福井市自然史博物館研究報告　第63号：1-10（2016）
Bulletin of the Fukui City Museum of Natural History, No.63, 1-10（2016）

Mars Observations in 2005, Part III

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(Abstract) The present article deals with the observations of Mars carried out at the Lick Observatory, University of California, by the use of the 91cm grand refractor during a period in October 2005.

1. Introduction

As was reported in Minami, 2013, the planet Mars in the 2005 apparition was closest to the Earth on 30 October 2005 at 03:26 GMT with the maximal diameter δ=20.2". In this apparition the present writer started his routine Mars observation from 22 November 2004 at the Observatory of the Fukui City Museum of Natural History just when the angular diameter of Mars was merely δ=3.8". Another important index is the Martian season λ indicated by the Areocentric Longitude of the Sun (Ls). The Martian vernal equinox on the northern hemisphere (or the Martian autumnal equinox on the southern hemisphere) occurs when λ=000°Ls. The Martian season on 22 November 2004 was λ=119°Ls, just after the southern winter solstice λ=090°Ls.

The present writer observed a total of 201 drawings of Martian surface during the period from 22 November 2004 to 7 August 2005 (δ=11.8", λ=265°Ls) and the observations were reported in Minami, 2013. As a sequel, the present writer published in Minami, 2015, a report of a total of 156 observations made at the Fukui City Observatory compiled from 16 August 2005 (λ=270°Ls, δ=12.6") to 30 September 2005 (λ=298°Ls, δ=17.8"). Thus the observations hitherto performed amounted to a total of 201+156=357.

2. Observations at the Lick Observatory until mid-October 2005

As a sequel to the observations reported in Minami, 2013&2015, we will here be concerned with a total of 68 observations made at the Lick Observatory during the period from 6 October 2005 at 06:20 GMT to 24 October 2005 at 08:40 GMT (from the 358th to the 425th drawing) by the use of the famous 91 cm (36") grand refractor. On 25 October, the present writer returned to Fukui, and resumed his observations from 25 October 14:00 GMT at Fukui. This routine observations together with Takashi NAKAJIMA in Fukui continued until 29 June 2006 (λ=073°Ls, δ=4.0").

As stated in Minami, 2015, after the present writer made the 357th observation this season on 30 September 2005 at 16:40 GMT, he left his home at Mikuni on 3 October 2005 at 09:30 JST, and took a domestic flight of the ANA754 from the Komatsu Airport at 11:50 JST and reached the Haneda Airport at 12:55 JST. From Haneda to the Narita Airport we took a train, and at Narita we took another flight of American Airlines 128 with seat 40J (B777) which departed at 17:15 JST and landed to San José at 09:40 PDF (earlier than scheduled 10:05 PDT). Here PDT=Pacific Daylight Time and 10h PDT implies 2h JST on the next day. We were forced to spend about two hours by the long and tedious winding queue at the immigration check. Finally I received a pickup by Bill SHEEHAN. He looked slimmer than before and talked more rapidly. The sky was fine at San José. Bill borrowed a rent-a-car, and went to a nice place surrounded by palm trees where Tony MISCH lives. Tony MISCH was a staff of the Lick Observatory and was to operate the big refractor [see Sheehan and others, 2003, for the case in 2003]. We talked for a while chez Tony MISCH and then they went back again to the Airport to receive a talkative guest from the UK.

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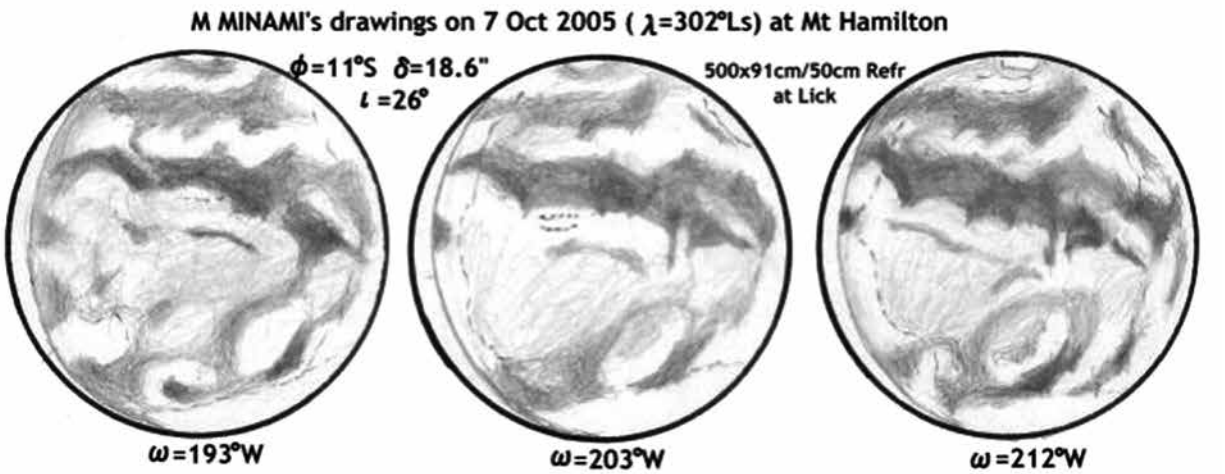
It was on the evening PDT of 3 October (or on 4 October 2005 GMT) that we went up to Mt Hamilton. The sky was clear and the planet Mars was shining. But it was not planned to observe Mars. The Internet by Nifty at the waiting room of the big 36" dome was out of order (later Tony kindly improved). On 4 October PDT, the sky was clear from the morning. I changed my sleeping room to a room in another guest house with a dining room. This building was closest to the 36" dome. I operated a personal computer (brought from Japan) in the waiting room of the 36" dome from 10h PDT to 17 PDT (editing the CMO and so on). We dined at about 18h PDT. Note that 17h PDT implies the mid-night in GMT.

