

MARS

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OBSERVATIONS

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CMO/ISMO Mars in 2018 (#03)

Forthcoming Mars in 2018. II

by

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Taking over Part I which dealt in CMO #463 with the general situation until March 2018, we shall here start Part II by referring first to the

6° Period from April 2018 to June 2018
($\lambda=152^\circ\text{Ls} \sim \lambda=203^\circ\text{Ls}$).

Already the western quadrature has been attained on 24 March, and the apparent diameter δ looks larger than 8 arc seconds, large enough for us to begin the visual observations. The tilt faces southwards. The southern spring equinox $\lambda=180^\circ\text{Ls}$ will visit on 18 May. We will thus face to the season of the southern dust disturbances, and also to the season when we should keep our eyes on development of the south polar hood/cap.

In **April 2018** (on 1 April, $\lambda=152^\circ\text{Ls}$, $\delta=8.5''$, $\varphi=06^\circ\text{S}$, and $\iota=41^\circ$), the planet Mars moves to the Sgr constellation, and the apparent declination will go down to 23°S so that the conditions will be less and less preferable for the observers on the Northern Hemisphere. On 2 April 2018, Mars will pass by M22 (globular cluster) to the 0.35° north, and also passes by the planet Saturn ($\delta=8.6''$, mag +0.3) to the 1.2° south. The tilt now faces southwards and may allow us to be able to check the sph/spc. Hellas will quite lessen the brightness. Arsia Mons on the southern hemisphere still shows the orographic activity, and the orography on the northern hemisphere may be still visible. The phase angle ι will be

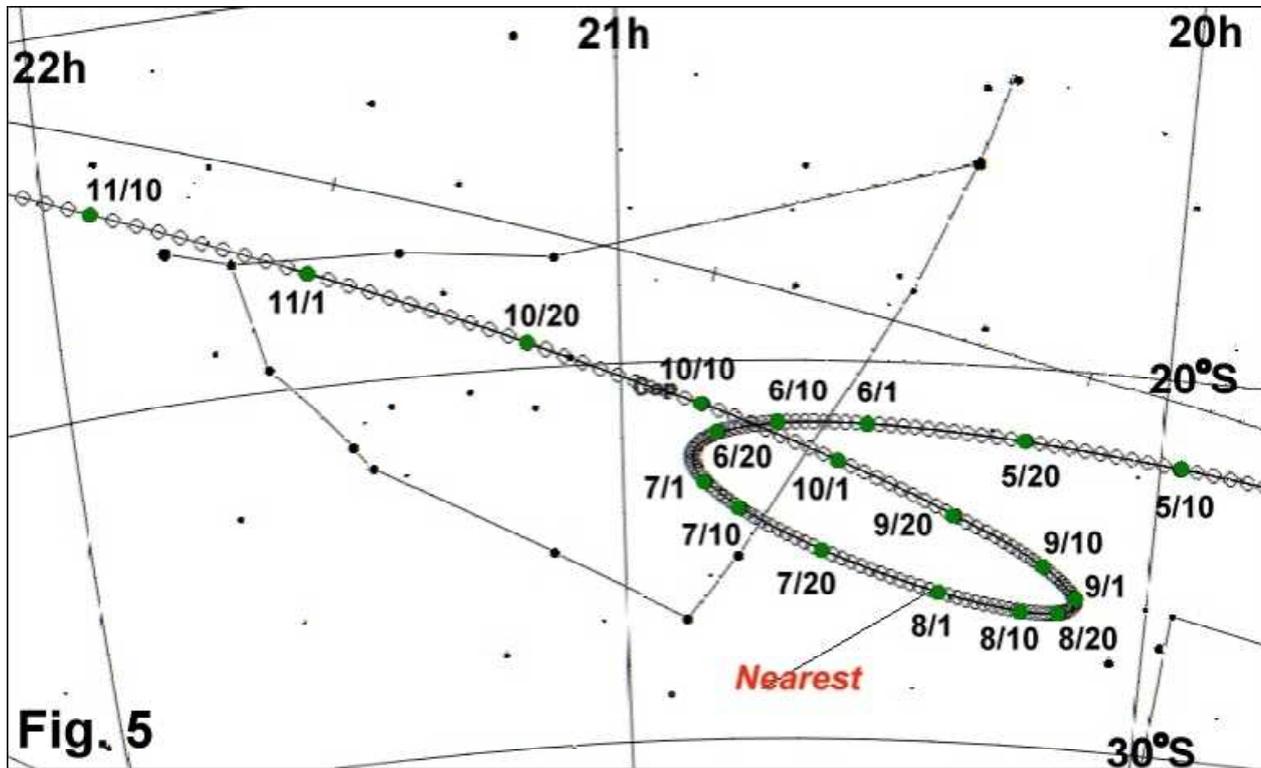
maximal in mid-April so that the defect illumination will provide a good chance to observe the area near the very evening terminator. The mist along the equatorial zone will be weak but we should record the colour variation of Syrtis Major when it approaches the terminator.

In **May 2018** (on 1 May: $\lambda=168^\circ\text{Ls}$, $\delta=11.1''$, $\varphi=12^\circ\text{S}$, and $\iota=40^\circ$), Mars still shines inside the Sgr constellation, though the apparent declination a bit recovers. At around $\lambda=170^\circ\text{Ls}$, the polar hood will more clear up to allow us to grasp the spc. The snow line at this season will be around 58°S . On 23 May the southern spring equinox ($\lambda=180^\circ\text{Ls}$) visits. Henceforward, the thawing of the spc should be checked from possible angles every night. The orographic activity will become weaker. After $\lambda=180^\circ\text{Ls}$ we will be able to observe the season in a better diameter condition compared with the case in the preceding 2016 apparition.

In **June 2018** (on 1 June, $\lambda=185^\circ\text{Ls}$, $\delta=15.3''$, $\varphi=15^\circ\text{S}$, $\iota=35^\circ$), the planet celestially goes to the Cap constellation, and makes a closer apparition. This time the planet makes a loop southwards and hence the apparent declination will be going down (seen from our Hemisphere). On 28 June the planet will

be stationary and then turns to retrograde. From the beginning of June, δ will exceed $15''$ and the condition of observing the period after southern spring equinox will be better than the conditions in 2016. Note that the possibility of the rise of the dust dis-

turbances is higher. The spc also begins to receive an intense Solar beam effect much more at the central part to show us some light and shade areas inside the spc.



7° We shall next refer to the “Closest” Period from July 2018 to August 2018 ($\lambda=203^\circ\text{Ls} \sim \lambda=240^\circ\text{Ls}$)

On 26 June, the apparent diameter of Mars will reach $20''$ first since the case in 2003. As shown in Fig. 5, the planet will draw a loop inside the Capricornus constellation. The declination will prove to be 26°S : that is, the planet altitude is quite lower from our place while the present apparition will turn out to be very preferable for the observers in the Southern Hemisphere.

It should be remarked that the season of the occurrences of the dust disturbances now set in (see Appendix for more details). As far as we remember, we may be able to pick out the vivid occurrence cases at $\lambda=183^\circ\text{Ls}$, 205°Ls , 214°Ls , 215°Ls , 224°Ls , 250°Ls , 260°Ls , 270°Ls , 274°Ls , 300°Ls . The dust cloud which occurred at $\lambda=183^\circ\text{Ls}$ was a rare case we met in 2001. The dust first witnessed at Hesperia which however rapidly expanded upwards and eventually became global, derailing the Martian season. For instance the water vapour

activity near the Tharsis ridges was vanished for a long time. The cases at $\lambda=214^\circ\text{Ls}$, 215°Ls , and at 274°Ls are related with a dust activity at the eastern corner of Deucalionis Regio, and will be touched in Appendix of this issue (the case at $\lambda=215^\circ\text{Ls}$ was observed nicely in the greatest apparition in 2003).

