COMMUNICATIONS IN

CMO Since 1986

No.76

MARS

_{No.}450

25 June 2016

OBSERVATIONS

Published by the International Society of the Mars Observers

CMO/ISMO 2016 Mars Report #10

2016 CMO/ISMO Mars Observations Made During the Fortnight Period from 1 June (λ =162°Ls) to 15 June (λ =170°Ls) 2016

♂·····This is the 10th report of the 2016 CMO/ISMO Mars observations. We shall here treat the ISMO Mars Observations made during the fortnight period from 1 June 2016 until 15 June 2016. During the period, the planet retrograded inside the Lib constellation, and shined at the ES sky when the sun set; and passed the meridian before mid-night. The apparent declination D kept around 21°S. The angular diameter of Mars decreased from δ =18.6" down to δ =17.9", and the phase angle increased from ι =08° to ι =21°. The season proceeded from λ =162°Ls to λ =170°Ls. The south polar cap (spc) has already attained its largest size at around λ =100°Ls (on the final days in January 2016), but its true body does not quite appear from the south polar hood (sph) covering, partly because the tilt is northwards moving from φ =12°N to φ =15°N. The snowline has been considered to stay at the latitude 58°S. The season of dust is coming: Already, during the last period, some excellent ISMO observations assured the spread of the airborne dusts though the sources wherefrom the aerosol dust was originated. However this period, Efrain MORALES (EMr) detected some dust disturbances twice on 9 June and 15 June which were located at the southern district of Sinus Margaritifer. Especially Bill FLANAGAN noticed on 15 June that one of the dust branches filled the inside of Coprates Chasma: This scene must have reminded him of the similar situation in 2005 (at λ =309°Ls), though the case in 2005 was much more furious. This time, the season is much younger, and so this event must be mere precursor of the dust events to follow. At the arctic region, some new change of patterns is occurring.

3 · · · · · As the observations performed during this fortnight period, we received a total of 105 observations made by 31 ISMO observers around the world. We are very thankful to all for the precious contributions.

ADCOCK, Barry (BAd) Viewbank, VIC, AUSTRALIA

1 RGB Colour + 1 Violet + 1 UV Images (12 June 2016) 25cm refractor

AKUTSU, Tomio (*Ak*) Tochigi, JAPAN (* Utsunomiya Univercity Observatory)

4 *RGB Colour* + 4 *B* + 4 *IR* Images (3*, 11 June 2016)

36cm SCT, 40cm Cassegrain* with an ASI174MM

ASADA, Tadashi (As) Fukuoka, JAPAN

2 Sets of RGB Images (5, 11 June 2016) PPARC[#] 60cm Reflector with an ASI120MM

BUDA, Stefan (SBd) Melbourne, AUSTRALIA 2 Sets of RGB Images (1, 15 June 2016) 41cm Dall-Kirkham with an ASI120MM **DELCROIX**, Marc (MDc) Tournefeuille, France 1 Set of RGB + 1 IR Images (5 June 2016) 32cm Spec with an ASI 290MM FLANAGAN, William (WFl) Houston, TX, the USA 5 Sets of *RGB* Images (8,~11, 15 June 2016) 36cm SCT @f/17 with a PGR GS3-U3-32S4M-C FOSTER, Clyde (CFs) Centurion, SOUTH AFRICA 9 Colour + 9 IR Images (6, ~8, 10, 15 June 2016) 36cm SCT @f/33 with an ASI 224MC **GORCZYNSKI, Peter (PGc)** Oxford, CT, the USA 4 Sets of *RGB* + 4 *IR* images (2*, 11, 12, 15 June 2016) 18cm Maksutov Cassegrain, 36cm SCT @f/39* with an ASI290MM HERNANDEZ, Carlos E (CHr) Miami, FL, the USA 1 Colour Drawing (14 June 2014) 23cm Maksutov-Cassegrain, 280×, 350× **ISHIBASHI Tsutomu** (Is) Sagamihara, Kanagawa, JAPAN 4 Colour Images (2, 5, 10 June 2016) 31cm Spec, with a SONY HC9 Video Cam JUSTICE, Mark (MJs) Melbourne, AUSTRALIA 1 Set of RGB Images (12 June 2016) 30cm Spec with a DMK21AU618 **KARDASIS, Manos** (*MKd*) Glyfada-Athens, GREECE 1 Set *RGB Colour* + 3 *Colour* + 1 *B* Images (4, 10, 11*, 12* June 2016) 36cm SCT with a DMK21AU618 & DBK21AU618* KUDOH, Hidetoshi (Kd) Cairns, QLD, AUSTRALIA 1 Colour Image (6 June 2016) 20cm Spec with a QHY5L-II-C KUMAMORI, Teruaki (Km) Sakai, Osaka, JAPAN 5 LRGB + 5 B Images (2, 3, 9, 10, 14 June 2016) 36cm SCT @ f/30, 38 with an ASI224MC & ASI290MM **LEWIS, Martin** (*MLw*) St. Albans, Hertfordshire, the UK 1 Colour Image (5 June 2016) 44cm Spec with an ASI174MC MELILLO, Frank J (FMl) Holtsville, NY, the USA 6 Colour Images (1, 8, 10, 11, 15 June 2016) 25cm SCT with a ToUcam pro II MORALES RIVERA, Efrain (EMr) Aguadilla, PUERTO RICO 9 Sets of RGB Images (2, 5, 7, 9,~11, 13,~15 June 2016) 31cm SCT with a Flea 3 MORITA, Yukio (Mo) Hatsuka-ichi, Hiroshima, JAPAN 1 Set of LRGB Images (10 June 2016) 36cm SCT with a Flea 3 MURAKAMI, Masami (Mk) Yokohama, Kanagawa, Japan 5 Drawings (2, 5 June 2016) 320× 20cm (F/8) Spec **OHSUGI, Tadao (Og)** Komatsu, Ishikawa, JAPAN 25cm Dall-Karkham with an ASI290MC 4 *Colour* Images (1, ~3, 9 June 2016) **PHILLIPS Jim** (*JPh*) Charleston, SC, the USA 1 Colour Image (14 June 2016) 25cm Maksutov Cassegrain with a Skynyx Colour cam **ROSOLINA, Michael (MRs)** Friars Hill, WV, the USA 3 Colour Drawings (2, 4, 15 June 2016) 35cm SCT, 330×, 360×,390× SCHULZ, Robert (RSz) Vienna, AUSTRIA

1 Colour Image (10 June 2016) 20cm SCT with an ASI224MC

SUSSENBACH, John S (JSb) Houten, the NETHERLANDS
1 RGB Colour + 1 IR Images (5 June 2016) 36cm SCT @f/20 with a QHY5L-II
TRIANA, Charles (CTr) Bogota, COLOMBIA
1 Set of LRGB Images (6 June 2016) 25cm SCT @f/27 with an ASI 120MM
TYLER, David (DTy) Flackwell Heath, Bucks, the UK
1 Colour Image (5 June 2016) 13cm refractor with an ASI 120MM
VALIMBERTI, Maurice (MVl) Melbourne, AUSTRALIA
2 Sets of RGB + 2 IR Images (1 June 2016) 36cm SCT @f/24 with an ASI 120MM
WARELL, Johan (JWr) Lindby, Skivarp, SWEDEN
5 Sets of <i>RGB</i> Images & 1 Drawing* (1, 3, 6*, 10, 11 June 2016) 22cm speculum @f/23 with a DBK21AU618, 170×*
WELDRAKE, David (DWd) NSW, AUSTRALIA
4 Sets of RGB Images (11, 15 June 2016) 13cm refractor @f/40 with an ASI120MM
WESLEY, Anthony (AWs) NSW, AUSTRALIA
1 Colour Image (8 June 2016) (51cm Spec)
WILSON, Tim (TWl) Jefferson City, MO, the USA
3 Colour + 2 B + 5 IR Images (6, 8*, 9, 11*, 12* June 2016) 28cm SCT with an ASI120MC & ASI120MM*
[#] PPARC (Planetary Plasma and Atmosphere Research Center) of the Tohoku University, Japa (Mt. Haleakala of the Maui island, Hawaii)
•••••We Further Received from PMx and JWr as follows:
MAXSON, Paul (PMx) Surprise, AZ, the USA
6 Sets of <i>RGB</i> + 6 <i>IR</i> Images (16, 17, 20, 21, 22, 23 May 2016)

25cm Dall-Kirkham with an ASI 290MM

WARELL, Johan (JWr) Lindby, Skivarp, SWEDEN

2 Sets of RGB Images(20 April; 24 May 2016) 22cm speculum @f/23, 30 with a DBK21AU618

 \mathcal{J} ••••••We shall now try to touch on each observation chronologically:

1 June 2016 (λ=162°Ls, δ=18.6", φ=12°N~13°N)

Frank MELILLO (FMI) obtained a single colour image at ω =144°W, φ =12°N. Olympus Mons is dimly visible near the CM. The clouds associated with the Tharsis three mountains are also pinned down. Solis L and Tithonius L look to be nearly on the evening limb. Elysium is not light on the morning side, but the Ætheria dark patch is definitely obvious with the preceding Propontis I to the north of which a mist zone runs. The south polar hood (sph) is bright, under which Maria zone lies quite darkly. The area around the supposed north polar cap (npc) is misty.

Maurice VALIMBERTY (MVI) gave three sets of three ingredients R, G, B images together with the IR images and obtained three sets of the RGB composites at ω =256°W, 258°W, 261°W, φ =13°N. Elysium Mons looks like having an annular shaped flank with a less whitish central area. The Ætheria dark patch has been complexly deformed to like a double canal. At the preceding limb at around 55°N, there is seen a small white cloud patch (which was previously detected). The details from the NW part of M Cim-

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merium to the north end of Syrtis Mj are enough. It appears the sph has retreated from Hellas. Around the npc some cloud patches are scattered.

Stefan BUDA (SBd) gave an excellent RGB composite at ω =268°W. The cloud at Elysium Mons is surely apparent not only through G and B, but also explicit in R, so that the flank itself of Elysium M reacts through the Astrodon filters. The small cloud patch at the evening limb (near at Ω =178°W, Φ =55°N, and so to the north of Propontis I). The Huygens crater looks rather 3D and the Baldet dark spot is visible, while the southern district of Syrtis Mj shows a tinge of the airborne dust. Note however the sph's brightest part is beautifully bluish white. Two protrusions from the npc are visible beyond Rima Borealis.