The Objective Glass of the 91cm Refractor at the Lick Observatory, California

In Japan, at that time, it was possible to begin observing Mars from around 23h JST (14h GMT), we might roughly be convinced that Mars could be observed in California from around 23h PDT (or 6h GMT on the next day). So I tried to stand by from 21h PDT, but the talkative English-man was continuing a nebular/cluster hunting at the telescope east, and thus we wasted time. Much after the midnight, I was allowed to approach the eye piece which was however astonishingly equipped with a Diagonal. I remembered that Bill SHEEHAN and others were using the Diagonal in 2003, but I myself would like to flatly refuse the mirrored Mars image where right and left are reversed. I gradually lost my temper and went back to my room in the guest house. I took a shower and fell asleep at 2h PDT.

On the morning of 5 October PDT, we had a smiling sky. I got up at 08:30 PDT. At 10:30, I had a cup of coffee at the dining room. At 12:30, I had lunch alone. At 13:00 I went to the building of the 36" dome, and looked through the shop. After dinner, I took a rest, and went to the Observatory again. Before 22:00 PDT on 5 October (5h GMT on 6 October), Tony came up to set the big refractor to be telescope west (this is a hard work). From around 23h PDT, I started to observe Mars. More exactly I began watching Mars at 06:10 GMT on **6 October**. I observed for 20 minutes and ended the observation at 06:30. I recorded the observation time at 06:20 GMT (on 6 October). This was the first observation made at Lick, and at the same time the 358th observation of the 2005 apparition of Mars. At that time, the longitude of the Central Meridian (CM) ω=168°W, the central latitude or the tilt ϕ=11°S, the Martian season in Ls was λ=301°Ls, the apparent diameter was δ=18.5", and the phase angle was ι=27°. The telescope used is the 91cm Refractor with the aperture stopped down to 50cm. The focal length is 17m63cm, and the ocular used was a 35mm eyepiece. The magnification was about 500×. The seeing condition was not preferable, rather very poor. (From now on, the observing note is written in italics and we write the note in the present tense: *The south polar cap* (*spc*) *looks not so clear. However Caralis Fons to the south of Mare Sirenum is clearly seen. The Arsia orographic cloud is evident near the evening terminator. The colour of the deserts is not exactly reddish, but quite brownish or brick reddish* (I was aware of the situation on the preceding day on 5 October GMT when I gave a glance through the unpleasant diagonal). Usually we observe every 40 minutes, but when there are two or more members to observe, it is difficult to choose the time system. So the second observation (359th) was given at 07:20 GMT on 6 October when ω=182°W. The seeing condition a bit improved. *The Ætheria dark patch is now apparent. Propontis I is also dark definite. M Cimmerium is completely visible inside the disk. The area of Eridania to Ausonia is bright. Because of the use of an orange filter, the terminator cloud is not seen clearly. Valhalla is also dim*. The 3rd observation (360th) was made at 08:30 GMT when ω=199°W. *Mare Chronium*

