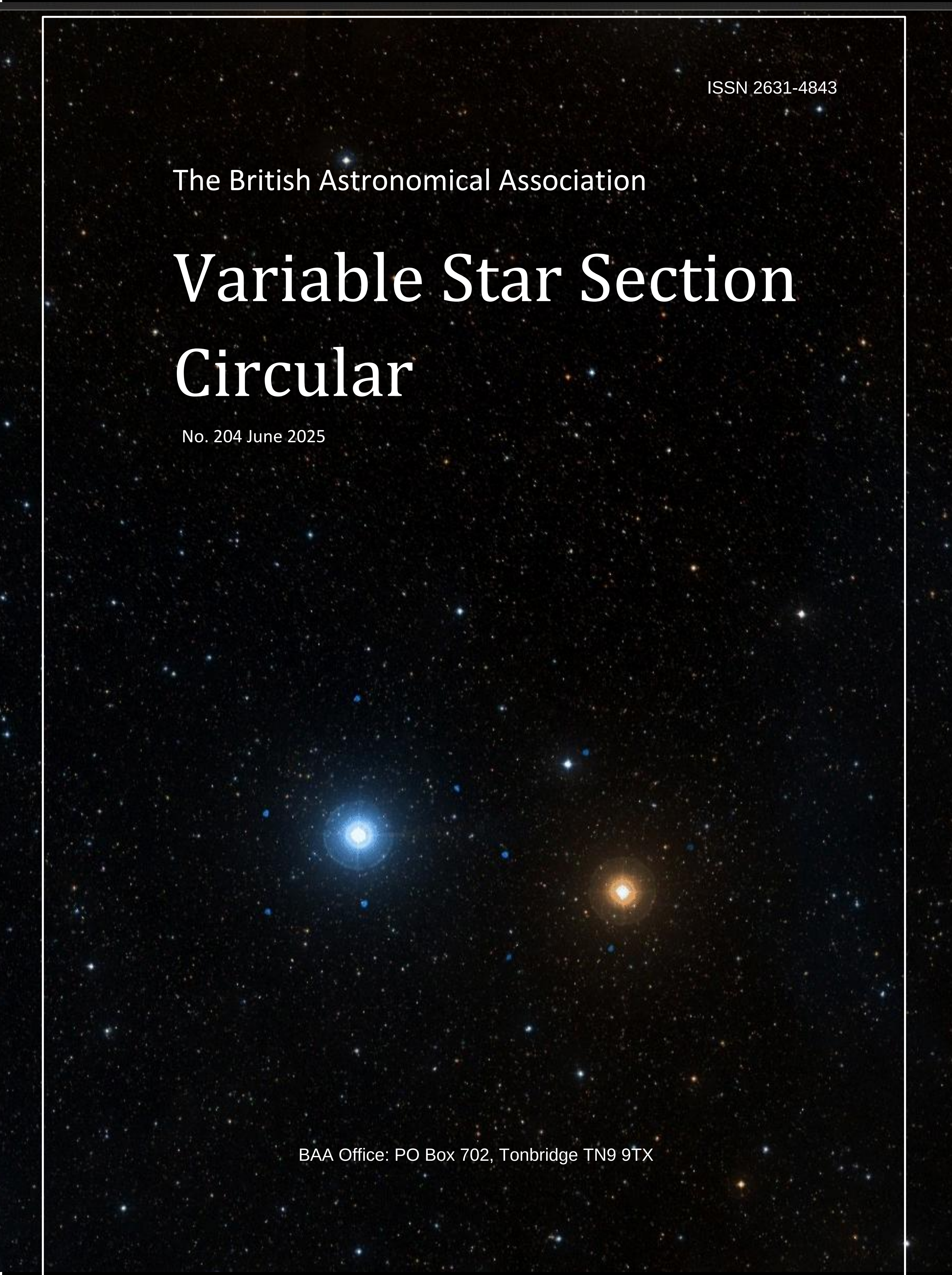
ISSN 2631-4843

The British Astronomical Association

Variable Star Section Circular

No. 204 June 2025



BAA Office: PO Box 702, Tonbridge TN9 9TX

Contents

Cover Picture

η and ζ Aurigae (see page 38)

Digitised Sky Survey (Aladin v11.0 2000 A&AS…143…338)

BAA
VARIABLE STAR SECTION
MEETING

Saturday October 25, 2025

The Humfrey Rooms
10 Castilian Terrace
Northampton, NN1 1LD

https://britastro.org/event/variable-star-section-meeting-2025

From the Director – *Jeremy Shears*

VSS Meeting on 2025 October 25 and a call for speakers

A reminder that our next VSS meeting is taking place on Saturday October 25 at the Humfrey Rooms in Northampton, kindly hosted by the Northamptonshire Natural History Society: https://britastro.org/event/variable-star-section-meeting-2025

If you would like to speak at the meeting, please let me know by August 1 and I will do my best to accommodate you in the programme.

VSS Assistant Director

I am delighted to say that Gary Poyner has agreed to become the Section's Assistant Director, in addition to his roles as *Circulars* Editor, CVs & Eruptive Stars Co-ordinator and webmaster. Thank you, Gary!

VSS *Circulars* on the Astrophysical Data System

I am pleased to announce that the *Circulars* index on the Astrophysical Data System (ADS) is now complete. Chris Lloyd recently uploaded the last batch covering VSSC 12 to 114, so they should all now be available. Very many thanks to Chris for undertaking this major project and for continuing to maintain the index.

ADS is a digital library portal for researchers in astronomy and physics, operated by the Smithsonian Astrophysical Observatory (SAO) under a NASA grant. Having the VSSC on ADS means that all our articles are accessible to the research community. This is also why it is important to include an abstract for articles submitted to the VSSC.

The ADS code for the *Circular* is BAAVC; a search reveals almost 3000 articles.

Observations of ZZ Psc requested in support of JWST observing campaign

Prof. Boris Gänsicke (University of Warwick) referred to the white dwarf **ZZ Psc** during his talk at the BAA Winchester Weekend. Also known as Giclas 29-38, or simply **G29-38**, it is a variable white dwarf star of the DAV (or ZZ Ceti) type, whose variability is associated with large-amplitude, non-radial pulsations caused by gravity waves. What is particularly interesting is that ZZ Psc is also thought to be surrounded by a debris disk which the white dwarf is accreting.

Dr. Tim Cunningham of the Center for Astrophysics at Harvard has requested time on the James Webb Space Telescope to observe the star. I am in contact with Tim and he would very much welcome VSS observers' assistance by carrying out high cadence photometry. The first of the scheduled JWST observing periods is 25 Jul– 3 Aug 2025. Tim comments:

"We are leading a high-cadence time-series Cycle 4 JWST program (https://www.stsci.edu/jwst/science-execution/program-information?id=9077). Our target is G29-38, the prototypical metal-polluted white dwarf hosting a dusty debris disk made up of tidally-disrupted planetary material. In fact, this was the first white dwarf discovered to have an infrared excess and is truly a cornerstone system among the sample of >1500 white dwarfs with evidence of planetary debris accretion.

Our approved program comprises 12 hours of continuous, non-interruptible time-series spectroscopy with JWST NIRSpec and MIRI. Our primary goals include a detailed study of the disk mineralogy for *the brightest WD circumstellar debris disk (the white dwarf is only 17pc from Earth), and to study disk variability. It is this second goal which is the primary motivation to build an extensive ground-based monitoring program.*

The white dwarf is pulsating (ZZ Ceti), with pulsation periods ranging from 100—1000s. The debris disk is known to exhibit short-period (minutes) and long-term (years) variations, and it has been shown at short NIR wavelengths (<2um) that IR variability of the disk is likely a direct result of reprocessing/reflections of the pulsations. Our program will study this for the first time at mid-IR wavelengths. This will also give us an opportunity to attempt the very first reverberation mapping of a white dwarf debris disk. As part of our program, we are building an extensive ground-based high-cadence photometric program with full longitudinal coverage.

The WD pulsations induced surface temperature fluctuations of up to 3000K, so it is critical to have simultaneous optical lightcurves in order to maximize the science output from the JWST observations. The optical lightcurves will allow us to subtract out the WD continuum in the infrared time-series spectroscopy, vital for probing whether variations are caused by reprocessing of the pulsations, or intrinsic dynamical processes in the disk.

In order to build a robust asteroseismological model of the white dwarf, our full-longitudinal coverage program will consist of ~2 weeks of continuous monitoring. This long baseline will allow us to develop a robust asteroseismological model of the white dwarf surface temperature, and a continuous lightcurve is essential in order to fully characterize the stability of the pulsation modes. The target is V=13.1mag, with pulsations amplitudes of 5—15% and periods 100—1000s. The brightness makes it a highly suitable target for >30cm class telescopes. Ideally, the cadence should be better than 10s in order to resolve the shortest periods, but given the long baseline, a longer cadence would still be valuable.

The JWST observations are 12 hours in total, and our goal is obtain a continuous 2-week lightcurve, with the JWST observations in the middle (i.e., one week either side of the JWST observations. The observation dates are not yet known, but they have been restricted to just three possible weeks designed to maximize the ground-based visibility as much as feasible from the JWST scheduling side. We have three possible schedulable windows: 1) ***Jul 25 – Aug 03 2025****, 2)* ***Nov 02 – Nov 10 2025****, and 3)* ***Jul 25 – Aug 03 2026****. Within these windows the target should be visible for 5—6 hours per night from the ground. The target has a declination of +05 degrees, making this a favourable target from both hemispheres. But indeed, the more the merrier! So anyone or network that you can think of that would be willing to help us in this ambitious endeavour would be most welcome to join the effort.*

Hence ground based photometry from amateurs would be appreciated during the campaign. Further details, including the time of the campaign, will be announced on BAA VSS Alert once they have been firmed up.

ZZ Psc is relatively bright, V ~ 13, and is located at RA 23 28 47.64 Dec +05 14 54.2 (J2000.0). Charts and sequences are available from AAVSO VSP.

Nova Cygni 1975 (V1500 Cyg) 50 years on

Incredible as it might seem, 29 August marks the 50th anniversary of the brightest nova seen in Northern skies for a generation, reaching magnitude +1.7. At the time I was a keen 13-year-old with a 6-inch (15 cm) reflector by Fullerscopes. That August I had taken to camping in the back garden next to the telescope and I had the opportunity of seeing the nova during the first few days.

To mark the occasion, Gary Poyner has written an article on the nova, and how it launched his VS career, for the August BAA J*ournal*.

Historical VS observations safely recovered

The VSS photometry database contains observations going back to 1840. However, from time-to-time VS historical observations come to light that have not been entered into our photometry database.

As mentioned in the last VSSC, Storm Dunlop sadly passed away earlier this year. Richard McKim was asked to review Storm's papers and he found a number of records of VS observations amongst them. These include observations made by Storm himself as well as a notebook by Roy Panther, the comet discoverer.

Shortly after that, and completely unconnected, I was approached by an amateur astronomer who had come across a long-forgotten pile of VSS report forms from roughly the 1970s to 1990s which include observations of g Her, V566 Her, U Her, TT Tau, and R Lyr.

Intriguingly, there are observations of U Her from 1961 made by R.C. Shinkfield on a report form headed "*BAA Southern Variable Star Section*". John Toone informs me that "this was the first VS group in the Southern Hemisphere established by J. J. Richardson in Sydney in 1924 and it inspired Frank Bateson to establish the VSS RASNZ in 1927. 1927 was also the year that Reg Shinkfield based in South Australia started his VS work. Incredible to see Shinkfield still using those forms in 1961".

Bob Dryden has very kindly offered to enter all of these newly recovered observations into the VSS database.

If anyone is aware of the existence of other historical VS observations, please do let me know so they might too be recovered and added to our database. Maybe worth looking in the backs of cupboards or lofts.

Centenaries of variable star observers

Col. E.E. Marwick (1853−1925), the second Director of the VSS, serving between 1889 – 1909, died a century ago, on 4 July 1925. In addition to his long career in the British Army, he was a keen variable star observer. He discovered T Cen and RY Sgr. He was BAA President 1912 – 1914.

Edward Pigott (1753–1825) died two centuries ago on 27 June 1825. Amongst other things, he will be remembered for his discovery of the variability of η Aql, R Sct and R CrB, as well as his collaboration with John Goodricke.

Recent observations of Mira Variables on the BAAVSS programme. 6

Shaun Albrighton

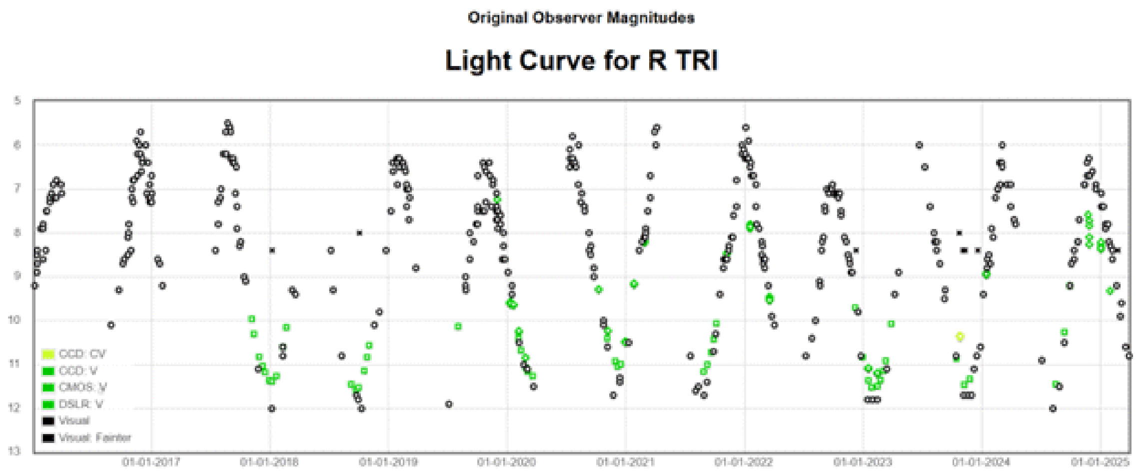
shaunalbrighton93@gmail.com

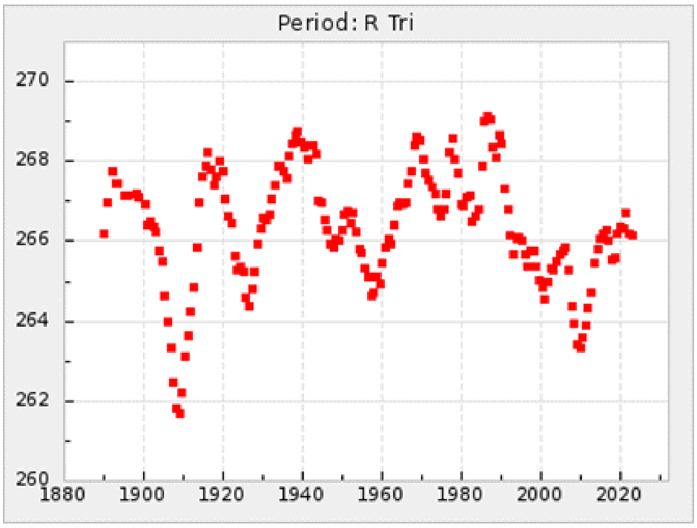
In this report we examine the final four Mira variables on the BAAVSS programme between 2016 and Apr 2025.

R Tri

VSX lists R Tri as having a range of 5.4 – 12.4, Period 266.58d, the duration of rise is recorded as 44% (117d). The spectral class varies between M4IIIe – M8e.

BAAVSS observations during the review period broadly confirm the extreme range in V Band of between 5.5 and 12.0. What is clearly evident, is that the maximum varies between 5.5 and 6.9. Minima however show a much smaller variation, although visually additional observers are needed to provide a full light curve. It should be noted that R Tri lies just north of the ecliptic, so is impossible/difficult to observe during late spring and early summer.



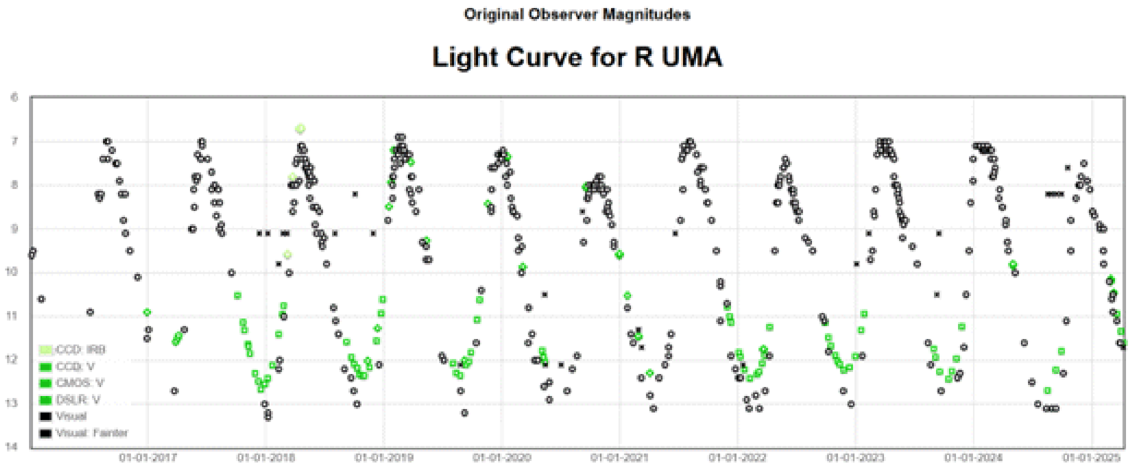


Period analysis by Thomas Karlsson (SAAF) [2], between 1890 and 2022, shows random fluctuations between 262d and 269d.

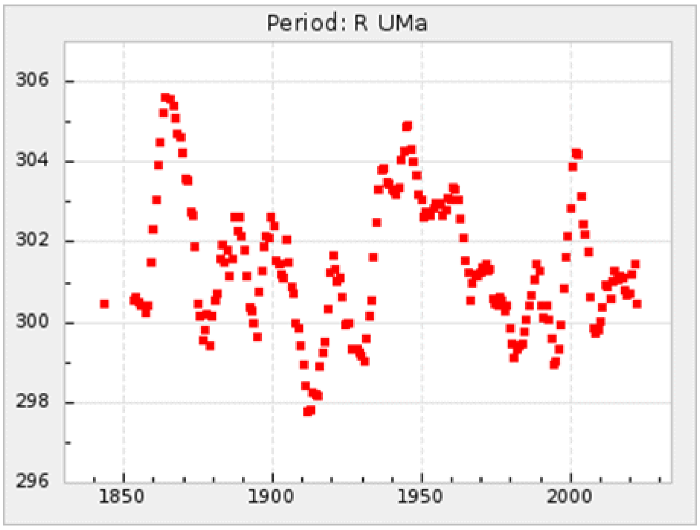
R UMa

R UMa is listed in VSX has having a range of 6.5-13.7V, Spec M3e-M9e, Period 301.45d, with quite short rise time of 118d (39%). BAAVSS observations since 2016 gives a lower range of 6.8 to 13.2, visually. As is typical CCD observations near minima are between 0.5 and 1.0 mags brighter.

R UMa along with S UMa and T UMa is circumpolar from British latitudes and additionally lies well above the ecliptic. This means that the star is easily followed throughout the whole year.



Back to contents



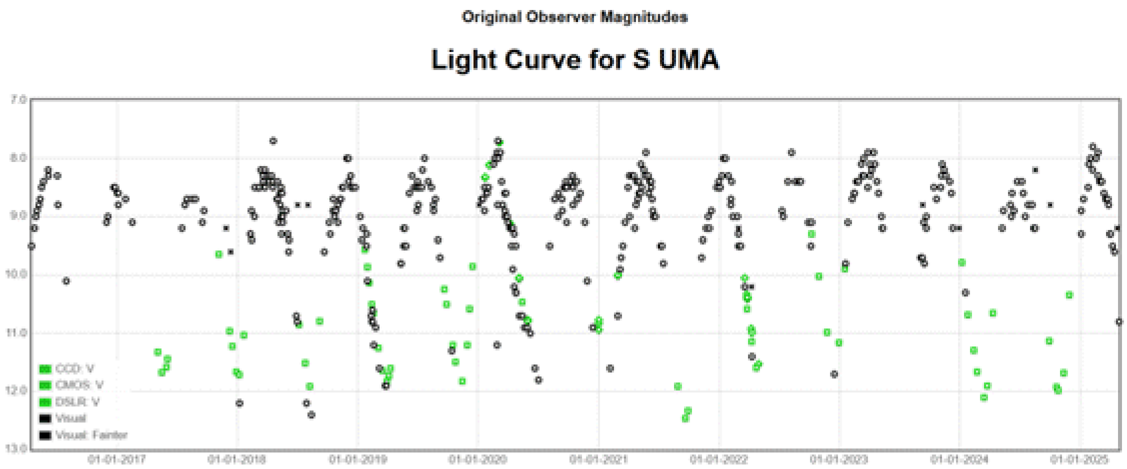
The period for R UMa varies randomly between 298 and 305 days. [2]

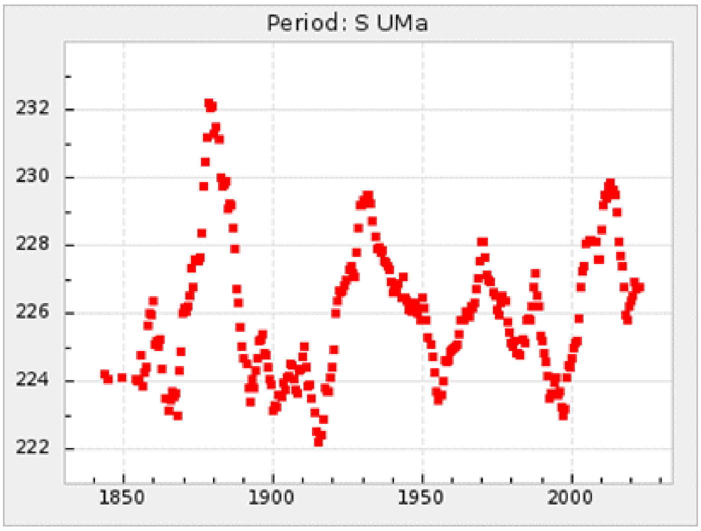
S UMa

VSX lists S UMa as having an extreme range of 7.8 – 12.5V. Spec S0,9e – S5,9e, Period 226.14d, rise occupies 106d (47%), as such the light curve appears very symmetrical.