Tadao OHSUGI (Og) gave an 290MC image at ω =281°W (at around 22h JST). The process is still excessive, and hence the soft gradation of the airborne dust is not apparent. However the aspect of the northern part of Ausonia Australis is informative. It's good to show the whiteness of the sph. Now the area around the npc is misty.

Johan WARELL (JWr) obtained a set for the RGB composite at ω =059°W. Solis L is dark on the morning side but not separated from the preceding dark marking. The area is described from S Meridiani which is a bit seen to Tithonius L. The area to the north of M Erythræum is slightly faded, but not detailed.

2 June 2016 (λ=162°Ls~163°Ls, δ=18.6")

Peter GORCZYNSKI (PGc) regained his tone and gave a set for the RGB composite at ω =129°W together with two kinds of IR685 images. Now at i=09°, Olympus Mons is dull near the CM. Tharsis Montes are also indistinct, but Ascræus Mons looks to be a bit covered by a white mist and the trace which was previously occupied by a cloud streak of the Ascræus Cloud is barely visible to the north of OM. Ophir-Candor is thickly covered by the evening mist. Alba is a bit whitish (in B). The evening Tempe is also whitish. The morning Cebrenia is not completely inside the disk but the morning mist covers the area. The sph is white in the RGB, while the area around the npc is misty.

Michael ROSOLINA (MRs) took a colour drawing of the Martian surface at ω =138°W. The ground is yellowish. There is shown a big white place at the evening limb, but we cannot identify what it's.

Efrain MORALES (EMr) obtained a set of images for an excellent RGB composite at ω =147°W. Olympus Mons shows its annular shield plateau with a jade greenish central area. Arsia Mons also shows a jade greenish centre. Ascræus Mons especially appears whitish with a thick cloud. Pavonis Mons is also a bit whitish. (In B, the trio are all whitish.) Alba is also whitish. On the morning side, Elysium is about to be inside and Propontis I takes a shape of ν . In R, the great curve surrounding Arsia Mons is interesting. The sph is whitish but its depth looks shallow (ϕ =13°N). The arctic area looks atmospherically disturbed. The whitish mist band which passes to the north of Propontis I is conspicuous.

Masami MURAKAMI (Mk), one of the present writers, having been busy with the CMO work (Webs and Gallery), was late in beginning his own Mars observation, but the angular diameter began decreasing, Mk set up his apparatus of 320×20cm Saheki-made speculum. The drawings were made at ω=244°W and at ω=264°W. To check the morning Syrtis Mj, he was a bit late, but it appeared not bluish, but rather dark: Already Æria was light at the morning terminator. The sph was lighter at the evening side. The arctic area was just light. At ω=264°W, Hesperia is separated, and Elysium is light near the evening limb.

By the way, Mk tried to use ASI 120MM on Mars, attached to an 8cm refractor which is used for the observation of the Solar Spots. He used an Autostakkert to yield a Mars image with Syrtis Mj. He does not report here about it, but he felt surprised with the result.

Og gave an image at ω=253°W. Still over-processed, as seen from the light marginal bordering of Nodus Alcyonius. We want to see the arctic area with much softer gradation. As to the possible detail, it will be shown by a clearer depiction of the Baldet dark spot. However, the region of Ausonia is well described.

Tsutomu ISHIBASHI (Is) gave a single colour image at ω=271°W, which is much nicer image than usual. The detail of the misty aspect of the arctic area is expected.

Teruaki KUMAMORI (Km) obtained as usual an L-colour image at ω =282°W and a B image at ω =281°W. Apparently the southern region to the south of Syrtis Mj has become faded. The depth of the sph is shallow, while the eastern part is thick. The arctic area is largely disturbed. Two hazy protrusions southwards are seen from the area of the npc. The cloud belt to the west of Utopia at the latitudes 52~53°N (inside Dioscuria) is not so clear on the B.

3 June 2016 (λ=163 °Ls, δ=18.6")

Og's colour image at ω =259°W. A bit lower contrast may show the faded area to the south of Syrtis Mj. Ausonia Australis shows a more reddish tint than the deserts. Some of the mist configurations are deposited?

Tomio AKUTSU (Ak) used the Utsunomiya University Observatory to produce two sets of IR-GB composites (used IR instead of R) at ω =265°W, ω =279°W. The IR image is not so sharp, and so the IR-GB image is of the moderate contrast and the colour Ak has been giving. The white colour of the sph is good. The Elysium-Mons cloud and the protrusion from the npc are well shown. On the second image, the sph looks to send a branch into Hellas.

Km produced an interesting L-colour image at ω =279°W together with a B image at 280°W. The L-colour image captures the details of the dark markings which however look quite withered. Due to this effect, the Huygens crater appears as 3D, and Syrtis Minor gives us its fresh impression. Otherwise whole dark markings may be said to show us their skeletal structures. The northern district of Syrtis Mj looks to show us an impression that the very part is as if split due to Nili Fossæ. Utopia is also withered and the light and shade inside are interesting. The sph may show a part of the spc. A part of the nph looks to go down to Hellas, while it may be no more than dusty. The npc is rather definite (a part of Rima Borealis is exposed) and from the eastern side a protrusion of the mist is sent up. The cloud at Elysium Mons is clearly separated from the pinkish western streak in spite of the fact that they are quite near the evening limb. This picture is a lot of fun to watch. However, this is just like to watch the skeleton and caused by

avoiding the description of the effect of the airborne dusts.

JWr gave an RGB composite as well as its three ingredients at ω =029°W. Different than the RGB image on 1 June, the present one gives us an indistinctly bright feeling. In R, the lhs of Tithonius L is dark, but on RGB, it is beneath a morning mist. The area of the npc is white, and the sph is considerably whitish bright. We cannot judge if some dusty disturbance is suggested to the northern area of M Erythræum.

4 June 2016 (λ=163°~164°Ls, δ=18.6"~18.5")

MRs gave a colour drawing at ω =114°W. Solis L must be near the evening limb and its north is very white. The sph looks whitish large (though with a rather thin depth).

Manos KARDASIS (MKd) obtained a set of the R, G, B ingredients to compose an RGB image at ω =008°W. A remarkable point is that the area westward from Neudrus to the north of M Erythræum down to the southern end of Chryse is suggested to be covered by some dusty matters. The both sides of the dark central line of S Margaritifer look surely faded (the lhs is a faded part of Pandoræ Fr, and the rhs is related with Pyrrhæ Regio and Eos which have faded areas). This fact reminds us of the image by Paul MAXSON (PMx) on 10 May (λ =150°Ls) at ω =039°W. We should note that the R image shows Brangæna and the Ods though not so evident on RGB. From this angle, the brighter part of the sph moved to the morning side. In B, Tempe is morning misty.

5 June 2016 (λ=164°Ls, δ=18.5")

EMr submitted an interesting RGB image with ingredients at ω =095°W. The G&B images worked in a so effective way that the evening side of the surface in the RGB image is shown largely covered by the smog-like haze which concealed the area from Ω =005°W line to Auroræ S (Ω =060°W). Tempe is also covered by a thick mist. Outside the evening area, For example, the Fortuna double ring, the Tharsis ridges and also Olympus Mons are grasped. Ophir is almost clear. The sph is quite whitish evident. The npc looks as if covered by a thick arctic cloud.

Tadashi ASADA (As) obtained a set of the R, G, B components by the remote control at ω =201°W. The R image not only shows some details of the Herschel crater and the doubled Ætheria dark patch, but also suggests a presence of Walhalla. The R also suggests that the sph contains the south polar cap (spc). It is very bright in G and B. The B shows that the cloud associated with Elysium Mons is quite thin. On the other hand, the arctic area near the npc is full of white clouds.

Mk tried again to watch Mars three times at ω =230°W, 240°W, 249°W. At ω =230°W, Syrtis Mj was near the morning terminator, but never bluish, while Elysium looks light. The sph has an extension. The arctic light area is larger than the (supposed) npc. At ω =240°W, in addition to the Ætheria dark patch, Mk witnessed N Alcyonius. The nph is felt larger than the npc itself. The limb at the higher northern latitude shows a small but bright patch. At ω =249°W the limb white patch is also caught. As to the sph, the evening side has a brighter part.

Is gave two colour images at ω =242°W, 252°W. The second image looks blurred, but the first one is much better. Inside Elysium, the white cloud and the reddish ground-lit streak are separated on the eve-

ning side. Hesperia is cut. Ausonia looks slightly reddish. The white haze is largely covers the area of the npc.

John SUSSENBACH (JSb) gave two kinds of the RGB expressions at ω =016°W and IR-RGB image at ω =013°W. The IR image gives a milder impression though it shows such minor details as Neudrus, Brangæna and the Ods. A most attentive point is how the present images depict the region from Neudrus up to the area of Pyrrhæ Regio. Apparently the region looks suggestively faded, but here the G and B images are not provided.

Dave TYLER (DTy) showed us a colour image at ω =016°W (maybe an RGB composite from the images by 120MM-s), but looks monotonous in general. Brangæna is visible, but the sph is not explicitly depicted.

Martin LEWIS (MLw) gave a 174 MC colour image at ω =018°W. The image looks dimmer in general and the sph appears in a different tint. The area around the south pole is just dull.

Marc DELCROIX (MDc) obtained three elements and the RGB composite at ω =034°W + an IR image at ω =028°W. There seems to exist a hazy area to the north of the position of M Erythræum on the RGB and the IR image. The sph may show a gaseous protrusion northwards. The Tempe morning mist now invades deeply the inside of M Acidalium.

6 June 2016 (λ=164°Ls~165°Ls, δ=18.5", φ=13~14°N)

Charles TRIANA (CTr) gave a set of L, R, G, B elements and composed an LRGB image at ω =104°W. We understand that the R image is rather blanky because the dusty haze has increased. The larger misty covering the evening side is of the same phenomenon as EMr's case on 5 June at ω =095°W. This time also the large area of the evening side is beneath the haze. A part of the sph looks to belong to the npc. The arctic area is also beneath a vast haze.

Tim WILSON (TWI) gave an image at ω =105°W. Unfortunately due to the IR image no vast hazy evening covering is captured. Both polar areas are vacant about the whiteness.

