

## MARS

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## OBSERVATIONS

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CMO/ISMO 2016 Mars Report #05

### 2016 CMO/ISMO Mars Observations Made During the One-Month Period from 16 February ( $\lambda=110^\circ\text{Ls}$ ) to 15 March ( $\lambda=123^\circ\text{Ls}$ ) 2016

♂..... This is the 5<sup>th</sup> ISMO 2016 Mars report of observations performed by the ISMO members during the period from 16 February to 15 March 2016. During the period the planet Mars moved forward inside the Lib constellation, and passed through the meridian at dawn. The declination  $D$  changed from  $17^\circ\text{S}$  to  $20^\circ\text{S}$ , (and so favourable for the observers on the southern hemisphere), and the angular diameter went up from  $\delta=7.7''$  to  $\delta=10.0''$ . The tilt went down from  $\phi=12^\circ\text{N}$  to  $08^\circ\text{N}$ , but the residual north polar cap and its environments are still kept inside the eye field. The phase angle decreased from  $\alpha=37^\circ$  to  $35^\circ$ . The Martian season proceeded from  $\lambda=110^\circ\text{Ls}$  to  $123^\circ\text{Ls}$ . This season was appropriate to watch the whitish mountainous clouds associated with Olympus Mons and other Montes including Elysium Mons. Arsia Mons however is slow to be clouded. The equatorial mist is now to be caught. We should say however that it is not a good tendency to use the colour camera from easiness. Instead the shooting through the true B filter will still remain important and more effective. After  $\lambda=120^\circ\text{Ls}$ , it will often happen for us to be able to see some arctic spiral clouds at the northern higher latitudes, and so it will be necessary to watch the areas around Mare Acidalius and Utopia through the filter which is effective in capturing the shorter wave length light. (According to Reiichi KONNAI, the arctic spiral clouds have often been detected since the beginning of March by the Mars Express Visual Monitoring Camera.)

♂..... This period we received a total of 37 observations from 12 members. The observers and their instruments are listed as follows:

**DELCROIX, Marc (MDc)** Tournefeuille, France

1 Colour + 1 IR Images (13 March 2016) 106cm Cassegrain (Pic du Midi Obs) with an ASI224MC

**FELL, Denis (DFI)** Kennedy, SK, CANADA

1 Drawing (6 March 2016) 15cm Maksutov-Cassegrain, 180×

**FLANAGAN, William (WFI)** Houston, TX, the USA

2 Sets of LRGB Images (27 February; 4 March 2016)

36cm SCT @f/23 with a PGR GS3-U3 32S4M-C

**FOSTER, Clyde (CFs)** Centurion, SOUTH AFRICA

11 Colour + 12 IR Images (17, 20~22, 26, 27, 29 February; 1, 3, 5, 6, 14 March 2016)

36cm SCT @f/33 with an ASI224MC

**JUSTICE, Mark (MJs)** Melbourne, AUSTRALIA

3 Sets of RGB Images (21 February; 1, 15 March 2016) 30cm Spec with a DMK21AU618

**KONNAI Reichi (Kn)** Ishikawa, Fukushima, Japan

1 Drawing (18 February 2016) 440×41cm SCT

**MELILLO, Frank J (FMI)** Holtsville, NY, the USA

1 Colour Image (12 March 2016) 25cm SCT with a ToUcam pro II

**MORALES RIVERA, Efrain (EMr)** Aguadilla, PUERTO RICO

7 Sets of RGB Images (17, 19, 23, 29 February; 1, 13, 14 March 2016) 31cm SCT with a Flea 3

**MORITA, Yukio (Mo)** Hatsuka-ichi, Hiroshima, JAPAN

4 Sets of LRGB Images (2, 7, 11 March 2016) 36cm SCT with a Flea 3

**PELLIER, Christophe (CPI)** Nantes, France

1 Colour Image (13 March 2016) 25cm speculum @f/32 with an ASI224MC

**POUPEAU, Jean-Jacques (JPp)** Essonne, France

1 Colour Image (25 February 2016) 35cm Cassegrain @f/20 with an ASI224MC

**WESLEY, Anthony (AWs)** NSW, AUSTRALIA

1 Colour + 2 IR Images (12, 13 March 2016) 41cm SCT

♂.....We now try to review each of the observations received chronologically. We hope to be recognized that this is not any fixed way for us to pursue this year. If the total amount of the observations heavily increases, we should like to find another way or a third way to review.

### 17 February 2016 ( $\lambda=110^\circ\text{Ls} \sim 111^\circ\text{Ls}$ , $\delta=7.8''$ )

**Clyde FOSTER (CFs)** gave an L-colour (and its decompositions) and IR685 images at  $\omega=019^\circ\text{W}$ ,  $\phi=12^\circ\text{N}$ . Though the deep evening part is indistinct, the two bays of the evening Sinus Meridiani are apparent together with Brangæna, and thus the images are good as a whole. Oxia Palus is also good in shape and connected with Niliacus Lacus through Indus. The southern part of Niliacus L is a bit detailed with Nilokeras. Mare Acidaliu occupies largely the northern hemisphere and the triangular North-Western (NW) part is dark. Iaxartes is visible and ends at Hyperboreus Lacus which is very dark adjacent to the bright north polar cap (npc). The arc-shaped ghost near the morning limb is annoying. Chryse is not so light, and the southern shadowy complex pattern is now more apparent. At the southern limb there is seen a misty light area and the morning Candor looks very white, but it is difficult to judge whether it's because of the water vapour or not, since the B image is not by using any genuine B image.

**Efrain MORALES (EMr)** obtained a set of R, G, B images and composed an RGB image at  $\omega=083^\circ\text{W}$ . In R, Tithonius Lacus and Ophir are recognised, and Solis Lacus is also visible. Mare Acidaliu must be near the evening terminator. The npc is suggested in R but not sharp on the composite because of a failure of B: The B image however shows a misty band along the equatorial zone from Tharsis.

### 18 February 2016 ( $\lambda=111^\circ\text{Ls}$ , $\delta=7.8'' \sim 7.9''$ )

**Reichi KONNAI (Kn)** sent to us his first fine colour drawing at  $\omega=271^\circ\text{W}$  taken by the use of a new 41cm SCT (see LtE in n°444). His pencil strokes are quite gifted; and here Syrtis Major is depicted with a delicate nuance near the CM and at the southern limb area Hellas is roundish bright. The description of

the npc and the faint evening mist distribution after Elysium set out is outstanding. We expect his further activity in the opposition period and the upcoming 2018 great apparition. (We don't yet know the area of Fukushima where he lives is endowed with the fine weather in summer, though anyway this Fukushima is one of the areas which suffered from a big earthquake in 11 March 2011 and was long polluted by the catastrophic/miserable accident of the so-called F1.)

### 19 February 2016 ( $\lambda=111^\circ\text{Ls}$ , $\delta=7.9''\sim 8.0''$ )

**EMr** gave a set of images at  $\omega=096^\circ\text{W}$ . Any of R, G and B images looks really independent, and every characteristic looks individual so that it is not readily apparent how every element works on the composite RGB image. However, the equatorial zones in G and B compose quite clearly a white/misty broad zone in RGB which expands from the evening Chryse-Xanthe to the morning limb. Due to the R and G images, Olympus Mons is more spotted in RGB. The shadowy markings in G suggest the cloud distributions around Tharsis, and thus we can notice the whitish bright Ascræus cloud following Ascræus Mons. The Alba Patera cloud is also noticed but its amount of the water vapour looks to be much less (it is mediocre on RGB while the desert around it described nicely in colour). The npc is well spotted but its shape is not definite. The trace of Hyperboreus L is not explicitly given. We would like to wonder whether the NS axis is exactly perpendicular.

