

MARS

No. **403**

25 October 2012

OBSERVATIONS

No. **29***Published by the International Society of the Mars Observers*

Application of Stereoscopic Inspection to Planetary Images

by

Reiichi KONNAI

3D viewing with a simple stereoscope using a pair of 2D photos or drawings having a parallax with each other has long been entertaining us ever since nineteenth century. The application of the stereoscope to astronomical researches dates back to as early as the beginning of twentieth century; George VAN BIESBROECK, a notable observational astronomer, referred in 1904 to the possible utilization of the stereoscope for detecting stars with large proper motion, minor planets, variable stars, Doppler shifts on the stellar spectrograms, and even the 3D structures of the comets.¹

A stereoscope is a device which enables us to easily obtain the fusion of the images of a stereo pair (side-by-side printed images of the same object taken from slightly different angles) to get a 3D view, the illusion of depth in an fused image (Fig 1).



Fig.1
Holmes Stereoscope 1861
Wikimedia Commons

Stereoscopic freeviewing is viewing a side-by-side image without the aid of mechanical devices as stereoscopes or other technical aids. Some recent

researches suggest that about twenty percent of the people with healthy both eyes can do stereoscopic freeviewing without or with minimum practice, and that more than sixty percent can acquire the skill through step-by-step training methods. (I myself can naturally, somewhat like chameleons, change the visual axes of my eyes independently from each other; makes me possible to fuse images some twenty degrees apart center to center.) For freeviewing two methods are available; ① The parallel viewing method: the left eye looks at the left image, the right at the right, the same way as with a stereoscope. ② The cross-eyed viewing method: the right eye looks at the left image, the left at the right.

The stereoscope requires exclusive stereograms with specially arranged images. On the other hand, with freeviewing, you can fuse any side-by-side (a little separation may be OK) seemingly identical images on the Web, or on a paper (try a "Find the Differences Puzzle"; with freeviewing you can spot all the differences in a few seconds as the differences announce themselves on the fused image by giving quite incongruous looks).

For a planetarily minded stereo-freeviewer like me, the Web provides a number of treasure houses where plenty of fine planetary stereo pairs are

waiting. If you have two good eyes and aren't used to freeviewing stereo pairs, access below to learn how to free view the 3D:

<http://www.studio3d.com/pages2/freeview.html>

<http://www.vision3d.com/virtual.shtml>

<http://nzphoto.tripod.com/sterea/stereoview.htm>

<http://www.angelfire.com/ca/erker/freeview.html>

Most people can learn to view both with parallel and cross-eyed though most find one type easier to view. Parallel viewing may be more suitable, because most of the planetary images on the Web taken in a single observing session are arranged from left to right with the passing time presumably in accordance with the scribing directions of a large majority of the modern languages; the left-earlier/right-later arrangement of the "south up" images is just appropriate for the parallel viewing to get natural 3D views of the planets, as the markings on the inverted images of Mars, Jupiter and Saturn move from right to left as they rotate which give natural-parallax-like effects in parallel viewing.

Anyway, once you have gained the skill, you can find many many fantastic planetary stereo pairs which are not just enjoyable but sometimes astronomically interesting! Here I am showing you some examples I have noticed lately:

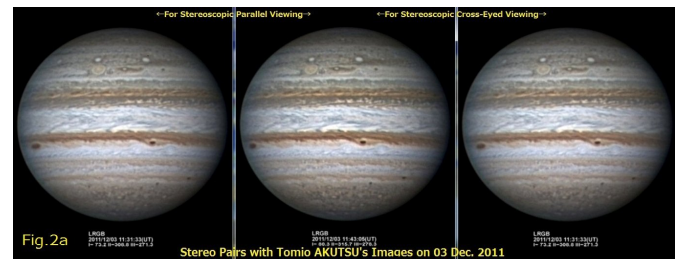
Jupiter: Stereoscopic Perception of Jovian Stepwise Differential Rotation

(Quantitative Assessment of the Differential Current Velocity Possible with Minimum Number of Images?)

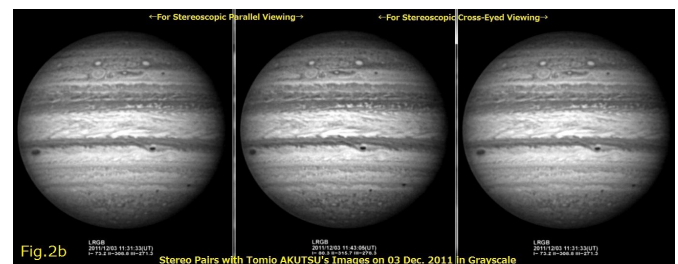
Lately I have been quite often impressed with our CMO colleagues' splendid Jupiter images. The qualities of some of them well rival those of HST's snapshots of the gaseous giant planet.

Last winter I noticed Tomio AKUTSU's superb images on 3 Dec 2011 appeared in the Solar and Planetary IIE for CMO #392 (dated 4 Dec 2011) made an excellent stereo pair for freeviewing. I have attached here a montage with his two LRGB images taken at an interval of some twelve minutes (Fig 2a). Of the three images, left two ones make a pair for the parallel view method, and the right two

ones serve as one for the cross-eyed view method. Also attached here is the same montage with a grayscale to avoid the influence of possible



chromostereopsis (Fig 2b).



Anyway, why don't you try and what do you see? With parallel freeviewing I myself see a fantastic 3D spheroidal globe of the gigantic planet; this of course, is rendered by the rotation of Jupiter during the twelve minutes interval of the two images which gives a longer baseline effect to make "Hyper Stereo Vision" or "Giant's Binocular View".

However, besides the Jovian globe's 3D spheroidal ball-like view, I clearly perceive some 3D anomaly on the markings; markings on the System-I (roughly corresponds to the bright zone around the equator) look to be raised against the neighboring System-II patterns, and some other zones/belts also appear to be closer or farther than adjacent belts/zones...looks as a whole somewhat like partly loosening mummy's bandages. The grayscale pair gives the same effect; meant the influence of the colors of the markings (chromostereopsis) is unlikely....