Hidetoshi KUDOH (Kd) is a Japanese who stays in Cairns, AUSTRALIA. Kd is a junior to Mk in a high school, Tokyo. Kd experiences Mars for the first time, but otherwise he is active as a botanist (we hear that "Cairns naturalist Hidetoshi Kudo discovered the Haines Orange Mangrove bordering Trinity inlet. It has never been seen before in Australia & is extremely rare in other parts of the world. (ABC Far North, 14 April 2016, in *Facebook*)." The present Mars image was taken at ω =215°W in good contrast. The whitish sph appears beautifully, and the white protrusion from the north pole area is well depicted. The Elysium cloud is weak though it is near CM. The pinkish ground-lit streak and the double canals of the Ætheria dark patch are well shown up. Syrtis Mj is coming, but not bluish. Good angle!

Clyde FOSTER (CFs) gave a big L-colour image at ω =345°W with an IR image. The description of the sph is not appropriate. It may be said that the arctic area has been changed to a large off-white haze.

JWr obtained an RGB image at ω =001°W with three ingredients. JWr also accompanied a drawing

made at ω =012°W. The RGB composite is shown in a befitting tint. The sph sends partly a hanging part to Argyre and this is explicit on the drawing.

7 June 2016 (λ=165°Ls, δ=18.5"~18.4")

EMr gave an RGB composite at ω =076°W. Different by 20°W than the angle of the previous EMr image on 5 June, the evening haze at Xanthe looks weaker. Even then the preceding limb side is heavily hazed. It is clear that around Eos a dusty condensate is floating, and we may find a germ of dust disturbance (unfortunately on the next 8 June no result of image was not dispatched from EMr). The brighter part of the sph looks to have a perimeter at around 55°S to the south of Solis L. There is a condensate zone to the south of Phœnicis L. The Fortuna disk is rather apparent. The large arctic area is haunted by several gloomy condensate patches. We believe this is an important work at λ =165°Ls.

CFs obtained two sets of L-colour and IR images at ω =303°W and 320°W, φ =14°N. The sph is not clear, but its branch invades surely the southern part of Hellas. The npc looks to stay dimly beneath the arctic condensate.

8 June 2016 (λ=165°~166°Ls, δ=18.4", φ=14°N)

TW1 gave an IR-colour image at ω =067°W. Small markings are shot, but the dark markings are not soft and so quite illegible.

FM1 gave a usual image at ω =091°W. Solis L is not separated from the preceding darker area. Ophir is misty light. The arctic area is misty blurred.

Bill FLANAGAN (WFI) has been inactive for a while because the weather at Houston was long dismal, while on 8 June the sky has been restored. The images were taken at ω =114°W (05:56 GMT). The R image might have been processed a bit excessively, but due to it, the Tharsis ridges are apparent on the RGB composite. The Fortuna double ring is also captured. The preceding area of Auroræ S is thickly covered by the evening condensate as before. The white mist at Ophir is also clearly checked on the B image. Almost whole of M Acidalium went to the rear side, but some white patches remain and Tempe is misty light. The npc is totally beneath the arctic haze (λ =165°Ls). The sph does no more than show the peripheral part, but the brightest part may reflect the appearance of the spc.

Anthony WESLEY (AWs) issued a big colour image at ω =217°W. Elysium is near the CM, and the cloud of Elysium Mons looks to be about to appear. Cerberus and Phlegra are very faded. Propontis I is detailed (for the first time?). The surface must be slightly dirty even from this angle, and to squeeze the details everyone at present seems to be forced to employ, more or less, an excessive procedure. AWs belongs to the "less" group, but M Cimmerium and N Alcyonius show some faint ghosts. For example, the leg whose northern end is the Gale crater looks to show a light bordering as well as a faint associated ghost line. However the pinkish streak inside Elysium is never ghost, and it's really ground lit. It is interesting to point out that inside the misty arctic area a bright twisty cloud road along which as if some worm crawled is visible. A perimeter of the spc may be now apparent, though no dark fringe is caught.

CFs obtained two sets of L-colour and IR images at ω=293°W, ω=303°W. At ω=293°W, the cloud at

Elysium Mons (EM) is one the preceding limb, and 40 minutes later it went away to the rear side. Since EM is located at Ω =213°W, 303-90=213 implies that the EM cloud has just disappeared. It may be certain that a gaseous branch (maybe not whitish) runs down from the sph to the inside of Hellas. The npc is dimly visible, but its both sides are hazy.

9 June 2016 (λ=166°Ls, δ=18.4"~18.3")

TW1 gave an IR-colour image at ω =053°W. About the both polar regions, this image does not utter any word. Just Ophir is light and the west side of Indus is light (see the next column).

EMr produced a set of three ingredients and an RGB composite at ω =057°W. This is an important set of images. Note first that the details are given no more than in moderation: Brangæna is a bit seen, and the area of Auroræ S is well visible including the brownish Ganges. This implies that the upper part of M Acidalium and the area of Ganges are under a high pressure atmosphere, while the area of Margaritifer S is governed by an ascending air and really a *dust disturbance* is depicted at a southern district of Margaritifer S. This looks surely dusty, shot also on the R image as well as in G&B. The evening limb side is also hazy. We cannot pin down the day when the dust disturbance was onset, because the angle from EMr is missed. We further note that the arctic area on 9 June is a bit more transparent than on 7 June. The morning misty condensate following Tithonius L is thicker than on 7 June.

Nota Bene 1: As said, we were unfortunate because the email from Efrain MORALES (EMr) did not reach us concerning the 8 June Mars, and we are sorry for Bill FLANAGAN (WFI) who was able to watch the planet on 8 June but his site is considerably far from the Atlantic Ocean. Anyway, this disturbance was real, and several rudimental cases at the area to the north of M Erythræum have been known ever since the case of Paul MAXSON (PMx) on 10 May. As remarked earlier in the present report, the case on 5 June by John SUSSENBACH (JSb) and EMr's case on 7 June could work as omens. However, since the season at present is quite young (λ =166°Ls), it will not develop into a storm.

Several dust disturbances have been known hitherto at this region whose back ground is at the dark markings. For example, one of the present writer (Mn) experienced a short-living dust at an earlier season (λ =125°Ls) in 1999. See the following site:

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn0/99Note18/index.htm

In this site, as another example of the similar dust disturbances, we touched on the case of E C SLIPHER on 9 or 10 July 1922 (at λ =187°Ls) which was cited in his Mars book (the photographic story) at p. 107. It says that this was not observed anywhere else, but we suspect that the case which was written by E M ANTONIADI in his book at pp.125~126 as observed by G FOURNIER et al on 29 June (+ 6 July) 1922 must have coincided with the SLIPHER case. Thirdly the above site shows the example of A DOLLFUS on 13 April 1984 (λ =132°Ls) at Pic-du-Midi. Finally we would like to note that the dust disturbance at the initial stage often contains or is related with the water vapour (as in 1956 and 1971).

WFI took a set at ω =102°W, but the quality of the images is not of high. Furthermore, the area in question was already at the rear side. However the evening side is strangely hazy as well as at the arctic area.

Og gave a 290MC image at ω=193°W. Notable is that Olympus Mons is less bright even at near the eve-

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ning limb (still $\iota=15^{\circ}$), though the annular ring is slightly visible. According to Dr T ASADA, Olympus Mons will be free from the roll cloud from around $\lambda=175^{\circ}$ Ls, and hence it's at the last stage. The arctic area is dull hazy.

Km obtained an L-colour and a B image at ω =202°W and at ω =199°W respectively. The markings are not so edged, but the tint of the surface is pretty. It's good to see the spc/sph in whitish tinge. The arctic area is also whitish hazy. Valhalla seems to be visible. The evening limb is at Ω =112°W since 202-90=112°W. Because OM is located at Ω =134°W, OM must be inside by 20°W: Really the annular ring of the shield plateau is a bit visible inside.

10 June 2016 (λ=166°Ls~167°Ls, δ=18.3"~18.2")

EMr produced an RGB set at ω =041°W. The rather isolated dust on the preceding day looks to have been rather flatly levelled, and the dirty coloured matter has been distributed from the west side of Neudrus double canals down to 10°S line and further to the southernmost area of Chryse. One branch goes to the southern side of Auroræ S. This does not imply that the previous dust developed, but the configuration was regarded as reproduced in the morning. Note that Ganges is still brownish and Oxus is also remains brownish. This configuration will remain the same until the night. (The dust will however be spread over if the dust is sent upwards by some upheaval of temperature at next dawn.) M Acidalium looks attacked from the west side as well as from the arctic area by dusty hazes. Especially the haze at the eastern side of the npc (possible) looks very dirty. That is, the arctic area is invaded by some dusty condensates. It is interesting to note that the small light spot between Niliacus L and M Acidalium is brownish or reddish. The spc looks widely governs the sph, but not yet the dark fringe is visible.

FM1 gave a single colour image at ω =054°W. The dust near at Pyrrhæ R and Eos is weakly visible on FMI's image. The expression of the sph/spc looks good. Auroræ S is dark.

WF1 now approached the area in question at ω =091°W. The disk on the RGB composite image shows the disk's perimeter is all roundish hazy, especially smoothly whitish at the area of the sph. Exceptionally the evening limb side preceding Soils L looks dirty in a dusty colour. The airborne dusty area now covers up to Auroræ S. The arctic haze also shows some dusty colour.

Is gave two shots at ω =184°W and at ω =186°W. It is hard to tell the difference, but the sph is well shown and the arctic misty covering is distinguished.

Km produced a set of an L-colour and a B image at ω =207°W. The L-colour image is modestly processed and shows well the Herschel crater. The inside of Elysium is completely depicted. The cloud of Elysium Mons does not stand out because it is still situated on the morning side. The sph and the area of the npc are nicely expressed. The aspect around the npc must be remembered as a phenomenon at λ =167°Ls. Note that Olympus Mons, near the evening limb, shows nicely its annular ring. It is however a bit beyond the permissible range for some markings to show a ghost shadow or ghost light fringe (for example at near the Gale crater and around N Alcyonius). Yukio MORITA (Mo) has been distressed for a while because of the dismal weather, but here showed a complete set of LRGB and RGB images at ω =194°W. We suppose that these LRGB and RGB images suggest the present aspect of the gloomy ground and the atmosphere caused by the global airborne dusts. In 2001, Mo was able to check the inside of Elysium where a shadowy line at the northern part became visible when the global dust reached down Elysium, and these images remind us of the shadowy line. The npc is pushed by an explicit white cloud. Olympus Mons' annual area is still visible near the preceding limb with a Jade greenish central hill (half covered by the orographic cloud). A bright limb cloud at Tharsis precedes it. The sph is also very bright.