is of a wine-colour especially at the morning side. M Cimmerium looks greenish. Thru the Wr#25R filter, Eridania looks very bright. There is seen a series of small dots along the northern coast of M Cimmerium in Integrated (Int) light but not in Red. Mare Tyrrhenum is faintly greenish but darker at the morning side though misted. The central region is light brownish in Int. A spot to the north of M Sirenum is very apparent. The fourth observation (361st) was given at 09:20 GMT, when ω=212°W. *Hadriacum M (Mare) is apparent. The western end of Valhalla is obvious in Int. Nodus Alcyonius is now quite evident near the morning terminator, and Syrtis Major (Mj) is coming in. Propontis I is obscure on the evening side. The north polar hood (nph) is also not clear cut. The deserts take the colour of brick red. It is hard to have a clear view of the south circumpolar region because the image is very bright*. On **7 October GMT**, the seeing condition slightly improved (poor to moderate). The 1st drawing (362nd) was taken at 06:10 GMT when ω=156°W, ϕ=11°S, λ=302°Ls, δ=18.6" and ι=26°. *The spc is clear, though small and very flat. The preceding cloud of Phœnicis Lacus (L) is very bright near the terminator, which is followed by a cloud and a stain of Arsia Mons. Olympus Mons looks now faded. Valhalla is visible in Int, but not so in Wr#25, following M Sirenum which is dark and looks quite classical. Propontis I is now clearly seen near the morning limb*. The 2nd sketch (363rd) was made at 06:50 GMT when ω=166°W. The seeing condition was moderate. *The shadowy summit of Olympus Mons is quite faint and the aureole around it is less light than the surrounding of Propontis I. Valhalla is seen dark in Int but not in Wr#25. The curved canal from Caralis Fons southwards is clearly visible. M Tyrrhenum is already seen near the morning limb. The Arsia cloud is now largely unified near the evening terminator.* The 3rd sketch (364th) was made at 07:40 GMT when ω=178°W. *Now the Arsia cloud is whitish bright near the terminator. Olympus Mons is still seen but looks obscure. The bright surrounding area of Propontis I is interesting bounded by a curved canal which runs to Trivium Charontis. The Ætheria dark patch is already inside the disk and so Elysium is apparent. Valhalla is also quite visible. The central desert area shows sometimes a ruddy colour (though almost always in a brick red colour)*. The 4th drawing (365th) was taken at 08:40 GMT when ω=193°W. The seeing condition was a bit deteriorated. *The morning white mist covers the limb area. Cerberus is surely visible but fainter. Valhalla is dimmer, just to the north of M Cimmerium. It seems that a vast mist follows the area of Olympus Mons*. The 5th (366th) was obtained at 09:20 GMT when ω=203°W: *Elysium is reddish, slightly lighter than the surrounding desert. Propontis I has become fainter. The west-end spike of M Cimmerium is clearly seen with the ant's legs connected with the Gale crater on one hand and with the Knobel crater though the figure of the Herschel crater is not evident. M Tyrrhenum is darker at the following part. M Hadriacum is a bit seen. Hellas is coming in, but not explicit in Wr#25. Notable is a dark spot at (or on) the terminator (to the north of M Sirenum, see Figure at ω=203°W below)*. The 6th (367th) was made at 10:00 GMT (3h PDT) on 7 October when ω=212°W. The seeing condition



improved to moderate (3/5) because the planet was high up.

Syrtis Mj is greenish quite near the limb and was detected at 09:55 GMT. At the preceding terminator the dark spot previously seen is very evident (see the Figure above at ω=212°W). The terminator is covered by an evening mist. Elysium is roundish lighter with some fine structure inside (the western part is lighter bounded by the Ætheria dark patch. Propontis I is now lost near the evening terminator. The spc is well visible with a hazy spot to the north of the cap. M Cimmerium now shows further details including the Herschel crater at the following area and the light and shade preceding area. I observed up until 10:20 GMT on 7 October. On the morning of **8 October PDT**, the sky was clear but it turned foggy to cloudy and windy in the evening PDT. I waited for, but left the 36" dome to go to the guest house. I strayed the usual way back, however, because of the darkness around the road. On **9 October PDT**, at lunch I was with Professor Stanley BROWN whom I did not know well. When we were two, he chanted to me "*Bon appétit*". To dinner, there came a total of ten scholars and students including Stan and female researchers. Tony came near at mid-night. On **9 October GMT** we started observations from 6:50 GMT when ω=148°W (368th), φ=11°S, λ=303°Ls, δ=18.8" and ι=25°. The seeing condition was very poor. *The Arsia cloud shows up. The area of Olympus Mons looks complexed. The preceding terminator is bright.* The 2nd sketch (369th) was made at 07:30 GMT when ω=157°W: *The spc is clearer than in the previous session. Ausonia is bright near the morning limb. Propontis I is still obscure. The colour of the deserts is ruddy, never orangish.* The 3rd sketch on the night (370th this apparition) was made at 08:10 GMT when ω=167°W. *The Arsia cloud is largely bright followed by a stain. Propontis I is still obscure adjacent to the nph. Ausonia is less bright than the preceding case. Eridania is also light.* The 4th observation (371st) was made at 08:50 GMT when ω=177°W. The condition a bit improved. *Propontis I is now very conspicuous surrounded by a light doughnut-like ring. The Ætheria dark patch has become darker. The Arsia cloud was thick at the beginning of the session, but became fainter at the end (09:10 GMT).* The 5th sketch (372nd) was made at 09:30 GMT when ω=187°W. Bill SHEEHAN returned from Mt Wilson and showed up at the dome at around 02:10 PDT (09:10 GMT). The seeing condition turned to very poor. *Again Propontis I is obscured perhaps because of the intrusion of the nph. Elysium is evident but Phlegra is not so conspicuous. The Ausonia area is clear.* The 6th observation (373rd) was made at 10:10 GMT on 9 October when ω=196°W: *The morning side is rather clearly presented: M Tyrrhenum shows up though faint in intensity. The Ætheria dark patch and N Alcyonius are quite evident. The evening side is generally obscure.* On 9 October PDF, I had lunch together with Prof Bon app! and for supper a dozen of scholars and students sat around a table including our group. On **10 October GMT**, we started the observation from 07:20 GMT on 10 October where ω=146°W (374th), φ=11°S, λ=304°Ls, δ=18.9" and ι=24°: The seeing condition is unstable; usually very poor but sometimes improved to moderate. *The spc is clearly seen roundish bright. M Sirenum is dark and definite and looks made of several parts. Solis Lacus is large but obscure near the terminator, and looks covered by the mist which precedes the Arsia cloud. (Under the poor seeing the limb side is yellowish bright, while if the seeing improves the whiteness stands out.) The nph is looks narrower today. Propontis I is coming. The central spot of Olympus Mons is sometimes visible. The desert is of brick reddish colour.* The next sketch (375th) was made at 08:00 GMT when ω=156°W: *The evening haze is distinct to the north of Solis L. There are a few cloud-patches near Phœnicis Lacus. There is a light spot between Olympus Mons and Propontis I (which just appeared).* The 3rd drawing (376th) was made at 08:40 GMT when ω=164°W: *The spc looks narrower than the case at ω=146°W (80 minutes before). The Preceding part of the Arsia cloud is very thick and has a definite perimeter.* On the morning of 11 October PDT, I was sorting out CMO #310 (10 October 2005 issue), and in the evening before the observation time, I was first shown kindly by Tony the 91cm Objective Glass which looked quite clean (heard that it was repolished in the 1980's). On **11**