Otherwise, we also remember other dust disturbances at $\lambda=232^\circ\text{Ls}$ which occurred at Eos/Capri Cornu and at $\lambda=315^\circ\text{Ls}$ which expanded from Chryse via Auroræ Sinus to the north of Argyre.

Anyway it will be necessary always to scrutinise the morning terminator or the morning limb, because the observation of the early development of the dust phenomenon is quite essential. It is recommended to chase any dust every 40 minutes.

In July 2018 (on 1 July, $\lambda=203^\circ\text{Ls}$, $\delta=20.9''$, $\varphi=14^\circ\text{S}$, $\iota=21^\circ$), Mars will be at opposition on 27 July at 05h GMT and will be closest to the Earth on 31 July at 08h GMT (0.385AU) with the maximal diameter of $\delta=24.31''$ while the apparent declination will

be down to 26°S (and so the culmination altitude in Tokyo may be 28°). Since the tilt is around $\phi=11^\circ$ it will be interesting to observe the inside of the spc. Note that after the opposition, the defect of illumination will go to the morning side, and hence the terminator at dawn can be observed. When the phase angle is small, we should like to watch the opposition effect of such Montes as Olympus Mons and Elysium Mons. In this period it will be easier to watch the shadowy parts inside the spc. The perimeter of the spc is also carefully watched. Some projections and brightening should be watched. During the period $\lambda=200^\circ\text{Ls}\sim 250^\circ\text{Ls}$, watch the area of Argyre or the so-called Argenteus Mons.

In **August 2018** (on 1 August; $\lambda=222^\circ\text{Ls}$, $\delta=24.3''$, $\phi=11^\circ\text{S}$, $\iota=06^\circ$), 1st August is the next day of the closest day and the planet is inside the Cap constellation. It still retrogresses and will reach the stationary state on 28 August. The spc hurries to thaw, and from around $\lambda=230^\circ\text{Ls}$, the deviation of the centre of the spc move out from the south polar point. Novus Mons (75°S, 320°W) will be separated as an peninsula at around $\lambda=250^\circ\text{Ls}$. It is the time to watch the aspect of the perimeter of the spc since the apparent diameter is relatively large. The observation of the inside of the spc is still important. Arsia Mons may show still an orographic behaviour but as the phase angle is augmented, it will be harder to get usual results.

8° APPENDIX (given by Masatsugu MINAMI)

Recollections of the Martian Dust Events Observed in the Perihelion Periods in 1956~2003.

We don't recall well what words Don PARKER exactly used, but we clearly remember his persistent impression about the planet Mars: We should say he used to express his complaint that the planet Mars betrayed us over and over again.

For example, even if we try to accumulate the days and places when and where the dust disturbance occurred in the past, these works don't lead us to any useful theorem; that is, the next forthcoming

dust occurrence usually happens to choose a different time (in Ls) and a different place (on Mars).

Perhaps it might have been the first exception when Don PARKER was most pleased because he was able with Tom DOBBINS and others to substantiate the prediction made by Tom DOBBINS and Bill SHEEHAN about the glint/flash phenomenon at Edom on 7 June 2001 at the expedition to Florida Keys. The first email from Don PARKER to me must have been the first email he dispatched pleasantly from the site at the Florida Keys:

Date: Thu, 07 Jun 2001 08:54:27 +0100

From: Donald Parker (dcpmiami@earthlink.net)

Subject: *Edom Brightening*

Dear Masatsugu: I am pleased to report that after two uneventful nights of observing our team here in the Florida Keys detected significant brightness fluctuations over Edom between 06:40 and 07:30 UT on 7 June 2001 UTD.

Getting back to the original subject, we here again show the series of the seasons of the great dust disturbances in the past: In fact, as I remember, the dust disturbances which we remember occurred at $\lambda=183^\circ\text{Ls}$, 205°Ls , 214°Ls , 215°Ls , 224°Ls , 250°Ls , 260°Ls , 270°Ls , 274°Ls , 300°Ls . As noted already the earliest case at $\lambda=183^\circ\text{Ls}$ was the one in 2001, and the cases at $\lambda=214^\circ\text{Ls}$ and 215°Ls will finally be dealt with.

My first experience met with a great dust storm was in 1956. This dust was first witnessed in Japan by several on 20 August 1956 ($\lambda=250^\circ\text{Ls}$) at the Noachis area and has been known since then as the Noachis Dust Storm. I was still a beginner at that time though in the precedent 1954 Mars apparition I obtained a total of 180 drawings mainly by the use of a 15 cm Refractor of the Fukui City Observatory.

In fact I had not had any knowledge about the dust storm at that time. A guide book (made of 102 pages) published by the Seibundo-Shinkosha did not touch the initial state of the dust storm, though the large spread of the yellow cloud was shown such as ANTONIADI's yellow cloud map in 1911. Sadao MURAYAMA (1924~2013), one of the writers

showed some images in October 1941 compared with some taken in November 1941 whose markings were looked obscured by the yellow clouds. However these images did not show good quality of printing. The writers of the booklet include Tsuneo SAHEKI and Shiro EBISAWA in addition to Sadao MURAYAMA. At that time in 1954 they were quite young, of 38, 24 and 29 years of age respectively. By the way I was 15 years old. We just mention that the writers were already established but I suppose they were not matured as much as could predict how and why the emergence of the dust storm started to make a form. In short, they could mention a general aspect of the yellow clouds, but they had never experienced so far the drastic emergence of the dust clouds. MURAYAMA impressively looked back how he noticed the tremendous dust on the Martian disk. On the evening of 20 August it was scheduled beforehand to shoot Mars of $\delta=23.4''$ to record the TV image (by a 2-inch quadruplex videotape or something like that) by the use of the famous/said-splendid 20cm Nikon refractor of the National Science Museum at Ueno in Tokyo where MURAYAMA belonged. So first an electronic engineer who introduced the Martian image into the TV screen asked MURAYAMA what was this bright patch inside the Martian disk. As such MURAYAMA was led to chase the geminating state of the so-called dust cloud. EBISAWA was a follower of MURAYAMA at that time.

This dust cloud on 20 August was also observed by several others. Among them Shotaro MIYAMOTO (1912~1992, 44 of age at that time) was beginning to carry out his life as a Mars observer and happily encountered the cudgel-like dust tail on 20 August 1956 by the use of the 31cm Cooke refractor owned by the Kwasan Observatory, Kyoto University. We suppose this happening on the day motivated him to continue his meteorological observations of Mars until his official retirement from Kyoto University at the age of 63. It is interesting to note that the drawing at $\omega=333^\circ\text{W}\sim 338^\circ\text{W}$ was no

later than the 7th drawing since his beginning of the Mars observations. He observed once at 13:45~14:06 GMT on 20 August 1956. His next drawing (8th) was made on 25 August at 14:40~15:00 GMT, and the third one (9th) was made on 25 August at 17:15 GMT ~17:55 GMT. MIYAMOTO however looked to be unable to find a confident method for the chasing of the dust phenomenon.

