The Lunar Observer

A Publication of the Lunar Section of ALPO

David Teske, editor

Coordinator, Lunar Topographic Studies Section Program

April 2024

In This Issue

Online readers, click on images for hyperlinks

Lunar Reflections

A warm greeting to all readers and contributors of *The Lunar Observer*! I hope that this finds you and your loved ones doing well. In April 2024, the big lunar news will be a precisely new moon! A total eclipse goes over Mexico, the USA and Canada. Hoping for clear skies for all eclipse chasers.

I hope that you find the current edition of *The Lunar Observer* interesting. In it, Greg Shanos and Walter Elias share images of the penumbral lunar eclipse (before the big event), Alberto Anunziato looks at crater pits on the Moon as places to visit someday, and ponders shadows on the crater Cassini and Vallis Alpes. Rick Hill tours the area of Sinus Aestuum and Paul Walker takes a look at Mare Tranquillitatis. Plus, Tony Cook has an in-depth study of lunar geologic change. Several observers also submitted images for Recent Topographic Studies. Many thanks to all who contributed! I do hope that you find their work of interest.

This past month, cloudynights.com has put the current edition of the ALPO *The Lunar Observer* on its home page! This has generated more views (887 views in March and 1,631 views in February!) of TLO and hopefully more interest in the newsletter and in ALPO.

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

Clear skies,
-David Teske

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Lunar Topographic Studies

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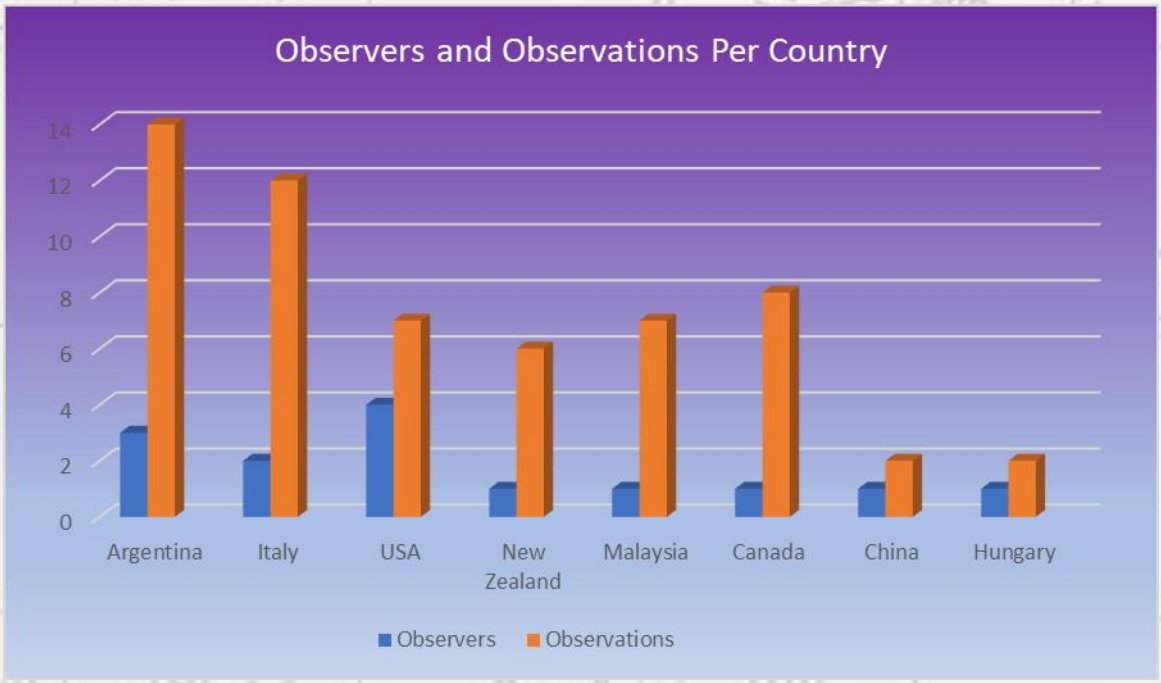
Observations Received

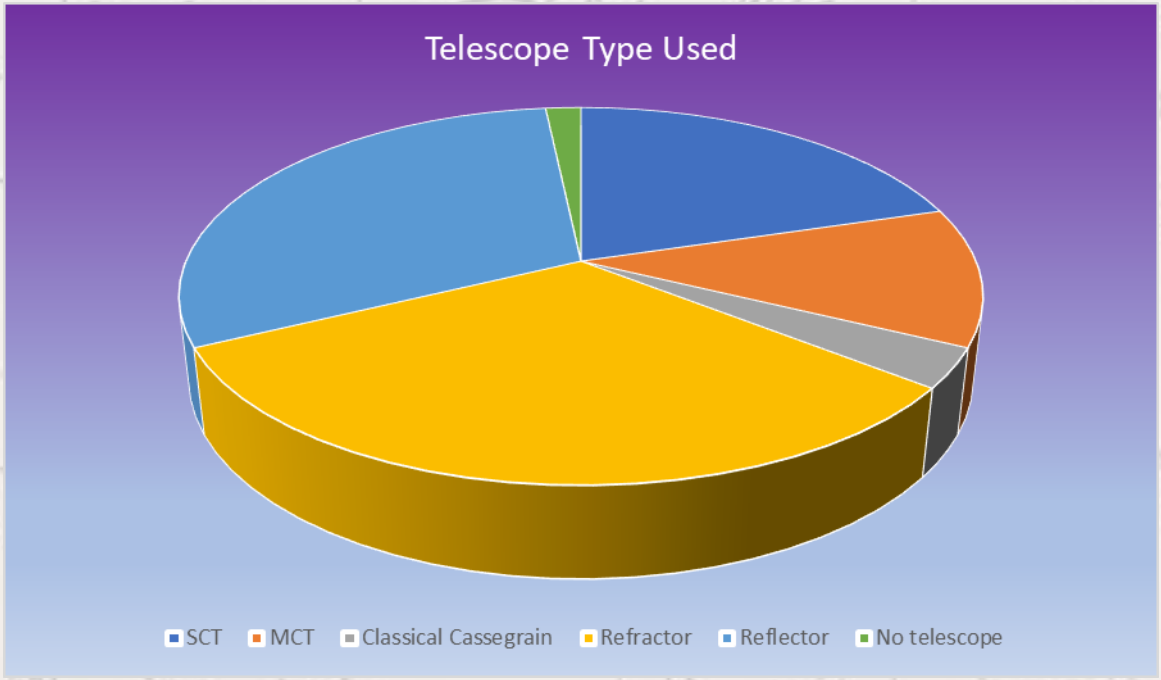
Name	Location and Organization	Image/Article
Alberto Anunziato	Paraná, Argentina	Article *Pit or Crater?, articles and drawings The Gigantic Shadow of Cassini* and *The Valley of Shadows*.
Maurice Collins	Palmerston North, New Zealand	Images of the 6-day old Moon (2), 10-day old Moon, 11-day old Moon (2) and Gassendi.
Massimo Dionisi	Sassari, Italy	Images of Copernicus, Gambart, Rupes Recti, Guericke, Aristarchus, Prinz, Marius and Reiner.
Walter Ricardo Elias	Oro Verde, Argentina	Images of the Penumbral Lunar Eclipse, the Full Moon, Aristarchus (2) and Copernicus.
István Zoltán Földvári	Budapest, Hungary	Drawings of Schlüter and Malapert.
Richard Hill	Loudon Observatory, Tucson, Arizona, USA	Article and image *Sinus Aestuum*.
Luigi Morrone	Agerola, Italy	Images of Plato, Copernicus, Agatharchides and Clavius.
KC Pau	Hong Kong, China	Images of Archimedes and Rupes Recta,
Raúl Roberto Podestá	Formosa, Argentina	Images of Alphonsus, Apenninus, Copernicus, Deslandres (2) and the Waxing Gibbous Moon.
Gregory T. Shanos	Sarasota, Florida, USA	Article and image *Penumbral Lunar Eclipse March 25, 2024.*
Michael Sweetman	Sky Crest Observatory, Tucson, Arizona, USA	Images of Maginus and Montes Apenninus.
Michael Teoh	Heng Fe Observatory, Penang, Malaysia	Images of Tycho, the Lunar South Pole, Schickard, Longomontanus, Schiller, Gassendi and Billy.
Ken Vaughan	Cattle Point, Victoria, British Columbia, Canada	Images of Gassendi, Janssen, Plato, Posidonius, Sinus Iridum, Theophilus, Zagut and Bullialdus.
Paul Walker	Middlebury, Vermont, USA	Article and images *Mare Tranquillitatis, Rima Cauchy and Rupes Cauchy*, images of Mare Frigoris and Mare Nectaris.

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

April 2024 *The Lunar Observer*
By the Numbers

This month there were 58 observations by 14 contributors in 8 countries.





Lunar X Predictions for 2024

40°N-75°W, Eastern Time Zone

Date, 2024	358° Colongitude	Altitude/Azimuth	Cloudy Nights
January 18	5:15 am	–37° / 345°	4:05 am
February 16	7:40 pm	+66° / 236°	6:49 pm
March 17	10:22 am	–11° / 38°	10:10 am
April 15	11:08 pm	+43° / 268°	11:41 pm
May 15	11:01 am	–16° / 53°	12:13 pm
June 13	10:15 pm	+34° / 244°	11:49 pm
July 13	9:11 am	–43° / 58°	10:48 am
August 11	8:15 pm	+24° / 212°	9:31 pm
September 10	7:49 am	–65° / 65°	8:29 am
October 9	8:12 pm	+16° / 206°	8:09 pm
November 8	8:33 am	–49° / 79°	7:49 am
December 7	10:43 pm	+4° / 253°	9:36 pm

Note: The Lunar X is not an instantaneous phenomenon; rather, it appears and evolves over several hours, so the times above are fundamentally approximate and serve only as a guide. The ardent observer should look a little early to catch the initial visible illumination. A less-dramatic Lunar X against a fully illuminated background can still be seen at least several days later. Because of the Moon's nominal 29.5-day synodic period (phase-to-phase), favorable dates for a given location tend to occur on alternate months (unfavorable dates for 40°N-75°W are shaded gray in this table). The 358° colongitude value for the terminator reaching the Lunar X and making it visible (see this RASC paper) and the corresponding lunar altitude/azimuth for 40°N-75°W were determined with WinJUPOS, which is freeware linked from the WinJUPOS download page.

The Cloudy Nights comparative data, derived by a different method, was presented in this post.

Daylight Saving Time for 2024 begins on March 10 and ends on November 3. The listed times are EST/EDT as appropriate for the date.

Submitted by Greg Santos.

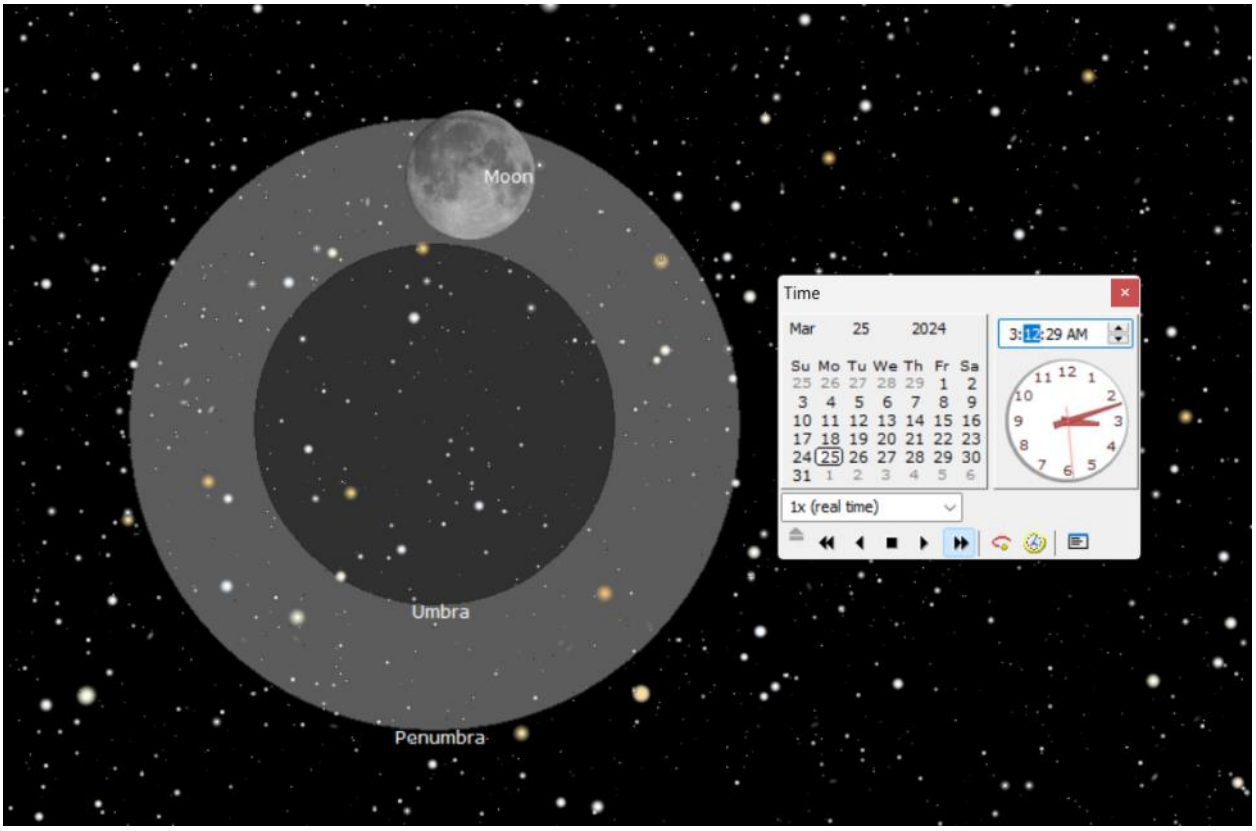
Penumbral Lunar Eclipse of March 25, 2024

Greg Shanos

Penumbral Lunar Eclipse of March 25, 2024 at 7h 13m UT (3:13 am local time). Maximum predicted eclipse for Sarasota, Florida was 7h 12m UT (3:12 am local time). The temperature was 64°F with a relative humidity of 89%. The Moon was 52.8° above the horizon. The image was processed as it would have appeared naked eye through binoculars. A definite darkening was visible in the south near the crater Tycho. Seeing was average with a jet stream. The transparency was clear with a slight haze, 8/10. Meade 2.25 -inch refractor 250mm at f/4.4 piggybacked on an equatorially mounted Meade LX6 8-inch Schmidt-Cassegrain. The camera was ZWO ASI 178MM monochrome camera with an Optolong UV/IR-cut filter. Processed using Autostakkert 4.0.11beta, Registax 6.1 and further sharpened in Photoshop CS4. Image by Gregory T. Shanos.

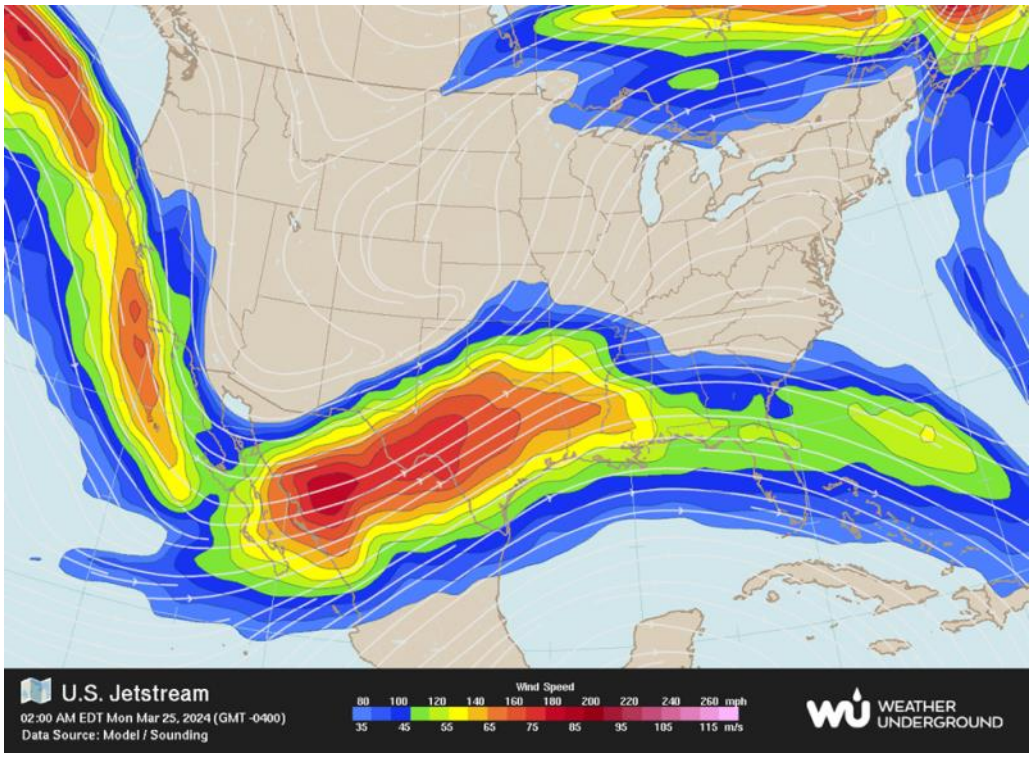
Penumbral Lunar Eclipse of March 25, 2024 at 7h 13m UT (3:13 am local time). Maximum predicted eclipse for Sarasota, Florida was 7h 12m UT (3:12 am local time). The temperature was 64°F with a relative humidity of 89%. The image was processed to show a higher contrast between the highlands and the maria. Seeing was average with a jet stream. The transparency was clear with a slight haze, 8/10. Meade 2.25-inch refractor 250mm at f/4.4 piggybacked on an equatorially mounted Meade LX6 8-inch Schmidt -Cassegrain. The camera was ZWO ASI 178MM monochrome camera with an Optolong UV/IR-cut filter. Processed using Auto-stakkert 4.0.11beta, Registax 6.1 and further sharpened in Photoshop CS4. Image by Gregory T. Shanos.

Lunar Topographic Studies
Penumbral Lunar Eclipse of March 25, 2024



The Sky 6 computer simulation of the Penumbral Eclipse of March 25, 2024 from Sarasota, Florida at maximum eclipse 3:12 am local time (7h 12m UT).

The jet stream above Florida during the penumbral eclipse. Sarasota, is located in the dark blue region.



Lunar Topographic Studies
Penumbral Lunar Eclipse of March 25, 2024

Penumbral Lunar Eclipse of March 25, 2024

Penumbral Lunar Eclipse, *Walter Ricardo Elias, Oro Verde, Argentina. 2024 March 25 04:37, 07:12 and 09:46 UT. SkyWatcher 150 mm reflector telescope, 750 mm focal length, Canon T1i camera. North is to the right, west is up.*

And just before the Penumbral Lunar Eclipse, *Walter Ricardo Elias, Oro Verde, Argentina. 2024 March 25 02:09 UT. SkyWatcher 150 mm reflector telescope, 750 mm focal length, Canon T1i camera.*

Pit or a Crater?

Alberto Anunziato

In the October 2023 edition, we shared in *The Lunar Observer* an analysis of the various selenographic accidents that could be observed in the filming of the camera on board the Vikram Lander of the Indian Space Agency's Chandrayaan 3 lunar mission, which landed near the Marzinus crater on August 23, 2023. The video used can be found on YouTube: https://www.youtube.com/watch?v=IhTQ6bNuP8c&t=56s and at 2 minutes 27 seconds a crater of an extremely irregular shape appeared, so irregular which made one think of a collapse crater or pit, due to its irregular edges (IMAGE 1).

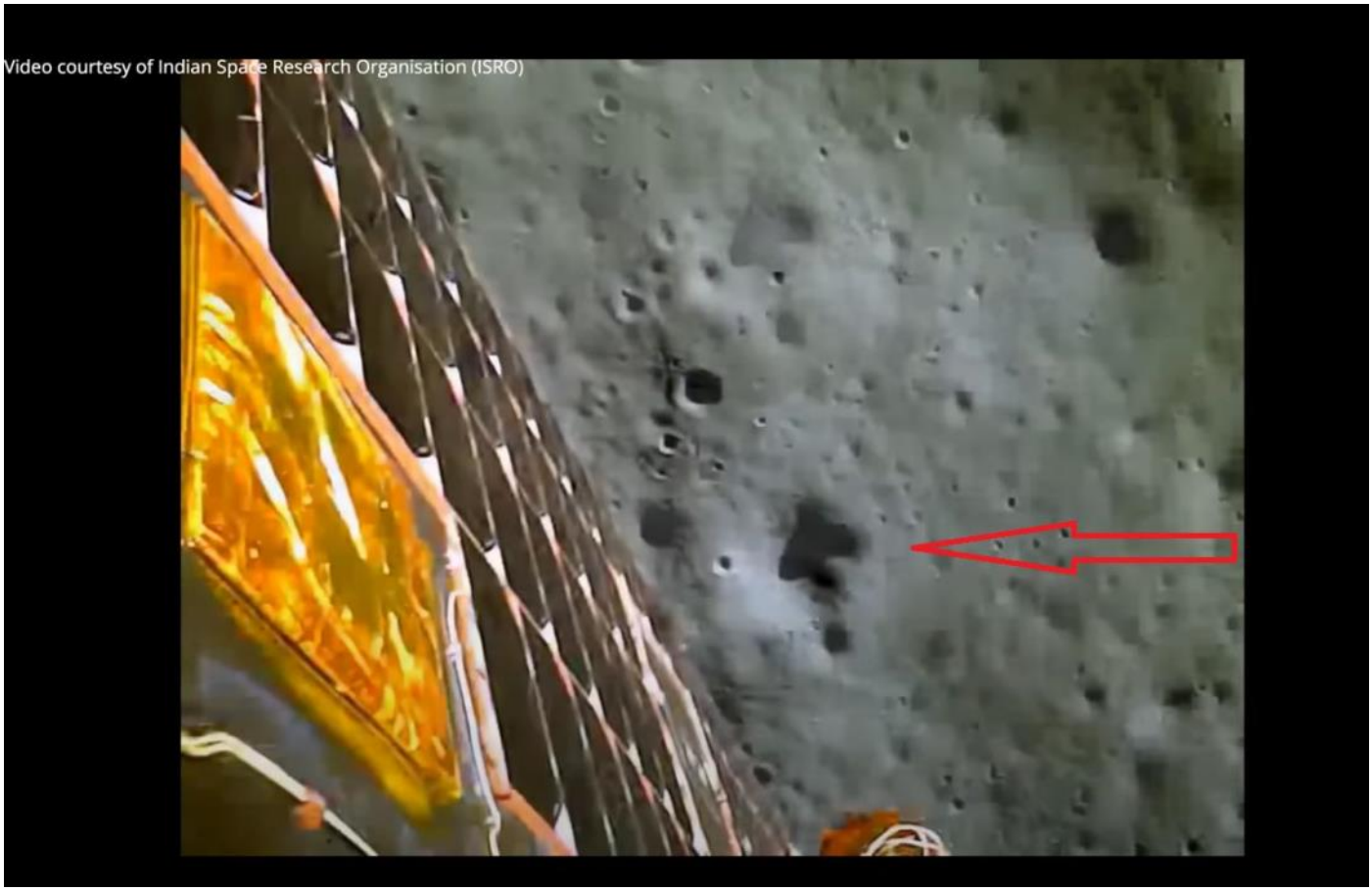


Image 1, *a possible collapse pit as imaged from the Vikram Lander.*

This month, as one of the activities to celebrate the fifth anniversary of the Sociedad Lunar Argentina, we scheduled a series of live talks on YouTube, and one of them was on a topic that fascinates me: the caves of the Moon. Those of us who are a few years old have seen significant progress in our knowledge of the geological formation that would explain why there were caverns under the surface of the Moon, like those inhabited by the Selenites in the famous film "First Men on the Moon", based on the story of H.G. Wells. These are lava tubes. With the photographs from Apollo and, above all, from Lunar Orbiter, it could be deduced that these caverns formed by the drainage of lava existed from images of rilles formed by collapsed sectors and sectors that would have a roof. Let us remember that many lava channels, such as Vallis Schröteri, could be explained as lava tubes whose roof has collapsed.

With modern probes such as Grail and Lunar Reconnaissance Orbiter, data on the crust began to become available that allow us to infer hollow spaces and images of pits that are collapse craters that could be the entrance to a lava tube, as if they were skylights on its roof. Now, preparing the talk "Cráteres de colapso y tubos de lava" I came across a catalog of pits made with LRO images, it is the LROC Pits Atlas, available at https://www.lroc.asu.edu/pits , in the form of an atlas and a catalogue. It is a relatively recent and fascinating tool, in which we find images with different illuminations and detailed information about 278 pits. In the previous issue of this magazine, in the Focus-On Lacus Mortis Section, we cited a work in which 4 of these 278 were chosen as the best candidates for an inhabited lunar base. The medium-term future of lunar exploration is related to lava tubes, which will be accessed through these pits. This study (López Martínez G. et al.) summarizes the importance of studying these pits: "Similar to how lava tubes-pits are formed on the Earth, on the Moon, these features could be the entrance to underground caves formed when lava tube ceilings are not resistant enough to support their weight and collapse. Some of them could even be interconnected if their origin is the same volcanic tube through which lava flowed in the past. Consequently, planetary pit craters and potential subsurface caves are promising astrobiological regions due to their properties to preserve their own microclimate. They also offer a natural shield against radiation (below or at 6 meters depth) and harsh surface conditions. Surface exposed water ice was found in the lunar polar regions and in simple craters, so lunar pit craters could preserve water ice reservoirs inside or near them. Caves have been described as possible first human settlements on the Moon and Mars, offering a permanent and safe refuge for astronauts and equipment storage. On top of that, the protection that is providing this natural shelter offers an additional interest: an intact lava tube in pristine conditions proper to understand the geological history of the Moon". We are living in interesting times, without a doubt. By the way, the largest and most accessible pit, in principle, for future exploration is located in Lacus Mortis and we shared its image in the previous issue. If I go to the Moon, that's the place I want to go, to the Lacus Mortis Pit and go down that ramp that seems so accessible…

Asking forgiveness for this long introduction, what I wanted to share here is the comparison between the selenographic feature that can be observed in the filming of the camera on board the Vikram lander, quite close to the lunar landing site, with images of pits cataloged in the LROC Atlas Pits. Of course, this "supposed" or "imaginary" pit is not found in the catalog and I have no intention of claiming a "discovery." Unfortunately, my internet connection makes it quite difficult these days to take the LROC Quickmap to the vicinity of the supposed pit to search for it, which will be my next task. I just wanted to share an "observational" comparison of the shape of what is seen in the image captured when Vikram landed on the moon with the shapes of the pits included in the aforementioned catalog, in order to learn more about this fascinating topic.

Before comparing the "Vikram Pit" with other cataloged pits, I would like to make some considerations about their distribution on the lunar surface. 1) They have an irregular distribution, apparently in groups. There are 4 craters that concentrate 52% of all the cataloged pits (King with 62, Copernicus with 32, Stevinus with 26 and Tycho with 24). Is there an observational bias or a geological explanation? The latter is more likely, considering that all 4 are young craters, from the Copernican era. 2) There are very few in the vicinity of the south and north poles. Here, more than with an observational bias, we are faced with adverse observation conditions, even for the wonderful LRO camera, since the angles of incidence of solar illumination are very low, which prevents us from seeing the interior to know if there are vertical walls. and ramps.

We are going to compare the shape of the supposed pit with the shape of pits included in the LROC Pits Atlas, to which the images that follow belong. Let's start the comparison with IMAGE 1, which at the bottom has two projections, the one on the right being more pronounced.

Lunar Topographic Studies
Pit or Crater?

In IMAGE 2 (Jackson 3, page 114) we mark two projections, finer and less pronounced, in IMAGE 3 (King 20a, page 151) we also mark a similar projection.