S Class variables are a rare variant of M Class. They are characterised by having roughly equal amounts of oxygen and carbon. In addition, titanium (II) oxide (TiO), lines are weaker, but they display strong bands of zirconium oxide (ZrO). Other examples of S class Miras include, R And, X And, chi Cyg, R Cyg and R Gem.

Observations since 2016 confirm the maximum brightness of 7.8, with only a small variation, 7.8-8.6. Minima have been poorly observed, although where seen, confirms a figure of around 12.5. Observers of T UMa, which receives greater attention by observers, are asked to take up S UMa, lying just a few degrees to the north.

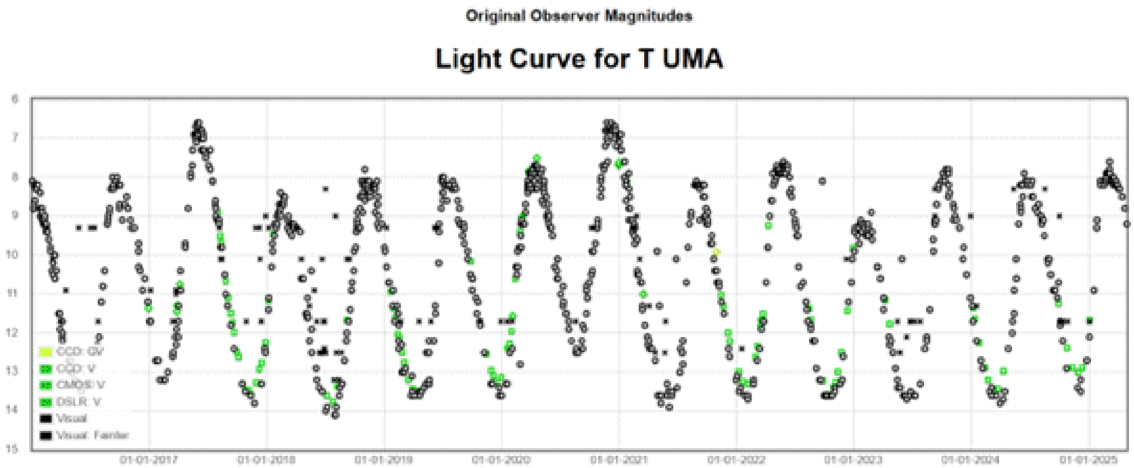




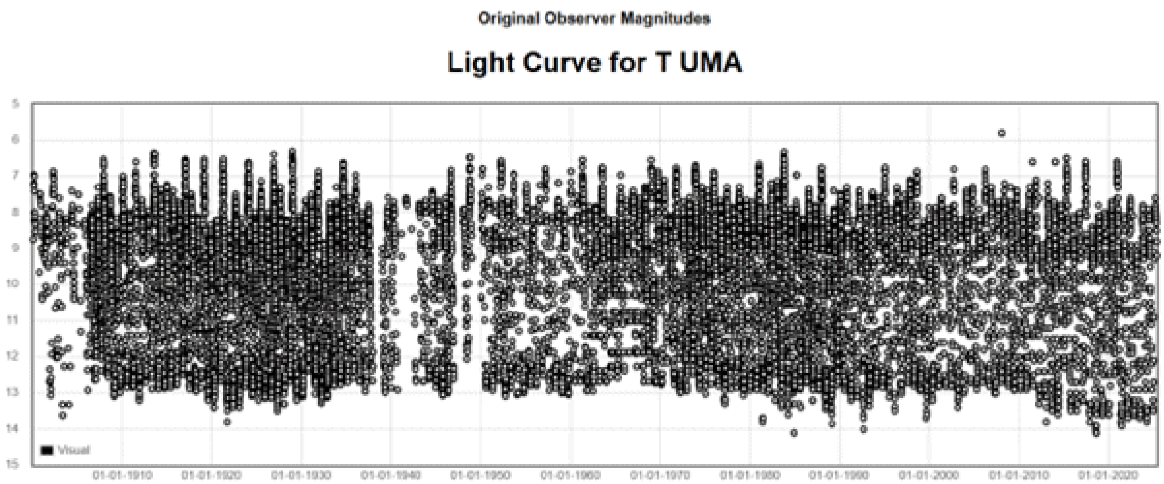
Period analysis shows that the period for S UMa has varied between 222 and 232 days. These variations which may be random, do hint at cycle of near 40 years.[2]

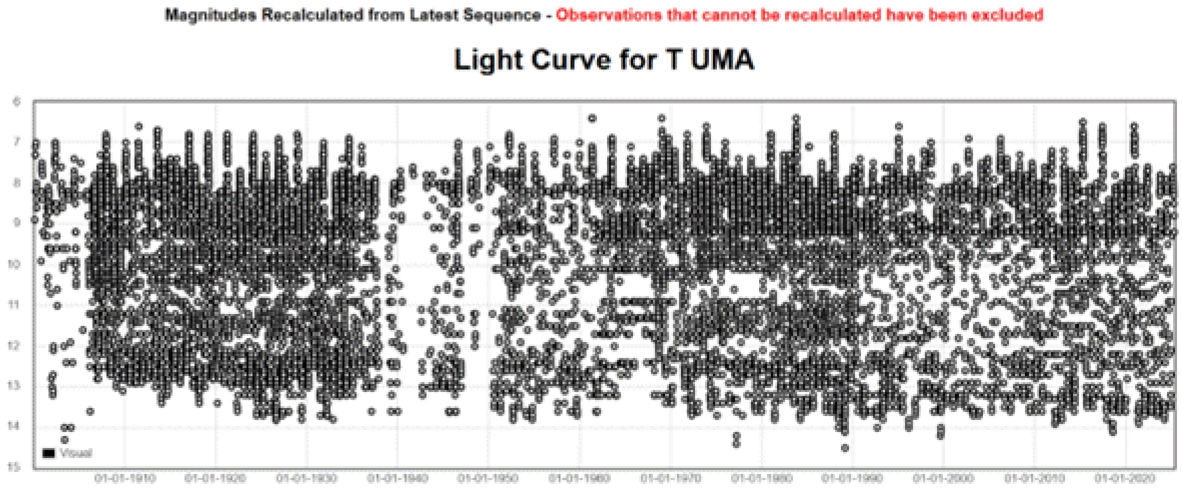
T UMa

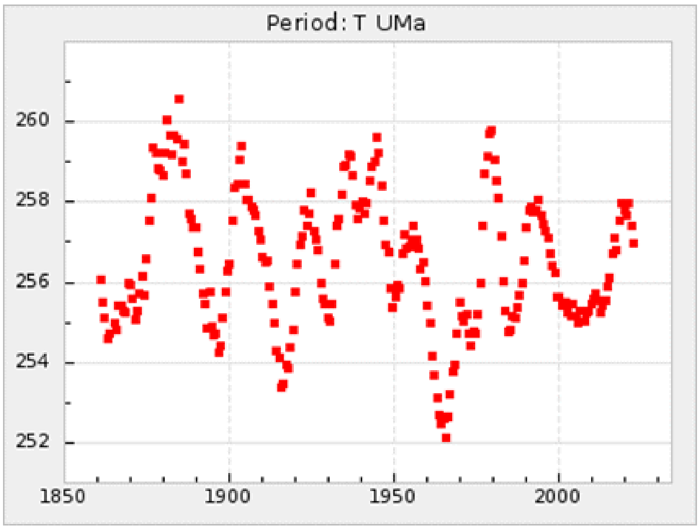
VSX lists T UMa as having a range of 6.5 -13.6V, Spec M4IIIe-M7e, Period 256.35d, with the rise taking 41% (105d). T UMa is one of the more unpredictable Mira variables. The results since 2016 show that maxima have varied considerably, peaking at 6.6 in 2017 and Dec 2020. In comparison the maximum of Jan 2023 only reached approx. 9.1. Likewise, minima have varied, of note being the bright minimum of 2020 (approx. 12.5).



Below is a BAAVSS plot of visual observations since 1900. You will see that minima from approx. 1935 to 1980 appear to be between 0.5 and 1.0 mags brighter than more recent observations. However, if we recalculate the observations (where possible) to allow for changes in the sequences used, this feature is basically eliminated. This demonstrates why recording the full magnitude estimate is of great value.







Period analysis [2] shows that the period for T UMa has varied between 352 and 360 days. At times this seems to be erratic, at others cyclical in nature, with a period of approx. 25 years.

References

1. All data VSX
2. Period plots are by Thomas Karlsson (SAF) https://var.saaf.se/mirainfoper.php

CV & E News

Gary Poyner

garypoyner@gmail.com

Recent activity and light curves for CV & E programme objects Markarian 421, W Com, 3C 273, V1108 Her and V1413 Aql, as well as the UGWZ star V748 Hya.

AGN:

The BLLac object **Markarian 421** is currently undergoing a 'low state' (for want of a better phrase), with its V magnitude approaching 14.0. The fade began during Jan-Feb 2025 from a mean magnitude of 13.2mv, to its current brightness (May 21) of 13.8 mv [Fig. 1]. These fades are less common than the more pronounced flare activity we witness in the jet, which can take the brightness of Mark 421 above magnitude 12.0mv – April 2013 for example. Low states approaching (or below) magnitude 14 occurred in 1985-87, 2003-04 and 2017-21 (from BAAVSS database). Much like the flare activity, there seems to be no set period for this behaviour. The jet in Mark 421 is known to precess, which is the probable cause for these dips in brightness, where our line of sight into the relativistic jet (a defining case for BLLAC objects and Quasars also known as Blazars) is reduced slightly, resulting in a drop in magnitude.

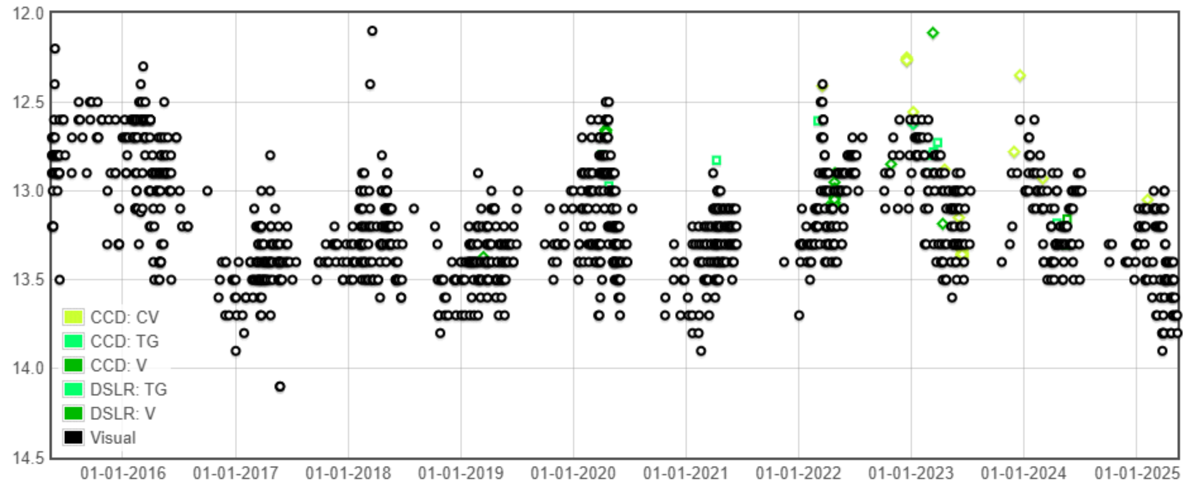


Figure 1: Markarian 421 2015-2025: D Boyd, G Darlington, M J Gainsford, V Hull, R K Hunt, G M Hurst, C P Jones, P C Leyland, M Mobberley, W Parkes, R A H Paterson, M Phillips, G Poyner, G J Privett, J Toone, T Vale, I L Walton (*BAAVSS Database*)

Another AGN which has been active over the past couple of months is **W Com**. From a major 'outburst' in April 1998, where it reached a visual magnitude of 12.8, W Com had been on a steady decline to 2016. After reaching magnitude 16.2 mv in April of that year, W Com began to show increased flare activity with a slow rise in brightness, peaking at magnitude 14.4 mv during May 2018 (Fig. 2). Then followed a further decline to 16.2V in March 2022, after which small flares of ~ one magnitude amplitude have followed until the beginning of 2025, when W Com has been recorded as its brightest level since 2021 at magnitude 15.1 mv in March of this year. The amplitude of this current flare is just under one magnitude and seems to be ending as I write these words (May 21), with W Com closing in on magnitude 16.0V again.

Understandably not as popular with observers as Mark 421 due to its brightness levels, nevertheless W Com is a fascinating object to monitor if you have a 30cm telescope or larger. It's absolutely worth registering negative observations for the chance of catching one of the frequent flares which have been occurring since 2018.

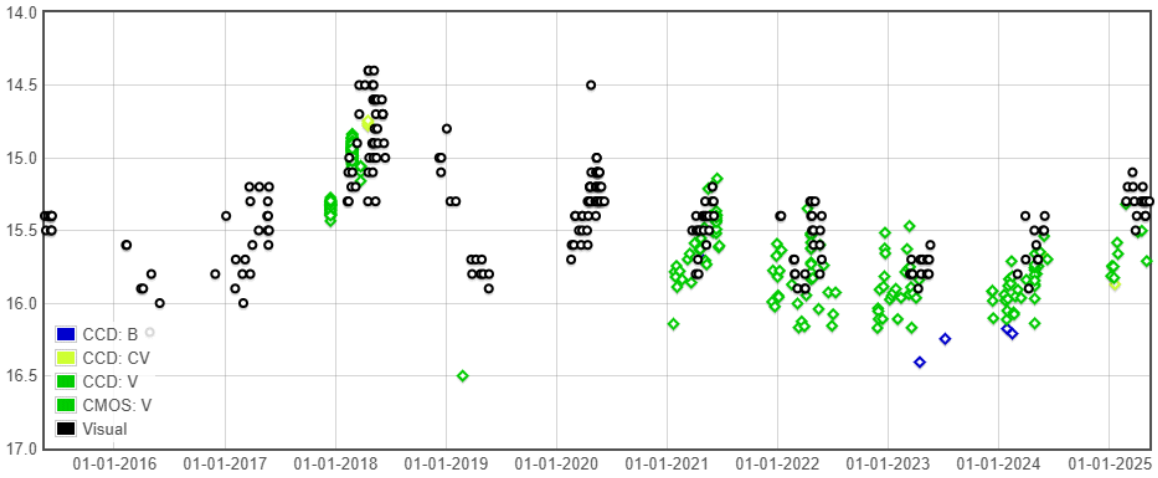


Figure 2. Activity in W Com since the 2018 flare: C P Jones, R D Pickard, G Poyner, J Toone, I L Walton (*BAAVSS Database*)

Our final active galaxy in this brief review is **3C 273** - the first ever quasar to be identified, and the brightest in the whole sky – visible with 15cm-20cm telescopes depending on your observing location.

The mean brightness of 3C 273 (discounting flare activity) has been decreasing since around 2013, from a mean magnitude of ~12.8 to its current level of 13.4-5V, although the last 0.3 mag fade has occurred since the beginning of April. The BAAVSS light curve can be traced back to 1981 (Fig. 3), and 3C 273 is now at its faintest level in that time period. Checking the AAVSO light curve [1], we can go back to 1963 for V values, and to 1887 for B values (from plate archives), to see that 3C 273 is now at its faintest level in V, I, R and B throughout its historical record.

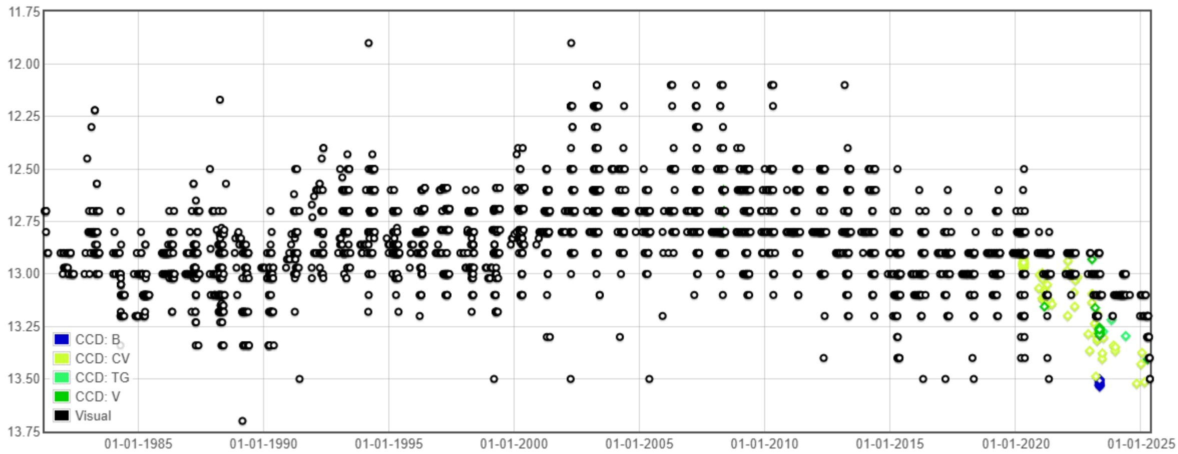


Figure 3: 3C 273 1981-2025: C D Beech, B J Beesley, D Boyd, A T A Bueno, G Darlington, J W L Ells, M J Gainsford, J Greaves, G M Hurst, J E Isles, R D Januszewski, C P Jones, S Koushiappas, R W Middleton, R A H Paterson, R D Pickard, G Poyner, D Stott, J Toone, V Tuboly, T Vale, I L Walton, W J Worraker (*BAAVSS Database*)

UGWZ stars

Two notable UGWZ stars have been in outburst over the past couple of months. **V748 Hya** was detected in outburst by Rod Stubbings on February 23.517 UT at magnitude 12.0 mv, the third outburst to be detected since the first observations made in 2006 (the second occurred in 2011) [2]. With no observations of this object in the BAAVSS database (until now), despite a declination of just -15 degrees, we need to look at the AAVSO light curve for historical activity [1]. The 2025 outburst peaked at magnitude 11.1 on Feb 24, then faded slowly to 13.94CV by March 14 before rapidly fading to 18.1Cv three days later. Classic UGWZ behaviour. Just one rebrightening was observed on March 21 at magnitude 14.4CV, before returning to quiescence at magnitude ~18.0CV.

This writer obtained a remote unfiltered image using SLOOH Canary 2 on Feb 25.09 at magnitude 11.83CV and followed it to near minimum using the same telescope and SLOOH Chile 2 for V-band measures (Fig. 4).

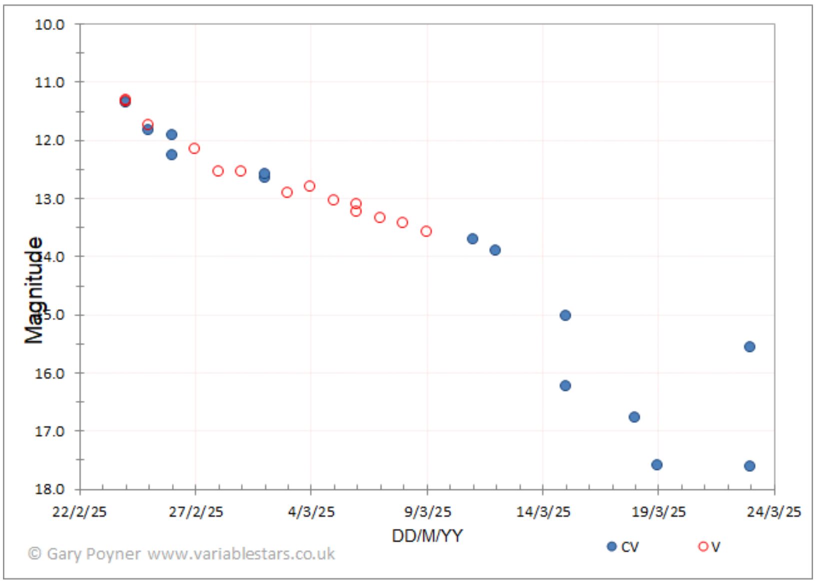


Figure 4: V748 Hya: G. Poyner

V1108 Her was detected in outburst on April 21.73 by Japanese observer Tadashi Kojima [3]. This is the third outburst of this object to be detected since its discovery by Japanese observer Y Nakamura on June 16, 2004 (then known as Var 4 Her). Interestingly for a catalogued UGWZ system, the second detected outburst occurred as recently as the end January 2023 – just two years previously. Maybe the classification will need revising. VSX classifies V1108 Her as type UGWZ, whereas on Japanese VSNET reports, it's UGSU(WZ). The jury remains 'out' it seems!

