Notes and News

From the President

October has returned, together with the long dark nights, and the end of my term as President draws near. How is our Association faring? I would like to think that we are in good shape with our affairs streamlined for the 21st century, thanks to the good work of my predecessors, Tom Boles and Guy Hurst, as well as the massive contribution from the Officers, Section Directors and members of Council who have contributed their time and effort to further the aims of the BAA during my two years in office.

One way of gauging progress is to compare the BAA of 2007 as depicted in the Report of the Council and Accounts (see pages 246–264 of this issue) with similar reports from years gone by. For some time now, I have maintained a spreadsheet listing some key indicators taken from these annual reports as published in the *Journal*. The data go back to the time I first joined the BAA so I have selected numbers from particular years to highlight a few specific points as shown in the accompanying table.

Of course inflation is an important factor, so I have listed this in terms of the retail price index excluding mortgage interest rates (RPIX), and I have used these values to normalise some of the figures to express them relative to 1997 values. (Note that the RPIX for 2007 is equal to the 2006 figure plus 3.5%.) In this way by adjusting for inflation, we can realistically compare like with like. So what do we see?

Firstly, let's look at membership. In an earlier 'From the President', I drew attention to the need to raise our membership figures above the 3,000 level. Five years ago, our numbers were at 2,547, the lowest for more than 40 years. This represented something of a minor crisis, and since that time we have been working hard to attract new members. Thanks to many folk, most notably Dr John Mason and our Office Manager Jean Felles, we have made good progress and I anticipate that with a fair wind we shall indeed consolidate our membership at the 3,000 level or a little higher.

Interest in astronomy, as reflected by our membership numbers, is of course partly dependent on relevant events happening at the time. Back in the late 'sixties and early 'seventies, the Space Race drew much public attention, rightly so, and BAA members grew in number reaching a peak in 1976 and then declining to a minimum of 3048 in 1984. The appearance of Halley's Comet in 1986 led to a minor surge in membership but this declined after a few years, reaching another low of 2771 in 1993. Fortunately a couple of years later, the Shoemaker–Levy 9 comet crash into Jupiter plus the arrival of two great comets, Hyakutake and Hale–Bopp, helped generate renewed interest in astronomy. The final noteworthy event of relevance in the 20th century was the total solar eclipse of 1999. As it happened, it was largely cloudy along the path of totality in the UK otherwise we might have expected more of a strengthening in our numbers thereafter. Instead membership declined further reaching a record low in 2002.

Maybe some new celestial event such as a supernova in the Milky Way will capture the public's imagination soon. Even if nothing dramatic happens in our skies, in 2009 we can all look forward to the International Year of Astronomy, in which the Association will play its part in publicly-organised events and which may serve to boost our numbers somewhat. I shall be doing my bit to make IYA 2009 a success – I hope you will too.

Next, I would like to draw attention to the cost of membership. Although you might be excused for thinking that this is on an ever-upward spiral, this turns out not to be true once you have taken inflation into account. Indeed, since 1980 the real cost of the subscription for an ordinary BAA member has remained more or less constant, fluctuating on average by less than 5% in real terms. I would say that this is quite remarkable given the improvements that have been introduced over the years, most notably exemplified by the *Journal*, the website and the fact that we currently hold more meetings than ever. And we have plans in the pipeline aimed at providing even better value for money to our members in the near future. I am also particularly pleased that in late July we took on a second employee in the Office, Madeleine Crow, to whom we extend a warm welcome. So I believe we are now well placed to meet the needs of all our members.

Finally the last column in the table is headed 'Total assets' for which I refer you to the balance sheet on page 261. This is based on

Radio Astronomy Group

Satellite antenna dish acquired for use by the BAA

The Radio Astronomy Group (RAG) of the BAA is pleased to announce it has obtained the use of the 2.4m diameter, fully-steerable satellite antenna dish residing on the roof of the National Space Centre (NSC) in Leicester (see Figure). The RAG is fortunate in having its assistant coordinator, Jeff Lashley, employed by the NSC as a technical support engineer and Jeff has worked tirelessly with coordinator Dr Laurence Newell in seeking permission for the Group to use the dish for radio astronomy purposes. Support has also been forthcoming via Terry Ashton, our university liaison officer, who works at the University of Leicester's Space Research Centre (SRC) which owns the dish.

The 2.4m diameter, fully-steerable satellite antenna dish.

In the mid-1990s there was an irrefutable need for some method of determining the distance of the phenomena known as gamma-ray bursts (GRBs), as information available at the time was inconclusive: GRBs could be extra-galactic, galactic or even local. A joint proposal by the universities of New Hampshire, Weber State and Leicester gave birth to the Cooperative Astrophysics and Technology Satellite (CATSAT) whose primary mission objective was to study spectral properties of GRBs in the 500eV to 5MeV range as an attempt to measure burst distances. The dish was installed during 2001 as part of a ground support facility for CATSAT, but the mission's cancellation in April of that year resulted in the dish remaining idle. Slow progress of the project, resulting in launch dates slipping and launch vehicles changing, was a contribution to CATSAT's demise but, in the main, it was knowledge which was the mission's undoing:

the sum of the General Fund, Bequests and Current Assets less amounts owing to creditors, and is expressed in relative terms such that 1997=100. Thanks to a number of significant bequests, the assets of the Association have continued to grow and are now in a healthy state, in part reflecting the increased wealth of the nation over the past four decades. Thanks to the excellent work of our present Treasurer, we now keep close control on our operating expenditure, balancing the budget without using up any significant proportion of the Association's assets.

I am now looking forward to our return to a refurbished Burlington House with new facilities including a lift and a lecture room, which is scheduled to take place at the end of this month. The move back should herald the beginning of a new era for the BAA, working alongside the Royal Astronomical Society to popularise astronomy in the UK and worldwide. We have taken advantage of our year out in temporary accommodation for a long-overdue sort out of our various collections including the BAA archive and Library, which we hope will now be fit for purpose in the 21st century.

It has been a fun and stimulating time to be heading the Association and I daresay I shall miss being in the driving seat. My thanks go out to all those who have helped in so many ways to revitalise the BAA during recent years – as a result we can anticipate exciting and rewarding times ahead. So there you have it. I shortly hand over the role of President to my successor, Roger Pickard, whilst the BAA is in good shape with much to look forward to in the near future. Please give Roger your full support: I certainly shall.