...Is this an illusion!? This is real, I believe, real stereoscopic perception of apparent differences in depth between adjoining currents rendered by the pseudoparallax derived from the relative dislocation of the markings during the imaging interval. Note this isn't the detection of real reliefs of varying altitudes of the Jovian clouds, but is the perception of pseudo-reliefs. During our single imaging session with our instruments' spatial resolution, Jovian in-

dividual markings on the digital images would show practically no change. While, a strip of zone or belt with a faster current (shorter rotation period) “rapidly” goes passing by adjacent slower one, like a passing express train carrying sleeping motionless passengers, at a considerable rate (...here “motionless” is the key because, if the individual markings show remarkable changes in appearance between an imaging interval, getting natural comfortable fusion of the pair images would be impossible). As to the “rapidly” or “at a considerable rate” mentioned above, let us consider for instance, through Tomio AKUTSU’s stereo pairs (Figs 2a & 2b); During twelve minutes interval the System-I current proceeds 0.06° in longitude than the system-II which corresponds to 0.03 arcseconds near the meridian along the equator on the Jovian disc, or 0.04mm on a Jovian image of 80mm across. These may sound to be too small differences beyond our telescopes’ resolving power, and too small to be detectable with our eye/brain system. As for these firstly, Dawes’ limit, popularly employed as the resolving power of a telescope is based upon the visual observations by a keen-eyed nineteenth century astronomer for the separation of sixth magnitude equal double stars. And another story for another object; Many experienced visual lunar and planetary observers have been claiming they could have detected linear features as thin as one-tenth of Dawes’ limit; It is well known that Eugène M ANTONIADI made a drawing of Saturn in 1899 by 26 cm refractor showing possible true Enke division (only $0.05''$ wide at most at eastern and western ends of ring A). Recently also, imagers using 25~40cm aperture class instruments (Dawes’ limit $0.46\sim0.29''$) have been constantly showing this division quite unambiguously on their Saturnian images. Thus we may be able to say that an excellent Jupiter image can involve a lot of further information one digit smaller than Dawes’ limit. Secondly as for our visual system, we have “stereo-acuity”...the ability of discriminating depth (or parallax) by the use of both eyes, the resolution of

which being usually 5-10 times higher (said to be over 30 times!) than that of ordinary visual acuity, thus known as an example of a hyperacuity (individual differences do exist though). Experienced observers can detect 5~6" parallax (get 3D depth) which corresponds to perceiving an 0.02mm offset seen at 0.25m distance. So, it might not be any wonder at all that we can see the Jovian system-I current as a strip of relief against the system-II background by stereo freeviewing for the stereo pair of images taken at a twelve minutes interval.

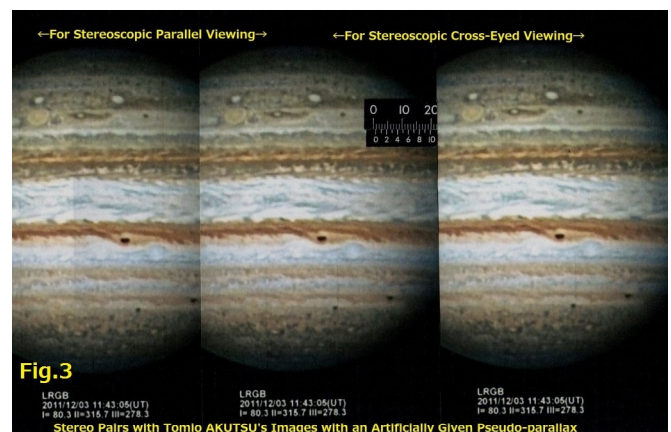
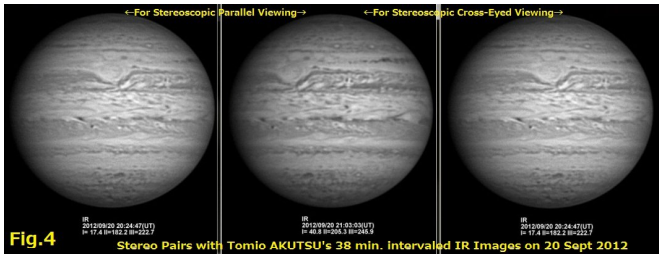


Figure 3 shows a low-tech primitive simulation montage (literally cut and pasted the printouts of Tomio’s single image) to demonstrate the effect above described. On the middle image, with a horizontal dividing line in the STrZ (on which the vernier scale line sits), the part of the image north of the STrZ is shifted 0.2mm easterly (left) to the part south of the STrZ. This amount of relative dislocation on the image roughly corresponds to five minutes difference in rotation period on Jupiter (alike System-I vs System-II) observed at one hour interval near the meridian around the equator. The left and right images are untouched same ones to make stereo pairs. With stereoscopic freeviewing, I hope you can readily see the part north of the STrZ closer than the southern rest of the image (you wouldn’t see a spheroidal ball like 3D Jupiter any longer, because no rotational shift of the markings involved). Then, try the Figs 2a and 2b again to get “real” impressions of the 3D Jovian differential rotation.

Figure 4: another excellent stereo pair with Tomio

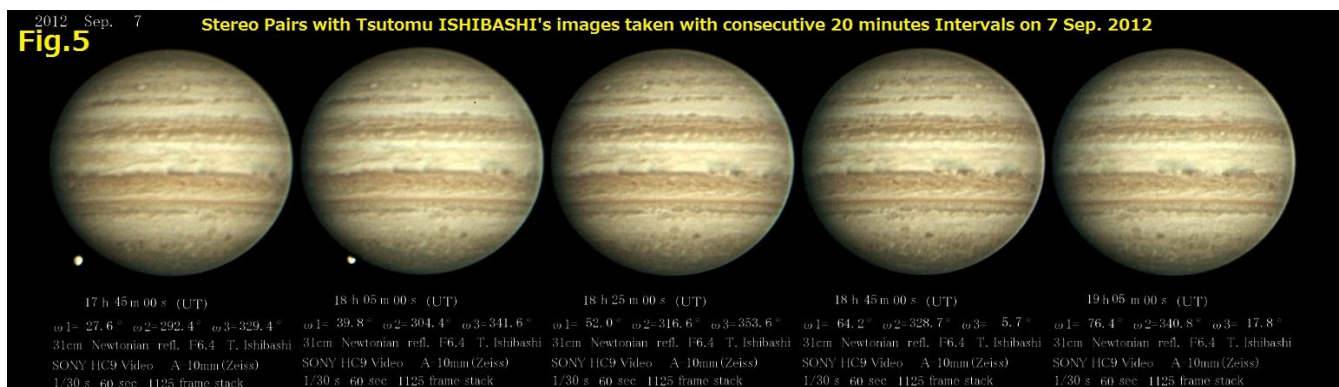
AKUTSU's infrared images, shows a peculiar response of the Great Red Spot (GRS) to stereoscopic inspection. On this pair, now reddish Oval BA