October GMT, we started from 06:00 GMT (23h PDT) at ω=117°W (377th), φ=12°S, λ=304°Ls, δ=19.0" and ι=24°: The seeing condition was moderate. *Solis L is as dark as M Sirenum. Thaumasia shows a clear contour. Claritas is not bright in particular. Tithonius Lacus is slightly fainter. Ascræus Mons is evident without cloud while Olympus Mons is dim*. The 2nd observation (378th) was done at 06:50 GMT when ω=130°W. *The spc is quite clear, while Olympus Mons is obscure. Phasis is dark. The Arsia cloud begins to show up. The terminator side does no longer show the sick cloud, while a condensation precedes Solis L*. The 3rd sketch (379th) was obtained at 08:00 GMT when ω=147°W. The seeing is very poor. *The terminator cloud at the (classical) Tharsis area is thick and the Arsia cloud follows. Solis L is already faint. The spc looks narrower. Eridania is light, but the preceding continents are dull*. The 4th one (380th) was made at 08:40 GMT when ω=156°W. The seeing was poor to mediocre. *M Sirenum looks compact, and its eastern tail goes to Araxes. A dark spot is constantly visible to the north of west end of M Sirenum. The terminator clouds obey the topology around Arsia*. The 5th one (381st) was made at 09:20 GMT when ω=166°W. The seeing improved to moderate. *There is seen a series of dark dots which is curved upwards from Caralis Fons. The cloud at the classical Tharsis and the following cloud of Arsia are white, but decreasing. The whiteness is in good contrast with the reddish desert. Propontis I is completely seen adjacent to the nph. Cerberus is faintly brownish*. On the morning of 12 October PDT, I finished the edition of CMO #310. On **12 October GMT**, the first drawing (382nd) was made at 05:40 GMT when ω=103°W, φ=12°S, λ=305°Ls, δ=19.2" and ι=22°: The seeing was moderate to poor. *Solis Lacus is totally visible, and its shape reminds us of the one in 2003. Phasis is down to Acampsis. A shadowy area follows Phasis pinched by Phasis and the tail of M Sirenum. The northern part of Claritas is bright. Agathodæmon is evident as well as Juventæ Fons, while Tithonius L is obscure. Notable is the dark brownish area adjacent to the nph*. The 2nd one (383rd) was made at 07:00 GMT when ω=023°W: *The spc is clear and already narrower. Agathodæmon is now dimmer while Auroræ S is darkish. There are seen two roundish light areas near Olympus Mons. The Arsia cloud is not so evident*. The 3rd sketch (384th) was made at 08:00 GMT when ω=138°W. *To the north of Solis L, the terminator evening cloud is largely explicit. The cloud associated with Arsia Mons is roundish definite*. The 4th one (385th) was made at 09:20 GMT when ω=157°W. *Olympus Mons faintly shows up. Valhalla is well visible. Propontis I is now witnessed adjacent to the nph. The Arsia cloud is checked near the terminator. Phœnicis L is dark evident near it*. On **13 October**, the big 36" refractor was operated by Rem STONE tonight. The seeing condition is poor to moderate, while on the occasion of 5th observation it improved to good, sometimes excellent. The 1st observation (387th) was made at 05:50 GMT when ω=097°W, φ=12°S, λ=305°Ls, δ=19.2" and ι=22°: *The spc is very clear. The lower tail of Solis L is down to the area of Tithonius L. The following part of the lower tail is bright as well as Claritas. Ophir is much brighter. Agathodæmon is dark, but the following part of Tithonius L lacks details*. The 2nd drawing (387th) was made at 06:30 GMT when ω=107°W: *Still Arsia cloud is not explicit. Ophir is bright, and a roundish light area is seen in the classical Tharsis. Claritas is light and Phasis looks still complete. The tail of M Sirenum is visible separated from Phasis*. The 3rd drawing (388th) was made at 07:40 GMT when ω=124°W: *To the north of Agathodæmon the evening cloud is dominant. Phasis evident with a darker part and Claritas and its northern opposite are equally bright. The Arsia cloud is not white but a bit yellowish light patch*. The 4th drawing (389th) was made at 08:20 GMT when ω=136°W: *The Arsia cloud is made of three parts: one is definite to the SW of Phœnicis L and the other, less definite, is lower than Phœnicis L. The third one follows the first. Claritas is light, not so whitish. Olympus Mons is dim, but shows up when the seeing improves. The nph is white composed of a few limb patches*. The 5th drawing (390th) was made under good seeing at 09:40 GMT when ω=153°W after Bill SHEEHAN's long watching: *The cloud that follows the sinking Solis L is whitish, but at first the Arsia cloud was not whitish though light enough. The upperpart is brighter. Gradually they*