Over and out,

Richard Miles, *President*

BAA membership statistics, 1967–2007

Year	*No. of members*	*RPIX (October)*	*Membership fee, £*	*Memb. fee, 1997 £*	*Subscription income (1997=100)*	*Total assets*
2007	2967	202.3	40.50	31.74	102	174
2002	2547	176.6	34.00	30.53	85	121
1997	2898	158.6	32.50	32.50	100	100
1987	3118	102.9	21.00	32.37	99	43
1977	4395	46.1	9.00	30.96	145	42
1967	3331	16.2	2.25	22.03	83	33

Radio Astronomy Group: *continued from previous page*

the origin of GRBs had largely been solved and other, approved, satellite missions were better equipped to address the problem.

The Group's proposals for use of the dish have been met with enthusiasm by the directors of the NSC and SRC, Mr Chas Bishop and Prof. George Fraser respectively. A formal agreement has been compiled by RAG's coordinator assisted by the NSC's Head of Technical Services, Mr Graham Law, which sets out rules relating to working arrangements, insurance, security and health and safety issues. In addition, the Group is required to present a progress report at six-monthly intervals commencing 2007 December. With all the legal requirements in place, work has now begun on restoring the dish to full working order.

The intention of the NSC project is to have an internet-connected radio telescope directly accessible to RAG members through the use of the Group's *Starbase* software, which was demonstrated at the Exhibition Meeting held at the NSC on 2007 June 30. The dish will be fitted with a receiver and control systems to allow observations of the 1420MHz radiation from neutral hydrogen in our Galaxy, with the aim of producing maps showing the Doppler-shifted components from the galactic arms. Ultimately we are hoping for a permanent exhibit at the NSC to be used by members of the general public. Prof Fraser has suggested we adopt the theme of 'Space Weather' and display information relating to solar radio emission, as received in Leicester, suitably compared with GOES X-ray satellite data and sudden ionospheric disturbances (SIDs) from the Group's network of VLF receivers; a task easily accommodated by *Starbase*. The exhibit could be expanded to incorporate other BAA activities.

We have placed an order for a Radio Astronomy Supplies' SpectraCyber Hydrogen Line Spectrometer following generous donations from RAG members (approximately £1200). The SpectraCyber will be our first receiver at the NSC. We have taken this action in advance of having the RAG's own Hydrogen Line receiver available, and with the full knowledge and consent of David Farn, its designer, in order to achieve earlier results. David has been able to confirm that hydrogen line reception is possible using a 2-metre diameter dish and hence the extra 44% flux collection area provided by the NSC dish guarantees more than adequate signal strength to drive the spectrometer.

When the dish control system was powered up after almost six years of inactivity, it came as no surprise that all systems were not operating as they should, with the azimuth motor appearing to be 'dead'. The first serious attempt at tracking down the fault took place during July and was led by Ian Wood with Jeff Lashley in attendance. Extensive checking of the electronic control system failed to reveal any obvious faults. The manufacturers, Dundee Satellite Systems, were contacted and their opinion is that the reduction gearbox fitted to the azimuth motor has damp-induced corrosion resulting in gearbox seizure owing to a very tight-tolerance, zero-backlash system. The only way to confirm this is to remove the drive system from the telescope for inspection and subsequent servicing, but this is not as trivial as it sounds: without the use of a crane at least five strong persons will be required for dismantling duties.

The above describes the project situation at the beginning of 2007 August. If you live in the vicinity and would like to get involved then please do not hesitate to contact Jeff at the NSC (e-mail: **jeffl@spacecentre. co.uk**) who will be pleased to advise as to how you can help. News of further developments can be found on the RAG website, **http://www.britastro.com/radio/**, which is currently being refurbished.

Terry Ashton, *University Liaison Officer*

Meteor Section

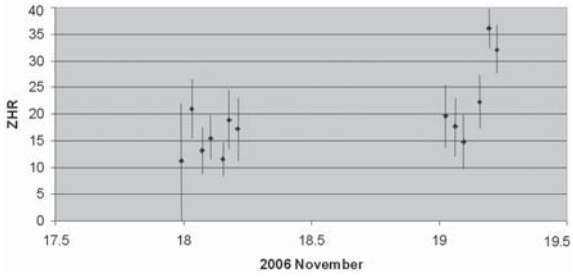
Dark skies for the Leonids in November

Active between November 15 and 20, the Leonids have, through the 1990s and early 2000s, attracted a great deal of observer interest, particularly in those years when storm activity – associated with the 1998 perihelion return of the parent comet 55P/Tempel–Tuttle – was expected. Recurrence of exceptional Leonid rates to compare with those of 1999, 2001 and 2002 is unlikely before the late 2020s.

This doesn't mean that the shower is not a worthwhile observational target in the years to come. Even in quieter years, as in the mid-1980s, the Leonids put on a respectable showing with observed rates reaching as many as 10 meteors/hr around maximum. Many of the meteors are bright, sometimes leaving behind long-duration persistent ionisation trains which remain visible for several minutes.

The 2007 return of the Leonids, with peak expected on Saturday night to Sunday morning of November 17–18, is well-placed with respect to moonlight. The Moon, a day past first quarter, will set around midnight UT, just as the shower radiant – in Leo's 'Sickle' asterism – is rising. By necessity, the Leonids are best observed in the early hours when the radiant is climbing higher into the eastern sky. Peak should occur around Nov 18d 05h UT. Observers are encouraged to make the most of this opportunity to obtain coverage of the Leonids as they return to the more 'normal' activity that prevails for two-thirds of their cycle.

Much interest was generated last year by the possibility of enhanced Leonid rates around 2006 Nov 19d 04h 45m UT, predicted by the Asher–McNaught 'filament' model of the meteor stream.[1] Weather conditions over the UK proved reasonably favourable for the critical weekend, and BAA observers collected a good volume of mostly visual watch data. Pooled results have been analysed to yield Zenithal Hourly Rates (ZHRs), corrected for sky transparency and radiant altitude, which are summarised in the diagram.



Leonid activity curve for 2006 from BAA observations.

The regular annual maximum (the one we expect to see in 2007) showed typically modest activity, with ZHR about 15. Observations on November 18–19 showed fairly low Leonid rates around midnight UT, but a significant enhancement to ZHR 30–35 in the two-hour interval around 04h 45m UT. Magnitude estimates do not suggest any particular unusual abundance of bright Leonids.