(merged Long Enduring Bright Spots in the South Temperate Belt) happened to be just south off the GRS. The Oval BA is very slightly faster than the GRS, passes the great storm about every two years. The difference in rotation period between the two storms is too small to be perceptible on our stereo pair images, so that with stereo freeviewing, the Oval BA and the GRS should look to be on the same level (more accurately to clung onto the "standard" virtual 3D spheroidal surface). However, with this stereo pair, the GRS looks definitely closer

than the Oval BA...what on Jupiter is the matter!? My understanding is as follows: The Great Red Spot is an enormous anti-cyclonic storm which rotates counterclockwise with a period of some six days. Thus the markings on the southern periphery of the GRS rapidly proceed (go east/go left on an inverted image), and the features along the northern boundary quickly retrograde (go west/go right on a south up image) against the neighboring zonal currents. As a result, southern part of the GRS looks closer, and northern one does farther to give the appearance of the GRS being rather "upright" contrasted with the background's inclination to the far side natural for the latitude. That's, I believe, why the GRS looks closer than the Oval BA (note also that the GRS appears to be farther than the bay-shaped northerly deflected SEBs, probably with the same/reverse story).

Figure 5 represents a montage of Tsutomu ISHIBASHI's five images in a row, taken on 7 Sept 2012



with consecutive twenty minutes intervals. This kind of arrangement is an irresistible nut for planetary (parallel) freeviewing maniacs; experienced parallel freeviewers can freeview ten stereo pair combinations, four consecutive twenty minutes interval images, and six longer-interval images of greater 3D depths! Cross-eyed-only freeviewers would see fused images with the feeling like looking at masks from behind, on which reliefs turn into intagli (and vice versa), may be not bad when get used to it, as we could have got used to looking at the heavens from outside by celestial globes. I who am a natural parallel freeviewer personally hope for planetary imagers the world over to show

on the Web their images taken in a single session arranging in a row with minimal spaces between the images, to make them possible to be stereo-freeviewed on the spot without any retouch (see later Fig 9, a great example).

As for the most appropriate imaging interval, it may depend on the image quality. Our instrument's highest resolution Jovian images would readily provide stereoscopic 3D differential rotation for a stereo pair with images taken at an interval as short as ten to twelve minutes while giving very large observable fused area, along with a fantastic overall ball like 3D globe. As to the average images, an interval around twenty minutes seems to be prefer-

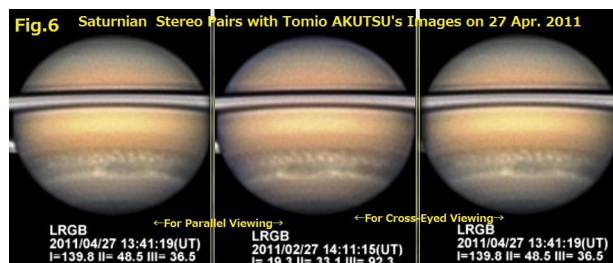
able to detect 3D reliefs easily, with still relatively extensive observable area. An interval over thirty minutes would make it hard to get a comfortable image fusion, though giving much enhanced 3D reliefs of the differential rotation. WinJUPOSly adjusted longer-interval images, might do well.

This enhanced acuity with stereoscopic inspection may be effective in detecting inapparent jet streams, or rapidly drifting markings earlier especially in highly disturbed state as the recent NEBs outbreak. It may also be useful in finding an area with peculiar atmospheric behavior like the GRS region. On some stereo pairs I have noticed some local anomalous 3D feelings in the both polar regions...possible reflections of the local cross-latitudinal turbulence?

Stereoscopic detection of the differential movement between the currents may be rather qualitative. Stereophotogrammetrical processing, I dream, may be able to show some markings' rapid drifting rates quantitatively using our colleagues' high-res images taken in a single imaging session.

Saturn: Possible Stereoscopic Detection of the Differential Rotation

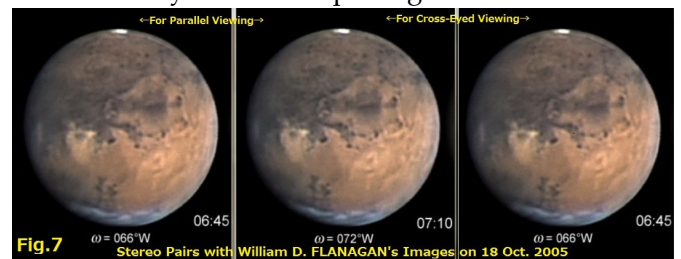
Saturn, another gaseous giant planet is known to have a definite differential rotation. However, with our telescopes' spatial resolution, stereoscopic detection of Saturnian differential rotation might be extremely hard, except when exceptionally conspicuous markings appeared. I am showing here a possible example. Figure 6 is the stereo pair, again with



Tomio AKUTSU's thirty minutes interval images taken on 27 Apr 2011 when the ringed planet's northern tropical to temperate areas were highly disturbed. To me, the great many striking white spots in the NTrZ undoubtedly look to be closer than the great oval-shaped dark feature just north off. Do you see what I see!?

Mars: Stereoscopic "Find the Differences Puzzles"?