The outburst was poorly covered from the UK (two observers, Darlington and Poyner) with the AAVSO light curve showing that from detection on April 21, V1108 Her faded to 13.6CV by May 5.0, then dropped to 15.81V by May 10.9 UT. The quiescent magnitude varies between magnitudes 16-17V.

V1413 Aql

The eclipsing Symbiotic star V1413 Aql is currently undergoing a bright outburst, equalling the historically bright outburst of 2020, reaching magnitude 10.2 in May 2025 (Fig. 5).

Since ending its 2024 eclipse at magnitude 12.3C on September 29 (the pre-eclipse magnitude was around 12.0V mean), the brightness has increased slowly to this record high level. The 2020 outburst lasted around six months, and although there is no reason to suspect that this outburst will mirror the former in duration, as it has in brightness, it's interesting to speculate that we may have several more months of high activity. The next eclipse is due in October/November this year. Depending on how bright V1413 Aql is at that time, the eclipse profile could be a little more interesting this year!

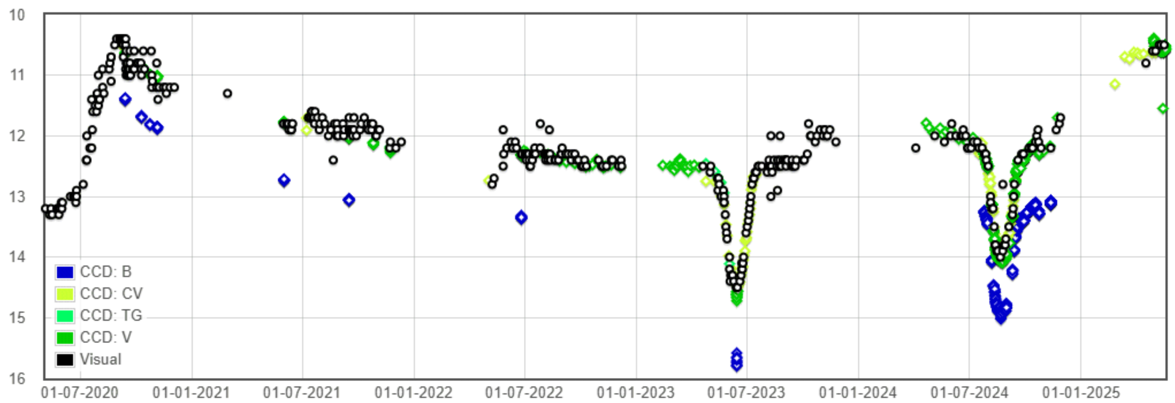


Figure 5: V1413 Aql 2020-2025. D Boyd, R Pearce, G Poyner, I Sharp, T Vale, I L Walton, P B Withers (*BAAVSS Database*)

References

1: AAVSO Variable Star Plotter
2: vsnet-alert 28048, Feb 23, 2025
3: vsnet-outburst 31464 (activity at a glance), April 22, 2025

Back to contents

NSV 18024

Rod Stubbings

stubbo@dcsi.net.au

Confusing data on the UG star NSV 18024 being just 7 arcsec from a bright 8th magnitude star are presented and discussed.

The first Vsnet-alert 8817 on NSV 18024. (2006)

Another NSV 19448-like system?? And also, in the Southern sky in the constellation Vela. NSV 18024 = HD 74771 is in outburst. Position: 08 44 34.05 -37 57 52.5 (2000). URGENT: Outbursts last only a little more than 2 weeks. This one started 5 days ago. We have less than 12 days to do something. This star was found to be another peculiar object in August while checking the NSV catalogue against ASAS-3 data. Some sources classify it as a G8-K0 star (G8IV/VCNIII).

The quasi-period this time was nearly 490 days. However, as in the case of NSV 19448, the current outburst came up early. It appeared 290 days after the last one. Hipparcos caught 3 events, and ASAS has now seen 4. There are seven outbursts to speak of. All of them are very similar. They last around 17 days and have a very symmetric shape. A small scatter is present. The Mira's extreme infrared brightness should affect the results at that 8th magnitude brightness in V. The narrowness of the brightenings almost excludes the possibility of background Mira. Maybe a CV, then? Amplitude is between 0.1 and 0.2 mag. And the star goes from its quiescent V=8.1 level up to 7.95–8.0.

Cheers,
Sebastian.

Vsnet-alert 10102 on NSV 18024 (2008)

The 8th-mag southern star HD 74771 is a possible bright cataclysmic variable, pointed out by S. Otero in vsnet-alert 8817. It appears to be in an outburst. Obtaining photometry and spectroscopy over the next several days is very important. J2000 coordinates are: 08 44 34.0 -37 57 52

Clear skies!
Howard E. Bond
Space Telescope Science Institute.

NSV 18024 is a UG star in the constellation Vela with a 10.0 to 14.0 magnitude brightness range, as noted in the Variable Star Index (VSX). I added this star to my observation list in 2018. The variable star plotter indicated that it was combined with a star of magnitude 8.1V. I monitored NSV 18024 for two years, unsure of what to expect. Many of my initial estimates fell within the brighter range until I noticed any changes in the star's field. In January 2020, I observed a distinct outburst at a magnitude of 13.4. This outburst was clearly separate from the 8th magnitude star. Visually, NSV 18024 appears to have a very blue hue.

Having identified the outburst location, I can report much fainter negative estimates in future observations. When conditions were perfect, I consistently observed NSV 18024 to a minimum magnitude of around 16.5.

This chart illustrates the location of NSV 18024 [Fig. 1]. It has been enlarged to highlight its position relative to the bright 8.1 star. When an outburst is detected, I can clearly see a gap when viewed through my telescope. There is an unobstructed line of sight between the 15.6 and 14.4 comparison stars, with no interference from the bright 8th-magnitude star. A similar chart from the STScI Digitised Sky Survey image matches the AAVSO chart [Fig. 2]

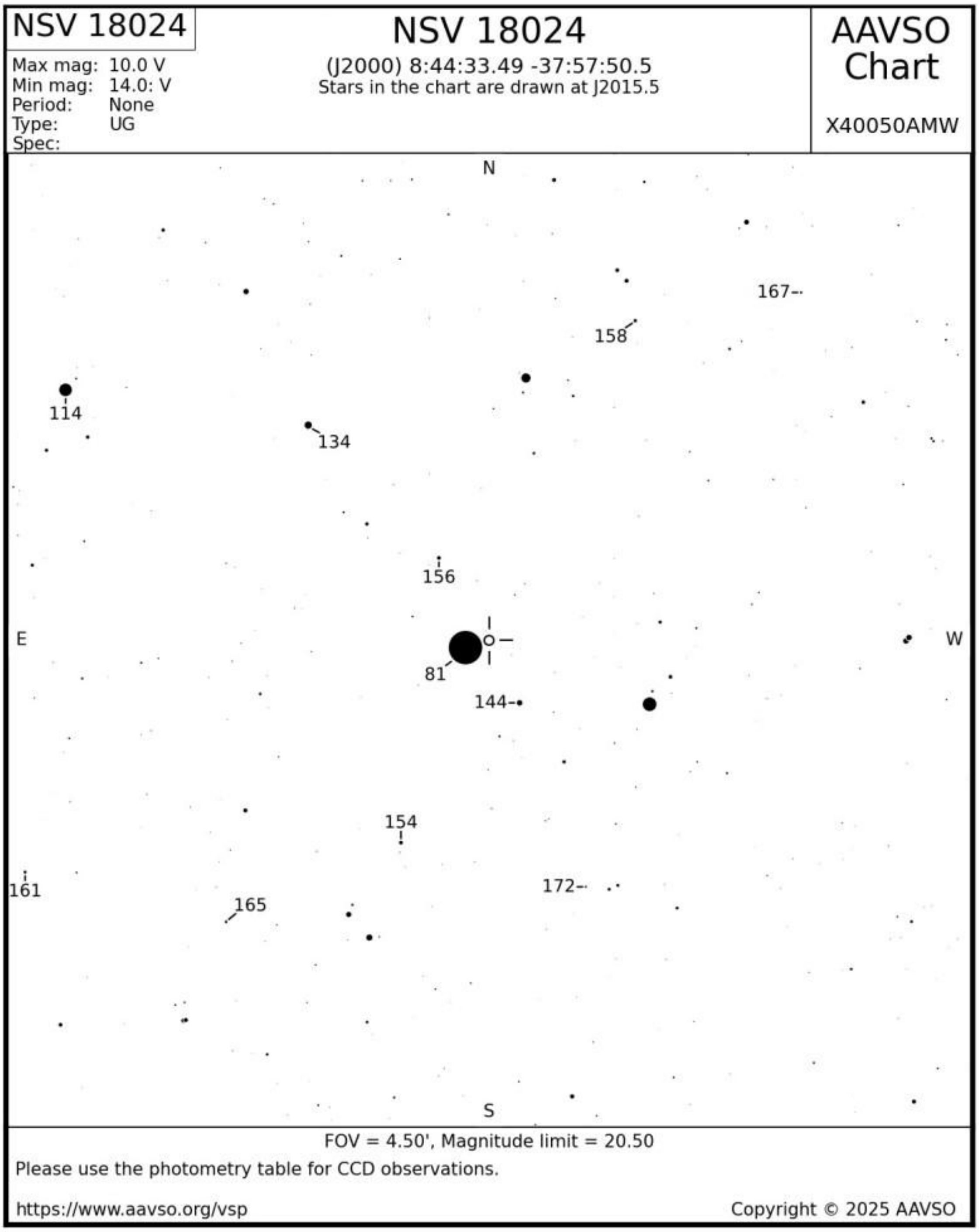


Figure 1. Chart of NSV 18024

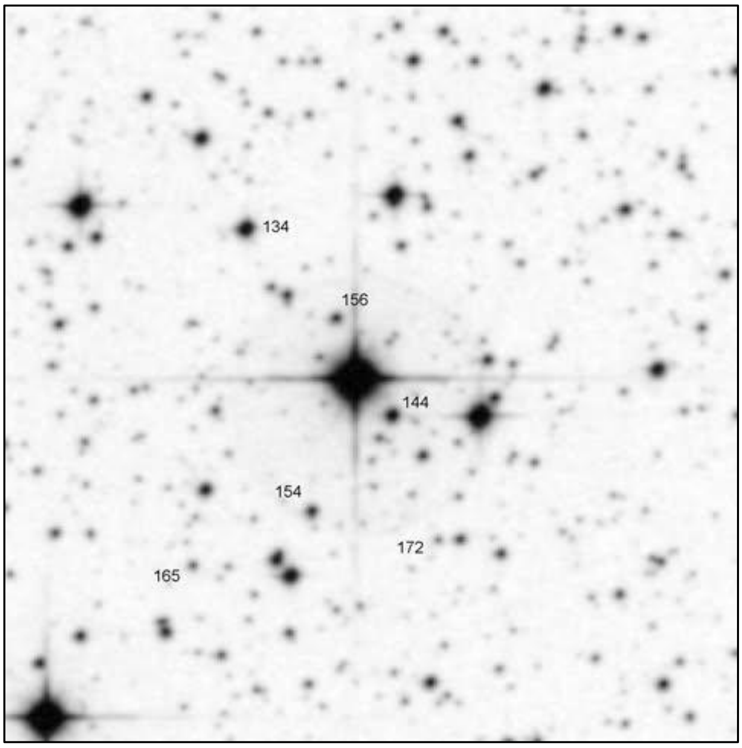


Figure 2. STScI Digitised Sky Survey image matching the AAVSO chart.

Now, let's address the confusing part. I had an interesting exchange with Sebastian Otero from the AAVSO regarding NSV 18024. This star's minimum magnitude is listed as 14.0. This is based on data from Gaia DR2 and Gaia EDR3, which include over 425 observations. However, I could not locate a star with a magnitude of 14.0 at that position.

Sebastian found the star in an ultraviolet U image from the SkyMapper survey [Fig.3]. The star is embedded in the glare of the 8th magnitude star. It is clearly visible and noted by the bulge in the star. He also said that the star is blue, bright in U, much fainter in G, and not visible in R.

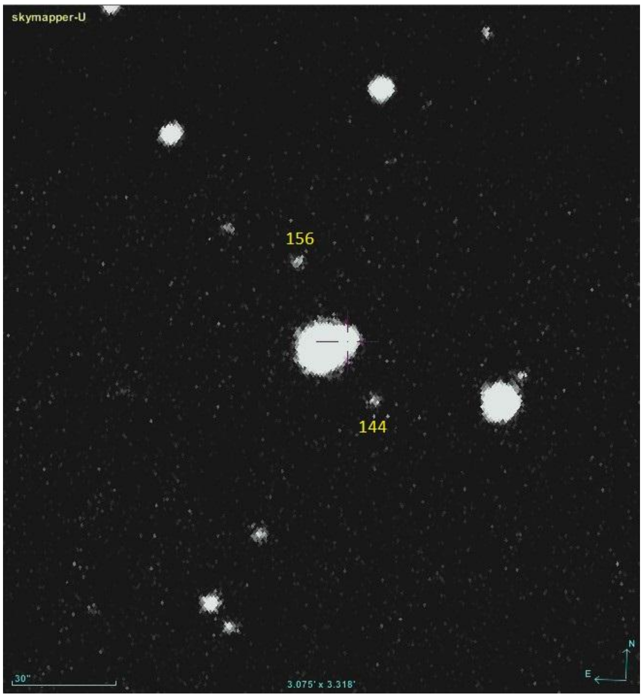


Figure 3 SkyMapper survey

Back to contents

A plot from the ASAS-3 data [Fig.4], displays seven outbursts. All outbursts are similar, lasting approximately 17 days and exhibiting a symmetric shape. The data shows a small scatter. The extreme infrared brightness of the 8th magnitude star must impact the results. Additionally, the narrowness of the brightenings suggests that a background Mira star is unlikely to be responsible. It may be a cataclysmic variable (CV) instead. The amplitude of the outbursts ranges between 0.1 and 0.2 magnitudes, with the star's brightness increasing from its quiescent level of V = 8.13 to around 7.95–8.0.

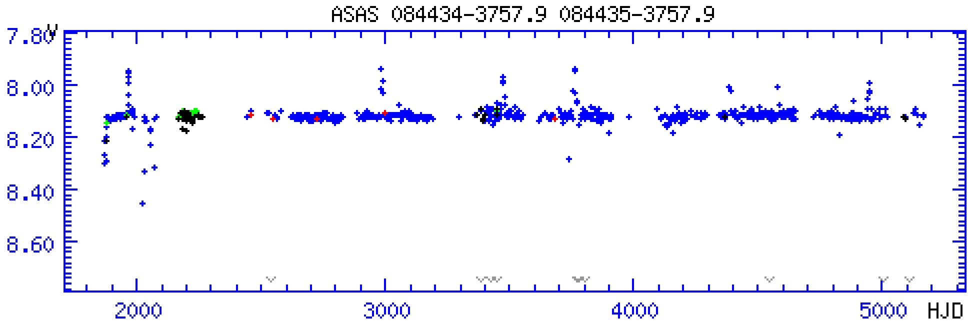


Figure 4. ASAS-3 data.

The Hipparcos mission previously detected three of these events. Sebastian Otero utilised all available photometric data to compile a light curve. He downloaded data from the Hipparcos and ASAS-3 catalogues and subtracted the light contribution from the companion star. This process allowed him to estimate the magnitude of the outbursts. Unfortunately, he could not observe the companion star fainter than magnitude 12. This was due to the brightness of the 8th-magnitude star.

Sebastian also found recorded observations from Howard Bond obtained by J. Espinoza through clouds with the SMARTS 1.3m telescope at Cerro Tololo on April 24, 2008. These images show that HD 74771 has a blue (B-V ~ 0) companion at V ~ 11, located 6″.8 WNW of the 8th-mag HD star. Spectra obtained during the 2008 April outburst confirmed strong, broad emission lines in the blue companion.

Howard Bond's outburst was also detected by ASAS-3, showing a good agreement between the two sources. This appears to be a star of the SS Cyg type. The outbursts often reach around magnitude 10, with the brightest recorded at magnitude 9.94, and there are no subsequent rebrightenings. It's important to note that Bond's measurements extend to magnitude 15.0.

Figure 5 shows the compiled light curve from 1989 to 2008. It includes Hipparcos data and ASAS-3 data, as well as Bond's V observations. The light curve of the 2008 outburst shows the Bond V and ASAS-3 data in Figure 6.

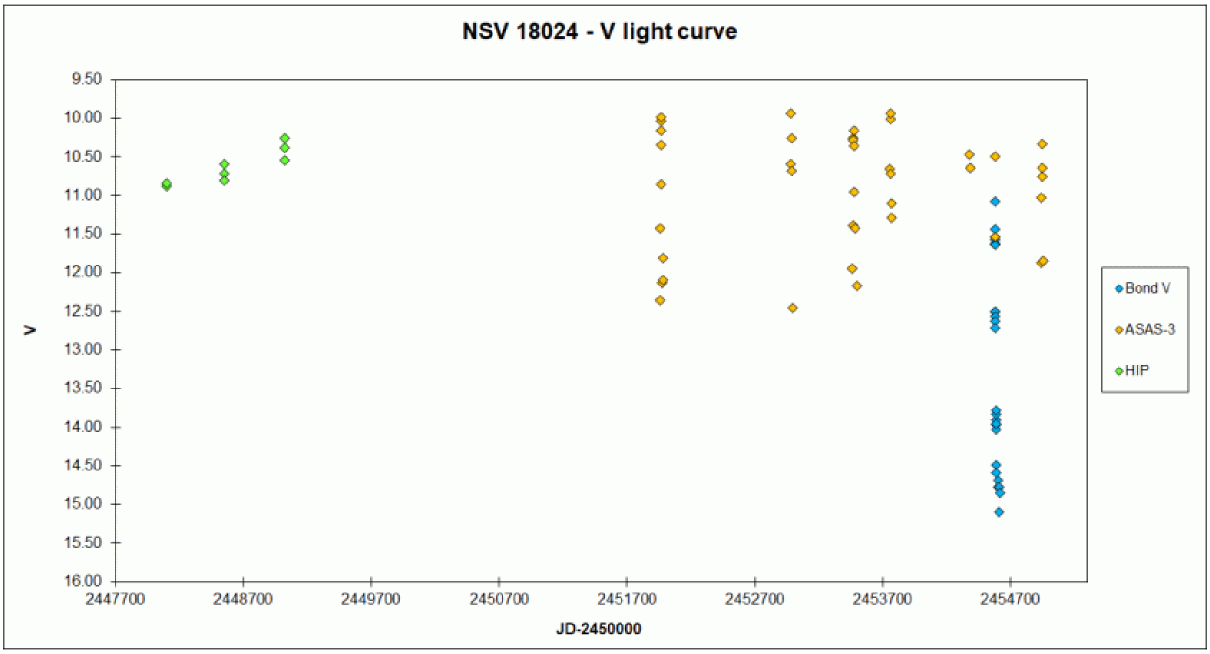


Figure 5. Hipparcos, ASAS-3 data, and Bond's V observations.