How about then Tsuneo SAHEKI (1916~1996) at Osaka? If we go straight to the point, he could (because of the fine sky), but did not direct the telescope to Mars on the evening and thus he overlooked the major event of the Century. Perhaps, he had been chasing a dusty matter near at Argyre and he had been already exhausted. As to this he made a confession about his situation on the day in an *Astronomical Journal* later in 1971 (*The Tenmon-Guide*, Extra issue in July, pp16&17).

As for me, I was certainly inside the dome of the Fukui City Observatory on the day, without knowing utterly about the incident of the Century. I had not well grown up yet as a Mars observer. My eye was not yet trained to be attentive to every corner of Martian disk. On the other hand, I was mostly interested in the perimeter of the south polar cap (spc) because I was imprinted that the isolation of Novus Mons will occur at $\lambda=250^\circ\text{Ls}$ through a knowledge I previously learned from E C SLIPHER's description or somebody else. A bit of knowledge a child may hold. I was just eager to check the crack which separated Novus Mons from the spc, and so finally satisfied but instead I missed to check the much more important area. Later in 2003, I had a chance to gaze around the peripheral area of the spc at the same Martian season by the use of a big 40cm Newtonian Reflector of Isao MIYAZAKI, at Okinawa, for example on 25 August 2003 (at $\lambda=248^\circ\text{Ls}$) at $\omega=276^\circ\text{W}$. The image of Novus Mons through the 40cm Newtonian appeared much more satisfactorily detailed. (The 15cm old Refractor at Fukui which was used in 1956 was already re-

placed by a nice 20cm Refractor in 1985. Otherwise the seeing condition of Okinawa was truly superior to the condition in Fukui.)

We should say, if we encountered with the strange dust, we had never had any ability to chase the dust movement. As we remember Takeshi HANAYAMA (1937~2017) at the Fukui Observatory took a set of images (on a cabinet dry plate) of the dust on 23 August, and I chased the dust on 25 and 26 August. Takashi NAKAJIMA (1939~), already our comrade, was nominated among the observers who detected a bright dust at Deucalionis Regio later on 3 October 1956 ($\lambda=274^\circ\text{Ls}$).

In 1971, a conspicuous dust disturbance occurred at $\lambda=260^\circ\text{Ls}$ on 22 September 1971 ($\delta=19.1''$), but the place was not visible from Japan. Furthermore we had no information about the newly arisen dust. I was observing at that time at the Department of Astrophysics, Kyoto University until 27 September but on the next day I departed from Kyoto to Sapporo, Hokkaido to attend the 1971 Annual Meeting of the Physical Society of Japan. On 30 September I stayed in Sapporo. On 3 October I went further northwards to Siretoko where I saw the bright Mars by naked eyes. On 7 October, I moved back to Hakodate, and then I arrived at Kyoto via Fukui on 10 October. Already the influence of the dust was going to be checked from Japan. It was cloudy on 11 October when I first heard about the dust covering from Dr K of the Astrophysics Department by phone. The first observation was made on 12 October, but it was very very late to start. Professor MIYAMOTO at Kwasan was on alert from the beginning and according to his Observing Notes he detected the fact the evening terminator was covered by the bright dust on 27 September at $\omega=119^\circ\text{W}$. On 29 September ($\lambda=264^\circ\text{Ls}$) he observed hour-to-hour at $\omega=085^\circ\text{W}$, 104°W , 120°W , 131°W , 152°W and the observations suggest that further chase of the dust must have been necessary. On the same 29 September, Reiichi KONNAI also obtained a nice drawing at $\omega=118^\circ\text{W}$

when $\delta=18.2''$. I myself was stupidly confined inside a train to Sapporo on the day.

Since I did not have any telescope of my own, I was to experience a similar drama in the following 1973 apparition, when the planet Mars was closest to the Earth on 17 October with the maximal diameter $\delta=21.5''$. The big dust event started from $\lambda=300^\circ\text{Ls}$ at around Solis Lacus and it was observed from Japan. Before 15 October, I attended the 1973 Annual Meeting of the Physical Society of Japan held at the Niigata University, and on the way back I dropped in Kanazawa on 14 October to see my old friend called Toshiji KURODA (1938~). He was already an important staff of the KIT (Kanazawa Institute of Technology) and on the later occasion when we held the Lowell Conference in 2004 at Anamidzu, we got a lot of help from him. On the evening of 14 October, we happily spent the night chez KURODA without knowing my destiny. On the next day, I took a train to Fukui, where I was picked up by Takashi NAKAJIMA to go up to the Fukui City Observatory. As soon as we introduced the planet Mars inside the eye-field, we readily noticed that a splendid dust was there covering the Solis Lacus area. I remember I persuaded NAKAJIMA to inform the local newspaper of this News. He a bit hesitated because I asked him *not* to be named MINAMI in the News. This was because I intuitively felt that I needed to stay at Fukui at least for a few days, and it implied that I should play truant from my duty in Kyoto. NAKAJIMA seemed finally to want my affirmation that it was really a true dust storm. I told him so two several times. I don't quite remember the details, but the news article surely appeared in *the Fukui Shimbun* with his drawing made on 15 October 1973.

The dust was still recycled on the next day, and also on 17 October....and finally the area of Solis Lacus was gone away. I liked the mild appearance of the main part on 16 October with a split form. The dust on 15 October looked fresh, but it was not of the first day but just of the third day

according to the later analysis at the Lowell Observatory. At any rate, thanks to my further stay at Fukui, I could compare my drawings every day, and felt that the comparison was quite inadequate because some data were lacking. At least hour-to-hour observations were not good to compare, and finally we noticed that the observations made every 40 minutes were needed and they should be performed at the same angles.

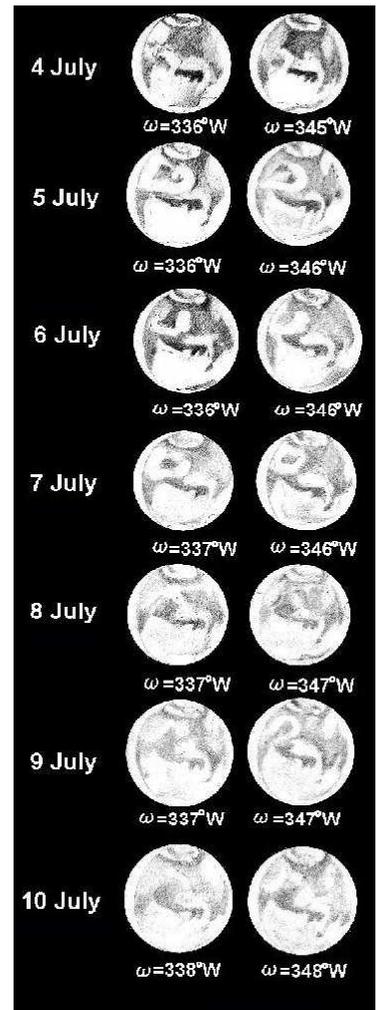
In 1986 and 1988, I went out to the Taiwan expedition. Nominally taking a leave of absence, I went to Taipei to give a series of lectures on some mathematical background of the several non-linear equations once a week in an Academic Institute and/or the National Taiwan University. Also I was permitted to stay in the Taipei City Observatory (directed by 蔡章獻) to use a 25cm Refractor at night. Unfortunately there occurred none of eventful dust storm during the periods of the two apparitions, while I practiced repeatedly every 40 minutes observations of Mars. I obtained a total of about 1800 drawings in 1986 and 1988.

