attached image from earlier this year."* – see Fig 4 (Top Right). Note that I have contrast enhanced all the images in Fig 4 to bring out the detail on the floor of Stofler. The bottom row of Fig 4 contains images taken by UAI observers on the repeat illumination night of 2023 Jun 25. In all the images you can just about see the darker grey streak across the floor in about the right place as seen in Trevor's sketch. This is simply an albedo marking across the floor of the crater, maybe related to a slightly different era of volcanism on the floor, or perhaps the light and/or dark bands across the floor are ray ejecta material? Another possibility could be a change in slope across the floor – so we might have shading from slope angle? Another UAI observer, Cervoni Maurizio, was observing visually and made a sketch (not shown here) using a 127mm Maksutov/Cassegrain (x224) and saw no sign of the dark streak across the floor, but other details in the crater looked fine. Seeing was Antoniadi III. It maybe that telescope aperture matters here as Trevor was using a 16" Newtonian back in 2020, albeit under Antoniadi IV (poor) seeing conditions. But at any rate, I think we can lower the weight of this LTP report to 0 as the dark streak is normal on the crater floor and we have replicated it in the right place in the images.

Basin and Buried Crater Project

Coordinator Dr. Anthony Cook- atc@aber.ac.uk

No images or sketches have been sent in specifically for the BBC project, taken during June or July, however Bob Stuart (BAA) did manage to find an archive image of his which portrays the buried crater, discovered by A. Gabriel (See the BAA's Lunar Section Circular: Vol 2, No. 11, Oct 1967, p3) back in 1967, and which is of diameter of 81 km and is located at 9.7˚E, 53.4˚S.