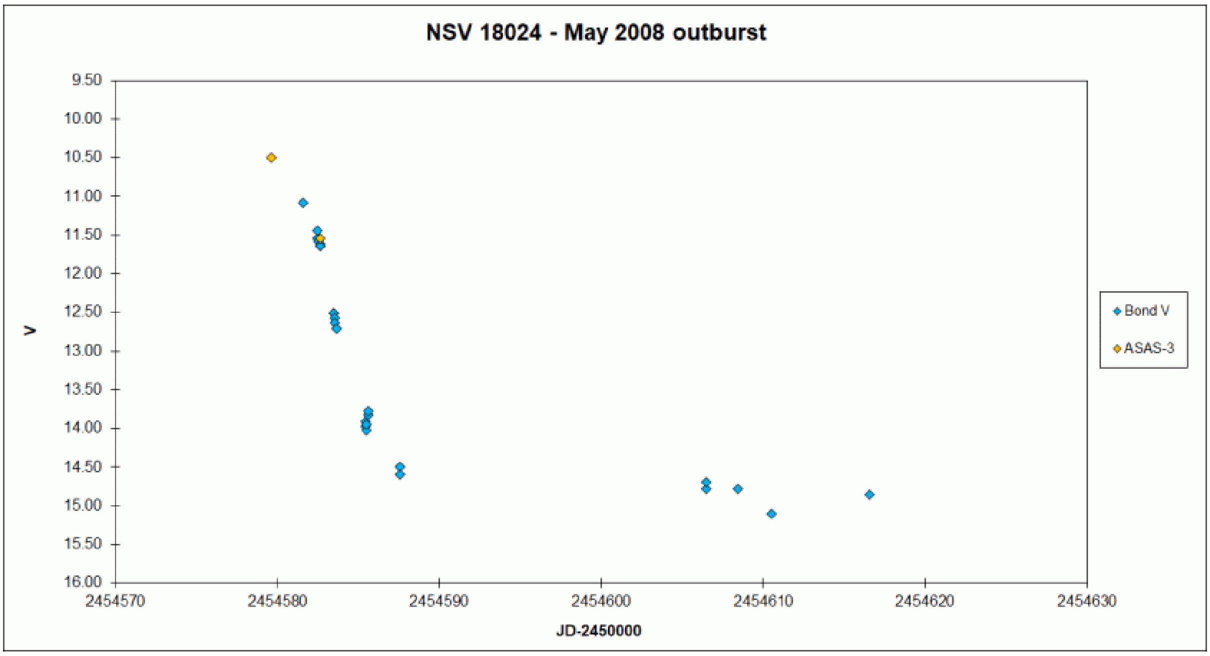


Figure 6. Bond V and ASAS-3 data.

In summary, NSV 18024 has been observed visually and photometrically, showing that the star faded to 15.0 magnitude. Furthermore, the ASAS-3 photometry supports the idea that the outbursting object is the companion. After discussing it with Sebastian, we agreed on the position, noting that no other bright objects are nearby.

So, why do many observations from Gaia and ATLAS-REFCAT2 indicate a minimum magnitude of V=14.0? I have over 500 observations on this field and have never detected a constant magnitude 14.0 star at this position. I have detected several visual outbursts, clearly separate from the 8th magnitude star. Furthermore, I observed it fade below the comparison stars of magnitudes 14.4 and

15.6, eventually reaching a magnitude of 16.6. Therefore, I disagreed with the reported minimum magnitude of 14.0.

I contacted Howard Bond from the Space Telescope Science Institute regarding the 2008 outburst. He kindly provided V-band images of the outburst from the SMARTS 1.3m telescope at Cerro Tololo from April 24 to June 2. He notes that the brightness of the companion star is much fainter, approximately magnitude 15. This companion is a cataclysmic variable and X-ray source rather than an HD star. Whether the system is physically associated or merely a result of chance alignment remains uncertain. He also suggested the object is of some interest as a CV in a (wide) visual binary. Presumably, the progenitor system lost some mass when the close binary was formed. This loss of mass would have expanded the wide binary orbit. It probably made the orbit more eccentric.

The images captured by the SMARTS 1.3m telescope at Cerro Tololo illustrate the star's bright outburst and subsequent fading (Figs. 7, 8, 9). These photos resemble what I observe through my own telescope during such outbursts. While my magnification and aperture are lower, a clear line of sight between the 14.4 and 15.6 stars can be seen. A noticeable gap is clearly visible from the 8th-magnitude star when an outburst occurs.

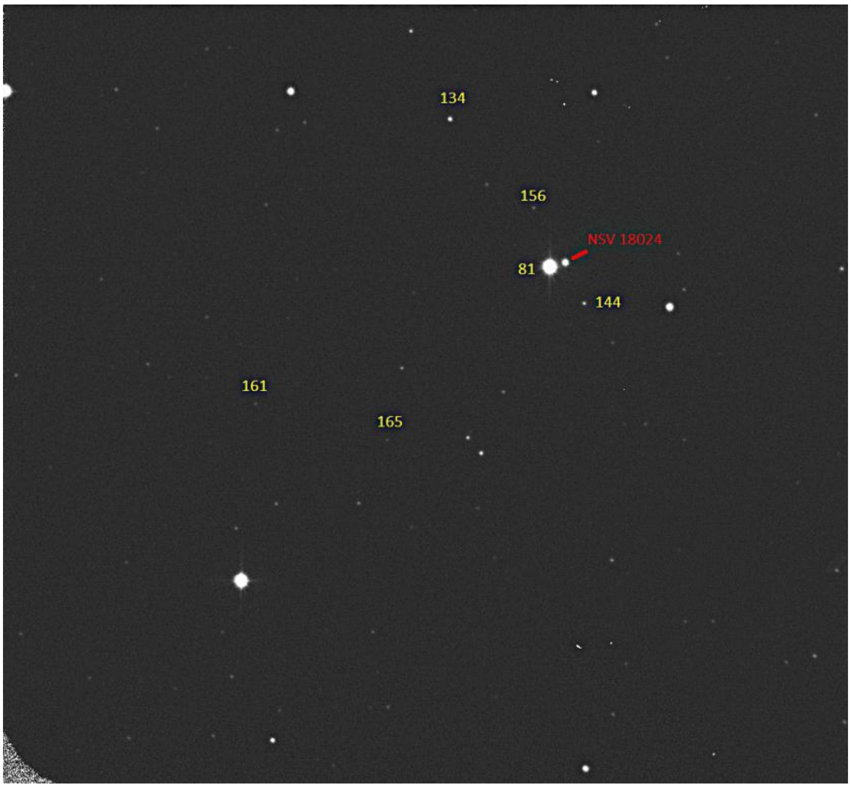


Figure 7. Outburst image taken on April 24, 2008, at mag 11.0.

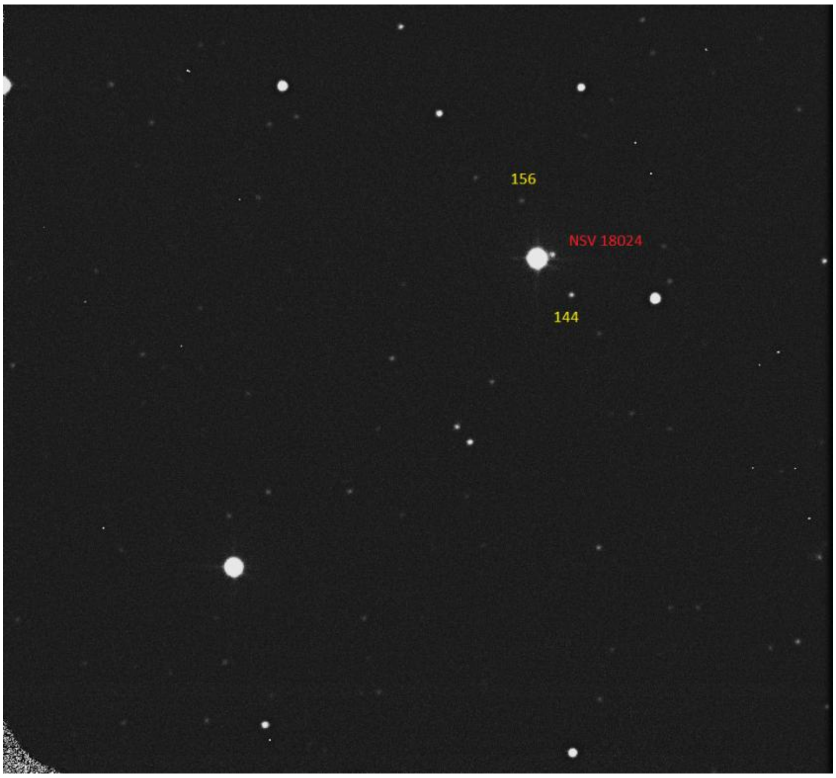


Figure 8. Image on April 30, 2008. You can see the fading to around mag 14.4.

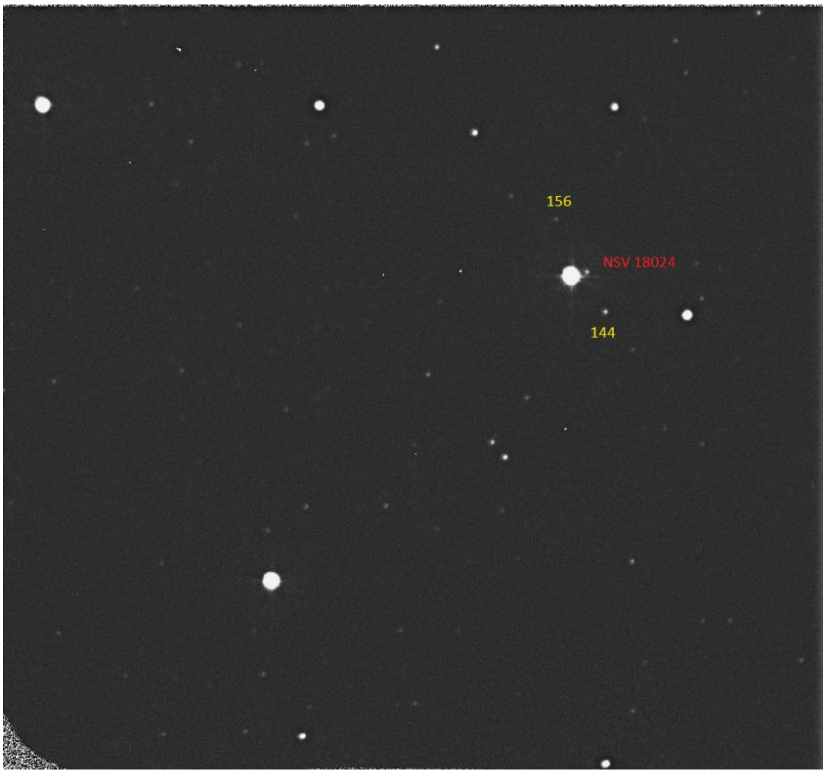


Figure 9. The image from May 29, 2008, is fainter and appears around mag 15.0.

My current light curve for NSV 18024 spans from 2018 to 2025 [Fig. 10]. These observations are visual measurements around a bright 8th-magnitude star. This star is accompanied by NSV 18024, which is located 7 arcsec to the west-northwest. The light curve shows five detected outbursts, recorded minimum magnitudes, and fainter-than-observations. I have also noticed the star around the 15.0 magnitude range at times. The latest outburst occurred in March 2025. The period between each outburst is 469 days, 797 days, 295 days, and 322 days. The brightest outburst reached 12.0, while the faintest observation recorded a minimum magnitude of 16.6. The outbursts detected lasted 5 days, 7 days, 7 days, 10 days, and 10 days.

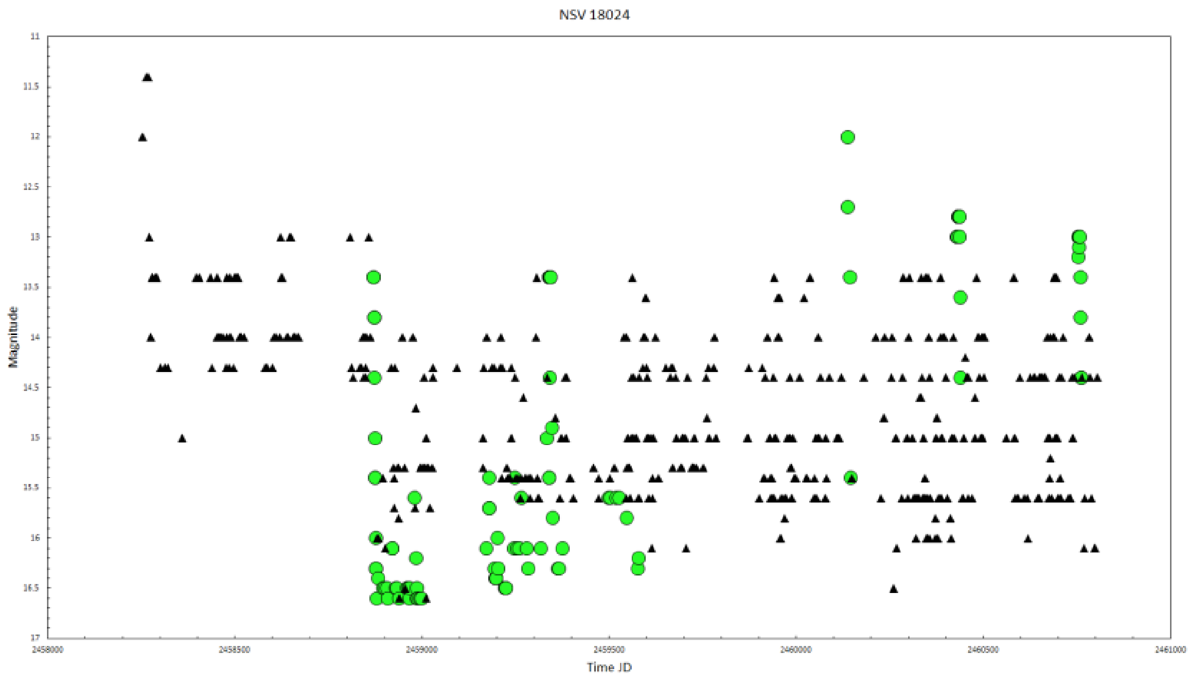


Figure 10. The current light curve for NSV 18024 spans from 2018 to 2025.

After detecting the initial outburst in January 2020 and noticing it fading over time, I contacted Stephen Hovell. Stephen is a visual observer from New Zealand who uses a 28-inch telescope. I asked Stephen to look at the field to see if he could identify any stars near the 8th-magnitude star using the same chart I had created. He observed the comparison stars 14.4 and 15.6, but he did not detect a 14.0-magnitude star at the position of NSV 18024.

Data from the AAVSO light curve generator [Fig. 11], highlighting Stephen's faint negative estimates of <15.3 and <15.6 in orange alongside my observations.

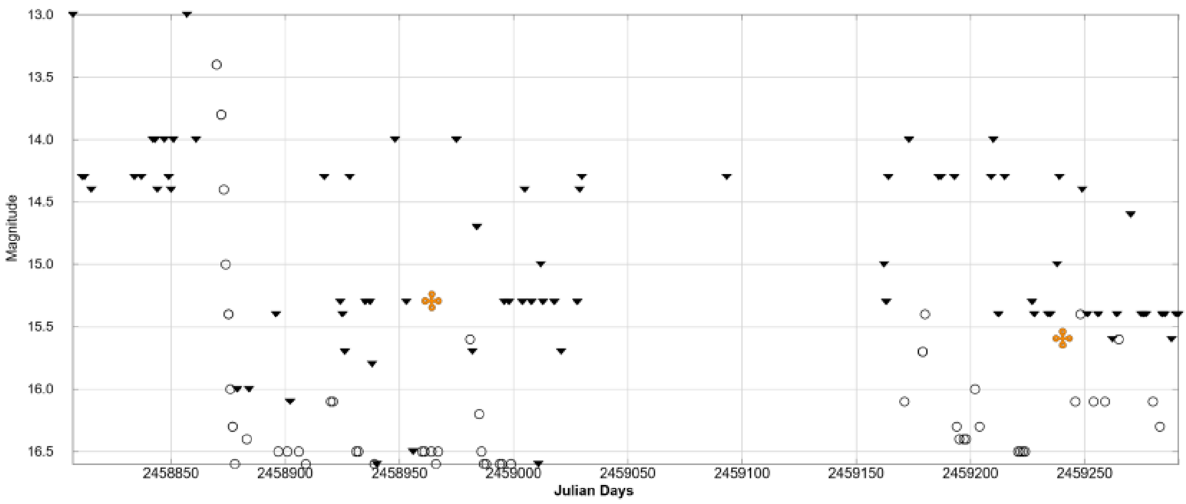


Figure 11. AAVSO light curve generator

I was looking for more information on NSV 18024. I discovered a recent light curve from the French Association of Variable Stars Observers (AFOEV), [Fig. 12]. These observations cover the period from 2020 to 2025. The data shows a minimum magnitude of around 16.5, with outbursts occurring at magnitudes of 12.0 and 12.8. The light curve also shows two fainter-than-observations in red.

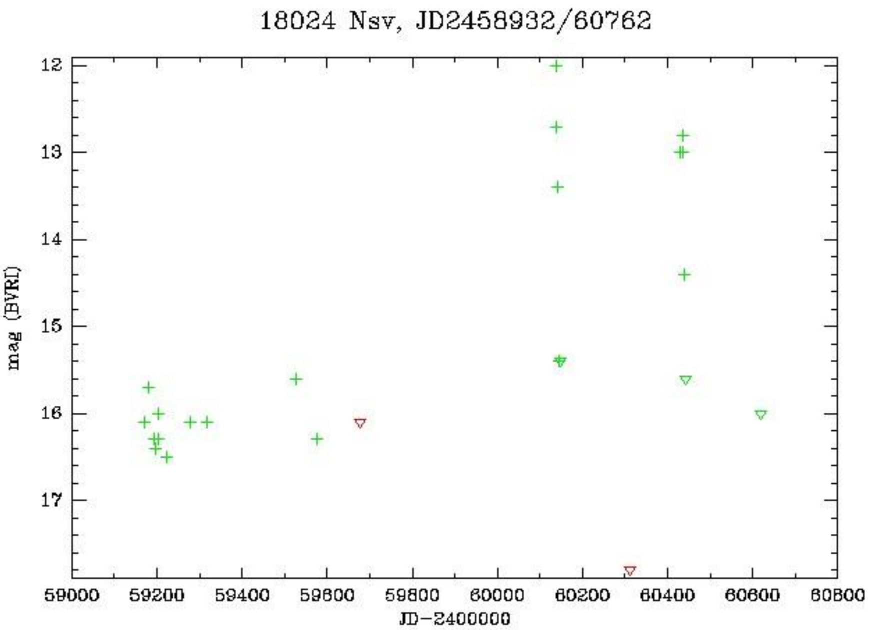


Figure 12. Light curve from the French Association of Variable Stars Observers (AFOEV).

My visual light curve for the same period [Fig.13], displays the 12.0 and 12.8 outbursts and the minimum observation at magnitude 16.5, consistent with the above light curve. Additionally, I observed another outburst at magnitude 13.4 around JD 2459343.

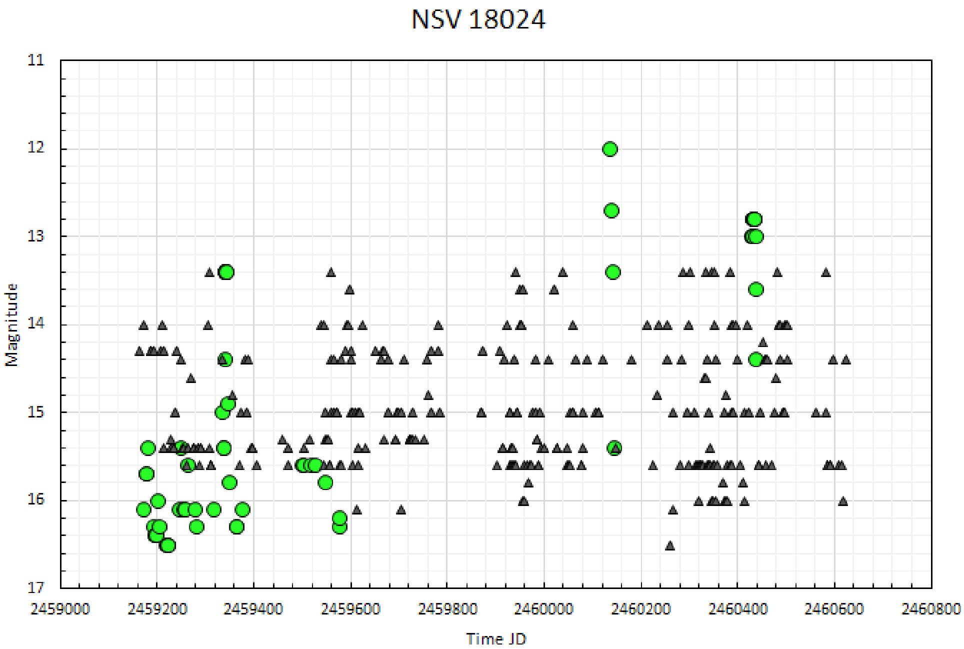


Figure 13. Visual light curve for the same period as figure 12

I contacted the AFOEV to gather more information about their light curve. I discovered that all the green observations on the light curve were my own! However, the red points on the AFOEV light curve represent two faint observations from Japanese observers. These Japanese observations are CCD measurements taken with a clear filter.

I then contacted Japan's Variable Star Observers League (VSOLJ) administration. Hiroyuki Maehara informed me that Masao Funada was one of the Japanese observers who made one of the faint observations. I have had contact with Masao Funada before regarding variable star queries. Therefore, I emailed him about his faint observation of NSV 18024. He sent his CCD image of NSV 18024 [Fig. 14].