Mars is a terrestrial planet with a solid surface and a thin atmosphere. When a solid body rotates, regions adjacent at one point in time will remain still adjacent as the body rotates (no differential rotation, no systematic dislocation of local features to provide pseudoparallaxes to make 3D reliefs in the stereoscopic viewing). So that, if you freeview a Martian stereo pair with the images taken at an appropriate interval, you'll see a beautiful, very smooth ball-like 3D globe without any reliefs or intagli, the albedo markings are like painted in watercolors (not with oil paints) on a smooth orangey ball. Thus stereo-viewing Martian stereo pairs, I feel, may be somewhat like trying "Find the Difference Puzzles": with stereo-freeviewing subtle differences declare themselves on the fused images by giving irritating incongruous looks to make them easily spotted; may be effective in finding delicate short term changes of albedo markings, or in confirming the "changelessness" of the local dust within a local daytime.² In spotting delicate differences



between the images, "The Blinc Comparator Method" may be superior as it utilizes "vernier acuity" which is more sensitive than stereoacuity. However, arranging a stereo pair should be by far easier than preparing a blinking animation.

Figure 7: a stereo pair with the excellent twenty-five minutes interval images by Bill FLANAGAN on 18 Oct 2005 represents the early stage of the local dust over Chryse to be practically unchanged during the imaging interval; on the stereoscopically fused image, no unusual feeling felt for the dust.

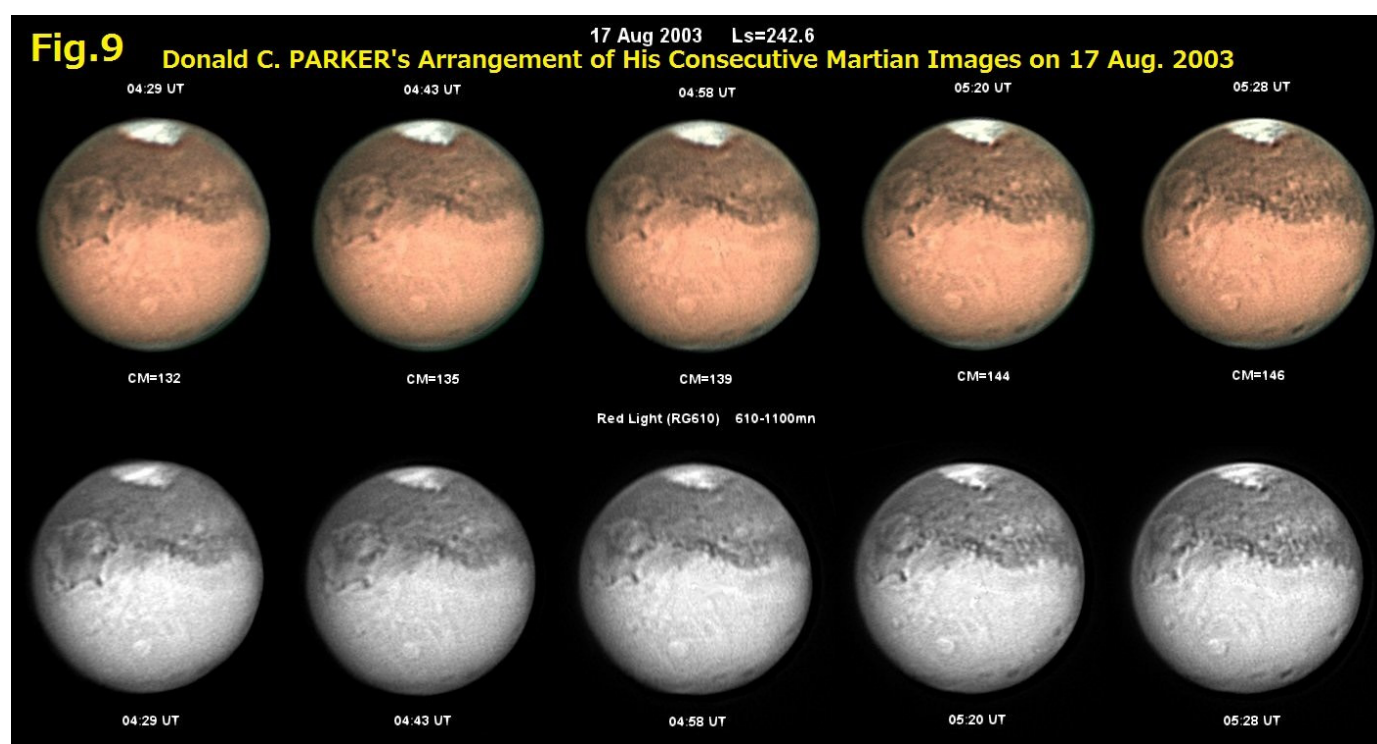
Figure 8 shows a parallel freeviewing arrangement of the three consecutive images again by Bill FLANAGAN on 22 Oct 2005 to provide three stereo



pairs with intervals of twenty-two, thirty-four and fifty-six minutes respectively. With the pairs I was surprised that the bright cores in the local dust over Solis Lacus to Thaumasia, and the long diagonal

streak of dust over the south polar region to Sinus Meridiani looked protruded from the globe by parallel freeviewing! I don't have any persuasive explanation for this for now. Were they reaching so high altitudes? Or the stereoscopic hyperacuity caught the subtle eastward movement?

Finally for the red planet a part of Don PARKER's original arrangement of his superb images on 17 Aug 2003, Fig 9, is the great example of an irresistible nut far above promised. Just parallel freeview



the whole Figures, and just enjoy the splendid fantastic color and B&W 3D eight balls floating in the air! (cross-eyed viewer will see eight salad bowls looked at from above.) The "real" relief of Olympus Mons, the highest volcano in the Solar System, I feel, is about to be perceptible!

In closing this lengthy essay, I'd like to recommend you, if you can freeview, to just try stereo-

freeviewing for any side-by-side look-alike images you encounter. You may get unexpectedly interesting findings!

(Notes)

1. Stereoscope Applied to Astronomical Researches, G. Van BIESBROECK. *Popular Astronomy*, vol. 12, pp.318-327, May 1904.
2. Refer to : Abandon the Patchwork of Dust Images of Different Days, Masatsugu MINAMI, CMO/ISMO #399, June 2012.