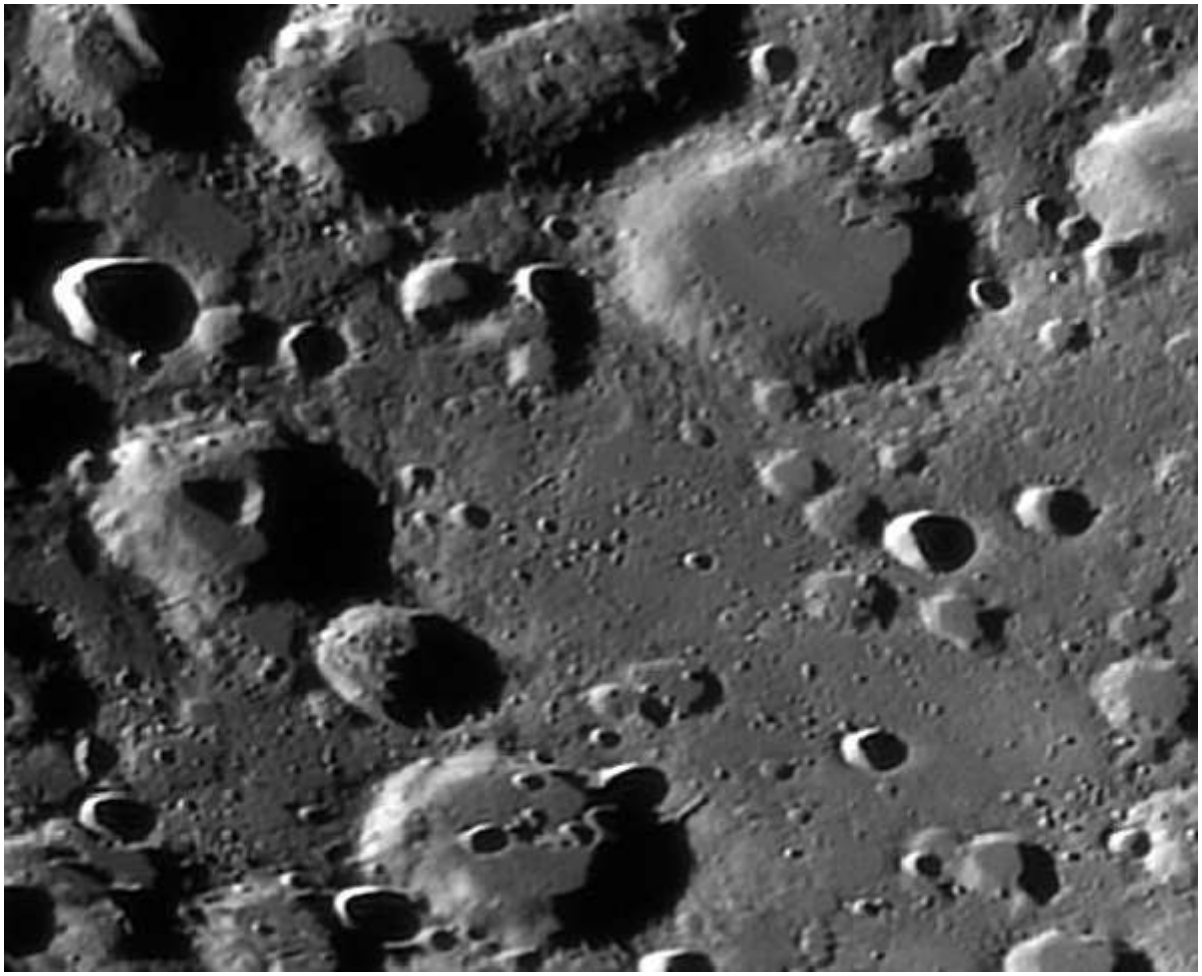


Figure 1. *The proposed ghost crater located at 9.7˚E, 53.4˚S, as found by Bob Stuart in his archive – located at the center of this image.*

Interestingly, there is a hint of another buried crater just to the bottom right of the one that A. Gabriel proposed, and that would be at diameter of 80 km and located at 14.6˚E, 54.4˚S, with Jacobi B close to its centre.

Fig 2 shows two almost perpendicular cross-sections through it. The N-S one is a bit more convincing, but not as convincing as last month's buried crater. I shall assign a weight of 1 to this proposed buried crate for now.

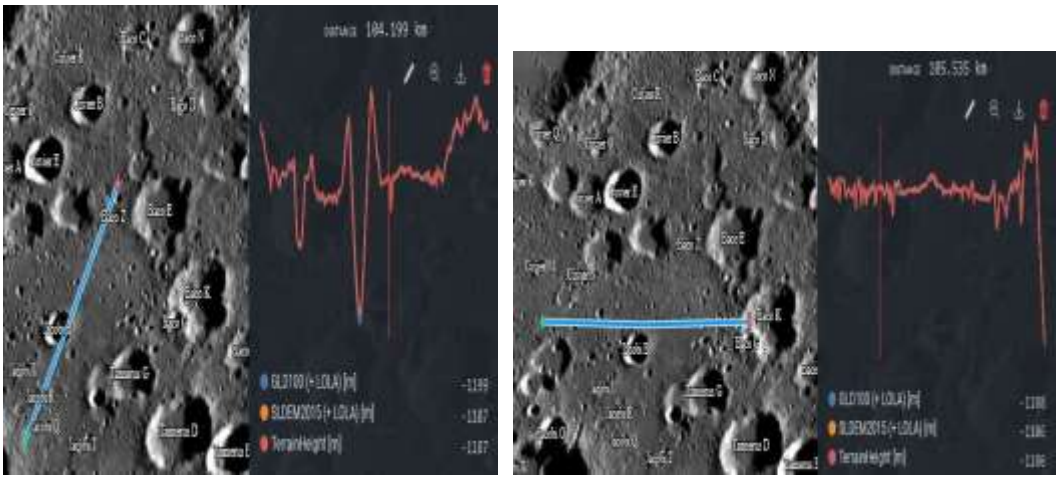


Figure 2. *Topographic cross-sections taken through the proposed buried crater using the LROC Quickmap web page.*

If you think that you have discovered a new impact basin, or unknown buried crater, please check whether it has been found previously on the following web site, and if not email me its location and diameter so that I can update the list.

https://users.aber.ac.uk/atc/basin_and_buried_crater_project.htm.

Alternatively, if you want an observational challenge, try to see if you can image one of more of the basins or buried craters at sunrise/set and establish what colongitude range they are best depicted at. Or you can even do this "virtually" with LTVT software. As you can see from the tables on the web sites there are lot of blank cells to fill in on the sunrise and sunset colongitude columns – so a good opportunity for you to get busy!

