

MARS

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CMO/ISMO 2018 Mars Report #04

**2018 CMO/ISMO Mars Observations Made
in February 2018 ($\lambda=123^\circ\text{Ls}\sim\lambda=137^\circ\text{Ls}$ 2018)**

By
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♂..... This deals with the fourth Mars Report of the ISMO Mars Observations performed in February 2018. In February the planet moved celestially from the Scorpion constellation to the Ophiuchus constellation, and the apparent declination D moved from 20°S to 22°S . The planet Mars rose at 2 hours AM LT, but the western quadrature will be attained in still coming March, and hence just before the planet reached the meridian, the Sun rose in February. The apparent diameter of Mars δ augmented from 5.6" to 6.6" (arc-seconds). The tilt moved from $\varphi=08^\circ\text{N}$ to $\varphi=01^\circ\text{N}$. The phase angle ι augmented from 35° to 38° . The evening side of the southern hemisphere showed a deep defect of illumination. The Martian season proceeded from $\lambda=123^\circ\text{Ls}$ to $\lambda=137^\circ\text{Ls}$ in February.

After 15 February, MRO MARCI looked to stop to work, and the Weekly Weather Report also stop to be updated after the week 12 Feb~18 Feb. During the first half period of February, Hellas's brightness has displayed unevenness. There was a lighter misty high-latitude patch near Argyre. It was noticed that the equatorial mist band went beyond from Syrtis Major to the area of Chryse. The orographic activity looked to settle down, though some Tharsis ridge showed cloud and the white cloud over Elysium Mons repeated. The arctic area still showed the residual fragment of Olympia. No large dusty movement was checked,

♂..... In February, C FOSTER (CFs) and D PEACH (DPc) kept working on the Mars observations and sent us several excellent images. Especially DPc used a remote controlling system and collaborated with the staff of the Chilescope (100cm Richey Chretien) which is located at ($30^\circ27'\text{S}$, $70^\circ45'\text{W}$) and produced several excellent images. Especially this collaboration detected a small spot near Oxus (we employed the nomenclature 'Oxus Dark Segment' already in CMO #423 (25 June 2014) when δ was larger than 15". But this time it was clearly detected when δ was no larger than 5.6"! (see below the news on 6 and 7 February).

Otherwise we also received several nice images from M VALIMBERTI as well as E MORALES. From Japan, T KUMAMORI (Km) and T AKUTSU (Ak) were active but they were worried about the very poor seeing conditions caused by the cold waves which quite often visited. At Fukui we suffered from a snow fall of 140cm on one night, the heaviest snowfall in 37 years.

♂.....What follows is the list of the observers and the instruments they used. We would like to appreciate their continued cooperation and hope for their future activities.

AKUTSU, Tomio (Ak) Hitach-Oota, Ibaraki, JAPAN

2 Sets of *RGB* + 2 *IR* Images (23, 26 February 2018) 32cm Spec with an ASI 290MM

FOSTER, Clyde (CFs) Centurion, SOUTH AFRICA

6 Sets of *RGB* +1*R* + 1*G* + 6 *IR* Images (1, 2, 5, 6, 9, 16, 18 February 2018)

36cm SCT @ *f*/27 with an ASI 290MM

KUMAMORI, Teruaki (Km) Sakai, Osaka, JAPAN

7 *Colour** + 5 *R* + 6 *B* Images (2, 5, 13, 17, 22, 26, 27 February 2018)

36cm SCT @ *f*/40 with an ASI 290MM & ASI 224MC*

MORALES RIVERA, Efrain (EMr) Aguadilla, PUERTO RICO

2 Sets of *RGB* + 3 *IR* Images (8, 10, 12, 21 February 2018) 31cm SCT with an ASI 290MM

PEACH, Damian A (DPc) Selsey, WS, the UK, remote controlled the Chilescope Team in CHILE

14 Sets of *RGB* + 6 *colour* + 1 *B* Images (2,~7, 9, 10, 12, 13, 15, 16, 18,~25 February 2018)

Chilescope (100cm Richey Chretien)

VALIMBERTI, Maurice (MVI) Melbourne, AUSTRALIA

2 Sets of *RGB* + 1 *IR* Images (16, 26 February 2018)

36cm Richey Chretien @ *f*/35, with an ASI 290MM

♂..... We Further Received some work made in January.

MORALES RIVERA, Efrain (EMr) Aguadilla, PUERTO RICO

1 Set of *RGB* + 1 *IR* Images (13, 18 January 2018) 31cm SCT with an ASI 290MM

♂.....We are now in a position to give some comments to the observations made in February 2018: Please refer to each image recorded in our CMO/ISMO 2018 Mars Gallery:

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/f_image.html

1 February 2018 ($\lambda=123^\circ\text{Ls}\sim 124^\circ\text{Ls}$, $\delta=5.6''$, $\varphi=08^\circ\text{N}$)

Clyde FOSTER (CFs) took an R image at $\omega=330^\circ\text{W}$ as well as a G image at $\omega=331^\circ\text{W}$ by the use of a 36 cm SCT. The camera used was an ASI 290MM, and filters used are from Baader. In R, Sinus Meridiani and Sinus Sabæus look nice, and Margaritifer Sinus also makes a form. Mare Acidalium shows a thin figure near the morning limb. In G, the dark markings are quite blurred, but the npc (north polar cap) looks brighter than on R.

2 February 2018 ($\lambda=124^\circ\text{Ls}$, $\delta=5.6\sim 5.7''$)

CFs obtained an RGB image at $\omega=314^\circ\text{W}$ based on the three filtered components. He also added an IR685 image. The RGB shows up a white Hellas suggesting a thickness near the evening terminator: It's best shot in G. Its area looks compact surrounded broadly by Yaonis Fretum and Hellespontus. Mare Serpentis is not so definite. S Meridiani already is shown up with a bright Edom. The evening Syrtis Mj (Major)'s western coast looks zigzagged. In R, several complexed dark spots are visible from Ismenius Lacus to Boreosyrtis. M Acidalium is still very slender near the morning limb. The arctic area around the npc is nicely shown.