Some have, perhaps rather naively, expressed disappointment that a 'storm' failed to materialise. Realistically, however, there was never any such expectation. What is clear is that around the predicted time of encounter with the debris filament shed from 55P/Tempel–Tuttle in 1932, Leonid rates were indeed substantially higher than would have been found in a normal year, offering still further vindication of the successful model developed by Asher & McNaught and others to account for Leonid outbursts over the years.

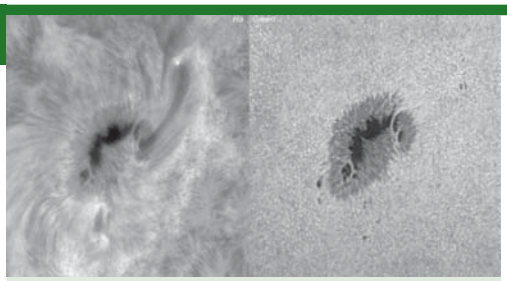
Neil Bone, *Director*

1 Asher D. J. & McNaught R. H., *WGN* **28**(5) 136–143 (2000)

Solar Section

2007 May

May brought a marked increase in sunspot activity compared to the previous two months, but the high latitude spots heralding the new cycle are still awaited. One observer reported a high latitude pore around N50º at 19:25 UT on May 30 in difficult seeing conditions. Most observers reported a blank disk between May 24 and 28 and on May 31, with all reporting a blank disk on May 25 & 26.



Images of AR953 on 2007 May 4 at 13:17 UT. *Left:* H-alpha; *right:* green (~visual). *Dave Tyler.*

AR953, S10º/308º, remained on the disk from April, close to the CM on May 1, type Cko with an area in excess of 400 millionths. The group was seen with the protected naked eye by several observers on May 1, 2 and 3. By the next day the group had reduced in area to 210 millionths and was type Hax. The group was of similar appearance on May 5 and 6 and was last seen on May 7 approaching the western limb.

AR954, S06º/288º, also remained on the disk from the previous month, as a small Bxo spot. There was no change to the group on May 2 but it decayed on the disk and was not seen by May 4.

AR955, S10º/175º, was first seen on May 9 as a small bipolar group type Dao. The next day the group became type Dai with an area of just 60 millionths. The group crossed the CM on May 11, increasing its number of spots briefly on the 12th before starting to decay. On May 13 and 14 it was bipolar with a penumbral follower and was last seen on May 15 as a single spot.

AR956, N03º/071º, appeared on the disk on May 14 type Bxo. The next day it was type Dac with an area of 220 millionths, and comprised several small penumbral spots. By May 17 it had become a more complex group with four penumbral spots and multiple spots type Dko. The group covered an area of 350 millionths and was seen by one observer with the protected naked eye. The following day, it had diminished with the main penumbral spot being in the following part of the group. The group continued to decay as it crossed the CM on May 19 and by the 20th there remained only one penumbral spot amongst eight satellite spots. Only a single Hax spot remained on May 22, reducing to Axx on the 23rd and was no longer seen on May 24.

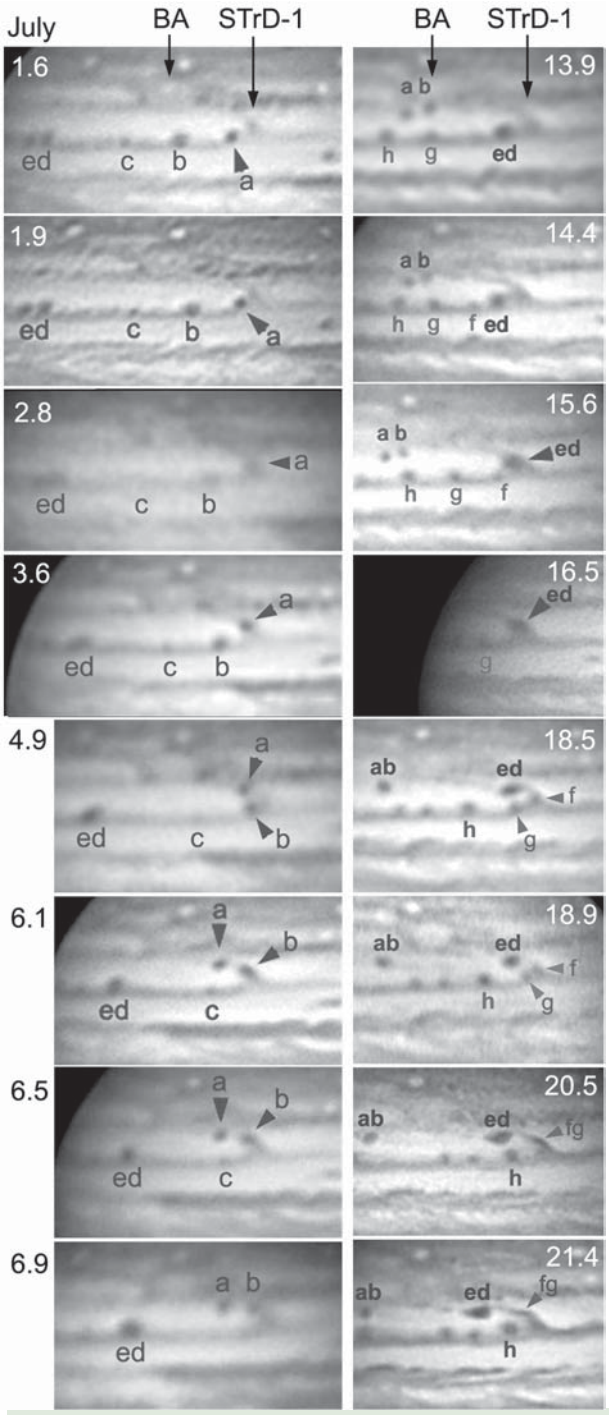
AR957, S04º/140º, made a brief appearance on the disk on May 18 type Bxo but was not seen thereafter.

AR958, S13º/231º, also made a brief appearance on May 29 type Axx and was type Hax by the 30th but was not seen on the following day.

(continued on page 228)

Jupiter Section

The climax of Jupiter's global upheaval



In the four months since our last report,[1] Jupiter's global upheaval has progressed surprisingly fast. Most notably, the South Equatorial Belt (SEB) faded as predicted, then the violent revival started even before the fading was complete. It has displayed an amazing phenomenon not seen for around 70 years, in which vortices running at ~60 m/s in a jetstream perform a U-turn: the Circulating Current.