In 2001, we had a vast dust cloud, and I remem-

ber Yukio MORITA issued a nice successful series of images at

$\omega=212^\circ\text{W}$ from 1 July (Day 8) to 4 July (Day 11) which was cited at Page 3 of the *Bulletin of the Fukui City Museum of Natural History* no.55:[1]

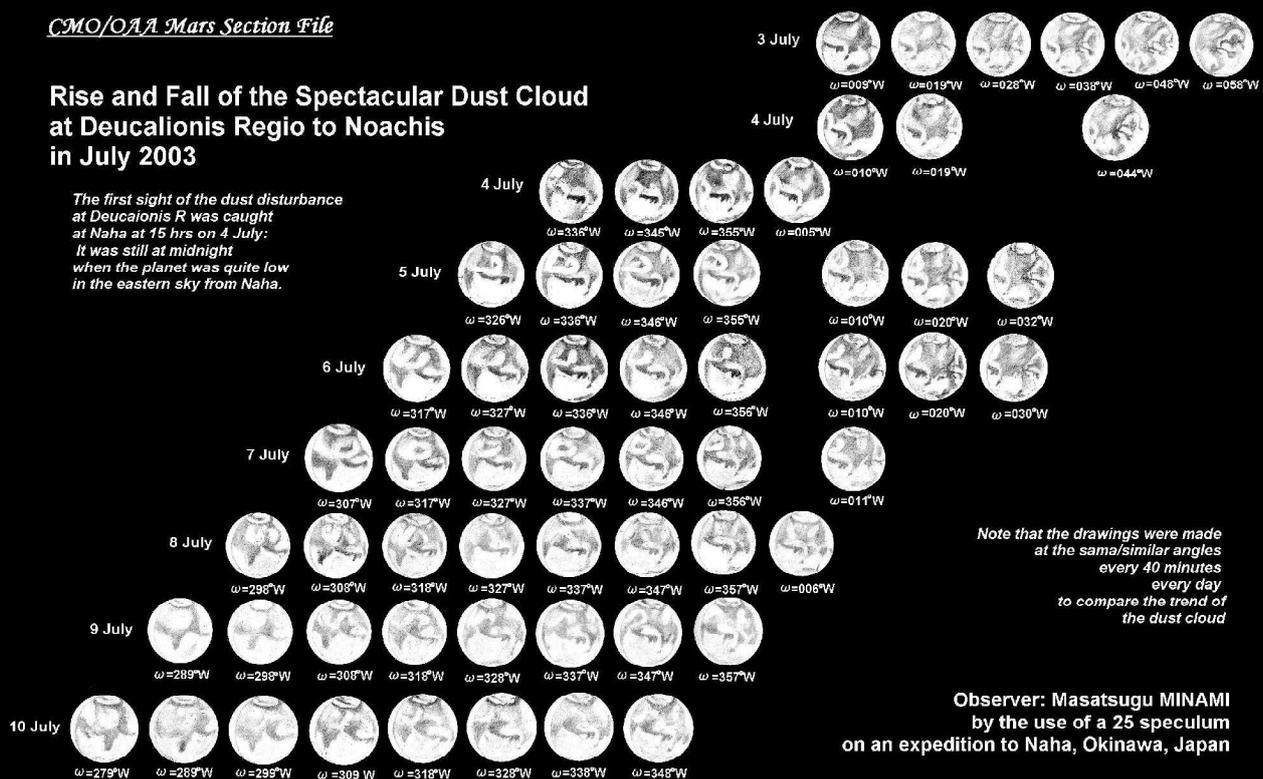
In 2003, we had a good opportunity for comparing the surfaces at the same angles in the case of a dust disturbance which was regarded to have started on 3 July 2003 at the eastern corner of Deucalionis Regio at the season $\lambda=215^\circ\text{Ls}$. This was treated in a



CMO/OAA Mars Section File

Rise and Fall of the Spectacular Dust Cloud at Deucalionis Regio to Noachis in July 2003

The first sight of the dust disturbance at Deucalionis R was caught at Naha at 15 hrs on 4 July: It was still at midnight when the planet was quite low in the eastern sky from Naha.



Note that the drawings were made at the same/similar angles every 40 minutes every day to compare the trend of the dust cloud

Observer: Masatsugu MINAMI by the use of a 25 speculum on an expedition to Naha, Okinawa, Japan

Plate IV

plate shown at Page 10 of the *Bulletin of the Fukui City Museum of Natural History* no.58: [2] where we recorded the surfaces from 3 July to 10 July every 40 minutes. Here we shall repeat to show the plate itself and some enlarged partial segments.

Finally we note that as a dust example at the season $\lambda=214^\circ\text{Ls}$ was the one observed by S EBISAWA on 11 July 1971 at $\omega=320^\circ\text{W}$ by the use of a 60cm

Reflector at the Laboratory of Solar System Physics, Meudon Observatory. The dust bar looks broadly to stay from the upper part of Hellas down to the east end of Deucalionis Regio. This was not seen on the preceding 10 July, and hence the emergence was regarded as occurred on 11 July 1971. See Page 13 of the *Contributions from the Kwasan and Hida Observatories, Kyoto University* No. 210 (1973).

References (URLs)

- [1] <http://www.nature.museum.city.fukui.fukui.jp/shuppan/kenpou/55/55-1-16.pdf>
 [2] <http://www.nature.museum.city.fukui.fukui.jp/shuppan/kenpou/58/58-1-10.pdf>

(to be continued)

CMO/ISMO Mars in 2018 (#04)

Ephemeris for the Observations of the 2018 Mars. II

January & February 2018

by

Masami MURAKAMI

AS a sequel to the preceding list of the Ephemeris for the physical observations of Mars, we here list up the necessary elements of the Ephemeris for period from 1 January 2018 to 28 February 2018. The data are listed for every day at 00:00 GMT (not TDT). The symbols ω and ϕ denote the Longitude and Latitude of the sub-Earth point respectively. The symbols λ , δ and ι stand for the Areocentric Longitude of the

Sun, the Apparent Diameter and the Phase Angle respectively. We also add the column of the Position Angle Π of the axis rotation, measured eastwards from the north point: This is useful when we try to determine the north pole direction from the $p \leftarrow \rightarrow f$. The Apparent Declination of the planet is also given at the final column (denoted D). The data here are basically based on *The Astronomical Almanac for the Year 2018*.