Damian PEACH (DPc), by using a remote sensing technology, collaborated with the staff of the

Chilescope (100cm Richey Chretien) at (30°27'S, 70°45'W) and produced an RGB composite as well as the three ingredients at $\omega=059^\circ\text{W}$. The image looks so stable in B that the RGB composite shows well a vast spread of mist at the southern part of the evening M Acidalium, as well as the mist band at the equatorial zone. The Tharsis ridge must be covered by the morning clouds. In R, the nippers of Nilokeras are quite evident as well as some protrusions from Auroræ Sinus and Tithonius Lacus. The area to the east of the Tharsis area is thick in an ochre colour (shadowy in B). The residual npc is clear beneath a misty atmosphere.

Teruaki KUMAMORI (Km) obtained an L-colour image at $\omega=229^\circ\text{W}$. The surface shows Syrtis Mj which has just inside the disk, but does not suggest any blue colour. The southern part of Syrtis Mj and Mare Tyrrhenum (including Syrtis Minor) are described richly in light and shade. However M Cimmerium looks out of shape. Hellas at the SW limb is whitish bright (also thickly bright in B, it must be largely made of the water vapour). In the L-colour, Elysium is roundish a bit misty light in an ochre tint. N Alcyonius is checked. The Ætheria dark patch looks a bit fainter. The description of the intermediate part of Utopia is good. The area of the arctic polar area is misty. The L image was the one stacked of 56,000 frames taken during ten minutes derotation, and the 224MC stacked image of 14,000 frames. The B image which shows the bright Hellas is the one stacked from 10,000 frames. Km also shows an R image at $\omega=234^\circ\text{W}$ stacked from 24,000 frames during 5 minutes derotation. The dark markings are clearly visible, but too contrasty. For example, N Alcyonius looks is not definite, while the Ætheria dark patch is over-emphasised.

3 February 2018 ($\lambda=124\text{--}125^\circ\text{Ls}$, $\delta=5.7''$)

DPc remote controlled Chilescope system to take an RGB composite image at $\omega=050^\circ\text{W}$ (or the time of the R image was at $\omega=047^\circ\text{W}$). Mare Acidalium largely occupies the northern hemisphere following the evening mist, and the southern part of M Acidalium looks slightly faded. However the nipper of Nilokeras is clearly shown following M Acidalium. Sinus Meridiani is on the edge of the evening terminator while the northern part of Sinus Margaritifer, and the fine structures of the area which is linked with Auroræ Sinus are well described as well as the area of Tithonius Lacus. They are all more than expected for $\delta=5.7''$. The fainter mist at the southern polar area is also well described. The residual npc is also shown up. The mist cloud along Ganges is also caught in B. The B image hitherto taken by the Chilescope has been excellent.

4 February 2018 ($\lambda=125^\circ\text{Ls}$, $\delta=5.7''$)

DPc obtained by the collaboration with the Chilescope an excellent RGB image set at $\omega=041^\circ\text{W}$. S Meridiani is hazy near the evening terminator, while Brangæna at Aram is clearly shown up (especially shown in R). The area from Oxia Palus to the Tithonius L on the morning side is rather completely described in details. Solis Lacus is already inside the disk separated from the morning limb. In B, there is seen a small misty patch near Argyre. The npc in R is shown to be connected with Hyperboreus Lacus, while in G and B, there follows a small misty cloud at a bit separated morning limb. One more bright mist cloud is seen in B around at the norther end of Ganges. Ophir is bright with less amount of water vapour (in ochre tinge).

5 February 2018 ($\lambda=125^\circ\text{Ls}$, $\delta=5.7\text{--}5.8''$)

First, **CFs** obtained an RGB composite at $\omega=288^\circ\text{W}$, $\phi=07^\circ\text{N}$. The size of the image is smaller, but the

image is impressive with a full content. Especially the inside of Hellas is nicely disclosed. The evening side of Syrtis Major is attractively described: The projection towards the "Old" Moeris Lacus is quit explicit. It is however hard to identify the Huygens Crater. Some details at the opposite side at Æria are shown up. N Alcyonius is also explicit together with some details at Cassius and Boreosyrtis. The residual npc is also shown well in R. However the IR685 does not show the npc.

Secondly, **DPc** by the collaboration with Chilescope produced an RGB composite at $\omega=031^\circ\text{W}$. Unfortunately the seeing condition must have been poor: The remaining S Meridiani is quite blurred. However some projections from Auroræ S are nicely caught. The white cloud near Argyre is still shown.

Thirdly, **Km** issued an L-colour image at $\omega=194^\circ\text{W}$: The L image was made based on 11 minute derotation, and stacked of 56,000 frames. However M Cimmerium does not show its details. The inside of Elysium is naturally light, the classical boundary of Elysium being roughly shown up. Especially the area of Trivium Charontis and Cerberus look more dusky than the Ætheria dark patch; while the R image (24,000 frames stacked) at $\omega=202^\circ\text{W}$ shows a different shade and light of the boundary: That is, Phlegra and Trivium Charontis are fainter than the Ætheria dark patch. The description of Utopia is also definite and the npc is blurred. Hellas is not so vivid in the B image (10,000 frames stacked). Seeing is 3/10.

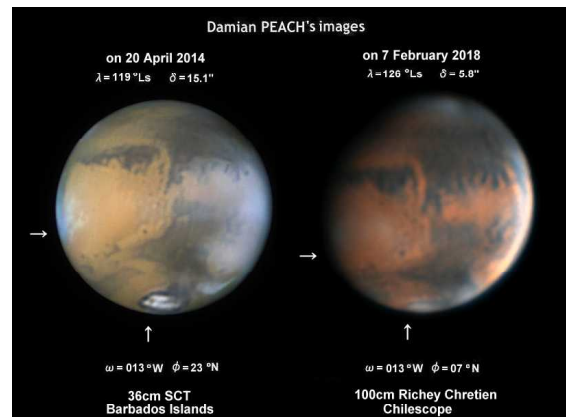
6 February 2018 ($\lambda=126^\circ\text{Ls}$, $\delta=5.8''$)

CFs made an excellent RGB composite at $\omega=277^\circ\text{W}$. Syrtis Mj appears near the centre in a good shape with a bit bluish tint. The area of N Alcyonius and the following area of Boreosyrtis are detailed (in R and IR). Hellas shows its whitish inside structure three dimensionally. CFs elaborated to show the part of Hellas in a bit larger series of RGB, R, G, B.