### 20 February 2016 ( $\lambda=111^\circ\text{Ls}\sim 112^\circ\text{Ls}$ , $\delta=8.0''$ )

**CFs** gave his usual set of images at  $\omega=343^\circ\text{W}$ . The L-colour image gives a shape of S Meridiani quite realistic. The preceding Aryn nail looks thicker. Brangæna is visible but looks quite blurred. Gehon runs downwards and broadly joins Oxus. Oxia P is quite definite, from which two canals apparently go down; one being Oxus and the other Indus which is faintly connected with the SE end of Niliacus L. M Acidalium is also well depicted including darker parts and fainter parts: The fainter parts include a trace of Achillis Pons. The area of Iaxartes looks slightly abnormal. It surely is connected with the dark marking of Hyperboreus L which is surrounding the distinct npc, while another zigzagged horizontal branch is bifurcated eastwards, and noticeably some light dusty segment exists between the branch and the tail of Hyperboreus L. Syrtis Mj is over the terminator. Evening markings are fainter because of vignetting, while a big thick mist floats out from Æeria. The L-colour image also shows a bright area at the southern part of Xanthe. We may need a genuine B image in order to certify whether it's morning thick mist or not.

### 21 February 2016 ( $\lambda=112^\circ\text{Ls}$ , $\delta=8.0''\sim 8.1''$ )

**CFs** produced two sets of images at  $\omega=315^\circ\text{W}$  and at  $\omega=323^\circ\text{W}$  ( $\phi=11^\circ\text{N}$  from today). The L-colour of the first set suffers from an arc-shaped ghost along the morning limb which is no good. However the markings inside the disk appear good. S Meridiani is definitely of Aryn's nails, and the eastern part of Sinus Sabæus looks fainter without showing Mare Serpentis. Syrtis Mj is near the evening terminator with its northern part is bluish covered by the evening broad mist which flows out to Æeria and further westwards. Hellas is interesting: Its western part whitish thick while the preceding part is quite dimmed. The npc is clear. In IR685, Hellas is nearly indistinguishable, while the npc forms the shape.

The second set was given half an hour later, and hence no serious difference was shown. Just Margaritifer S looks separated from the ghost arc, and so Oxia P is caught. The eastern part of the Hellas basin went to the darker side (maybe not yet to the rear side). Aryn's nails look more handsome. The

white mist over the northern Syrtis Mj is still remains. The npc is quite clear. We have an impression that the B image here shows up some markings darker than we expected. We also feel the 40 minutes separation instead of 30 minutes must be easier at present.

**Mark JUSTICE (MJs)** sent us a good set of images which was performed at  $\omega=207^\circ\text{W}$ . The composed image of R, G, and B images impressively shows the light Elysium in a pinkish tint: Its colour is in good contrast with the colour of the npc. Elysium is brighter in R and B, while weaker in G. In the case of the npc, this is pure white, perhaps because the R, G and B images make a perfect set concerning the npc. As the G and B suggest, the evening equatorial area look misted in a complexed way in RGB. Mare Cimmerium is slightly bluish dark, but the eastern part is under the terminator darkening (vignetting). The western part is described still imperfect, but we can suspect the presence of the *ant's* leg-like pier whose tip is the Gale crater as well as the following pier whose tip is the Knobel crater (Walter F GALE, 1865~1945, was a Australian Banker/Astronomer who observed Mars in 1892). M Tyrrhenum is seen separated, and Syrtis Mj will soon appear. These details are not described yet but soon these will be shown up more clearly.

#### 22 February 2016 ( $\lambda=112^\circ\text{Ls}$ ~ $113^\circ\text{Ls}$ , $\delta=8.1''$ ~ $8.2''$ )

**CFs** got an L-colour image and an IR685 at  $\omega=331^\circ\text{W}$ . From this angle (and with  $\iota=37^\circ$ ) Hellas is dim near the terminator. The northern part of Syrtis Mj is covered by a white mist which overflows to Æria. The shape of S Meridiani looks a bit deteriorated. The north-eastern (NE) part of M Acidalium is largely shown. The npc is definite. The problem is that the origin of the brightness at the area of Chryse near the morning limb is unknown since here is without the use of the true B image. The area is also bright in R.

#### 23 February 2016 ( $\lambda=113^\circ\text{Ls}$ , $\delta=8.2''$ )

**EMr** obtained a set of images at  $\omega=056^\circ\text{W}$ . The R image is good to show the area around Solis Lacus and Tithonius Lacus. Ophir is nicely shot: It is not so sensitive in G and B while it shows a pinkish ground-lit tint in RGB. Inside M Acidalium, the area around Tanais is considerably dark. Hyperboreus Lacus is also very dark, and Iaxartes links it with M Acidalium. The fork of Nilokeras is also shown in R. In B, a zigzagged chain of light areas at Chryse, Xanthe, Tharsis and the morning limb area is detected along the equatorial zone which is shown up in RGB as a whitish misty zone. Note especially a thicker misty area in Xanthe near Auroræ Sinus. Furthermore there is seen in B a mass of evening mist: The composed RGB image shows that this is the one located to the east of Achillis Pons. Note also that a limb morning cloud to the south of Solis L. The npc is well defined.

#### 25 February 2016 ( $\lambda=114^\circ\text{Ls}$ , $\delta=8.3''$ ~ $8.4''$ )

**Jean-Jacques POUPEAU (J<sup>2</sup>Pp)** came onstage with a bigger aperture. The image in colour was made by ASI 224MC at  $\omega=325^\circ\text{W}$ . The image looks smaller and the colour looks not so clear. However a bit of the white Hellas is impressively visible at the evening terminator. Sinus Sabæus is near the CM while Sinus Meridiani does not show a high resolution but it is well separated from the coming Margaritifer Sinus. Syrtis Major is near the evening terminator and so dim. Mare Acidalium is mostly inside the disk. The npc is figured. To depict the equatorial misty band, a supplementary eye through the Blue channel may be needed.

### 26 February 2016 ( $\lambda=114^\circ\text{Ls}$ ~ $115^\circ\text{Ls}$ , $\delta=8.4''$ ~ $8.5''$ )

**CFs** obtained an L-colour image at  $\omega=286^\circ\text{W}$  together with an IR685 image at  $\omega=287^\circ\text{W}$ . Hellas is roundish white (the L-colour image looks quite coarse). Syrtis Major is near the CM, but the Huygens crater is not well depicted. Sinus Sabæus is attractively hanging down towards the morning limb, but the arc-type ghost is annoying. There is seen a thin vast mist from the evening terminator to Syrtis Mj. The npc is nicely shot. However, to the East, no explicit glimpse of Rima Borealis (or its western extension) is given.

### 27 February 2016 ( $\lambda=115^\circ\text{Ls}$ , $\delta=8.5''$ )

**CFs** obtained his usual set of images at  $\omega=283^\circ\text{W}$ ,  $\varphi=10^\circ\text{N}$ . Compared with the preceding colour image, the L-colour image shows more clearly the Z-shaped whitish bright part inside Hellas. The Huygens crater is not yet. In IR, Boreosyrtis and Nodus Alcyonius are evident as before. The dark fringe of the npc is not well shown up. The description of the evening mist after the set of Elysium should be said weaker than expected.