coalesced and become a larger terminator cloud. Olympus Mons is visible though no dense dark core is there. The lighter ring at the flank is also dimmer. Propontis I is very dark surrounded by a light ring. Valhalla is checked to the north of the western part of M Sirenum. The curved canal from Caralis Fons is evident. I continued to watch up until 10h GMT. On **14 October**, the 1st observation (391st) was made, under good seeing, at 05:50 GMT where ω=094°W, φ=12°S, λ=306°Ls, δ=19.3" and ι=21°: *The spc is clear, looking to be divided. The evening terminator is covered by water condensate. Generally the left-hand side of the disk is misty, while the rhs looks ruddy. Ophir is bright, and Iuventæ Fons is easily visible. Ganges is broad. Solis L, not so dark, occupies the area near the CM (central meridian) with several spokes. M Sirenum is quite dark even near the limb.* The 2nd observation (392nd) was made late at 09:00 GMT when ω=134°W: The seeing deteriorated. *The Arsia cloud is definite and bright following Phasis and Phœnicis L. The terminator cloud is not so conspicuous. Olympus Mons is identifiable with an aureole but not misty.* Then the dome was closed due to the foggy condition. I worked for the CMO Web inside the preparation room of the big dome until after 3h PDT. It was still foggy outside. The morning of 15 October PDT, the outside remained totally foggy. Near noon it was fine for a while, but at suppertime (six joined) it became foggy again, but I entered the 36" dome. On **15 October GMT**, the seeing condition was very poor. The 1st observation (393rd) was made at 05:40 GMT when ω=077°W, φ=12°S, λ=306°Ls, δ=19.4" and ι=21°: Christoph PELLIER (in France) already reported that a clear dust disturbance was observed near Eos on 13 October. *The area in question is inside the field of view, while the dust is not caught maybe due to an unfavourable seeing condition. On the other hand Ophir is bright as well as Thaumasia. The spc is visible. Nilokeras is dark.* The 2nd check (394th) was made at 06:20GMT when ω=086°W: However the seeing was too poor to detect any details. *Solis L is near the CM. The preceding Mare Erythræum looks dark, as dark as the coming M Sirenum.* The 3rd observation (395th) was made at 07:00 GMT when ω=096°W, while at the stage of rough sketch, the observation was interrupted because it began to rain. On **16 October GMT**, it was foggy and windy and hence no observation was made. On 16 October PDT, we were invited by Mr and Mrs Rem STONE to dinner at a restaurant called "Mt Hamilton" which was located halfway down Mt Hamilton. The window of the restaurant commanded a fine night view of San José. Returning to the Observatory then we began to observe Mars (396th) from 05:50 **on 17 October GMT** where ω=061°W, φ=12°S, λ=308°Ls, δ=19.6" and ι=19°: The seeing condition was very poor. *Ophir is clearly bright and Agathodæmon is visible. But Eos is usual, though Auroræ Sinus may be a bit unusual. No core shows up however around Eos. Just Xanthe looks sometimes light.* The next observation (397th) was made at ω=091°W: *The area of Eos is covered by the evening mist under which Margaritifer S looks to be dark. Auroræ S is separated from the mist. Ophir is light as well as Claritas. Thaumasia is also evident because the preceding coast is lined dark.* The 3rd drawing (398th) was made at 08:30 GMT where ω=100°W: *The evening terminator side is misty light. Thaumasia is light evident. Claritas and its northern opposite are also light. M Sirenum has become darker. The desert on the morning side looks ruddy. The morning southern continent also looks ruddy.*

3. A Conspicuous Dust Disturbance Occurred on 18 October GMT (λ=308°Ls)

Early on the afternoon of **17 October PDT**, we received an email of breaking news from Silvia KOWOLLIK (Germany) at 01:55 GMT on 18 October (18:55 on 17 October PDT) which informed us that she had just detected a bright dust in Chryse at 01:45 GMT (ω=353°W) (just ten minutes earlier than her email). The argent emails from Silvia and others are collected in Appendix of Minami, 2006. On our side we also dispatched an alert via Japan (by Masami MURAKAMI in Yokohama) to the CMO members.