DPc then brought about an excellent RGB set in a collaboration with Chilescope at $\omega=022^\circ\text{W}$. S Meridiani remains completely near the evening terminator with Brangæna. From Oxia Palus to Agathodæmon-Tithonius Lacus, smaller fine structured markings are shown in almost every nook and cranny. The southern markings are not sharply described, but just Mare Erythræum is identified. The white mist near at Argyre is shown in B. On the northern hemisphere, M Acidalium appears totally with some details: The southern 2/3 part looks fainter than the bottom part: This is not because of a haze but basically because of the soil (the B image shows a misty band near the evening terminator, but does not look to invade M Acidalium). The npc is definite in R, while the area of Hyperboreus L may be misty.

It should here be remarked that a tiny spot which we called *Oxus Dark Segment* in **CMO #423** is now trapped amazingly by the Chilescope when the angular diameter of the Martian disk is only $\delta=5.8''$.

(DPc's image on 20 April 2014 at $\omega=013^\circ\text{W}$ or the DPc's Barbados images on 21 April 2014 ($\lambda=119^\circ\text{Ls}$, $\delta=15.1''$) at $\omega=347^\circ\text{W}$, 001°W , 012°W all show this tiny dark spot. Some HST images in 2001 (as well as some MGS images in 2002) show this spot to have a length. This looked to be located at a graben to the south by 30km of Oxus Cavus. Hence we gave a nomenclature "Oxus dark segment" in **CMO #423**. See



also the next DPc/Chilescope image.

7 February 2018 ($\lambda=126^\circ\text{Ls}$, $\delta=5.8''$)

DPc brought about by the collaboration with the Chilescope staff another excellent set of RGB image at $\omega=013^\circ\text{W}$. This more explicitly exposes the presence of the *Oxus dark segment* at $\delta=5.8''$. Otherwise, the RGB shows a detail of Sinus Meridiani, and Brangæna shows up more clearly and broadly (R and G). The area of Oxia P looks to be made of a boned scissors. The small projections into Chryse from the southern dark markings are fully shown which are also extended to the area of Auroræ S. The nippers of Nilokeras are also well shown up though they are near the morning limb. M Acidalium looks a bit weaker compared with the northern part. The mist patch near at Argyre looks inflated in B and G.

8 February 2018 ($\lambda=127^\circ\text{Ls}$, $\delta=5.8''$)

Efrain MORALES (EMr) now came onstage (though started from January). This is the IR685 image at $\omega=014^\circ\text{W}$, $\phi=06^\circ\text{N}$. The apparatus is a 31cm SCT with the Baader filter. The camera employed is an ASI 290MM. It is possible to identify the main markings, but every marking shows a blurring. Just impressively the inside of M Acidalium is not monotonic. At the position of Niliacus Lacus there are two dark patches. The region of M Erythræum shows some spread of light and shade portions.

9 February 2018 ($\lambda=127^\circ\text{Ls}$, $\delta=5.8\sim 5.9''$)

First, **CFs** gave an RGB image at $\omega=247^\circ\text{W}$, $\phi=06^\circ\text{N}$ accompanied by the original R, G, B, and an IR685. Hellas is very whitish bright on the high latitude morning area with some suggestion of a fine structure inside. Syrtis Mj is nicely shown up on the morning side with some bluish colour at the northern part. This area is darker in R and IR (weak in G and B). Adjacent to the evening limb of Syrtis Mj, Osiridis Prom is particularly light. Elysium near the evening terminator is whitish implying that the area is full of water vapour (fully shown on the B image). Nodus Alcyonius is visible in R and IR, and in R it gives a similar impression in density with the Ætheria dark patch. Cassius is followed by a light area, and the three markings of N Alcyonius, Cassius and Boreosyrtis look stable. The description of Utopia is also excellent for $\delta=5.8''$. The npc looks flat.

Secondly **DPc** gave a single colour image at $\omega=353^\circ\text{W}$ in collaboration with the Chilescope team. However the seeing condition must have been unfavourable. For instance S Meridiani should be said duller though Brangæna is checked. The Oxus dark segment does not make the shape. The npc appears softly whitish. At the Antarctic area there is seen a morning mist patch.

10 February 2018 ($\lambda=128^\circ\text{Ls}$, $\delta=5.9''$)

DPc's RGB composite image at $\omega=343^\circ\text{W}$ with the collaboration with the Chilescope team. The R image shows some details. At the area of S Meridiani, Brangæna is visible and Oxia P looks to send down a fiddler crab's like scissors. M Acidalium is now wholly inside the disk, but the southern part is a bit fainter. The npc looks stable.

EMr made an RGB composite at $\omega=354^\circ\text{W}$. The R image is good and shows some scissors-like detail around Oxia P. The morning M Acidalium is totally shown up; the southern part looking weaker. The npc is reflected in all colour. The Antarctic is associated with a mist patch.

12 February 2018 ($\lambda=129^\circ\text{Ls}$, $\delta=6.0''$)

Now the angular diameter attained $\delta=6''$. **DPc** composed an RGB image at $\omega=325^\circ\text{W}$, $\phi=05^\circ\text{N}$ after taking several ingredients of Mars working in collaboration with the Chilescope team. Sinus Sabæus lies near the centre and Syrtis Mj is dusky near the evening terminator with some bluish tint. The B image looks excellent, and shows the bright Hellas and clearly shows the npc. The Antarctic morning mist patch is trapped. M Acidalium is not fully seen, but some misty layers are shown in B near the bottom of M Acidalium. As far as we see the area of S Meridiani, the image is not so excellent while the minor detail like Brangæna is easily checked.