Date (00:00GMT)	ω	ϕ	λ	δ	ι	Π	D
01 January 2018	227.62°W	15.75°N	108.77°Ls	4.79"	30.1°	38.5°	-15°14'
02 January 2018	217.92°W	15.53°N	109.22°Ls	4.81"	30.3°	38.5°	-15°25'
03 January 2018	208.23°W	15.30°N	109.68°Ls	4.83"	30.5°	38.5°	-15°36'
04 January 2018	198.54°W	15.08°N	110.13°Ls	4.86"	30.7°	38.5°	-15°48'
05 January 2018	188.85°W	14.85°N	110.59°Ls	4.88"	30.8°	38.4°	-15°59'
06 January 2018	179.16°W	14.62°N	111.04°Ls	4.90"	31.0°	38.4°	-16°10'
07 January 2018	169.47°W	14.39°N	111.50°Ls	4.92"	31.2°	38.4°	-16°20'
08 January 2018	159.78°W	14.16°N	111.96°Ls	4.95"	31.3°	38.4°	-16°31'
09 January 2018	150.10°W	13.92°N	112.42°Ls	4.97"	31.5°	38.3°	-16°42'
10 January 2018	140.42°W	13.69°N	112.88°Ls	4.99"	31.6°	38.3°	-16°52'
11 January 2018	130.74°W	13.45°N	113.34°Ls	5.02"	31.8°	38.2°	-17°03'
12 January 2018	121.06°W	13.22°N	113.80°Ls	5.04"	32.0°	38.2°	-17°13'
13 January 2018	111.38°W	12.98°N	114.26°Ls	5.07"	32.1°	38.1°	-17°23'
14 January 2018	101.70°W	12.74°N	114.72°Ls	5.09"	32.3°	38.1°	-17°33'
15 January 2018	092.02°W	12.50°N	115.18°Ls	5.12"	32.5°	38.0°	-17°43'

Date (00:00GMT)	ω	ϕ	λ	δ	ι	Π	D
16 January 2018	082.35°W	12.26°N	115.65°Ls	5.15"	32.6°	38.0°	-17°53'
17 January 2018	072.68°W	12.01°N	116.11°Ls	5.17"	32.8°	37.9°	-18°02'
18 January 2018	063.01°W	11.77°N	116.57°Ls	5.20"	32.9°	37.8°	-18°12'
19 January 2018	053.34°W	11.52°N	117.04°Ls	5.23"	33.1°	37.7°	-18°21'
20 January 2018	043.67°W	11.28°N	117.50°Ls	5.26"	33.2°	37.6°	-18°30'
21 January 2018	034.00°W	11.03°N	117.97°Ls	5.28"	33.4°	37.5°	-18°40'
22 January 2018	024.34°W	10.78°N	118.43°Ls	5.31"	33.5°	37.5°	-18°49'
23 January 2018	014.67°W	10.53°N	118.90°Ls	5.34"	33.7°	37.3°	-18°57'
24 January 2018	005.01°W	10.28°N	119.37°Ls	5.37"	33.8°	37.2°	-19°06'
25 January 2018	355.35°W	10.03°N	119.83°Ls	5.39"	34.0°	37.1°	-19°15'
26 January 2018	345.69°W	9.78°N	120.30°Ls	5.42"	34.1°	37.0°	-19°23'
27 January 2018	336.03°W	9.53°N	120.77°Ls	5.45"	34.3°	36.9°	-19°32'
28 January 2018	326.37°W	9.28°N	121.24°Ls	5.48"	34.4°	36.8°	-19°40'
29 January 2018	316.71°W	9.02°N	121.71°Ls	5.51"	34.6°	36.7°	-19°48'
30 January 2018	307.06°W	8.77°N	122.18°Ls	5.54"	34.7°	36.5°	-19°56'
31 January 2018	297.40°W	8.52°N	122.65°Ls	5.57"	34.8°	36.4°	-20°04'
01 February 2018	287.75°W	8.26°N	123.12°Ls	5.61"	35.0°	36.3°	-20°11'
02 February 2018	278.10°W	8.01°N	123.59°Ls	5.64"	35.1°	36.1°	-20°19'
03 February 2018	268.45°W	7.75°N	124.06°Ls	5.67"	35.2°	36.0°	-20°26'
04 February 2018	258.80°W	7.49°N	124.54°Ls	5.70"	35.4°	35.8°	-20°33'
05 February 2018	249.15°W	7.24°N	125.01°Ls	5.72"	35.5°	35.7°	-20°41'
06 February 2018	239.50°W	6.98°N	125.49°Ls	5.75"	35.7°	35.5°	-20°48'
07 February 2018	229.86°W	6.72°N	125.96°Ls	5.77"	35.8°	35.4°	-20°54'
08 February 2018	220.21°W	6.46°N	126.44°Ls	5.81"	35.9°	35.2°	-21°01'
09 February 2018	210.57°W	6.21°N	126.92°Ls	5.84"	36.1°	35.0°	-21°08'
10 February 2018	200.92°W	5.95°N	127.39°Ls	5.88"	36.2°	34.8°	-21°14'
11 February 2018	191.28°W	5.69°N	127.87°Ls	5.91"	36.3°	34.7°	-21°20'
12 February 2018	181.64°W	5.43°N	128.35°Ls	5.95"	36.4°	34.5°	-21°26'
13 February 2018	172.00°W	5.17°N	128.83°Ls	5.99"	36.6°	34.3°	-21°32'
14 February 2018	162.36°W	4.91°N	129.30°Ls	6.02"	36.7°	34.1°	-21°38'
15 February 2018	152.72°W	4.65°N	129.78°Ls	6.06"	36.8°	33.9°	-21°44'
16 February 2018	143.08°W	4.39°N	130.26°Ls	6.10"	36.9°	33.7°	-21°49'
17 February 2018	133.45°W	4.14°N	130.75°Ls	6.14"	37.1°	33.5°	-21°55'
18 February 2018	123.81°W	3.88°N	131.23°Ls	6.17"	37.2°	33.3°	-22°00'
19 February 2018	114.18°W	3.62°N	131.71°Ls	6.21"	37.3°	33.1°	-22°05'
20 February 2018	104.54°W	3.36°N	132.20°Ls	6.25"	37.4°	32.9°	-22°10'
21 February 2018	094.91°W	3.11°N	132.68°Ls	6.30"	37.6°	32.7°	-22°15'
22 February 2018	085.28°W	2.85°N	133.17°Ls	6.34"	37.7°	32.5°	-22°19'
23 February 2018	075.65°W	2.59°N	133.65°Ls	6.38"	37.8°	32.3°	-22°24'
24 February 2018	066.02°W	2.33°N	134.14°Ls	6.42"	37.9°	32.0°	-22°28'
25 February 2018	056.39°W	2.08°N	134.63°Ls	6.47"	38.0°	31.8°	-22°32'
26 February 2018	046.76°W	1.82°N	135.11°Ls	6.51"	38.1°	31.6°	-22°36'
27 February 2018	037.14°W	1.56°N	135.60°Ls	6.55"	38.2°	31.4°	-22°40'
28 February 2018	027.51°W	1.31°N	136.09°Ls	6.60"	38.3°	31.1°	-22°44'
01 March 2018	017.88°W	1.05°N	136.58°Ls	6.64"	38.4°	30.9°	-22°48' ---

Letters to the Editor

●.....*Subject: Mars 7 November 2017 0328UT IR*
Received: 7 November 2017 at 14:14 JST

Hi all, Mars has attained 4" this morning. Another view of the Tharsis plateau, although the large volcanos are not evident yet. Nerigos directly above the NPC. Tanais extends off the Mare Acidalium, as does Nilokeras, extending towards Lunae Lacus. Valles Marineris and Solus Lacus towards the top of the image. I see that my old enemy, the edge artefact, is evident again, so I have some work ahead of me.... Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171107/CFs07Nov17.png>

○.....*Subject: Mars 8 November 2017 0327UT IR*
Received: 8 November 2017 at 13:20 JST

Hi all, Mars IR this morning. Single 45s capture. Rather turbulent seeing. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171108/CFs08Nov17.png>

○.....*Subject: Mars 10 November 2017 0325UT IR*
Received: 10 November 2017 at 15:05 JST