ISMO 11/12 Mars Note (5)

Neighbourhood of the NPC during the Period from $\lambda=042^\circ\text{Ls}$ to $\lambda=093^\circ\text{Ls}$

Masatsugu MINAMI

Here we shall give a general survey of the north polar region (npr) in 2011/12 observed

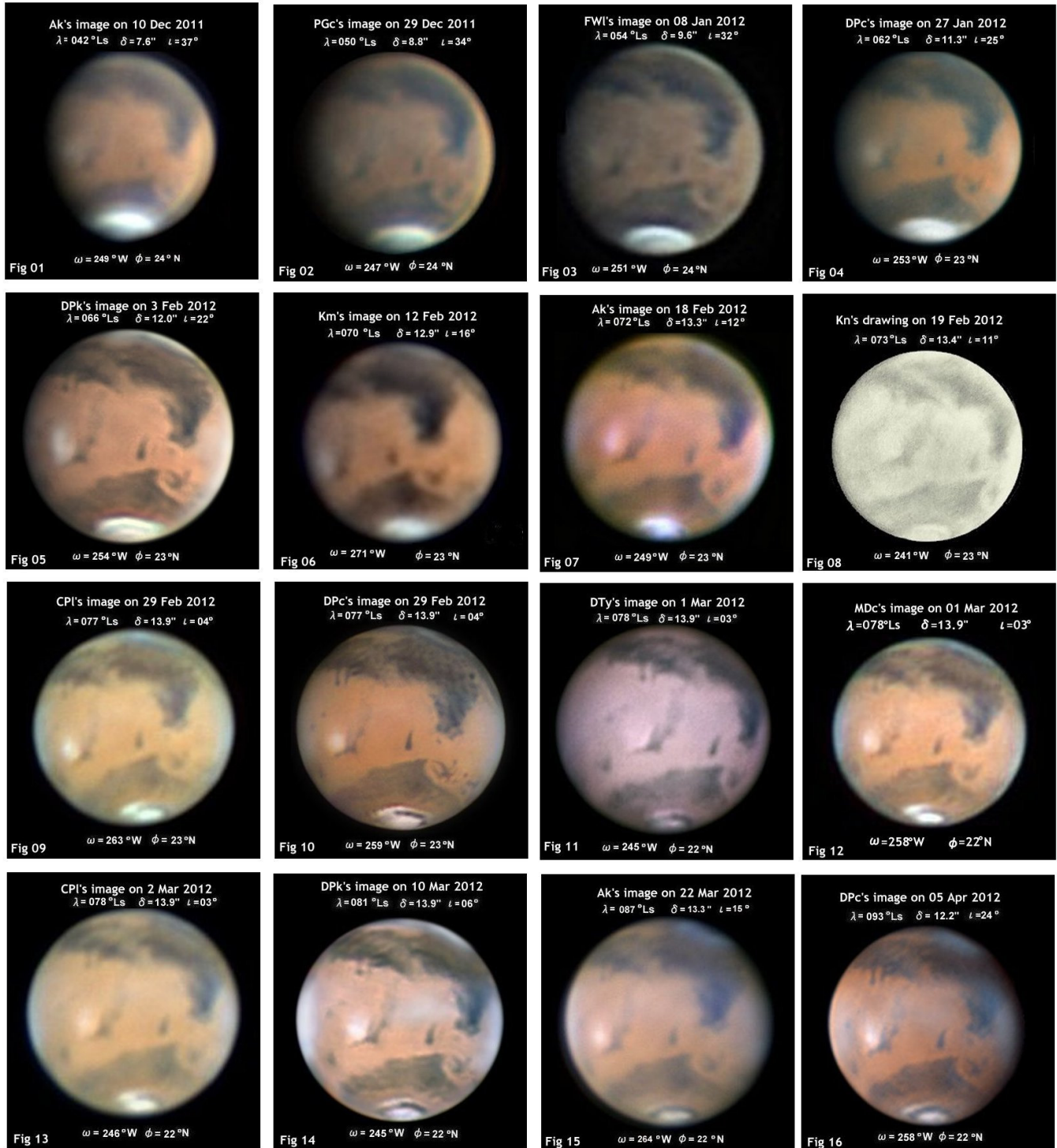
by the ISMO members during the period from around $\lambda=042^\circ\text{Ls}$ to $\lambda=093^\circ\text{Ls}$.

Already M MURAKAMI, T NAKAJIMA and A NISHITA wrote "Forthcoming Mars in 2011/2012. II" and gave a prediction about the general behaviour of the npr in CMO/ISMO #395 (25 March 2012) based on the results in the past: The article says for

example from around $\lambda=065^\circ\text{Ls}$ Rima Borealis must be apparent and from around $\lambda=100^\circ\text{Ls}$, residual north polar cap must be quite stable. Here this apparition we could not reach $\lambda=100^\circ\text{Ls}$ with clear images of the north polar cap (npc), while we should say we obtained a rather good result from around $\lambda=042^\circ\text{Ls}$ ($\delta=7.6''$) to $\lambda=093^\circ\text{Ls}$ ($\delta=12.2''$): In

the following we collect some results in a set of Figures during the period, while we are here concerned with the images which were only seen from the central interval between $\omega=240^\circ\text{W}$ and $\omega=250^\circ\text{W}$ (or so): and hence the images are not exhaustive in the set of Figures.

The npc began to show a shadowy part at the



north end around from $\lambda=005^\circ\text{Ls}$, and for example the image taken by Peter GORCZYNSKI (PGc) on 31 Oct 2011 ($\lambda=023^\circ\text{Ls}$) at $\omega=091^\circ\text{W}$ shows a shad-

owy line which crosses the npc/nph obliquely, and on 29 Nov ($\lambda=036^\circ\text{Ls}$) Bill FLANAGAN (WFI) shows a clear dark line which runs along the EW

line inside the npc at $\omega=215^\circ\text{W}$, 219°W . This dark line is the one constituting the border of the residual part of cap and the one we called the P-ring which stayed long. Later from this, Rima Borealis was born. Figure 1 is the one given by T AKUTSU (*Ak*) at $\lambda=042^\circ\text{Ls}$ seen from $\omega=249^\circ\text{W}$. In what follows we shall not give necessarily the images of the highest quality, since we are always forced to be bound by the value of *Ls*. That is to say, some other nice images must have been omitted because of the longitudes (see so the Appendix below).

As the season proceeded to $\lambda=059^\circ\text{Ls}$, the npc became as shown on *PGC's* image in Fig 2: The P-ring was quite clear, though as the image of the npc taken by *WFI* on 7 Jan ($\lambda=054^\circ\text{Ls}$) at $\omega=190^\circ\text{W}$ might have been more interesting. As Fig 3 we pick out Freddy WILLEMS (*FWI*)'s image on 8 Jan ($\lambda=054^\circ\text{Ls}$) at $\omega=251^\circ\text{W}$ where the residual cap shows a reddish tint.