CFs gave two sets of an L-colour/an IR images at ω =294°W, ω =309°W. Both show a gaseous protrusion from the sph to Hellas. At the arctic area, a broad haze stands up southwardly from the area of the npc.

Robert SCHLUZ (RSz) obtained at ω =312°W a single 224MC colour image. The tone of colour looks foreign to the planet Mars. The markings do not show the edge, but the Huygens crater is captured. The sph looks to have invaded Hellas.

JWr gave a set of RGB materials at ω =321°W. The sph is barely seen, and it is as if Hellas is light near the evening limb. The limb preceding Syrtis Mj is also very bright.

Manos KARDASIS (MKd) gave a set of R and B ingredients and composed an RGB image at ω =326°W. The sph is a bit seen. The southern neighbours of Syrtis Mj look considerably faded, though the Huygens crater is obvious. The northern part of M Acidalium is well covered by the morning mist, while the morning area of Margaritifer S looks free from the mist. The npc is not detected but the area is hazy.

11 June 2016 (λ=167°Ls, δ=18.2")

We hope that **EMr** would like to determine the S-N axis by the Don PARKER/Y MORITA method by determining $\rightarrow p$. The sph/spc is whitish evident but it appears too declined. The dusty band starts at the southern part of Neudrus canals and reaches the latitude line of Agathodæmon. Pandoræ Fr is also dirty. Note however Ganges and the area of Oxus are brownish. The small light spot to the EN of Niliacus L is reddish. The Ods is visible. The arctic region including the northern part of M Acidalium is largely hazed in off-whitish non-vivid colour. The npc cannot be pinned down.

TW1 lined up three IR807 images at ω =035°W, 046°W, 062°W. How should we do about the chasing the dust by IR images?

FM1 gave a colour image at ω =048°W. The sph/spc looks definite. The np region is largely hazed. The area in question looks slightly faded. Ophir is usually reddish light.

PGc changed the telescope to an 18cm Maksutov equipped with an ASI 290MM. The first light RGB image was given at ω =056°W. In RGB, the dust expansion at the southern hemisphere looks as before. On the other hand, the northern evening limb side looks quite dusty widely from the northern coast of M Acidalium. The arctic area is also largely dull-hazy. The image of the sph/spc is white brilliant.

WFI gave an impressive RGB set at ω =082°W. In spite of the fact that such details as the annular light ground (with a spot inside) at Fortuna and several chasmal dark spots are clearly visible, the surface looks duller in general, perhaps due to the expansion of the airborne dusts. Especially, all round the peripheral limb side of the disk is more or less hazy. Exceptionally the evening side to the east of Solis L looks quite dirty without water-vapour haze. Auroræ S is vaguely seen through the dusty haze. M Acidalium is still inside the disk, but its southern part looks dirty, less dark. The arctic limb area is dully overcast.

As sent us three R, G, B components at ω =145°W obtained by the remote control. On the G, B images, an evening limb cloud is very bright to the east of Tithonius L or Ophir. In B, the trio clouds of the Tharsis ridges are visible. The southern limb is bright and the arctic area shows a few of cloud patches.

David WELDRAKE (DWd) put forward two sets of RGB images at ω =150°W, ω =161°W. Since 120-90=60, ω =150°W implies that the cloud on the preceding limb is the one at Ophir-Candor. Forty minutes later, it tuned to be fainter. Instead, in B, the three clouds at Tharsis ridges are more evident while they were quite faint 40 minutes before. The strength of the cloud associated with Olympus Mons is different between two B. The sph is brighter in G and B. The arctic mist is large definite in G&B. Especially the cloud belt to the north of Propontis I is thick in B.

Ak at home recorded two sets of RGB, B and IR685 images at ω =200°W and 218°W. The colour image looks a bit coarse, but shows Ak's colour. On the B images, a cloud belt stems from Arcadia via the north of Propontis I to Elysium which attracts us. Elysium is never yet whitish because it's located before afternoon.

MKd gave a single DBK colour image at ω =306°W. We suppose that the presence of the overall airborne dusts must not admit the normal processing, and that this image may convey the surface under the airborne dust Martian sky. Even then the Huygens crater is evident. Surely a branch of the sph invades the southern part of Hellas. Yaonis Fr is clearly visible as a wall. The npc is not definite and the arctic area to the north of 60°N is overcast by a large haze.

JWr gave an RGB set at ω=309°W. The SE of Hellas is very whitish bright. The npc area is blurred.

12 June 2016 (λ=167°Ls~168°Ls, δ=18.2"~18.1")

PGc made an RGB set of every component including an IR685 at around ω =022°W. The original dust must have been not so different than the day before, but some whitish small spots are seen at the dusty area to the east of Neudrus (seen also in G). We may otherwise say that a branch is above at Coprates chasma. The sph is whitish beautiful. The npc is detectable, but the dusty bright cloud patch (visible in R) at the east of Iaxartes is more evident together with some following morning mist. In R, the Ods is checked.

TW1 took two sets of (IR, B) images at ω =031°W and ω =050°W. The IR images show the dusty cloud at the north of M Acidalium.

Mark JUSTICE (MJs) took a set of three components to produce an RGB at ω =151°W. Remarkable is a brilliant small white cloud at Ascræus Mons. Others also show their clouds just dimly. Following them, the pinkish Olympus Mons's annual plateau is seen with a jade greenish centre (Arsia summit also shows the jade green tint). The arctic cloud suggests that a cloud belt must be surrounding the npc area. Another remarkable thing is the starting point is clearly visible near the CM of the cloud band which runs to the morning side including Elysium through the north of Propontis I. The sph/spc on the RGB is blue-whitish brilliant.

Barry ADCOCK (BAd) sent us an RGB colour at ω =165°W as well as a Violet and a UV images. Olympus Mons is visible, and the cloud band from Diacria to Elysium (thru the north of Propontis I) is checked. The sph looks well bright but off-whitish, and the arctic area is misty.

MKd gave a DBK colour image at ω =302°W. Hellas looks a bit reddish, and to its ES direction, the sph looks whitish. The npc is unknown, but its morning side is misty.

13 June 2016 (λ=168°Ls~169°Ls, δ=18.1"~18.0")

EMr shows us a very artificial RGB image at ω =010°W. We don't so much welcome the images constructed by an extremely excessive procedure. Even if the development of the dust configuration is a principal concern, it will be necessary for us to keep the same extent of sensibility each day. In fact the aspect of the dusty matters on this image should be said not so drastically improved, or differently from the case of information obtained the day before. At the arctic area, though some part of Hyperboreus L is poked out, the area is thickly clouded except for a certain direction. The both sides of the equatorial zone appears to be rather free from the water vapours, while the arctic region including M Acidalium looks rough.

14 June 2016 (λ=169°Ls, δ=18.0")

EMr gave an RGB set at ω =006°W. Again an excessive image: The area of the dusty disturbances on this image is never informative, because the area appears as if vanished into the darkness.

Jim PHILLIPS (JPh) is onstage after a long while. Here is made use of a 25cm Maksutov to produce a colour image at ω =029°W. The markings are nicely reproduced with some details (for example, the so-called Ods is shot), but colour contrast looks narrower in width. And hence unfortunately the dust disturbance at Pyrrhæ Regio to Coprates Chasma looks dimmer. The rough circumstance at the arctic region is not well reproduced.

Carlos HERNANDEZ (CHr) gave an elaborated colour drawing at ω=039°W. The dusty invasion into Coprates Chasma looks to be noticed, but no description of the activity at the southern part of S Margaritifer.

Km gave an L-colour/B image at ω=157°W/158°W respectively. The sph, seen from this side, looks very thin in depth. Olympus Mons shows an annular aspect. The cloud of Ascræus Mons is especially whitish bright. The arctic area is rough complex with some dusts and water condensates. A contiguous dark band of Rima Borealis is however seen through.

15 June 2016 (λ=169°Ls~170°Ls, δ=18.0"~17.9", φ=15°N)

MORALES (EMr) gave an RGB set at ω =353°W (01:51 GMT), φ =15°N. As easily judged from the depiction of the Ods, the present RGB composite is much softer than before. Here EMr detected apparently a dust patch whose shape is irregular at the southern part of Margaritifer S. This is further associated with another dust patch to the west. The main dust disturbance is more definite and a bit larger than the isolated dust patch EMr detected near here on 9 June at ω =057°W. It is also certain that some area of Chryse is dusty. The northern half of M Acidalium which stays on the early morning area is rough with the misty condensate down to the arctic dusty/misty region. The season was λ =169°Ls, and the latitude Ds of the sub-Solar point has moved southward upto 05°N.

GORCZYNSKI (PGc) also observed at ω =003°W (02:33 GMT) and made a set of the RGB and IR images where PGs detected also the couple of the dust disturbances. The IR image also show the dust, and the central line of Margaritifer S looks as if the line cut the dust into two.

MELILLO (FMI) took a couple of images at ω =006°W (02:47 GMT) at ω =024°W (03:58 GMT) and recorded the couple of dust disturbances.

ROSOLINA (MRs) visually observed at ω =020°W (03:45 GMT), and drew a lighter area at the same place. The memorandum looks however incomplete.