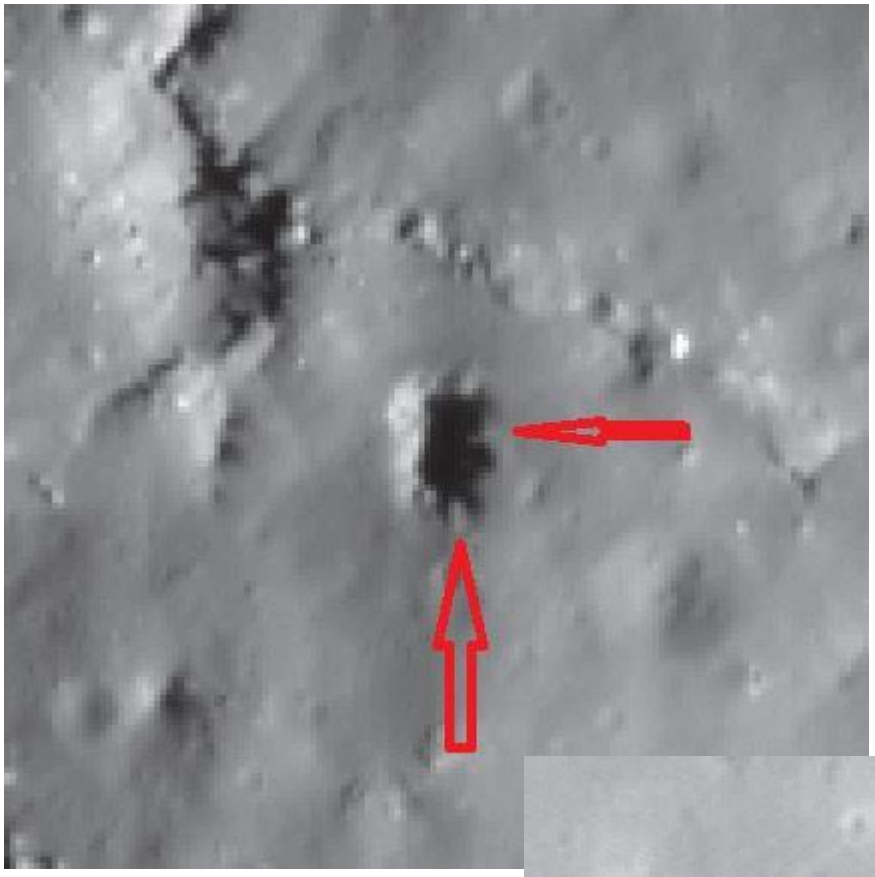


Image 2, *Jackson 3, page 114.*

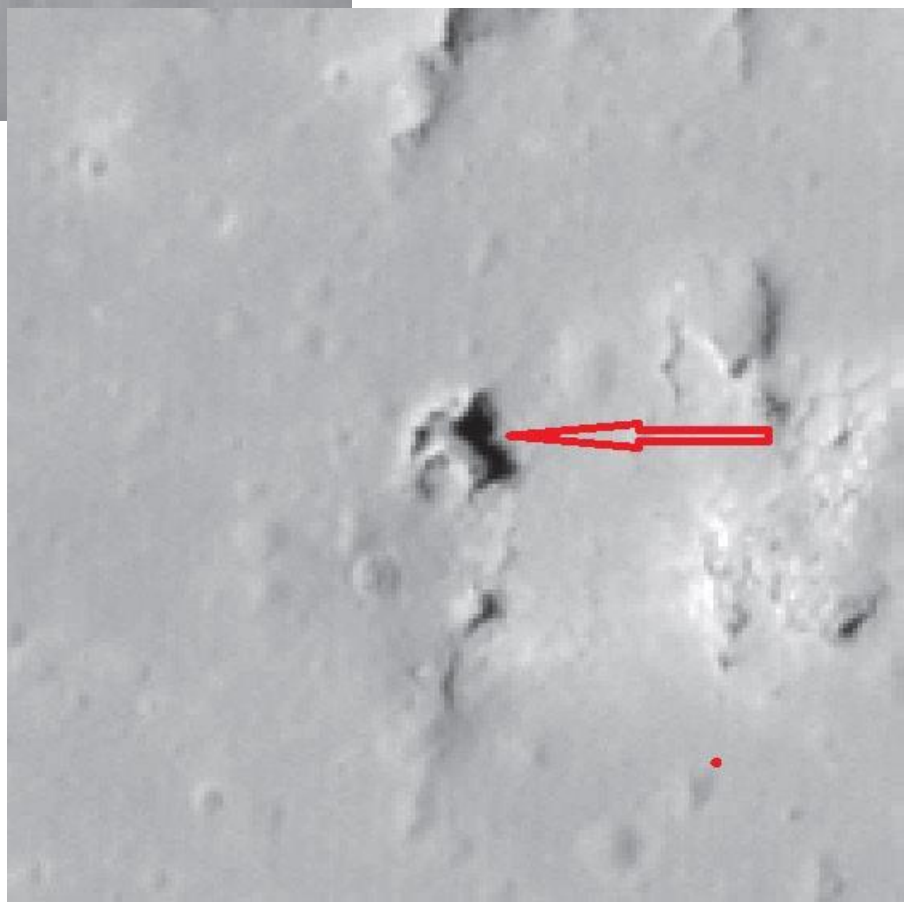


Image 3, *King 20a, page 151.*

In IMAGE 4 (Tycho 16, page 270) the ledges on the right are as pronounced as those in IMAGE 1 and on the left, there could be a possible ramp, which we could also see in IMAGE 1. The ledges in all four images may or may not be what Pits Atlas calls "overhang", that is, a kind of roof or ceiling. In 29 of the cataloged graves this strong indication of a cavern beneath the grave is confirmed, in the 3 that we saw its presence is doubtful. Regarding the presence of a ramp, the pits of IMAGE 2 and 3 do not have one, while it is very likely that it exists in the pit of IMAGE 4, quite similar to IMAGE 1, which could have a ramp on the side, lower left (merely speculative hypothesis, like everything we have been saying). In the pit of IMAGE 5 (Oday 2, page 205) we mark the possible ramp, with a very slight resemblance to what we indicated in IMAGE 1.

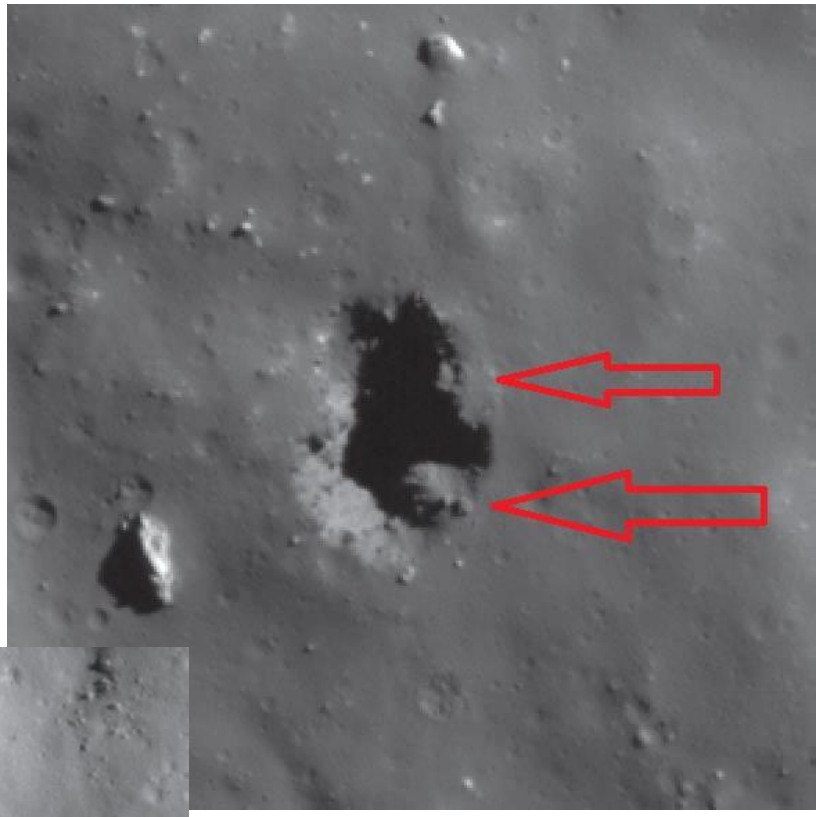


Image 4, *Tycho 16, page 270.*

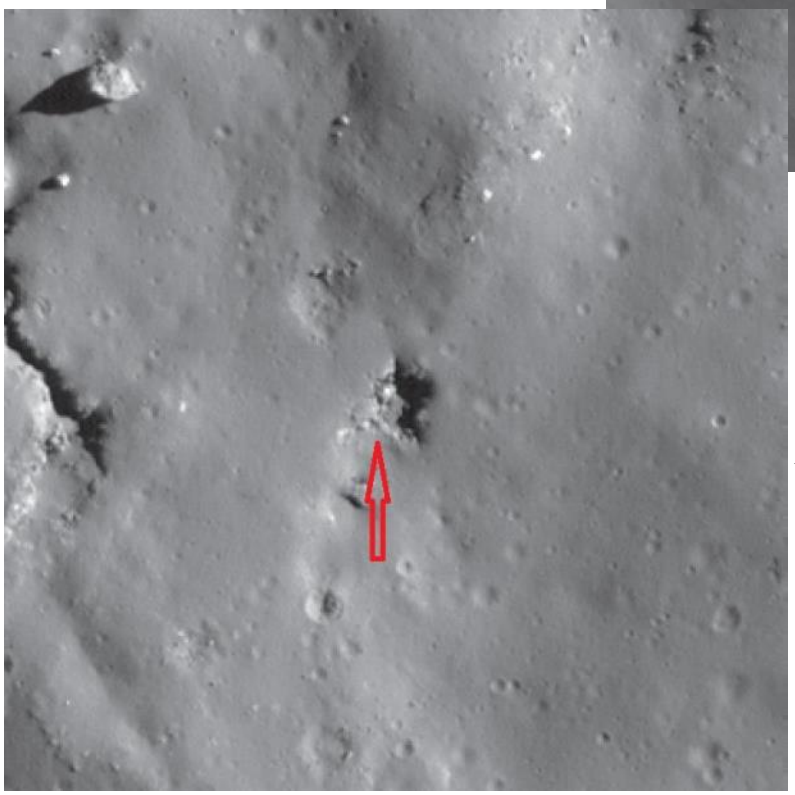


Image 5, *Oday 2, page 205.*

IMAGE 6 corresponds to the pit called Tycho 14 (page 267), which we consider very similar in shape to IMAGE 1, the horizontal arrows indicate the projections and the vertical arrow the possible ramp. IMAGE 7 (Stefan L1, page 220) is the most similar to the "Vikram Trench", the arrow indicates the more than obvious ramp (the level of detail of the loose rocks is incredible), which could be comparable to the upper part left of IMAGE 1.

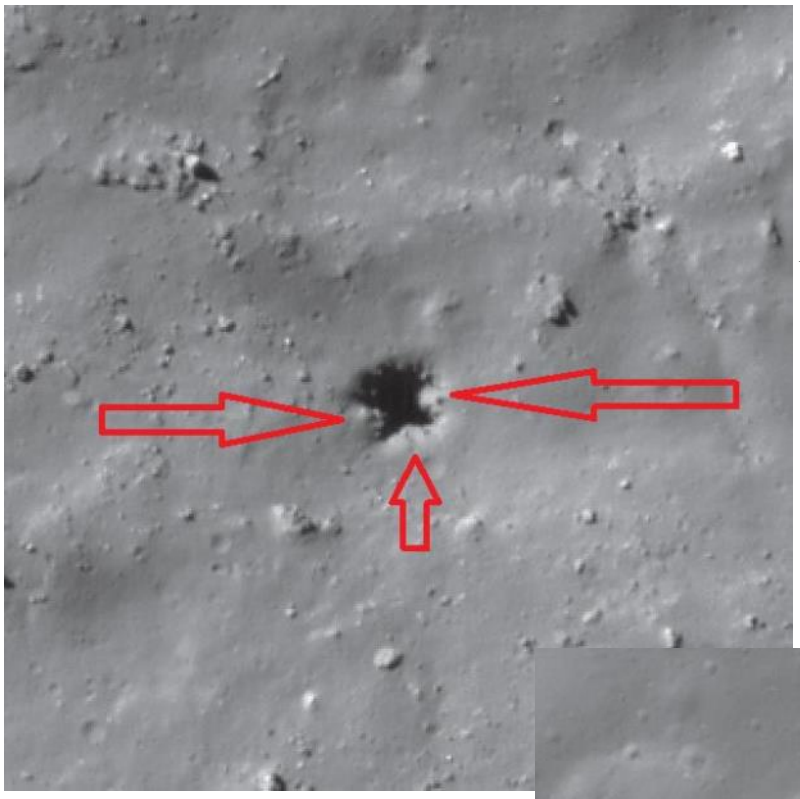


Image 6, *Tycho 14, page 267.*

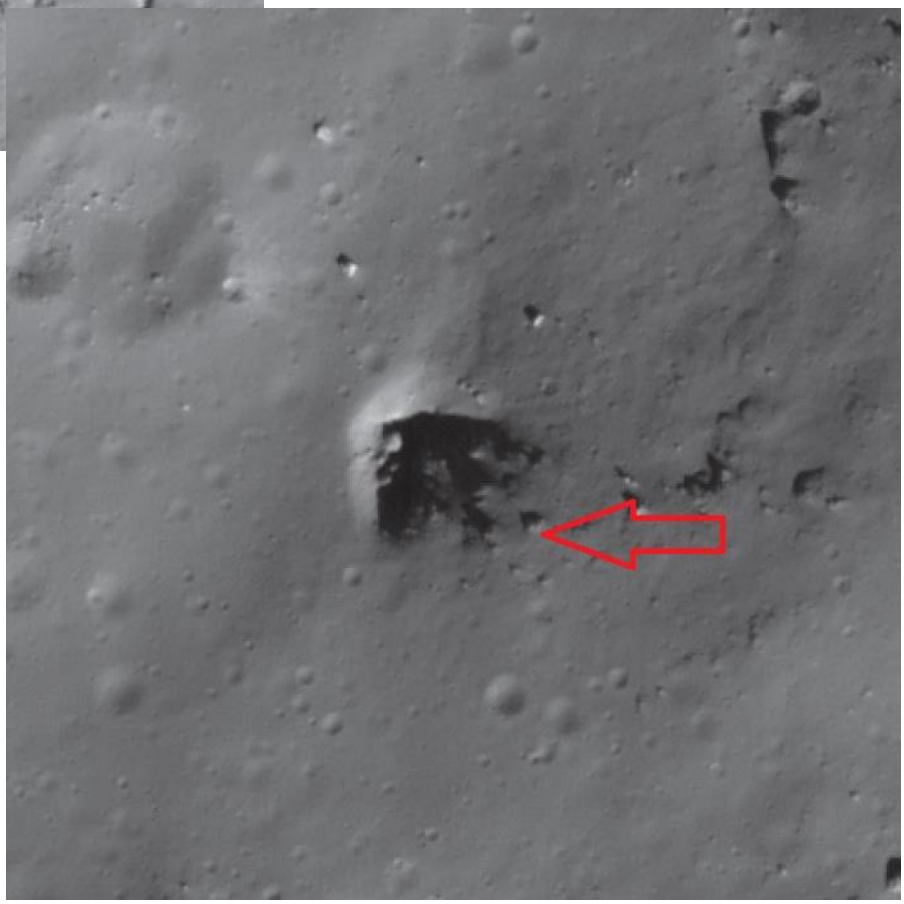


Image 7, *Stefan L1, page 220.*

Well, we have already let our imagination run wild too much. The shapes of the selenographic features in IMAGE 1 and the pits in IMAGES 2 to 7 have a certain similarity. IMAGE 1 could be a very irregular crater, and it surely is, and the play of shadows and lights makes us excited (which is a constant in lunar observation by amateurs). It is also true that the shadows would indicate a crater that is too deep to be such a small impact crater. It is almost impossible for it to be a pit if it was not included in the LROC Pits Atlas, since the LRO camera is much superior to that of the Vikram and its images have been analyzed in depth in that incredible catalog, but it is also true that the Vikram images were taken closer than the LRO and the proximity of the poles makes observation difficult, except when you are as close as the Indian lander. We will have to look in the LRO Quickmap for an irregular crater that in shadows is similar to the "Vikram Pit", which is surely the case. It is possible that my amateur illusion has pushed me to this rambling based on analogy more than on the accurate data from the LRO Quickmap. I admit my fantasy side and I try to deal with it, but it is also true that it was an opportunity to learn more about these selenographic features that will be essential in the not-so-distant future. A point against our imagined cavern beneath the "Vikram Pit": "Unfortunately lava tubes are more products of mare; in polar highlands they would be old and damaged," according to Arlin Crotts in The New Moon (page 247). Imagine what incredible adventures await us in these caverns: "What are the contents and structure of those lava tubes? They are amazing in preserving a moment from several billion years ago, likely free of the slow grinding of regolith from impacts. Some may even be sealed against the vacuum: What atmosphere do they contain? (Helium and argon are prime candidates, but water vapor and carbon dioxide/ monoxide are possible)" (Crotts, page 286).

REFERENCES

Crotts, Arlin (2014), The New Moon, Cambridge University Press, New York.

López-Martínez G. et al. (2023), Habitability Potential of Lunar Pit Craters: Marius Hills, Mare Tranquilitatis, Lacus Mortis and Mare Ingenii Pit, 54th Lunar and Planetary Science Conference 2023 (LPI Contrib. No. 2806). Disponible en: https://www.hou.usra.edu/meetings/lpsc2023/pdf/2380.pdf

Wagner, R. V. and Robinson, M. S. (2021). Occurrence and Or-igin of Lunar Pits: Observations from a New Catalog. 52nd Lunar and Planetary Science Conference, Abstract #2530. https://www.hou.usra.edu/meetings/lpsc2021/pdf/2530.pdf

The Gigantic Shadow of Cassini

Alberto Anunziato

The idea of sketching Cassini was not to record details of the surface, since we know everything about this Imbrian crater, and therefore very old, and subsequently flooded by lava. Cassini is so old that it has two enormous craters inside that are quite old (Cassini A, 17 km in diameter and Cassini B, 9 kilometers in diameter) and their contours appear completely smoothed, the product of billions of years of micrometeorite impacts and solar radiation. When it was young it must have been magnificent (as we all were in our youth), which can be deduced from the size of its ejecta mantle (or glacis) and the (residual) height of its walls. These may not seem so high when we see images of this lava-flooded crater, but with the terminator nearby they cast an incredibly long shadow, as we see in IMAGE 1.

Image 1, Cassini, *Alberto Anunziato, Paraná, Argentina. March 02 05:15-05:45 UT. Meade EX105 Maksutov-Cassegrain telescope, 154 x.*

Limitations of the observer's vision: the very bright south wall casts a shadow very irregular, but we don't see the irregularities on the smooth wall. Interesting case of indirect perception of the shape of the wall that we do not perceive directly but through the shadow. As if my body cast a thin, muscular shadow and they had to deduce that I am an Adonis even though I look like a man in his fifties. The eastern part of the glacis also casts an extraordinarily long and pointed shadow. Indeed, as Peter Grego says in his "The Moon and How To Observe It," its flanks extend "unusually." I imagine that all of us observers went through the same thing: thinking that we captured a unique moment, personally I have never seen Cassini so impressive. But Elger's description in "The Moon" already demonstrates that Cassini's dramatic shadows were a refined pleasure for lunar observers: "the most striking view of Cassini and its surroundings is obtained when the morning terminator is on the central meridian". It is interesting that Cassini, so attractive in oblique illumination, was overlooked by early observers, as Elger notes that "Though a prominent and beautiful object under a low sun, its attenuated border and the tone of the floor, which scarcely differs from that of the surrounding surface, render it difficult to trace under a high angle of illumination, and perhaps accounts for the fact that it escaped the notice of Hevel and Riccioli; though it is certainly strange that a formation which is thrown into such strong relief at sunrise and sunset should have been overlooked, while others hardly more prominent at these times have been drawn and described".

As for the interior, the topographic characteristics of its lava-flooded floor, such as the rilles, which classify it within the floor-fractured craters, are beyond the reach of my small telescope, although I think they are covered by the also very elongated shadows that Cassini A projects, which are interrupted by the south wall. Perhaps the patchy area of dull brightness to the west of Cassini A's shadow is a small elevated area.

Finally, two questions about these magnificent shadows. First, the shadow exactly bordered a small peak in Mare Imbrium, probably an extension of the nearby Montes Caucasus or an outcrop of one of the rings of the Imbrium basin; which allows us to calculate the distance it covers, about 40 kilometers from the south wall, which with a generous calculation we could extend to near Theaetetus, which gives us (according to the LROC Quickmap) about 65 kilometers (IMAGE 2). Second: how will this enormous and threatening shadow be perceived on the surface of the Mare Imbrium? I believe that Cassini's shadow will contribute to making the surface around it less bright at lunar dawn, just as the illuminated areas of the Moon make the shadows less dark, as the astronauts of the Apollo missions have narrated.

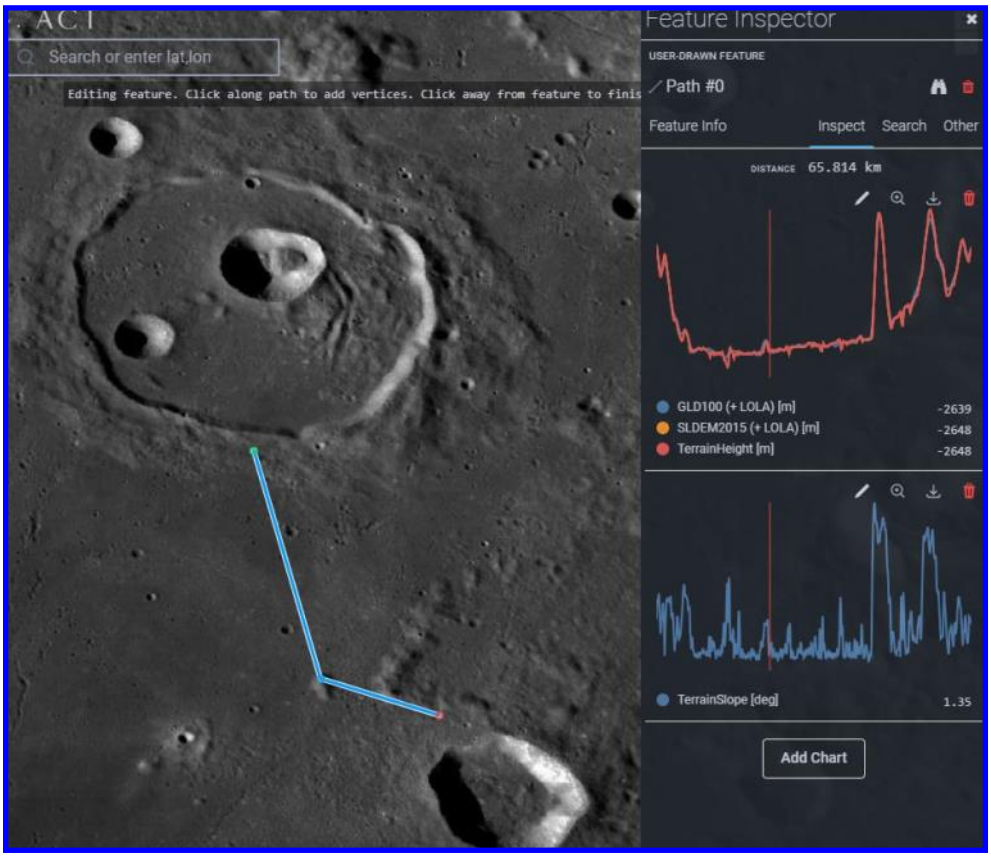


Image 2, *Cassini, LROC.*

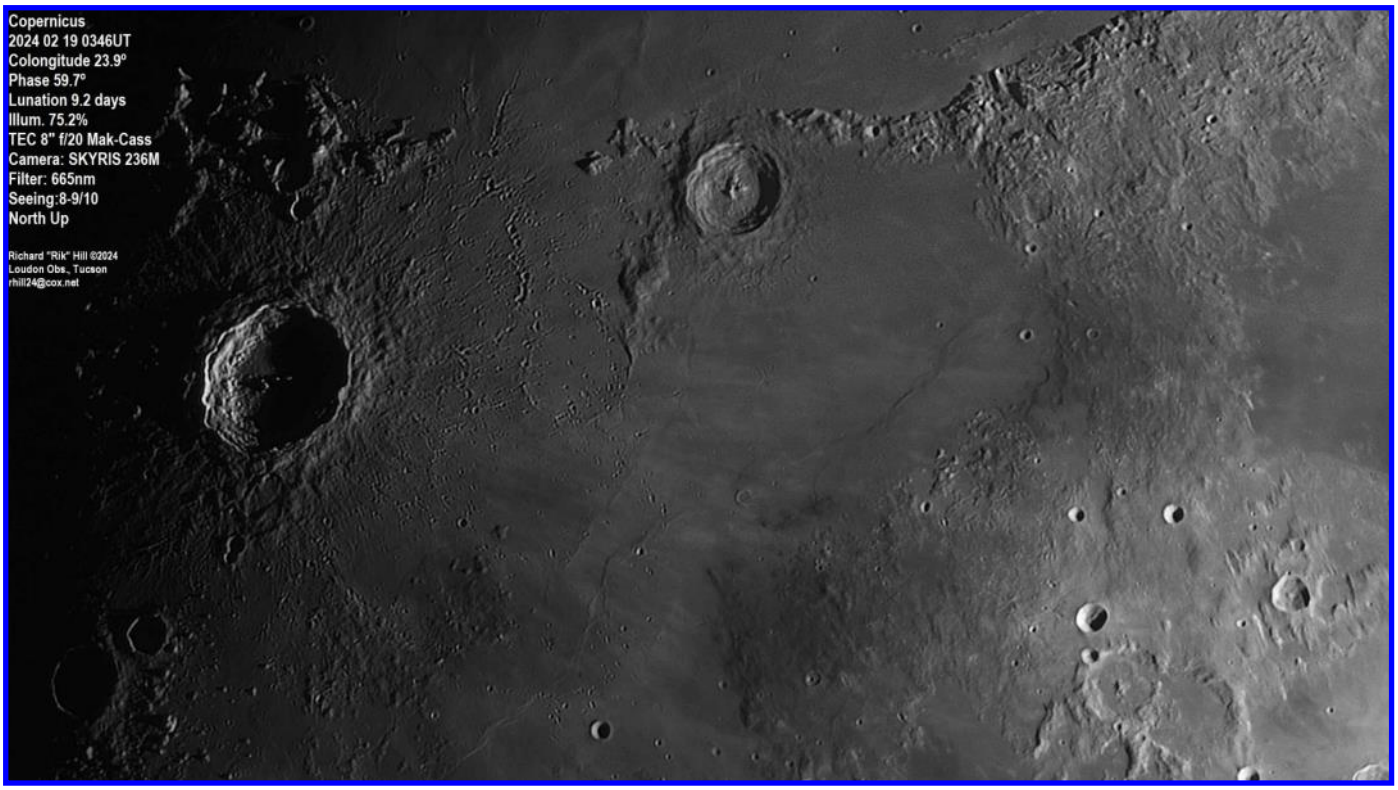
Sinus Aestuum

Rik Hill

Nine days after new moon the great crater Copernicus (diameter 95 km) and its little brother Eratosthenes (60 km) are on the terminator giving one of the more spectacular views the lunar observer can see. Younger observers have related how they can see Copernicus when it is on the terminator, but I never have though I have looked many times over the years. Both craters are known as "terraced" craters for the obvious reason that the interior walls appear terraced as if it were a farming project. In the lower left corner can be seen two shadow filled craters. The largest is Reinhold (49 km) and the smaller polygonal one is Reinhold B (26 km). In the opposite corner are two good sized craters, Pallas (51 km) and Murchison (60 km) which are usually seen in images of Triesnecker (27 km) that is peeking in the extreme lower right corner and its rimae system.

Heading to the northeast (upper right) from Eratosthenes is the southern end of the Montes Apenninus including Mons Wolf (3500 m high). Between Copernicus and Eratosthenes, you can see a clustering of craters all roughly the same size. Notice they are laid out rather concentric to the walls of Copernicus and not all are round. These are "secondary" craters formed in low velocity impacts of the ejecta thrown out during the Copernicus impact that occurred in the last billion years, rather recent on the moon. In fact, this is the basis for the Copernican Period in the lunar geologic timescale while Eratosthenes defines the Eratosthenian Period that goes from 1.1 to 3.2 billion years ago. This is why you don't see any ejecta blanket features on the side of that crater facing Copernicus. Secondary craters can be seen all over Sinus Aestuum, the plain below Eratosthenes to the east of Copernicus. Also, on this plain you can see the rays from Copernicus as delicate shadings on the surface. During high sun, like full moon, these become overwhelmingly bright and dominant.

Lost in the secondary craters between the two great craters you can see an outline of a circle. This is Stadius (71 km) a once great crater every bit as glorious as Eratosthenes when it was formed over 3.85-3.8 billion years ago (the Imbrian Period) but now buried in the flooding that created Sinus Aestuum and then overlain by ejecta from both the more recent craters. Oddly enough, all these secondary craters created from Copernicus



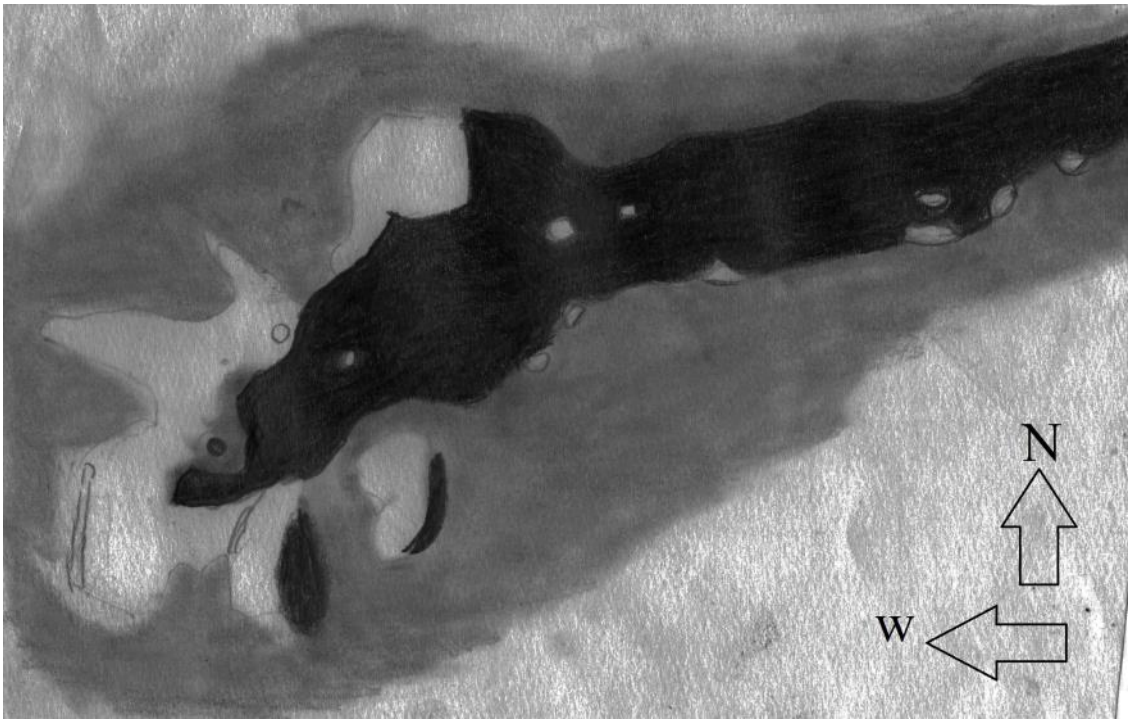
Lunar Topographic Studies
Sinus Aestuum

The Valley of Shadows

Alberto Anunziato

Vallis Alps is one of the most impressive wonders of the Moon. I wouldn't dream of making a sketch that could contribute to what we already know, but I gave in to temptation, it looked so melancholic flooded with shadows... I had never seen it like that, so I tried it. Then I tried to find information about what I had observed. Firstly, the shadows take up more space than the valley itself, in shadows it appears much thicker towards the west part of the mountainous area. In shadows, that oval area long known as the "Grand Amphitheater", which Thomas Elger dreamed of in "The Moon", is not so clearly visible. Tell me if it is not a wonderful description of what we would see on either side of the Canyon: "At the entrance to the *amphitheater*, the actual distance between the colossal rocks which flank the defile is certainly not much more than 2 miles. From this standpoint the view across the level interior of the elliptical plain would be of extraordinary magnificence. Towards the S., but more than 12 miles distant, the outlook of an observer would be limited by some of the loftiest peaks of the Alps, whose flanks form the boundary of the enclosure, through which, however, by at least three narrow passes he might perchance get a glimpse of the Mare Imbrium beyond". I am not going to be original; the resemblance is very obvious with its terrestrial counterpart: "Vallis Alpes (Alpine Valley), 130 km long and in places 18 km wide, cuts cleanly through the lunar Alps and, is visible as a dark line after local lunar sunrise and before sunset (…) Earth's largest land gorge, the Grand Canyon in Arizona, averages 13 km wide and 1,600 m deep. While the Grand Canyon has been hewn out of the Earth's crust by the continuous erosive action of the Colorado river over hundreds of thousands of years, erosion is not the cause of its lunar counterpart: there never have been appreciable quantities of running liquid water on the Moon's surface. In the case of the Alpine Valley, tension in the lunar Alps caused two parallel faults to appear across the mountain range, and the area bounded by the faults sank down below the level of the mountain tops. This kind of valley is known as a graben – it is by far the largest linear rille on the Moon" ("The Moon and How To Observe It", Peter Grego).