First, though, came the spectacular outbreak on the superfast jetstream of the North Temperate Belt (NTB), which began on 2007 March 27. On May 8, the brilliant white spot at the preceding end caught up with the chaotic turbulence at the following end, and disappeared within two days. Thus the NTB had revived all round the planet: initially it was turbulent and grey, but by late May, a long segment of it was becoming reddish. In June and July, this reddish colour was intense: the NTB equalled the NEB as the reddest belts on the planet. This is a classic sequel to such superfast NTB outbreaks that occur during global upheavals, and has not been seen for over 20 years. Moreover, the disturbances also darkened the adjacent zones, so the whole northern hemisphere was dark and largely reddish.

The southern hemisphere, in contrast, was largely bright and brightening, as the SEB began to fade (whiten) as predicted. The southern belt component became progressively lighter and more diffuse from April onwards, as did the two South Tropical Disturbances attached to it. The belt faded fastest preceding the Great Red Spot, which became a prominent isolated reddish oval. On historical grounds, the SEB(S) was expected to continue fading until it was white, after which a violent 'Revival' would break out.

However, on May 17, Chris Go (Philippines) discovered a new white spot appearing within a dark spot at L2=180° (Figure 2). This was notable because a bright outbreak imaged by *Voyager* in 1979 started precisely in the centre of such a cyclonic dark spot, and SEB Revival outbreaks in 1949 and 1993 were suspected of doing so as well. At first we could not be sure whether this would initiate the Revival, as it came much earlier than expected. But there were precedents in 1949 and 1955 when SEB Revivals started before the SEB was fully faded. Another similarity to the start of the 1949 Revival was the slow development of the initial source. But by early June it had developed the typical form of a SEB Revival outbreak. Although its activity was on a smaller scale than in some historical examples, this was more than compensated by the intricate details revealed by hi-res images. Bright and dark spots continued to arise at the source, with the turbulent white spots or streaks in the belt drifting to lower longitudes, and dark spots on SEB(S) rapidly 'retrograding' to higher longitudes (Figures 2 & 4).

This outbreak gave us a great opportunity to look for the circulations at the two South Tropical Disturbances (STrDs). A STrD is believed to be a reconnection between the westward jet on SEBs and the eastward jet on STBn, as was discovered by BAA visual observers in 1920. They recorded SEBs spots in a SEB Revival swinging round to the STBn and reversing their drifts, a phenomenon they called the Circulating Current. BAA observers recorded it again in 1932–'34. But since then, although there were observations of partial circulation at STrDs in 1979–'81 and 1993, there

Figure 1. The Circulating Current, recorded in hi-res images for the first time. Decimal dates in 2007 July are given. Dark spots a to h are travelling to the right on the SEBs. On encountering STrD-1, they swing south around its p. edge and re-emerge travelling to the left on STBn. Note the mergers of spots d and e (July 3), a and b (July 16–18), and f and g (July 19). The red oval BA is nearby. Images are as follows: July 1, 13:22 UT, Isao Miyazaki (Japan); July 1, 22:54 UT, Fabio Carvalho (Brazil); July 2, 18:20 UT, Sadegh Ghomizadeh (Iran); July 3, 15:14 UT, Miyazaki; July 4, 20:41 UT, Manos Kardasis (Greece) and Carmelo Zannelli (Italy); July 6, 02:56 UT, Larry Owens (Georgia, USA), July 6, 12:55 UT, Miyazaki; July 6, 22:04 UT, Pete Lawrence (UK). July 13, 22:47 UT, Jordi Ortega (Spain); 2007 July 14, 09:27 UT, Maurice Valimberti (Australia); July 15, 14:17 UT, Miyazaki; July 16, 11:53 UT, Chris Go (Philippines); July 18, 12:08 UT, Miyazaki; July 18, 21:25 UT, Jose Antonio Soldevilla (Spain); July 20, 13:31 UT, Go; July 21, 10:01 UT, Valimberti.