**Bill FLANAGAN (WFI)** came to the stage at  $\delta=8.5''$ . This set of images was made at  $\omega=046^\circ\text{W}$ . Every R, G, B element image is excellent showing its characteristic, and well summarised in the composed RGB image. In R, the inside of the area of Niliacus Lacus, Achillis Pons and Mare Acidaliu are detailed together with the following Nilokeras. The triangular dark area of M Acidaliu near Tanais is definite and is connected through some thin bridges (including Iaxartes) to Hyperboreus Lacus which is the darkest. The npc appears flatly. There seems to exist a misty belt parallel to Hyperboreus L (to the fringe of the npc). In B and G, there is visible a mass of evening cloud to the east of Niliacus L or Achillis Pons. The dark markings on the southern hemisphere are also detailed in R: The descriptions of such markings as Auroræ Sinus, Agathodæmon, Tithonius Lacus, Solis Lacus and so on are nearly perfect for this angular diameter. Ophir is light in R and G. Margaritifer Sinus is still inside and Oxia Palus is definite, and Sinus Meridiani is a bit seen, but generally the evening side is in the lingering dusk. In G and B, a small limb cloud is seen at the southern limb. Near the morning limb, the bright Ascræus cloud is white shining.

### 29 February 2016 ( $\lambda=116^\circ\text{Ls}$ , $\delta=8.6''$ ~ $8.7''$ )

**CFs** gave a usual set at  $\omega=250^\circ\text{W}$ . Syrtis Mj moved to the morning side, and Hellas is white near the morning terminator. The R decomposition shows an irregular boundary of the Hellas ingredient. The inside of Elysium shows a white cloud near the evening terminator. The Ætheria dark patch which bounds Elysium from the west looks normal. The npc is flat, and there is visible a fringe which may be an extension of Rima Borealis, and Olympia looks to disappear. Syrtis Major is nicely shot in a good shape. Mare Tyrrhenum is near the CM, and the area around Syrtis Minor is well depicted. M Cimmerium is partly seen beyond Hesperia. In the northern district, Utopia is usually seen together with its tip and the separated Nodus Alcyonius.

**EMr** took a set of images at  $\omega=325^\circ\text{W}$ . Sinus Sabæus is passing the CM, and Sinus Meridiani shows barely two nails. Hellas is white near the terminator, conspicuous in B. Note that the northern part of Syrtis Major is pretty blue: This is not because of the blue "cloud" but because a vast evening white mist is effective in G and B while not in R. Mare Acidaliu is coming. Oxus is shot. The npc is pure white.



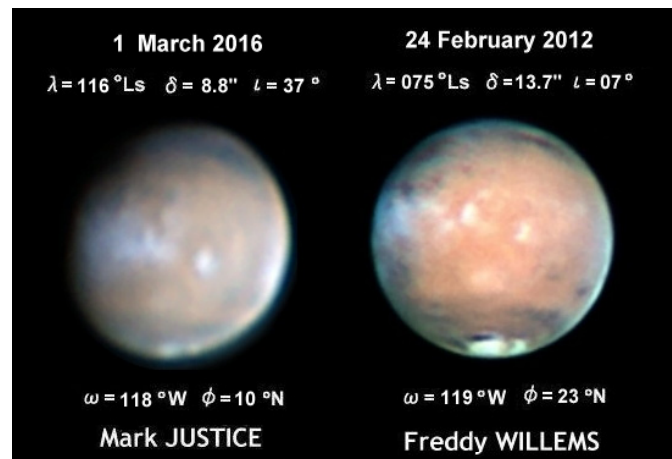
There is a weak white mist near the S limb.

### 1 March 2016 ( $\lambda=116^\circ\text{Ls}$ ~ $117^\circ\text{Ls}$ , $\delta=8.7''$ ~ $8.8''$ )

**CFs** obtained a set of images at  $\omega=249^\circ\text{W}$ . These are quite the same as the one at  $\omega=250^\circ\text{W}$  taken on the preceding day, and so same comments can be applied. However the present one gives a bit better impression. Especially the description of the east coast of Hellas looks more detailed (overflow to Mare Hardiacum?). The dark parts of Syrtis Mj and M Cimmerium give a bit better impression. The position of the Herschel crater may be spotted. However the ghost near the morning limb is poorer. There must be no essential difference between two observations.

**EMr** gave a set of images at  $\omega=351^\circ\text{W}$ . Syrtis Mj has just set out. S Meridiani looks located near the CM ( $\iota=37^\circ$ ). In R, the Aryn nails are quite evident but not in G (because of the seeing?) Oxia Palus is also nicely spotted in R but looks blurred in RGB. The R shows well the atmosphere of Oxus concerning the curving and the density. M Acidalium is almost inside, but the arc-like ghost is annoying. The npc is good in colour. The morning mist is thick especially at Xanthe.

**MJs** gave a set of images at  $\omega=118^\circ\text{W}$ : So three observers aimed Mars from three terrestrial stations which were separated each other by about  $100^\circ$ . That's a promising start, just before the advent of the season of a possible global spread of any dust cloud. In this case of MJs, the white clouds associated with Montes are nicely described in B and G: The cloud at the western flank of Olympus Mons is conspicuous, vivid also in R. The Ascræus Cloud is also whitish evident especially in B. The evening cloud zone from Xanthe to the north of Tithonius L, further to Tharsis, is attractive. Arsia Mons however looks rather inactive. The npc is definite and to its west, Olympia is appearing. Note also Mare Sirenum is apparent near the morning southern limb. The distribution of clouds associated with Montes may here be compared with an image made by Freddy WILLEMS (FWI) in 2012. Note that the Martian season was quite earlier and the tilt and phase were different.



### 2 March 2016 ( $\lambda=117^\circ\text{Ls}$ , $\delta=8.8''$ ~ $8.9''$ )

**Yukio MORITA (Mo)** obtained two sets of R, G, B, L images and composed two sets of RGB and LRGB images at  $\omega=124^\circ\text{W}$  and at  $\omega=129^\circ\text{W}$ . The finished images look softy and the evening cloud zone from Xanthe is nicely mapped, but a detail concerning the Montes clouds is lacking. We have an impression that B and RGB images at  $\omega=124^\circ\text{W}$  are reminiscent of the visual images we had in the 1980s through our naked eyes. Preceding Olympus Mons there is located a shadowy band from S to N and the cloud of Olympus Mons is like a cotton-ball. As the RGB, the second one at  $\omega=129^\circ\text{W}$  looks more preferable.

### 3 March 2016 ( $\lambda=117^\circ\text{Ls}$ , $\delta=8.9''$ )

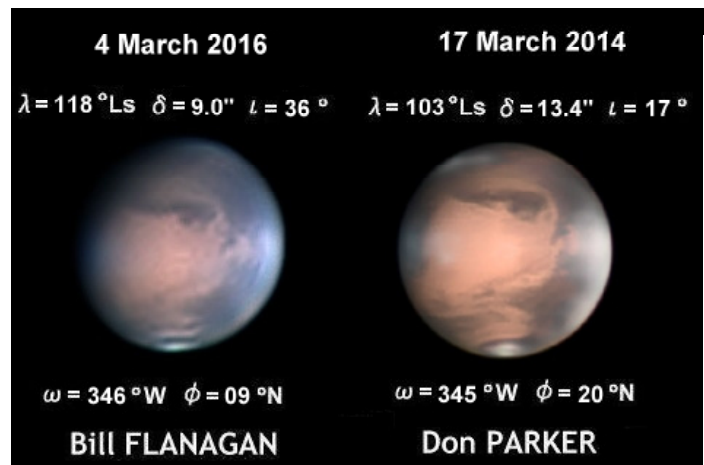
**CFs** issued just an IR685 image at  $\omega=229^\circ\text{W}$ . Hellas is coming at the southern limb. It is a chance to seize the details of M Cimmerium, but the image is not sharp enough.