Just as I had never seen the valley in shadow, I had also never observed the line of pearls on its southern flank: "For a greater part of its extent it is bounded on the S.E. side by a precipitous linear cliff, which, under a low evening sun, is seen to be fringed by a row of bright little hills" (Elger). The bright points seen inside the shadow correspond to the highest points of the northern flank, almost entirely invisible by the shadows, except for a small elevation within the valley and very close to the southern flank.

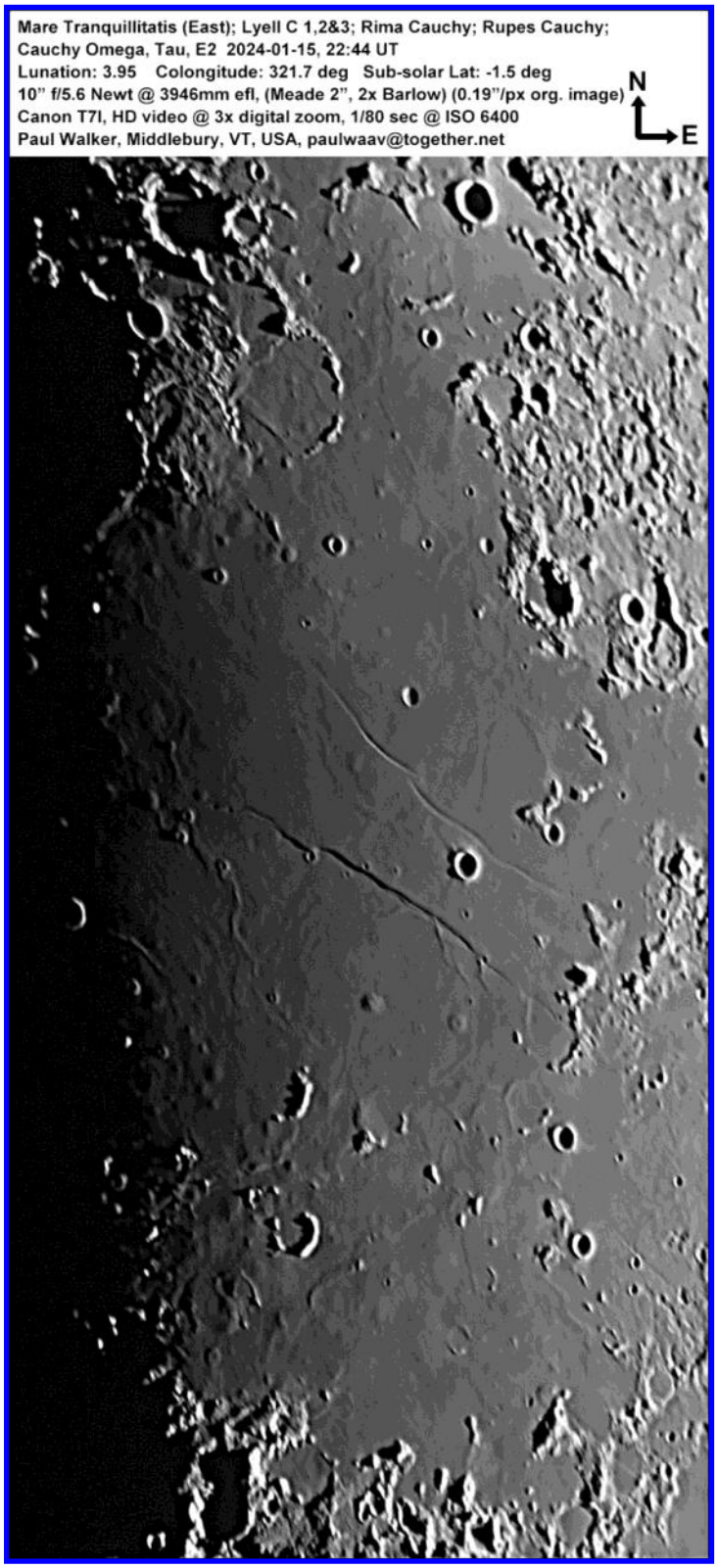


Vallis Alpes, *Alberto Anunziato, Paraná, Argentina. March 02 05:15-05:35 UT. Meade EX105 Maksutov-Cassegrain telescope, 154 x.*

Mare Tranquillitatis, Rima Cauchy and Rupes Cauchy

Paul Walker

Oh, so many features, where to begin! Guess I start at the top. First locate the prominent 20 km crater, Carmichael, at the top left of center. A little to its left, center of the image is what appears to be a ghost crater. On the left side (west) of this is Maraldi 3 (per the Virtual Moon Atlas (VMA)) an extrusive volcanism. It is difficult to positively identify some features because the identifiers on the VMA seem to be offset a little to the right from where they should be. But it appears to be the tadpole shaped feature with its "tail" toward the north. Not to be confused with the much more prominent mountain to its southeast that looks like a single quotation mark. To the SSE of the ghost crater appears to be another ghost with just a little of its south rim protruding above the lava plain. Moving south of the prominent "single quotation" you will come across a small crater. Just a bit below this and to the east is a small light-colored spot. This is a bit of extrusive volcanism called Maraldi M 1 (per VMA).



Mare Tranquillitatis (East), Rima Cauchy, Rupes Cauchy *Paul Walker, Middlebury, Vermont, USA. 2024 January 15, 22:44 UT. Lunation: 3.95 Colongitude: 321.7 deg Sub-solar Lat: -1.5 deg. 10" f/5.6 Newt @ 3946mm efl, 2x Barlow, Canon T7I, HD video @ 3x digital zoom.*

From there, move west to the eastern intersection of the walls of Maraldi D, the large mostly filled crater, and Maraldi E the smaller mostly filed crater just above it. There, in the middle of the intersecting walls, is Maraldi D 2. It is described as extrusive volcanism like many other features here. On the LROC QuickMap (https://quickmap.lroc.asu.edu/) I see what looks like a tiny 0.44 km eroded crater a little below the center the jumble of much larger undulations of this area. You can compare it to a similar sized fresher crater to the WSW near the edge of the jumble. So how much of that "jumble" is remains of the crater walls and how much is from volcanic activity? Hard to tell.

I looked at some of the other overlays available on the LROC QuickMap. I found the Unified Geologic Map overlay, which could be helpful in some cases. There are a lot of colors in this overlay and it's a bit hard distinguishing between some of them. This jumbled area is colored a medium brown indicating a "Crater Unit". No part of it colored red for a "Mare Dome Unit". However, several other places in the image are colored as "Mare Dome Units". I am guessing that "Mare Dome Units" are comprised of multiple small domes and not individual domes. The named domes in the area on the LROC QuickMap and VMA would indicate this is the case.

Moving south from there into Maraldi D, one can see bumps, 2 above center and one near the bottom right of center. Though they look like they could be volcanic domes they are not identified as such on the VMA. Lawrence Garrett, a fellow member of the local club and member of ALPO, pointed me to the lunardomeatlas.blogspot.com blog site. There, I see the one near the bottom right of center, labeled C42.

Going out of Maraldi D from its center in the 3:30 direction is small but prominent bump (about ½ way across the flat area). This is the lunar dome, Lyell C 3 (VMA) and as C34 on lunardomeatlas.blogspot.com. From there going left, about 2/3 the way back to the rim of Maraldi D appears to be a very low lunar dome but it is not labeled on the VMA. On lunardomeatlas.blogspot.com it is labeled as C35. I am thinking there are too many lunar domes in this image to point them all out.

So, I'll move on to other features. Like the 2 fault features, Rima Cauchy and Rupes Cauchy. Rima Cauchy is type of fault called a graben where the crust fell down between two fault lines as the crust on either side pulled apart. An interesting feature of this fault is in the middle of the portion visible in this image. That is the fault is appears have a discontinuity. This seemed kind of odd. While wondering about this I realized it reminded me of how wood sometimes cracks. Wood of coarse cracks along the grain, a crack can stop along one grain line and be taken up on and adjacent line. So, depending on where the crust is weakest and/or where cracks may have formed from earlier stresses, I can see how this type of discontinuity can occur.

Rupes Cauchy is for the most part a "normal fault" where there is a single fault line that angles into the crust and one side slides down as the crust pulls apart. This is like the well know "Straight Wall", Rupes Recta. While this is the case over most of length of Rupes Cauchy, its far western end appears to be a graben. Also at the western end are 2 collapse pits (visible as 2 black dots in the image). One is about 350 m deep, the other about 450 m. This compares to 65-100 m depth for the nearby floor of the graben (see Figure 2). Makes one wonder what the difference under the surface is to cause these pits. Perhaps they are actually collapsed sections of a lava tube. The pits are 1.75 x 4.3 km and 2 x 3.4 km. The pits are difficult visual targets but within the realm of possibility.

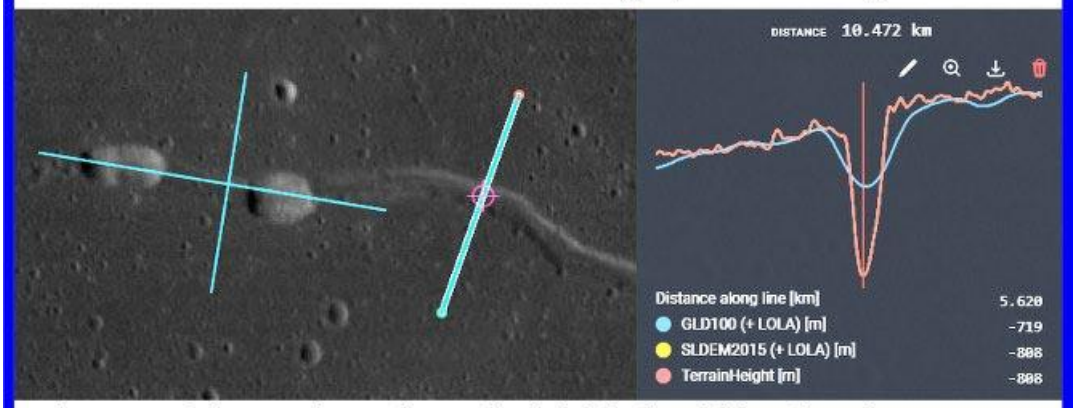
The eastern end of Rupes Cauchy (inside what looks like a ghost crater) also appears to be a graben and has four much smaller pits. They are not obvious in the image. Three of them blend in with the fault. They are round rather than oblong like the ones at the other end. The biggest is 2.25 km (right most and visible as a small black dot in the image). This one is off-center to the graben and looking at the profile with LROC QuickMap has a bit of a raised edge, both features indicating it may be a small crater. The others are harder to assess. Rupes Cauchy has some "discontinuities" like Rima Cauchy. It looks like a minor one in the middle of these 4 craters/pits.

OK, I'll mention 2 more lunar domes but only because you can't miss them below Rupes Cauchy. They are C2 and C3 as labeled on https://lunardomeatlas.blogspot.com/. They are 12.2 km and 17 km in diameter, 125 m and 190 m tall, respectively. C3 is below the center of Rupes Cauchy and has a textured surface. C2 is the bump to its right with a depression in the center. Both should be easy to see under good lighting.

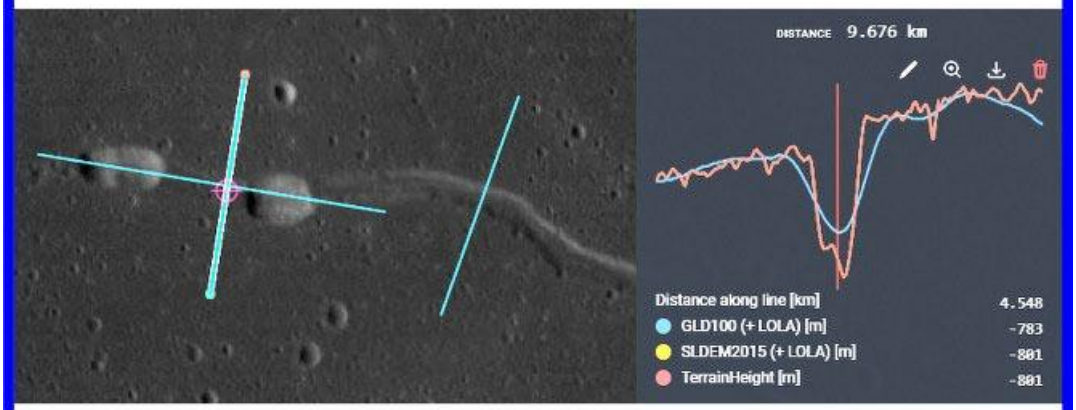
Lunar Topographic Studies
Mare Tranquillitatis, Rima Cauchy and Rupes Cauchy

Figure 2 Pits at the West end of Rupes Cauchy

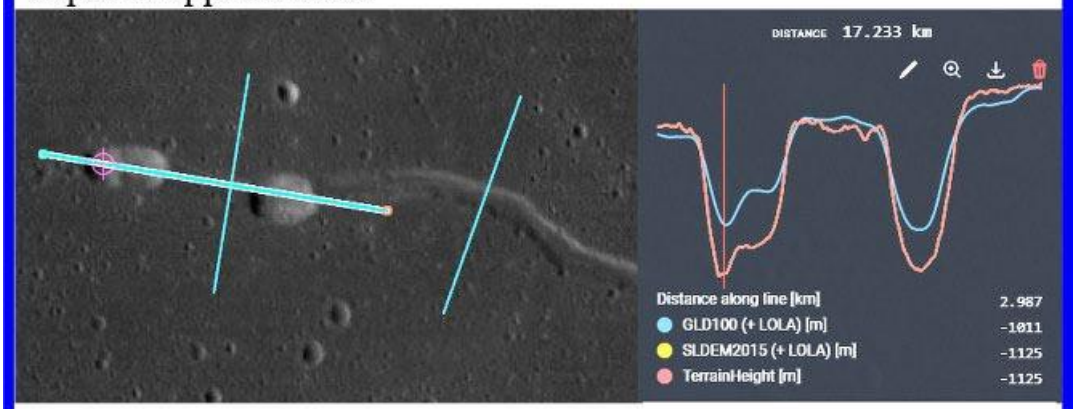
The red circles with the cross hair on the left corresponds to the location of the red vertical lines in the graphs on the right.



The top of the Garben along the highlighted blue line is approx. -650m, the bottom approx. -800m making it approx. 150m deep.

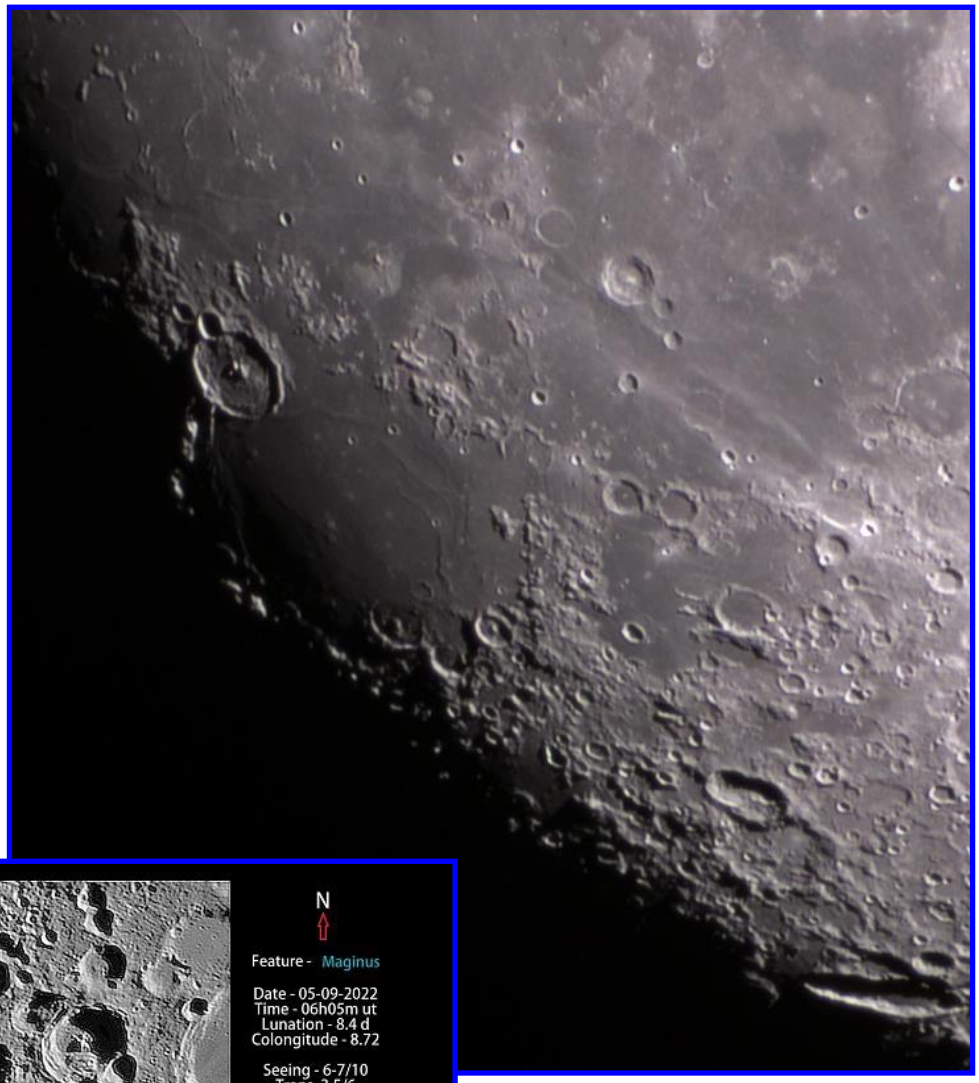


Here the top is approx. -720m and the bottom approx. -800m for a depth of approx. 80m.

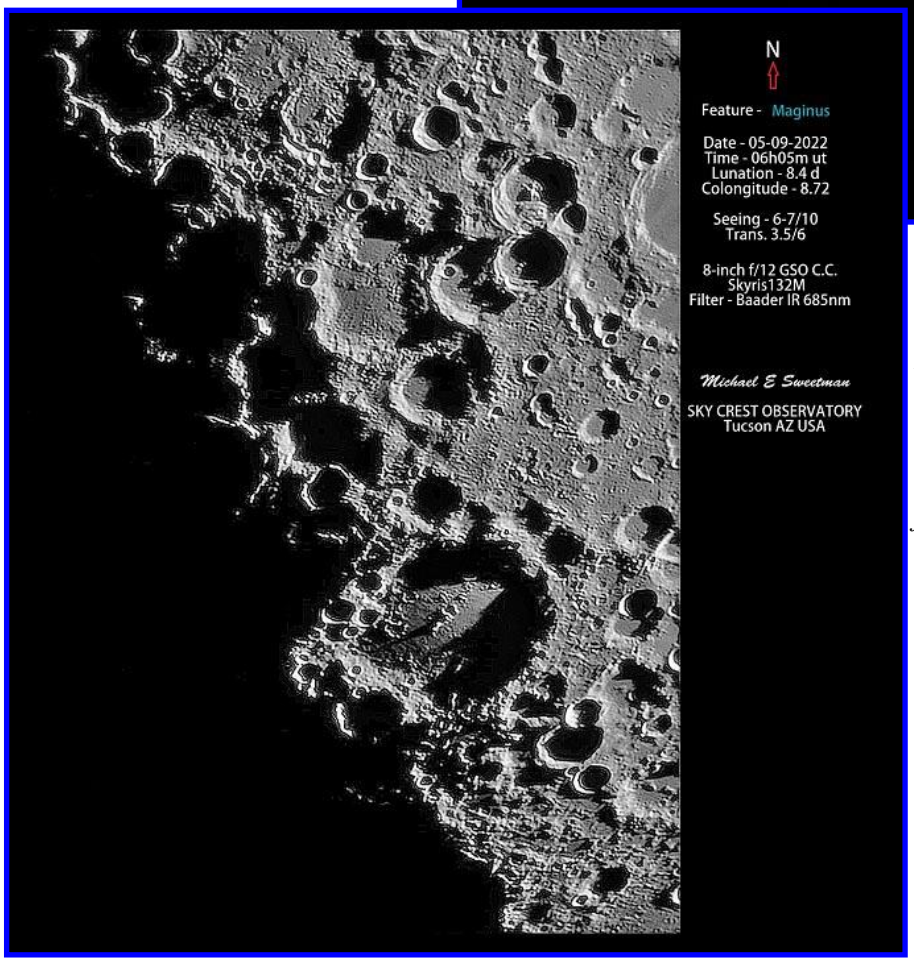


The top here is approx. -780m and the bottom of the pits are approx. -1100m, giving a depth of approx. 220m

Data Source: LROC QuickMap

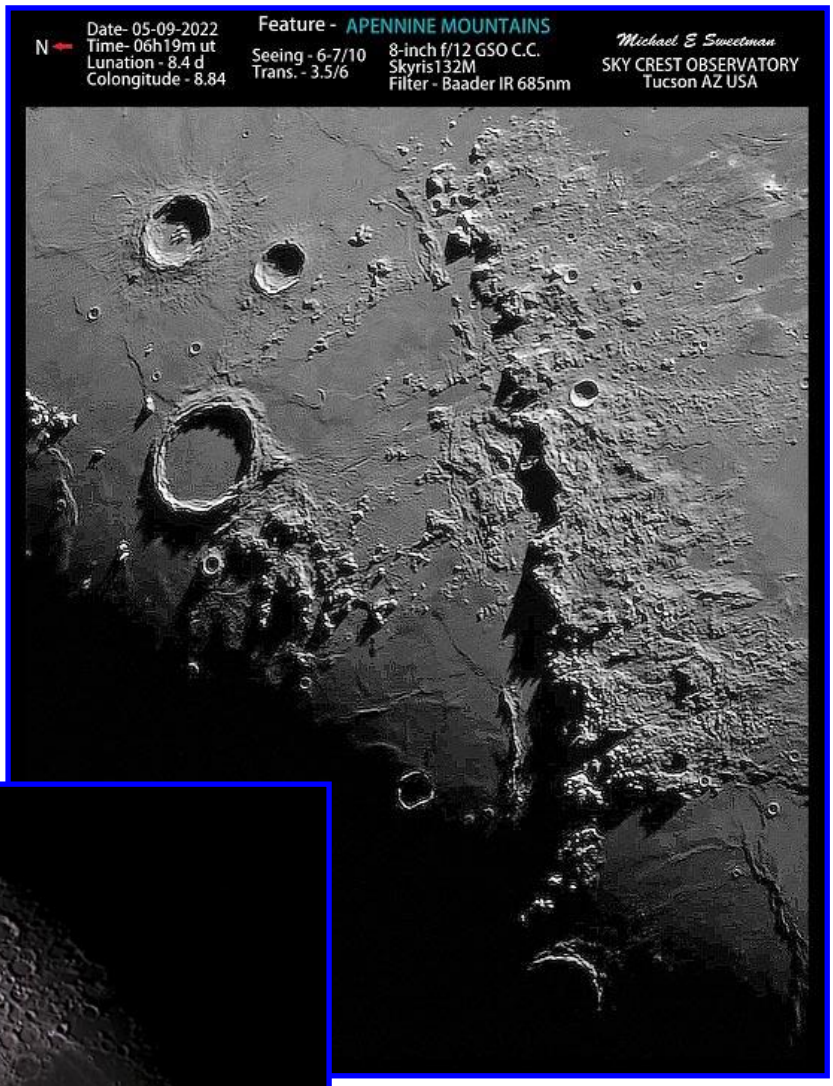


Gassendi, *Maurice Collins, Palmerston North, New Zealand. 2024 March 21 08:09 UT. 80 mm ED refractor telescope, QHY5III462C camera.*

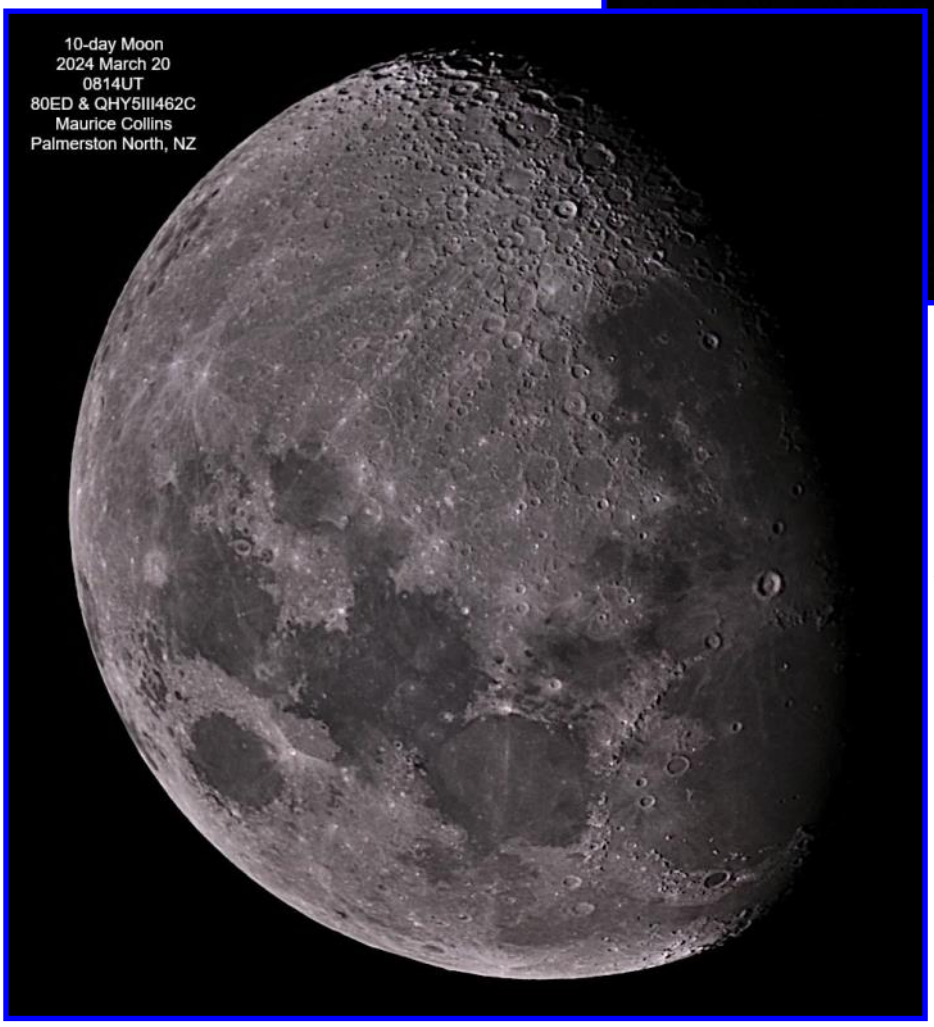


Maginus, *Michael E. Sweetman, Sky Crest Observatory, Tucson, Arizona, USA. 2022 May 09 06:05 UT, colongitude 8.72º. 8 inch f/12 GSO Classical Cassegrain telescope, Baader IR 685 nm filter, SKYRIS 132 M camera. Seeing 6-7/10, transparency 3.5/6.*

Recent Topographic Studies



Montes Apenninus, *Michael E. Sweetman, Sky Crest Observatory, Tucson, Arizona, USA. 2022 May 09 06:19 UT, colongitude 8.84°. 8 inch f/12 GSO Classical Cassegrain telescope, Baader IR 685 nm filter, SKYRIS 132 M camera. Seeing 6-7/10, transparency 3.5/6.*



10-Day Old Moon, *Maurice Collins, Palmerston North, New Zealand. 2024 March 20 08:14 UT. 80 mm ED refractor telescope, QHY5III462C camera. North is down, west is right.*