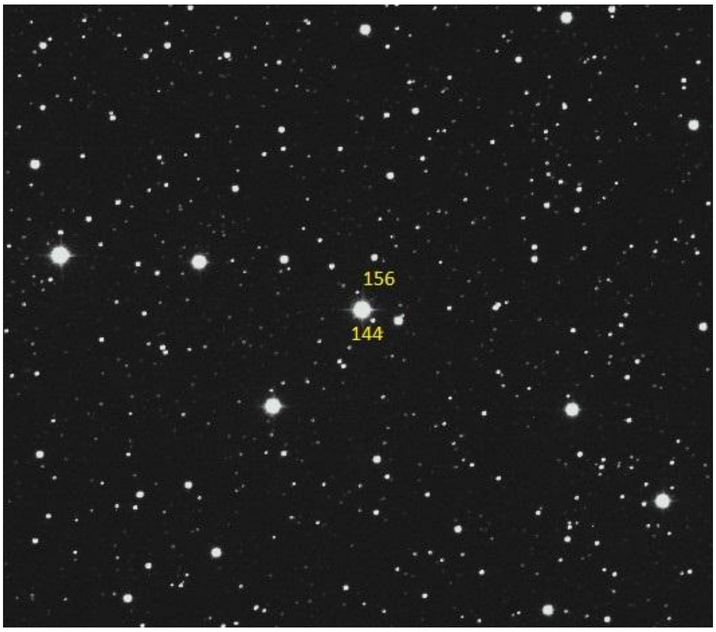


Figure 14. CCD image of NSV 18024 from Masao Funada, Japan.

As you can see from the image in figure 14, NSV 18024 is hidden in the glare of the 8th-magnitude star. After seeing the Bond image, he realised his faint observation was incorrect. Masao uses robotic telescopes. He kindly offered to get an image from the telescopes in Australia. He said he would change the exposure times and use light-reducing filters (BVR).

The new image from Masao Funada in the V band [Fig. 15] showed no improvement. This image confirms that NSV 18024 is not in outburst. I already knew this because of the recent outburst in March 2025. I was more interested in getting the faint magnitude around minimum. This highlights the difficulty of separating NSV 18024 from the bright 8th-magnitude star with CCD images. As the Bond images showed, you need a larger aperture telescope.

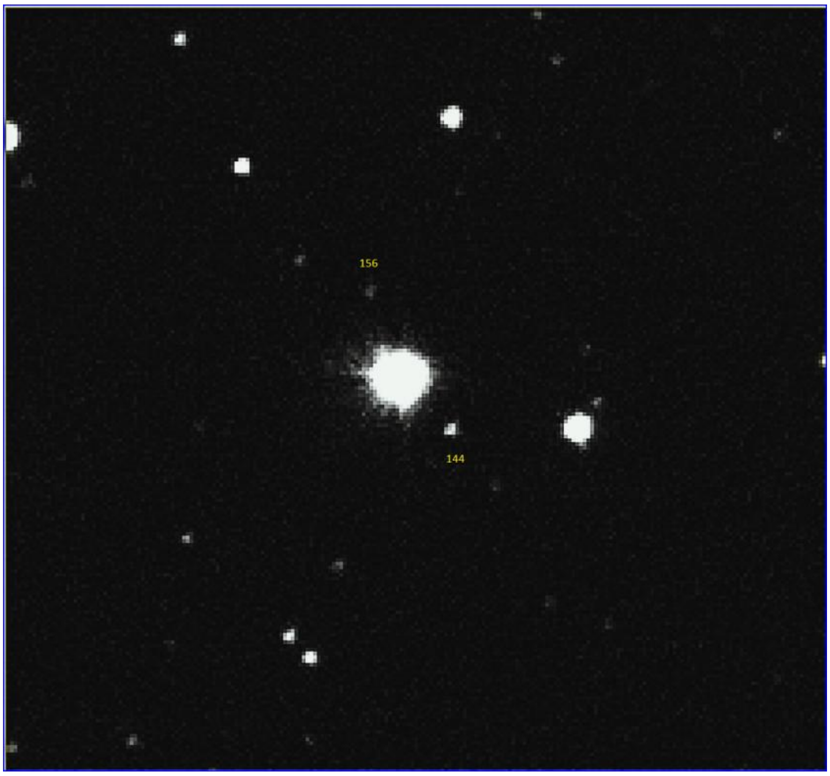


Figure 15. Image from Masao Funada in the V band.

In conclusion, we have established that NSV 18024 has a minimum magnitude of 15.0 from the Bond images. My visual observations show it to be fainter around 16.5. CCD images taken with modest telescope apertures indicate that this star cannot be distinguished from the bright 8th-magnitude star.

Visual monitoring of this field is undoubtedly our best data source in these circumstances. I utilise a 22-inch aperture telescope, and under optimal conditions, I observe sharp, pinpoint stars. The absence of a bloated 8th magnitude star ensures I can confidently detect NSV 18024 at a minimum.

References

AAVSO Light Curve Generator

French Association of Variable Stars (AFOEV)

The International Variable Star Index (VSX)

Back to contents

Vsnet-alert 8817, 2006

Vsnet-alert 10102, 2008

Variable Star Observers League (VSOL)

Email, R. Stubbings to S. Otero, 2020 September 01

Email, S. Otero to R. Stubbings, 2020 September 09

Email, S. Otero to R. Stubbings, 2020 September 19

Email, R. Stubbings to Howard E. Bond, 2021 January 24

Email, Howard E. Bond to R. Stubbings, 2021 January 25

Email, R. Stubbings to S. Otero, 2021 January 25

Email, R. Stubbings to S. Hovell, 2021 January 25

Email, S. Otero to R. Stubbings, 2021 January 26

Email, Howard E. Bond to R. Stubbings 2021 January 26

Email, S. Hovell to R. Stubbings, 2021 January 27

Email, S. Otero to R. Stubbings, 2021 January 30

Email, R. Stubbings to AFOEV, 2025 March 30

Email, AFOEV to R. Stubbings, 2025 March 31

Email, R. Stubbings to VSOL, 2025 April 6

Email, R. Stubbings to M. Funada, 2025 April 6

Email, VSOL to R. Stubbings, 2025 April 7

Email, M. Funada to R. Stubbings, 2025 April 17

The nature of the recent transients AT 2024bcl, AT 2024jqp, AT 2024jvr and AT 2024nat

Christopher Lloyd

cl57@ymail.com

ATLAS and other survey data suggest that these four faint transients are likely WZ Sagittae systems. All show no evidence of prior normal or superoutbursts since 2016, suggesting long recurrence time scales, while AT 2024bcl, AT 2024jqp, and AT 2024jvr also show rebrightening events.

Introduction

The Transient Name Server (TNS) is the official IAU mechanism for reporting new astronomical transients, and although it is primarily intended as a clearing house for supernovae, it also include CVs, and even the occasional variable star. The majority of discoveries are made by the large synoptic survey instruments and other professional consortia, but many other groups, some with more modest equipment, are also represented. The four objects discussed here were classified as likely CVs on the basis of their spectra during the outbursts, and for TNS sources they are all relatively bright. Generally, there is little contemporaneous photometry, other than the discovery, and perhaps confirmation, so the purpose of this paper is to use data from the synoptic surveys to try to provide additional information and an improved classification of the transients.

The main data source is the Asteroid Terrestrial-impact Last Alert System (ATLAS) (Tonry et al., 2018), where most of the observations are made in the 'cyan' *c* (420–650 nm) and the 'orange' *o* band (560–820 nm). The data were downloaded from the ATLAS Forced Photometry web service (Shingles et al., 2021). Additional data are available from the Zwicky Transient Facility (ZTF) (Bellm et al., 2019, Masci et al., 2019) in the Sloan *g* (414–546 nm) and *r* (566–721 nm) passbands, which coincide with the blue halves of the *c* and *o* bands. The All-Sky Automated Survey for Supernovae (ASAS-SN) Shappee et al. (2014), Kochanek et al. (2017) also provides some data in the Sloan *g* band.

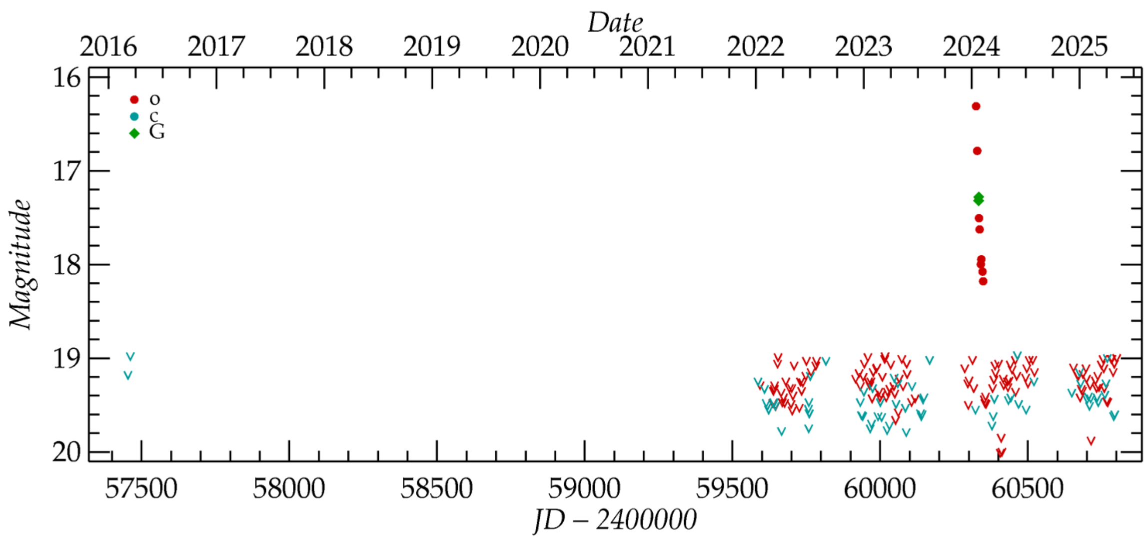


Figure 1: The full light curve of AT 2024bcl showing the ATLAS o and c data, with the means of multiple positive observations (filled symbols), individual observations (open symbols) and upper limits fainter than m = 19.0. There are two Gaia observations.

AT 2024bcl = Gaia24akc

AT 2024bcl was discovered on 2024 January 24.108 (JD=2460333.608) at G = 17.32 by the GaiaAlerts Group (Hodgkin et al., 2024), which is at least 8 days into the outburst, and was classified spectroscopically as a CV another 7 days later by the ePESSTO+ group (Brivio et al., 2024). Both the discovery and classification reports may be accessed directly through the TNS Object page. The spectrum shows a relatively noisy, strong blue continuum, with no clear feature at Hα, but likely absorption at Hβ Hδ and Hγ. Apart from an upper limit of G = 21.5 from 33 days earlier, there is no other photometry published around the time of the outburst. The transient is currently listed as a UG variable in the AAVSO VSX under the Gaia24akc designation.

ATLAS data are available from 2015, but are very sparse prior to 2022, and the object is too far south to be observed by the ZTF. The full light curve is shown in Fig. 1, but only the upper limits fainter than m = 19.0 are plotted to avoid confusion. The recent outburst is obvious and is shown in detail in Fig. 2, but there is no indication of any previous activity. It rises from quiescence in less than one day to a maximum at o = 16.3 and declines at a relatively modest rate of 0.11 mag d^{-1} over the following 17 days. Over the subsequent 8 days there is a plateau where the magnitude remains relatively constant at $o \simeq 18.0$, before fading quickly to quiescence. The behaviour during this plateau is open to interpretation, and may represent a rather unusual standstill, or possibly, one or more rebrightenings. The quiescent magnitude of $r \simeq 23.7$, estimated from the DECaPS images (VSX), combined with the peak magnitude $o \simeq r = 16.3$, gives an amplitude of 7.4 magnitudes,

The median cadence of the observations is 2.3 d, so It is unlikely that previous outbursts have been missed during these times, but there are significant seasonal gaps, and coverage prior to 2022 is very sparse. The nature of the outburst, the amplitude, decline rate, and lack of previous activity suggests that this is the superoutburst of either an SU UMa (UGSU) or WZ Sge (UGWZ) system. The principal distinguishing features are that UGWZ systems have recurrence intervals in the thousands of days as opposed to hundreds for the UGSU stars, and they tend not to show normal outbursts, but do show rebrightening events (see e.g., Kato, 2015, Tampo et al., 2020). There is considerable overlap in the decline rates during the plateau phase, but the UGWZ stars tend to be slower, and similarly with the outburst amplitudes, where the largest tend to be the UGWZ systems. In this case although the outburst amplitude is possibly low, the apparent lack of normal outbursts and the rebrightening, tips the scales towards the classification as a UGWZ system.

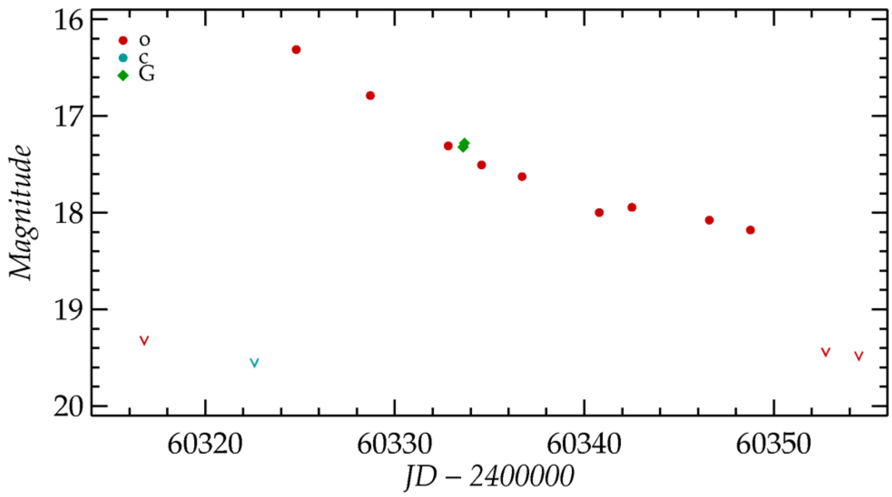


Figure 2: The detail of the recent outburst of AT 2024bcl. The symbols are as before.

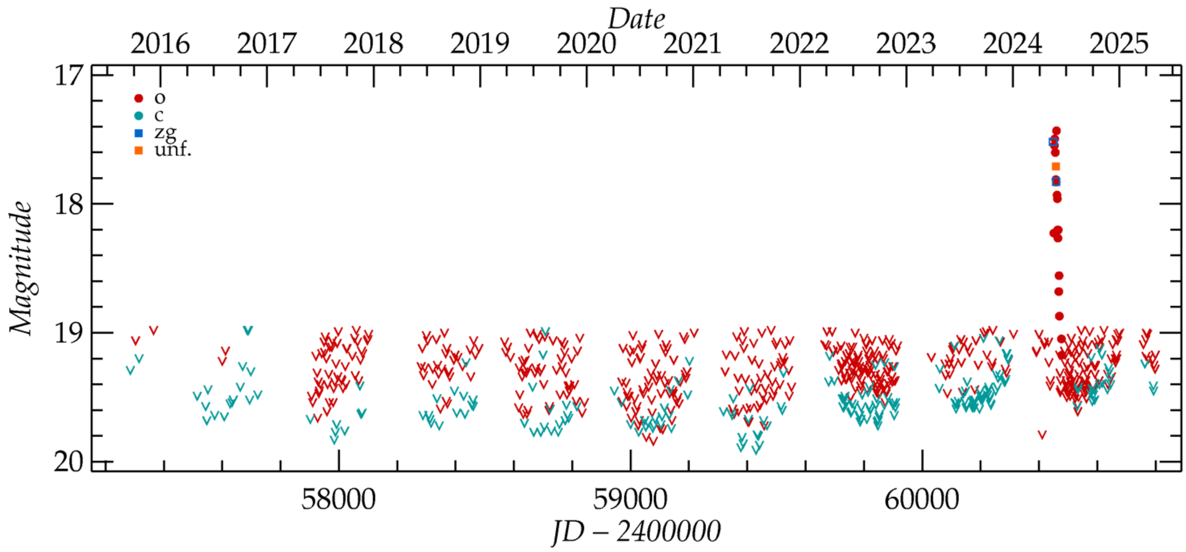


Figure 3: The full light curve of AT 2024jqp. The symbols are as before.

AT 2024jqp = KATS24K005 = TCP J20545188+2942214

The earliest observation of the outburst of AT 2024jqp was made by the ZTF on 2024 May 18.46 (JD = 2460448.96) at *zg* = 17.52 (as ZTF24aaoovbv), although the discovery wasn't made until 9 days later by the Xingming Observatory Sky Survey Group (XOSS) on 2024 May 27.81 (JD = 2460458.31) at an unfiltered magnitude of 17.71 (Zhang et al., 2024). Spectral classification was made by the ePESSTO+ group a further 10 days after discovery as a CV, with weak H*α* emission, and a strong blue, if noisy, continuum (Matilainen et al., 2024). See the TNS Object page for the reports and other contemporaneous data. The transient is currently listed as a UG variable in the AAVSO VSX under TCP J20545188+2942214, but the other designations are also recognised.

ATLAS provides good coverage from 2017, with a median cadence of 2.0 d, and these are shown together with the ZTF and XOSS observations in the Fig. 3, with the detail of the outburst in Fig. 4. The initial outburst is poorly constrained as the first ZTF observation is 10 days after the last upper limit, but this is followed immediately by a drop of $0^{m}.7$, and then a return to the maximum brightness of *o* $\simeq$ 17.5, which appears to be a precursor outburst. The remainder of the outburst shows a slightly

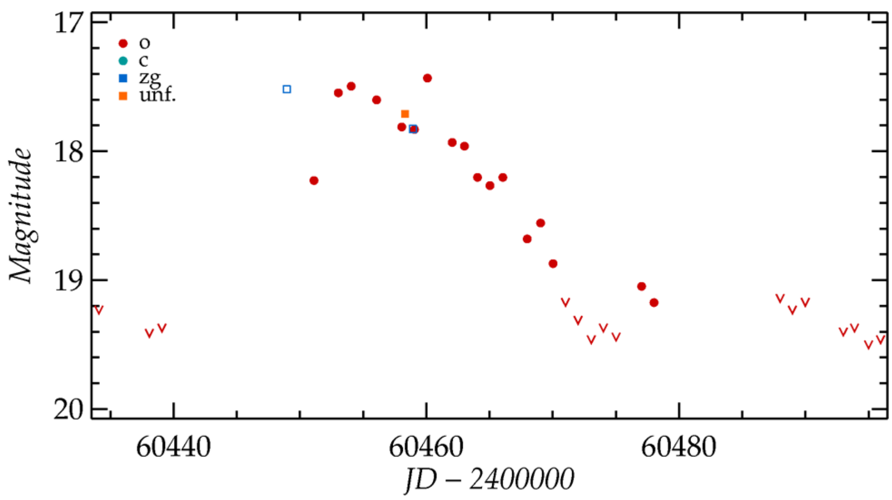


Figure 4: Detail of the outburst of AT 2024jqp. The symbols are as before

accelerating decline with a mean rate of 0.077 mag d^{-1}, over the following 17 days. After a series of faint upper limits, the system becomes visible again at $o \simeq 19.1$, which is consistent with a rebrightening.

The magnitude at minimum from the ZTF is zr = 22.3, and the mean magnitude from Pan-STARRS is r = 21.7, so given the peak magnitude of $o \simeq = 17.5$ then the outburst amplitude is a surprising low 5 magnitudes. Despite this, the other indicators such as the decline rate, the length of the outburst, the lack of any previous activity, and most importantly, the rebrightening, suggest that this is a UGWZ system.

AT 2024jvr = ZTF24aaphhoi = CSS 090205:174301+300053

The outburst of AT 2024jvr was discovered by the ZTF (as ZTF24aaphhoi) on 2024 May 29.44 (JD = 2460459.94) at $zr = 17.19$ (Hinds et al., 2024), and the following day it was seen at maximum, some two magnitudes brighter. However, the object has been seen in outburst once before, on 2009 February 5.52 (JD = 2454868.02) at $V = 17.0$, by the Catalina Real-time Transient Survey (CRTS Drake et al., 2014), where it had been simply identified as a CV. Spectral classification during the recent outburst as a CV was provided by Wise et al. (2024), one day after maximum, where the low-noise spectrum showed a strong blue continuum, and weak Hα absorption, but progressively deeper subordinate Balmer lines. See the TNS Object page for the reports and other contemporaneous data. The transient is currently listed as a UG variable in the AAVSO VSX under CSS 090205:174301+300053, but the other designations are listed.

In addition to the ATLAS data, observations are also available from the ZTF, and from the ASAS-SN project, which has a brighter limit and just covers the outburst. The full light curve in shown in Fig. 5, and good coverage begins in 2017. The median cadence of all the data is 1.9 days. Detail of the outburst is shown in Fig. 6, where all the important details are well covered by the different wavebands. The outburst was caught on the rise and after maximum the plateau phase can be followed for 18 days, which declines at a mean rate of 0.12 mag d−1. There is an initial fade and then a rebrightening, which seems most likely to be single, then the final fade to quiescence. The whole outburst covers 30 days. It is possible to follow the variation in the different bands, which clearly demonstrates that the system was very blue with ($o \simeq r - g$) $\simeq -0.3$ throughout the outburst.