#### 4 March 2016 ( $\lambda=117^\circ\text{Ls}$ ~ $118^\circ\text{Ls}$ , $\delta=8.9''$ ~ $9.0''$ )

**WFI** took an excellent set of images at  $\omega=346^\circ\text{W}$ ,  $\phi=09^\circ\text{N}$ . Sinus Meridiani is near the CM, and look detailed in LRGB: Aryn's nails are described near-perfectly, and Brangæna is miraculously shown up (due mainly to L? because slightly different in R). In LRGB, Oxia Palus is quite detailed and Aram Chaos ( $2.6^\circ\text{N}$ ,  $021.5^\circ\text{W}$ ) is very visible (refer to Google Mars, and fill in Aram Chaos in the "search". In R, Indus is faintly connected with Niliacus L. Further note that to a bit east of M Acidalium and this side of Oxus there is seen a small dot inside the lighter belt along Oxus which we first called a "bridge" but later re-named it as "Oxus Dark Segment" (maybe at around ( $001^\circ\text{W}$ ,  $36^\circ\text{N}$ ) ---it was talked about because Christophe PELLIER (CPI)'s images at Pic du Midi conveyed the marking in March 2014.

M Acidalium is here totally visible, but the neighbourhood of Iaxartes is not normal as was noticed before at the column of 20 February 2016 where **CFs**'s image at  $\omega=343^\circ\text{W}$  was discussed. Here there are two canals which start from the bottom of M Acidalium, and the preceding evident one does not flow towards the npc but eastwards and the both sides of the canal are brighter in R. The bright streaks show a pinkish tint in LRGB so that they are dusty. The other canal from the bottom may look to be connected with Hyperboreus Lacus which is no so large but may be prolonged as if the dark fringe of the npc. These features are said somewhat different from the case reported in the preceding issue where the discussions were given of the observations on 5 February 2016 by Mark JUSTICE (MJs) at  $\omega=354^\circ\text{W}$  and by Maurice VALIMBERTI (MVI) at  $\omega=355^\circ\text{W}$ . At least the irregular pinkish brightness was not shown.

Here we try to compare the WFI image with the one by Don PARKER (DPk) on 17 March 2014 at  $\omega=345^\circ\text{W}$ , especially to see the usual aspect of the area between the npc and M Acidalium. Note however the season, the tilt and so on are different and read  $\lambda=103^\circ\text{Ls}$ ,  $\delta=13.4''$ ,  $\iota=17^\circ$ , and  $\phi=20^\circ\text{N}$  in the case of DPk. In DPk's case, Hyperboreus L is darker and definite, while on the image by WFI, the elongated fringe of the npc is darker. This may be due to the irregularity caused by the dust. The DPk image nevertheless suggests that another branching of Iaxartes might occur in some cases.



#### 5 March 2016 ( $\lambda=118^\circ\text{Ls}$ , $\delta=9.0''$ ~ $9.1''$ )

**CFs** gave a usual set of images at  $\omega=200^\circ\text{W}$ . The L-colour image is excellent, and some details of Mare Cimmerium are shown. In addition to the inner details, the leg whose end point is the Gale crater is nicely described, and the Herschel crater looks visible. Note that a very bright spot inside the brighter part of Elysium: It is located at the place of Elysium Mons. The Ætheria dark patch is nearly of the same form seen in the previous apparitions. However the descriptions of the npc and its environment are inarticulate and not enough. Here Olympia which lies just above the npc looks evaporating.

#### 6 March 2016 ( $\lambda=118^\circ\text{Ls}$ ~ $119^\circ\text{Ls}$ , $\delta=9.1''$ ~ $9.2''$ )

**CFs** took almost all the same excellent set of images at  $\omega=199^\circ\text{W}$ . This is more superb than the preceding one. This may be said to have captured Olympia.

**Denis FELL (DFI)** made a drawing at  $\omega=336^\circ\text{W}$ . Hellas is going away from the stage. Syrtis Major is located near the evening terminator, and Sinus Sabæus presents near the CM with Sinus Meridiani. Margaritifer Sinus is already visible and Mare Acidalius is come inside the disk but the southern part may be under the morning mist. The desert is drawn faintly and there is no unpainted part. The npc is very white.

**7 March 2016 ( $\lambda=119^\circ\text{Ls}$ ,  $\delta=9.2''\sim9.3''$ )**

**Mo** obtained one set of L, R, G, B images at  $\omega=054^\circ\text{W}$ . The LRGB is better than the RGB this time. Through L, the area to the north of Solis Lacus is detailed: The area of Tithonius Lacus looks like an inverted triangle and it looks like surrounded by a V-shaped bright segments (the left-handed side being Ophir-Candor). The R shows a slight detail from Niliacus L to Nilokeras, and the lower half of M Acidalius is quite darker. Tempe is a bit light. The description of the npc is weak in L and R, and no good. The G and B images well describe the mist patches along the equatorial zone.

**11 March 2016 ( $\lambda=121^\circ\text{Ls}$ ,  $\delta=9.6''\sim9.7''$ )**

**Mo** obtained one usual set of images at  $\omega=019^\circ\text{W}$ ,  $\varphi=08^\circ\text{N}$ . S Meridiani is near the evening terminator. In LRGB, Aram is clearly visible. The southern pattern of Chryse is shot well in R, but in general any marking is not sharp. M Acidalius is seen all and the NW part is darker. Ganges looks broad. Auroræ Sinus is darker. Mo provides us the  $p\text{---}f$  line but the NS line does not look correct this time. A faint mist is visible near the southern limb.

**12 March 2016 ( $\lambda=121^\circ\text{Ls}\sim122^\circ\text{Ls}$ ,  $\delta=9.7''\sim9.8''$ )**

**Frank MELILLO (FMI)** sent us a single colour image at  $\omega=229^\circ\text{W}$ . Hellas is large and whitish bright near the morning limb. Elysium also has a white part, which is bounded its west by the Ætheria dark parch. The npc area is also white but Olympia is not discriminated. Syrtis Major must be near the morning limb. The limb side is thickly whitish.

**Anthony WESLEY (AWs)** sent us an IR image taken at  $\omega=023^\circ\text{W}$ . This IR image is beautifully processed, not too enhanced. Sinus Meridiani is near the terminator, but the shape of Aryn's nails look exact together with Brangæna. The complex pattern of the south end of Chryse is nicely reproduced. Auroræ Sinus is also well described. Ophir is light, and Agathodæmon is seen bent. Oxia Palus is evident connected by Indus with Niliacus Lacus. Mare Acidalius is also nicely mapped with appropriate light and shade. The npc is not bright, and dusty matter is not exposed in IR, but the dusky lines near Iaxartes look interesting. The configuration around there observed on 4 March by WFI seems to be kept.

**13 March 2016 ( $\lambda=122^\circ\text{Ls}$ ,  $\delta=9.8''\sim9.9''$ )**

**Marc DELCROIX (MDc)** obtained an ASI 224MC colour image at  $\omega=158^\circ\text{W}$  and an IR image at  $\omega=161^\circ\text{W}$  at Pic du Midi. On the former, the cloud at the west flank of Olympus Mons and preceding Tharsis cloud is separately shown in the evening. There is seen a broad shadowy band between the two cloud patches. On the morning side, the whitish bright Elysium is coming in. Propontis I is well dark and the markings at the area of Phlegra to Cerberus look brownish. The npc is not so clear. In IR the cloud at Olympus Mons appears light. Ætheria dark patch is already caught at  $\omega=161^\circ\text{W}$ . Mare Cimmerium is not well mapped.



**Christophe PELLIER (CPI)**'s first observation in 2016: (He started when  $\delta=9.8''$ .) This picture was also an ASI 224MC colour image made at  $\omega=167^\circ\text{W}$ . The npc is not so in a definite shape, but the area is whitish and the marking to the south is largely described dark. The evening white cloud associated with Olympus Mons is clearly defined near the terminator. The morning Elysium area also conveys a whitish bright cloud associated with Elysium Mons upto the morning limb. The Ætheria dark patch is already shot at  $\omega=167^\circ\text{W}$ . The shadings from Cerberus to Phlegra are evident and Propontis I is dark. Mare Sirenum is near the evening terminator and its shape is not definite due to a dusky condition, but the following Mare Cimmerium is suggestive and a part of Valhalla may be checked. At the morning southern limb a weak mist is seen.