The time 02h GMT implied 19h PDT and hence it was not yet possible for us in California to catch Mars: It implied however we should wait

for another 4 hours for Mars to appear in the night sky at California. Anyway it was certain for me to catch the dust disturbance soon (it was very impossible for me to encounter with it if I stayed in Japan). I heard later that Silvia secured a total of 12 images from 1:45 GMT to 05:04 GMT every 20 minutes. So, on **18 October GMT**, when Silvia was compelled to stop the chase at 05:04 GMT (because the planet declined to the deep west in Germany), we were able to start just from 05:30 GMT when ω=048°W, ϕ=12°S, λ=308°Ls, δ=19.7" and ι=18°: The night Tony MISCH and Rem STONE operated the big Refractor. Before I moved to the inside of the big dome, I was aware that Joel WARREN in Texas had emailed me that he obtained some affirmative images of dust at 03:23 GMT. I was then confined inside the 36" dome and took 6 drawings every 40 minutes from 05:30 GMT to 08:50 GMT chasing the dust patch. The first glance readily and clearly proved that a bright dust disturbance as suggested by Silvia KOWOLLIK was surely visible near the CM. The 1st observation (399th) on 18 October was thus made at 05:30 GMT when ω=048°W. The 5th drawing of the present writer was already published in Minami, 2013 at page 9, and based on the emails and my own observations we sent out the following email to the CMO members at 06:43 PDT via Masami MURAKAMI in Japan:

●……Date: Tue, 18 Oct 2005 at 13:43 GMT
From: "Masami MURAKAMI"
Subject: *Dust storm at the southern Chryse,*

Dear Mars Colleagues, Masami and I received an email from Silvia KOWOLLIK, Germany, at 01:55 GMT on 18 October (today) informing lively that the area of Chryse was unusual and looked roundish bright at ω=355°W, and subsequently she sent us a raw image taken at just before 3h GMT. Meanwhile Joel WARREN dispatched an image taken on 03:23 GMT. So the area of Chryse came to the American continents.

Since I am staying here at the west coast (at Mt Hamilton), the planet was to be caught after 5h GMT, while the sky condition was poor this evening, and so I did not expect. However, though the seeing condition was terribly poor (furthermore clouds passing), it was apparent, from the outset of the session at 05:30 GMT (ω=048°W), that the southern Chryse was dusty bright, really looking roundish. I don't detail my observations here, but this is a real dust storm: I observed then at ω=057, 067, 077, 087 and 096°W until 08:50 GMT. The seeing gradually recovered but the area went to the terminator side. After staying inside the big dome for 3 hours, I came down to check the internet to find the images made by Don PARKER who already took a good set of images at 04:41 GMT (ω=034°W) and by Dr Cray at 05:01 (ω=041°W) to 07:02 (ω=070°W). We also received a final version of the precious image by KOWOLLIK at 02:44 GMT (ω=008°W), which was already uploaded in our CMO Gallery.

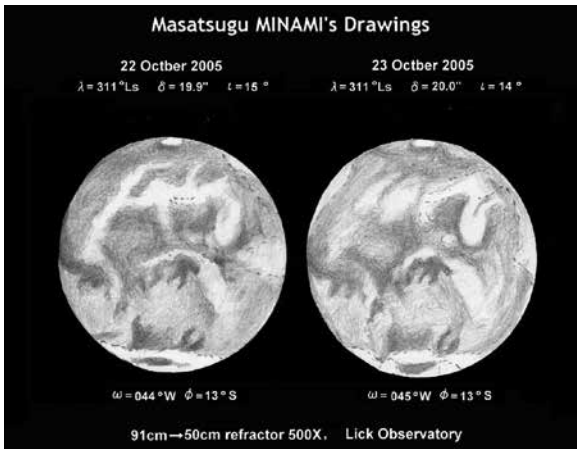
We should add that today's dust storm if seen through naked eyes looked much bigger and brighter, looked as if bounded by a shadowy roundish band, apparently brighter than the following Ophir. Around from ω=087°W, the eastern border became fainted and finally the dust looked mingled with the evening white mist. The Lick refractor was used with its OG stopped down to 50cm with a magnification of 500×. Bill SHHEHAN was not here: I was helped by Rem STONE and Tony MISCH.

At present, GRAFTON's image at 06:42 GMT (ω=065°W) and GASKELL's one at 04:41 GMT (ω=036°W) have been reported. I think this is a rare case in that the onset dust was chased from an early moment (KOWOLLIK) and to the evening. This dust was of course was related with the precursor found by Ch PELLIER on 13/14 October. The off-again on-again series of the dust disturbances are not rare: For instance in the case of December 2003 dust storm, it repeated first an on-but-off-again jumps even before 12 December as shown by TES. Anyway it was gone, and may be subsided at night, but tomorrow it will make a quantum jump. With best wishes, at Mt Hamilton, Masatsugu MINAMI (CMO/OAA).

This email was recorded in Minami, 2005a. As to the other details, refer to Minami, 2005b and Minami, 2006. Minami, 2006 is a good summary of the initial state of the dust at that time. One particular point worth mentioning repeatedly is the fact that the dust was stable from its birth until it came to the opposite terminator to go to the rear side.

On the following two days, unfortunately we could not chase the dust event (on 19 and 20 October). On 19 October GMT, the moon sometimes appeared, but it was usually foggy or rainy. I stayed at the Observatory from 19h PDT to 01:30 PDT, but in vain. On 20 October GMT the sky looked clear with the shinning Mars, but due to the high humidity they hesitated to open the slit of the dome. Really when I returned home, the handrails near the entrance of my room were full of night dew though the sky was still clear and calm without wind.