FLANAGAN (WFI) produced an important RGB image at ω=042°W (05:15 GMT) where he recorded the disturbance and found that the latter dust branch crawled into Coprates Chasma. The dust inside Chasma is rather bright. Hitherto WFI was behind the east coast or Puerto Rico by about one hour or two hours, but this time

Bill FLANAGAN's images 15 June 2016 19 Oct 2005 19 Oct 2005 1 = 1699 "Ls 6 = 17.9 " 4 = 20 " 1 = 1699 "Ls 6 = 17.9 " 4 = 20 " 1 = 1699 "Ls 6 = 17.9 " 4 = 20 " 1 = 1699 "Ls 6 = 17.9 " 4 = 20 " 1 = 1099 "Ls 6 = 17.9 " 4 = 20 " 1 = 1099 "Ls 6 = 17.9 " 4 = 20 " $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 17.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1099 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1000 \text{ "Ls} 6 = 10.9 \text{ "} 4 = 10^{\circ}$ $1 = 1000 \text{ "} 4 = 10^{\circ}$ 1 =

the delay worked happily for WFl to encounter Coprates Chasma which is filled with the dust. WFl observed the dust filled Coprates Chasma diligently in 2005, and so we here cite his image this time in comparison with those in 2005. As to the event in 2005, we will give a commentary in a below column.



Nota Bene 2: On 15 June, **Damian PEACH (DPc)** dispatched a news at 05:51 GMT (14:51 JST) from Barbados (received here by Mk), that a dust cloud appeared at a southern part of Margaritifer S on his R and G images taken at 01:34 GMT (while the B image did not show it). The exposed time is slightly earlier than the time of EMr. The R image will be cited in the LtE below.

(We continue here to write about the rest of observations on 15 June.)

DWd, in Australia, gave two sets of RGB images at ω =093°W, ω =122°W. Especially the latter image was taken under a good seeing and separated the cloudy Ophir. We feel sorry about a few hours delay concerning preceding the dust event.

SBd made a set to produce an excellent RGB composite image at ω =131°W. SBd's RGB images show a Martian surface nicely polished, while we observe that the peripheral part of the disk really expresses the effect of the airborne dust. Especially the gloomy atmosphere of the arctic region proves the present situation. SBd's bland tone without any aggressive/excessive procedure favourably impresses us. Olympus Mons shows us its annular structure near the CM, while the cloud of Ascræus Mons is still silent (a bit Jade-greenish?). The ground ring at Fortuna is visible. Solis L a bit hazed is about to go to the rear side. Ophir is thickly cloudy. M Sirenum, near the marginal sph, is faded due to the aerosols. The misty band to the north of Propontis I should be noticed.

CFs gave two kinds of usual sets at ω =251°W and at ω =290°W. The latter one looks less blurred. At first we saw that the dark fringe of the spc was appearing, but in vain because we found a long arc ghost along the evening limb. Finally Elysium is near the limb. At this season it will be more valuable if any one can chase the cloud associated with Elysium Mons from the onset of the orographic cloud to the limb (though t=20° may be implying too late).

3·····As above mentioned at the corner **"We Further Received"** at p Ser3-1159, we further received several pieces of information, two sets of observations and six sets respectively from Johan WARELL (JWr) and Paul MAXSON (PMx) after each deadline. So we shall here keep a record of them:

20 April (λ =140°Ls, δ =14.5″), JWr took a set of images at ω =128°W: At that time, the white clouds were active in Arcadia to Amazonis and hence the B image shows several small white spots. The clouds at the Tharsis ridges are evident also on RGB.

16 May (λ =**153°Ls**, **δ**=**17.9**″), **PMx** obtained a set at ω =334°W, φ =16°N: The npc is definite, and also Hyperboreus L is visible. The sph expands at the southern limb in an off-whitish tint.

17 May (λ =154°Ls), PMx gave a set at ω =329°W, φ =10°N which shows a similar aspect to the previous case. The Huygens crater is visible. A bit of the evening mist runs to Syrtis Mj.

20 May (λ =155°Ls), PMx gave a suggestive RGB image at ω =302°W. Hellas's frosts have been sublimed, but at the SE corner a bright (pinkish) frosty matter is visible, just like a protrusion from the perimeter of the south polar cap (spc). This does not show the cold white tint, but a warm colour. Yaonis Fr and Hellespontus are very obvious. The Huygens crater is well visible. Despite the details, this image suggests a covering of the airborne dusts. (The IR685 at ω =303°W is of course more transparent image.) The present RGB image as well as the RGB image on the next day may work as those that record one of peaks of an airborne dust disturbance this season together with the important observations made by Maurice VALIMBERTI (MVI), Stefan BUDA (SBd) and others in Australia.

21 May (λ =155°Ls), PMx gave another timely RGB image at ω =292°W. Syrtis Mj is near the CM, and the southern hemisphere to the south of Syrtis Mj looks largely covered by the airborne dusts. The bright part of the sph shows a pinkish tint. The npc is visible dimly. Utopia looks like being covered by a sandy colour air.

22 May (λ =156°Ls), PMx gave an RGB image at ω =276°W, φ =11°N (and an IR image at ω =277°W). Both images show well a light and shade variation at the region to the south of Syrtis Mj. Ausonia Aus-

tralis is a bit reddish in RGB. And the northern Utopia also looks a bit reddish or sandy just to the south of the npc (beyond the eastern extension of Rima Borealis). The Huygens crater appears *three dimensional*. The nph is whitish. Elysium cloud is very white near the preceding limb.

23 May (λ =157°Ls, δ =18.4″), PMx gave an RGB image at ω =271°W. The light and shade variation of the subdued markings to the south of Syrtis Mj looks the same as the day before, but generally a bit dull-hued. The preceding part of the sph is a bit pinkish bright.

24 May (λ =158°Ls, δ =18.5″), JWr further obtained an RGB set at ω =124°W. Solis L is about to approach the evening limb. An evening mist is very whitish bright at the limb. Olympus Mons is visible on the morning side of the RGB image.

Nota Bene 3: The dust storm we met in 2005 was nicely chased every day by a lot of observers from the US, including Bill FLANAGAN (WFl). The first news of the onset of the dust was readily conveyed by Silvia KOWOLLIK (SKw) in Germany on 18 October to the CMO/OAA (one to Mk, one of the present writers and the other to Mn, the other of the present writers). Fortunately Mn was staying at the Lick Observatory, California. The first observation by SKw was made at 01:50 GMT, and we received her news by email at 01:55 GMT! Of course when the first news arrived it was still bright at California (2h GMT implies 19h PDT -- Local Time at California), and so we were forced to wait for another span of hours until the planet reached Lick's sky. Really Mn's first observation was made at 05:30 GMT (22:30 PDT), and he observed six times every forty minutes until midnight. It was onset at the southern district of Chryse-Xanthe on 18 October, but reappeared on the next morning in a different way at Coprates Chasma as shown on the WFl images cited above. During the waiting time Mk in Yokohama was busy in communicating with Mn at Lick, and was on the alert. He sent out Alerts and News to the OAA Mars Section Members as well as several Mars friends around the world by the use of the Mars-Section mailing list. The report of the incident was given in

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn2/CMO312.pdf and one year later we looked back the event from a wider view point in

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn3/CMO324.pdf

(page Ser2-0469, entitled "Miracles occurred on 18 October 2005")

It is quite uncertain how the aftermath to the present dust disturbance will turn out, but since the season has not been matured it will soon subside, or possibly will become another precursor. The dust storm in 2005 was very furious. Here are shown two drawings which were taken a few days later. The bright dust streak inside the Coprates Chasma had an incredible power. (These drawings are shown on 30 December 2015 in Facebook by a request.)



(Masatsugu MINAMI and Masami MURAKAMI)

Ser3-1173

Letters to the Editor

•----Subject: Updated animation 30th May 2016 Received: 31 May 2016 at 23:11 JST

Hello all, I have updated the animation sent yesterday of Mars' rotation to include data fron 1209UT to 1323UT. To make the file a reasonable size, I have compressed the data, which has made the result more grainy with the loss of some fine detail. Individual RGB frames will follow in the next day or so.

Best wishes

○····Subject: Mars 1st June 2016 Received: 3 June 2016 at 19:33 JST

Attached is a composite of some Mars images taken on the 1st June in fair seeing. More to follow soon from previous days. Best wishes

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160601/MVl01June16.jpg

O----Subject: Mars 30th May 2016 Received: 5 June 2016 at 14:40 JST

Attached is a composite of some of the Mars images I captured on the 30th May. Seeing was very good; probably the best so far this apparition. A dusty looking Hellas dominates the image. Best wishes.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160530/MVl30May16.jpg

○····Subject: Mars 24th May 2016 Received: 6 June 2016 at 21:29 JST

Hello all, Here are a couple of image sets of Mars taken on the 24th May in good seeing conditions. I have more data to process for this day and will try to send an animation covering approximately 3hrs from 1048 to 1331 in the next few days. Best wishes,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160524/MVI24May16.jpg **Maurice VALIMBERTI** (Melbourne, AUSTRALIA)

•----Subject: Mars, 27 May 2016 Received: 31 May 2016 at 23:27 JST

Dear friends, I acquired Mars last Friday night under unusually good seeing conditions, but unfortunately it is still only 13 degrees high at culmination (the ADC is not able to fully compensate the atmospheric disperison). Quite tediuos work getting anything decent from the avi's, particularly the color balance is problematic. But I am quite satisfied as it is the best image for me this season, and now some more interesting albedo features are starting to come into view. I'm also attaching a better processed May 20 image. Best wishes,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160527/JWr27May16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160520/JWr20May16.jpg

○ ····Subject: Mars, 2016 June 6 Received: 9 June 2016 at 14:31 JST

Dear friends, I have image Mars a few nights in early June but not yet finished the processing, but I hope to send them in the coming days. The planet is beautiful sight with Saturn and the head of Scorpius low in the south, and with the mild summer nights observations are a true pleasure!



Here's a view from last Friday night with unusually good conditions, seeing went up to 5/10 occasionally. Hellas on the evening limb has a thin yellowish haze unlike the other blue-white hazes along the limb. NPH is small and Orestes quite prominent.