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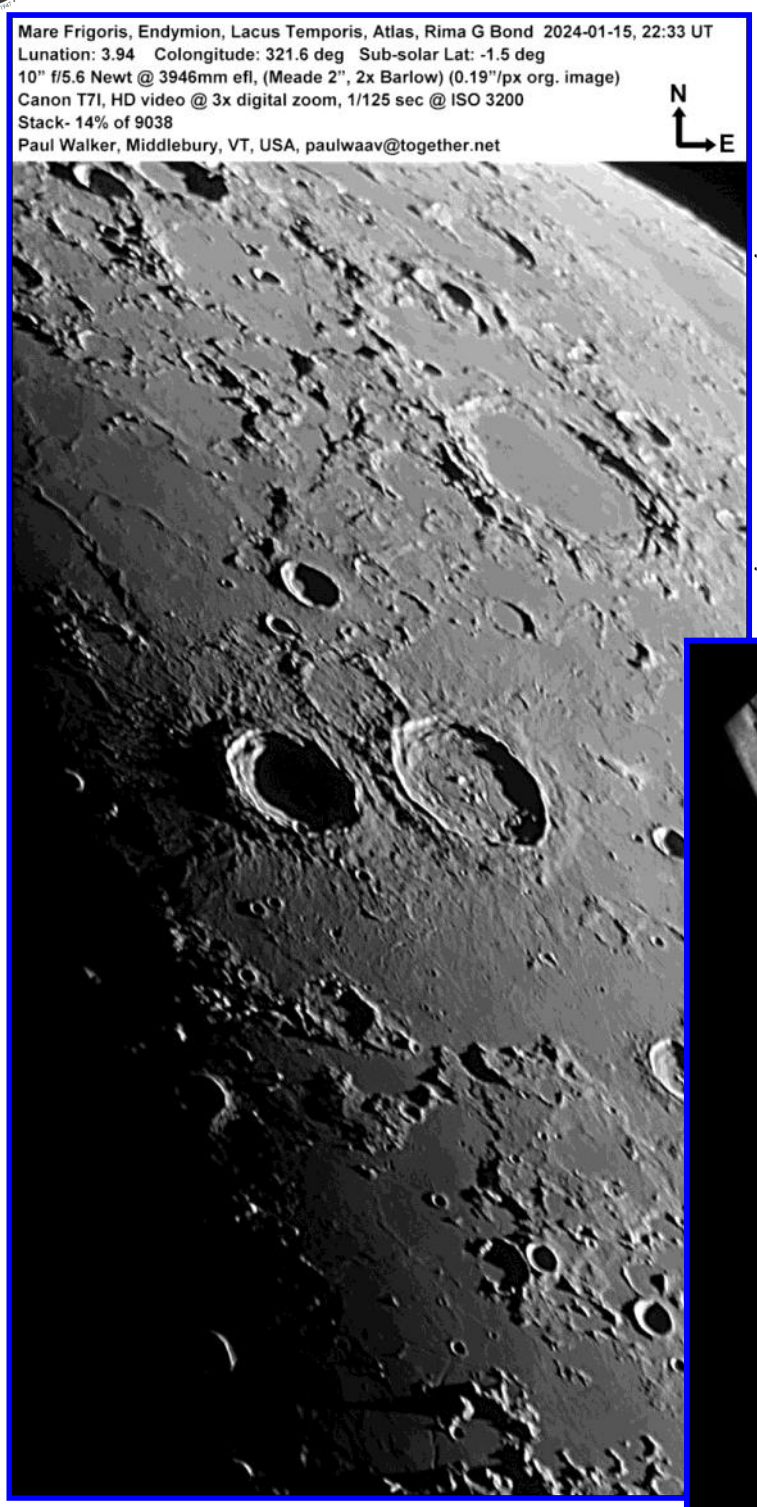

Mare Frigoris, Endymion, Lacus Temporis, Atlas, Rima G Bond, *Paul Walker, Middlebury, Vermont, USA. 2024 January 15, 22:33 UT, lunation: 3.94, Co-longitude: 321.6 deg, Sub-solar Lat: -1.5 deg. 10" f/5.6 Newt @ 3946mm efl, 2x Barlow, Canon T7I, HD video @ 3x digital zoom.*

Schlüter and Schlüter A, *István Zoltán Földvári, Budapest, Hungary. 2020 April 07 21:17-21:43 UT, co-longitude 86.6°. 70 mm refractor telescope, 500 mm focal length, Vixen Lanthanum LV 4mm eyepiece, 125x. Seeing 6/10, transparency 5/6.*

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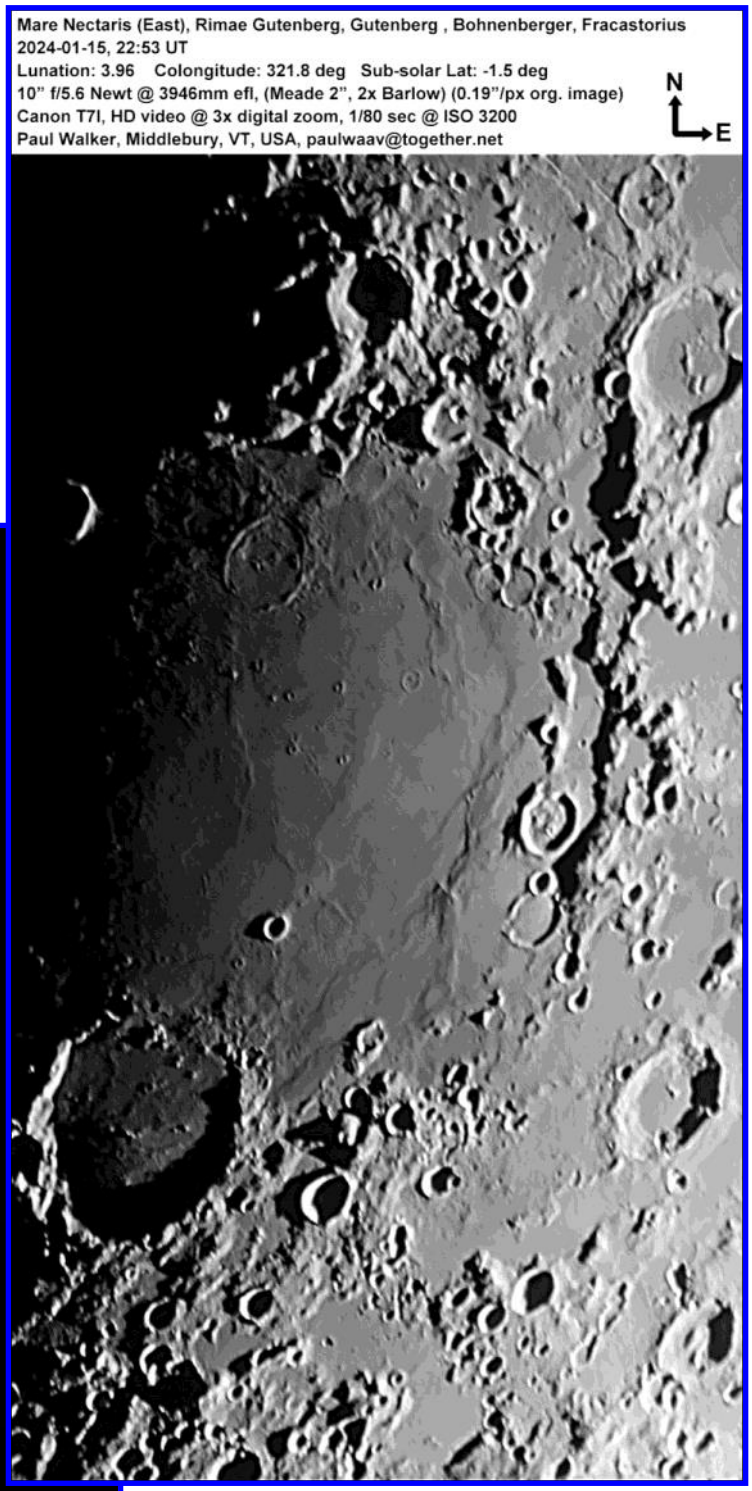
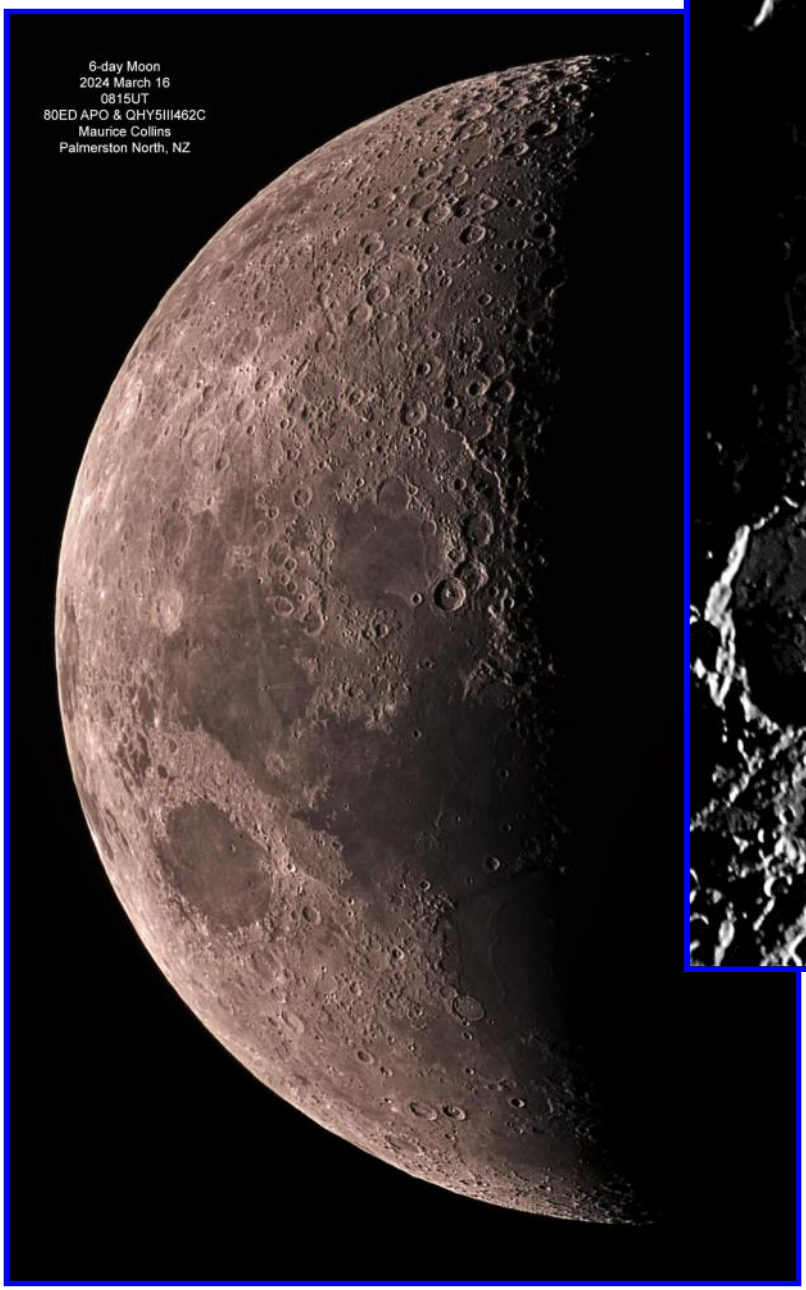


Mare Nectaris (east), Rimae Gutenberg, Gutenberg, Bohnenberger and Fracastorius, *Paul Walker, Middlebury, Vermont, USA. 2024 January 15, 22:53 UT, lunation: 3.96, Colongitude: 321.8 deg, Sub-solar Lat: -1.5 deg. 10" f/5.6 Newt @ 3946mm efl, 2x Barlow, Canon T7I, HD video @ 3x digital zoom.*



6-Day Old Moon, *Maurice Collins, Palmerston North, New Zealand. 2024 March 16 08:15 UT. 80 mm ED refractor telescope, QHY5III462C camera. North is down, west is right.*

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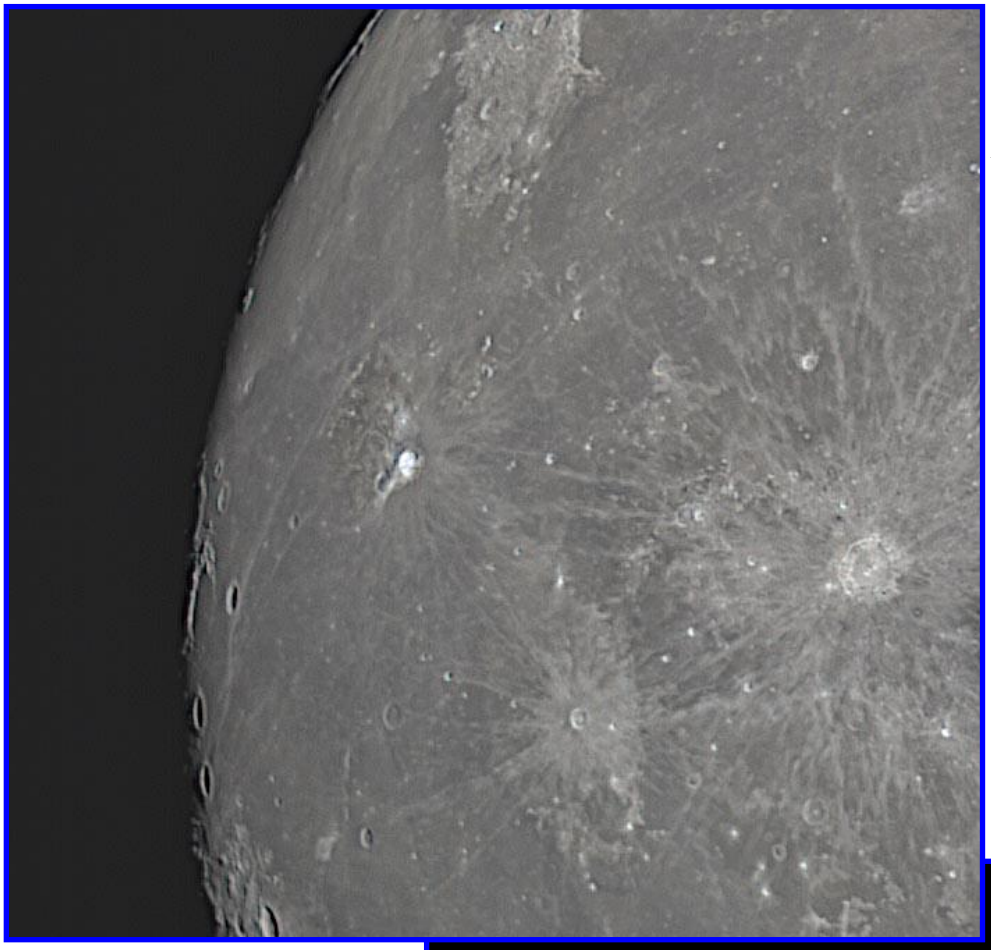
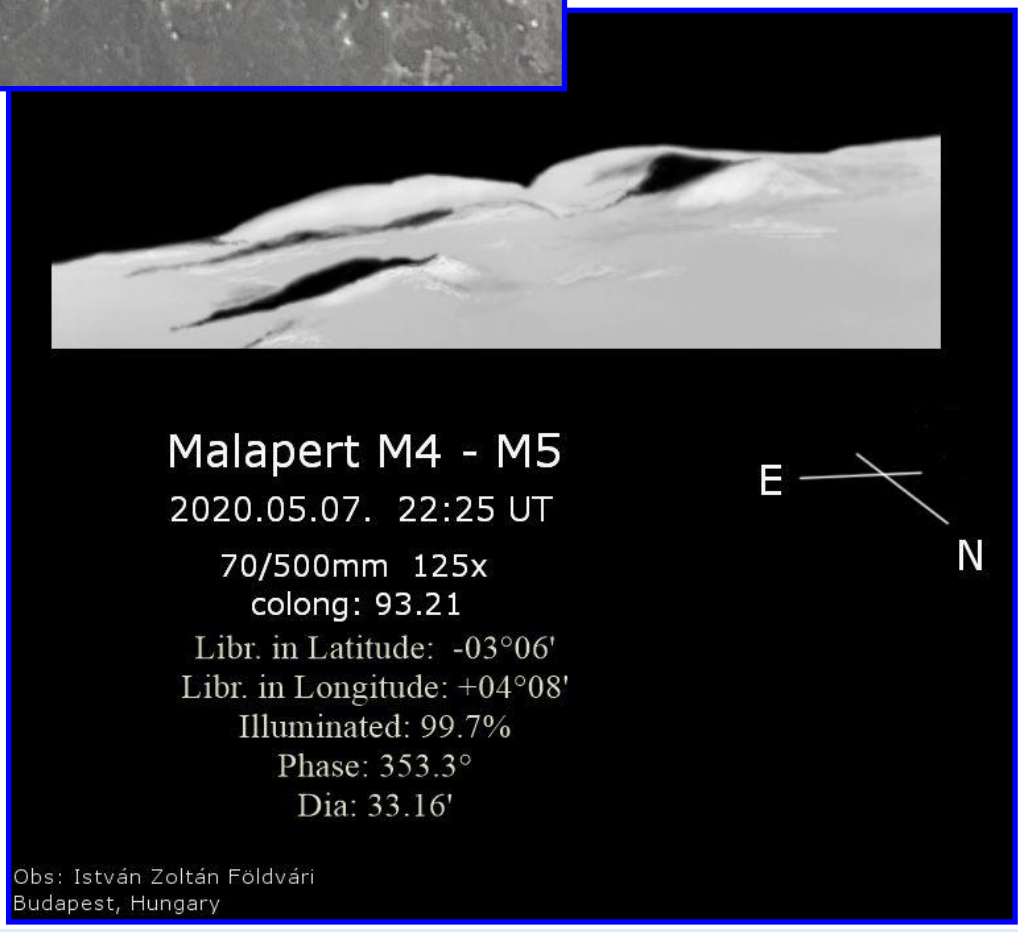
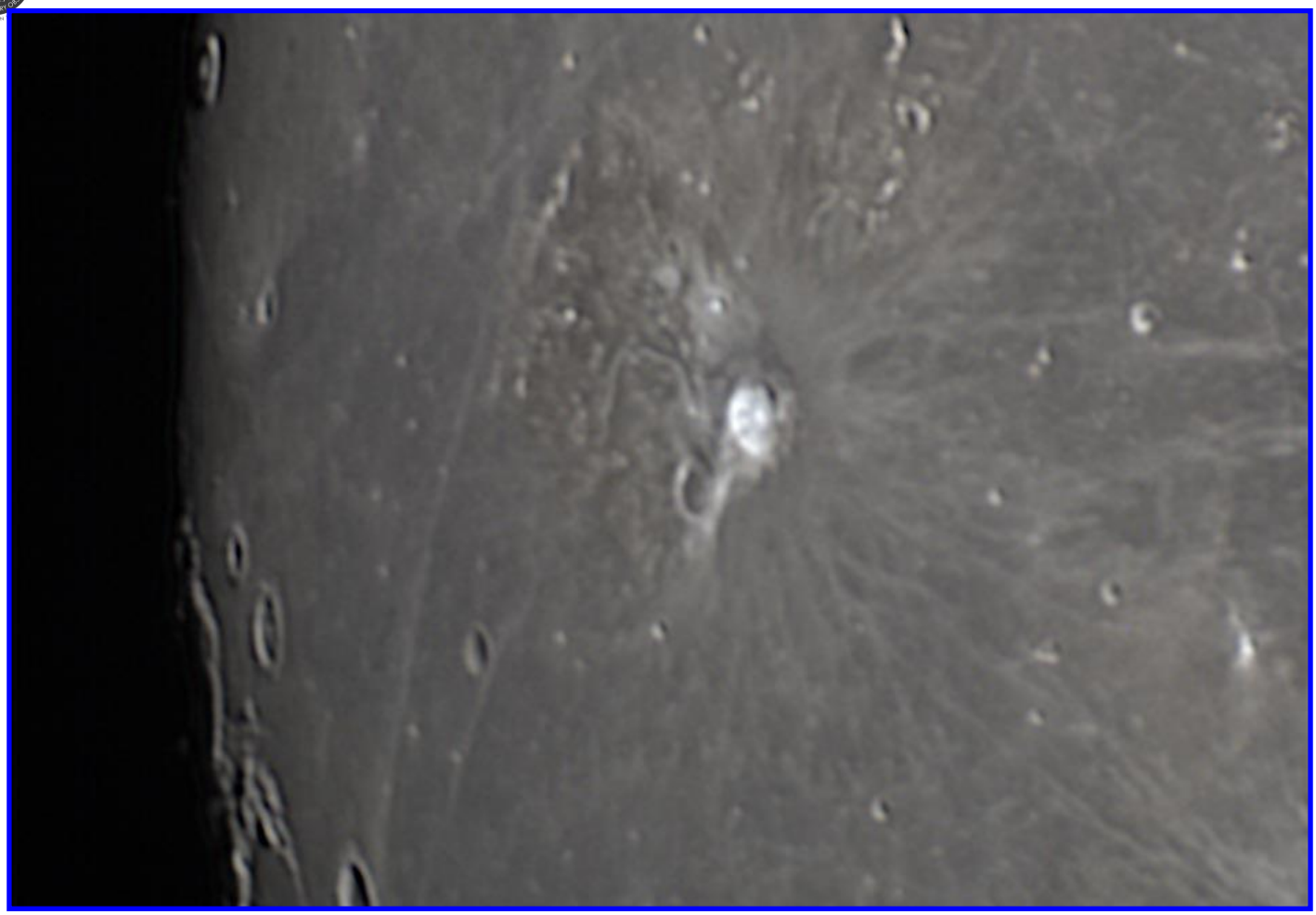


Aristarchus, *Walter Ricardo Elias, Oro Verde, Argentina. 2024 March 23 23:06 UT. SkyWatcher 150 mm reflector telescope, 750 mm focal length, QHY5-II-C camera.*

Malapert M4-M5, *István Zoltán Földvári, Budapest, Hungary. 2020 May 07 22:19-22:40 UT, colongitude 93.1°. 70 mm refractor telescope, 500 mm focal length, Vixen Lanthanum LV 4mm eyepiece, 125x. Seeing 3/10, transparency 5/6.*



Recent Topographic Studies

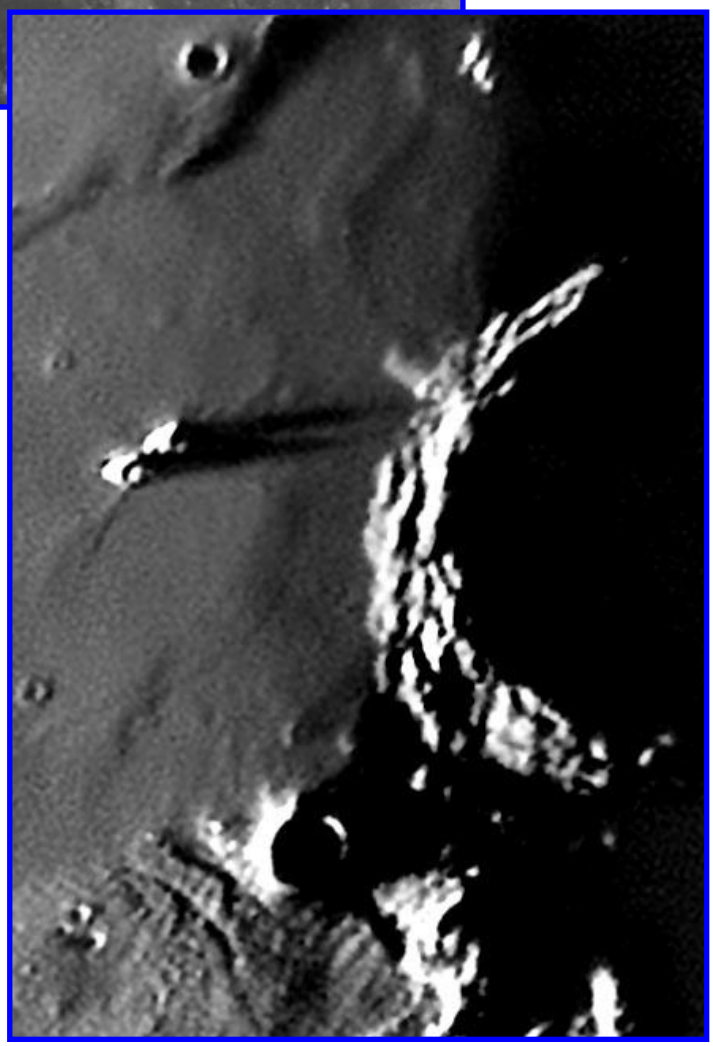


Aristarchus, *Walter Ricardo Elias, Oro Verde, Argentina. 2024 March 23 23:18 UT. Sky-Watcher 150 mm reflector telescope, 750 mm focal length, 3x barlow, QHY5-II-C camera.*

Plato and Vallis Alpes, *Luigi Morrone, Agerola, Italy. 2024 March 20 18:48 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, FFC Baader barlow, Optolong filter green, Fornax 52 mount, Player One Saturn M SQR (IMX 533) camera.*

Recent Topographic Studies

Copernicus, *Walter Ricardo Elias, Oro Verde, Argentina. 2024 March 23 23:08 UT. Sky-Watcher 150 mm reflector telescope, 750 mm focal length, QHY5-II-C camera.*



Archimedes, *KC Pau, Hong Kong, China. 2020 April 15 21:49 UT. 250 mm f/6 Newtonian reflector telescope, 2.5x barlow, QHYCCD290M camera.*

Recent Topographic Studies

11-Day Old Moon, *Maurice Collins, Palmerston North, New Zealand. 2024 March 21 07:57-08:07 UT. 80 mm ED refractor telescope, 3x barlow, QHY5III462C camera. North is down, west is right.*

Copernicus, *Luigi Morrone, Agerola, Italy. 2024 March 20 17:57 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, FFC Baader barlow, Optolong filter green, Fornax 52 mount, Player One Saturn M SQR (IMX 533) camera.*

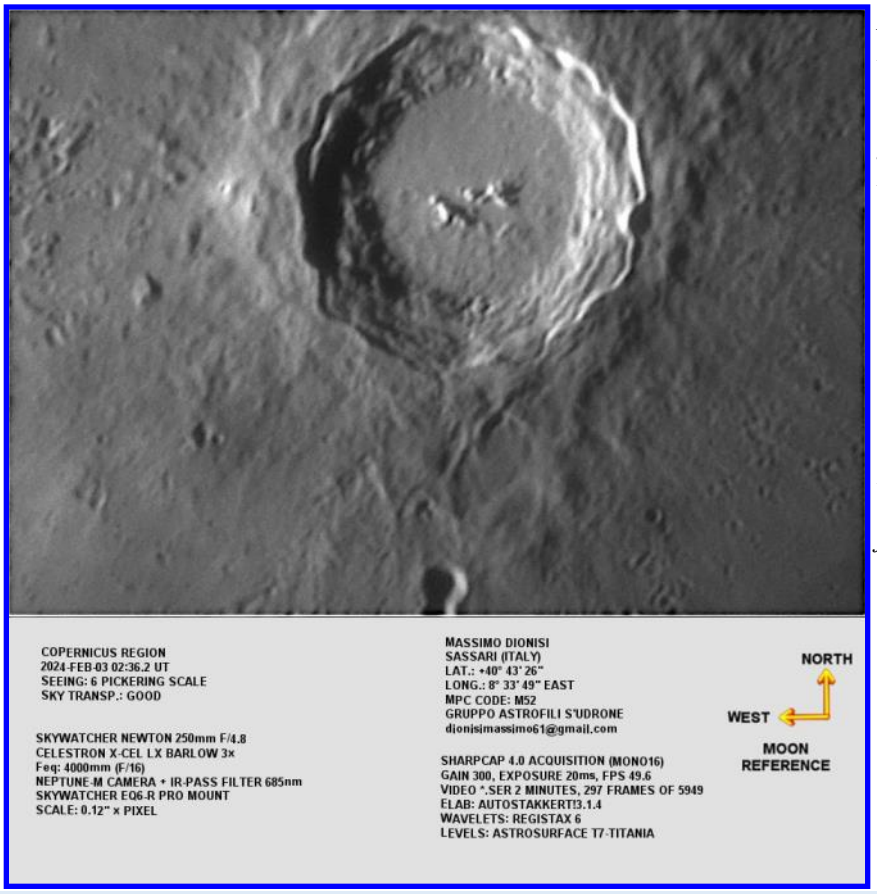
Recent Topographic Studies

6-Day Old Moon, *Maurice Collins, Palmerston North, New Zealand. 2024 March 16 08:13 UT. 80 mm ED refractor telescope, QHY5III462C camera. North is down, west is right.*

Rupes Recta, *KC Pau, Hong Kong, China. 2017 May 04 12:02 UT. 250 mm f/6 Newtonian reflector telescope, 2.5x barlow, QHYCCD290M camera.*

Recent Topographic Studies

Agatharchides, *Luigi Morrone, Agerola, Italy. 2024 March 20 18:51 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, FFC Baader barlow, Optolong filter green, Fornax 52 mount, Player One Saturn M SQR (IMX 533) camera.*



Copernicus, *Massimo Dionisi, Sassari, Italy. 2024 February 03 02:36 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency good.*