Lunar Calendar August 2023

Date	UT	Event
1		North limb most exposed (+6.5°)
1	1832	Full Moon
2	0600	Moon at perigee 357,310 km
3	1000	Saturn 2° north of Moon
4	2200	Neptune 1.5° north of Moon
7	0246	Moon at ascending node
8	1000	Jupiter 3° south of Moon
8		East limb most exposed (+7.6°)
8	1028	Last Quarter Moon
9	1300	Moon 1.4° south of Pleiades
12		Greatest northern declination (+27.9°)
13	2200	Pollux 1.7° north of Moon
15		South limb most exposed (-6.6°)
16	0938	New Moon, lunation 1245
16	1200	Moon at apogee 406,634 km
18	1100	Pallas 1.1° south of Moon, occultation north Canada to China
21	2300	Moon 2° south of Moon
21	1623	Moon at descending node
24	0957	First Quarter Moon
25		West limb most exposed (-7.6°)
25	0200	Antares 1.1o south of Moon, occultation southern Canada, USA, Mexico
27		Greatest southern declination (-28.1°)
28		North limb most exposed (+6.6°)
30	1600	Moon at perigee 357,181 km, LARGE TIDES
30	1800	Saturn 2° north of Moon
31	0136	Full Moon (closest 2023) (Look out for blue/supermoon stuff!)

AN INVITATION TO JOIN THE A.L.P.O.

The Lunar Observer is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non- members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a non-member you are invited to join our organization for its many other advantages.

We have sections devoted to the observation of all types of bodies found in our solar system. Section coordinators collect and study members' observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals.

Our quarterly journal, *The Journal of the Association of Lunar and Planetary Observers-The Strolling Astronomer*, contains the results of the many observing programs which we sponsor including the drawings and images produced by individual amateurs. Additional information about the A.L.P.O. and its Journal is on-line at: **http://www.alpo-astronomy.org.** I invite you to spend a few minutes browsing the Section Pages to learn more about the fine work being done by your fellow amateur astronomers.

To learn more about membership in the A.L.P.O. go to: **http://www.alpo- astronomy.org/main/member.html** which now also provides links so that you can enroll and pay your membership dues online.

SUBMISSION THROUGH THE ALPO IMAGE ARCHIVE

ALPO's archives go back many years and preserve the many observations and reports made by amateur astronomers. ALPO's galleries allow you to see on-line the thumbnail images of the submitted pictures/observations, as well as full size versions. It now is as simple as sending an email to include your images in the archives. Simply attach the image to an email addressed to

lunar@alpo-astronomy.org (lunar images).

It is helpful if the filenames follow the naming convention :

FEATURE-NAME_YYYY-MM-DD-HHMM.ext

YYYY {0..9} Year

MM {0..9} Month

DD {0..9} Day

HH {0..9} Hour (UT)

MM {0..9} Minute (UT)

.ext (file type extension)

(NO spaces or special characters other than "_" or "-". Spaces within a feature name should be replaced by "-".)
As an example the following file name would be a valid filename:

Sinus-Iridum_2018-04-25-0916.jpg
(Feature Sinus Iridum, Year 2018, Month April, Day 25, UT Time 09 hr16 min)

Additional information requested for lunar images (next page) should, if possible, be included on the image. Alternatively, include the information in the submittal e-mail, and/or in the file name (in which case, the coordinator will superimpose it on the image before archiving). As always, additional commentary is always welcome and should be included in the submittal email, or attached as a separate file.

If the filename does not conform to the standard, the staff member who uploads the image into the data base will make the changes prior to uploading the image(s). However, use of the recommended format, reduces the effort to post the images significantly. Observers who submit digital versions of drawings should scan their images at a resolution of 72 dpi and save the file as a 8 1/2"x 11" or A4 sized picture.

Finally a word to the type and size of the submitted images. It is recommended that the image type of the file submitted be jpg. Other file types (such as png, bmp or tif) may be submitted, but may be converted to jpg at the discretion of the coordinator. Use the minimum file size that retains image detail (use jpg quality settings. Most single frame images are adequately represented at 200-300 kB). However, images intended for photometric analysis should be submitted as tif or bmp files to avoid lossy compression.

Images may still be submitted directly to the coordinators (as described on the next page). However, since all images submitted through the on-line gallery will be automatically forwarded to the coordinators, it has the advantage of not changing if coordinators change.

When submitting observations to the A.L.P.O. Lunar Section

In addition to information specifically related to the observing program being addressed, the following data should be included:

Name and location of observer
Name of feature
Date and time (UT) of observation (use month name or specify mm-dd-yyyy-hhmm or yyyy-mm-dd-hhmm)
Filter (if used)
Size and type of telescope used Magnification (for sketches)
Medium employed (for photos and electronic images)
Orientation of image: (North/South - East/West)
Seeing: 0 to 10 (0-Worst 10-Best)
Transparency: 1 to 6

Resolution appropriate to the image detail is preferred-it is not necessary to reduce the size of images. *Additional commentary accompanying images is always welcome.* **Items in bold are required. Submissions lacking this basic information will be discarded.**

Digitally submitted images should be sent to:
David Teske – david.teske@alpo-astronomy.org
Alberto Anunziato–albertoanunziato@yahoo.com.ar
Wayne Bailey—wayne.bailey@alpo-astronomy.org

Hard copy submissions should be mailed to David Teske at the address on page one.