**EMr** obtained a set of images at  $\omega=188^\circ\text{W}$  and composed an RGB. The npc, the cloud at Olympus Mons and the inside of Elysium are shown to be white. The Ætheria dark patch is now darker but it is not possible to say about the shape (in RGB). M Cimmerium is totally apparent but without detail.

**AWs** produced an IR image at  $\omega=007^\circ\text{W}$  and then a colour image at  $\omega=009^\circ\text{W}$ . These are processed without excessive enhancement. Sinus Meridiani, now near the evening terminator, is very pretty showing nicely the nails and a weak stream of Brangæna. The shape of Oxia Palus is also good, and Aram Chaos seems to be checked. The complex half-toned patterns at the southern end of Chryse are well described. The light and shade of Niliacus Lacus upto Nilokeras is also produced nicely as well as the whole area of M Acidalium. In the colour image, the southern district of M Acidalium looks to have been slightly misted (on the other hand the northern district is darker as pointed out several times). Hyperboreus Lacus is dark in the colour as well as in the IR. The area between the npc and M Acidalium, if seen on the colour images, looks to keep the aspect observed by WFI on 4 March 2016 at  $\omega=346^\circ\text{W}$ . Further observations are expected.

#### 14 March 2016 ( $\lambda=122^\circ\text{Ls} \sim 123^\circ\text{Ls}$ , $\delta=9.9'' \sim 10.0''$ )

**CFs** issued an L-colour image and IR685 image at  $\omega=113^\circ\text{W}$ . The Olympus Mons's frank white cloud is seen before the CM. The Ascræus Cloud also remains still very white. Notable is that the flank cloud of Arsia Mons is a bit seen. The evening cloud is strong from Tithonius Lacus to its north. If we refer to the IR image, half of Solis L proves to have been concealed. Alba Patera is a little whitish. Mare Sirenum is totally inside the disk. The npc is definite in the colour and also in the IR image. The colour image suggests that a mist is seen to the south of the npc, and Olympia may be a bit visible to be coming in.

**EMr** obtained a set of images at  $\omega=229^\circ\text{W}$ : Hellas is largely white near the morning limb. The cloud of Elysium is bright in any colour element and hence very white conspicuous in RGB. The main part of the Elysium cloud looks to be localised. The npc is also white but its shape is not well-defined. The markings are seen well in R. Syrtis Major is totally inside the disk, and light and shade are well shown in R. The area around Syrtis Minor is nicely described. Hesperia also shows a connection with Mare Cimmerium. The leg concerned with the Gale crater is clearly visible in RGB, and the Herschel crater is also checked. The Ætheria dark patch is a bit detailed. Nodus Alcyonius is obvious, and Utopia is well depicted.

15 March 2016 ( $\lambda=123^\circ\text{Ls}$ ,  $\delta=10.0''$ )

Now the angular diameter reached  $\delta=10''$ . **MJs** obtained a set of excellent R, G, B images to compose an RGB image at  $\omega=351^\circ\text{W}$ . The cloud of the southern limb is now often grasped. Sinus Sabæus and Sinus Meridiani appear to be cool. There rise two canals from Sinus Meridiani southwards which may be identified as Neudrus I and Neudrus II which are running upwards through Pandoræ Fretum (R and G prove). MJ's description is good from Brangæna to Oxia Palus, and further to Niliacus lacus. Note also the Oxus Dark Segment which was previously talked about (see the text concerning 4 March above) can be here checked. Its position is at around ( $001^\circ\text{W}$ ,  $36^\circ\text{N}$ ). It is interesting that MJ's detected it by the use of a 30cm aperture.

The npc is pure white but Hyperboreus Lacus is not yet dark. The area to the south of the npc looks slightly wine-coloured. Finally we should notice that an area inside Eden near the CM between Hiddekel and Gehon, accommodates a lingering float of a patch of mist. This is not so thick but we should say it's conspicuous. This must be contained as an element of the equatorial misty zone which starts from Æria to the morning side. We hope everybody will be interested in the phenomenon detected by Mark JUSTICE (MJ's) on 15 March 2016.

*Masatsugu MINAMI and Masami MURAKAMI*

## *Letters to the Editor*

●.....**Subject: Mars 2016/02/17 0318UT**  
**Received: 18 February 2016 at 04:55 JST**

Hi all, Mars capture from this morning. Elevation wise, Mars is beautifully placed in the predawn sky, but seeing conditions were poor, which I am starting to believe it has a significant impact on the bright limb contrast arc. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160217/CFs17Feb16.jpg>

○.....**Subject: Mars 2016/02/20 0247UT**  
**Received: 20 February 2016 at 18:12 JST**

Hi all, A capture of Mars from this morning, with the planet now at 8" diameter.

A few notes:

a) When initially looking at the live image on my screen, I was again of the impression that the seeing conditions were poor. The main albedo features were not particularly clear and the bright limb was seen to be "shaking" substantially.

b) I was therefore pleasantly surprised with the outcome of the final image. I am taken a number of captures(when time allows), processing and then selecting

the best for further processing. With seeing conditions poor, I am getting quite a range of quality after initial processing and discarding the majority.

c) Even the live image on screen indicated fairly bright cloud over the Chryse equatorial region. This hasn't come out very clearly in the colour image, but can be seen to some extent in the blue image.

d) The following (right) limb remains exceptionally bright, probably indicating extensive cloud over the Tharsis region?

e) Nice, distinct equatorial cloud is seen over the preceding (eastern- please correct me if I have this wrong) side of the Arabia region. I am not sure if anyone noticed what appeared to be quite a distinct, isolated cloud in the Arabia region on the 17 Feb image?

f) Some finer albedo detail is showing on the southern and following (western) regions of Arabia. The "half hexagon" that I seem to recall from the last apparition is quite evident in the colour and red images.

g) Interesting bright region just south of the NPC which seems to be brightest in the red channel. Would this be dust deposits at the the edge of the NPC?

h) There seems to be fairly extensive cloud activity at the southern extremity of Mars. I am not sure if this is

due to the Argyre Basin, or more extensive cover. Comments welcome

i) Probably one of my nicer images for the apparition so far, given the current conditions, but I am really hoping for better seeing conditions as we move closer to opposition. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160220/CFs20Feb16.jpg>

○...**Subject: Mars 2016/02/21 0257UT**  
**Received: 22 February 2016 at 00:39 JST**

Hi all, Up early to see if I could get a bit better seeing conditions but unfortunately still mediocre conditions. Attached 2 image sets, with conditions deteriorating further towards dawn. Hellas is very prominent as well as some cloud over Syrtis Major.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160221/CFs21Feb16.jpg>

○...**Subject: Mars 2016/02/22 0314UT**  
**Received: 24 February 2016 at 04:47 JST**

Hi all, Ongoing poor predawn seeing conditions on 22 Feb, but submitting "for the record". Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160222/CFs22Feb16.jpg>

○...**Subject: Mars 2016/02/26 0247UT**  
**Received: 26 February 2016 at 13:26 JST**

Hi all, I have been frustrated the last few mornings with total cloud cover. This morning cloud cover was also extensive. However there was a small gap where I managed to obtain one colour and one IR capture. Detail is poor, but the brilliant white cloud/ice in or over the Hellas basin is seen. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160226/CFs26Feb16.jpg>

○...**Subject: Mars 2016/02/27 0313UT**  
**Received: 27 February 2016 at 17:35 JST**

Hi all, The real advantage of the ASI224MC colour camera really comes into its own during the rather poor weather conditions we are currently having (extending over the last week or so) in my area. Often there is only a window of a few minutes to capture one or two avis, before conditions cloud over or deteriorate (I had very heavy dew conditions this morning). Once we move into autumn and closer to opposition I am expecting (at least hoping) conditions will settle. I will then definitely consider some RGB imaging with the ASI174MM or ASI120MM.