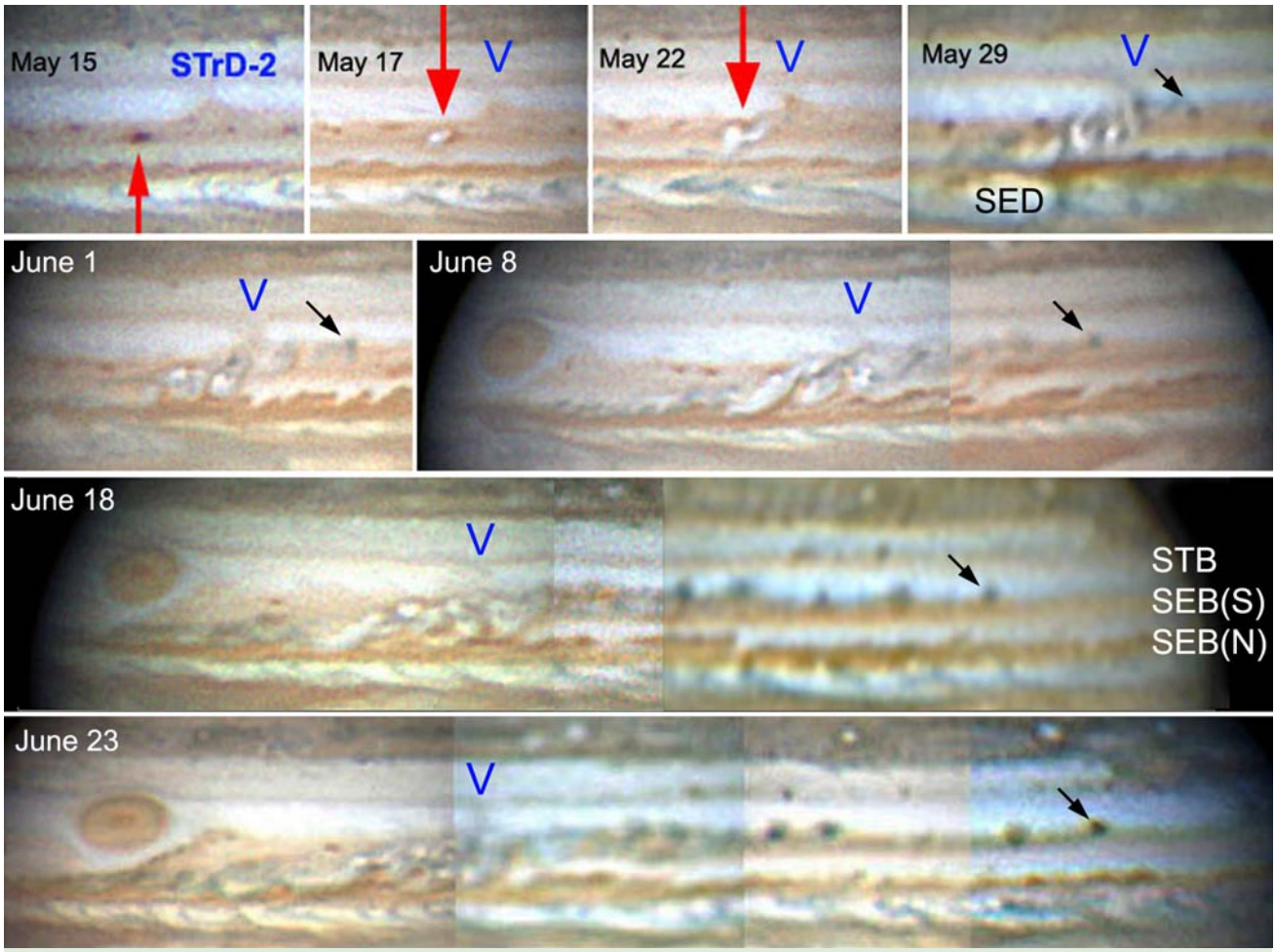


Figure 2. Origin and development of the SEB Revival. A small dark spot on May 15 was the location of the initial bright spot on May 17 (red arrows below & above). This was very close to STrD-2, which darkened briefly (May 22) but then persisted as a very faint feature (marked V); it apparently had no physical connection with the outbreak source. From the source, bright spots advanced to the left towards the GRS, and dark spots ran in the opposite direction ('retrograding' on SEB(S): the leading spot is marked by the oblique arrow). Images are as follows: 2007 May 15, 16:21 UT, Paul Haese (Australia); May 17, 16:56 UT, Chris Go (Philippines); May 22, 16:20 UT, Go; May 29, 17:08 UT, Daniel Chang (Hong Kong, China); June 1, 15:22 UT, Go; June 8, 15:25 UT, Go, plus 16:07 UT, Tiziano Olivetti (Thailand); June 18, 13:32 & 14:40 UT, Go, plus 15:37 UT, Chang; June 23, 12:11 UT, Anthony Wesley (Australia), plus later images by Isao Miyazaki (Okinawa, Japan).

have been no conclusive observations showing spots transferring fully into the STBn jetstream. Now, the full spectacle of the Circulating Current has ben recorded in hi-res images for the first time.

This happened when the retrograding dark spots on SEB(S) encountered STrD-1. Starting on July 1 as predicted, the whole chain of spots recirculated from SEBs to STBn. Observers worldwide were needed to follow these rapid events. With bad weather covering Australia and the tropics, the initial events were recorded most of all by Isao Miyazaki in Okinawa; but observers elsewhere managed to make valuable contributions too – especially ten new contributors in ▸ *p. 230*

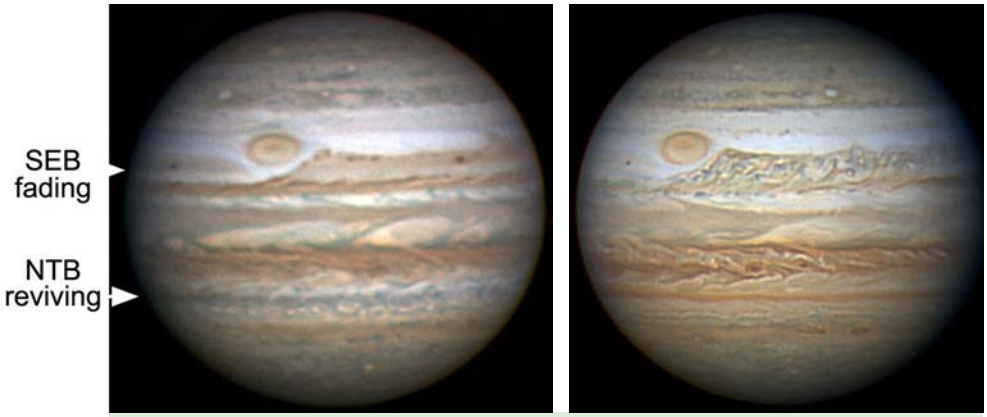


Figure 3. Hi-res colour images of Jupiter with the Great Red Spot. *Left*: 2007 May 5, 16:27 UT, Zac Pujic (Queensland, Australia). The view just before the SEB outbreak. The southern SEB has faded considerably (compare with pictures on cover of 2007 June *Journal*), though small cyclonic very dark spots remain. The revived NTB is grey and very turbulent. *Right*: 2007 July 22, 11:08 UT, Anthony Wesley (NSW, Australia). The SEB Revival is now well advanced, having filled the SEB with turbulence down to the GRS, but the SEB(S) is still almost invisible to the left of the GRS. The revived NTB is strongly reddish.

Solar Section - continued from p. 225

H-alpha

Prominences

17 observers reported a prominence MDF of 2.84 for May. Most were unremarkable.

On May 7 a jet curving southwards was seen in the west at S12º which seemed to be associated with AR953 close to the western limb. A low dense prominence was seen in similar circumstances on May 8 extending from S12º to S18º.

A pillar prominence was noted on the SE limb extending to a height of 102,000km on May 11, and also a 'bunch of hairy prominences' on the eastern limb at S24º to S28º.

A flame prominence extended to a height of 149,000km on the SE limb on May 16 and a 'lofty prominence' was seen on 18th at SW31º veering northwards.

May 20 was an active day with a large loop type prominence being observed on the eastern limb at 0º to S04º; a fine large prominence at the eastern limb with some detached material nearby; a large double arch and a pointed arch; a double arch on the SW limb; a large group on the eastern limb extending S12º to S25º.

Filaments & plage

Eric Strach observed a long, winding filament emanating from the south of AR953 from May 1 to 5, associated with bright plages. This observation was confirmed by Monty Leventhal. On the 2nd Brian Mitchell saw a strong 'S' shaped filament emanating from the central spot in AR953 with bright plages in both AR953 and AR954. Two parallel dark and one weak filament were noted close to the SW of AR953 on May 5 at 11:02 UT, leading to a patch of very bright plage, which could have been the start of a flare.