CALL FOR OBSERVATIONS:
FOCUS ON: Floor-Fractured Craters

Focus on is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the September 2023, will be Floor-Fractured Craters. Observations at all phases and of all kinds (electronic or film based images, drawings, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or add these features to your observing list and send your favorites to (both):

Alberto Anunziato – albertoanziato@yahoo.com-ar
David Teske – david.teske@alpo-astronomy.org

Deadline for inclusion in the Floor-Fractured Craters Focus-On article is August 20, 2023

FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for contributors the following future targets have been selected:

Subject	TLO Issue	Deadline
Floor-Fractured Craters	**September 2023**	**August 20, 2023**
Dorsa Smirnov	**November 2023**	**October 20, 2023**
Sinus Iridum	**January 2024**	**December 20, 2023**
Lacus Mortis	**March 2024**	**February 20, 2024**

Focus-On Announcement
Floor-Fractured Craters

Floor-Fractured Craters are a relatively recent category of craters, which have undergone a modification of their floor after their formation by an impact: their higher floors are smooth, with fractures, ridges, hills and other features. We have spectacular craters like Posidonius or Taruntius or lesser known craters like Le Verrier or Letronne. We will use Robert Garfinkle's "Luna Cognita" catalog and typology for a monograph on these very special and diverse craters. Please check your files for images of these spectacular craters and forward them by August 20, 2023 to Alberto Anunziato and David Teske.

SEPTEMBER 2023 ISSUE-Due August 20th 2023: FLOOR FRACTURED CRATERS
NOVEMBER 2023 ISSUE-Due October 20th 2023: DORSA SMIRNOV
JANUARY 2024 ISSUE-Due December 20th 2023: SINUS IRIDUM
MARCH 2024 ISSUE: Due February 20th 2024: LACUS MORTIS

Focus-On Announcement
Hiking in the Moon: Dorsa Smirnov

It costs nothing to dream about the future. If the Moon will surely be humanity's first step out of its terrestrial cradle, the place where we do everything a second time, there will also be a time for us to take our passion for the trails to our second home. And when we get used to walking in the regolith, perhaps the new challenge will be the gentle heights that almost completely cover the maria, we are talking about the wrinkle ridges. Although Dorsa Smirnov would not be the first option for a walk, due to the steepness of its crests, it is ideal for a telescopic tour. It is the most complex and extensive dorsal system on the Moon. It is located on the eastern edge of the Mare Serenitatis and is better known as Serpentine Ridge (an ancient name that also included what is now known as Dorsa Lister). We will tour the Serpentine Ridge structure, trying to see the topographic details of this fascinating series of elevations. Please check your files for images of these spectacular craters and forward them by October 20, 2023 to Alberto Anunziato and David Teske.