I also include a drawing made afterwards (a scan of the observing form), and a photovisual comparison. The altitude was 13 degrees at imaging and 12 degrees for the visual observation. With best wishes,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160606/JWr06June16.jpg

○····Subject: Mars 2016 June 3 Received: 10 June 2016 at 17:33 JST

Hi again, The red planet captured a week ago under decent conditions. Best wishes,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160603/JWr03June16.jpg

Johan WARELL (Skurup, SWEDEN)

•----Subject: Re: Mars 2016/06/07 1923UT CM320 Received: 9 June 2016 at 11:35 JST

Hi Clyde, I think this cloud is similar to one you recorded on May 9th. As I proposed in ALPO's highlights page, it may be caused by another wave of dust moving Northwest in Hellas crashing in to the NW crater wall. It will be interesting to see imagery of this region June 9, 10, 11th. Thanks,

O....Subject: Re: Mars 2016/06/07 1923UT CM320 Received: 10 June 2016 at 04:11 JST

Hi Clyde, I think that's some of the airborne dust overflow from the wave of dust hitting the crater wall. Oh, and your June 6th image shows a dark line going from the SW to the NE in Hellas presumably the wave of dust that would hit the crater wall on the 7th. Yours and other high resolution images make this analysis possible. The dark lines in Hellas are not artifacts. If they are, then we might as well give up. That's my opinion. Good seeing,

O....Subject: Re: Mars 2016/06/10 1924UT CM294 Received: 13 June 2016 at 12:27 JST

Hi Clyde, Please send me your poor seeing, I'd be glad to have it. Ha! Your image shows a 'white' cloud over NW Hellas. I'm thinking that it's CO₂ vapor and that the SPC's invisible CO₂ slab ice has started to sublime. Maybe the sublimation started in mid-to-late April. We know that sublimation at the poles produces wind, right. When the visible granular H₂O cap sublimes, a dark collar appears around the cap, where high winds blow bright dust into the air uncovering dark mare. Does anyone see a dark collar now? I'm going back to images in April and see when the wind started blowing dust into Hellas.

Good seeing,

O----Subject: Re: Mars 6-9 June Dynamic activity Received: 17 June 2016 at 10:51 JST

Hi Clyde, That's a great composite. The Hellas dust treatment is good except for the red line from "The plume etc" is covering the dust deposited to the West on the large June 8th image. Also the expanding white cloud in the north polar regions might be a forerunner of the development of the north polar hood. Thanks. **Jim MELKA** (Chesterfield, MO)

•----Subject: Mars - May 30 Received: 1 June 2016 at 10:23 JST

Hi Mr.Minami and All!, Here I submit my session from the May 30 under below average conditions.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160530/EMr30May16.jpg

O....Subject: Mars May 31st, June 2nd Received: 4 June 2016 at 04:02 JST

Hi Mr. Minami and All!, Here are my most recent sessions from May 31st and June 2nd under below average conditions.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160531/EMr31May16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160602/EMr02June16.jpg

○····Subject: Mars Received: 10 June 2016 at 01:55 JST

Hi Mr. Minami and All!, Here I submit my latest sessions from May 5th, 7th under the influence of the Saharra dust aerosols.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160605/EMr05June16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160607/EMr07June16.jpg

O....Subject: Mars - June 9,10,11th Received: 13 June 2016 at 01:27 JST

Hi Mr. Minami and All!, Here I submit my latest sessions from June 9.10,11th. Still under the influence of the Saharra dust aerosols.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160609/EMr09June16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/EMr10June16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160611/EMr11June16.jpg

○····Subject: Mars June 13th Received: 15 June 2016 at 03:35 JST

Hi Mr. Minami and All! Here I submit my latest session from June 13th. Still under Saharra dust aerosols conditions.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160613/EMr13June16.jpg

Efrain MORALES (Aguadilla, Puerto Rico)

•Subject: Mars 31 May 2016 Received: 3 June 2016 at 06:48 JST

Dear Sir, Attached find two new Mars images. Since the altitude in Holland is only 15 degrees, I used an ADC.Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160531/JSb31May16.jpg

○ ····Subject: Mars 5 June 2016 Received: 7 June 2016 at 02:08 JST

Dear Sir, Attached find some new Mars images. Despite the low altitude of Mars in The Netherlands of 15° the seeing was fair and many details were visible

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in the night of 5 June 2016. The ADC was very useful. The images show several nebulae and clouds With kind regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160605/JSb05June16.jpg

John SUSSENBACH (Houten, The NETHERLANDS)

•----Subject: Mars May 11 Received: 3 June 2016 at 08:53 JST

Mars images from May 11

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160511/PMx11May16.jpg

○····Subject: Mars May 12 Received: 7 June 2016 at 10:50 JST

Mars images from May 12 in average seeing.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160512/PMx12May16.jpg

○····Subject: Mars May 13 Received: 10 June 2016 at 03:57 JST

Mars from May 13..

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160513/PMx13May16.jpg

○····Subject: Mars May 15 Received: 12 June 2016 at 08:39 JST

Mars from May 15

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160515/PMx15May16.jpg

○…Subject: Mars May 16 Received: 14 June 2016 at 10:44 JST

Average seeing only.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160516/PMx16May16.jpg

Paul MAXSON (Surprise, AZ)

•----Subject: Mars images 20160601 Received: 3 June 2016 at 10:35 JST

Hello everyone, I managed to capture the same CM after a two day interval. The changes in the cloud



pattern are interesting to compare. Bad weather has set in now so I may not be able to do any imaging for a while.Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160601/SBd01June16.jpg

Stefan BUDA (Melbourne, AUSTRALIA)

•Subject: Mars Sketch 2 June 2016 Received: 3 June 2016 at 23:10 JST

Dear Sirs, Please find attached the drawing I did on June 2nd. Conditions were not very good but Mars's atmosphere continues to put on a good show. Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160602/MRs02June16.jpg

○ ---- Subject: Mars 04 06.2016 Received: 5 June 2016 at 10:14 JST

Dear Sirs: Please find attached my sketch of June 4th. Transparency early in the evening was very poor but by the time Mars culminated it had improved dramatically. Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160604/MRs04June16.jpg

O....Subject: Mars Sketch 15 June 2016 Received: 16 June 2016 at 05:47 JST

Please find attached my latest Mars sketch. Seeing was very good. Parts of Margaritifer Sinus and Pyrrhae Regio looked dusky to me. Blue morning haze or clouds were visible over much of M. Acidalium. Information is below and also on the sketch. Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160615/MRs15June16.jpg

Michael ROSOLINA (Friars Hill, WV)

•Subject: Mars: June 1, 2016 Received: 4 June 2016 at 06:32 JST

Hi, I have attached my latest image of Mars June 1, 2016 at 3:45 UT. Thanks,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160601/FMI01June16.jpg

○…·Subject: Mars: June 8, 2016 Received: 14 June 2016 at 12:27 JST

Hi, I have attached my image of Mars June 8th, 2016.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160608/FMI08June16.jpg

O.....Subject: Mars: June 10, 2016 Received: 14 June 2016 at 12:28 JST

Hi, I have attached my image of Mars June 10th, 2016.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/FMI10June16.jpg

○…·Subject: Mars: June 11, 2016 Received: 14 June 2016 at 12:29 JST Hi, I have attached my latest image of Mars June 11, 2016 at 3:14 UT. Thanks,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160611/FMI11June16.jpg

Frank J MELILLO (Holtsville, NY)

•----Subject: Mars images Received: 4 June 2016 at 14:14 JST

Dear Sirs, Please find attached a Mars image set from the 20th May 2016. Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160520/MJs20May16.jpg

○····Subject: Mars images Received: 5 June 2016 at 10:46 JST

Dear Sirs, Please find attached a Mars image set from

the 24th May 2016. Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160524/MJs24May16.jpg

○····Subject: Mars images Received: 7 June 2016 at 09:25 JST

Dear Sirs, Please find attached a Mars image set from

the 30th May 2016. Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160530/MJs30May16.jpg

○····Subject: Mars images Received: 15 June 2016 at 13:12 JST

Dear Sirs, Please find attached a Mars image set from the 12th June 2016. Best regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160612/MJs12June16.jpg

Mark JUSTICE (Melbourne, AUSTRALIA)

•----Subject: Mars 2016/06/04 Received: 6 June 2016 at 01:53 JST

Hello, here is a set under average seeing but low altitude. South polar hoods and some North polar hoods are visible. Clouds in Tempe, with a blue tint.

http://www.hellas-astro.gr/sites/default/files/images/observations/mars/2016-06-04-20-52-30_2079.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160604/MKd04June16.jpg

○…·Subject: Mars 2016/06/10 Received: 14 June 2016 at 03:20 JST

Hello, here is a set under good seeing but low altitude. South polar hoods and some North polar clouds expanding south are visible. Clouds in southern Hellas.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/MKd10June16.jpg

○----Subject: Mars 2016/06/11 Received: 14 June 2016 at 03:31 JST

Hello, here is a set under average seeing but low

altitude. South polar hoods expanding till south of Sinus Sabaeus and some North polar clouds expanding south are visible. Clouds in southern Hellas. Thin clouds between Ismenius Lacus and Boreosyrtis.

http://www.hellas-astro.gr/sites/default/files/images/observations/mars/2016-06-11-20-5 1-00_2086.jpg

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160611/MKd11June16.jpg

○ ---- Subject: Mars 2016/06/12 Received: 14 June 2016 at 03:59 JST

Hello, here is a set under poor conditions imaging through clouds and low alt.

South and North polar clouds expanding north and south respectively.

http://www.hellas-astro.gr/sites/default/files/images/observations/mars/2016-06-12-21-1 0-00 2087.jpg

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160612/MKd12June16.jpg

Manos KARDASIS (Glyfada-Athens, GREECE)

•----Subject: Mars image - June 2 Received: 6 June 2016 at 04:58 JST

Gentlemen, Here are images from June 2. Seeing was pretty good, but with Mars so low in the sky (27 degrees) the blue channel especially was soft. Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160602/PGc02June16.jpg

O----Subject: Mars images - June 12 Received: 12 June 2016 at 23:21 JST

Gentlemen, These images were captured through a 180mm mak. I have given up on the C14. I find the mak to be much less susceptible to the marginal seeing and low 27 degree elevation at my location.

Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160612/PGc12June16.jpg

O----Subject: Mars image - June 11 Received: 15 June 2016 at 09:22 JST

This may be my best set of images for this apparition. Seeing was only about average. Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160611/PGc11June16.jpg

Peter GORCZYNSKI (Oxford, CT)

•----Subject: Mars June 6 Received: 7 June 2016 at 01:52 JST

Date: June 6, 2016, Time: 04:04 GMT, CM: 105°, Ls: 164°, Telesc: 28cm SCT, Camera: ASI 120MC, +IR 807 http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160606/TW106June16.jpg

Tim WILSON (Jefferson City, Mo)

•----Subject: Mars 2016/06/06 2028UT CM345 Received: 7 June 2016 at 15:14 JST

Hi all, Returned yesterday from a one week trip to the Golden Gate Highlands National park on the border of South Africa and Lesotho. A really beautiful spot with extensive sandstone formations. But nice to be back at home in the observatory again and there was some reasonable, although mixed, seeing last night. Mars image set attached, with some extensive and interesting cloud structure over the Mare Acidalium region. We are approaching the Martian Southern Spring Equinox(Ls 180), so there is that growing excitement and expectation whenever Mars appears on the screen, as to whether there will be any brightish red/yellow regions showing. I am not noting anything of significance as yet though. Best,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160606/CFs06June16.jpg

○…·Subject: Mars 2016/06/07 1923UT CM320 Received: 8 June 2016 at 15:46 JST

Hi all, Getting some reasonable seeing, although we are expecting a cold front later this week. Attached image from last night. There appears to be residual cloud on the western(right) side of Hellas. What I noted in processing a number of images from the evening was that there is a very fine line of cloud extending westwards and slightly north from Hellas, expanding and dissipating as it gets towards the western limb. It is very subtle and probably best seen in the G image. It is almost as if cloud is finding its way through a small gap in the western wall of Hellas and being blown westwards. However, this is only a theory. Comments would be welcome. Best ,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160607/CFs07June16.jpg

O----Subject: Mars 2016/06/07 1811UT CM303 Received: 8 June 2016 at 17:08 JST

Hi all, A second submission from yesterday evening taken a little over an hour before the previous image set. In this image, the linear cloud which appears to extend from the rim of Hellas, expanding and dissipating to the west(right) is seen a little more clearly(although still subtle). In particular it is seen more clearly in the G and B images than in the previous image set. To expand on my "theory": Is it possible

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that there is an "East South Easterly" blowing over Hellas which is pushing a "mixed cloud" of cloud and dust (I say this as there does appear to be a R component in the cloud) against the western wall of Hellas? Further, if there is a small breach in the upper western wall of Hellas, the cloud is being pushed up and through this breach, resulting in the linear cloud extending to the west north west, expanding and dissipating towards the limb? I am not sure about the prevailing winds at this time of the Martian season, so I may be way off the mark. However if anyone has any views or comments, I would be interested to hear. This may support, at least to some extent, some of Jims recent commentary on Hellas winds? Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160607/CFs07June16.jpg O....Subject: Re: Mars 2016/06/07 1923UT CM320 Received: 9 June 2016 at 13:05 JST

Thanks Jim, Any thoughts on the subtle linear cloud extending from Hellas to the West(WNW)? I am not sure how clearly you can see it on the image. It is more clearly seen on the 2nd image I submitted(at CM302). Do you think it is just a fine temperate linear cloud or related to the Hellas cloud? I am busy with the captures from yesterday evening, although seeing was not particularly good. Best regards,

○ …· Subject: Mars 2016/06/08 CM294, CM303 Received: 9 June 2016 at 18:00 JST

Hi all, Two image sets from last night. Seeing was average/below average. There is some nice activity taking place. Regarding the Hellas disturbance:

- a) It appears to me that this is a "mixed cloud", including a reasonable level of dust.
- b) The cloud seems to have changed shape and consolidated/concentrated a bit, although take note of my comment f), below.
- c) The "subtle" linear cloud extending WNW of Hellas that I noted yesterday is very clearly seen in the 18.10UT image.
- d) It is my view that the 18.10UT image links the linear cloud with the Hellas disturbance, hence I would be tempted to refer to it as a "plume". If It appear that material is being blown out of Hellas and driven in a WNW direction.
- e) It appears that the plume is quite dynamic. Note in the 18.50UT image (only 40mins later), that the rim

of Hellas is visible where the plume crosses it, which is not the case in the earlier image.

f) When rapidly switching between todays 18.50UT image(I deliberately tried to capture the same CM) and the 18.11 image from yesterday, a lot of changes in and around Hellas are noted. It appears that there is a lot of dissipation of material across Hellas and also in the close surroundings. The indication is that the disturbance has had quite a wide influence.

Over and above the Hellas disturbance, there is a large cloud front adjacent(following) to the NPC which has developed over the last 24hrs. The following edge of the front is notably sharp. There is also quite a concentrated cloud formation on the preceding side of the NPC. Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160608/CFs08June16.jpg O.....Subject: Re: Mars 2016/06/07 1923UT CM320 Received: 10 June 2016 at 04:50 JST

Thanks, Jim. I had not noticed the dark line in Hellas on the 6th, but do take note of it now. The images I sent through this morning I think are fairly conclusive in confirming the linear cloud as a plume emanating from the Hellas disturbance. Interesting that it seems to have funnelled through/over the western wall(rather than a general overflow), although I estimate the plume probably to be over 200kms wide! Busy with some more captures now, although seeing is, to put it politely, "poor"..... Cheers,

○…·Subject: Mars 2016/06/10 1924UT CM294 Received: 11 June 2016 at 14:24 JST

Hi all, I am afraid seeing conditions have been exceptionally poor the last two evenings, with focussing being a real challenge. I am amazed that the ASI224MC is still able to eke out at least some of the major features. Cloud activity in Hellas is continuing. I also note the two reddish lines over Syrtis Major, although any detail must be rated as a bit suspect under these conditions. Regards,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/CFs10June16.jpg

○…·Subject: Mars 2016/06/10 2027UT CM309 Received: 12 June 2016 at 17:46 JST

Hi all, A second image set taken a bit later on 10

June. Conditions still very poor.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/CFs10June16.jpg

O....Subject: RE: Mars 2016/06/10 1924UT CM294 Received: 13 June 2016 at 14:22 JST

Thanks for the comments Jim! Yes, I guess I should not complain about the seeing, particularly with the elevation of Mars from down here. The seeing has however been unusual these last few days before a cold front swept in over the weekend. I would refer to it as "micro" poor seeing. Rather than the image jumping around and "boiling"(although I am getting this a bit earlier in the evening), it is very fuzzy, and difficult to focus. I suspected an equipment problem, but other local observers are also experiencing it as well. We have rain and cold at the moment, but should hopefully start clearing tomorrow. I am enjoying the various comments and feedback on the images from Roger and yourself and also from Gary (Rosenbaum) the other day. Richard also commented on the wind direction which would support the "plume" of cloud/material being blown out of the Hellas Basin this last week, which I found exciting. It is really interesting to get proposed interpretation of the images related to the geography and meteorology of Mars. Bit by bit, I am learning more about this fascinating planet. For those that are not on ALPO Mars Observers, Gary's comments on my Hellas images as follows:

"Hi, Clyde, You are getting some really good images of Mars. Both Jim and Roger have already made some good comments on the dust situation in the Hellas area. In a very general sense during this season on Mars (Ls 165 deg) the mid- afternoon flow within the Hellas Basin is clockwise with a west to east flow in the northern region and an east to west flow in the southern region. Sometimes the winds increase in speed and carry dust from the southern part of Hellas over the rim of the crater to the west or west/northwest which is probably what we are seeing. Since the southern edge of Hellas is in close proximity to the SPH there can be some white cloud mixing with the flow of the crater. The SPC should be formed by now and the strong thermal gradient between the ice and the warmer exposed surface creates a cold flow off

cap. The downslope along the southern edge of Hellas enhances, channels and concentrates the off cap flow and the surface wind stress is highest in the afternoon along the western rim of Hellas. We don't see evidence of this all the time but it is not exactly rare so I would not call it a disturbance. This time of year there is a net transfer of water vapor from the northern Hemisphere to the southern hemisphere and there will be an increase of frontal storm activity in northern latitudes. These storms travel east and along the leading edge warm air is transported north while cold air moves south along the following edge. Oftentimes there will be water ice clouds associated with the storms and occasionally some dust activity as well. Active areas for these storms are near Acidalium and Utopia".

○ ···· Subject: Mars 2016/06/10 "L decomposition" Received: 14 June 2016 at 22:44 JST Hi, all,

I had the opportunity on the 10 June to retest my ASI174MM, which I have had a real struggle to clean from some dust motes.

Having taken my normal ASI224MC captures(submitted previously), I took a series of R, G, B and IR captures with the ASI174MM.

My objective was to see whether there are concerns with the "L decomposition" methodology (Luminance filter with a colour camera, channel split in Photoshop) that I have been using for generating the R, G and B images on my regular image sets, as compared with monochrome RGB imaging. More specifically, I wanted to confirm whether there is value in the "L decomposed R, G, B" images, instead of just submitting a single colour(L) image.

A few notes:

- As per my original images from the 10th June, unfortunately seeing conditions were poor/below average, so it is possibly not the best conditions for this exercise.
- 2 .Also as previously noted, focussing was a real challenge on this evening.
- 3. Calculated Image scale for the ASI224MC is 0.07"/pixel whilst the ASI174MM is 0.10"/pixel.

- 4. There is a slight time difference between the comparison images
- 5. The processing of all the images was not identical, so this can impact on the comparisons somewhat.
- 6. My understanding of at least one of the concerns about the "decomposed RGB" methodology is that individual colour channels can be contaminated by "leakage" of the other channels.



Attached is a comparison of the decomposed RGB images from the ASI 224MC with the R, G and B captures from the ASI 174MM. I have also included IR captures with both cameras.

My comments on the results:

a) Red

- a. The R monochrome seems to provide a slightly higher resolution than the OSC decomposition.
- b. Looking at the Hellas cloud, there may be some "leakage" of B and G components, which has brightened the cloud in the OSC decomp R image.
- c. I note that the NP cloud shows a R component in both images.
- b) Green
 - a. The monochrome G image is a bit "burned out" on the Hellas cloud.
 - b. The monochrome G image quality is not particularly good, possibly due to the conditions and difficulty in focussing as mentioned above.
 - c. Resolution of the albedo features may be a bit better in the OSC decomp image. This may however be due to R "leakage"
 - d. Clouds may be showing a bit more strongly on

the monochrome G image, although this may be due to processing.