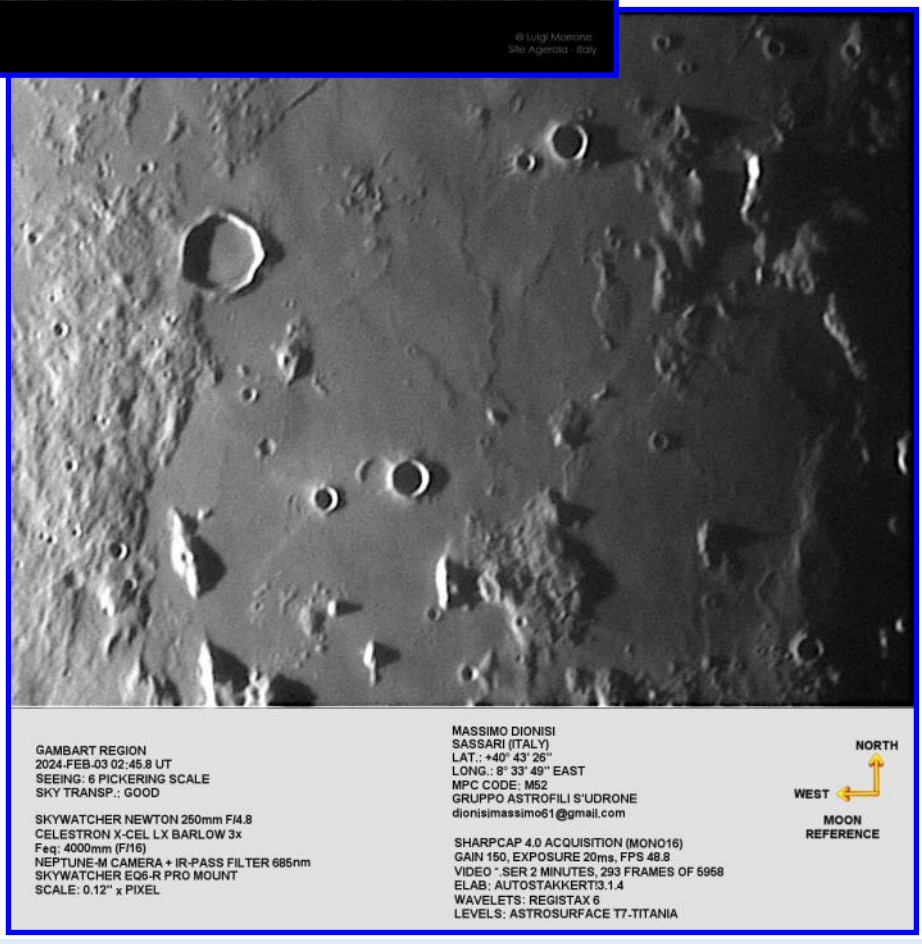
Recent Topographic Studies

11-Day Old Moon, *Maurice Collins, Palmerston North, New Zealand. 2024 March 21 07:50 UT. 80 mm ED refractor telescope, 2.5x barlow, QHY5III462C camera. North is down, west is right.*

Alphonsus, *Raúl Roberto Podestá, Formosa, Argentina. 2024 February 17 22:19 UT. 102 mm Maksutov-Cassegrain telescope, UV/IR cut filter, ZWO ASI178MC camera.*

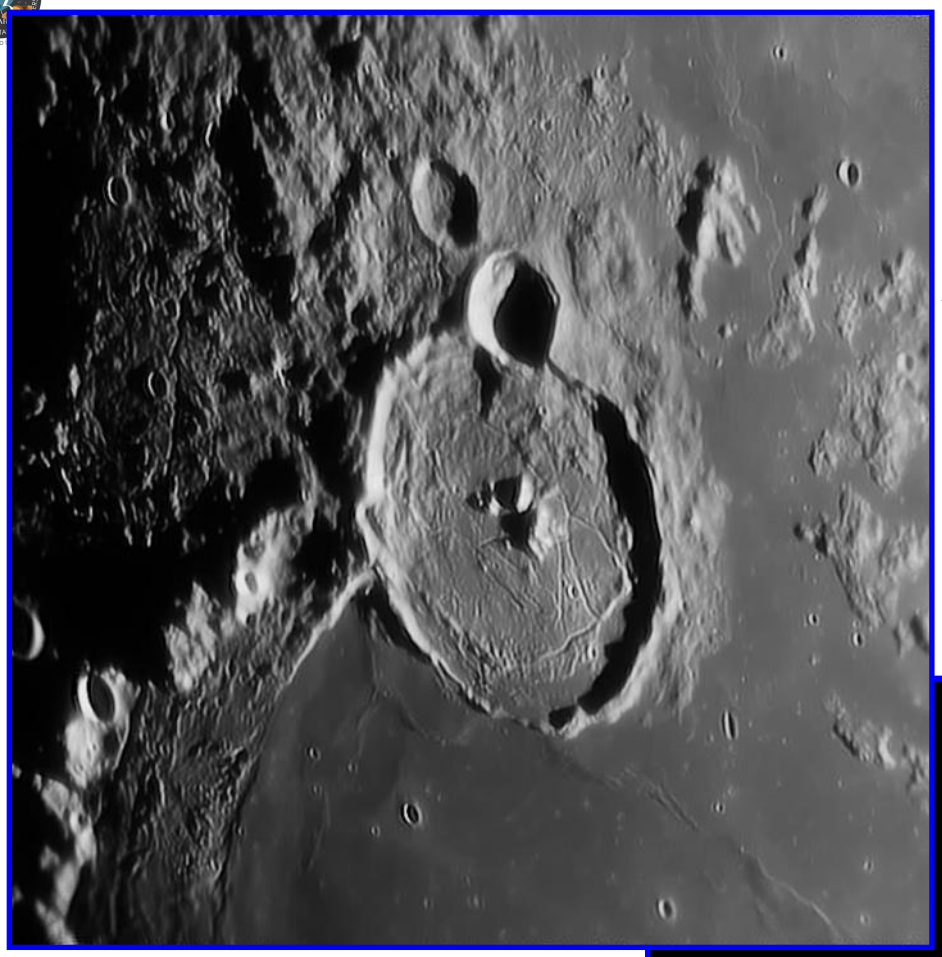
Recent Topographic Studies

Clavius, *Luigi Morrone, Agerola, Italy. 2024 March 20 18:20 UT. Celestron 14 inch Edge HD Schmidt-Cassegrain telescope, FFC Baader barlow, Optolong filter green, Fornax 52 mount, Player One Saturn M SQR (IMX 533) camera.*

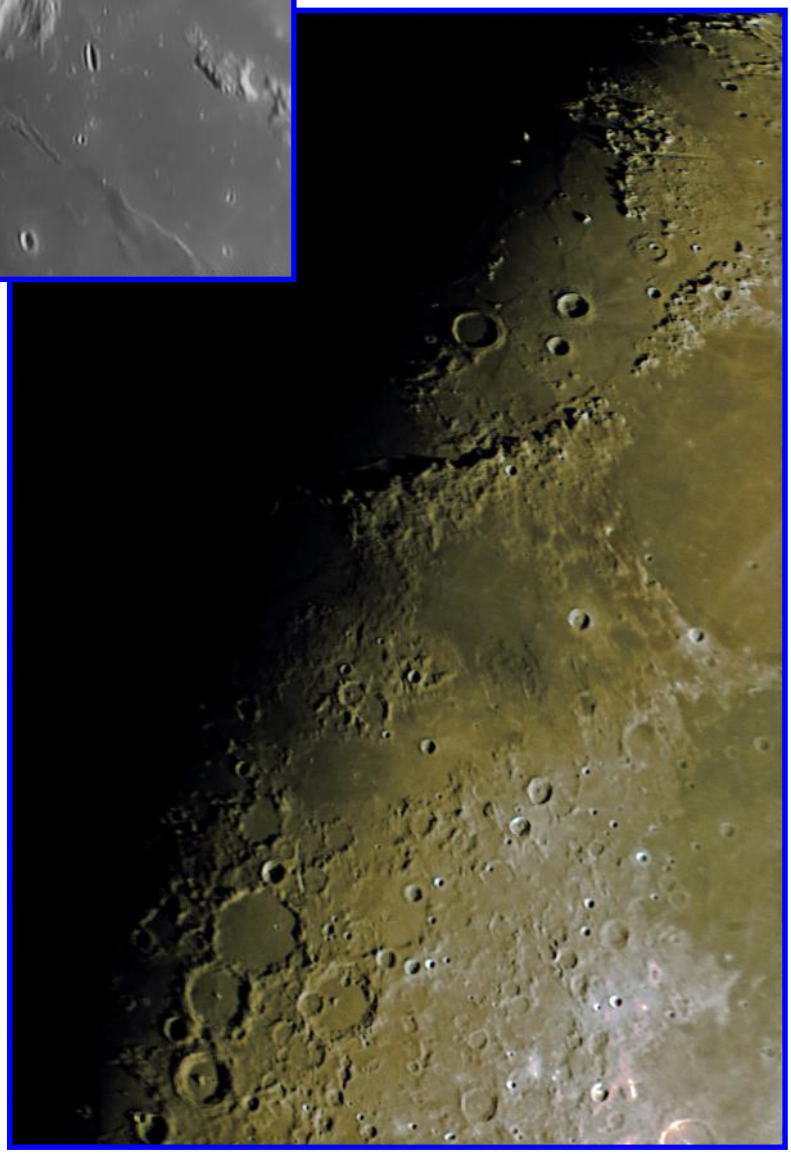


Gambart, *Massimo Dionisi, Sassari, Italy. 2024 February 03 02:45 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency good.*

Recent Topographic Studies

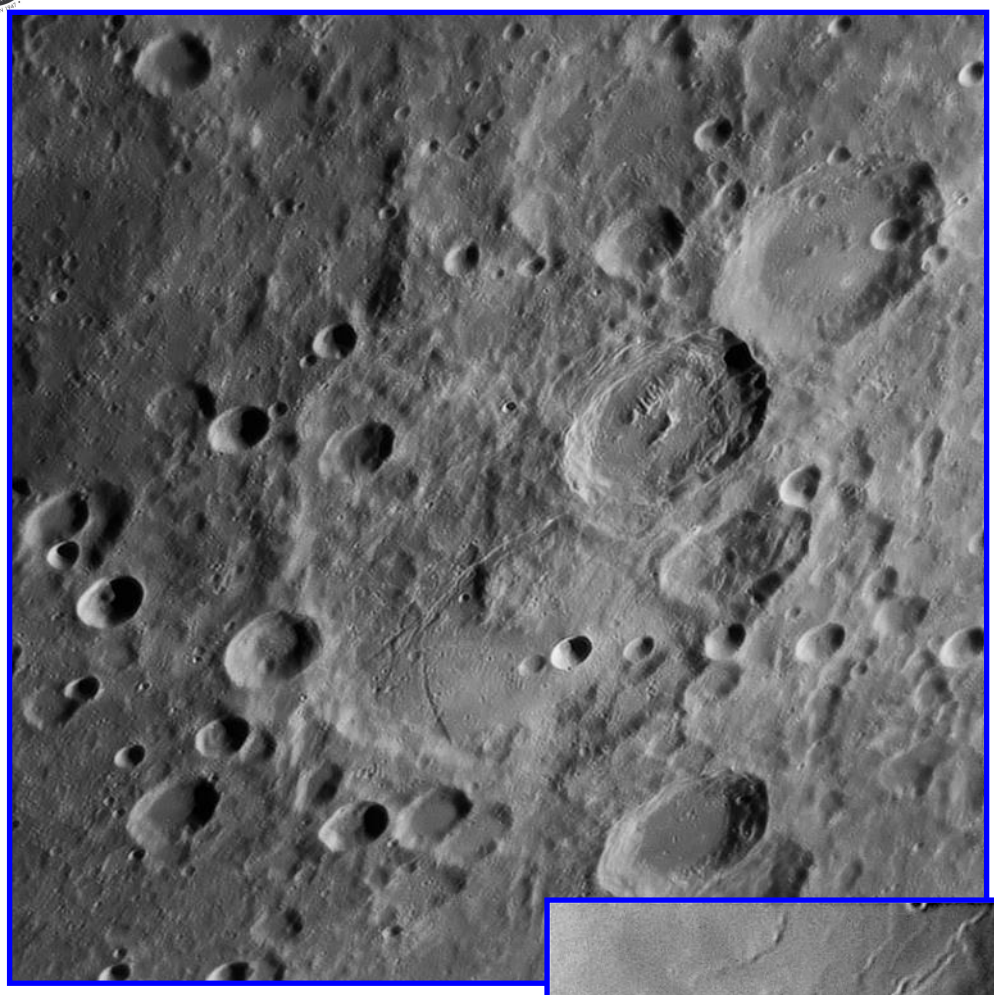


Gassendi, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2023 November 24 04:35 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*

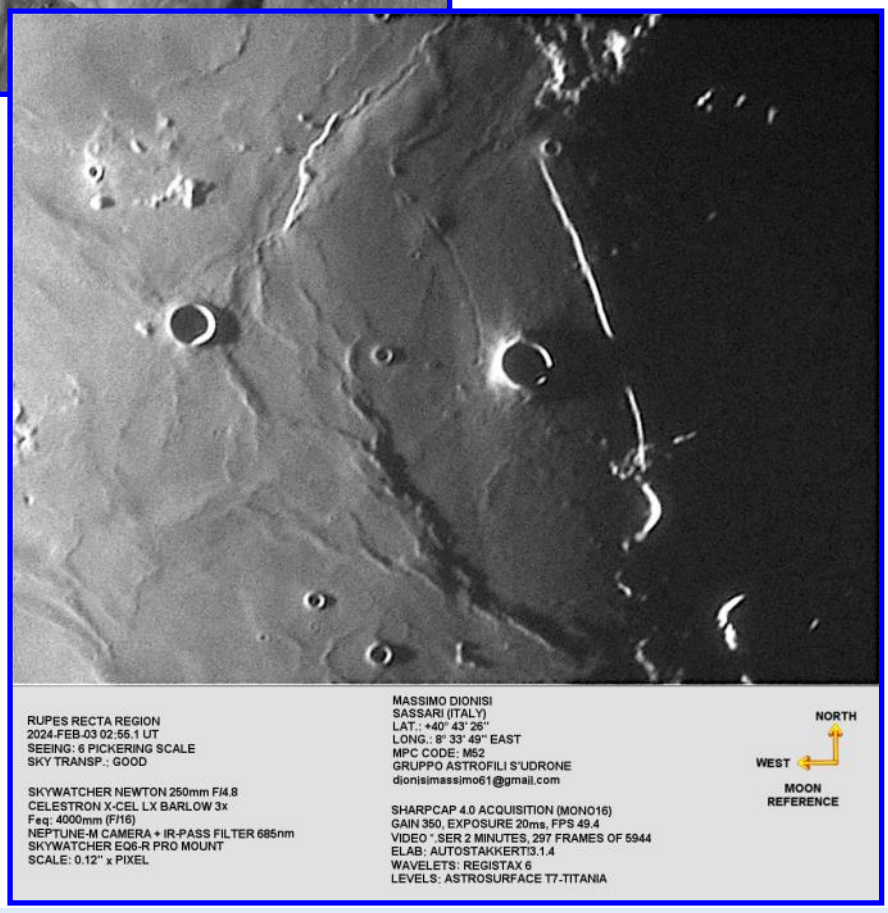


Apenninus, *Raúl Roberto Podestá, Formosa, Argentina. 2024 February 17 22:35 UT. 102 mm Maksutov-Cassegrain telescope, UV/IR cut filter, ZWO ASI178MC camera.*

Recent Topographic Studies

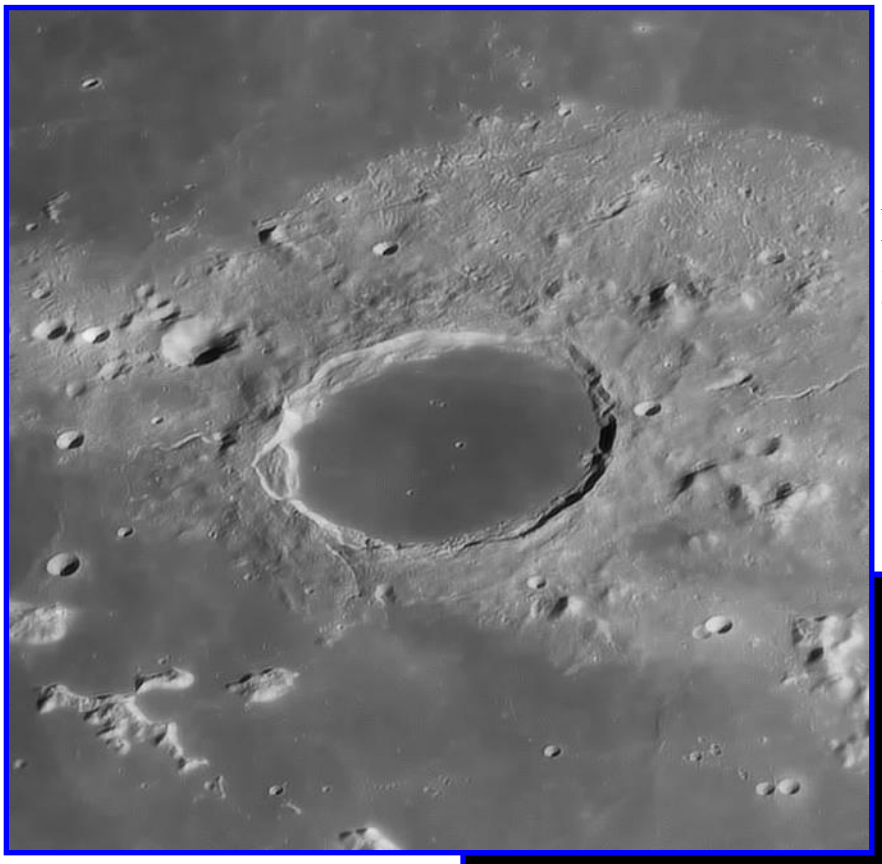


Janssen, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2024 March 14 04:08 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*

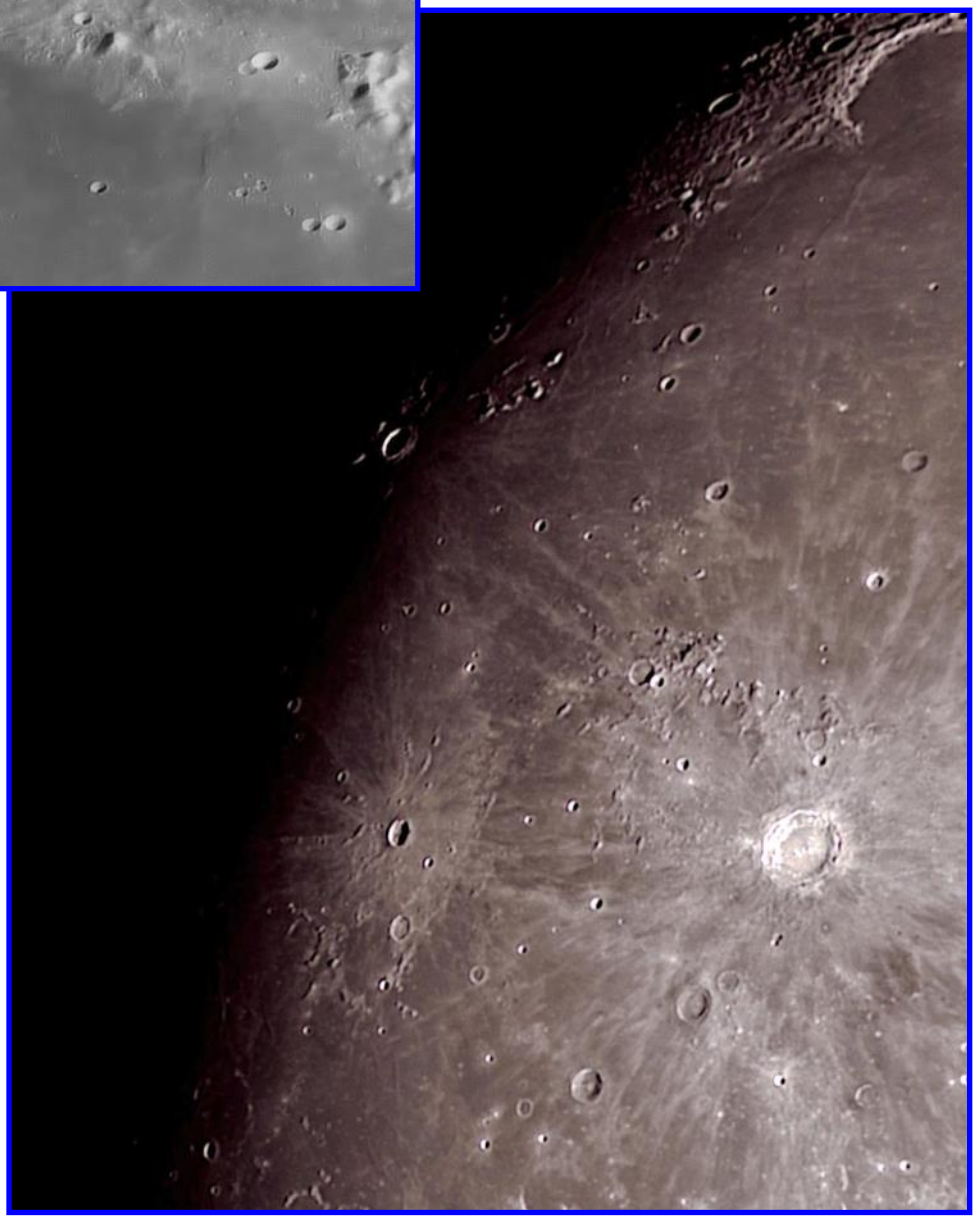


Rupes Recta, *Massimo Dionisi, Sassari, Italy. 2024 February 03 02:55 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency good.*

Recent Topographic Studies

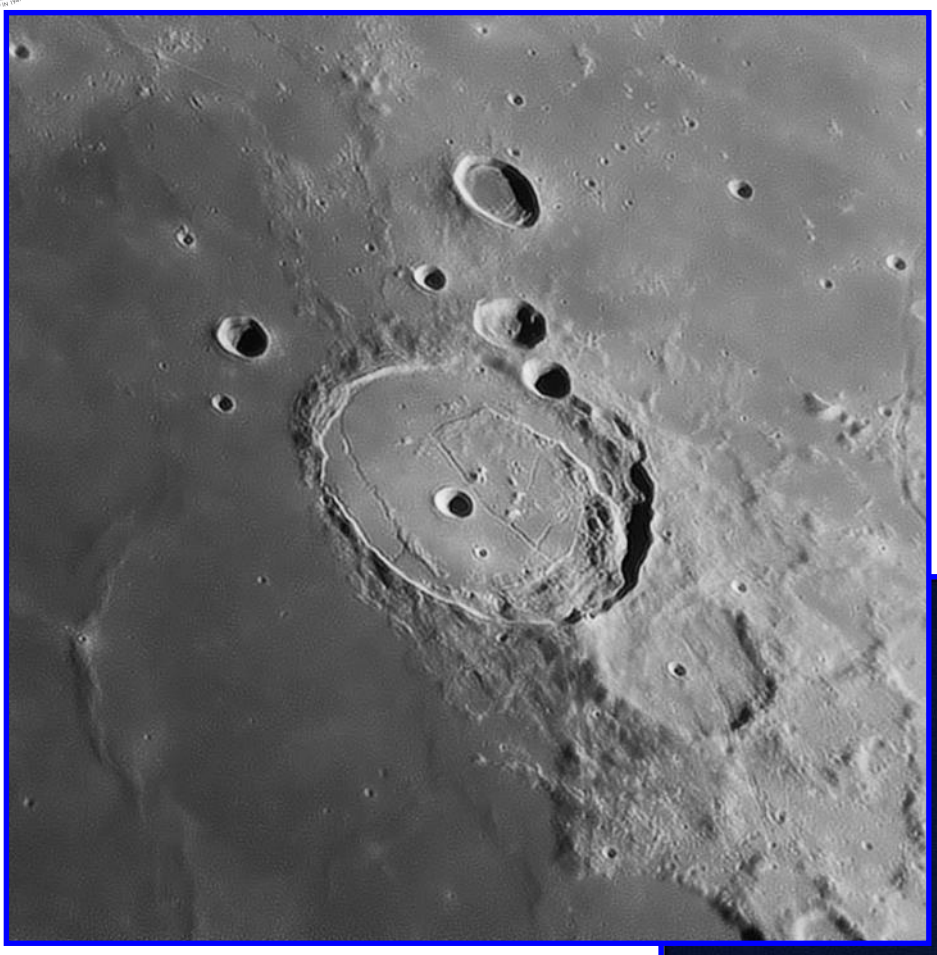


Plato, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2023 November 24 04:05 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*

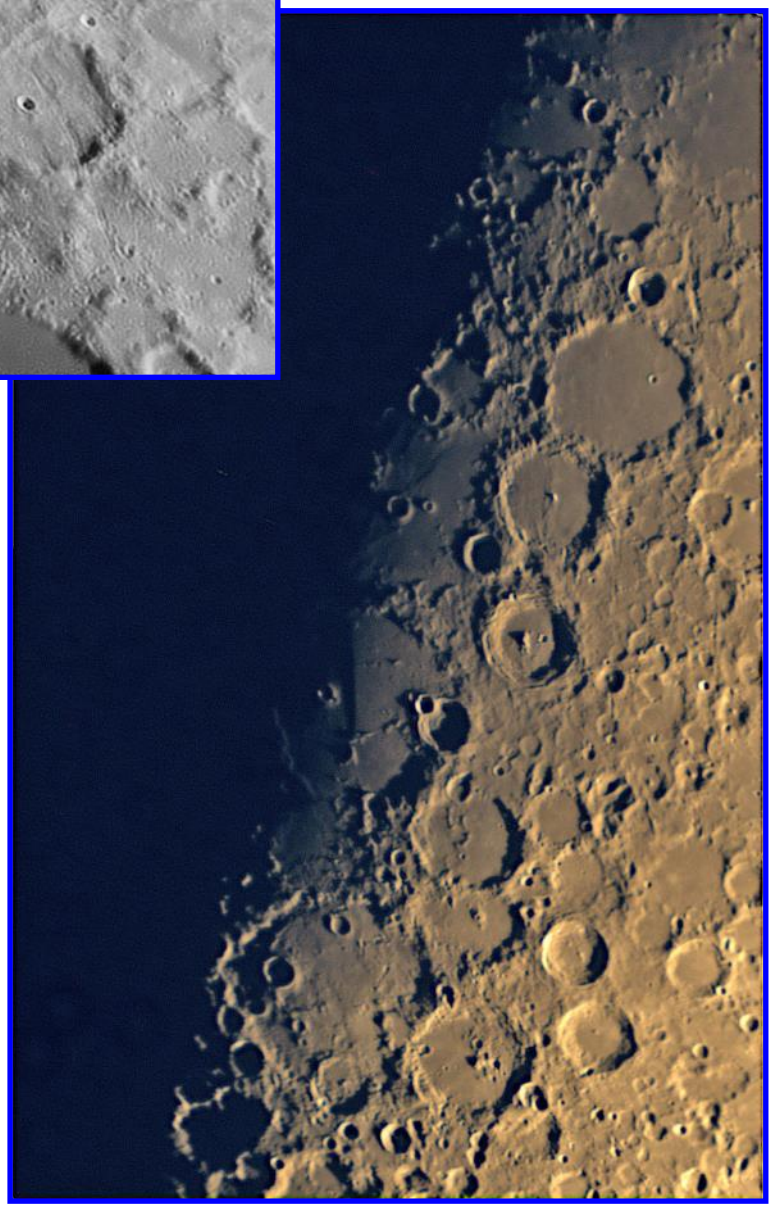


Copernicus, *Raúl Roberto Podestá, Formosa, Argentina. 2023 December 24 00:40 UT. 60 mm APO refractor telescope, UV/IR cut filter, ZWO ASI178MC camera.*

Recent Topographic Studies



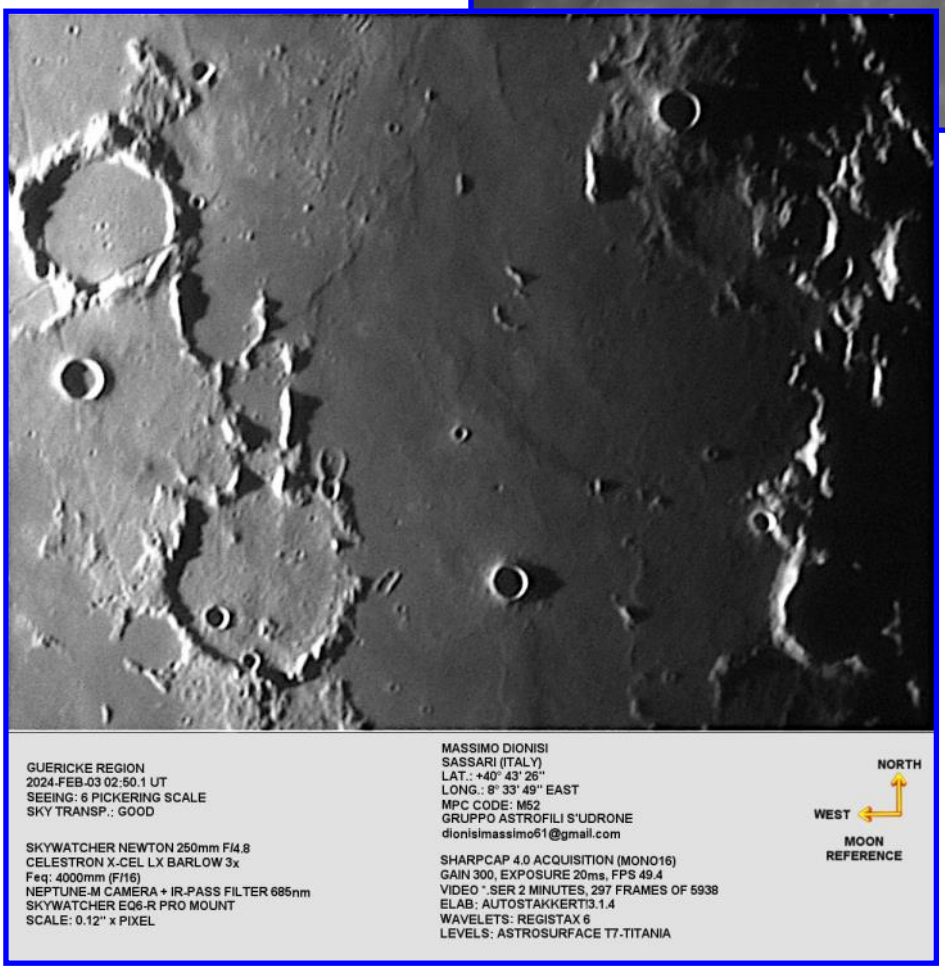
Posidonius, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2024 March 17 03:32 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*