Figure 4 is the one given by Damian PEACH (*DPc*) on 27 Jan 2012 ($\lambda=062^\circ\text{Ls}$) at $\omega=253^\circ\text{W}$: The thawing looks slower within 10 degrees in *Ls*. Next image in Fig 5 is the one given by Don PARKER (*DPk*) on 3 Feb ($\lambda=066^\circ\text{Ls}$). As Fig 6 we pick out Teruaki KUMAMORI (*Km*)'s image taken on 12 Feb at $\lambda=070^\circ\text{Ls}$ where the outer ring looks to have a bit shrunk. Day was not so different from *Ak's* day on 18 Feb ($\lambda=072^\circ\text{Ls}$) (Fig 7). However the outer white ring which was clear on *DPk's* image became blurred (compared with *DPk's* one). Especially *Ak's* image of the residual cap in Fig 7 looks smaller than before. This must possibly imply a deviation of the cap from the pole. We also cite R KONNAI (*Kn*)'s drawing near the day on 19 Feb ($\lambda=073^\circ\text{Ls}$) as Fig 8. To his naked eyes Rima Borealis (a residual of the P-ring) is vaguely visible.

Two images on 29 Feb ($\lambda=077^\circ\text{Ls}$) are chosen: one by Christophe PELLIER (*CPI*) in Fig 9 and the other by *DPc*: Note the two look slightly different perhaps because of the difference of the apertures of the telescopes, but the area of Olympia was differently depicted.

Here it should be noted that at this period (at

$\lambda=077^\circ\text{Ls}$) the shape of the residual cap has become clearer.

On *DPc's* image Rima Borealis looks complex. On the day (29 Feb) *DPc* chased from $\omega=259^\circ\text{W}$ to 297°Ls ; to be checked in the ISMO Gallery.

As March came in, similar images made by Dave TYLER (*DTy*), *DPc*, Mark DELCROIX (*MDc*), and Martin LEWIS (*MLw*) were obtained to be checked in the ISMO Gallery, among them we here cited two by *DTy* and *MDc* in the Figure (Fig 11 and Fig 12). The surrounding of the npc is clear except for Olympia. Olympia looks the same on *MDc* and the one taken by *CPI* on the following day. The image by *DTy* is comparable with *DPk's* Fig 14 at $\omega=245^\circ\text{W}$: The npr of *DPk's* image is full of interesting details.

It should be noted the P-ring (partly Rima Borealis) on *DPc's* image on 29 Feb ($\lambda=077^\circ\text{Ls}$), Fig 10, looks different from the one in the crack on *DPc's* image on 5 Apr ($\lambda=093^\circ\text{Ls}$), Fig 16. The darker part is shorter in the former and so at that time there must have been still an overhang from the npc. At $\lambda=093^\circ\text{Ls}$ the P-ring clearly encircles the residual cap. As to the situation after $\lambda=100^\circ\text{Ls}$, we expect more clear observation in the next apparition.

The present writer is of the opinion that the period when the upper atmosphere over the npr is quite early: In the 2009/2010 apparition the tilt of the north pole was a little more away than this apparition and hence the period of the disappearance of the polar mist was not enough clear; just we were aware that after $\lambda=050^\circ\text{Ls}$ the P-ring became faintly apparent. However this apparition, it became more explicit because of the more favourable tilt and the apparent diameter: As stated before, the P-ring looked more explicit eg on the image of Bill (*WFI*) at $\lambda=054^\circ\text{Ls}$ or the reddish tint of the residual cap became more reddish at $\omega=254^\circ\text{W}$ on Don (*DPk*)'s image at $\lambda=066^\circ\text{Ls}$ (Fig 5): The same phenomenon is also apparent on the image of Efrain MORALES (*EMr*) on 2 Feb ($\lambda=065^\circ\text{Ls}$) at $\omega=247^\circ\text{W}$:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120202/EMr02Feb12.jpg>

Thus the fine days must have been realised at the

polar area because of the governing of the polar high pressure atmosphere, while still a local trend of the polar atmosphere is seen so that it is not easy to pin down the period of the local clear-up of the polar mist.

> **APPENDIX:** We here collect some of images which were seen from different angles to supplement the above consideration:

>Bill (*WFI*)'s image

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120107/WFI07Jan12.jpg>
at $\omega=190^\circ\text{W}$ shows that the inside of the npc looks to have a complex tint and splits as repeatedly mentioned.

>Freddy (*FWI*)'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120119/FWI19Jan12.jpg>
at $\omega=149^\circ\text{W}$, 159°W , the east end shows an interesting curious shape at $\lambda=059^\circ\text{Ls}$.

>*EMr*'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120202/EMr02Feb12.jpg>
As mentioned, seen at $\omega=247^\circ\text{W}$, the central part of npc looks reddish. Following day's image by *DPk* is cited already as Fig 5.

>Sean WALKER (*SWk*)'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120210/SWk10Feb12.jpg>
proves that near the centre the npc looks to split at $\omega=161^\circ\text{W}$, perhaps due to a dust. This split is also seen on the image by Frank MELILLO (*FMI*) at $\omega=178^\circ\text{W}$ on the day:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120210/FMI10Feb12.jpg>

>*DPk*'s image on 15 Feb:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120215/DPk15Feb12.jpg>
shows a blurred part near the centre at $\omega=130^\circ\text{W}$: maybe due to a polar dust.

>*PGc*'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120216/PGc16Feb12.jpg>
is the image on the following day (16 Feb) at $\omega=128^\circ\text{W}$. Note the split.

> In the same way *PGc*'s image on 18 Feb:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120218/PGc18Feb12.jpg>
still shows the split at $\omega=136^\circ\text{W}$.

>*DPc*'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120219/DPc19Feb12.jpg>

depicts an outer ring seen at $\omega=017^\circ\text{W}$: The inside looks complex, but a slight lack of resolution.

>*Km*'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120219/Km19Feb12.jpg>
shows an outer ring which is complex at $\omega=223^\circ\text{W}$.