EMr took an IR 685 image at $\omega=338^\circ\text{W}$. Both of S Meridiani and Margaritifer S do not show good shape, though several dark markings including the morning M Acidalium are shown.

Note: The west longitude of Aguadilla where EMr observes is $67^\circ9'\text{W}$ while the longitude of the site of Chilescope is $70^\circ45'\text{W}$, and hence the observation times of Mars are not so different in both sites. However the altitude of the planet must be very different: Both must be different by about 40 degrees.

13 February 2018 ($\lambda=129^\circ\text{Ls}$, $\delta=6.0''$)

DPc collaborated with the Chilescope team to produce the RGB elements at $\omega=312^\circ\text{W}$. Hellas appears in all colours but especially conspicuous in B. On the other hand Syrtis Mj appears duller in B. This is related with the fact the northern half of Syrtis Mj is slightly bluish in the RGB composite. The details of markings are provided by the R image. Aryn's nails already look complex near the morning limb. Since the tilt ϕ moved up to 5°N , several markings to the north of Ismenius L began to look flatter. However the ochre tint governs upto the region of the northern higher latitude. The npc is evident whitish in a flat shape.

Km obtained an L-colour image at $\omega=120^\circ\text{W}$, in addition to the R image at $\omega=130^\circ\text{W}$. The L is based on the 10 minutes derotation and made stacked of 29,000 frames, and the 224MC image was made stacked of 17,000 while the R image based on 20 minutes derotation to stack 24,000 frames. The desert region in ochre colour in the L colour gives a good impression, and suggests several light and shade patches related with the Tharsis ridges (not easy to identify).

15 February 2018 ($\lambda=130^\circ\text{Ls}$, $\delta=6.1''$)

DPc collaborated with the Chilescope team to obtain an excellent RGB composite at $\omega=294^\circ\text{W}$, $\phi=05^\circ\text{N}$. Hellas is bright except on the R image (especially bright in B), though its boundary is not sharp and looks blurred, while the shape looks reasonable in RGB. The npc is clearly flat especially in R. Syrtis Mj appears large, and the northern end looks like a ship's bottom, and in R some (four?) numbers of projections are counted from the bottom. Nodus Alcyonius reproduced in a real form, and other minor markings at around Cassius and Boreosyrtis are full of detailed small markings. Near the morning limb, Sinus Meridiani has just been inside the disk but already Aryn's nails are visible. The area around Sigeus Portus is also detailed. The area round Mare Serpentis and the Huygens crater looks softer and rough, the latter being about to be soon identified.

16 February 2018 ($\lambda=130-131^\circ\text{Ls}$, $\delta=6.1''$)

First, **CFs** produced an excellent set of RGB elements as well as the RGB composite and an IR685 image at $\omega=183^\circ\text{W}$, $\phi=04^\circ\text{N}$. The evening cloud at Tharsis is well whitish. Elysium is still on the morning side, but well ground-lit with a whitish part corresponding to the position of Elysium Mons. Phlegra and Cerberus bound well the classical Elysium and on the following side the \AE theria dark patch, partially dark, bounds the following boundary of Elysium. The Cebrenia zone broadly looks a bit reddish in the zone pinched by Propontis I and Utopia. Mare Cimmerium is largely seen, and Hellas is a bit seen in B near the morning limb.

DPc continued to remote control the Chilescope system to take and RGB composite at $\omega=286^\circ\text{W}$ which is shown as a single image. The seeing condition seemed to prove unfavourable and there are shown little details with respect to Syrtis Mj. N Alcyonius is blurred. Just Hellas is distinguishable, and the npc is shown up.

Here Maurice VALIMBERTI (**MVI**) from Melbourne has come onstage. His apparatus is a 36cm Richey Chretien @f/22, equipped with an ASI 290MM camera and with the Astronomik IIC RGB filters. The RGB image was made at $\omega=060^\circ\text{W}$, $\phi=04^\circ\text{N}$. On the R image some details from Ganges to Tithonius Lacus are shown. Some atmospheric phenomena are visible in G and B at the evening side preceding M Acidalium which is not so clearly detailed in R however. Just Nilokeras may be pinned down. There is seen a misty patch near the Antarctic area in B.

17 February 2018 ($\lambda=131^\circ\text{Ls}$, $\delta=6.2''$)

Km produced an L-colour image and B image at $\omega=079^\circ\text{W}$. The L image was made stacked from 48,000 frames based on a 11 minutes derotation (and colour image was stacked of 17,000 frames, and B image of 24,000 frames). The L-colour is shown in a bigger size and so impressive with several clear dark markings. Solis Lacus appears as the darkest marking, and to the north of it Tithonius L makes a figure, and Phoenicis L is also visible. It may be possible to unearth the series of Tharsis Montes. Ophir and Auroræ Sinus from Ganges are traced. M Acidalium is half hidden, but the area of Nilokeras is darkish. In B ($\omega=082^\circ\text{W}$), the Antarctic mist is present, and the light and shade of the northern hemisphere is not monotonous.

18 February 2018 ($\lambda=131^\circ\text{Ls}$, $\delta=6.2''$)

CFs obtained an RGB image at $\omega=151^\circ\text{W}$ as well as IR685. On the RGB image, the evening cloud at the Tharsis ridge and the white cloud at the side wall of Olympus Mons are shown beautifully (due to G and B). Elysium is still located on the morning limb and follows Phlegra and more explicit Propontis I. The white core at the arctic area looks doubled.