Again, the image set from this morning is somewhat

limited in fine detail. The brilliant white ice/cloud in or over the Hellas basin is again prominent and there is indication of some detail in the basin (well seen in the IR image). Maybe someone can comment on whether this is a raised strip of mountains on the floor of the basin? A further question: I am tending to interpret bright areas in the green channel as likely physical ice (either water or CO<sub>2</sub>) deposits on the surface, whereas the blue channel shows clouds (also either water or CO<sub>2</sub>). Is this correct? Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160227/CFs27Feb16.jpg>

○...**Subject: Mars 2016/02/29 0214UT**  
**Received: 29 February 2016 at 13:38 JST**

Hi all, Mars capture from this morning with conditions a bit improved. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160229/CFs29Feb16.jpg>

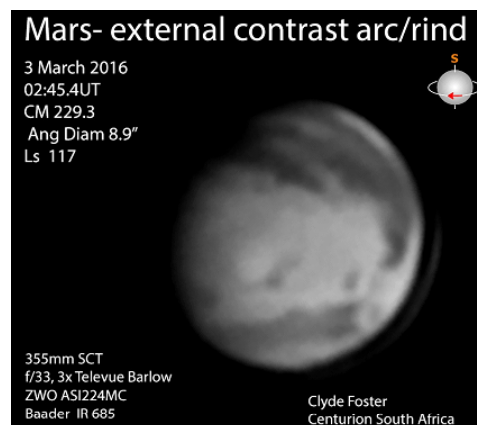
○...**Subject: Mars 2016/03/01 0248UT**  
**Received: 2 March 2016 at 03:55 JST**

Hi all, Mars capture from this morning. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160301/CFs01Mar16.jpg>

○...**Subject: Mars 2016/03/03 0245UT**  
**Received: 3 March 2016 at 13:09 JST**

Hi all, Mars IR capture from this morning. I am not sure what has happened, but I seem to have picked up a problem with the colour on my ASI224MC, so am not in a position to submit a colour image today. I will try and resolve as a matter of urgency.



Contrast arc/rind note: I also attach a sharpened image where I have not removed the contrast arc. On my last imaging session (1 March), towards the end of the session I slewed the scope to the other side of the mount, as Mars is approaching the meridian during the early morning sessions. Unfortunately the camera

cable came under tension and pulled out of the camera (I hadn't had a cup of coffee yet....). I am not sure if the camera was damaged somehow, hence the colour problem this morning? However, note that the contrast arc this morning is very evident in the IR image, but is OUTSIDE the limb. The inside of the limb appears good, and unaffected by contrast arc, although the limb itself is maybe not as sharp as usual. This is obviously a much more favourable situation to deal with as it is easy to remove, and does not influence the detail on the planet. The factors that I can think of that have changed:

- a) The scope was swung across to the other side of the mount, so the orientation of the main optical train has also swung over?
- b) Mirror flop? However, I do keep the mirror locked as I use an electric focuser.
- c) I flipped the X and Y axes in Firecapture to keep my normal orientation on the screen. However, this should not impact on the arc in any way?
- d) When I slewed across and the cable came under tension, I am aware that I have some very small play in the imaging train. ie from the rear mount on the scope, the barlow and the filterwheel. It is possible that the alignment of this imaging train was adjusted slightly with the tension. The camera is screwed firmly into the filterwheel, so there is no play there.

Any comments on this are welcome. I go along with the diffraction theory as proposed, but I think this may also hint at optical alignment as a factor? Either way, this, in my mind, is a better situation to deal with compared with the inner arc. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160303/CFs03Mar16.jpg>

○...**Subject: Mars 2016/03/05 0202UT**  
**Received: 5 March 2016 at 15:44 JST**

Hi all, Mars capture from this morning, with Elysium region bright and prominent. Gale crater "outcrop" visible? Conditions reasonable, although the contrast arc was quite bad- please be wary of interpretation of limb detail. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160305/CFs05Mar16.jpg>

○...**Subject: Mars 2016/03/06 0236UT**  
**Received: 6 March 2016 at 17:48 JST**

Hi all, Mars capture from this morning. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160306/CFs06Mar16.jpg>

○...**Subject: North Polar Spiral cloud**  
**Received: 13 March 2016 at 14:58 JST**

Dear Reiichi, I hope you are well. Thank you for your recent image and comments on the CMO LtE regarding the North Polar Spiral Cloud. I believe this area will be rotating into view for me in the next few days. Unfortunately we are experiencing another period of bad weather in my area, although we do definitely need the rain! How long lasting are these clouds normally? ie are they fairly short lived, or do they last for an extended time period? Best regards,

○...**Subject: RE: Northern Polar Spiral Clouds**  
**Received: 14 March 2016 at 01:53 JST**

Dear Reiichi, I am very sorry to hear of your loss. Although I have not met you personally yet, I appreciate that these times are never easy. My thoughts and best wishes are with you.

Thank you for your comments regarding the spiral clouds. I am hoping that I get better conditions in the next few days, and I will see if there is any activity visible. Best regards,

○...**Subject: Mars 2016/03/14 0154UT**  
**Received: 14 March 2016 at 12:34 JST**

Hi all, Another patch of poor weather over the last week, and it looks like it may continue. I took a chance on getting up early and managed to squeeze in a few captures between cloud, before being clouded out totally. In the circumstances, I dropped back to the 2x powermate. Other than NP, Tharsis and equatorial cloud, some cloud also noted over high southern latitudes. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160314/CFs14Mar16.jpg>

**Clyde FOSTER** (Centurion, SOUTH AFRICA)

●...**Subject: Mars - February 17th**  
**Received: 19 February 2016 at 00:48 JST**

Hi Mr. Minami and All!, Here is my most recent session of Mars on February 17th but under below average conditions low in elevation. Here is Jupiter and the moon Ganymede transiting before my session with Mars, Clear Skies.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160217/EMr17Feb16.jpg>

○...**Subject: Mars - February 19th**  
**Received: 20 February 2016 at 21:29 JST**

Hi Mr. Minami and All!, Here is my latest session of Mars from February 19th and a session of the ring planet Saturn after my Mars session on the 19th. Clear Skies.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160219/EMr19Feb16.jpg>

○.....*Subject: Mars - February 23rd*  
*Received: 27 February 2016 at 00:09 JST*

Hi Mr. Minami and All!, Here is my latest observation of Mars on February 23rd and of Saturn.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160223/EMr23Feb16.jpg>

○.....*Subject: Mars - Feb.29th, March*  
*Received: 5 March 2016 at 05:40 JST*

Hi Mr. Minami and All!, Here are my most recent sessions from Feb. 29th and March 1st, my latest session of jupiter from March 3rd also.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160301/EMr01Mar16.jpg>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160229/EMr29Feb16.jpg>

**Efrain MORALES** (Aguadilla, Puerto Rico)

●.....*Subject: Mars 2016/02/25*  
*Received: 25 February 2016 at 17:05 JST*

Hello, Here is Mars on 2016/02/25. The seeing was very bad and the transparency was average. The planet was only 23° elevation. T = -0.2°C. Regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160225/JPp25Feb16.jpg>

**Jean-Jacques POUPEAU** (Essonne, FRANCE )

●.....*Subject: Fwd: Mars images*  
*Received: 29 February 2016 at 07:12 JST*

Dear Sirs, Just checking if perhaps the following email was lost, as can happen. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160221/MJs21Feb16.jpg>

----- Original Message -----

Subject: Mars images

Date: Tue, 23 Feb 2016 16:22:08 +1100

Dear Sirs, Please find the attached Mars image set from the 21st February 2016. Taken in fair seeing through the less dense gaps in cloud. Best regards,

○.....*Subject: Mars images*  
*Received: 3 March 2016 at 06:32 JST*

Dear Sirs, Please find the attached Mars image set from the 1st March 2016. Taken in poor seeing. The image is poor but it is amazing what AutoStakkert can extract from what I considered a hopeless set of AVI's. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160301/MJs01Mar16.jpg>

○.....*Subject: Mars images*  
*Received: 16 March 2016 at 20:42 JST*

Dear Sirs, Finally, after much cloud and missed opportunities, please find an attached Mars image set from the 15th March 2016. This set was taken in good seeing. Best regards,

**Mark JUSTICE** (Melbourne, AUSTRALIA)

●.....*Subject: Mars - February 27, 2016*  
*Received: 3 March 2016 at 00:26 JST*

Dear Masatsugu and Masami, Attached is a set of Mars images I took from my backyard on 27 February. The seeing was not very good that night and with Mars lower in the sky this year, I only have about 30 minutes to acquire images of Mars as it peeks through a hole in the tree line when it crosses the meridian.