An arc filament was seen to the north of AR956 on 18th and 19th. A long curved filament extended to the west and north of AR957 on 19th when the group was on the CM, with a second filament to the south of the group.

A long 'S' filament was seen on May 22 N. to S. in association with AR956. A lone filament was seen in the SE quadrant on 29th which was not associated with any spot group.

On 30th at 09:30 UT a small dark filament was visible inside plage at the disk centre. In white light the plage was seen as facula but no spot was visible.

Flares

Several flares were reported. Monty Leventhal observed a flare on May 2 at 22:35 UT in association with AR953 and on May 6 at 22:45 UT, south of AR953 as it approached the western limb.

Ernest Richardson reported a 'cluster of three flares' on 13th at 07:45 UT.

Lee Macdonald was observing between 18:50 and 18:55 UT on May 20 and noted a possible limb flare on the western limb.

CaK

Brian Mitchell reported a bright patch on May 8 at S10º/180º, which matured into sunspots and bright plage on 9th. Following the disappearance of large prominences on the eastern limb S12º to S25º, small scattered patches appeared at what would have been the site.

2007 June

Activity in June was very similar to that of the previous month. Observers reported a blank disk from June 14 to 24 inclusive.

AR958, S12º/228º, faded at the end of May but reappeared on the disk on June 1 as a minor type Axx spot. The group was last seen on June 5, type Hsx.

AR959, S11º/205º, was present on the disk on June 1 type Bxo. The group gradually faded and was no longer seen by June 9.

AR960, S06º/181º, also appeared on June 1 close to the eastern limb, type Cki, consisting of a penumbral spot with two minor satellites. By the next day the group had moved further away from the limb revealing several irregularly shaped penumbral spots with an estimated area of 590 millionths type Ekc. During the next few days the group reduced in size to type Eac and after crossing the CM consisted of just two small penumbral spots. By June 12 only a single Hsx spot remained which was last seen on 13th close to the western limb.

AR961, S09º/221º, first appeared on June 25 close to the eastern limb type Hsx. On June 27 it sported minor satellites type Cso and had an estimated area of 120 millionths by 28th. The group was still on the disk approaching the CM on 30th, type Cki.

AR962, S12º/188º, was first seen on June 28 type Bxo (possibly the return of AR960). It was still on the disk on June 30 type Hsx.

H-alpha

Prominences

13 observers reported a prominence MDF of 3.21 for June, which was another unremarkable month for activity. Monty Leventhal observed a prominence on the SE limb extending to 140,000km on June 1 and a prominence on the SW limb extending to 93,000km on June 5.

Eric Strach reported a 'short arc with the southern limb extending beyond it' on the western limb at N29º on June 11. Ken Medway saw a 'large low mound on the NW limb' on the same day.

Peter Meadows reported the tallest prominence observed during the month on June 18 when he saw a spike prominence on the NE limb. Lee Macdonald also reported 'a pair of fair-sized prominences at the E limb' on this date. Brian Mitchell saw no prominences at all on 19th and 20th. On June 26 a prominence appeared on the NW limb extending to 121,000km, and on 27th a tall pillar was noted at N40º which was still conspicuous the following day.

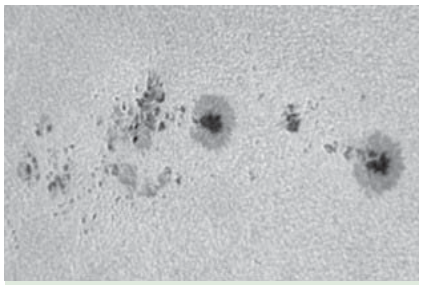


Image of AR960 on June 4 by Peter Garbett

Filaments & plage

Most filaments and plage were seen in association with AR960 as it progressed across

North & south MDF of active areas g

	MDFNg	*MDFSg*
May	0.32	0.67 (34)
June	0.05	0.95 (30)

g = active areas (AAs)
MDF = mean daily frequency
R = relative sunspot number
The no. of observers is given in brackets.

BAA sunspot data, 2007 May–June

	May		*June*	
Day	*g*	*R*	*g*	*R*
1	2	29	2	25
2	2	27	2	34
3	1	17	2	35
4	1	16	1	41
5	1	16	2	45
6	1	13	2	40
7	1	11	3	51
8	0	6	2	32
9	1	16	1	18
10	1	19	1	14
11	1	20	1	12
12	1	18	1	12
13	1	16	1	11
14	2	22	0	0
15	2	26	0	0
16	1	28	0	0
17	1	30	0	0
18	1	30	0	0
19	1	28	0	0
20	1	20	0	0
21	1	17	0	0
22	1	12	0	0
23	1	12	0	0
24	0	3	0	0
25	0	0	1	8
26	0	0	1	12
27	0	1	1	12
28	0	3	1	14
29	1	9	2	23
30	1	8	2	25
31	0	2		
MDFg	0.92 (54)		0.92 (51)	
Mean R	15.24 (47)		15.45 (45)	

the solar disk. A strong arc filament was seen on June 7 to the south of AR960 and a short but strong filament NW of AR961 on June 29. Bright plage was seen in an arc to the east of AR961 on the 28th and 29th, and also to the north of AR962 on the 29th.

Flares

Several flares were seen in association with AR960. Peter Meadows observed a short lived flare on June 2 between 16:15 and 16:25 UT, close to the eastern limb and to the SE of AR960. Monty Leventhal reported a type 2B flare on June 3 starting at 01:50, which peaked at 02:20 and ended at 02:50 hrs UT. A. W. Heath reported a flare at 07:00 on June 3 and Ernest Richardson reported two flares at 08:10. John Cook detected five M-class flares in the first five days of the month. Eric Strach observed a 2B flare on June 5 towards the east of AR960 at 10:20 and imaged the flare at its maximum intensity. A. W. Heath reported further flares on June 4 at 09:45, 9th at 09:35 and 10:00 when the flare was accompanied by a very dark filament, and a weak flare on the 'following' limb at 07:00 on June 28.

CaK

Brian Mitchell reported June 25 as remarkable for no patches on the disk, just very light mottling. Otherwise patches accompanied groups at all times. The patch associated with AR962 was visible on the eastern limb on June 28 preceding the group's appearance.