DPc produced an excellent RGB image at $\omega=252^\circ\text{W}$, $\phi=04^\circ\text{W}$, made under the collaboration with the Chilescope team. The images are large enough to accommodate some details. The typical markings from the northern part of Syrtis Mj up until Mare Tyrrhenum are nicely detailed, and the Huygens crater is nicely shown up. The area around Syrtis Minor is quite detailed. The northern-west end of M Cimmerium is also miraculously spotted. The marking around the Gale crater looks perfect. The Elysium evening

cloud is apparently atop of Elysium Mons, and separated from the Ætheria dark patch which is now to be shown as a double canal-like especially at the southern part. The size of the Ætheria dark patch is now half sized compared with its earlier fame. N Alcyonius shows a good shape. The details of Boreosyrtris appear from the very morning. Finally Hellas is typically bright in all colours, a bit bluish in RGB. The npc show its flat shape in R.

19 February 2018 ($\lambda=132^\circ\text{Ls}$, $\delta=6.2''$)

DPc also obtained an excellent image at $\omega=253^\circ\text{W}$ similar to the preceding work. The quality keeps the level of the preceding image, but in R some look more detailed, but may suggest some rough results: For instance, Nodus Alcyonius shows a strange tail on this day.

20 February 2018 ($\lambda=132^\circ\text{Ls}$, $\delta=6.3''$)

DPc obtained by the same collaboration an RGB image at $\omega=250^\circ\text{W}$, $\varphi=03^\circ\text{N}$. Due to the seeing condition, markings on each image look slightly blurred.

21 February 2018 ($\lambda=133^\circ\text{Ls}$, $\delta=6.3''$)

DPc's stable RGB set based on the same collaboration was made at $\omega=237^\circ\text{W}$, $\varphi=03^\circ\text{N}$. The markings on each image strangely look *geometrical*. Some details shown at the area of Syrtis Minor as well as the NW part of M Cimberium are quite excellent, having never seen for $\delta=6.3''$. The double appearance of the canal to the south of the Ætheria dark patch is not clear today. The rough appearance of the Ætheria dark patch reminds us of the case after 2010. Elysium Mons is whitish separated from the Ætheria dark patch. Hellas must have been showing a further aspect concerning the white area.

22 February 2018 ($\lambda=133\sim 134^\circ\text{Ls}$, $\delta=6.3\sim 6.4''$)

DPc continued to chase the Planet Mars by the collaboration with the Chilescope members. The RGB image on the day is made at $\omega=227^\circ\text{W}$. The evening cloud at Elysium Mons is white but looks blurred. Due to the cloud, Phlegra looks a bit faded. The white cloud does not reach the following boundary of Elysium made by the Ætheria dark patch, and the bright slit is ground-lit in ochre colour. The upper part of the Ætheria dark patch looks doubled. As to this bifurcation property, let us to refer to Bill FLANAGAN (WFl)'s images taken on 6 May 2014 ($\lambda=126^\circ\text{Ls}$, $\delta=14.2''$) at $\omega=245^\circ\text{W}$, and 252°W . Also refer to Don PARKER (DPk)'s image on 10 March 2012 at $\omega=245^\circ\text{W}$. These aspects are also different from the aspects of the Ætheria dark patch in around 2001.

Km gave an L-colour image at $\omega=022^\circ\text{W}$ base on the 36 minutes derotation: The L image was made of 16,000 frames and the 224MC image of 8,000 frames. M Acidalium appears near the centre of the northern hemisphere with a blurred boundary. Meridiani S is near the evening terminator, and the following dark spikes until Auroræ S are suggested, but any of which is without definite contour. The misty matter is seen near Argyre.

23 February 2018 ($\lambda=134^\circ\text{Ls}$, $\delta=6.4''$)

DPc shows an interesting angled RGB image (single) at $\omega=222^\circ\text{W}$, $\varphi=02^\circ\text{N}$ taken with the collaboration with the Chilescope team. Syrtis Major lies still beneath the morning mist and looks light-bluish. At the highly morning limb, Hellas is water-vapour like whitish. Elysium is light with

mingled with a whitish matter following a thinner brownish Phlegra. The west end of Mare Cimmerium looks detailed. The dark segment which extends to the Gale crater is explicit. The Herschel crater is nearly visible?

Tomio AKUTSU (Ak) gave an RGB image at $\omega=008^\circ\text{W}$ together with an IR image at $\omega=010^\circ\text{W}$. The IR image shows Meridiani S near the evening terminator, and is shown separated from Margaritifer S. M Acidalium is shown in good shape and the southern half is a bit fainter than the bottom part. The markings on the RGB do not take normal form. The B image also does not show the arctic area.

24 February 2018 ($\lambda=134^\circ\text{Ls}$, $\delta=6.4''$)

DPc continued to work with the Chilescope team and obtained a single RGB composite at $\omega=191^\circ\text{W}$. Syrtis Major is not yet apparent because it is away the limb. Mare Cimmerium is already inside the disk but its west end looks to be morning misty. Elysium is still on the morning side: Elysium Mons is covered by a compact white cloud. Cerberus and Phlegra show a light brownish colour. Propontis I is well visible and to its east a misty whitish cloud is shown up to the evening terminator. The npc area is also white misty.

25 February 2018 ($\lambda=135^\circ\text{Ls}$, $\delta=6.5''$)

DPc still continued the collaboration with the Chilescope to obtain a single RGB composite at $\omega=199^\circ\text{W}$. Syrtis Mj is not present, and M Cimmerium is not fully visible (almost blurred). The orographic cloud covering the top of Elysium Mons is locally whitish bright. Cerberus (brownish) and the opposite Ætheria dark patch (rather bluish) look darker than on the preceding day. Hellas is weaker because of the angle. The seeing must be so unfavourable that the Gale crater cannot be identified.

26 February 2018 ($\lambda=135\text{--}136^\circ\text{Ls}$, $\delta=6.5\text{--}6.6''$)

MVI provided an excellent set of R, G, B and an RGB composite at $\omega=314^\circ\text{W}$ as well as an IR image at $\omega=316^\circ\text{W}$. The morning Sinus Meridiani (Aryn's nails) is clearly shown in R, while the evening Syrtis Major is not so cleaned. However Hellas, near the evening terminator, shows several impressions. In B, two white balls covers, one being at the Arctic area, in G, the same configuration while the bottom cloud is less thick, and in R, less bright, and nothing in IR. RGB shows the main cloud (less whitish) at the evening Hellas position. The area of Mare Serpentis looks featureless even on IR image.