Hi all, Mars this morning. Windy conditions with the planet jumping around, and seeing was poor, but 4x60s derotation managed to pull a little bit of detail out. Some new settings that I tried in AS3! definitely seemed to help(thanks to Emil and Martin), but it will be nice to test further under better conditions. M Acidalium and Niliacus L. coming into view with Nilokeras and Lunae Lacus central. Towards the south, Aurorae Sinus and the Valles Marineris complex can be detected.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171110/CFs10Nov17.png>

○.....*Subject: Mars 17 November 2017 0305UT IR*
Received: 17 November 2017 at 12:53 JST

Hi all, We have been subjected to a cut-off low pressure system over the country for most of the last week with a cold front just having moved through, and a Jetstream approaching 50m/s, so it doesn't get much worse than that.....! Attached is the best I could get this morning Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171117/CFs17Nov17.png>

○.....*Subject: Mars 19 November 2017 0312UT IR*
Received: 19 November 2017 at 14:35 JST

Hi all, Mars IR this morning. Seeing conditions remain poor/challenging. M Acidalium at lower right. Sinus Sabeaus and Sinus Meridiani towards the top, with Syrtis Major starting to come into view. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171119/CFs19Nov17.png>

○.....*Subject: Mars 21 November 2017 0247UT IR*
Received: 21 November 2017 at 12:50 JST

Hi all, Mars IR from this morning. Syrtis Major and Sinus Sabeaus are fairly obvious, with a hint of Hellas and the NPC. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171121/CFs21Nov17.png>

○.....*Subject: Mars 26 November 2017 0244UT RGB and IR*
Received: 26 November 2017 at 20:13 JST

Hi all, We have been having turbulent weather, so I wasn't too hopeful this morning when I got a clear gap, but did think that I detected some detail on screen, so decided to try my first RGB imaging of the apparition. 2 sets of RGB's and I selected the best for combining. It is my intent to run "true" RGB's throughout the apparition. It was nice to see a rather colourful Mars start appearing as I worked through the processing. A nice surprise at this size (4.2"). A rather brilliant white Hellas on the upper following limb and there also appears to be cloud over Elysium on the preceding limb. The NPC is a bit dull by comparison. There is a hint of the Hesperia gap between M Tyrrhenum and M Cimmericum. This first RGB set has certainly got my excitement going with what is to come....

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171126/CFs26Nov17.png>

○.....*Subject: Mars 27 November 2017 0252UT RGB and IR*
Received: 27 November 2017 at 13:41 JST

Hi all, RGB and IR of Mars from this morning. Elysium again prominent. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171127/CFs27Nov17.png>

○.....*Subject: Mars 29 November 2017 0302UT RGB and IR*
Received: 29 November 2017 at 16:30 JST

Hi all, RGB and IR of Mars from this morning. Elysium again prominent. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171129/CFs29Nov17.png>

○.....*Subject: Mars 01 December 2017 0242UT IR*
Received: 1 December 2017 at 21:53 JST

Hi all, An IR capture from this morning taken through incoming cloud, and in poor seeing, which cut the session short. Elysium is central, surrounded by a number of dark markings including Propontis I, Trivium Charontis and Cerberus. I am not 100% sure, but the bright spot appears to be closer to Albor Tholus than Elysium Mons. M Cimmerium towards the top and there also appears to be some structure to the NPC. The NPC outlier would be expected to show a horizontal gap, rather than the vertical gap observed. Any comments welcome

Best regards, Clyde

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171201/CFs01Dec17.png>

Clyde FOSTER (Centurion, SOUTH AFRICA)

●.....*Subject: Mars 2017/11/09-Kumamori*
Received: 10 November 2017 at 13:55 JST

Dear Masatsugu MINAMI, the temperature has been as low as in usual winter, though it still shows 8°C in Osaka. The seeing looks to improve just before the sunrise. Just I got a Red image in the twilight. Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171109/Km09Nov17.png>

○.....*Subject: Mars 2017/11/12-Kumamori*
Received: 13 November 2017 at 17:27 JST

Dear Masatsugu MINAMI, this morning it was a bit colder at 7°C. The seeing condition was generally poorer, but bit improved just before the sunrise. Sorry just no more than an R image. Best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171112/Km12Nov17.png>

○.....*Subject: Mars 2017/11/16-Kumamori*
Received: 17 November 2017 at 15:04 JST

Dear Masatsugu MINAMI, there came a travelling anticyclone over here and the temperature went down to 6°C; the coldest this season. At dawn the seeing somewhat improved to allow me to produce a B image as well as a color cam-image. With best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171116/Km16Nov17.png>

○.....*Subject: Mars 2017/11/20-Kumamori*
Received: 21 November 2017 at 18:12 JST

Dear Masatsugu MINAMI, An atmospheric pressure pattern in winter governed our place, and hence the sky was clear, but the north wind component was too strong to keep the seeing. The B image did never converge and the color cam could not compose the elements. Just some traces of struggles. With best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171120/Km20Nov17.png>

○.....*Subject: Mars 2017/11/27-Kumamori*
Received: 28 November 2017 at 18:36 JST

Dear Masatsugu MINAMI, After a while, we had a mildly cleared sky but the Martian image looked blurred. Made just an R image before the sunrise. With best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171127/Km27Nov17.png>

Teruaki KUMAMORI (Osaka, JAPAN)

●.....*Subject: Thank you note*
Received: 13 November 2017 at 12:16 JST

Dear Masami MURAKAMI, I got the CMO issue and enjoyed it. My computer and I myself are in a better condition. Thanks a lot. My best wishes.

Takashi NAKAJIMA (Fukui, JAPAN)

●.....*Subject: Richard Baum*
Received: 13 November 2017 at 09:39 JST

Just a brief note to say that our great friend and mentor Richard Baum passed away this morning. (Sent from my iPhone)

○.....*Subject: memoir richard baum*
Received: 28 November 2017 at 01:52 JST

Dear friends and colleagues, As many of you know, Richard Baum, a noted amateur astronomer and historian, passed away on Sunday November 12. The funeral is Thursday in Chester. I had a few days off this past week and wrote the memoir attached. Eventually it is going to appear, though in shortened form, in the SHA Bulletin and JALPO; however, the entire piece-illustrated-will be attached as a pdf in the event anyone wants to read it. If you have any corrections or additions, please let me know and I can make them prior to its going into publication. Best,

○.....*Subject: richard baum obituary--final*
Received: 30 November 2017 at 02:22 JST

Hi all, Richard's funeral is tomorrow; I thought that I would send the final version of the obit/memoir I wrote for this dear friend to so many of us in the amateur astronomy world. He will be greatly missed. Best,

○.....*Subject: From Bill Sheehan: obits and things*
Received: 4 December 2017 at 04:37 JST

Dear Masatsugu, I assume, because I have not heard of you for a long time, that you must be quite ill. However, I want not to bother you but to make you aware of some things going on. I am sending the copy of an obituary of my friend Richard Baum, who passed away on November 12 (same day as Percival Lowell 101 years before). This may be appropriate for the CMO. A book, with Dale Cruikshank, on Pluto will be published by U of Arizona Press. This also has chapters on Lowell and the Search for Planet X for which I wrote drafts that were published in the CMO. Finally, I am planning with Rem Stone, Tony Misch, and Laurie Hatch to observe again this coming summer on Mt. Hamilton, and would like to invite you, if you are well enough by then to join us, for the occasion. We would not be bothered by an Englishman of poor manners as last time. All my good wishes,

Bill SHEEHAN (Flagstaff, AZ)

●.....*Subject: Re: Richard Baum*
Received: 13 November 2017 at 13:15 JST

Thanks Bill for posting this... Richard Baum was our ALPO Mercury coordinator in the 1980s and 1990s. I started to correspond with him with my Mercury observations and shortly thereafter, I took over the section after another coordinator after Richard. He was very helpful to me and Richard looked over my Mercury papers many times before I sent them to the ALPO editors. Also, he admired my Venus work over the years especially the night side imaging. I have one of his book, 'The Haunted Observatory'. Richard Baum was the one person I really wanted to meet but unfortunately that never came true. He will be missed. Best,

Frank J MELILLO (Holtsville, NY)

ALPO Mercury Coordinator

●.....*Subject: Re: Richard Baum*
Received: 13 November 2017 at 15:21 JST

Thanks Bill for sharing the sad news, I too greatly admired Richard. His passing is a great loss., and his kindness and enthusiasm will be missed.