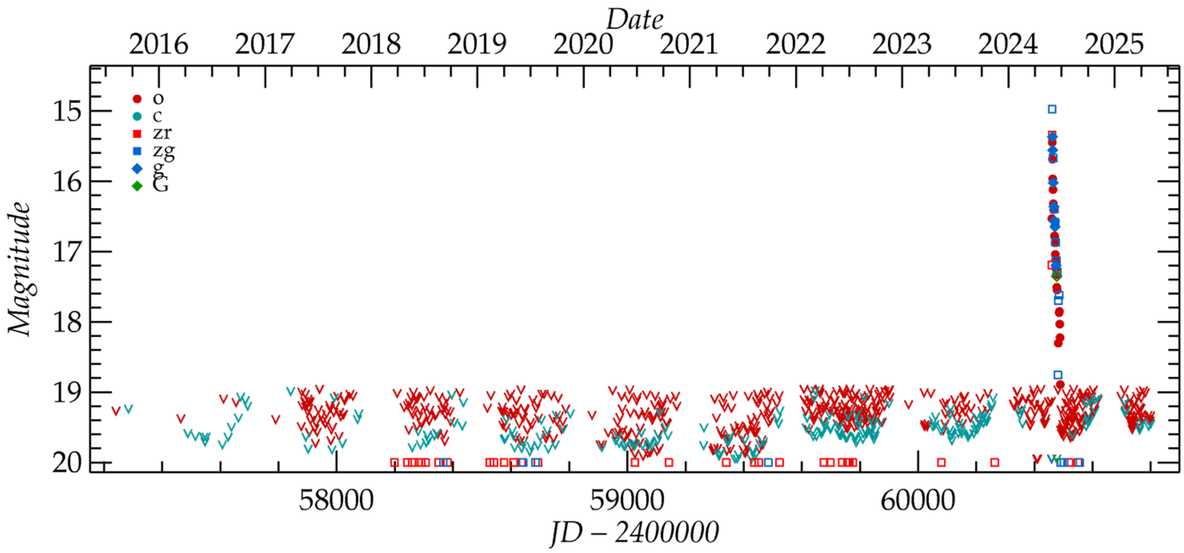


Figure 5: The full light curve of AT 2024jvr showing the ATLAS o and c, the ZTF zg and zr, the ASAS-SN g observations, the single Gaia point, and ATLAS upper limits. The observations with m > 20.0 are shown at this level and are mostly from the ZTF.

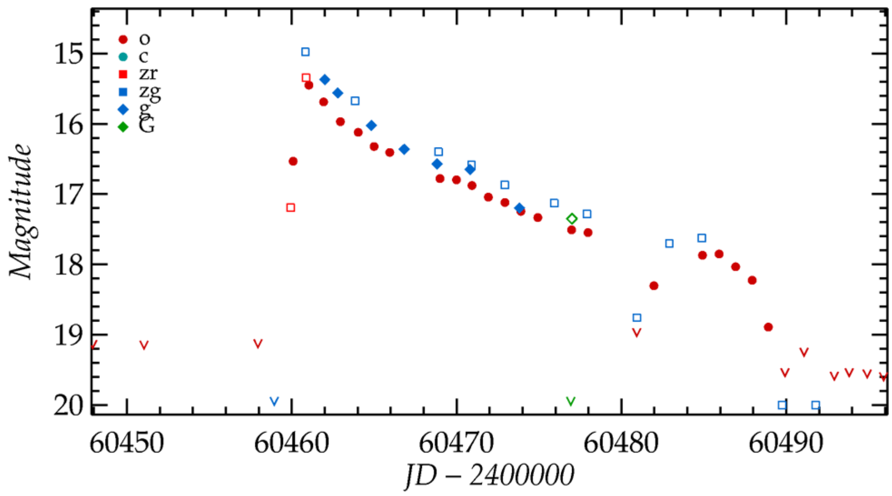


Figure 6: Detail showing the outburst of AT 2024jvr. Most important details are well covered by the different wavebands, including the rise from quiescence, the steady decline during the plateau phase, the first fade and the rebrightening, which seems most likely to be single, then the final fade. The symbols are as before. The separation between the o and different g bands clearly demonstrates that the system was very blue with (o − g) ≃−0.3 throughout the outburst.

The ZTF data contains 48 observations, mostly *zr* fainter than 19.0, that are distributed between *zr* = 20.0 and 22.0, with a median *zr* = 21.4. However, about two thirds of these lie at a position ≃ 2 arcsec from the transient, and likely correspond to a different object, that is probably blended with observations of the transient at quiescence. The object at 2 arcsec is identified in several deep surveys including Pan-STARRS (Chambers et al., 2016), which gives *r* = 22.2 for this object, and the DESI Legacy Imaging Surveys (Duncan, 2022) reports detections at the positions of both the transient and the object at 2 arcsec, although magnitudes are not given. So, the quiescent magnitude is at least *r* = 22.5, leading to an outburst amplitude of 8 magnitudes, and probably a magnitude more, depending on the DESI limit. Given the rebrightening, and all the other consistent features it is most likely a UGWZ system.

AT 2024nat = ATLAS24jvu

AT 2024nat was discovered by ATLAS (as ATLAS24jvu) on 2024 June 27.92 (JD = 2460489.92) at *o* = 17.61, and probably caught on the rise, just one day after the previous non-detection (Tonry et al., 2024). Maximum occurred over the following two days, at perhaps 0.1 magnitudes brighter. Confirmation is provided by unfiltered observations from the GOTO group. Spectral classification as a CV was provided by the ePESSTO+ group (Gonzalez-Banuelos et al., 2024), one day after maximum, where the relatively noisy spectrum showed a strong blue continuum, with filled-in H*α* and progressively deeper subordinate Balmer lines. See the TNS Object page for the reports and other contemporaneous data. The transient is currently listed as a UG variable in the AAVSO VSX under the ATLAS24jvu designation.

ATLAS data are available from 2016, mostly in *o* and *c*, with a few *r* and *g* observations, at a median cadence of 1.3 d, but there are significant seasonal gaps. The full light curve in shown in Fig. 7, with detail of the outburst shown in Fig. 8. The outburst was caught just prior to maximum and the plateau phase can be followed for 10 days, which declines at a mean rate of 0.12 $\mathrm{magd^{-1}}$. As the outburst is relatively faint the later stages are not visible. VSX gives the quiescent magnitude as an uncertain *g* ∼ 24, leading to an outburst amplitude of a modest 6 or 7 magnitudes. There is no direct evidence to support the UGWZ assignment, but equally there is no indication of previous UGSU normal outbursts, and even at a magnitude below the maximum seen here, it is likely these would have been seen.

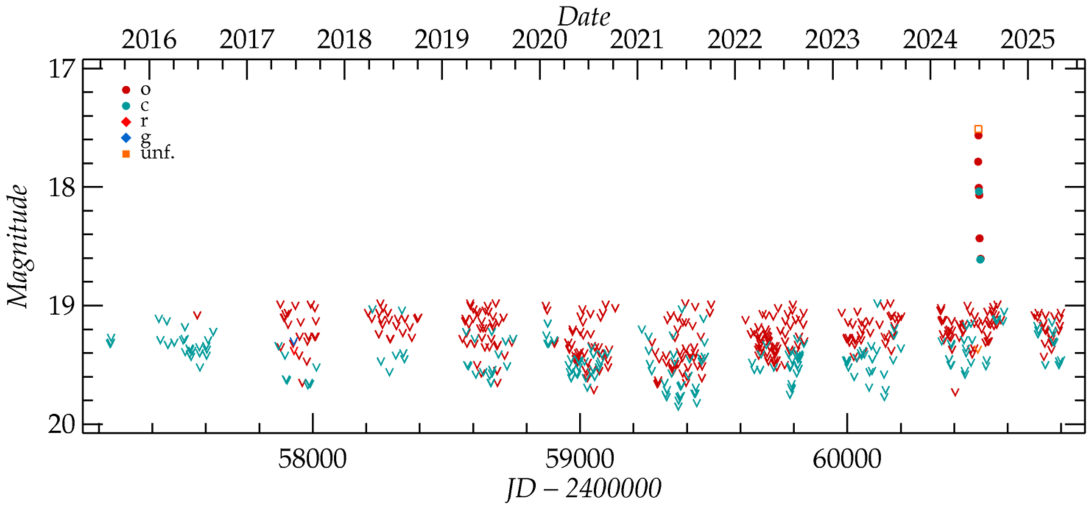


Figure 7: The full light curve of AT 2024nat showing the ATLAS *o*, *c*, *r* and *g* data the unfiltered GOTO observations

Summary

ATLAS and other survey data have clarified the previous behaviour of these four faint transients and enabled a likely classification of three as UGWZ systems, and while this also probably applies to AT 2024nat, the more direct evidence is missing. All show no evidence of prior normal or superoutbursts since 2016, suggesting long recurrence time scales, while AT 2024bcl, AT 2024jqp, and AT 2024jvr also show rebrightening after an initial deep fade. In addition, the previous outburst of AT 2024jvr suggests a maximum superoutburst interval of 15 years.

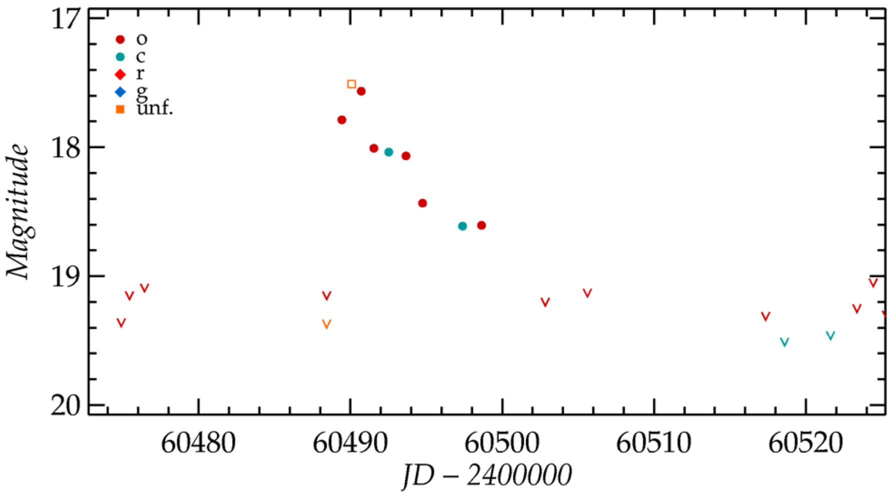


Figure 8: The detail of the outburst of AT 2024nat. The symbols are as before.

Acknowledgements

The author is pleased to acknowledge use of NASA's Astrophysics Data System Bibliographic Services. This research has made use of the SIMBAD database and the VizieR catalogue access tool operated at CDS, Strasbourg, France. The author gratefully acknowledges use of the AAVSO Variable Star Index (VSX). This work has made use of data from the Asteroid Terrestrial-impact Last Alert System (ATLAS) project. The ATLAS project is primarily funded to search for near earth asteroids through NASA, Kepler/K2 and STFC grants.

References

Bellm, E. C., Kulkarni, S. R., Barlow, T., et al., 2019, *PASP*, **131**, 068003
Brivio, R., Ferro, M., Benetti, S., et al., 2024, *Transient Name Server Classification Report*, **2024-303**, 1
Chambers, K. C., Magnier, E. A., Metcalfe, N., et al., 2016, *arXiv e-prints*, arXiv:1612.05560
Drake, A. J., G¨ansicke, B. T., Djorgovski, S. G., et al., 2014, *MNRAS*, **441**, 1186
Duncan, K. J., 2022, *MNRAS*, **512**, 3662
Gonzalez-Banuelos, M., Alburai, A., Kopsacheili, M., et al., 2024, *Transient Name Server Classification Report*, **2024-2189**, 1
Hinds, K., Fremling, C., Perley, D., et al., 2024, *Transient Name Server Discovery Report*, **2024-1721**, 1
Hodgkin, S. T., Breedt, E., Delgado, A., et al., 2024, *Transient Name Server Discovery Report*, **2024-276**, 1
Kato, T., 2015, *PAS Japan*, **67**, 108
Kochanek, C. S., Shappee, B. J., Stanek, K. Z., et al., 2017, *PASP*, **129**, 104502
Masci, F. J., Laher, R. R., Rusholme, B., et al., 2019, *PASP*, **131**, 018003
Matilainen, K., Vassallo, C., Killestein, T., et al., 2024, *Transient Name Server Classification Report*, **2024-1839**,1
Shappee, B. J., Prieto, J. L., Grupe, D., et al., 2014, *ApJ*, **788**, 48
Shingles, L., Smith, K. W., Young, D. R., et al., 2021, *Transient Name Server AstroNote*, **7**, 1
Tampo, Y., Naoto, K., Isogai, K., et al., 2020, *PAS Japan*, **72**, 49
Tonry, J., Denneau, L., Weiland, H., et al., 2024, *Transient Name Server Discovery Report*, **2024-2150**, 1
Tonry, J. L., Denneau, L., Heinze, A. N., et al., 2018, *PASP*, **130**, 064505
Wise, J., Hinds, K., Perley, D., et al., 2024, *Transient Name Server Classification Report*, **2024-1744**, 1 Zhang, M., Xu, J., Sun, G., et al., 2024, *Transient Name Server Discovery Report*, **2024-1703**, 1

Eclipsing Binary News

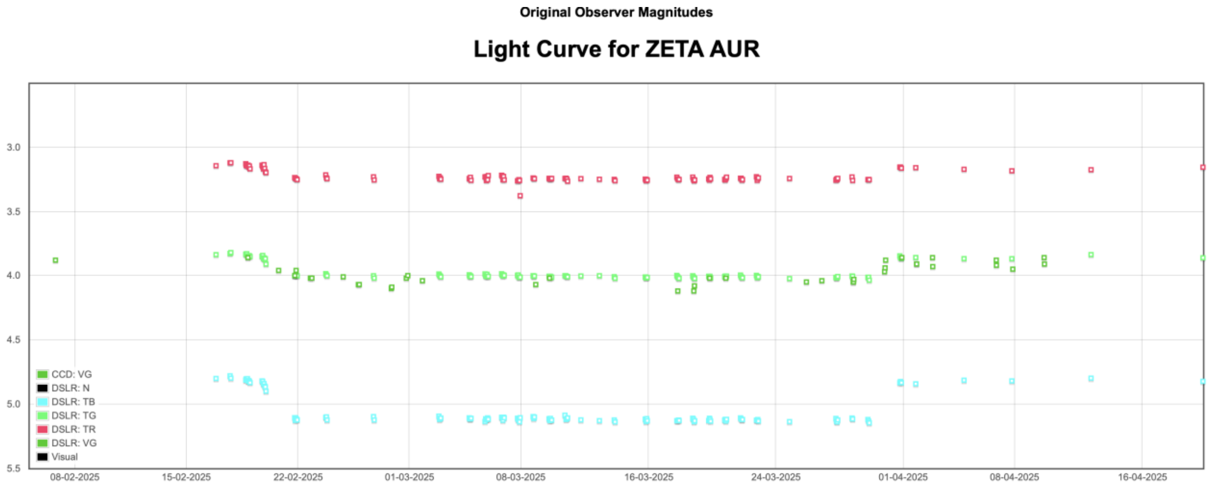
Des Loughney
desloughney@blueyonder.co.uk

The 2025 Eclipse of zeta Aurigae

In VSSC 202 information was given about the predicted 2025 eclipse of the zeta Aurigae system. As it turned out the weather was favourable in the UK and allowed a good run of measurements during the five weeks of the eclipse. A profile of the eclipse was obtained by two observers, Des Loughney (DL) and Horst Meyerdierks (HM). All their measurements have been lodged within the BAAVSS database. DL's measurements are of the "Corrected Green Channel to Johnson V" category. HM's measurements are of three categories, blue filter, green filter and red filter. DL's measurements were made from suburban Edinburgh, Scotland, using DSLR photometry.

Horst Meyerdierks observed ζ Aur, and the 4.7 mag comparison λ Aur, from his balcony in northern Germany (53.22° North, 8.78° East). He used an Hα modified Canon EOS 600D DSLR set to 800 ISO. The lens was a Sigma 55–200 mm zoom lens, set to 55 mm focal length for a 15° field of view, and stopped down from f/4 to f/5.6. For each measurement a number of 8- or 15-second exposures were split into the three colours TB, TG and TR, then stacked to accumulate typically 300 seconds of exposure. Aperture photometry was then carried out on the resulting images. All processing up to differential magnitudes was carried out in Siril v1.2.x (Richard et al. 2024) (1). The results are formally better than 0.01 mag. During the eclipse, such measurements were made at approximately hourly intervals.

Below is the light curve for the eclipse as portrayed in the BAAVSS database.



The measurements using the red filter are described in red and are all HMs. The green measurements are those of DL and HM combined. The blue measurements are those of HM using a blue filter. From the light curve a number of points can be made. It is clear that the eclipse occurred more or less as predicted. Ingress and egress were both picked up where the secondary blue-white star is shining through the atmosphere of the primary red star. Ingress and egress lasted as expected for about a day and a half. Ingress was picked up in V measurements of 3.86 on 18/2/25, 3.94 on

20/2/25 and 4.00 on 21/2/25. Egress was picked up by three measurements on 28/3/25 of 3.97, 3.94 and 3.87.

The depth of the 2025 eclipse, in V magnitude, was about 0.16. The depth in blue light was greater at about 0.3 magnitude. This is to be expected as it was the secondary blue-white star that was being eclipsed.

H Meyerdierks comments that: “Bennett et al. (1996)(2) show a similar difference in their figures 7b and 7c for blue (0.55 mag depth) and V magnitudes (0.15 mag depth).

The data show a downward trend of brightness versus time, both during the eclipse and combining data before ingress and after egress. This may be the brightness change during the binary star orbit as illustrated in figure 3 of Eaton et al. (2008) (3)”.

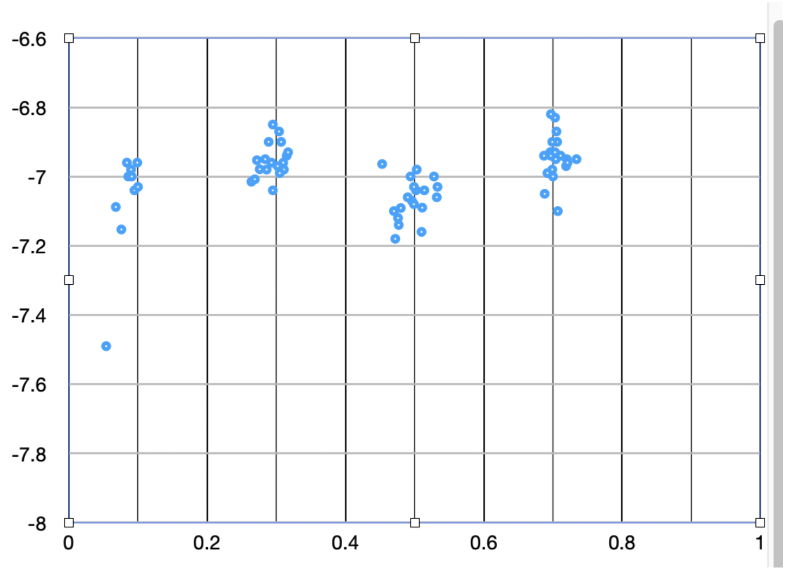
The Wikipedia entry on Zeta Aurigae has a diagram from paper (2) which shows that the depth of the eclipse in ultraviolet light is about two magnitudes.

The recent eclipse shows the value of doing measurements with more than one filter. More information about the eclipse can be obtained by using, as well as a V filter, a blue filter and an ultraviolet filter.

U Cephei

In VSSC 203, in Eclipsing Binary News, there was a section with the heading of ‘U Cephei 2024’. The section described MAST data from 2024, including a light curve from 22/5/24. The light curve is very irregular and may illustrate an ‘outburst’ of U Cephei. I was interested to see if measurements in 2025 would show if the outburst had ceased or was continuing.

The VG measurements, using the DSLR photometry methodology, were made between 22nd February and 9th April. 70 measurements were made altogether. The figure below illustrates the measurements in a phase diagram. The horizontal axis is the phase, and the vertical axis is the magnitude. It was not possible to make measurements of the primary eclipse between the specified dates, in the UK.



The out of eclipse magnitude is supposed to be 6.75. This was not obtained. The brightest measurement was about 6.8. It can be seen when we look at the measurements around phase 0.7

that the brightness ranges over 0.25 magnitude from 6.8 to 7.1. It seems that the system is still in outburst with changes in the dynamics of mass transfer affecting the out of eclipse light curve.

On the evening of the 18th March 2025, over a period of one hour, from 21.00 to 22.00, the VG measurements were 6.94, 7.05, 6.99, 6.93, 6.93, 7.00, 6.83.

The phase diagram shows around phase 0.5 a lower set of measurements which coincides with the secondary eclipse of U Cephei. GCVS states the secondary eclipse is of 0.2 magnitude from 6.75 to 6.93. My measurements have the same depth but from 7.00 to 7.20.

References

1: C. Richard, V. Hourdin, C. Melis, A. Knagg-Baugh (2024), "Siril: An advanced tool for astronomical image processing", Journal of Open Source Software, 9(102), 7242.

2: P, D.Bennett, G M Harper, A Brown, C A Hummel (1966), “The masses and radii of the eclipsing binary eta Aurigae, ApJ 471, 454.