- e. Other than the above, my personal view is that the OSC decomposition gives a "reasonable" comparison with the monochrome G.
- c) Blue
 - a. The monochrome B image quality is poor.
 - b. The Hellas cloud appears to show more strongly in the monochrome B image, whereas the Northern clouds are more comparable.
 - c. Albedo features in the OSC decomposition may be due to R "leakage".
 - d. Again my personal view is that the OSC decomposed B gives a reasonable comparison with the monochrome B
- d) IR
 - a. The monochrome IR is a bit more processed that the OSC decomposition
 - b. Possibly the monochrome may show a slightly better resolution, but in my opinion, it is only slightly better.

CONCLUSIONS:

- This was a single exercise, performed under non-ideal conditions, so any interpretation should be handled with caution.
- It is my personal view however, that should seeing or weather conditions impose constraints, that the "L decomposition" methodology can provide at least "reasonable" RGB decomposed images and some added-value to the image interpretation.
- With my personal objective of imaging Mars on every possible occasion, irrespective of angular size, weather and seeing conditions, with the intent of monitoring the planet as comprehensively as possible, in situations where seeing and weather imposes significant observing/imaging constraints, the use of the "L decomposition" methodology is, in my view, a reasonable compromise, and can provide at least some additional data, where RGB imaging may not be practical.
- I do not challenge the advantage of using RGB imaging as the preferred methodology, when conditions are suitable, and do not see the L decomposition

methodology as competing with high quality RGB imaging. On the contrary, I remain with a personal ambition to achieve the hi-res RGB imaging standards that are being set by the best.

• I appreciate that there are likely some strong views on the above in the imaging community, and that I may get shot at/down on specific points! However, I personally wanted to undertake the exercise for my own interest, and felt that there may be benefit in sharing.

○…·Subject: Re: Mars 2016/06/10 "L decomposition" Received: 15 June 2016 at 00:16 JST

Thanks Roger, Yes, and specifically on that evening, focussing was very difficult. The monochrome G and B's were a real "hit and miss". It is another advantage of the ASI224MC in poor conditions that you can take a string of L captures in the hope that at least one of them, by chance, may get a good focus point. That has been a technique I have been using throughout the apparition, which has, so far been dogged by poor weather and seeing. This has given me at least reasonable results. The cloud we have had for the last 3 days is forecast to clear during the evening, so I am hoping for some luck tonight. Best regards,

O----Subject: Mars 6-9 June Dynamic activity Received: 15 June 2016 at 17:46 JST

Hi all, Given the overcast conditions over the last 4 or so days, I have consolidated a few of my images



from last week, where there was a bit of activity, into an annotated composite. The weather is forecast to clear, so hope to be "back on the job" this evening....

Clyde FOSTER (Centurion, SOUTH AFRICA)

•----Subject: Solar and Mars to 5-June-2016 Received: 8 June 2016 at 20:28 JST

Hi Guys the sun has had a bit of a rest, but I see there is a new small spot on there today. Here are a few solar images from the end of May and beginning of June. The evening of the 5th was nice and warm and clear so I gave Mars a go with my solar set-up. Not too shabby for 17 degrees altitude. Best wishes

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160605/DTy05June16.jpg

Dave TYLER (Backs, the UK)

•----Subject: Mars, 8th June Received: 9 June 2016 at 10:16 JST

Hi all, finally some relief from the endless poor weather and bad seeing - last night was steady enough for a reasonable image to be captured on Mars. We can see Elysium prominent at the centre, with some thin clouds scattered across the disk, concentrated over the poles (north pole at top left).

 $http://www.kwasan.kyoto-u.ac.jp/\sim cmo/cmons/2016/160608/AWs08June16.jpg$

Anthony WESLEY (NSW, AUSTRALIA)

••••••Subject: Saturn and Mars 5th June 2016 Received: 11 June 2016 at 05:45 JST

Hi, Surprisingly good seeing during my first sessions of the season for Mars and nearby Saturn last Sunday night, with the planets at only 18° altitude.



Mars showing some nice details in the murk but an absence of cloud detail due to the reddening. Saturn with an ASI224MC OSC camera and then this colour image overlaid with luminance from an ASI174MM mono camera with an Astronomik 642nm filter to sharpen up the colour image. Saturn in particular a testament to modern cameras, processing methods and particularly ADCs. Cheers

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160605/MLw05June16.jpg

Martin R LEWIS (Hertfordshire, the UK)

•Subject: observations of Mars June 11th 2016 Received: 12 June 2016 at 09:45 JST

Dear Mr. Minami and Mr. Murakami, I hope you are both well. Please find attached two RGB sets I took of Mars last night (June 11th). The seeing was good and I had a view of the Tharsis region. The B images show the clouds over the volcanoes getting stronger as they move to evening, other than that the disk of Mars was fairly quiet. Thank you,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160611/DWd11June16.jpg

David WELDRAKE (NSW, AUSTRALIA)

•-----Subject: Mars Image 2016/06/06 Received: 12 June 2016 at 20:45 JST

Dear Masatsugu, Dear Masami, I send you one

image. Best regards

Mars, 2016/06/06 UT 03:59:42 : CM= 103.8°

Comments:

Mars image on 06-Jun-2016. After the opposition on 22-May-2016 the planet still has a good angular diameter of 18.5'. In the center the region of Tharsis, Arcadia and Solis Lacus are observed. Surface details in Valles Marineris, Melas, Thitonius, Noctis and Phoenicis Lacus are observed. The clouds in Tharsis Montes and Olympus Mons are few.

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160606/CTr06June16.jpg

Charles TRIANA (Bogota-Colombia)

•----Subject: Mars observation 10th June 2016 Received: 12 June 2016 at 21:29 JST

Dear CMO/OAA-team ! Here is my latest Mars ob-

servation from 10th June 2016. best regards

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/RSz10June16.jpg

Robert SCHULZ (Vienna, AUSTRIA)

•----Subject: Mars 2016.06.05 Received: 13 June 2016 at 03:06 JST

Dears, A few images of Mars from a good night, but with a low elevation. IR shows some details, but the color images are less good. Clouds over south polar area, on the Tharsis plateau at the limb, and on Acidalia Planitia. Steady skies,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160605/MDc05June16.jpg **Marc DELCROIX** (Tournefeuille, FRANCE)

● ·····Subject: Mars 12 June Received: 13 June 2016 at 13:49 JST

Dear Mr Murakami, Attached are three images of Mars from 12 June. RGB, violet 450×40 nm and UV 400×40 nm. http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160612/BAd12June16.jpg

Barry ADCOCK (Viewbank, VIC, AUSTRALIA)

•-----Subject: Mars - June 8, 9, 10 & 11 Received: 14 June 2016 at 04:02 JST

Dear Masatsugu and Masami, Attached are some images of Mars I took last week. I have been having trouble with the weather during this apparition. We have been setting rainfall records here in Houston and I was clouded out most of April and May. Our year to date rainfall is currently 80% of our total annual average; the bulk of it occurring since mid-April.

I finally got some clear skies last week, so attached are images from the mornings of June 8, 9, 10 and 11. It's cloudy and more rain expected later today but hopefully I'll get some more clear skies later in the week! Best wishes,

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160608/WF108June16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160609/WF109June16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160610/WF110June16.jpg http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160611/WF111June16.jpg

Bill FLANAGAN (Houston, TX)

•----Subject: Re: Mars 2016/06/10 "L decomposition" Received: 14 June 2016 at 23:53 JST

Hi, Clyde - I agree with your conclusions regarding the images that you presented. However, I suspect that there is a confounding variable in your analysis, which is focus. With your usual color captures, you are dealing with a brighter image on the screen, which allows you to focus more accurately. With monochrome captures, there is likely to be a slight difference in focus among the three colors, so that you might need to refocus between monochrome color exposures. Should you need to refocus, images of lower contrast (green and blue, on Mars) will be focused less accurately, if you focus by judging the image's appearance on the screen. In looking at lots of images, I have seen that many blue-filtered monochrome images of Mars lack crisp edges of albedo features. Focus is a problem. In principle, monochrome images should be slightly better because they suffer less from atmospheric chromatic dispersion than color images do. In practice, this is offset by the greater difficulty of obtaining accurate focus.

In my opinion, that is.

Roger VENABLE

• ·····Subject: Mars Last Night Received: 15 June 2016 at 08:18 JST

Mosquitoes were out in large numbers and I had no repellent!! Good seeing though. Using my AP 10" Maksutov and a color Skynyx camera

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160614/JPh14June16.jpg

Jim PHILLIPS (Charleston, SC)

•----Subject: Dust storm Received: 15 June 2016 at 14:51 JST

Hi Richard, I shot the attached just a few hours ago (June 15th, 01:34 UTC.) This is just a quick 30sec capture in R filter.



It seems to show a notable dust cloud over Margaritifer Sinus. It was not present the previous night. Also it appears bright in R and G filters but very faint in B. Best Wishes

Damian PEACH

•----Subject: Re:Dust storm Received: 15 June 2016 at 16:36 JST

Thanks Damian, indeed it must be a dust cloud...

Good imaging in Barbados !

○····Subject: Re:Re:Dust storm Received: 15 June 2016 at 16:53 JST

Exact Richard, this was at Ls 191 - images are available as well on BDIP database. It was shortlived according to Slipher.



Christophe PELLIER (Nantes, FRANCE)

•----Subject: Re:Dust storm Received: 15 June 2016 at 16:41 JST

Hello Damian, Thanks very much. Yes I agree it is a dust storm. Location is not common but it calls to mind a larger event of 1922 photographed by Slipher and which I discuss in my Memoir. Maybe this will develop..... Well done!

○····Subject: Dust storm alert: Margaritifer S to VM. Received: 16 June 2016 19:21 JST

Images received from several observers for June 15 show a small patchy area of dust over the southern part of telescopic Margaritifer Sinus as well as a streak of still brighter dust running east-west along the eastern part of the Valles Marineris. Further observations will be welcome. Telescopic dust activity commencing in Margaritifer Sinus is not common, though it is often affected by dust originating elsewhere, and many such events have been observed in and around Valles Marineris. A notable past storm that originated over S. Margaritifer Sinus began on 1922 July 9. It was followed by members of the BAA and W. H. Pickering visually, and by E. C. Slipher visually and photographically at the Lowell Observatory. This event is fully described on pages 43-44 of the Director's monograph on telescopic martian dust storms (BAA Memoirs, Volume 44 (1999)).

Richard McKIM (Peterborough, The UK)

Dr R.J.McKim, Director, Mars Section, British Astronomical Association

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