On **21 October GMT**, we observed four times at 05:50 GMT (ω=026°W), at 07:50 GMT (ω=055°W), at 08:30 GMT (ω=065°W) and at 9:10 GMT (ω=075°W). The seeing condition was moderate to good (except for the last case), and some dust-cores looked scattered on the southern dark markings: Especially the cores at Solis Lacus and Ogygis Regio were bright, and it was apparent that Coprates Chasma *et al* were full of dust disturbances. These spreads were considered that they were occurring at the rather lower altitude. On **22 October GMT**, we observed six times at 05:40 GMT (ω=014°W), at 06:20 GMT (ω=024°W), at 07:00 GMT (ω=034°W), at 07:40 GMT (ω=044°W), at 08:20 GMT (ω=053°W), and at 09:20 GMT (ω=068°W) under a moderate seeing. (On the morning of 22 October (Sat) PDT, it was fine, and for supper ten persons joined at the staff canteen.) On **23 October GMT**, we observed six times at 05:40 GMT (ω=006°W), at 06:20 GMT (ω=015°W), at 07:00 GMT (ω=025°W), at 07:40 GMT (ω=035°W), at 08:20 GMT (ω=045°W) and at 09:00 GMT (ω=054°W). The dust spreads look slightly dispersed than on 22 October, but roughly the cores were reproduced at the similar places. For instance, the linear dust streak explicit to the south of Sinus Meridiani on 22 October loosened on 23 October. Anyway it has become harder to check the differences by naked eyes. On **24 October GMT**, we observed five times at 05:30 GMT (ω=354°W), at 06:10 GMT (ω=004°W), at 06:50 GMT (ω=014°W), at 07:40 GMT (ω=026°W) and at 08:40 GMT=01:40 PDT (ω=041°W). The observation (425th) was the last drawing taken at the Lick Observatory.

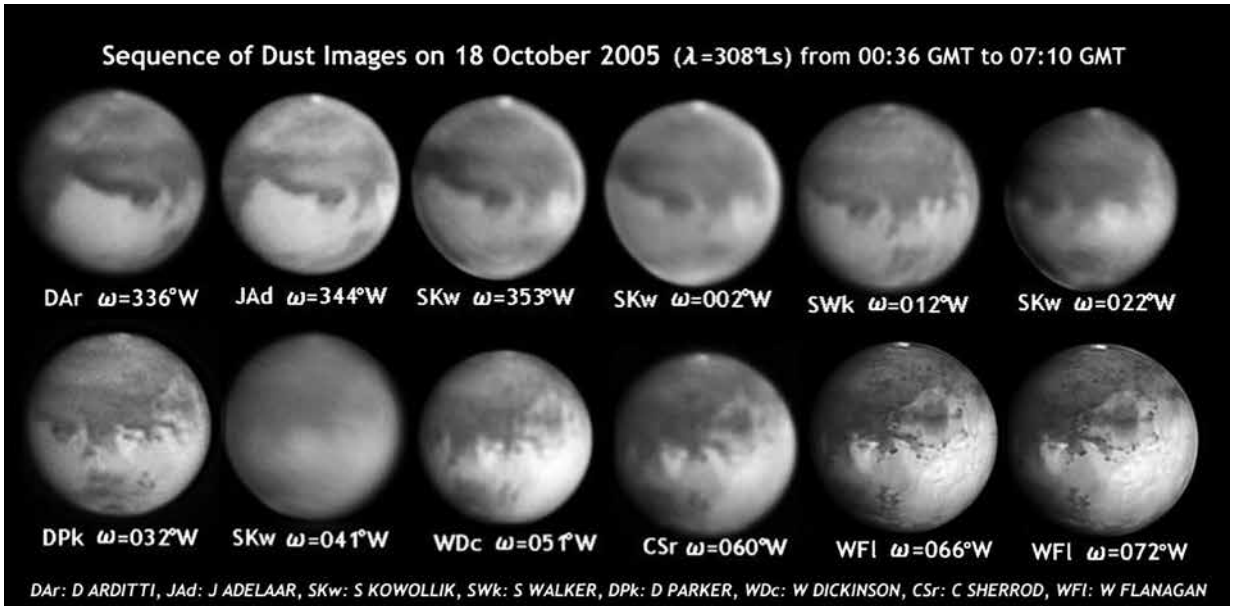


On 24 October PDT, I got up at about 7h PDT. At 8:45 PDT Tony MISCH kindly drove us (me and the English gentleman) down to the San José Airport by one hour ride. The American Airlines 129 took off at 12:20 PDT on 24 October and landed at the Narita Airport at 15:45 JST (23:45 PDT) on 25 October. I took a bus from Narita to Haneda where I happily met Masami MURAKAMI. We had a short conversation, and then I took a domestic airline (ANA 759) from Haneda to Komatsu (one hour flight) where the plane landed at around 20:45 JST. I was fetched by my wife at the Komatsu Airport and safely returned home. After dinner at Mikuni, I drove up to the Fukui City Observatory where I met Takashi NAKAJIMA who started the Mars observation from around 20:30 JST. I started to observe Mars from 14:00 GMT, and observed five times up until 17:50 GMT (02:50 JST).