Lyn Smith, *Director*

Mercury & Venus Section

The variability of Venusian markings in the visual waveband

The question of whether the markings of Venus vary in appearance within the range of the visual waveband is one that has been investigated by members of the Mercury & Venus Section since 1956. It is agreed that in changing a red filter for a blue one, the contrast between limb and terminator is greater: the limb brightening is enhanced and the terminator shading deepened. The apparent phase may also be reduced. Most observers agree that brighter areas are better seen through green, blue or violet filters, but whether the dark markings vary in form with wavelength has always been a controversial point. Comparison of CCD filter work since the early 2000s has shown that the well-marked dark features shown in ultraviolet (UV) images are very similar to those which can be seen or imaged in violet light. Sometimes the UV markings can be imaged clearly or seen visually (but more weakly) in blue light. UV imaging of the planet was discussed at some length in the 2004 Venus report[1] and will be further described in the 1999–2006 report (currently in press).

Recent improvements in webcam imaging have demonstrated that the markings seen in the visible waveband really do vary with wavelength, completely validating earlier studies by Section members. This was always the opinion of Paul Doherty, J. Hedley Robinson (see the 1975 E. elongation report),[2] V.Axel Firsoff,[3] David Gray, Alan Heath, myself,[4] and many others. This does not necessarily mean that all the visual colour filter drawings made in the past are correct: something missing from a drawing through one filter but seen through a different one may simply reflect the fact that the observer was concentrating on different parts of the disk when the moments of best seeing arrived, but gross differences in form (such as are often observed) are hard to explain away. At the present 2007 E. elongation several observers made systematic filter images before dichotomy, and David Gray, Alan Heath, Ian Hancock and the writer also made drawings with different filters. Christophe Pellier's images in Figure 1 clearly show that the 'visual' band markings slightly differ between blue, green and red light. This tends to validate earlier series of drawings by Gray: to his eye, red light rarely revealed features, but when visible in red the belts were subtly different to those visible in blue or violet.[5] Gray's current filter drawings (Figure 2) are also pertinent, and Damian Peach's CCD images of the same date (Figure 3) are reproduced to impartially validate many of their features.

Infrared work shows another pattern of dusky markings. Generally the features seen in the IR are extremely vague, but just occasionally narrow sharp belts appear clearly defined. Brighter patches are rare in the near-IR waveband accessible to ground-based astronomers, around the 1 micron (1000nm) region. This is a relatively new field for the amateur, and the determination of rotation periods for features at different latitudes in the UV and IR is still a worthwhile exercise, even with *Venus Express* at the planet, as they seem to be time-variable.

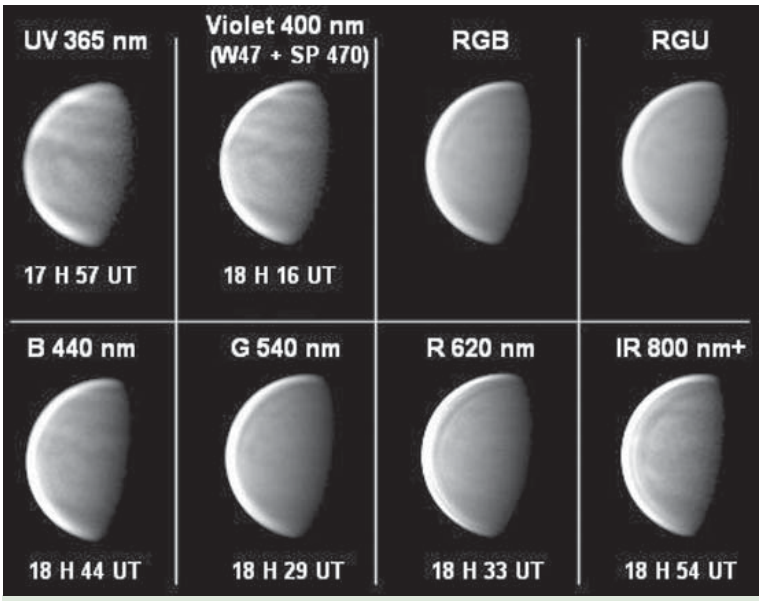


Figure 1. Images by C. Pellier (Paris, France) on 2007 May 3, with 250mm Cass. and SKYnyx 2.0M camera (other details on image). South is uppermost (and in all other Figures). Note the conspicuous dark shadings in the UV image which are very similar to the appearance in violet. Details in the blue image are weaker but still similar. Green and red show weak, but somewhat different banding. The IR image shows obvious features which differ significantly from the UV image. Two composites are presented; the RGB should closely resemble the eyepiece view. The curved limb band in some images is a processing artefact.

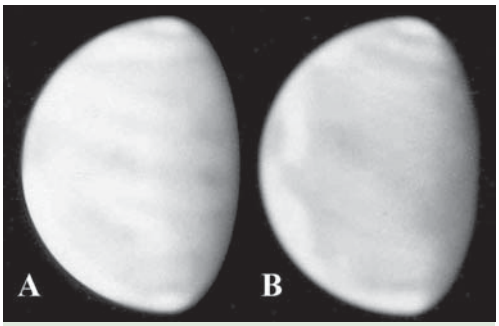


Figure 2. Drawings by David Gray (Kirk Merrington, Co. Durham, UK), 2007 April 18d 16h 40m, 415mm Dall–Kirkham Cass., ×365. **(A)** 16:40 UT, W15 yellow+ W58 green filters combined (integrated light yielded a near-identical view); **(B)** W47B blue-violet filter, 17:00 UT. Bright cloud on the *p*. side in (**B**); subtle differences between the dark belts in (**A**) and (**B**).

It seems then that what we see in visual wavebands is somehow a mixture of the well-defined markings that lie deeper in the atmosphere, observable in blue-violet light and more sharply in the ultraviolet, and more diffuse markings in an overlying stratum that are best observed in the red and near-infrared. We know that the 'UV features' are often overlain by the latter, higher altitude clouds, which can temporarily distort the shape of the characteristic Y and Ψ markings. Shorter wavelength visual work enhances the UV markings and longer wavelength work suppresses them but favours views of the upper, overlying clouds. Perception of the UV patterns at visual wavebands will be enhanced if the overlying layers of atmosphere are temporarily clearer than usual. Both *Venus Express* and the high-quality UV imaging produced by members of the Section demonstrate that they are major short-term changes in the clouds, and that Venus still retains an element of mystery.