I hope to be able to contribute more images as this year's apparition continues. Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160227/WFI27Feb16.jpg>

○.....*Subject: Mars - February 27, 2016*  
*Received: 3 March 2016 at 08:45 JST*

Dear Masatsugu, Great to hear from you also! I am hoping to have more opportunities to image Mars this apparition. Later in the year I will have a slightly bigger notch in the trees through which I can capture Mars when it moves slightly past the meridian to the west. For the next few weeks I seem to be fighting both the weather and the approaching daylight of the morning. It looks to be cloudy tonight.

Both Kris and I look back with fond memories of the week in 2009 at Paris and Meudon. It was great meeting you and everyone else in attendance. Plus the Paris Observatory and Meudon were fabulous! Lot's of amazing astronomical history at both places. And of course the visit to Camille Flammarion's home and observatory was an incredible way to end our stay!

Kris says to tell you hello and sends her best.

Best wishes,

○.....*Subject: Mars - March 4, 2016*  
*Received: 7 March 2016 at 02:35 JST*

Dear Masatsugu and Masami, Attached is a set of Mars images from 4 March. Looks like I'm in for some cloudy skies and rain over the next week but hopeful-



ly the weather will improve soon after that.

Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160304/WFI04Mar16.jpg>

**Bill FLANAGAN** (Houston, TX)

●.....*Subject: March 06 2016 observation*  
*Received: 7 March 2016 at 02:36 JST*

attached this morning's sketch, conditions unfavorable for imaging.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160306/DFI06Mar16.jpg>

**Denis FELL** (Kennedy, SK, CANADA)

●.....*Subject: Mars 12th March, time correction*  
*Received: 13 March 2016 at 11:22 JST*

My earlier Mars image had a completely wrong time and date on the image the script I use for this was out of date and didn't read the winjupos timestamp properly. Here is the corrected image with the appropriate date and time. cheers,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160312/AWs12Mar16.jpg>

<http://www.acquerra.com.au/astro/gallery/mars/20160312-190506/m20160312-190506utc.png>

Subject: Mars, 12th March

Sent: Sunday, March 13, 2016 9:32 AM

Hi all, here is an image of Mars from this morning (March 12 UT) through an IR750nm filter. There is an interesting bright streak visible near the left (following) limb. regards,

ps please let me know if this list is not up to date, this is the first use of it since the Mars apparition in 2014.

○.....*Subject: Mars, 13th March*  
*Received: 14 March 2016 at 09:07 JST*

Seeing was a little better this morning, good enough for a colour RGB image. Some equatorial clouds can be seen as well as a number of surface features. cheers

<http://www.acquerra.com.au/astro/gallery/mars/20160313-184724/m20160313-184724utc.png>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160313/AWs13Mar16.jpg>

○.....*Subject: Mars, 13th March IR*  
*Received: 14 March 2016 at 13:34 JST*

One more image - Mars through a 750nm longpass filter, showing the surface features a little more clearly. cheers,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160313/AWs13Mar16.jpg>

**Anthony WESLEY** (NSW, AUSTRALIA)

●.....*Subject: Mars images, 13 March 2016*  
*Received: 13 March 2016 at 20:43 JST*

Hi all, Quite correct seeing this morning on Mars. Orographic cloud over Olympus Mons. Regards,

[http://www.astrosurf.com/pellier/M2016\\_03\\_13-CPE](http://www.astrosurf.com/pellier/M2016_03_13-CPE)

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160313/CP113Mar16.jpg>

**Christophe PELLIER** (Nantes, FRANCE)

●.....*Subject: Mo02 07 11Mar\_16*  
*Received: 14 March 2016 at 00:54 JST*

Dear MINAMI-sama, As the month of March came in, the seeing condition at Hiroshima a bit improved; and so enclosed find please my Mars images taken on 2, 7, and 12 March. Best.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160311/Mo11Mar16.jpg>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160307/Mo07Mar16.jpg>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160302/Mo02Mar16.jpg>

**Yukio MORITA** (Hiroshima, JAPAN)

●.....*Subject: Mars: March 12, 2016*  
*Received: 14 March 2016 at 02:04 JST*

Hi - I have attached my latest image of Mars March 12, 2016. Thanks,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160312/FM112Mar16.jpg>

**Frank J MELILLO** (Holtsville, NY)

----- **Corner of the VMC/ESP News by Kn**

●.....*Subject: Northern Summer Polar Spiral Clouds*  
*Received: 27 February 2016 at 16:36 JST*

Dear All, Now the Martian season is reaching  $\lambda=116^\circ\text{Ls}$ ; Yes, we can expect the seasonal first emergence of the north polar cyclones (or "the northern polar spiral clouds" or "the northern summer cloud fronts" à la Christophe PELLIER). Better refer to Christophe's excellent Notes: A Pre-Polar Spiral Cloud at Early Northern Summer (ISMO 11/12 Mars Note (15)) CMO#412 (25 July 2013)

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO412.pdf>

Cloud-fronts Activity on Mars in Northern Summer: A General Overview (ISMO 2013/14 Mars Note (#01) CMO#428 (25 Nov. 2014)

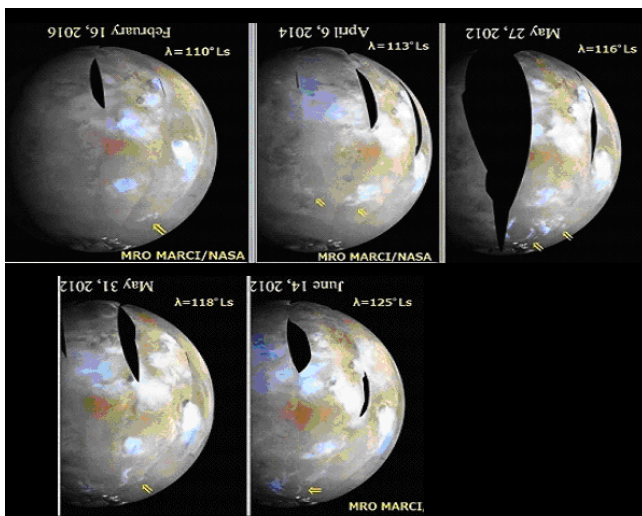
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO428.pdf>

Cloud fronts on Mars in northern summer : activity observed in 2014 ISMO 2013/14 Mars Note (#02) CMO#429 (25 Dec. 2014)

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO429.pdf>

Northern summer polar spiral clouds are known

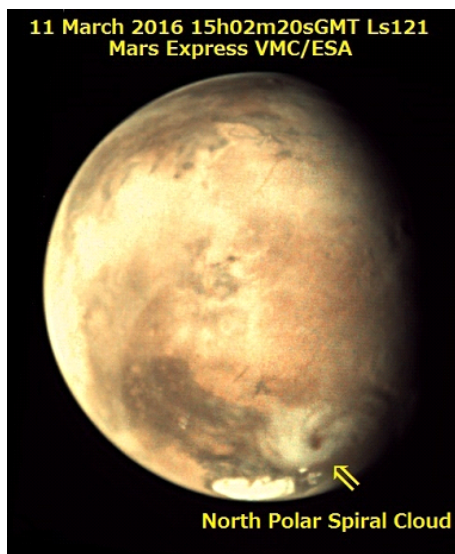
to be most active when they appear on the dawn terminator, then they thin and degrade with the passing time to leave only remnants in the late afternoon, so we should say it's rather unfavorable for us now to detect the spiral clouds, because the morning terminator is over farside of the western limb. Please find attached a montage with this apparition's possible very early detection by the MRO MARCI of the arc-shaped afternoon remnants of the northern summer polar cloud front at  $\lambda=110^\circ\text{Ls}$  compared with the 2014 apparition ones.