Stephen O'MEARA
 (Sky and Telescope, NY)

●.....*Subject: Re: Richard Baum*
Received: 13 November 2017 at 19:53 JST

Dear Bill, very sad news. Such a loss for the community, such an impressive heritage left...

Paolo TANGA
 (Observatoire de la Cote d'Azur, FRANCE)

●.....*Subject: Re: Richard Baum*
Received: 13 November 2017 at 23:25 JST

Sad news that brought back a flood of memories, not all of them astronomical. As you know, Richard was a lad of 10 in the summer of 1940, when the threat of a German invasion of Britain was very real. His father was a constable. This tale of Richard's seems quintessentially British to a Yank...

In the wee hours of the morning during the late summer of 1940 Richard's father came home, woke the household, and announced that there was an invasion alert and reports [spurious] that German paratroops were landing. He asked Richard's mother to take the family to the greater safety of her sister's home in the country. Richard noticed that a holster containing a Webley revolver adorned his father's hip rather than the customary nightstick. He pointed to it with curiosity and his father removed it from the holster and handed it to Richard, eliciting a scream from Richard's mother. Richard's father then uttered: "Not to worry. They haven't issued us any bullets."

Tom DOBBINS (Howard, OH)

●.....*Subject: Mars AK16Nov2017*
Received: 19 November 2017 at 23:34 JST

Dear all, I moved this fall to Hitachi-Oota City, Ibaraki Prefecture where I was born. The aging Ob-

servatory at Nasu-Karasuyama was vanished, and the telescopes and all that were also moved to the new place. Here I tried to take Martian images by using the 32cm Speculum. Please find attached my IR-685 image produced on 16 November 2017 ($\lambda=089^\circ\text{Ls}$) at $\omega=263^\circ\text{W}$ when $\delta=4.1''$.

With best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171116/Ak16Nov17.png>



Tomio AKUTSU (Ibaraki, JAPAN)

●.....*Subject: Mars Nov 26*
Received: 27 November 2017 at 10:40 JST

Greetings, I am sending in my first Mars images of the current season. Sorry but I am using my smaller telescope (203mm). Seeing was average this morning. I did not notice anything unusual on the disk. Thank You

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171126/TW126Nov17.png>

○.....*Subject: Mars Dec 1, 2017*
Received: 4 December 2017 at 09:00 JST

Hello, Sending in the latest Mars observation.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171201/TW101Dec17.png>

Tim WILSON (Jefferson City, MO)

●.....*Subject: Re: Mars 01 December 2017 0242UT IR*
Received: 1 December 2017 at 23:21 JST

Clyde - At Ls 95 of this date, Mars may show linear dust streaks across the NPC. These were particularly prominent and well imaged in 2010, when Mars was near opposition at a similar Ls. So, I suspect that you've picked up a dust streak. Good job! It is now thought that the Rima Tenuis seen in some apparitions was due to dust streaks in the NPC at about this Ls. This feature has not been de-

tected in many apparitions, so it seems likely that it doesn't occur at all in most apparitions. However, we observe Mars to figure out things like this.

○.....*Subject: Re: Mars 01 December 2017 0242UT IR*
Received: 1 December 2017 at 23:29 JST

By the way, your image is with CM about 180 degrees from Sanchez's excellent image of such a streak at Ls 89 on 2010 Feb 2. It appears that you've imaged the cap-crossing streak from the opposite side of the planet! It appears that the streak does have a favored orientation across the cap.

Roger VENABLE (Chester, GA)

●.....*Subject: Re: Mars 01 December 2017 0242UT IR*
Received: 1 December 2017 at 23:29 JST

Dear Clyde, I agree you must have caught a dust streak as that is the only explanation, as Roger clearly writes. They were rather prominent in 2010, and there are also records in 2012 of less prominent ones. What appears to have been another such promising event in 2014 March to May turns out upon closer inspection to have been a small rift cutting off an arc of the cap, the western end of which is near longitude 340 and features on the polar map made by peach for April 2014. Lo res images of it give the impression of dust spread over the cap but if you look only at the sharpest ones it is clearly a rift. Given the improvement in resolution over the previous comparable 1999 opposition we must be careful not to label a previously unresolved seasonal detail as being a transient event! I think Mars is still too small for you to have clearly caught Olympia and the Rima Borealis, although they must have appeared by this time. And another feature which at first sight looks like a dust storm is a little orange patch at the mouth of Chasma Boreale. But better images over more than one opposition show it to be a permanent feature. As it appears in only some images it is easy to mistake it for a transient dust storm.

A series of observations is often needed in interpretation. I am thinking of some marvellous images

of the icy Hellas in 2014 April which at first sight seemed to show fingers of white cloud escaping mostly from the NE side of the Hellas basin. But if one compares images over three months with April in the middle, these fingers of cloud do not move. They are ground frost!

One thing more about a Rima T, though. In 1980 when Rima Tenuis was reported, those reports lasted over at least three months, so if some could have been interpreted as a dust streak, not all of them could. It is also likely the observers were misled by viewing Chasma Boreale from the Sinus Sabaeus side, for it curves round to nearly meet the edge of the cap there. Lack of resolution and the human brain would do the rest by completing the rift. The other reason for writing this is that although there were sightings of the rift from the Sabaeus end, there was but one drawing or photo that showed a mere indentation in the outline of the cap at the opposite side. As I pointed out at the time, you cannot have a rift bisecting the cap if it does not come out the other side! But I am certainly now coming to the view that certain past observations

can be explained as dust streaks rather than observer error.

I have now nearly completed the 2014 report which will feature a lot of your work, and reports for 2010 and 2012 now wait for space in the Journal.

Good wishes and keep up the good work,

○.....*Subject: Season's greetings*
Received: 10 December 2017 at 19:36 JST

Dear Masatsugu,



With best regards

Richard McKIM (Peterborough, the UK)
 Director, the BAA Mars Section



CMO/ISMO 2018 Mars Report #01

2018 CMO/ISMO Mars Observations in October ($\lambda=072^\circ\text{Ls}$) and November 2017 ($-\lambda=094^\circ\text{Ls}$)

By
Masatsugu MINAMI and Masami MURAKAMI

♂.....It has now begun the season of the 2018 Great Apparition of Mars. Mars will be closest to the Earth on 31 July 2018 when the angular diameter δ will attain 24.31". This column is for the first CMO/ISMO Mars Report which is based on the images sent by the ISMO members from the period of October and November 2017.