Ak gave an RGB composite at $\omega=347^\circ\text{W}$ and IR image at $\omega=349^\circ\text{W}$. On the latter image, the area of Aram looks vacant so that Sinus Meridiani and Margaritifer Sinus are separated. Mare Acidalium is seen totally on the morning side. The arctic area may be light. In RGB every dark marking look blurred, just the position of Meridiani Sinus being suggested.

Km provided a good L-colour image at $\omega=349^\circ\text{W}$ based on the 12 minutes derotation: For the L image Km stacked 40,000 frames and for the colour 224MC, Km did 2,4000 frames. Sinus Sabæus and Sinus Meridiani are clearly shown up, and independently Margaritifer Sinus shows a detail, and Pandoraë Fretum looks slightly fainter or made of several light shades. M Acidalium lies down on the morning side, but discloses that the both sides are framed by a twin of darker lines. Along M Acidalium, Oxus

runs down to Ismenius Lacus. However the Oxus dark segment is not caught. Argyre is identified and its far side may be covered by a mist. The R image is also good at $\omega=357^\circ\text{W}$, but the markings look too contrasty: stacked of 88,000 frs obtained during 21 minutes derotation.

27 February 2018 ($\lambda=136^\circ\text{Ls}$, $\delta=6.6''$)

Km made an L-colour image at $\omega=334^\circ\text{W}$. This is less impressive than the work on the preceding day. S Meridiani is well shown, but S Sabæus and the halved Syrtis Mj look quite blurred. Noachis is also obscure except for the bald Pandræ Fr. M Acidalium is faint near the morning limb. The L image is made stacked of 40,000 frames (12 minutes derotation). On the other hand, the R image at $\omega=341^\circ\text{W}$ was made from 40,000 frs (the 11 minutes derotation).

Letters to the Editor

● *Subject: Mars 16 February 0245UT RGB and IR*
Received: 16 February 2018 at 14:51 JST

Hi all, Mars this morning. Cloud is evident over Elysium and also Olympus Mons, which is on the evening terminator. The subtle albedo features around Elysium (Propontis I, Phlegra, Trivium Charontis and Cerberus) are noticeable. I suspect that the crater Milankovic may just be detectable in the R image, although not confirmed. Cloud is visible on the southern limb. I am not sure if this is cloud that has been blown from the Hellas Basin, or whether this is an indication of the formation of the South Polar Hood. Any comments welcome.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180216/CFs16Feb18.png>

○ *Subject: Mars 18 February 2018 0153UT RGB and IR*
Received: 18 February 2018 at 18:57 JST

Hi all, Mars this morning with bright cloud over Olympus Mons and the other Tharsis volcanos. The small NPC appears to be flanked by Olympia Planitia (right?) and an additional cloud (left?).

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180218/CFs18Feb18.png>

○ *Subject: Re: Mars 16 February 2018 0245UT RGB and IR*
Received: 22 February 2018 at 16:09 JST

Hi Jim, Thanks for your interesting comments and my apologies for the delay in response. My first

thoughts were that the dark markings in Hellas were related to topographical features, so it is interesting to read your interpretation. I am afraid that I have had to go to my family in Durban, as my dad is in a critical condition (he is 92 years old), so I am not sure how long I will be away. Weather has been consistently overcast, but I hope to be back in action when I eventually get home.

Best Regards,

○ *Subject: Mars 1 March 2018 0334UT RGB and IR*
Received: 1 March 2018 at 14:49 JST

Hi all, Following a week away on a family commitment, I returned home yesterday. I managed to find some gaps in the cloud this morning, but seeing was very poor and the session impacted by severe dewing. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180301/CFs01Mar18.png>

○ *Subject: Mars 2 March 2018 0250UT RGB and IR*
Received: 2 March 2018 at 15:20 JST

Hi all, On-screen seeing conditions looked very poor, but the software managed to pull out some detail. Some clouds noted across the planet, most noticeable being a bright cloud (or ice?) over the Aonia Terra/Aonius Sinus region at upper right.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180302/CFs02Mar18.png>

○ *Subject: Mars 3 March 2018 0231UT RGB and IR*
Received: 4 March 2018 at 04:46 JST

Hi all, Mars this morning, with the Argyre basin prominent towards the top of the image.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180303/CFs03Mar18.png>

○...*Subject: Mars 4 March 2018 0208UT RGB and IR*
Received: 4 March 2018 at 23:20 JST

Hi all, Mars this morning, with Sinus Meridiani coming into view and the Argyre Basin again prominent towards the top of the image

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180304/CFs04Mar18.png>

○...*Subject: Mars 5 March 2018 0246UT RGB and IR*
Received: 5 March 2018 at 16:49 JST

Hi all, Mars image set from this morning. Argyre at upper centre. I also note a small bright spot on the bright limb in the Tanais region (bottom right). The two legs of Sinus Meridiani are resolved.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180305/CFs05Mar18.png>

Clyde FOSTER (Centurion, SOUTH AFRICA)

●...*Subject: Mars images (Feb 7th.)*
Received: 17 February 2018 at 07:04 JST

Hi all, Good seeing for this set. Very happy with these for $\delta=5.8''$. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_07dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180207/DPc07Feb18.png>

○...*Subject: Mars images (Feb 18th.)*
Received: 20 February 2018 at 02:14 JST

Hi all, Good seeing for this session. Excellent resolution on the surface considering $D=6.2''$. Hellas and Elysium clouds are prominent. Syrtis Major shows interesting structure. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_18dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180218/DPc18Feb18.png>

○...*Subject: Mars images (Feb 9th.)*
Received: 22 February 2018 at 08:07 JST

Hi all, Terrible seeing so just one image for the record! Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_09dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180209/DPc09Feb18.png>

○...*Subject: Mars images (Feb 10th.)*
Received: 26 February 2018 at 07:42 JST

Hi all, Poor seeing on the 10th. Sinus Meridiani is prominent. Brilliant limb haze over Chryse/Acid-alium. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_10dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180210/DPc10Feb18.png>

○...*Subject: Mars images (Feb 12th.)*
Received: 27 February 2018 at 00:46 JST

Hi all, Some images from the 12th. Poor seeing again. Note the blue Syrtis cloud visible.

Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_12dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180212/DPc12Feb18.png>

○...*Subject: Mars good seeing (Feb 15th.)*
Received: 27 February 2018 at 07:03 JST

Hi all, We had good seeing on the 15th with Syrtis Major and Hellas well placed. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_15dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180215/DPc15Feb18.png>

○...*Subject: Mars images (Feb 16th.)*
Received: 2 March 2018 at 06:01 JST

Hi all, Poor conditions so only one image obtained for the record. Hellas brilliant at bottom.

Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_16dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180216/DPc16Feb18.png>

○...*Subject: Mars images (Feb 19th.)*
Received: 10 March 2018 at 07:48 JST

Hi all, Pretty good seeing for this set of images on Feb 19th. Hellas and Syrtis Major prominent. Bright clouds over Elysium. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_19dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180219/DPc19Feb18.png>

○...*Subject: Mars images (Feb 20th.)*
Received: 14 March 2018 at 04:37 JST

Hi all, Some images from Feb 20th. Bright orographics over Elysium. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_20dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180220/DPc20Feb18.png>

○...*Subject: Mars good seeing (Feb 21st.)*
Received: 15 March 2018 at 09:05 JST

Hi all, Good seeing for these images on the 21st. Bright Elysium orographics. Best Wishes

http://www.damianpeach.com/mars2018/m2018_02_21dp.jpg

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180221/DPc21Feb18.png>

Damian PEACH (Selsey, WS, the UK)
 Web: <http://www.damianpeach.com/>

●.....*Subject: Mars 16th February UT*
Received: 17 February 2018 at 19:15 JST

Hello all, Finally had some decent seeing for a short while before dawn. Attached is an image of Mars from the 16th February UT. Quite a bit of cloud visible in the blue image. Best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180216/MVI16Feb18.png>

○.....*Subject: Mars 26th February 2018UT*
Received: 27 February 2018 at 14:14 JST

Hi everyone, Attached is an image set of Mars taken this morning (5:20am local time) in average seeing conditions. Nice blue cloud over northern Syrtis Major and a bright Hellas in blue and green filters with perhaps just a hint of the basin floor showing at its center? Best regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180226/MVI26Feb18.png>

○.....*Subject: Mars 2nd March 2018UT in above average seeing*
Received: 3 March 2018 at 19:44 JST

Hello all, Attached is an image set of Mars taken on 2nd March 2018 in above average seeing conditions.

Also attached for your interest is an RGB image of Jupiter taken at 1826UT on the same day.



Kind regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180302/MVI02Mar18.png>

○.....*Subject: Additional Mars data 2nd March 2018*
Received: 4 March 2018 at 16:21 JST

Hello all, attached is a second, earlier, image data set of Mars from the 2nd March UT together with a small animation showing Mars' rotation in approximately 30min. Regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180302/MVI02Mar18.png>



○.....*Subject: Mars 6th March 2018 UT*
Received: 7 March 2018 at 20:33 JST

Hello all, Attached is an image set of Mars taken on the 6th March as indicated in average seeing conditions. Regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180306/MVI06Mar18.png>

○.....*Subject: Mars 7th March 2018*
Received: 10 March 2018 at 11:05 JST

Hello all, Attached is an image set of Mars taken on the 7th March 2018 in above average seeing conditions. Best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180307/MVI07Mar18.png>

○.....*Subject: Mars 8th March 2018 UT*
Received: 12 March 2018 at 16:15 JST

Hello all, Attached is an image set of Mars taken on the 8th March 2018 in fair seeing conditions.

Best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180308/MVI08Mar18.png>

Maurice VALIMBERTI
 (Melbourne, AUSTRALIA)

●.....*Subject: Mars 2018/02/17-Kumamori*
Received: 18 February 2018 at 16:38 JST

Dear Masatsugu MINAMI: The cold has loosened its grip, while some clouds float to make the seeing condition unfavourable. Even if the condition happens to be improved, it tends soon poorer. This trend makes me very tired. Best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180217/Km17Feb18.png>

○.....*Subject: Mars 2018/02/22-Kumamori*
Received: 23 February 2018 at 10:44 JST

Dear Masatsugu: Through a thin cloud expansion, I started, but the cloud layers gradually increased in thickness. The observation was finished thus a bit halfway. Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180222/Km22Feb18.png>

○.....*Subject: Mars 2018/02/26-Kumamori*
Received: 27 February 2018 at 17:48 JST

Dear Masatsugu: After a long while, the sky became clear, and the seeing improved. I hope so the severe intolerable condition in winter happily ended.

With Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180226/Km26Feb18.png>

○.....*Subject: Mars 2018/02/27-Kumamori*
Received: 28 February 2018 at 18:42 JST

Dear Masatsugu: The seeing condition this night is slightly poorer than yesterday, but images appeared tolerably. Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180227/Km27Feb18.png>

○.....*Subject: Mars 2018/03/02-Kumamori*
Received: 3 March 2018 at 17:36 JST

Dear Masatsugu: The so-called explosive low -pressure cyclone went away, so that we expected the nicer atmosphere, but the seeing was not preferable.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180302/Km02Mar18.png>

○.....*Subject: 2018/03/06-Kumamori*
Received: 7 March 2018 at 20:10 JST

Dear Masatsugu: because of the cold anticyclone from the northern continent, it became very cold just like in a wintery weather, but the seeing condition was better than expected, and I had obtained some plausible results. Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180306/Km06Mar18.png>

○.....*Subject: Mars 2018/03/10-Kumamori*
Received: 11 March 2018 at 15:44 JST

Dear Masatsugu: A migratory anti-cyclone governs from the southern sea, so that I expected a further improved seeing, but not quite. Just the winter very poor condition looks disappeared, though the temperature was 2°C here. With best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180310/Km10Mar18.png>

○.....*Subject: Mars 2018/03/11-Kumamori*
Received: 14 March 2018 at 18:37 JST

Dear Masatsugu: Just before the Sunrise the seeing began to improve, and hence I got moderate images, but due to the poor transparency the contrast of the images was weakened. With best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180311/Km11Mar18.png>

○.....*Subject: Mars 2018/03/14-Kumamori*
Received: 15 March 2018 at 17:13 JST

Dear Masatsugu: The sky was clear at night, but near at dawn some clouds began to haunt but fortunately a clear sky came just before the sunrise.

Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180314/Km14Mar18.png>

Teruaki KUMAMORI (Osaka, JAPAN)

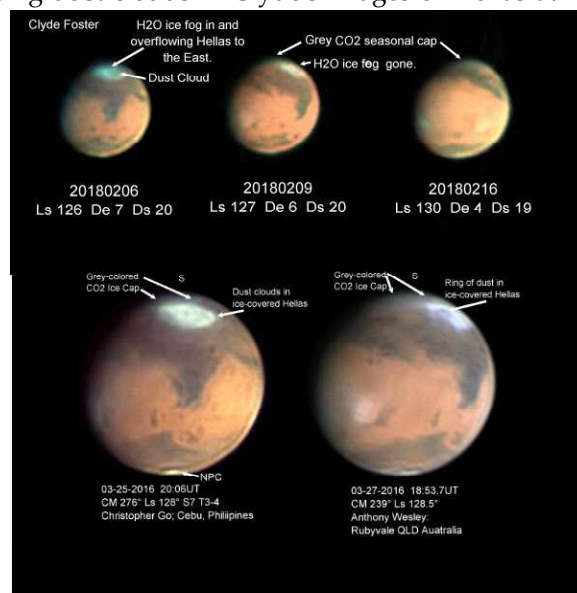
●.....*Subject: Re:[marsobservers] Mars images (Feb 18th.)*
Received: 20 February 2018 at 03:32 JST

Fantastic, Damian! Interesting that Hyblaeus appears to be split into three parallel dark streaks. Also, the dark spot just north of the tip of Syrtis Major looks like either Nili Sinus or Antigonae Fretum, I think. It hasn't been so dark in recent apparitions, has it??

Roger VENABLE (Chester, GA)

●.....*Subject: Re: Mars 16 February 2018 0245UT RGB and IR*
Received: 21 February 2018 at 10:37 JST

Hi Clyde, Please see 3 of your recent images along with two images from the 2016-2017 apparition all with an Ls of about 128 in the attachment. The sharp images from Go and Wesley clearly show a gray-colored CO₂ seasonal ice cap in mid-winter. The maximum extent of the CO₂ cap has been stated in a professional paper to bisect Hellas. The 2016 images show the edge of the ice cap to be near the Southern rim of Hellas. This may indicate that the ice cap at Ls ~128 has already been sublimating. Sublimation produces high winds from where the sublimation is present. From the 2016 images we could have predicted seeing dust clouds in Clyde's images of Hellas at Ls



128. Clyde's 20180206 and 20180209 images show air-borne dust waves in Hellas. There aren't dust clouds in his 0216 image. Maybe the topography is reducing wind velocity. Note, I suspect the blue-colored H₂O ice fog in the 0206 image is hiding the CO₂ cap.

Well Clyde, you have awakened me from my Martian slumber. I want to add the composite image of Mars to a new Observers page but the ALPO database is being "upgraded" and is unavailable. I hope everything has been backed up. Keep sending us images. Based on other later 2016 images, I may make some dust cloud forecasts.

Jim MELKA (Chesterfield, MO)

●.....*Subject: Mars 23 & 26 Feb 2018*
Received: 1 March 2018 at 00:30 JST

This is AKUTSU from Ibaraki. Mars taken on 23 and 26 February 2018. Best.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180223/Ak23Feb18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180226/Ak26Feb18.png>

Tomio AKUTSU (Ibaraki, JAPAN)

●.....*Subject: Mars 2018-03-01*
Received: 2 March 2018 at 19:13 JST

My first Mars image for some time, so poor have

conditions been. Regards,

http://www.astrogem.com.au/Mars/2018-03-01/r2018-03-01-1738_6-pmi.png
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180301/PMI01Mar18.png>

Phil MILES (Rubyvale, QLD, AUSTRALIA)

●.....*Subject: Mars Jan-Mar 2018*
Received: 9 March 2018 at 02:44 JST

Hi Mr. Minami, Here I submit some balated images up to the present observations. Clear skies!

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180301/EMr01Mar18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180221/EMr21Feb18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180212/EMr12Feb18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180210/EMr10Feb18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180208/EMr08Feb18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180118/EMr18Jan18.png>
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180113/EMr13Jan18.png>

Efrain MORALES RIVERA
(Aguadilla, PUERTO RICO)

●.....*Subject: Mars M180312 ishibashi*
Received: 16 March 2018 at 14:30 JST

This is ISHIBASHI from Sagamihara. Here is the first image I secured by ASI290. It's puzzling to determine the direction of the southern pole.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180312/Is12Mar18.png>

Tsutomu ISHIBASHI (Kanagawa, JAPAN)

★ ★ ★

Masami's à la Carte:

Trend of Hellas in 1997: <http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn0/97Note05.htm>
Ch. PELLIER's article on cloud front in 2014: <http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO429.pdf>
On Baltia cloud: <http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO416.pdf>
Ch.PELLIER on Alba Mons: <http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO399.pdf> (Ser3-p0344)

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CMO n°467/ ISMO #93 (25 March 2018)

Editorial Board: Tadashi ASADA, Masatsugu MINAMI, Masami MURAKAMI, Takashi NAKAJIMA and Akinori NISHITA



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