3: J A Eaton, G W Henry, A P Odell (2008). “Orbits and pulsations of the classical Zeta Aurigae binaries,” ApJ, 679, 1490.

Low-resolution spectroscopy of zeta Aurigae 2025 January-May: A 'semi-normal' eclipse

Hugh Allen

allenhugh10@googlemail.com

The primary eclipse of zeta Aurigae has for the first time been extensively observed with an Alpy 600 low-resolution spectroscope, covering the period 2025 January - May. The spectral types of the binary component stars are confirmed, and the progress of total eclipse is traced out. Most significantly the extent of chromospheric eclipse is successfully observed, allowing comparison to historical measurements of its considerable variability.

Introduction

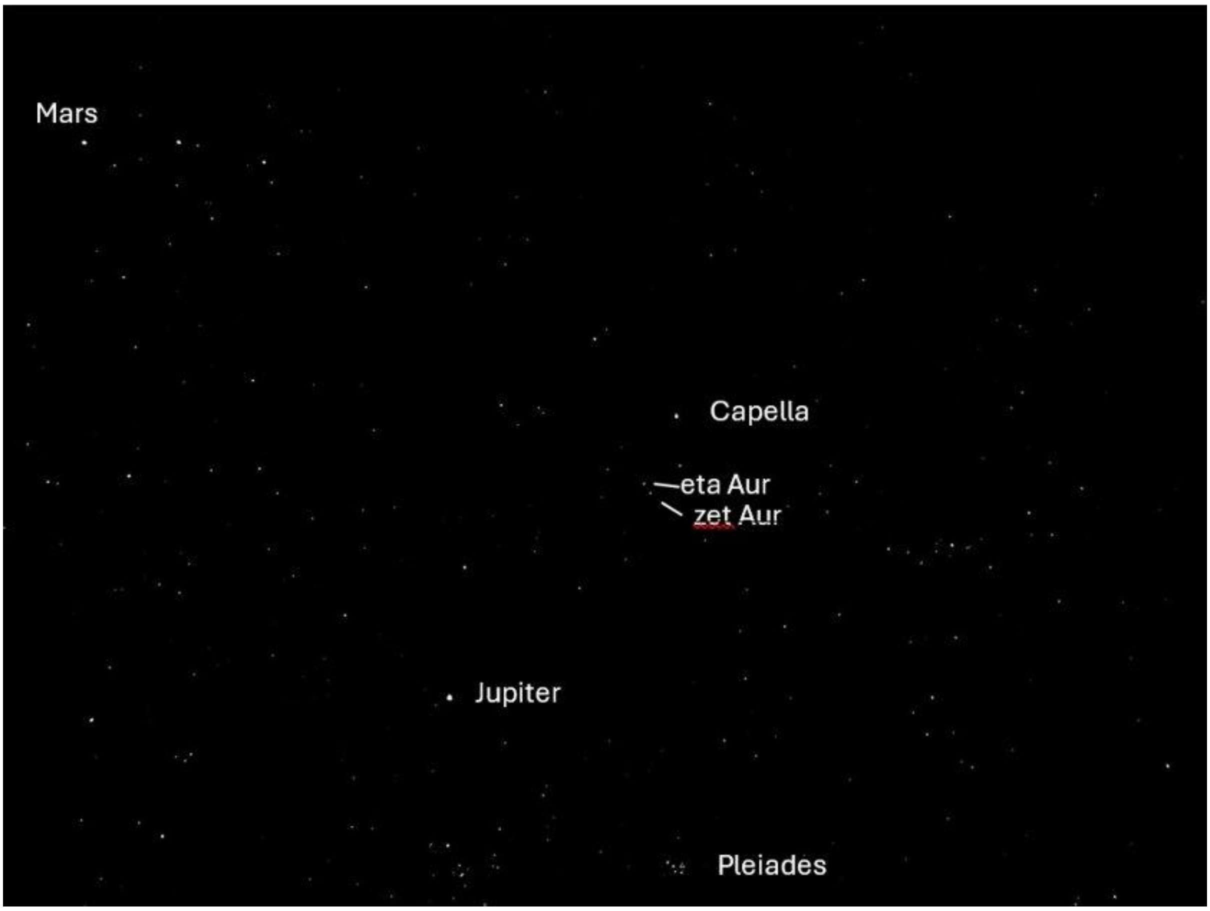


Figure 1: iPhone shot of the western sky centred on the constellation of Auriga, Sunday evening 2025 April 6. At a visual magnitude around 3.75, zeta Aurigae is easily visible to the naked eye. Its bright neighbour eta Aurigae was used as a convenient reference star, to correct for atmospheric effects.

Zeta Aurigae's composite spectrum was first recognised in 1897 by Antonia C Maury, one of the most renowned of the 'Harvard Computers' at the Harvard College Observatory:

'This star is one of the most beautiful examples of composite spectra found among stars not known to be double….The spectrum predominant in the blue is of Group XV, agreeing with that of α Bootis [Arcturus, K-type red giant]*, except in the hydrogen lines Hβ and Hγ which are far too strong for the group.'* [1]

In 1924 Jan 18, zeta Aur was discovered to be an eclipsing binary when the Canadian astronomer William Harper captured a spectrum which was of a K-type star alone (Fig. 2).[2]

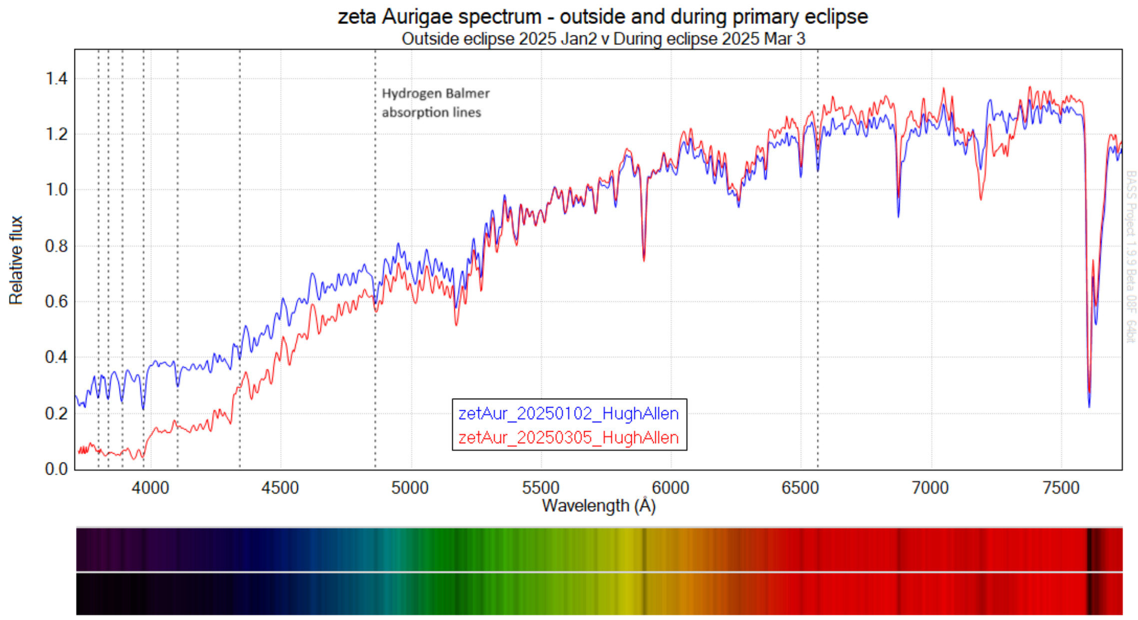


Figure 2: Repeating the observations of zeta Aur by Antonia Maury and William Harper. During the eclipse the spectrum (in red) is of a normal cool star, whilst outside of eclipse the increased flux and strong hydrogen absorption lines at the blue/near UV end of the spectrum show the presence of a hot star

Zeta Aur enters primary eclipse every 972.2 days (~$2^2/_3$ years) when the hot B-type star disappears for about 35 days behind the much larger K-type giant.[3] The favourable February – March timing of the 2025 eclipse, with zeta Aur high in the darkening evening sky, also coincided with an extended period of fine weather over the UK allowing an exceptional time series of 28 spectroscopic observations with a low-resolution Alpy 600 spectroscope (resolving power R = 600 at Hα wavelength). All of the author's observations are available in the BAA Spectroscopy Database (https://britastro.org/specdb/). To avoid more typical interruptions by bad weather, future eclipses could benefit from a coordinated observing campaign amongst Alpy 600 users.

The considerable scientific interest in spectroscopic observation of zeta Aur is underlined by over a century of professional high-resolution studies,[4] with zeta Aur now placed at the head of a recognised sub-group of binary stars.[5] Published amateur observations of previous eclipses have focused on changes in brightness,[6] apart from a few low-resolution spectra in the AAVSO database around the last favourable eclipse in late 2019.[7] However, amateur, low-resolution spectroscopy has much to offer: monitoring the progress of the total eclipse; the spectral classification of both component stars; and perhaps most interestingly, observation of the chromospheric eclipse when the hot B-type star shines through the extended outer atmosphere of the red giant.

Spectral classification of zeta (ζ) Aurigae's component stars

The 35-day duration of total eclipse is a unique opportunity to capture the spectrum of the red giant alone. The absorption lines in the eclipse spectrum on 2025 March 5 are a close match to the spectrum of the nearby K3II-III red giant iota Aurigae captured on the same night (Fig. 3):

	Equivalent Width, Å		FWHM, Å	
	zet Aur red giant	iot Aur	zet Aur red giant	iot Aur
Hα at 6563 Å	1.54	1.44	13	11.9
Na I blend at 5893 Å	5.05	4.65	16.4	16.2
Ca II at 3934 Å	11.82	11.05	23.1	22.6

Figure 3: The Equivalent Width is a measure of the intensity of the absorption line relative to the depth of the continuum, and the Full Width Half Maximum FWHM is a measure of the shape of the line. The singly-ionised Ca line (Fraunhofer K-line) is particularly strong in cooler stars.

Assuming that the two stars are subject to similar interstellar reddening then the slightly cooler continuum shape of zeta Aur's red giant component (Fig. 4) is consistent with its established K5II classification.[8]

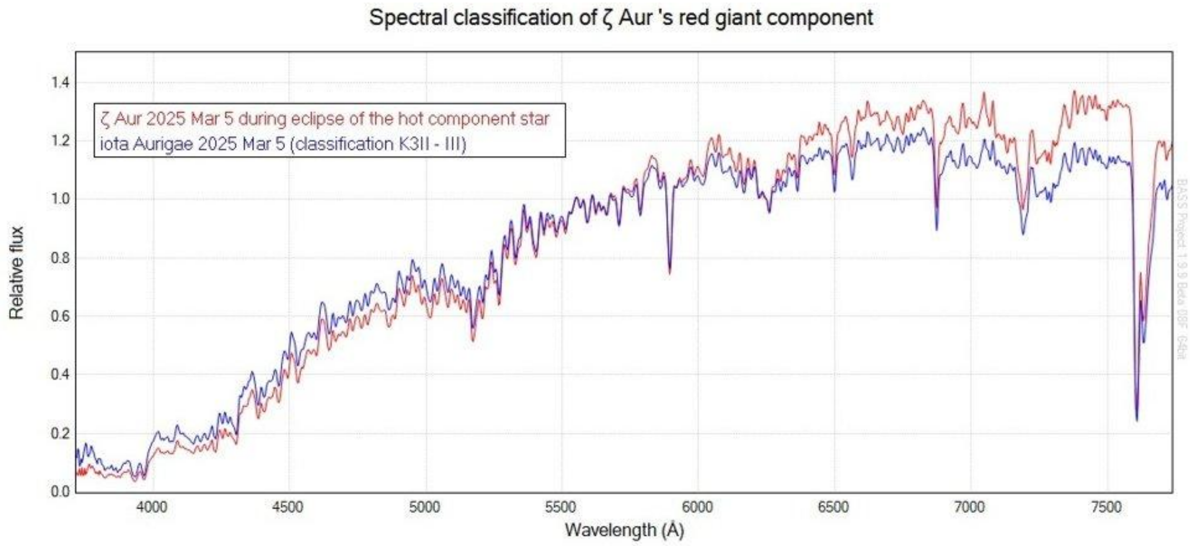


Figure 4: The shape and intensity of the absorption lines are a close match. The spectrum of zeta (ζ) Aur has a slightly redder (cooler) continuum shape.

The B7V spectrum of the hot star can be isolated by subtracting the red giant spectrum from the composite spectrum outside of eclipse (Figure 5), considering that the impact on the spectrum of interstellar reddening is low with a published colour excess of E(B-V) = 0.08 [3, Page 471]

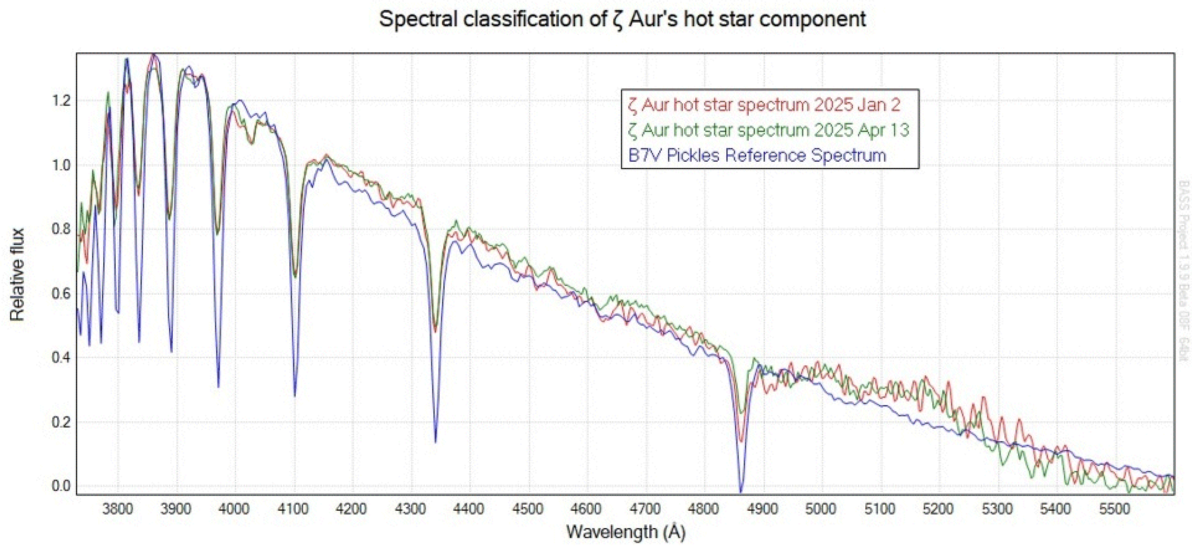


Figure 5: The results from observations on two different dates are in good agreement. The strong undulations in the zeta Aur spectra are noise due to the relatively weak signal from the hot star. The deeper hydrogen Balmer absorption lines in the Pickles reference may be because of a slightly higher resolution.

Observation of total eclipse

The total eclipse can be observed spectroscopically by following, for example, the fade of the hydrogen Balmer Hδ absorption line at 4102 Å. This line is strong in the hot B-star spectrum but much weaker at the cooler temperature of the red giant. The resulting profile (Figure 6) is similar to that measured by TB-filter photometry.[9]

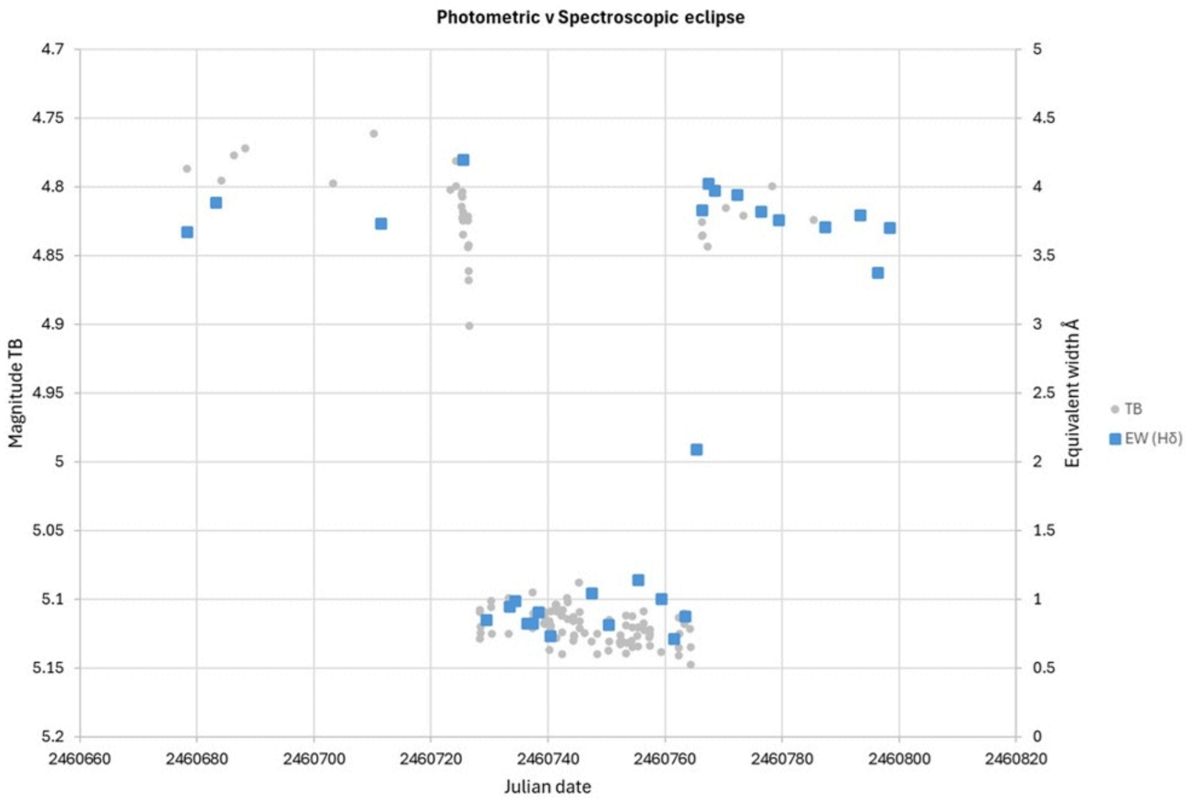


Figure 6: Total eclipse monitored by the fade of the Hδ absorption line. The relative intensity of the line is measured in Equivalent Width (the width in Å of a rectangle with the same area as the absorption line, drawn from the normalised continuum to zero relative flux).

Observation of the chromospheric eclipse

The intensity of the Fraunhofer K-line at 3934 Å (singly-ionised calcium) also traces out the total eclipse but inversely to the hydrogen Balmer lines; the K-line is very strong in the cool red giant spectrum but is absent in the hot B-star so that outside eclipse the equivalent width of the K-line is 'diluted' by the light from the hot B-star (Figure 7).

For a time before and after total eclipse the hot B star shines through the extended outer atmosphere of the red giant, the so-called chromospheric eclipse which makes the zeta Aurigae stars of such scientific interest. Absorption lines are added to the composite spectrum, particularly from neutral and singly-ionised metals, and hydrogen Balmer.[10] This effect can explain the observed upward spike in the K line equivalent width at JD2460765.372 (2025 Mar 30), as the B-star is just emerging from total eclipse. It also leads to the sloping fade towards eventual disappearance of the chromosphere between JD2460787 (2025 April 21) and JD2460793 (2025 April 27). The observed 22 - 28-day extent of the red giant chromosphere makes the 2025 eclipse 'semi-abnormal', according to historical studies of its considerable variability.[11, page 644]

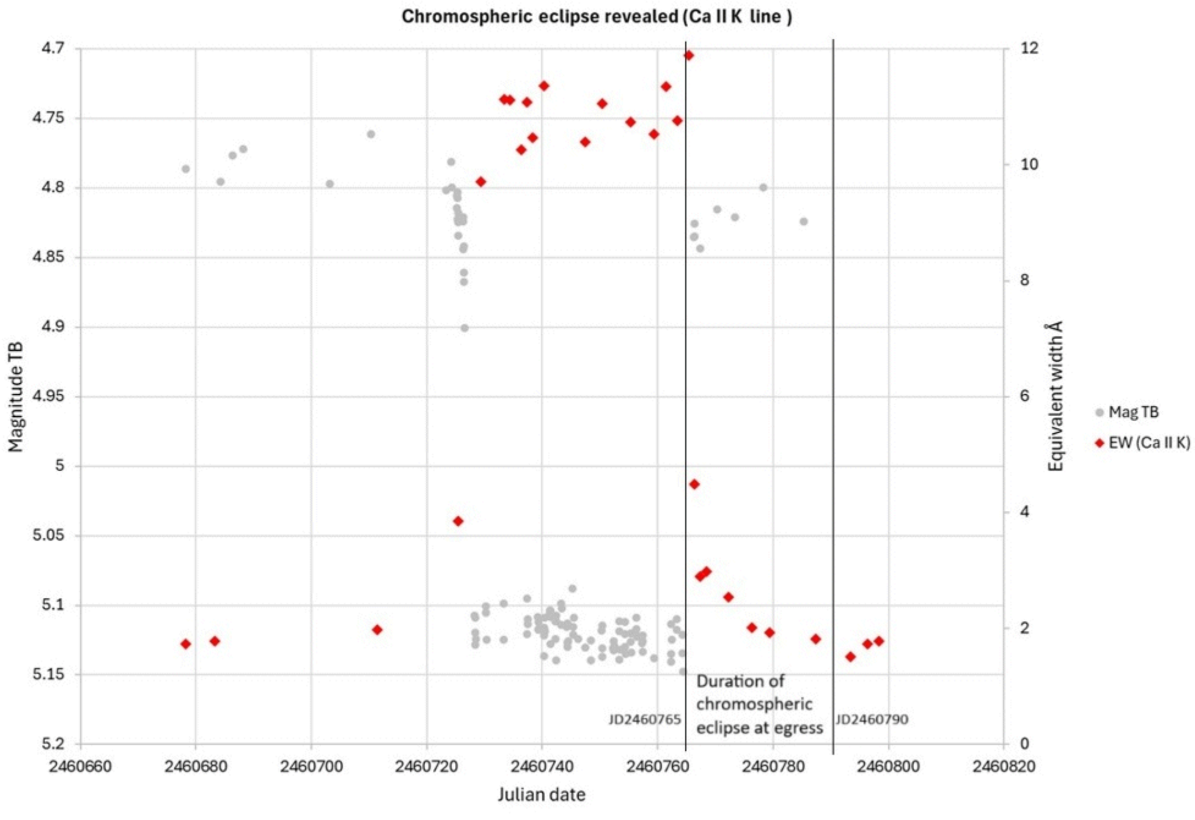


Figure 7: Chromospheric eclipse is revealed in the initially elevated then sloped decline of the Ca II K-line strength which is boosted by absorption in the extended chromosphere of the red giant

Acknowledgement

I acknowledge with thanks the variable star observations from the *AAVSO International Database* contributed by observers worldwide and used in this research.