Deslandres, *Raúl Roberto Podestá, Formosa, Argentina. 2024 February 17 22:32 UT. 102 mm Maksutov-Cassegrain telescope, UV/IR cut filter, ZWO ASI178MC camera.*

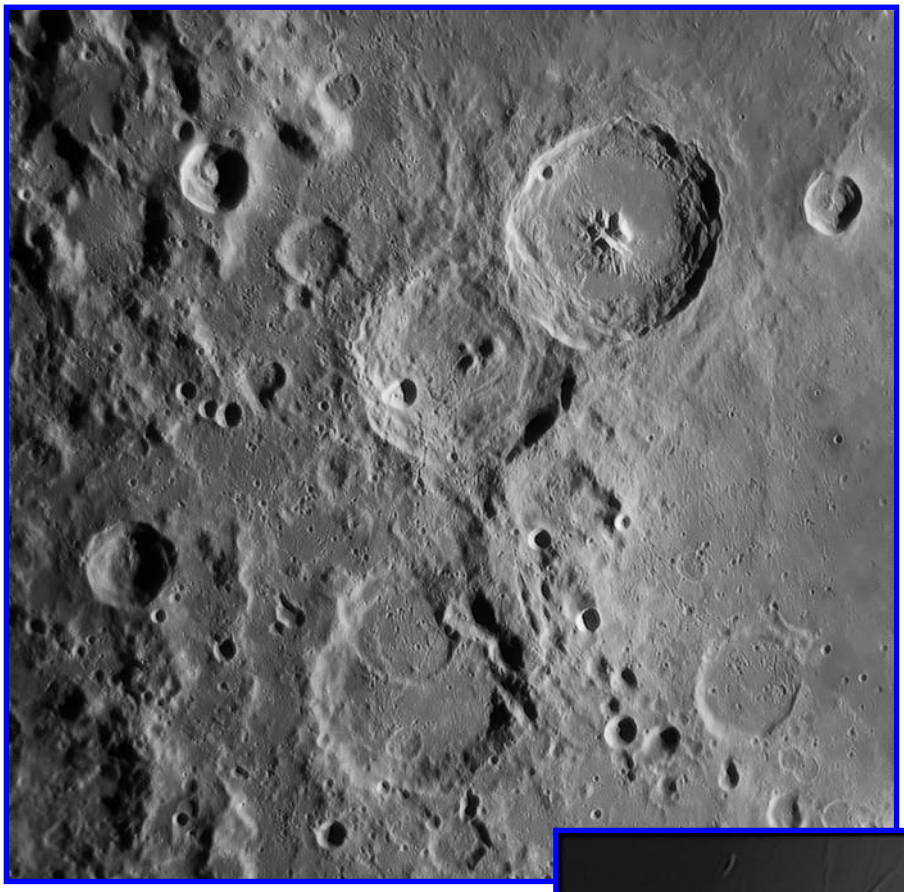
Recent Topographic Studies

Sinus Iridum, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2023 November 24 04:51 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*



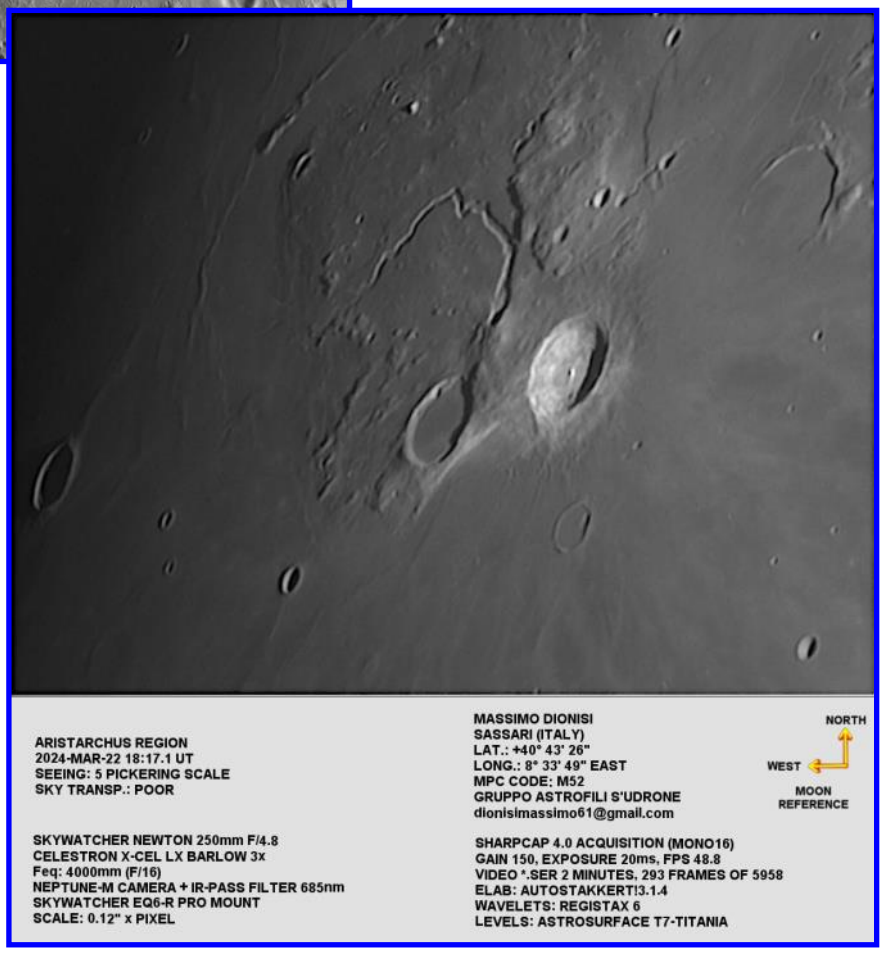
Guericke, *Massimo Dionisi, Sassari, Italy. 2024 February 03 02:50 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency good.*

Recent Topographic Studies

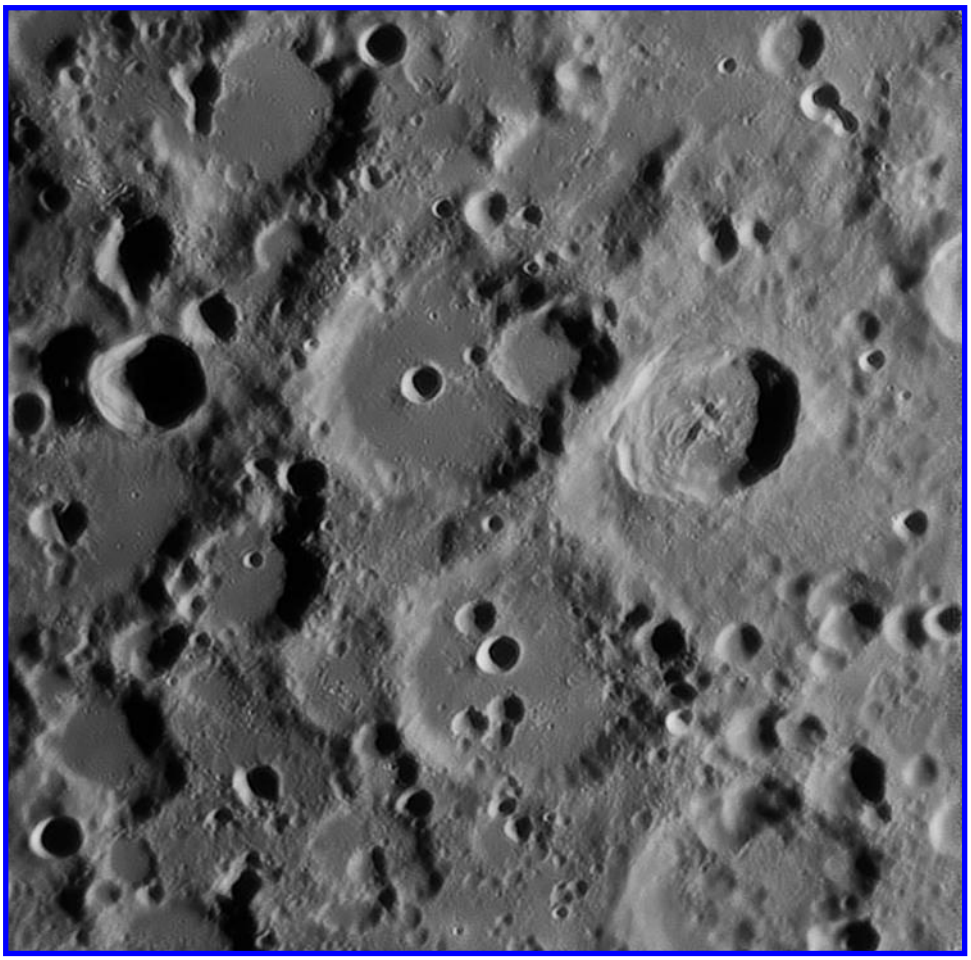


Theophilus, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2024 March 17 03:30 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*

Aristarchus, *Massimo Dionisi, Sassari, Italy. 2024 March 22 18:17 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 5 on Pickering scale, transparency poor.*



Recent Topographic Studies

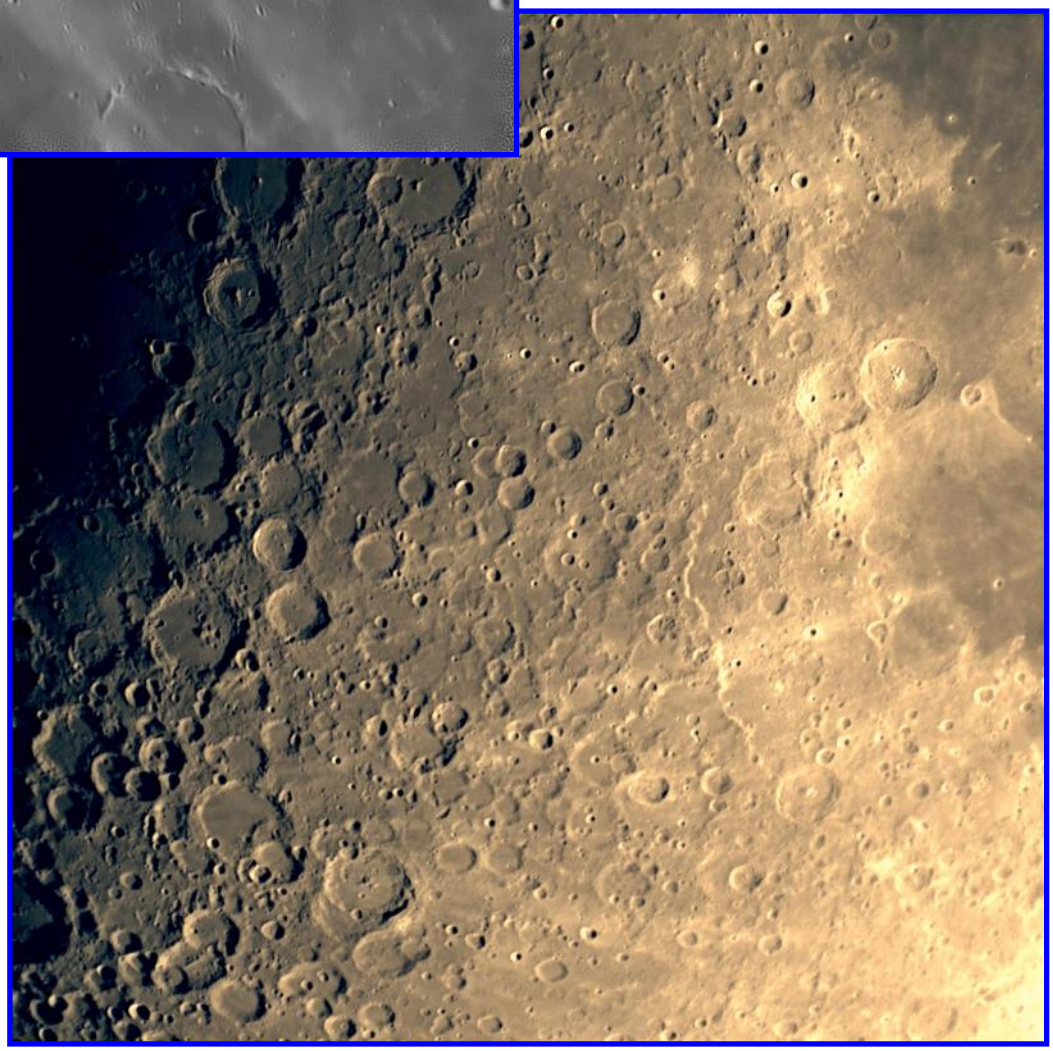


Zagut and Rabbi Levi, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2024 March 17 04:23 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*

Tycho, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:27 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M camera.*

Recent Topographic Studies

Bullialdus, *Ken Vaughan, Cattle Point, Victoria, British Columbia, Canada. 2023 November 24 03:50 UT. 12 inch Meade LX200 GPS Schmidt-Cassegrain telescope, Astronomik 642 nm R-IR filter, ZWO AI178 MM camera.*

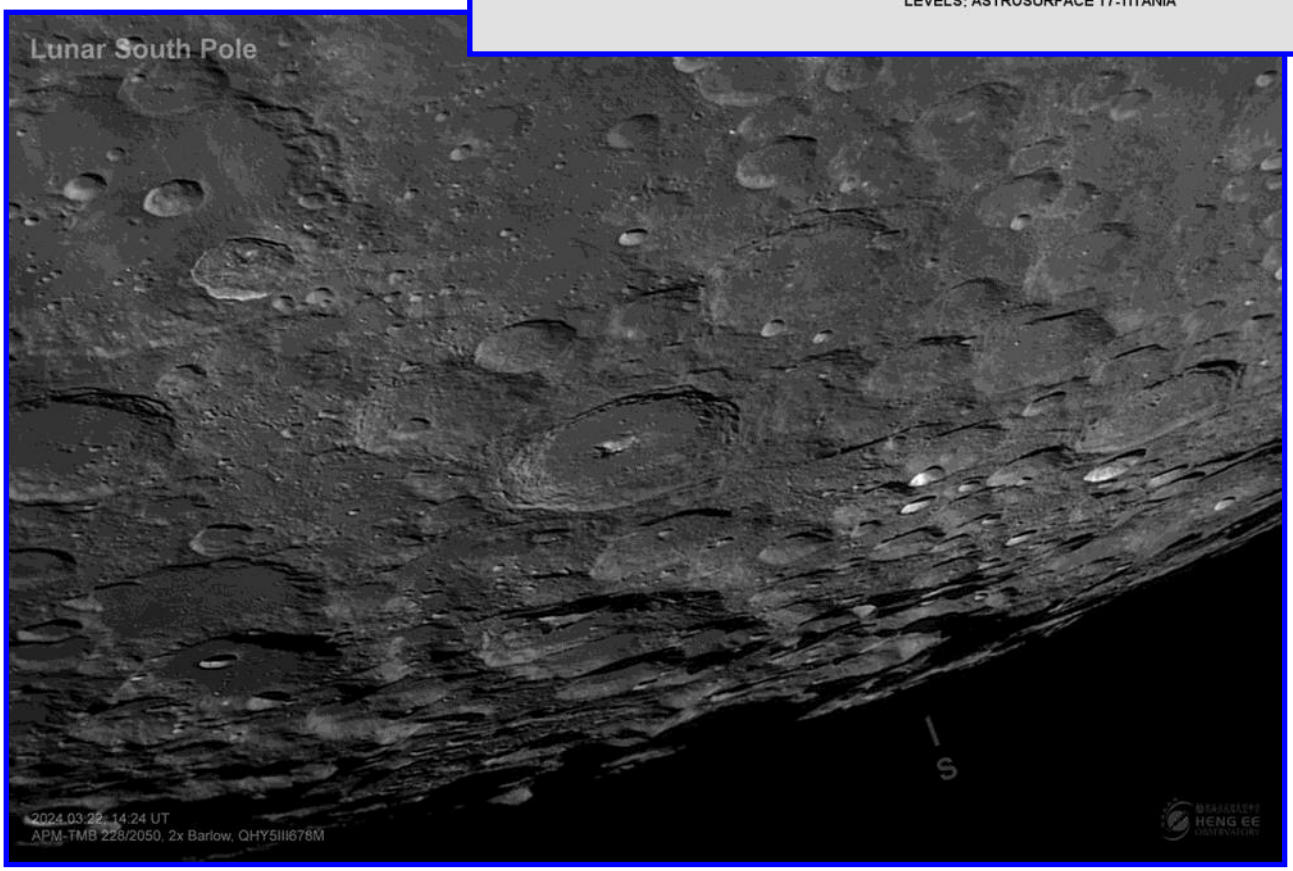


Deslandres, *Raúl Roberto Podestá, Formosa, Argentina. 2024 February 17 22:20 UT. 102 mm Maksutov-Cassegrain telescope, UV/IR cut filter, ZWO ASI178MC camera.*

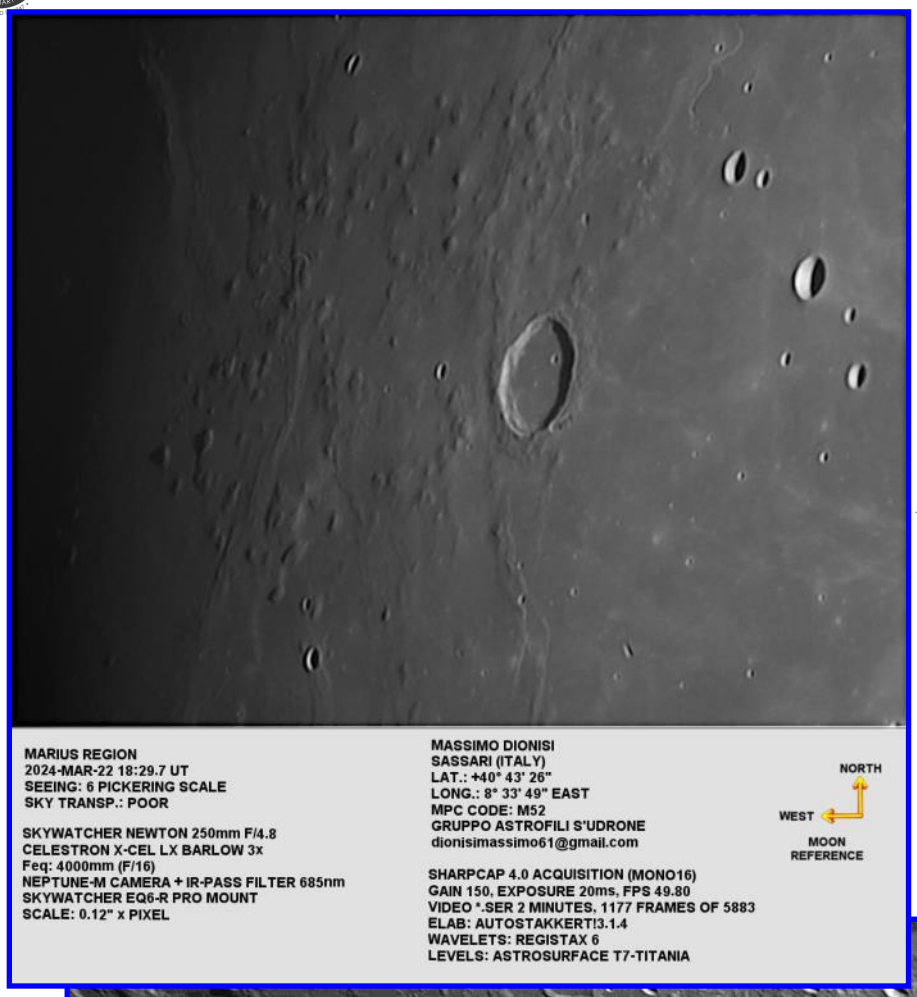
Recent Topographic Studies

Aristarchus and Prinz, *Massimo Dionisi, Sassari, Italy. 2024 March 22 18:23 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 5 on Pickering scale, transparency poor.*

Lunar South Pole, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:24 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M camera.*

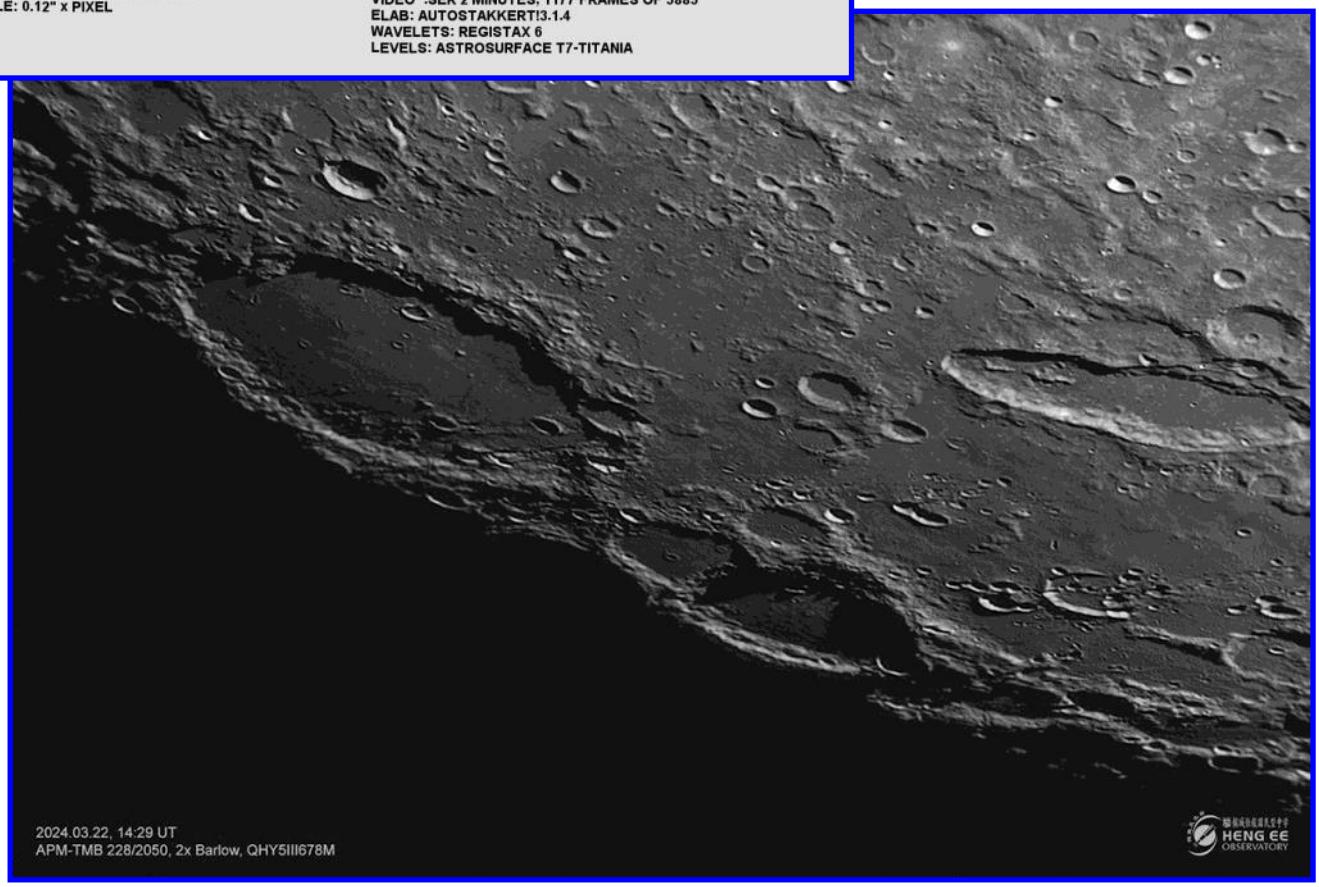


Recent Topographic Studies



Marius, *Massimo Dionisi, Sassari, Italy. 2024 March 22 18:29 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency poor.*

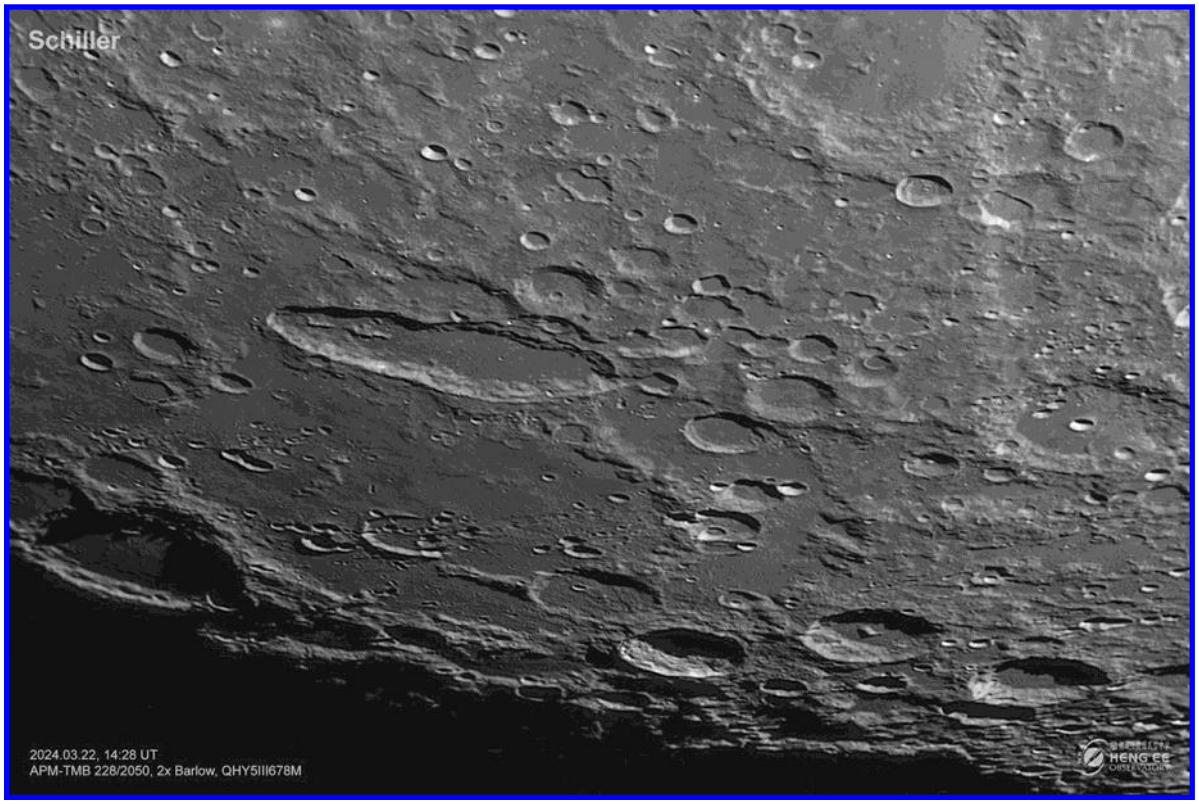
Schickard, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:29 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M camera.*



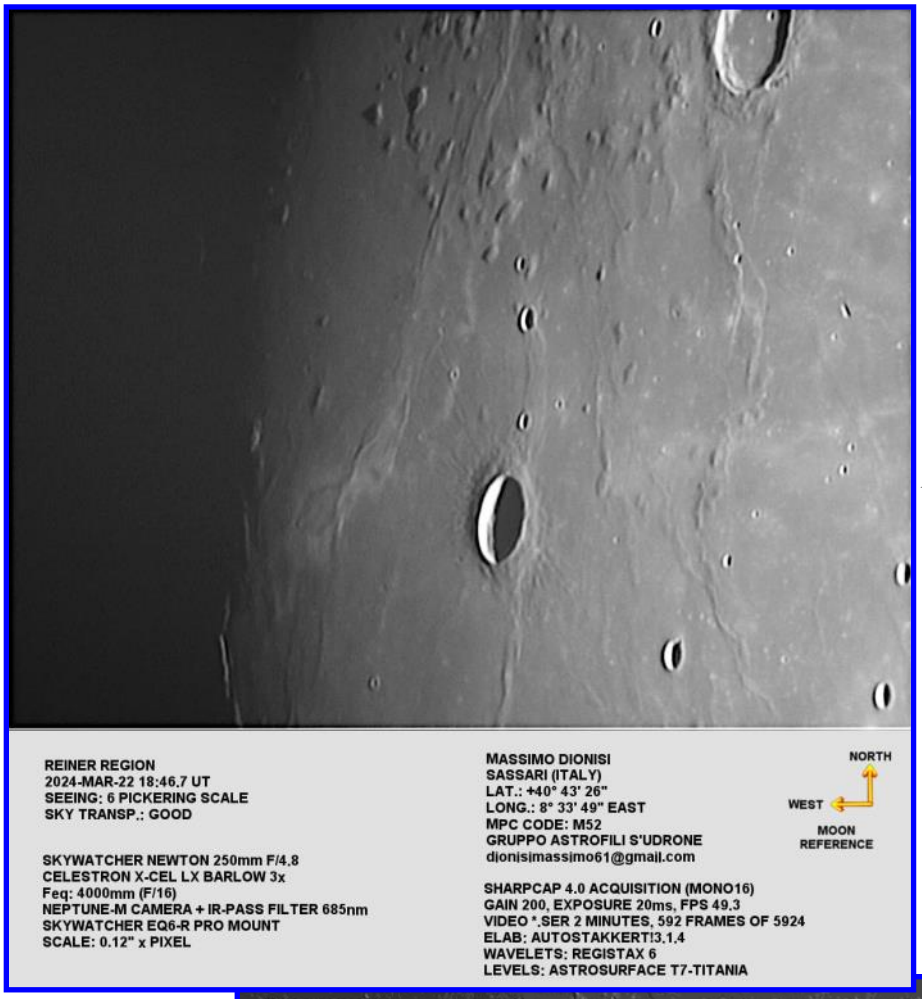
Recent Topographic Studies

Longomontanus, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:26 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M camera.*

Schiller, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:28 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M camera.*