SEPTEMBER 2023 ISSUE-Due August 20th 2023: FLOOR FRACTURED CRATERS
NOVEMBER 2023 ISSUE-Due October 20th 2023: DORSA SMIRNOV
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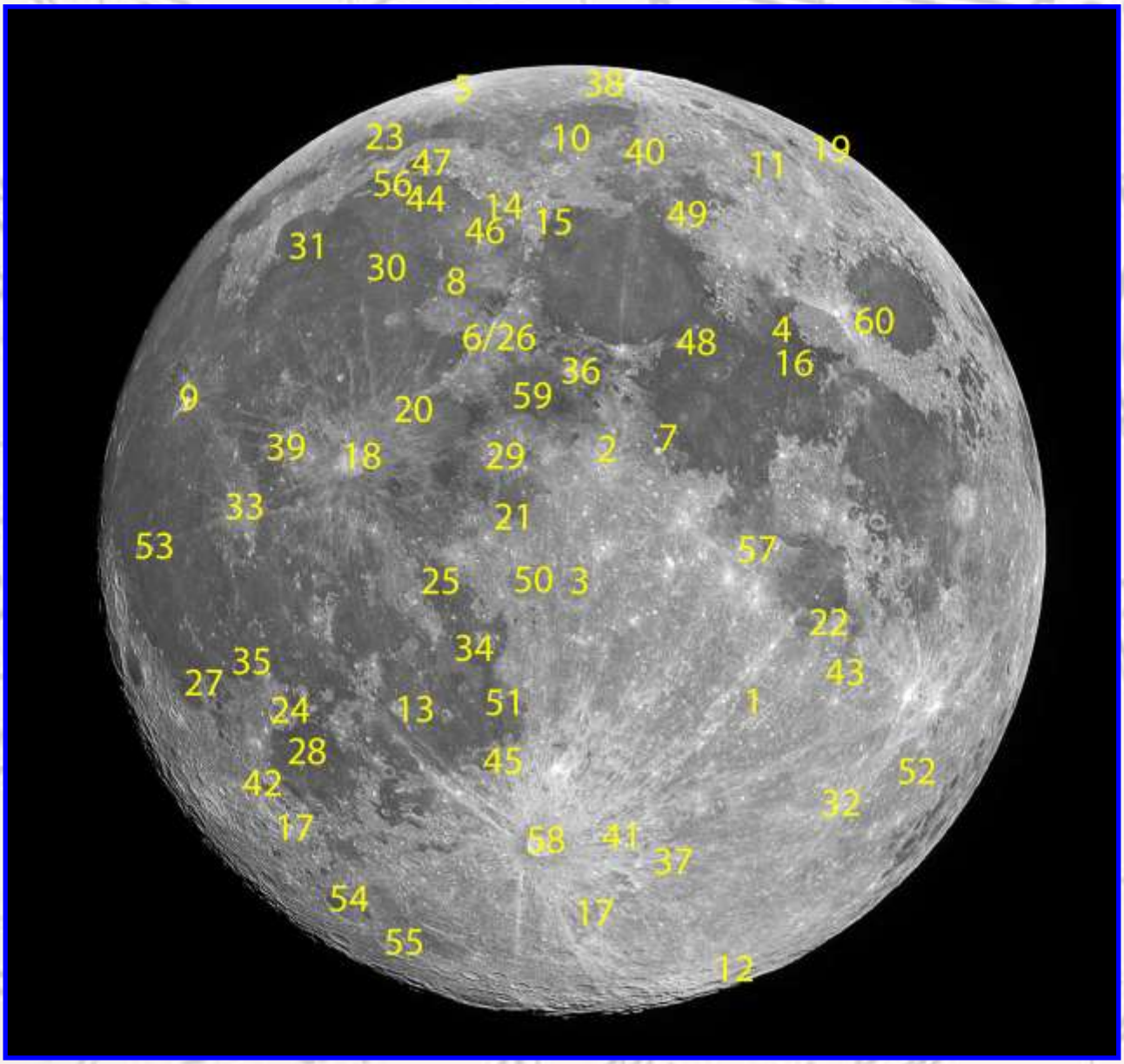
MARCH 2024 ISSUE: Due February 20th 2024: LACUS MORTIS

Serpentine Ridge, 2020/05/28, 00:37 UT
Colongitude 338.7, Seeing 7-8/10, Transparency 5/6
C9.25 Schmidt-Cassegrain, f/10, FL 2395mm, Celestron Skyris 236M, No Filters
Howard Eskildsen, Ocala, Florida, USA

Key to Images In This Issue



1. Abenezra
2. Agrippa
3. Albategnius
4. Amoris, Sinus
5. Anaximander
6. Apenninus, Montes
7. Ariadaeus
8. Archimedes
9. Aristarchus
10. Aristoteles
11. Atlas
12. Boussingault
13. Bullialdus
14. Cassini
15. Caucasus, Montes
15. Cauchy
16. Cavendish
17. Clavius
18. Copernicus
19. De la Rue
20. Eratosthenes
21. Flammarion
22. Fracastorius
23. Frigoris, Mare
24. Gassendi
25. Guericke
26. Hadley, Mons
27. Hansteen
28. Humorum, Mare
29. Hyginus, Rima
30. Imbrium, Mare
31. Iridum, Sinus
32. Janssen
33. Kepler
34. Lassell
35. Letronne
36. Manilius
37. Maurolycus
38. Meton
39. Millichius
40. Mortis, Lacus
41. Nonius
42. Palmieri
43. Piccolomini
44. Pico, Mons
45. Pitatus
46. Piton, Mons
47. Plato
48. Plinius
49. Posidonius
50. Ptolemaeus
51. Recta, Rupes
52. Reichenbach
53. Reiner Gamma
54. Schickard
55. Schiller
56. Teneriffe, Montes
57. Theophilus
58. Tycho
59. Vaporum, Mare
60. Yerkes