Richard McKim, *Director*

1 R. J. McKim, K. W. Blaxall & A. W. Heath, *J. Brit. Astron. Assoc.*, **117**(2), 65–76 (2007 April)
2 *J. Brit. Astron. Assoc.*, **86**, 155–161 (1976)
3 *ibid.*, **67**, 66–75 (1957)
4 in J.Hedley Robinson, *Using the Telescope*, David & Charles Ltd., 1978, drawings on pp 64–65
5 See R. M. Baum, *J. Brit. Astron. Assoc.*, **107**, 336–337 (1997) for further illustrations and discussion.

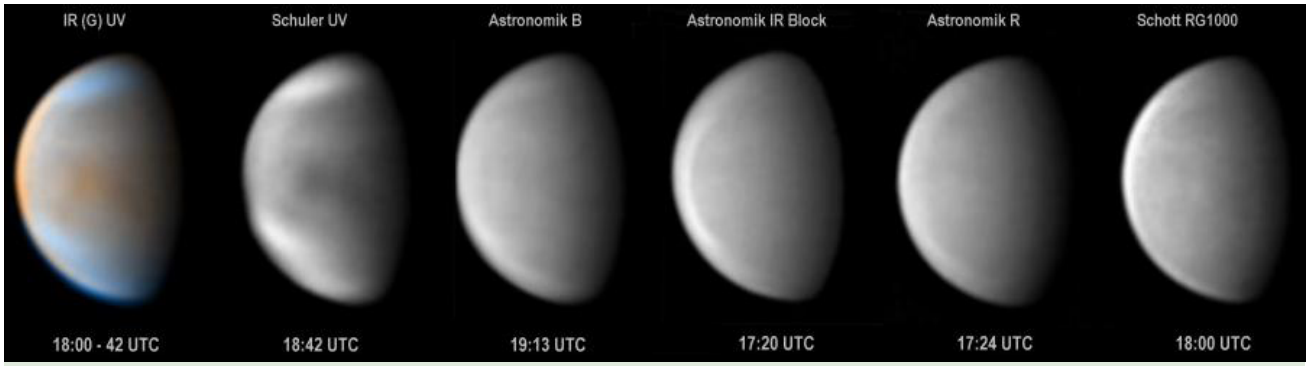


Figure 3. Filter images by Damian Peach (Loudwater, Kent) with 235mm Schmidt–Cass. and SKYnyx 2.0M camera on 2007 April 18 (other details on image) for comparison with Figure 2. Note that Figure 2B agrees very well with the Schuler UV image on the left (although the polar hoods are larger and brighter in the UV); Figure 2A is best compared with the two red/near infrared filter images on the right.

Jupiter Section: *continued from page 227*

southern Europe, and one in Iran. So STrD-1 was imaged on two out of every three rotations of the planet during July.

Figure 1 shows the phenomenon in detail. The leading spot (a), and many following it, reversed their drift rates from DL2 = +120°/month (–58 m/s) to –93°/month (+37 m/s). In many cases, spots merged (a–b, d–e, f–g, and others since), either before, during or after their recirculation; so without this intensive monitoring, it would have been hard to keep track of them.

Meanwhile the SEB source region, at L2 ~ 180°, continued to produce bright and dark spots in a scene of great turbulence. The disturbed sector extended down to the GRS in late June. The SEB sector between STrD-1 and GRS was unaffected by all this, and continued to fade until, in July, the southern two-thirds was almost invisible. But in late July, diffuse darkening of SEB(S) began to penetrate gradually f. STrD-1, and disturbance on SEB(N) spread p. the GRS, so this sector too is set to revive as a dark belt. We may then look forward to fading of the GRS, and onset of reddish colour across the revived SEB.

John Rogers, *Director*

1 *J. Brit. Astron. Assoc.*, **117**(3), 113–115 (2007 June)

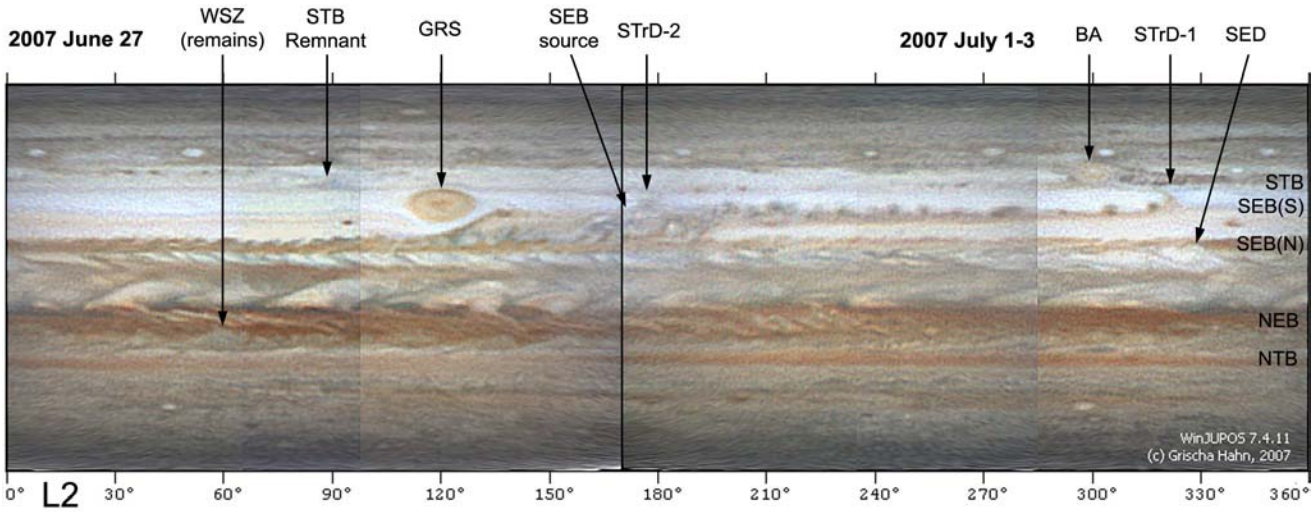


Figure 4. Map of Jupiter on June 27 (left half) and July 1–3 (right), showing the SEB Revival at its most active, the dark Equatorial Zone, and the red revived NTB. Other long-lived features are marked. It was on June 27 that the SEB disturbance initiated two striking phenomena having arrived at the Red Spot Hollow: a very dark rim on the f. side of the Hollow, and a long series of 'waves' on the SEB(N) p. the Hollow. Images by Chris Go (Philippines), made into a cylindrical projection map by Grischa Hahn using his WinJUPOS software.