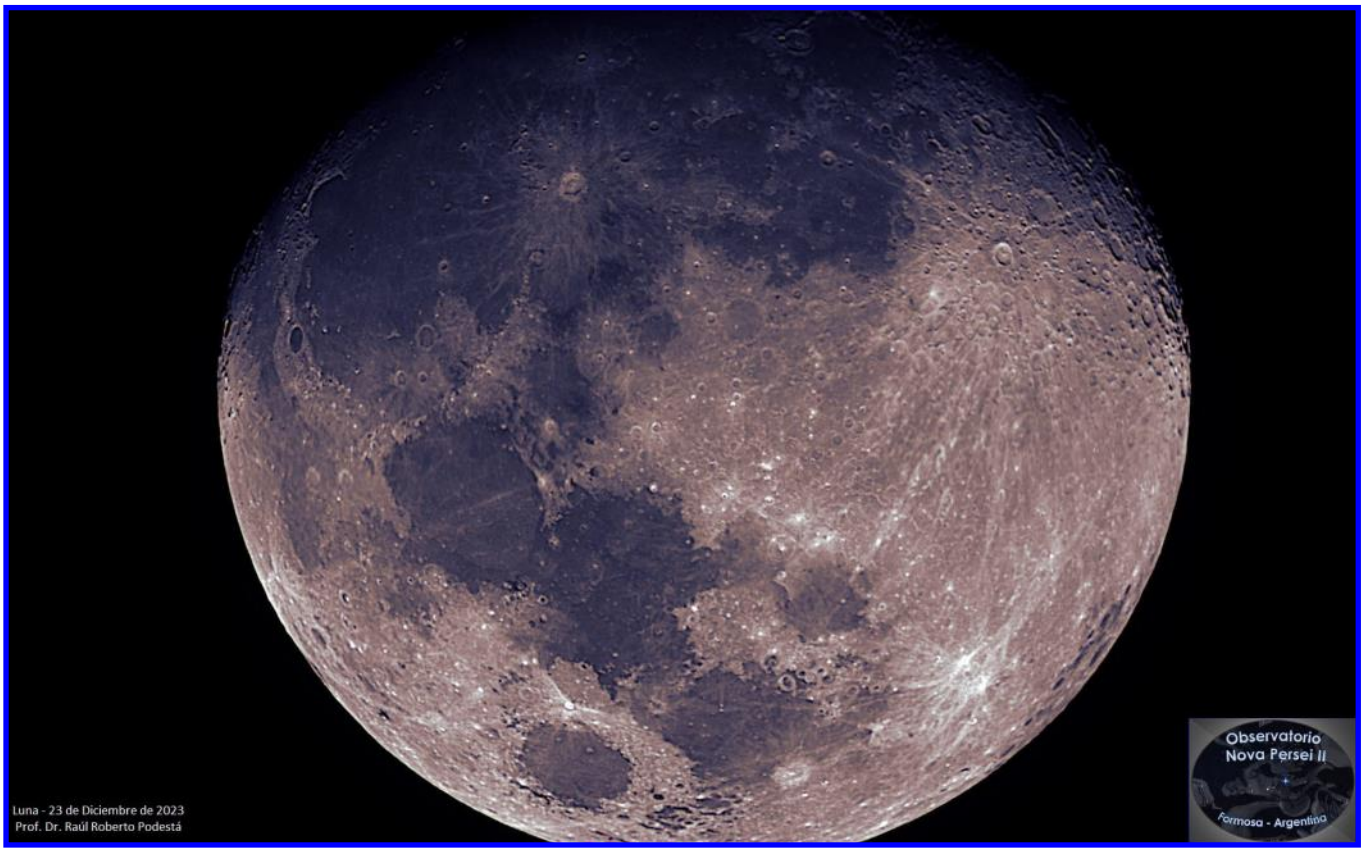
Recent Topographic Studies



Reiner, *Massimo Dionisi, Sassari, Italy. 2024 March 22 18:46 UT. Sky Watcher Newtonian reflector telescope, f/4.8, 3x barlow, effective focal length 4,000 mm, IR pass filter 685 nm, Neptune M camera. Seeing 6 on Pickering scale, transparency poor.*

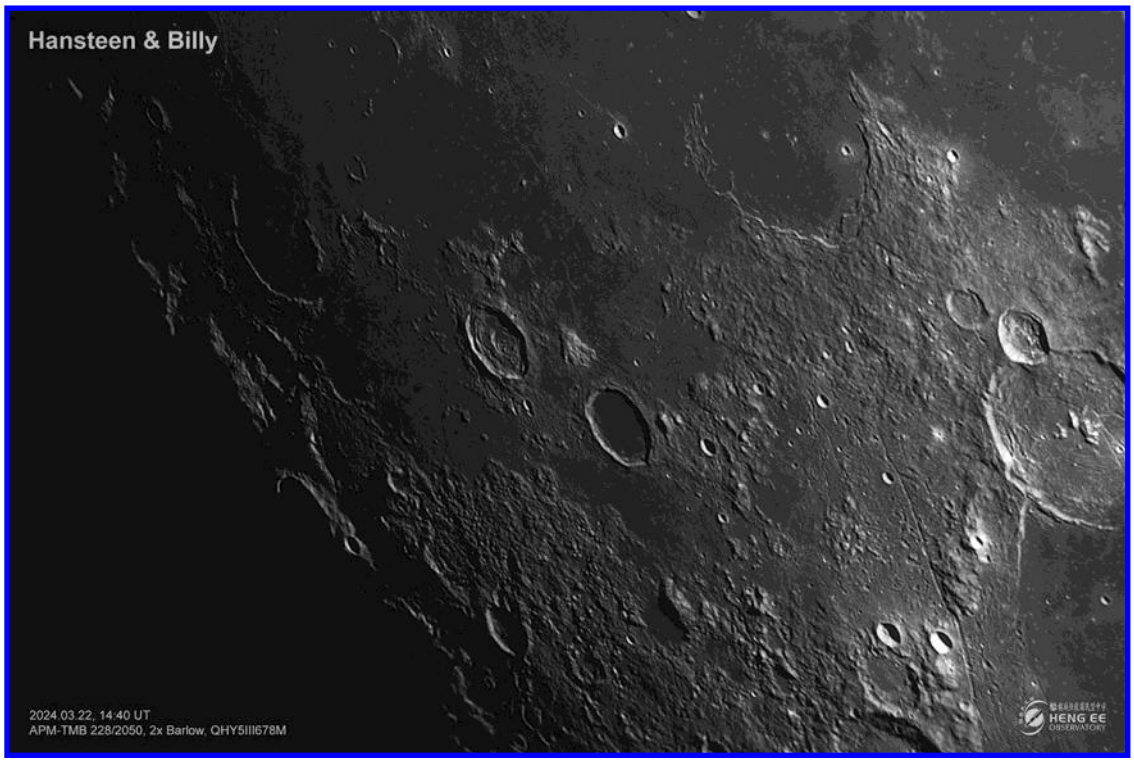
Gassendi, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:35 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M camera.*

Recent Topographic Studies



Waxing Gibbous Moon, *Raúl Roberto Podestá, Formosa, Argentina. 2023 December 24 00:14 UT. 60 mm APO refractor telescope, UV/IR cut filter, ZWO ASI178MC camera. North is left, west is up.*

Billy, *Michael Teoh, Heng Fe Observatory, Penang, Malaysia. 2024 March 22 14:40 UT. APM-TMB 228/2050 mm refractor telescope, 2x barlow, QHY5III678M 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

2024 April

Are These Real LTP?
Images of two potential LTP have been received, both concerning Aristarchus and blueness.

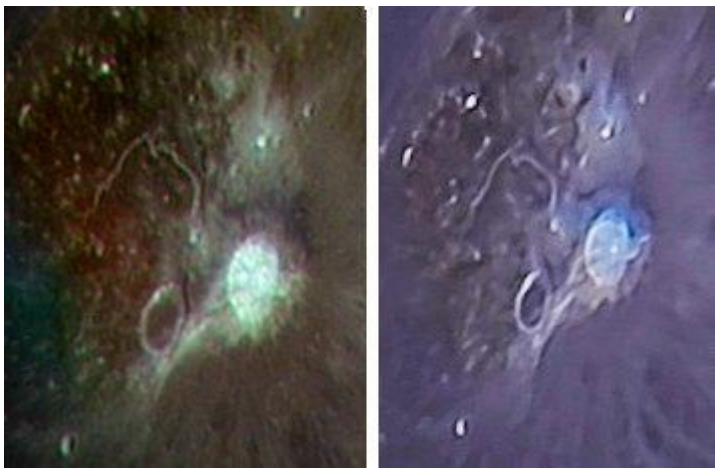


Figure 1. *Aristarchus orientated with north towards the top.* ***(Left)*** *An image by Brendan Shaw (BAA) taken on 2003 Dec 07 UT 23:42 with color saturation increased.* ***(Right)*** *An image by Andy Conway taken on 2024 Feb 23 UT 19:22 with color saturation increased. Processed with Autostakkart - best 10% of the images selected for stacking and wavelets applied.*

Aristarchus 2024 Feb 23 UT 19:22: An email was received from Andy Conway (Glasgow?, UK). Andy was using an 8" Stella Lyra Newtonian (Dobsonian mount) with a 9mm Plossl eyepiece, a Samsung A33 phone was mounted at the eyepiece and 36 sec of video was obtained. Seeing was average to good. It is not surprising to see natural mauve color on the north ejecta blanket of Aristarchus and a tinge of red on the south, but what is slightly strange is the blueness hugging the north rim (See Fig 1 - Right). You can compare this with another color image taken back in 2003, by Brendan Shaw, under similar illumination. Color balancing is tricky to perform precisely but the take home point is that Brendan's image shows no blueness hugging the northern rim of the crater. Now there could be a number of possibilities to explain the blueness: 1) Chromatic aberration or atmospheric spectral dispersion seems unlikely as this does not show up on other features, though if you look at Fig 2 (left) there is a hint of blueness in approximately same location and maybe redness on the southern rim? 2) internal reflection in the optics is also unlikely as the video was taken with the lunar surface drifting across and internal reflection largely stays in the same place. 3) Image processing artefacts are a possibility as the phone image was compressed and the wavelet processing may have caused "ringing" effects on the contrasty edge of Aristarchus's northern rim. I think for now I will apply an ALPO/BAA weight of 2.

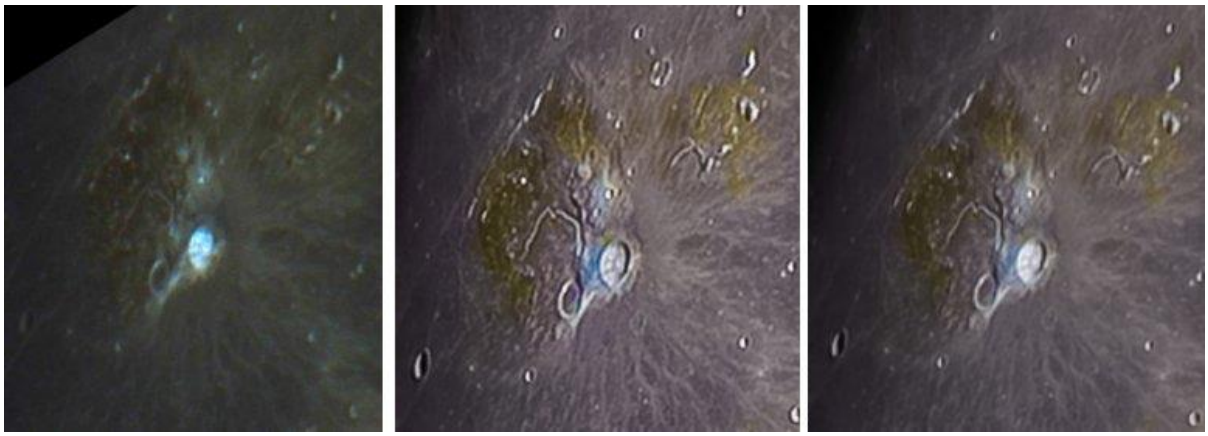


Figure 2. *Aristarchus orientated with north towards the top.* ***(Left)*** *An image by Franco Taccogna (UAI) taken on 2012 Oct 28 UT 19:33 with color saturation increased.* ***(Center)*** *An image by Gonzalo Vega (AEA) taken on 2024 Mar 23 UT 22:08 with a Player One Ceres C camera – presumably with color saturation increased?* ***(Right)*** *An image by Gonzalo Vega (AEA) taken on 2024 Mar 23 UT 22:08 with a Nikon D5100 camera – presumably with color saturation increased?*

Aristarchus 2024 Mar 23 UT 22:08: Two images were taken by a relatively new observer to submit observations to us from the AEA group in Argentina, Gonzalo Vega, and forwarded to me by Walter Elias. They were taken through a 20cm f/5 Newtonian Eq5 GoTo scope. Both images show no blueness on the northern rim (Fig 2 - Center and Right), but instead blueness between the west rim of Aristarchus and the north east of Herodotus. Furthermore, two cameras were used and the blueness appears in the same place. According to Walter Elias, no follow up images were taken. Walter himself took some color images of the crater on the same night at 23:06 and 23:18UT but the lower resolution and data compression made color analysis difficult and there was certainly no sign of blueness. So, either some blue LTP event occurred an hour earlier and had vanished by the time Walter observed, or Walter's image quality was not sufficient. We do of course have past, similar illumination color images, and one of these Fig 2 (Left), taken by UAI observer Franco Tacogna, shows no sign whatsoever of blue between Aristarchus and Herodotus – instead blueness inside Aristarchus, which is what I would normally expect it. The fact that the images supplied to us by Gonzalo Vega, both show blueness in the same location, despite being taken with different cameras with the crater located at different positions in the image, helps to rule out chromatic aberration and internal lens flare. Atmospheric spectral dispersion is another possibility and would be present in the same locations in both images – however this is more prominent on extreme contrast edges, which the location between Herodotus and Aristarchus is not! A color processing artefact might be a possibility but note that this should enhance the blueness of the interior of Aristarchus (see Fig 2 – Left), but we cannot see that in the two images that Gonzalo presents us with. In view of the fact that two different cameras were used, and there is no strong natural color here – I will give this report an ALPO/BAA weight of 3 – but obviously would have liked to have seen a time sequence or at least another color image taken by another observer at that time from somewhere else in the world.

So as to whether these two reports are of LTP I would be interested to hear your thoughts? But anyway, please check to see if you were imaging the Moon on these nights, or if you know of other astronomers who might have been. This would then put us in a much better position at proving, or disproving, these reports of color in the images submitted.

Routine reports received for January included: Paul Abel (Leicester, UK – BAA) observed: Hansen and Rima Ariadaeus. Leo Aerts (Belgium – BAA) imaged: Albategnius, Aliacensis, Alphonsus, Archimedes, Aristillus, Arzachel, Cassini, Deslandres, Maginus, Mare Insularum, Mons Mouton, Montes Apenninus, Moretus, Palus Putredinis, Pitatus, Plato, Ptolemaeus, Rima Hyginus, Rupes Recta, Schroter, Several Features, Stöfler, Triesnecker, Tycho, Vallis Alpes and Walter. John Axtell (UK – BAA) imaged: Mare Nectaris. Massimo Alessandro Bianchi (Italy – UAI) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: several features. Liz Daly (Mid Wales, UK – NAS) imaged several features. James Dawson and Richard Severn (Nottingham, UK – BAA) imaged: Rupes Recta. Walter Elias

Elias (Argentina – AEA) imaged: Aristarchus and Herodotus. David Finnigan (UK – BAA) imaged: Bailly, Klaproth and Lagrange. Valerio Fontani (Italy – UAI) imaged: Fra Mauro. Les Fry (Mid-West Wales, UK – NAS) imaged: Aristotles, Cyrillus, Gemma Frisius, Mare Serenitatis, Maurolycus, N. Pole, Posidonius, Promontorium Archerusia, Rima Ariadaeus, Rupes Altai, S. Pole and Theophilus. Massimo Giuntoli (Italy – BAA) observed: Cavendish E. Bill Leatherbarrow (Sheffield, UK – BAA) imaged: Aristoteles, Cassini, Palus Putredinis, Ptolemaeus, Stöfler, Triesnecker, Vallis Alpes, W Bond and Walther. Chris Longthorn (UK – BAA) imaged: Albategnius, Aristarchus, Fracastorius, Rima Hyginus, Theophilus, Triesnecker and several features. Trevor Smith (Codnor, UK – BAA) observed: Apianus D, Aristarchus, Maurolycus and Ptolemaeus. Franco Taccogna (Italy – UAI) imaged: Aristarchus, Herodotus, Lansberg and several features. Aldo Tonon (Italy – UAI) imaged: Fra Mauro, Herodotus, Lansberg, and several features. Alexander Vandenbohede (Belgium – BAA) imaged: Bode, Boussingault, Cyrillus, Guericke and Moretus. Luigi Zanatta (Italy – UAI) imaged: earthshine, Fra Mauro and Lansberg.

Note that I have included many observations submitted to the BAA Lunar Section pool here, just in case some were taken by chance during a repeat illumination session.

Analysis of Routine Reports Received (January) – Continued from the last newsletter:

Mare Crisium: On 2024 Jan 15 UT 18:06 Chris Longthorn (UK – BAA) imaged this area under the same illumination conditions to the following report:

North shore of Mare Crisium 1915 Dec 11 UT 06:00? Observed by Thomas (Glenorchy, Tasmania) "star-like pt. on N. shore of mare. (Eimmart?) Particularly bright spot. Tho't it was sunlight from rim of sm. crater." NASA catalog weight=0 NASA catalog ID #358. ALPO/BAA weight=1.

Figure 3. *A color saturation enhanced image of Mare Crisium, orientated with north towards the top. Taken on 2024 Jan 15 UT 18:06 by Chris Longthorn (BAA).*

The bright star like point on the northern shore of Mare Crisium (See Fig 3) is not Eimmart, just a sunward facing slope with a bright ray crater on top. Mission accomplished with figuring out what this was, and it crops up in other past LTP reports that have been eliminated. We shall remove this individual LTP report from the catalog by assigning an ALPO/BAA weight of 0.

Ptolemaeus: On 2024 Jan 18 UT 17:20-17:35 Trevor Smith (BAA) conducted a visual observation of this crater for the following lunar schedule request:

BAA Request: Examine the floor visually, sketch, or image to show the progression of the shadow spires across floor. If observing visually, how would you describe the appearance of the central lit area on the floor? If imaging, do a time lapse e.g. 1 image per minute to show the progression of the shadow spires. We are asking for these observations following an observation by N. Travnok (Brazil) on 2020 Jul 27 UT 23:00 who commented on an unusual appearance to the floor. It would be really useful to have visual observing of the appearance and please note down what the seeing conditions are like. If you want to image it at high resolution, please go ahead but remember that any image stacking should not be from sections of video of longer than 1 min duration as the shadows change in length rather quickly at sunrise. Any sketches, visual descriptions, or images taken, should be emailed to: a t c @ a b e r. a c. u k

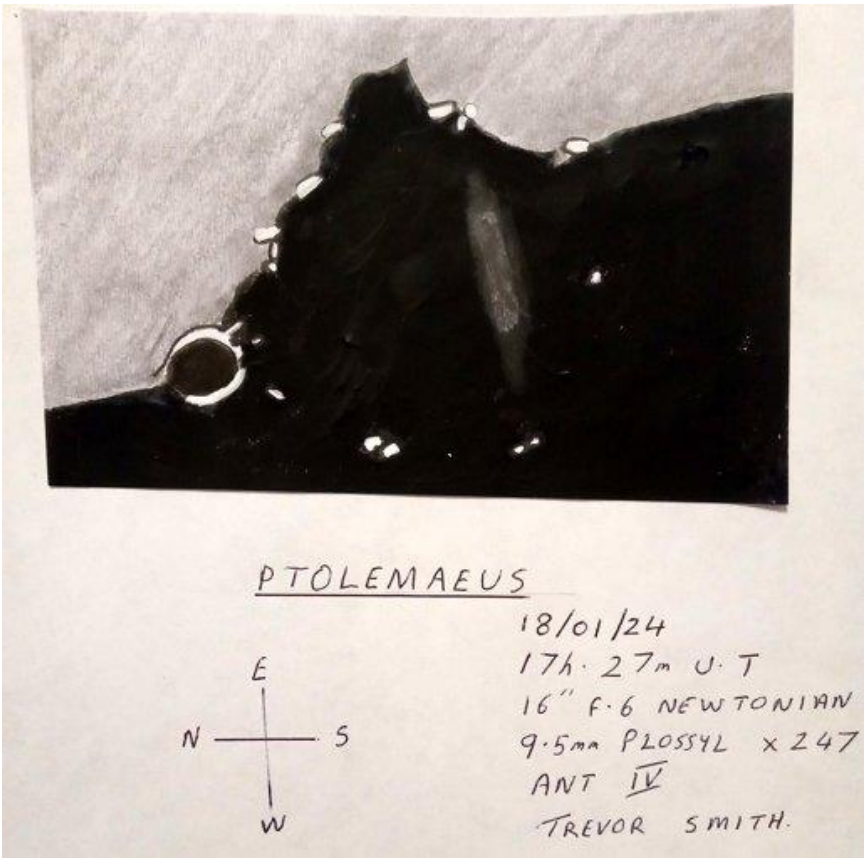


Figure 4. *A sketch of Ptolemaeus crater made by Trevor Smith (BAA) for the date and UT given on the sketch. The north direction is also indicated.*

At 17:20UT Trevor noticed a brightening on the southern floor – resembling a faint linear greyish smudge – and although not bright was obvious once he had noticed it. Trevor comments that he had to make it brighter in Fig 4 to be seen but in reality was dimmer than this. He had been observing earlier in the evening (before 17:17 after which he got temporarily clouded out) but had not noticed it. Trevor wonders if it was produced by light scattering off the ramparts. Unfortunately he was finally clouded out at 17:35 and so could not watch its development,

Plato: On 2024 Jan 19 UT 17:45 Leo Aerts (BAA) imaged this crater under similar illumination to the following report:

Plato 1789 Jul 30 UT 21:00? Observed by Schroter (Lilienthal, Germany) NASA Catalog Event #61, NASA Weight=2. Event described as: "Soon after sunrise saw a kind of fermentation on the floor which clearly resembled a kind of twilight, (due to some kind of aberration unknown to the observer?)" For further details see reference: Middlehurst, B.M., Burley, J.M., Moore, P.A. and Welther, B.L., 1968, NASA TR R-277. ALPO/BAA weight=2.

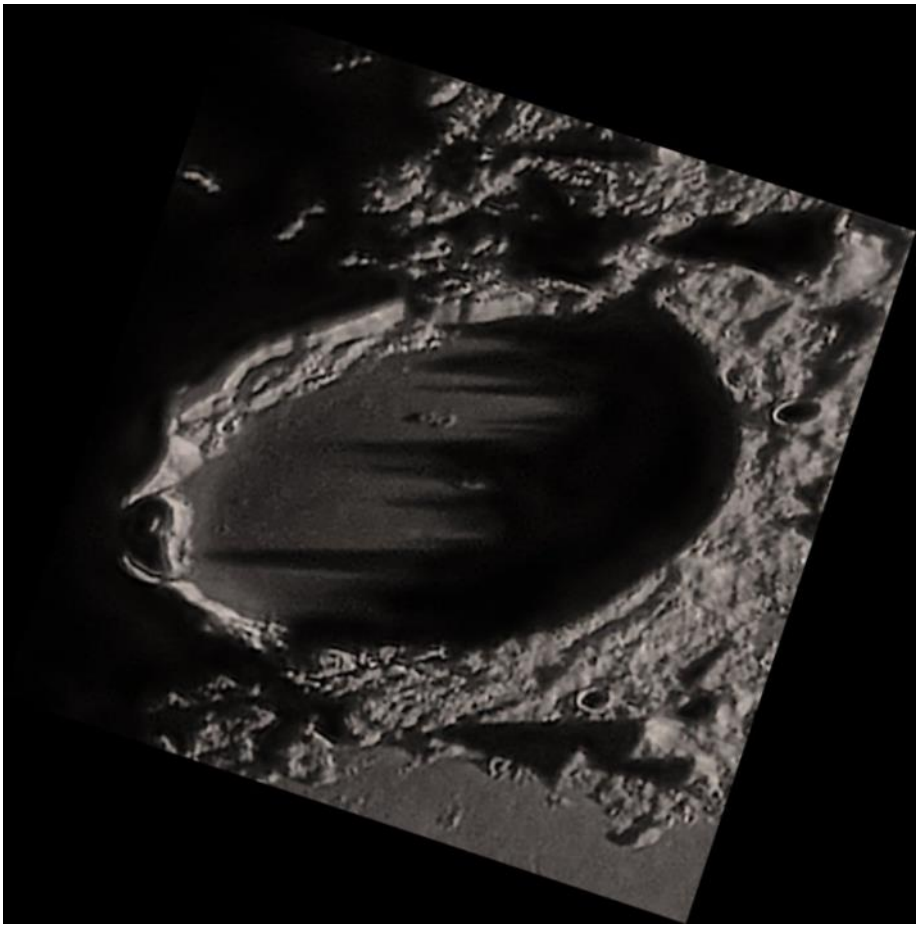


Figure 5. *Plato as imaged by Leo Aert (BAA) on 2023 Jan 19 UT 17:45.*

One of the drawbacks of the repeat illumination predictions is that the tolerance is ±0.5˚ for sub-solar longitude and sub-solar latitude, and at lunar sunrise this can have a big impact on the length of the shadows. On the other-hand if we had finer tolerance of say is ±0.05˚ then the chances of having any repeat predictions would be most unlikely. Considering Cameron has an estimated UT of 21:00 for the 1789 report, Leo's image is probably the best we can hope for and is certainly not short of resolution. Perhaps the "fermentation" that Schroter described is the effect of atmospheric seeing on very fine detail of the needle-like coming into and going out of focus? We shall leave the weight of this report at 2 for now.

Alphonsus: On 2024 Jan 19 UT 18:11 James Dawson and Richard Severn (BAA) imaged the Rupes Recta region which just happened contain the southern part of Alphonsus, under similar illumination to the following report below. Likewise, at 18:20UT Alexander Vandenbohede (BAA) also took an image which contained part of Alphonsus under similar illumination:

Alphonsus 1952 Nov 25 UT 17:15 A.P. Lenham (Swindon, UK, 3-inch refractor) noted that the usual dark spots were not visible. This may not be a LTP but has been given a LTP category as it is a curious appearance and needs to be verified on a repeat illumination appearance. ALPO/BAA weight=1.

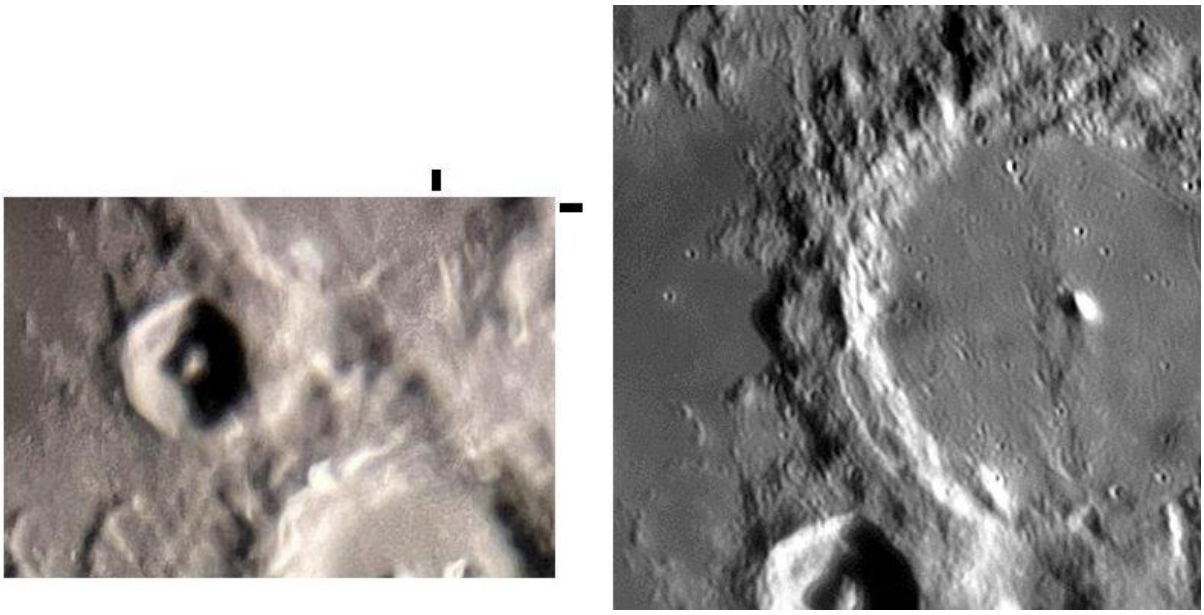


Figure 6 (Left) *The southern part of Alphonsus, Alpetragius and the northern half of Arzachel, orientated with north towards the top. Taken from a small portion of a larger image of the Rupes Recta region, imaged by James Dawson and Richard Severn on 2024 Jan 19 UT 18:11. The tick marks point to one of the dark pyroclastic patches on the floor of Alphonsus. (Right) Increased coverage in an image by Alexander Vandenbohede (BAA) taken at 18:20 UT.*

Although Fig 6 (Left) is only a small part of the original image that was supplied, it contains one of the dark spots on the floor of Alphonsus – so we know at this illumination dark spots should be visible and so when A.P. Lenham did not see them back in 1952, he had a reason to note this down. However, Alexander Vandenbohede took another image, some 9 minutes after Fig 6 (Left), which shows a bit more of the floor. I have done some image contrast stretching in Fig 6 (Right) as the dark spots were not very contrasty unlike at Full Moon. This would concur with A.P. Lenham having difficulty seeing them, especially if the transparency was poor. So, I think I will lower the ALPO/BAA weight from 1 to 0 and remove the LTP from the database.