>*DPk*'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120222/DPk22Feb12.jpg>
taken at $\omega=036^\circ\text{W}$ shows a complex structure inside: a dust is visible at the western side. This is also seen on *DPc*'s image on the same day at $\omega=024^\circ\text{W}$.

>Stefan BUDA (*SBd*)'s interesting image at $\lambda=074^\circ\text{Ls}$ on 23 Feb:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120223/SBd23Feb12.jpg>
shows a dust obliquely at $\omega=183^\circ\text{W}$.

>*FWI*'s image:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120224/FWI24Feb12.jpg>
proves a polar dust which is seen at the western side at $\omega=112^\circ\text{W}$.

>Collaboration of *SWk* and *DPk* on 25 Feb:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120225/SWk25Feb12.jpg>
shows that at $\omega=075^\circ\text{W}$ a line along EW inside the npc. Dust on the morning side.

>*EMr*'s image on 26 Feb:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120226/EMr26Feb12.jpg>
where we see a dust blowing out at $\omega=014^\circ\text{W}$.

>*WFI*'s image on 26 Feb:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120226/WFI26Feb12.jpg>
shows a complex npc seen from $\omega=041^\circ\text{W}$: A dust apparently exists.

>*PGc*'s image on 27 Feb at $\omega=008^\circ\text{W}$

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120227/PGc27Feb12.jpg>
proves a dust which crosses the P-ring.

>*Km*'s image on 27 Feb at $\omega=137^\circ\text{W}$

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120227/Km27Feb12.jpg>
proves Olympia at the morning side.

>*EMr*'s image on 28 Feb at $\omega=348^\circ\text{W}$

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120228/EMr28Feb12.jpg>
shows a cut of the P-ring similar to *PGc*'s on 27 Feb.

>*DPk*'s image at $\omega=344^\circ\text{W}$:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120301/DPk01Mar12.jpg>
shows a faint chasma inside the npc.

> In March, we are endowed with further images as to which we shall report on another occasion. \square

Letters to the Editor

●.....**Subject:** FW: Luigi Prestinzenza
Received; 6 September 2012 at 21:52 JST

Dear Paolo, I am very sad to hear of Luigi Prestinzenza's death. We corresponded on a regular basis for a number of years, he was always very kind, very enthusiastic, and very encouraging to Mars observers like myself. We exchanged books, and shared many interests. He invited me to visit him in Sicily, and I always dreamed of doing so, but unfortunately I could never manage to do it. I gathered that he must have lived with his sister; he did not seem well in the last few years, and our communications became fewer and farther between.

As I recall, his first passion may have been football.

Thanks for conveying to me the sad news; I shall lift a glass of Sicilian wine in his memory, and publish a notice of his passing in the CMO/ISMO.

Ciao, Bill SHEEHAN

>-----

>Dear Bill

>I remember having mentioned with you Luigi Prestinzenza (whom you never met, if I remember well), the Italian journalist in Sicily, observer of Mars since his youth and expert of history of its observation.

>Unfortunately, he passed away for the consequences of a long-term illness, on September 4th. In recent years he was still very active in promoting and supporting amateur astronomy in Sicily, also by his popularization papers.

When he started in astronomy, he was lucky enough to meet Italian Mars observers as Glauco de Mottoni and Guido Ruggieri.

http://uai.it/web/guest/uainews/journal_content/56/10100/292166

>Ciao

○.....**Subject:** Luigi Prestinzenza
Received; 7 September 2012 at 09:28 JST

Caro Emilio e Mario penso che voi abbiate o possiate avere un contatto diretto con la famiglia di Luigi Prestinzenza.

Chi ha potuto incontrarlo, come me, ha avuto la

fortuna di misurarne la passione e la dedizione che ha sempre messo al servizio di tutti gli astrofili. Mi preme tuttavia far giungere alla famiglia le piu' sentite condoglianze non solo da parte mia, ma anche da parte di una comunità piu' ampia di osservatori e studiosi di Marte, che in queste ore hanno appreso la sua scomparsa.

In particolare, Richard McKim (British Astronomical Association), Masatsugu Minami (Oriental Astronomical Association), William Sheehan (Lowell Observatory, autore di varie opere sulla storia delle osservazioni del pianeta), ricordano la fitta e calorosa corrispondenza che hanno scambiato con lui, sempre disponibile e generoso nei contatti umani e nell'approccio all'astronomia. Desiderano quindi associarsi al suo ricordo, perchè i suoi cari sappiano quanto le sue qualità e conoscenze fossero apprezzate anche al di fuori delle nostre frontiere.

Paolo TANGA (Observatoire de la Côte d'Azur)

○.....**Subject:** Mars Conference reflections
Received; 22 September 2012 at 01:51 JST

Hi, all, Just thought I'd remind you that we're now at 103 years since Antoniadi's great views of Mars with the Meudon refractor, and that it's been three years already since our Mars conference at Paris Observatory and Meudon.

Richard—our attempts to float "*Men of Mars*" have foundered, I'm afraid, on attempts to make it appeal to an academic audience we never intended.

I'd still like to do something—one thought (though it cannot be actualized anytime soon because of other commitments) would be to do a revision of "*Planet Mars*" (1996), which U of Arizona Press keeps asking me for, as a collaborative project. We could add lots of "*Men of Mars*" material to the historical chapters, and possibly reorganize the chapters on the spacecraft eras with updates on what we know about Martian meteorology (the dust storms especially) and geology from an amateur scientist's (not specialist's) perspective. It would be interesting to do if only because it would provide me (us) a forum in which to absorb and organize the vast amount of information forthcoming now about

Mars from Curiosity. Best,
Bill SHEEHAN (Willmar, MN, the USA)

●.....*Subject: BAA Mars Section news*
Received; 23 September 2012 at 23:13 JST

2012 September 22nd

Dear Mars observer: This is just to let you know that we have recently uploaded to our website the pdf file versions of the final BAA Mars reports on the 2007-08 apparition, which are appearing in the 2012 August and October numbers of the BAA Journal. Visit www.britastro.org/mars for full details.