Good Seeing!

○...Subject: North Polar Spiral Cloud  
Received: 12 March 2016 at 23:41 JST

Dear all, Please find attached the image of the well-developed north polar spiral cloud, one of the northern summer staples, captured by the Mars Express Visual Monitoring Camera/ESA. Best,



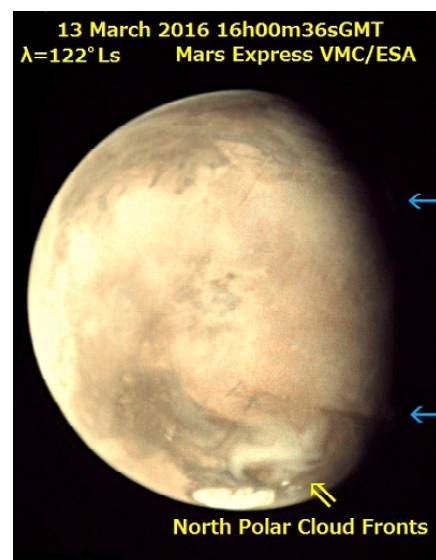
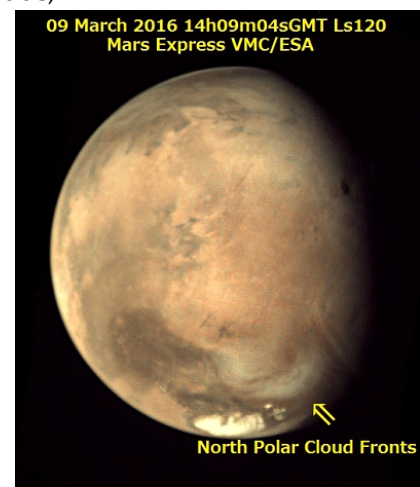
○...Subject: Northern Summer North Polar Spiral · ·  
Received: 14 March 2016 at 01:30 JST

Dear Clyde, Thanks a lot for your concern. I am all right, recovering from the loss of a spouse syndrome.

Northern summer polar spiral clouds, I think, are probably ephemeral, each one starts early in the morning and fades away late in the afternoon, means that we may find a new north polar spiral cloud every Martian day. The shape and the scale of the cloud may change from day to day; attached here is the one captured on 09 March 2016 by the Mars Express' Visual Monitoring Camera which can be classified as "Level 2 (eye(s)filled in)" of Christophe PELLIER's classification of the observed activity of the cloud fronts. Please refer to the Christophe's note: Cloud fronts on Mars in northern summer : activity observed in 2014 ISMO 2013/14 Mars Note (#02) CMO#429 25 Dec. 2014

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO429.pdf>

Hoping your Big Guns will soon capture the polar spiral clouds,



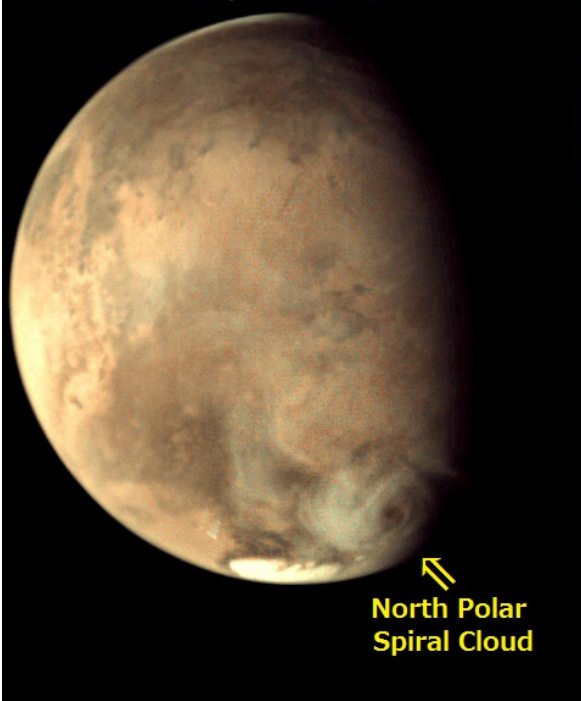
○...Subject: North Polar Spiral Cloud  
Received: 15 March 2016 at 21:05 JST

Dear all, Attached here is the latest image by the ESA's Mars Express Visual Monitoring Camera showing a northern summer north polar cloud fronts with a large wine-color eye, though the spiral structure is vague. Note also the two lighter projections just off the dawn.

○...Subject: VMS images  
Received: 24 March 2016 at 20:08 JST

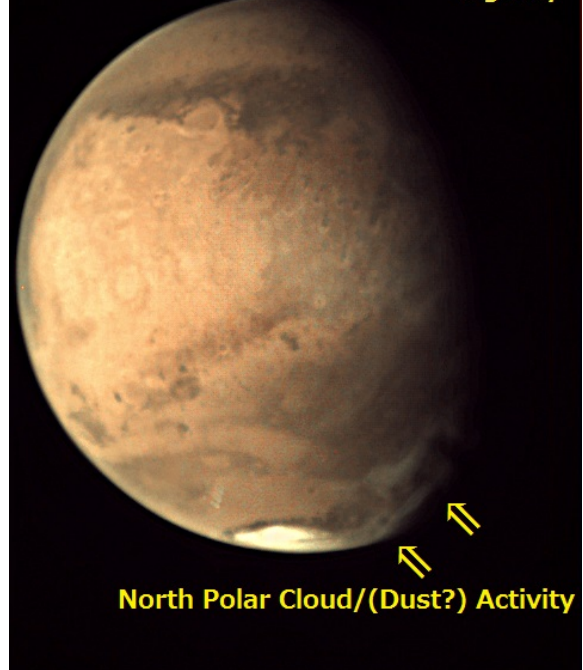
Dear all, Now reawoken MEX VMC/ESA (or a press officer?) is constantly releasing Mars images

21 March 2016 20h01m32sGMT  $\lambda=126^\circ$  Ls  
Mars Express VMC/ESA



full of precious information especially for the morning terminator twilight~dawn zone where various mysterious meteorological phenomena occur which we earth-based observers cannot see geometrically now in this pre-opposition period. Attached here are the latest ones. Better access directly to VMC The Mars Webcam|Flickr-Photo Sharing!  
[https://www.flickr.com/photos/esa\\_marswebcam](https://www.flickr.com/photos/esa_marswebcam)

22 March 2016 17h00m55sGMT  $\lambda=126^\circ$  Ls  
Mars Express VMC/European Space Agency



Reiichi KONNAI (Fukushima, JAPAN)

★ ★ ★

## International Society of the Mars Observers (ISMO)

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**CMO n°445/ ISMO #71 (25 March 2016)**

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