Aristarchus: On 2024 Jan 22 UT 18:26 Franco Taccogna (UAI) imaged this crater under similar illumination to the following report:

On 1987 Jan 11 at UT 18:15-23:00 P. Grego (Birmingham, UK, 6" reflector, seeing=III) sketched Aristarchus crater and saw two luminous circular patches on the exterior east wall - these were less bright than the inner wall but brighter than the outer wall. The Cameron 1978 catalog ID=292 and weight=5. The ALPO/BAA weight=2.

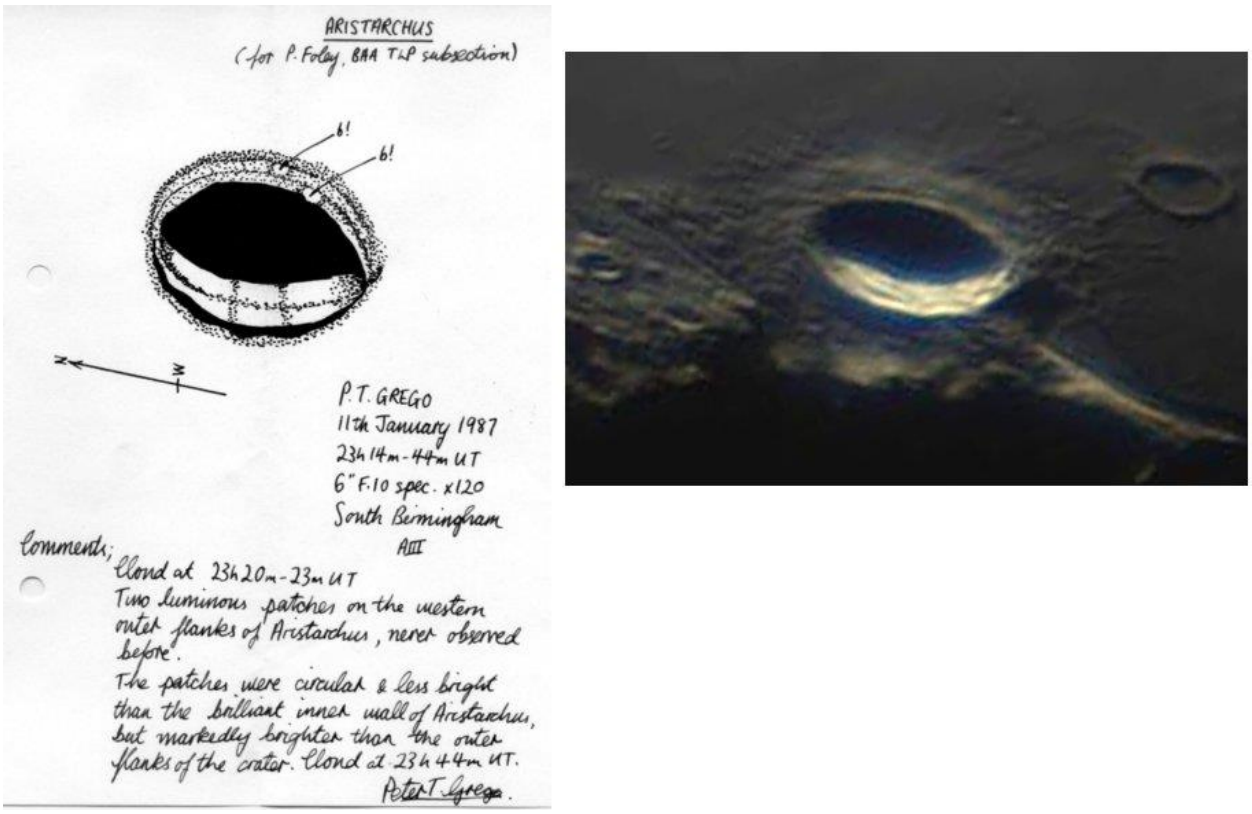


Figure 7 *Aristarchus with north towards the left.* ***(Left)*** *A sketch made by Peter Grego for the date and UT listed in the sketch. Note that the west direction is classical. Normally in IAU sense west would be towards the bottom of the sketch.* ***(Right)*** *An image by Franco Taccogna (UAI), taken on 2024 Jan 22 UT 18:26, with similar illumination and orientation to the Grego sketch.*

Franco's image (Fig 7 – Right) does not show the two luminous points on the eastern outer rim, but it may just be that the predictions are only accurate to ±0.5˚ similar illumination, so maybe if the image was taken a few minutes later the sunlight might just start reaching those points. We shall leave the ALPO/BAA weight at 2 for now.

Herodotus: On 2024 Jan 22 UT 22:38 Aldo Tonon (UAI) imaged the crater under similar illumination to the following two reports:

Observed by Bartlett (Baltimore, MD, USA, 5" reflector x180, S=1-5, T=5) Pseudo peak visible within floor shadow at 03:10h" NASA catalog weight=4 (high). NASA catalog ID #671. ALPO/BAA weight=3.

On 2002 Feb 24 UT 05:15-05:35 W. Haas (Las Cruces, NM, USA) observed an obscuration in Herodotus - the shadow was, almost, but not completely black. ALPO/BAA weight=2.

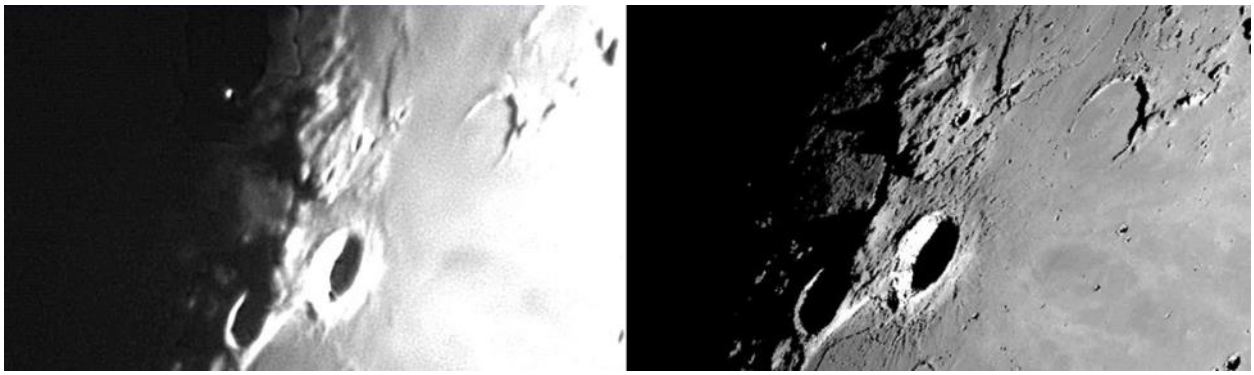


Figure 8. *A contrast stretched version of Aristarchus and Herodotus, orientated with north towards the top.* ***(Left)*** *Image by Aldo Tonon t(UAI) taken on 2024 Jan 22 UT 22:38****.*** ***(Right)*** *An LTVT simulated view, generated by Aldo Tonon.*

Fig 8 left shows no sign of a pseudo peak, or a greyness inside the shadow – nor does the LTVT simulation in Fig 8 right. We shall leave the weights respectively at 3 and 2.

Herodotus: On 2024 Jan 23 UT 02:33 Walter Elias (AEA) imaged this crater under similar illumination to the following LTP report:

On 2016 Jun 17 UT 05:00 A.Anunziato (AEA, Argentina Meade ETX 105, seeing 7/10, sketch made) observed a very tiny light spot where the shadow from topographic relief to the south of Vallis Schroteri merges into the crater rim shadow on the floor of Herodotus. There should be no light spot here. ALPO/BAA weight=1.

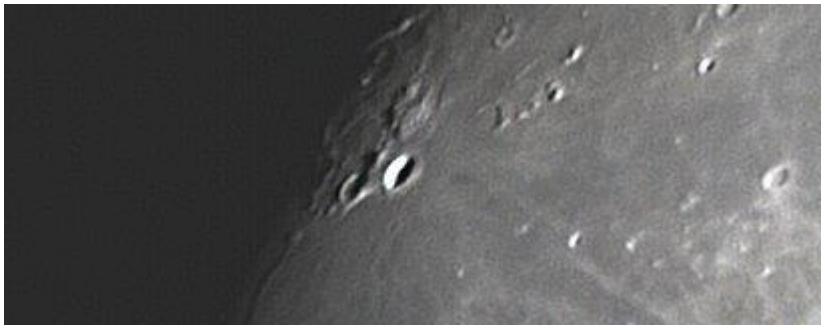


Figure 9 *Aristarchus and Herodotus as imaged by Walter Elias (AEA) on 2024 Jan 23 UT 02:33.*

No sign of the light spot in the location mentioned in the 2016 report, appears in Fig 9, so we shall leave the ALPO/BAA weight at 1 for now.

Cavendish E: On 2024 Jan 23 UT 21:00 Massimo Giuntoli (BAA) observed visually this crater, using a 124mm refractor at x190 and found this crater to be normal in appearance. Note that sometimes this crater becomes very bright – so we are trying to find out what selenographic colongitude this happens at. Massimo comments that in the Feb LSC an image taken by Chris Longthorn, was taken at the same time that Massimo noticed the northern section of the western wall of the crater was bright as it was emerging from shadow.

Censorinus: On 2024 Jan 25 UT 19:21 Massimo Alessandro Bianchi imaged the whole Moon under similar illumination and similar topocentric libration to the following report:

Near Censorinus 1964 Apr 26 UT 20:00? Observed by Hopmann (Czechoslovakia?) "Surface brightening somewhat similar to Kopal and Rackham in #779" NASA catalog weight=3. NASA catalog ID #810. ALPO/BAA weight=2.

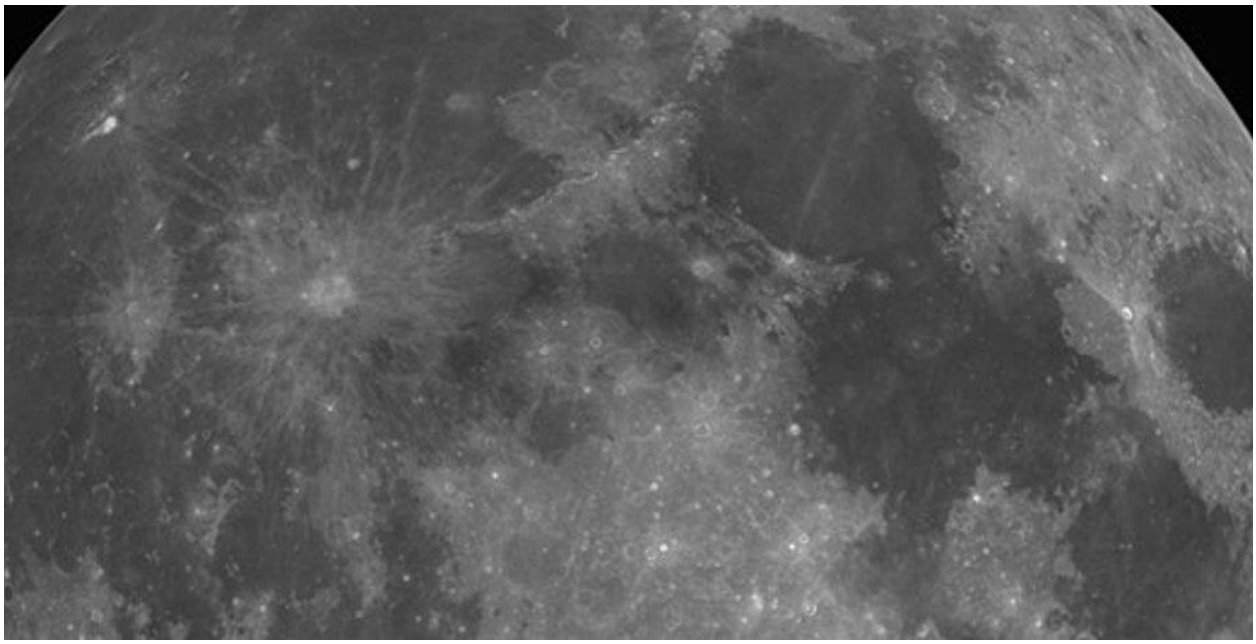


Figure 10. *Part of the northern hemisphere of the Moon as imaged on 2024 Jan 25 UT 19:21 Massimo Alessandro Bianchi and orientated with north towards the top.*

I am uncertain whether the Hopp measurements of the brightness of the region near Censorinus were via photographic densitometry or by photometry. However, whichever method was used, Fig 10 is what the Moon would have looked like in terms of viewing angle and illumination to within ±1˚. Measuring the brightest pixel in the bright parts of Aristarchus, Censorinus and Proclus gives respectively: 223, 244 and 240. So, if Censorinus was what was measured back in 1964 then yes it would have been one of the brightest features on the Moon and definitely brighter than the bright spot near Hell which is usually the brightest. Whether the "near Censorinus", in the description, can be treated as "Censorinus", is uncertain. We shall therefore leave the ALPO/BAA weight at 2 for now until some observational reports or publication for the 1964 event can be found and shed more light on this LTP.

Figure 11. *Marie and Jeremy Cook, pictured in the early 1950's*

Marie was born in 1931 in Lambeth, South London. Growing up during World War II she and her mother were bombed out of their house and their cat was blown throw the wall by the explosion, but survived, albeit behaving a bit differently afterwards. Prior to, and during the war, she took an interest in ballet and was involved in ENSA, entertaining troops. Later she met her future husband, Jeremy Cook through a church club and they married in the mid 1950's. One of the key people at the church club was Collin Ronan, the amateur astronomer and author, who they would later meet again at the BAA and he would eventually become the BAA's president. Their son, Tony, was born in the early 1960's. Astronomy interests developed when the family lived in Frimley, Surrey. Marie had written off to Sir Patrick Moore and he invited us all down to visit him in Selsey and thence recruited us into the BAA and it's Lunar Section.

Marie was an excellent astronomer, specializing in LTP work and sketching the Moon for the BAA's New Moon publication; she even wrote a paper (J. Br. Astron. Assoc. 110, 3, 2000 p117-123) and would later become a member of the BAA council. The paper: "The Strange Behaviour of Torricelli B" was about a previously un-noteworthy crater that on 1983 Jan 29, one day after Full Moon, and at an extremely close lunar perigee, for a short time became considerably brighter than any other crater on the Moon, before fading but exhibiting a strong violet color. The extreme brightness was witnessed by two observers, and the strong blue or violet tint, appearing later, was seen by many observers. Despite repeated repeat illumination and repeat topocentric libration observations, nothing quite
like this extreme brilliance has ever been seen again at this feature.

Marie and Jeremy became involved in the council of the Reading Astronomical Society for many years. Another hobby of Marie and Jeremy was genealogy and this was perhaps a main reason why they both moved to Mundesley, Norfolk in the early noughties to continue work looking into the Cook family tree, as the ancestors of the Cook family came from Norfolk. Alas Jeremy, author of the revised Hatfield Photographic & SCT Lunar Atlas, passed away shortly after they moved to Mundesley and Marie soldiered on for about twenty years. Alas, in April 2022 she was taken into hospital with Hiatal Hernia and Pneumonia, and although she fought off the latter, was in and out of care homes and hospital until her passing at the end of February. She will be greatly missed by her son, daughter-in-law, grandchildren, family and friends. Hopefully she has now met up with her husband, Jeremy and is keeping him informed on the progress of the family and friends, and astronomy back down here on Terra Ferma.

Basin and Buried Crater Project

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

It has been a few months since the last article, but I felt, after seeing the amazing lunar sunset over Rupes Recta image (Fig 1), by Leo Aert I just wanted to highlight several possible buried craters that jump out. Note I am not saying that these are "definitely" all craters, as some maybe ring dykes or chance circularity from overlapping wrinkle ridges, but nevertheless they are all circular structures that need investigating. The message I want to get across is that you too can also discover buried craters by taking very low sun incidence angle images of the sunrise and sunset terminators.

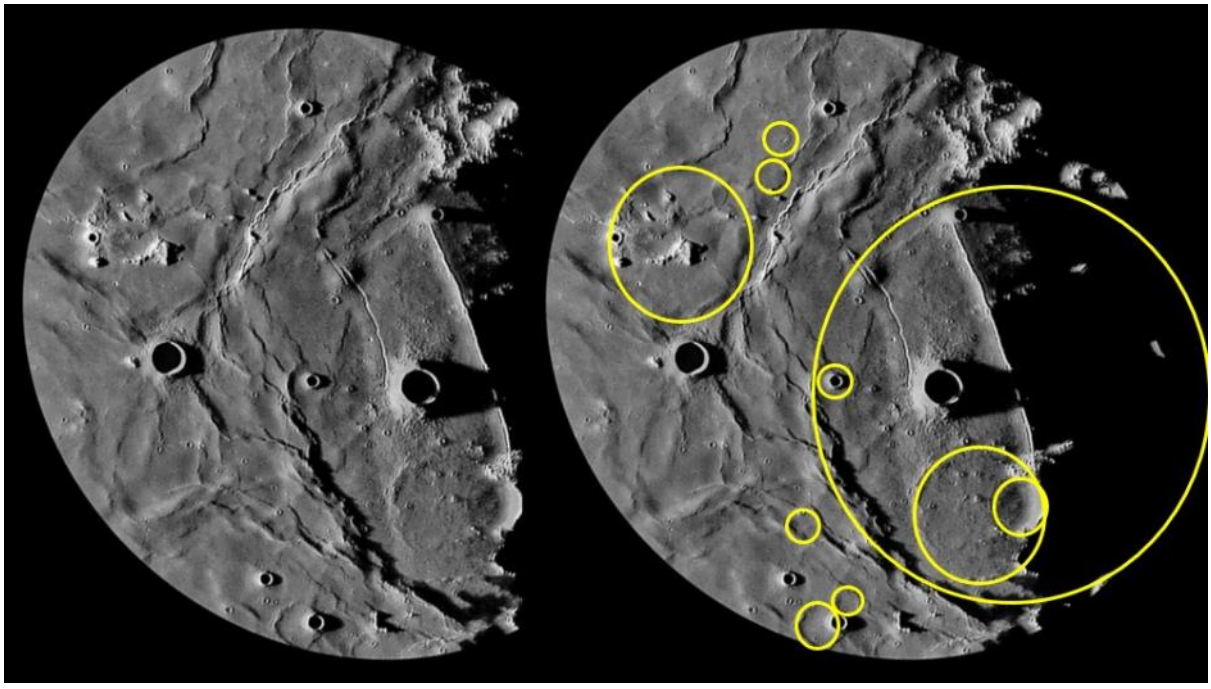


Figure1 *The Rupes Recta area as imaged by Leo Aerts on 2019 Nov 20 and orientated with north towards the top.* ***(Left)*** *the original image.* ***(Right)*** *Image with candidate buried craters added.*

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 April 2024

Date	UT	Event
1		Greatest southern declination -28.5°
1		West limb most exposed -7.4°
2	0315	Last Quarter Moon
2		North limb most exposed +6.8°
6	0400	Mars 2.0° north of Moon
6	0900	Saturn 1.2° north of Moon, occultation Antarctica
7	0800	Neptune 0.4° north of Moon, occultation south India, southeast Asia
7	17	Venus 0.4° south of Moon, occultation Polynesia, Americas, Ireland
7	1800	Moon at perigee 358,850 km Large Tides
8	1220	Moon at ascending node
8	1821	**New Moon (lunation 1253) Total Solar Eclipse, Mexico, USA, Canada**
10	2100	Jupiter 4° south of Moon
11	1300	Moon 0.4° south of Pleiades
14		Greatest northern declination +28.6°
14		East limb most exposed +7.0°
15		South limb most exposed -6.8°
15	1400	Pollux 1.5° north of Moon
15	1913	First Quarter Moon
20	0200	Moon at apogee 405,623 km
22	1045	Moon at descending node
23	1045	Spica 1.4° south of Moon
23	2349	Full Moon
26	2100	Antares 0.3° south of Moon, occultation Africa to Polynesia
28		West limb most exposed -6.2°
29		Greatest southern declination -28.4°
30		North limb most exposed +6.7°

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.

ATTENTION ALL CONTRIBUTORS
Effective Immediately (March 1, 2024)

While it is a great honor to put together The Lunar Observer, we are now overwhelmed by our success with some issues in excess of 200 pages.

The increased time it requires for me to perform this job (as a volunteer) pulls me away from my own family and other obligations. Thus, the following rules are being implemented to improve content flow on my end and provide you with the criteria needed to make the "TLO" even more professional in appearance and subject matter.

1. **Review your image(s) at your location before submitting it/them, then brighten or darken it/ them as needed and if required, using whatever tools you have at hand. Images deemed unsuitable (including blurry, out-of-focus or "clouded-out" images) will either be returned for your attention or simply not used.**
2. **Images in jpeg format are preferred but others are also acceptable.**
3. **Crop your images to avoid jagged edges.**
4. **Orient the image so it makes the most sense. North at the top (with Mare Crisium at the upper right) is preferred but not required. To our many wonderful southern hemisphere contributors, please orient as you wish (probably south at top).**
5. **Be very limited on end-of-the-month submissions.**
6. **CHOOSE ONLY YOUR BEST IMAGES and limit the number to no more than eight (8) per each issue of the TLO. (obviously, if there is an article you are writing or contributing to this does not apply).**
7. **The image filename should be submitted with the object name spelled correctly, then the year-month-day-hour-minutes-Your Name or initials So, my image of Copernicus should have a file name of:**

Copernicus_2023-08-31-2134-DTe
means
Copernicus, 2023 August 31, 21:34 UT by David Teske

If we all do this going forward, it should make putting this all together faster and easier. Many of you already do this. Thank you for your contributions and your help. We have a premier lunar resource for the planet.

Please send images/drawings/text to drteske@yahoo.com

ATTENTION ALL CONTRIBUTORS
Effective Immediately (March 1, 2024)

In his efforts to make our organization as professional as possible, the late Walter Haas, the founder of the ALPO, urged that all image and sketch CAPTIONS be as complete as possible. This could enable others to perform their own observations using as much of the original caption data as possible to obtain the same or at least similar results. And while not everyone can provide every detail, we request the following in your captions:

1. Name of feature or object followed by name of imager and their specific location (including geographical coordinates if readily available).
2. Date and Universal Time when image was captured (or sketch was completed) using either the three-letter abbreviation or full spelling of the month to avoid possible month-and-date or date-and-month confusion.
3. Sky seeing (steadiness) conditions (0 = Worst and 10 = Perfect).
4. Sky transparency (opacity of the atmosphere) conditions (poor to good)
5. Intensity conditions (Standard ALPO Scale of Intensity: 0.0 = Completely black and 10.0 = Very brightest features, Intermediate values are assigned along the scale to account for observed intensity of features).
6. Equipment details (including instrument type, brand is optional) and aperture size (inches or mm/cm); telescope mount data (if applicable), camera brand and type, filter data (if applicable), as much exposure data as available (sketchers should provide other pertinent data).
7. Capturing, exposure and processing software data.
8. Personal comments about specific features including north (or south) in the image (sketch), markings and all other items pertinent to the subject being presented.
9. Any other pertinent comments.
10. Email or other contact information.

Below are two sample captions. Both at least attempt to follow the above-stated guidelines

Meton Region as imaged by Massimo Dionisi of Sassari, Italy (10°43’26” N, 8° 33’9” E), on 2024 January 30, at 00:03 UT. Equipment details: Sky Watcher 250 mm, f/4.8 reflector telescope, Tecnosky ADC, Celestron X-cel LX 3x Barlow lens, effective focal length = 4,750 mm, 685 nm IR pass filter, Neptune-M camera, Skywatcher EQ6-R Pro mount. Seeing conditions = III-to-IV (Antoniadi scale). Software details: SharpCap 4.0 acquisition (mono), AutoStakkert! 3.1.4 ELAB, Registax Wavelets.

Lunar craters Hausen and Bailly D as imaged by István Zoltán Földvári of Budapest, Hungary on 2020 April 07, at 21:03-21:17 UT. Colongitude 86.5°. Equipment details: 70 mm refractor telescope, f/l = 500 mm, Vixen Lanthanum LV 4mm eyepiece, 125x, Baader Contrast Booster Filter. Sky seeing = 7 out of 10, sky transparency = 6 out of 6.

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: Chains of 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 May 2024, will be Chains of 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 Chains of Craters Focus-On article is April 20, 2024

FUTURE FOCUS ON ARTICLES:

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

Subject	TLO Issue	Deadline
Chains of Craters	**May 2024**	**April 20, 2024**
Mare Nectaris	**July 2024**	**June 20, 2024**
Aristoteles and Eudoxus	**September 2024**	**August 20, 2024**
Archimedes Region	**November 2024**	**October 20, 2024**

Focus-On Announcement
Chains of Craters: The More the Better

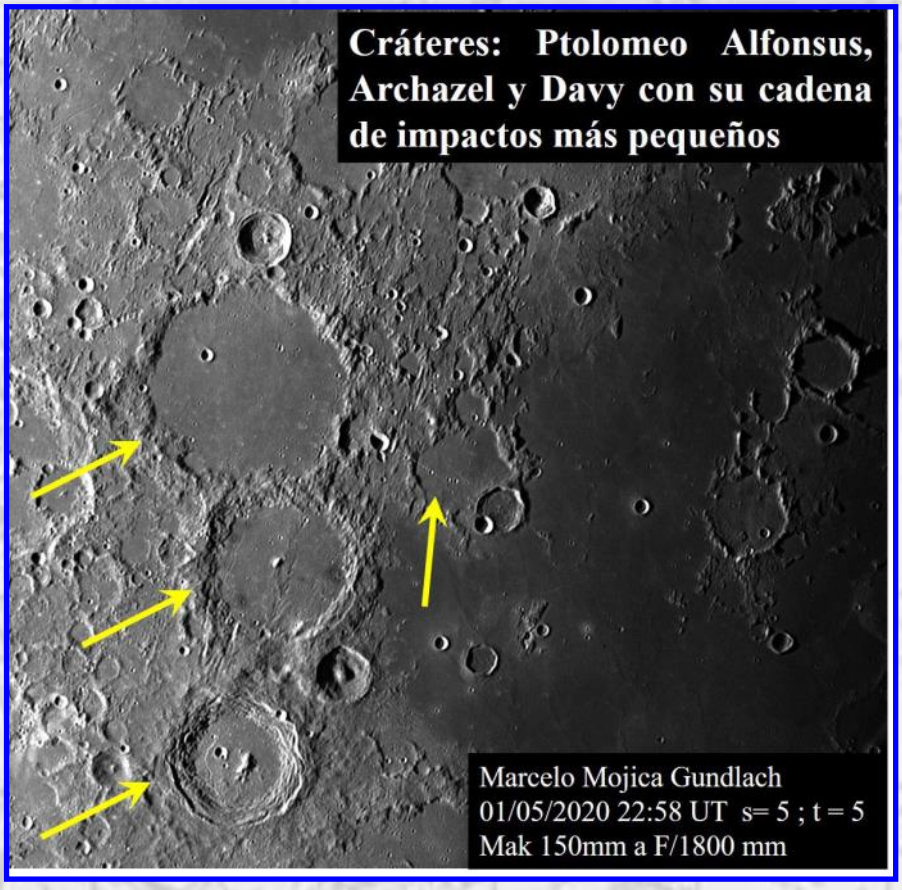
Today we know the origin of the groupings of craters very close to each other, but it took years of progress in our knowledge of the Moon to know if the craters that appear very close to each other have a common origin and what that origin is. We are going to learn about the chains of craters (or Catenae, according to the International Astronomical Union) that appear on the Moon, whether they were produced by the fragmentation of an impactor, by secondary impacts of a main crater or by collapses of volcanic origin. Let's share images of chains of craters from the smallest to the super massive ones like Vallis Rheita.

FOCUS ON MAY 2024: Due April 20, 2024: CHAIN OF CRATERS

FOCUS ON JULY 2024: Due June 20, 2024: MARE NECTARIS

FOCUS ON SEPTEMBER 2024: Due August 20, 2024: ARISTOTELES AND EUDOXUS

FOCUS ON NOVEMBER 2024: Due: October 20, 2024: ARCHIMEDES, AUTOLYCUS AND ARISTILLUS



Marcelo Mojica Gundlach

Focus-On Announcement
Mare Nectaris: A Small Basin Full Of Wonders

Mare Nectaris is one of the smallest maria on the Moon, but also one of the most varied. It would be very interesting to receive your best images of the most notorious features of Mare Nectaris: the heights of Rupes Altai, Mädler and his complicated design of bright lines (rays or elevations?), the complicated topographies of Fracastorius, Gaudibert and Piccolomini, the rilles, wrinkle ridges and chains of craters that we can find; and, of course, the fantastic trio of Theophilus, Cyrillus and Catherina. And thus take a circular walk through a fairly identifiable basin and understand a little more about its geology and landscape.

FOCUS ON MAY 2024: Due April 20, 2024: CHAIN OF CRATERS

FOCUS ON JULY 2024: Due June 20, 2024: MARE NECTARIS

FOCUS ON SEPTEMBER 2024: Due August 20, 2024: ARISTOTELES AND EUDOXUS

FOCUS ON NOVEMBER 2024: Due: October 20, 2024: ARCHIMEDES, AUTOLYCUS AND ARISTILLUS

Francisco Alsina Cardinalli

Key to Lunar Images In This Issue

1. Aestuum, Sinus
2. Agatharchides
3. Alpes, Vallis
4. Alphonsus
5. Apenninus, Montes
6. Archimedes
7. Aristarchus
8. Billy
9. Bullialdus
10. Cassini
11. Clavius
12. Copernicus
13. Deslandres
14. Frigoris, Mare
15. Gambart
16. Gassendi
17. Guericke
18. Iridum, Sinus
19. Janssen
20. Longomontanus
21. Maginus
22. Malapert
23. Marius
24. Marzinus
25. Nectaris, Mare
26. Plato
27. Posidonius
28. Recta, Rupes
29. Reiner
30. Schickard
31. Schiller
32. Schlüter
33. Theophilus
34. Tranquillitatis, Mare
35. Tycho
36. Zagut