The 2007-08 apparition was a very complex one on account of the early encircling dust storm and the many changes in the albedo markings. The seasonally unusually early visibility of the Northern polar cap was a striking feature of the images from mid-2007; the recession rate of the cap appeared normal, and the seasonal separation of Novus Mons from the SPC was also typical. The report is in two parts. I: surface features and dust activity; II: white clouds (including equatorial cloud belt and orographics).

The BAA Mars Section website, maintained by Bob Marriott, also contains pdfs of all our reports on the

Red Planet since 1995 as well as a list of all the previous ones. The site also contains the latest observing programme and a selection of useful maps. We hope you will pay it a visit.

The Director is working hard to bring the current reports up to date. The forthcoming 2010 final report will contain a gallery of observers' photographs (as did that for 2003) and if you have not sent me a recent photo please feel free to do so, preferably taken together with your favourite telescope.

The 2012 apparition has been a very successful one too, and further details about the observations made will feature in later issues of the BAA Journal.

With best wishes

Richard McKIM

(Director of the BAA Mars Section, the UK)

●.....*Subject: RE: CMO #402 uploaded*
Received; 25 September 2012 at 20:55 JST

Hello Masami: Thank you for sending me CMO 402. I have read several past issues of the CMO and am impressed with the amount of valuable information they contain. Please keep up the good work.

Richard SCHMUDE (GA, the USA)

☆☆☆

TEN YEARS AGO (210)

-----**CMO #265 (25 October 2002) pp3443~3462---**
<http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/cmo265/index.htm>

The opening article of CMO #265 (25 Oct 2002 issue) was titled as "Trend of Phoenicis L during the 2001 Dusty Time" (2001 Mars CMO Note (11)) written by M MINAMI. As was well known, the summits of the higher mountains were evident as reddish dark spots poking out of the global yellow cloud and they proved useful to check the locations of other markings blurred by the dust. In this article the areas of Phoenicis L and its neighbourhood were checked concerning the trend of the dust activity with reference to the evident Arsia Mons and swaths of MOC until 184 days since the emergence of the global dust especially from the window at around $\omega=127^\circ\text{W}$.

<http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/265Note11/index.html>

Next "Possible Flashes on Mars in 2003" (Great 2003 Mars Coming (2)) was written by M MURAKAMI: It was possible another series of flashes might occur during the period from the end of July to the beginning of August, and hence MURAKAMI cautioned (he also talked about it at the Ina Meeting: Meeting Report (4)):

<http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/coming2003/02.html>

Finally, Aki NISHITA put forward the column "Ephemeris for the Observation of the

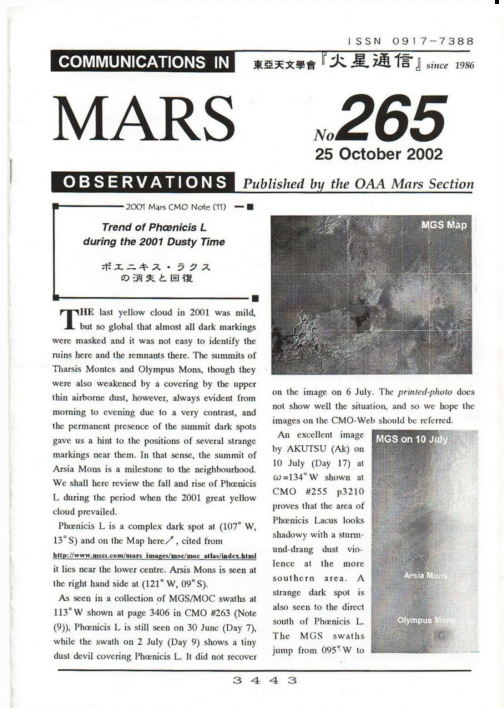
2003 Mars. I" "Great 2003 Mars Coming (3)": It provided the coming data from Nov to the end of Dec (two months). The season at the end of 2002 was $\lambda=116^\circ\text{Ls}$ and the apparent diameter was $\delta=4.6''$:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/coming2003/03.html>

In the LtE corner, emails from Clay SHERROD (AR), Ed GRAFTON (TX), David GRAHAM (the UK), Frank J MELILLO (NY), Agustin SANCHEZ LAVEGA (Spain), David STRAUSS (MI), Bill SHEEHAN (MN), Dave MOORE (AZ), Sam WHITBY (VA), Don PARKER (FL), Damian PEACH (the UK, in Tenerife) are found. Domestically T AKUTSU and Y MORITA et al wrote; especially a letter was received from an office at No where P LOWELL once visited.

As a 5th SAIJIKI-Mura, MURAKAMI wrote about his trip in September 2002 around the area of Rikuzen district in the eastern Japan. This district suffered from a devastating earthquake and a big Tsunami in 2011. He remembers well the beautiful row of the pine trees at Rikuzen Takata, but the trees were completely destroyed by the Tsunami: Furthermore it was reported that nothing are left for example in the town where he took lunch near the station at Rikuzen Takata station.

TYA (86) in CMO #265 was written by Toshiaki HIKI where he treated CMO #122 published on 25 October 1992. Twenty years ago the planet Mars stayed in Gem and shined high up in the morning sky. The Martian season proceeded to $\lambda=341^\circ\text{Ls}$. On 3 Oct 1992, H ISHADOH observed a streak of dust and the darkening of Ganges, while it soon diminished. The tilt is northward, and the npf was active at the morning side. It was also planned and performed to observe the planet every 40 minutes on the same days, picking out some days, through all nights by the domestic members. (Mk & Mn)



International Society of the Mars Observers (ISMO)

Advisory Board: Donald PARKER, Christophe PELLIER, William SHEEHAN, and Tadashi ASADA, Reiichi KONNAI, Masatsugu MINAMI

Bulletin: Kasei-Tsushin CMO (<http://www.mars.dti.ne.jp/~cmo/ISMO.html>)

CMO #403/ ISMO #29 (25 October 2012)

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



☆ Any e-mail to CMO is acknowledged if addressed at the same time to

cmo@mars.dti.ne.jp (Masami MURAKAMI at Yokohama)

vzv03210@nifty.com (Masatsugu MINAMI at Mikuni-Sakai)

☆ Usual mails to CMO are acknowledged if addressed to

Dr Masatsugu MINAMI, 3-6-74 Midori-ga-Oka, Mikuni, Sakai City, Fukui, 913-0048 JAPAN