4. Concluding Notes about the 18 October Dusts (λ=308°Ls)

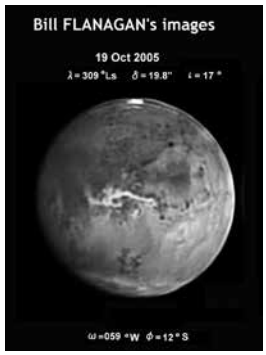
As was stated in the preceding section, it was my good fortune to be there at the Lick Observatory to witness the interesting dust disturbance occurred on 18 October 2005, though I accomplished no more than six observations every 40 minutes at the final stage of the diurnal motion of the dust disturbance. Since this disturbance was discovered just after the Martian dawn in Europe and the internet network was on line, its diurnal motion was chased fully from every corner of Europe and America.

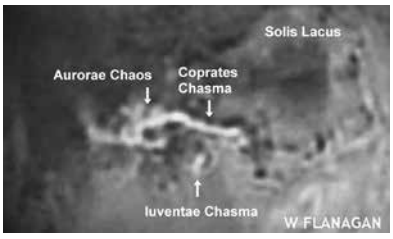
Here is shown a sequence of the Martian images selected from CMO/OAA Gallery of the 2005 Mars (http://www.kwasan.kyoto-u.ac.jp/~cmo/



cmons/2005/f_imase.html) (nearly every ten degrees on 18 October 2005). It has been quite a rare case to have been able to chase from the birth of the dust disturbance until the decline to the evening terminator. Just because the time is a bit deviated from the opposition the very motion at dawn was not well revealed. However, as suggested in the preceding section, the present case is quite nearly providing a proof of our proposition that any dust disturbance must be drastically onset at dawn being crawled out from the Orpheus abyss but re-ceiving the full heat from the morning Sun while it could stay rather stable during the daytime (as the scenario recorded in Minami, 2009). At night, any dust activity calms down because of the severely low temperature (in case, the whole dusts may return on the ground), but if it has latently a full potential it may raise again a dust cloud in the next morning perhaps near the original place but in a different way. If the original has not enough potential, it may subside away and disappear seen from the Earth. In the case of the 18 October case, however, we may say we have a nice precursor as witnessed by Christophe PELLIER on 13 October at ω=351°W and ω=000°W. This dust at the southern Chryse was quite sharp and observed at midnight GMT, and hence it looks to leave a trace on 14 October and perhaps also on 15 October. However on 16 October there exist a few images which do not show any explicit trace. However the place of PELLIER's dust is not so separated from the place of KOWOLLIK's, and hence we cannot yet exclude a possibility that an implicit relation exists between the two.

We could not afford to observe on 19 and 20 October due to the high humidity at Mt Hamilton, but a lot of images compiled in our CMO Gallery tell us that on 19 October the dust appeared as a transformed image from Eos to the valley area of Coprates Chasma as shown here on the image made by Bill FLANAGAN at Houston, TX. His images are also cited in the Figure of the 18 October case here, and hence it is easier to grasp how different are the morning forms of the dust. Apparently the new dust distribution remained similar throughout the daytime. On 20 October, the dust at Coprates Chasma looked loosened and there was associated a new dusty area to the south of the Chasma area. As to the dust deformation and the difference of the distribution on the following days from 21 October to 24 October, we could check the final trend of the dust disturbance at Lick as suggested in the preceding section. It was





amazing to chase the work-role of the bright dust-cores and their dust effects on other dark markings.

It is usually classified the scale of the dust storms as “local”, “regional” or “global”. However this classification must be said absurd because this depends heavily on the two-dimensional description. In reality any dust configuration has a third axis (z-axis) ingredient: In fact, the present case the strength of the energy of the ascending air-mass at the morning terminator must have been mediocre. On the other hand the 2001 dust germ at Hesperia must have latently been rich in the power of updraft. Refer to Minami and Nakajima, 2008. Potentially the 2001 dust from Hesperia as we experienced in Fukui and Okinawa showed from the early stage a powerful altitudinal expanding trend. That is, the z-axis component of the ascending current in 2005 was weaker than the case in 2001. The onset season was in 2005 at λ=308°Ls, while in 2001 the global dust disturbance was entrained as early as at λ=183°Ls. The areas of the onsets are also different.

Acknowledgements

I would like to express my sincere thanks to Rem STONE, Tony MISCH and Laurie HATCH as well as to Bill SHEEHAN who all coordinated kindly the nights of the Mars Observations at the Lick Observatory at Mt Hamilton and helped me much during my stay there.

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2005年の火星観測報告（その３）

南　政次*

（要旨）2005年の火星観測は2004年11月から2006年6月まで続行したが，2005年の10月にカリフォルニア大学付属のリック天文台に遠征し，世界第二位の口径91cm屈折望遠鏡を用いて火星を観測する機会があった．本稿はその報告である．期間中，注目を浴びた黄塵の発生日（10月18日GMT）にその夕方での黄塵の動向，更にその後の発展ぶりを観察する幸運にも恵まれた．最後の節で，CMOの観測者のデータも加味して、この黄塵の概要に触れた．

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