The first image was provided by Teruaki KUMAMORI (*Km*) who gave an auspicious start on 9 October ($\lambda=072^\circ\text{Ls}$) with a very excellent R image even though the planet was still so far away that the apparent diameter was mere $\delta=3.7''$: It nicely shows the dark markings of Syrtis Major and Utopia as well as a bright matter covering the arctic area. (See the image shown at the Façade:

<http://www.mars.dti.ne.jp/~cmo/ISMO.html>)

Next we received another IR Mars on 12 October ($\lambda=073^\circ\text{Ls}$) of $\delta=3.7''$ from Clyde FOSTER (*CFs*), South Africa, and until the end of November we received from four members as shown below with a total of 26 images. During this period, the planet, after the conjunction on 27 July, continued a prograde motion from the Leo constellation to the Vir constellation. The apparent declination D went southwards.

The altitude at the time of sunrise was low (seen from the Northern Hemisphere) so that the time of

shooting was never long enough. At the end of November the angular diameter reached $\delta=4.2''$, and the Martian season proceeded to $\lambda=094^\circ\text{Ls}$: On 20 November 2017 the northern summer solstice ($\lambda=090^\circ\text{Ls}$) was attained. The tilt went back from $\varphi=25^\circ\text{N}$ to $\varphi=22^\circ\text{N}$. The phase angle ι increased from 19° to 25° . In the latter part, some colour cam images were issued, but not so many.

The broken lantern images of the MRO MARCI suggest some dusts around the residual northern polar cap, and the orographic activity is still in season at Tharsis Montes, Olympus Mons and Elysium Mons. Hellas was whitish bright. No big disturbance could be trapped.

♂..... We received a total of 26 images with thanks from four members as shown below

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

1 IR Image (16 November 2017) 32cm Spec with an ASI 290MM

FOSTER, Clyde (CFs) Centurion, SOUTH AFRICA

3 Sets of RGB + 14 IR Images (12 October; 1, 3, 5, ~8, 10, 17, 19, 21, 26, 27, 29 November 2017)
36cm SCT @f/27 with an ASI 290MM

KUMAMORI, Teruaki (Km) Sakai, Osaka, JAPAN

2 colour* + 10 R + 2 B Images (9, 26, 31 October; 1, 4, 9, 12, 16, 20, 27 November 2017)
36cm SCT @f/35, 40 with an ASI 290MM & ASI 224MC*

WILSON, Tim (TWI) Jefferson City, MO, the USA

1 IR Image (26 November 2017) 20cm SCT with an ASI 290MM

♂..... We shall give some short reviews for several images. As often said, the R image given by KUMAMORI (Km) on 9 October ($\lambda=072^\circ\text{Ls}$) at $\omega=271^\circ\text{W}$ is quite excellent for the period where the angular diameter δ of Mars is under $4''$. We can compare the brightness of Hellas and the residual north polar cap (npc). It also shows a delicate variation of the area near the evening terminator. It must have been difficult to take any image before the time, but if we could, the variation near the terminator must have been interesting. Hellas will be more whitish as the season approaches $\lambda=100^\circ\text{Ls}$. The north of the tip of Utopia is also nuanced.

On 31 October ($\lambda=082^\circ\text{Ls}$) at $\omega=060^\circ\text{W}$, Km's R image shows Hyperboreus Lacus clearly adjacent to the residual npc in good contrast. Niliacus L is also shown largely, and Ganges and Ophir are described as a good pair.

On 1 November ($\lambda=082^\circ\text{Ls}$), FOSTER (CFs) showed an image at $\omega=155^\circ\text{W}$ where the positioning of smaller markings is difficult. There seems to be shown a dusky surrounding of the residual npc as if the cap is split. A swirl of some dust may possibly be crossing the residual cap.

Km took an image on the day at $\omega=050^\circ\text{W}$: As before Niliacus L looks larger. It seems there is seen a canal inside Chryse. The residual npc is rather smaller. Hyperboreus L is fainter than before.

On 3 November ($\lambda=083^\circ\text{Ls}$) CFs delivered an image at $\omega=135^\circ\text{W}$ where the area of the npc looks split. In such a case, we need at least two images separated by 5 degrees or so, though at present it may be hard to produce another image.

On 4 November ($\lambda=083^\circ\text{Ls}$) at $\omega=019^\circ\text{W}$ Km produced an excellent image where the main part of Mare Acidalium is nicely shown and Iaxartes is sharply sent down. The residual npc is also taken in a good shape. Argyre does not send any signal. Oxia Palus is definite and sends a canal downwards. Chryse shows a canal inside. This image is excellent unbelievably for the diameter $\delta=3.9''$.

CFs's image on 6 November ($\lambda=084^\circ\text{Ls}$) at $\omega=102^\circ\text{W}$ shows us several minor markings, but it is still hard to tell the details. The main part of the residual cap must be checked.

Km's image on 9 November ($\lambda=086^\circ\text{Ls}$) at $\omega=335^\circ\text{W}$ is a good image with a good contrast. The residual npc is rather bright. The shape of M Acidalius is rarely met in this form. Aram is light in a good contrast.

On 12 November ($\lambda=087^\circ\text{Ls}$) at $\omega=308^\circ\text{W}$, Km produced another image in less contrast than that on 9 November, but Edom is seen light, and the region from Dioscuria to Cydnia is nicely shown to have several complexed dark spots. Now the time of Hellas is coming.

Km's image given on 16 November ($\lambda=089^\circ\text{Ls}$) at $\omega=261^\circ\text{W}$ is a colour image by ASI 224MC. The colour image gives a good feeling. Hellas near the morning limb is not very white, but well whitish. The white colour of the cloud over Elysium Mons is outstanding. The Æteria dark patch follows the Elysium Mons cloud. The residual npc looks mild. Hesperia is visible. Utopia is shown largely rich in light and shade. The derotation is made with a width of 6°W .

On the same day, AKUTSU (Ak) issued an IR685 image at $\omega=263^\circ\text{W}$. Just Syrtis Mj is shown but Utopia looks simply more faded. Ak's angle is not so different from Km's. But there must be a great difference between their workmanship.

On 20 November ($\lambda=090^\circ\text{Ls}$) at $\omega=222^\circ\text{W}$, Km gave a less vivid image. However Elysium is nicely shown more inside. M Cimmerium looks to be going to show the details when the angular diameter is much bigger. The residual npc must be quite whitish.

CFs's IR image on 21 November ($\lambda=090^\circ\text{Ls}$) at $\omega=307^\circ\text{W}$ shows darkly Syrtis Major, Sinus Sabæus follows. The residual cap looks tight.

CFs made a colour composite on 26 November ($\lambda=093^\circ\text{Ls}$) at $\omega=258^\circ\text{W}$. Hellas is whitish and Elysium is whitish near the evening terminator. The residual cap looks pinkish.

CFs's image on 27 November ($\lambda=093^\circ\text{Ls}$) at $\omega=250^\circ\text{W}$ is also coloured. Hellas is pleasantly whitish near the limb. Elysium is also whitish. The area of the npc is a bit blurred. The desert following Syrtis Mj is nicely reddish.

Finally CFs gave a colour composite on 29 November ($\lambda=094^\circ\text{Ls}$, $\delta=4.2''$) at $\omega=233^\circ\text{W}$. The whitish Hellas is coming in, and Syrtis Mj near the morning limb looks bluish. Elysium is pinkish light. The npc is rather whitish. Hesperia is visible. □

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CMO n°464/ ISMO #90 (25 December 2017)

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