References

1. Harvard Ann., 28, 99, 1897 Antonia C Maury Table X page 93 and Note 147 page 99
2. Pub. Dom. Ap. Obs., 3, 151, 1924.
3. Bennett P. and Harper G 'The masses and radii of the eclipsing binary zeta Aurigae,' *The Astrophysical Journal,* **471,** 454 – 479 (1996)
4. For example, articles in previous issues of the VSS Circular: VSSC172 p11, VSSC183 p27-28, VSSC184 p33
5. Giants of Eclipse: The ζ Aurigae Stars and Other Binary Systems' edited by Thomas Ake and Elizabeth Griffin, published by Springer Nature (2015)
6. For example, Christie W. H. and Wilson O. C. 'ζ Aurigae: The Structure of a Stellar Atmosphere,' *The Astrophysical Journal,* **81,** 426 – 460 (1935)
7. Spectra can be found on the AAVSO database AVSpec https://apps.aavso.org/avspec/search
8. SIMBAD Astronomical Database https://simbad.u-strasbg.fr/simbad/
9. Observations downloaded from the AAVSO International Database AID, contributed by observer MHOC. The filter used is TB, a tricolour blue filter. https://www.aavso.org/data-download
10. For example, Griffin REM et al 'Optical spectra of ζ Aurigae binary systems I. The 1987 eclipse of ζ Aurigae', *Astron. Astrophys.* **234,** 284 – 298 (1990)
11. McKellar A. and Petrie R.M. 'Intensity and Radial-Velocity Measurements on the Spectrum of Zeta Aurigae at Recent Eclipses' *Monthly Notices of the RAS,* **112,** 641 – 650 (1952)

BB Cephei observation updates

David Conner

dsconner100@gmail.com

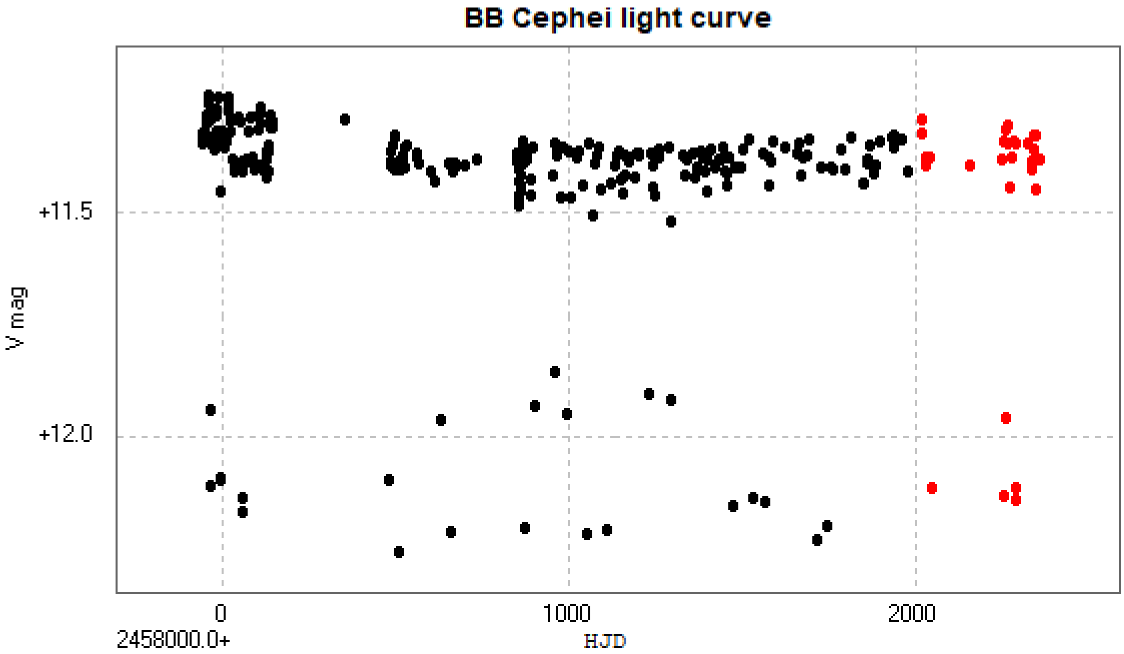
This article follows on from my previous article about this system in Variable Star Section Circular 183 (March 2020) which discusses the changing light curve of the eclipsing binary BB Cephei.

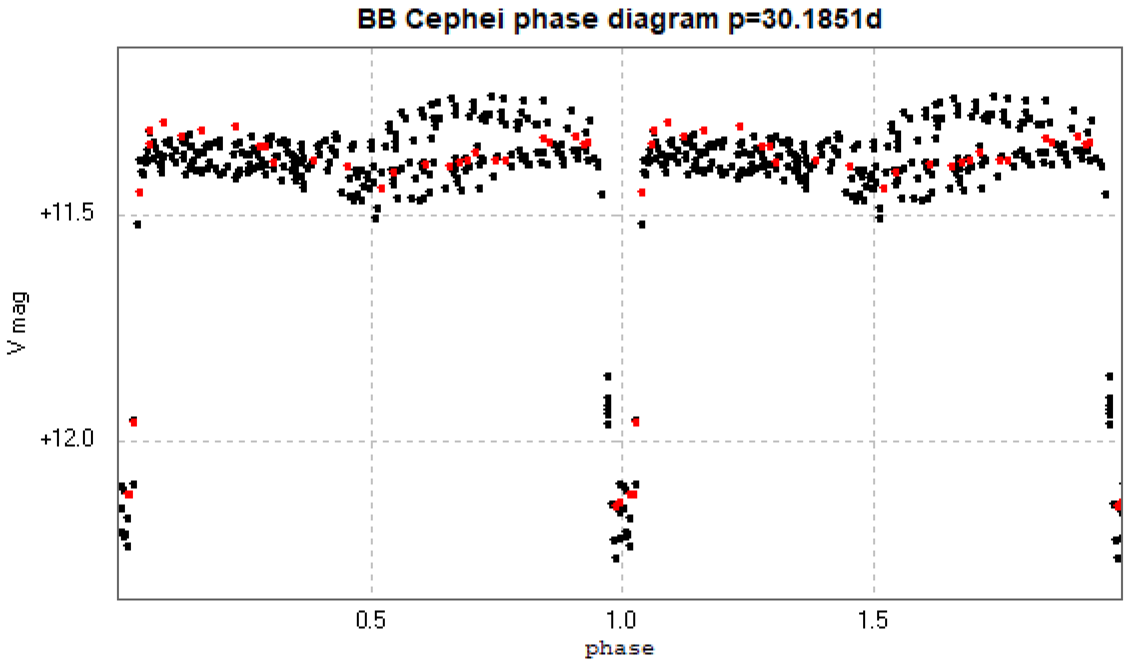
According to the GCVS, this is an EA type with an F1V spectrum, while the AAVSO VSX classifies it as an EA/DS type (detached system with a subgiant) with a G0 spectrum (accessed 2025 May 12). To highlight the changes to this light curve over time there follow two light curves, with their associated phase diagrams, for two overlapping sets of data showing changes between two seasons of observations.

Group 1; 2017 July 6 to 2024 February 12.

The following light curve and phase diagram were constructed from photometry of 309 images made with the COAST telescope between 2017 July 6 and 2024 February 12. All images were taken using a V filter.

The curves consist of 278 observations made from 2017 July 6 to 2023 February 1, which are in black, and 31 observations made from 2023 March 18 to 2024 February 12, which are in red.

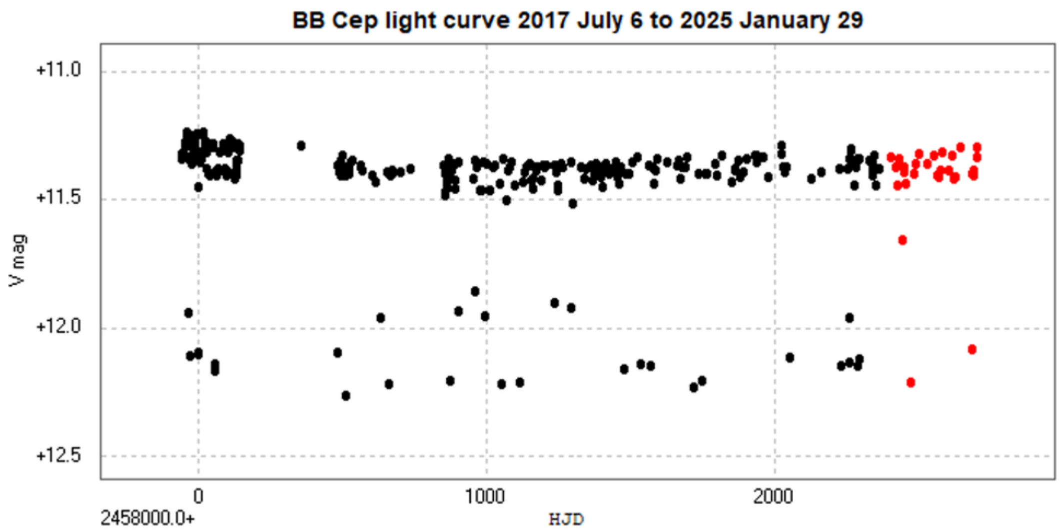




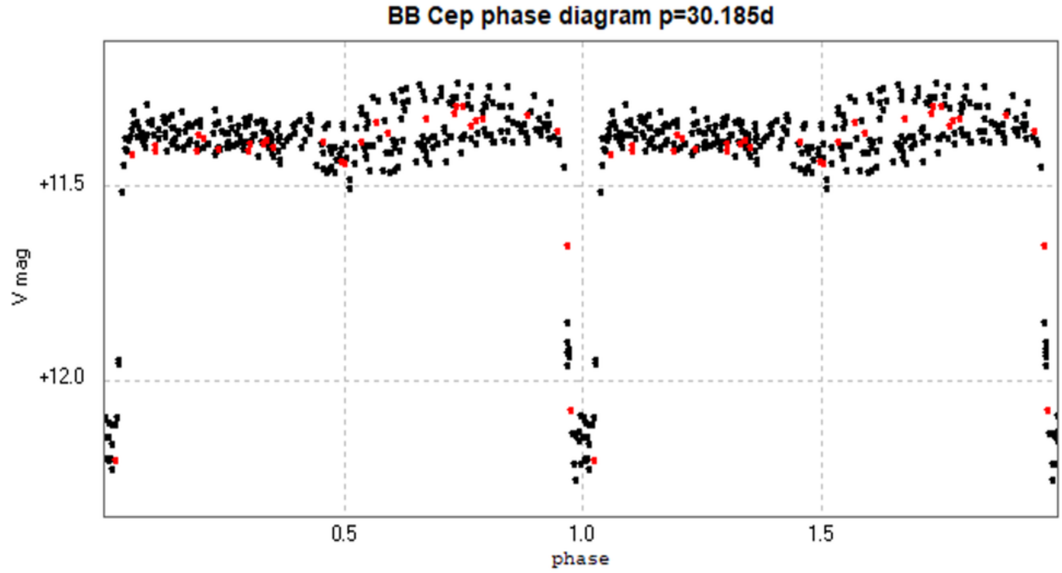
Group 2; 2017 July 6 and 2025 January 29.

[Note that these recent observations include some which were made with the PIRATE telescope as well as with the COAST telescope at the Tenerife Observatory. Due to ongoing technical issues with the COAST telescope, the number of such observations might increase to become a significant fraction of the data. This information is included in the data submitted to the BAA and the AAVSO.]

The following light curve and phase diagram consist of the above observations made from 2017 July 6 to 2024 February 12, which are now all in black, and an additional 30 observations made from 2024 April 4 to 2025 January 29, which are in red. The same comparisons were used throughout, and all images were taken using a V filter.



Back to contents



The second phase diagram shows that the recent season's maximum between phase 0 and phase 0.5 is now fainter than previously, and also fainter than that between phase 0.5 and phase 1. The maximum between phase 0.5 and phase 1 is brighter than the previous season, and also brighter than that between phase 0 and phase 0.5. These changes are consistent with the types of changes previously discussed in Circular 183 and on my website.

The O'Connell Effect refers to the light curve changes themselves, not their causes. It is usually applied to shorter period (less than 10 days or so) eclipsing binaries which are close enough to affect each other. In the case of BB Cep, with a period of ~30 days, their cause is unclear. They may possibly be due to the appearance and disappearance of bright and dark spots on one or both components. More observations and analysis needed.

Recent observations of Eclipsing Binary minima

David Conner

dsconner100@gmail.com

Observations of recent times of minima of eclipsing binaries made with the 2 inch Titan at Somerby Observatory.

The '2 inch Titan' consists of the objective lens and tube of a 9x50 finder scope coupled to an Atik Titan monochrome ccd camera, (50mm ~ 2 inches, hence the name). It is mounted on a Fullerscopes MkIV mount and autoguiding is provided by a QHY5 CMOS camera via PHD2. Photometry of the images is performed in AIP4WIN, and light curves and times of minima are determined using Peranso.

STAR	HJD of minimum	Filter	Error +/-	Type of minimum
IY Aur	2460664.34192	CV	0.00008	Primary
GW Gem	2460729.35691	CV	0.00015	Primary
TX UMa	2460737.38268	CV	0.00010	Primary
TX UMa	2460740.44705	CV	0.00007	Primary
GW Gem	2460755.40270	CV	0.00080	Secondary

More information about these can be found on my website.

The Constellation Bucket List

John Toone

enootnhoj@btinternet.com

An account of obtaining visual observations of variable stars within all eighty-eight constellations during the years 1975-2025.

One of my astronomical bucket list objectives has been to observe variable stars by visual means within all of the eighty-eight official constellations. In the period 1975-1999 I made steady progress and secured observations of variables in eighty-one constellations (or so I thought, read on) but then the project stalled. In 2005 I added Equuleus to the list when I produced a revised sequence for the eclipsing binary S Equ, but by the end of 2024 the total still stood at eighty-two, so I thought it was about time that the project was wrapped up.

The constellations I understood to be outstanding in 2024 were: Ara, Circinus, Columba, Octans, Tucana & Volans; and to capture variables within them a trip to the southern hemisphere would be necessary. Travelling to the southern hemisphere from the UK is a lengthy process and with my current time constraints I could only allow a brief trip, so that led me to consider South Africa. Cape Town is an 11-hour flight from London and with the time zone being only 2 hours ahead of the UK, jet lag is minimised. Cape Town is at latitude -34 degrees and marginally south of Sydney which has been my most southerly observing site in the past. From Cape Town Octans, Tucana & Volans are circumpolar and the other three constellations would be accessible in the first quarter of the year. The dryest season for Cape Town is late summer and February appeared to be the most favourable month for clear skies, so new moon in February 2025 became my target window. Since I would never observe from within a city such as Cape Town, I looked for a coastal location on the opposite side of False Bay in the hope that any cloud would cling to the nearby mountains including Table Mountain. The site selected was on the fringe of Pringle Bay a 90-minute drive east of Cape Town which was on the whale watching coast with no land mass to the south except for Antarctica (Figure 1).

Figure 1: The map from my British Airways flight screen shortly after take-off from Cape Town on 4th March 2025. This gives a good indication of the remoteness of South Africa and its proximity to Antarctica.

I didn't want the trip to be solely about achieving the bucket list, I was also keen to do something scientifically useful in the short time that I would be there. Since I would only be equipped with binoculars, I decided to target a number of obscure (mostly) red variables to see if they were aligned or discrepant with the reported measurement range of the Hipparcos Mission (my findings on those variables will be reported separately in VSS Circular No 205). I also looked forward to catching up with the likes of eta Car, R Dor & L2 Pup which I had not observed for twenty years.

In the lead up to the trip I refreshed my old southern hemisphere sequences and, in a few cases, produced new charts. Colin Henshaw and Peter Williams provided very helpful advice on which variables to target within the six constellations. Peter even provided information on Mira stars that were predicted to be within binocular range in the latter part of February.

Pringle Bay turned out to be an excellent choice because when I got there it was a safe & secure isolated town that had applied a ban on outdoor lighting (a lesson on lighting/security for the UK here). Three nights were clear, two partly clear and only one cloudy during my six-night stay. I observed from the balcony of a guest house (Figure 2) which overlooked the South Atlantic Ocean and overhead I could see magnitude 10 with 15x70 binoculars.

Figure 2: My base between 26th February & 4th March 2025 in Pringle Bay. I observed from the balcony of the white building positioned centre-right. Across the sea the land in the distance is the Cape of Good Hope

It was good to see the Magellanic Clouds again and also the southern Milky Way which stretched across the sky almost overhead. I was reminded of how dark the Coal Sack appeared and was pleased to see 47 Tuc & omega Cen with the naked eye and looking mottled in binoculars.

On my first night (26th February) I recorded my longest continuous observing spell at 7 hours 40 minutes but in that time, I only managed 60 observations. That is because I had to re-familiarise myself with the southern sky and star hop long distances from unmistakable reference points such as Achernar, alpha/beta Cen, Canopus, Miaplacidus, Crux and the False Cross.

Shining at magnitude 4.2-4.4 eta Car was much brighter than when I last saw it in 1999. It was not easy to estimate because of the rich Milky Way & nebulous background. The same applied to S Dor in the Large Magellanic Cloud which was an extreme challenge at magnitude 9.3-9.4.

L2 Pup at 7.9 was 0.5 magnitude fainter than when I last saw it in 2004 and nowhere near the range of 4.2-5.7 seen in 1982-1995.

The southern RCB stars V854 Cen and RY Sgr were both at maximum at magnitudes 7.3-7.4 and 6.9-6.7 respectively.

Recently I had noted the prominence of delta Sco from the UK, but due to its low altitude and the distance of the comparison stars, I couldn’t make a reliable estimate. From Pringle Bay however; Virgo, Libra & Scorpius were well elevated in the morning sky and I was able to make a confident estimate of magnitude 1.6 based on comparison with Spica and Zuben-el-Genubi.

In the north I was still able to make observations of AB Aur & R CrB and each night I checked the field of T CrB but it was below the threshold of my binoculars and could not be seen.

Observations were made of variables in Circinus, Columba, Octans, Tucana & Volans on the first night and Ara on the third night so the primary mission was accomplished in good time and I travelled home thinking that the bucket list was complete.

When I prepared a list of the first observations in each constellation (Table 1) the only object I had within Canis Minor was the BL Lac object PKS 0754+10 and I realised that it was actually positioned just over the constellation boundary in Cancer which meant that the bucket list was still incomplete. Fortunately, Canis Minor is north of the celestial equator and readily accessible from the UK and I finally completed the bucket list with an observation of BQ CMi on the 1st April 2025. This came 49 years & 326 days after the first observation of R CrB on 9th May 1975. Reviewing the finalised list, it is perhaps surprising that many of the far south constellations were covered before the prominent northern constellation of Aries. Also, I had forgotten that the first object seen in Ursa Major was a 13th magnitude BL Lac object, perhaps a legacy of my interest in deep sky objects back in 1977.

If others have done the constellation bucket list I would very much like to hear their stories. It may not be a scientifically useful achievement but it gave me an excellent appreciation of the whole sky and was a lot of fun to undertake over a fifty-year timescale split equally across the Millennium.

Constellation	Variable	Date	Location	Constellation	Variable	Date	Location
Corona Borealis	R	09/05/1975	Boothstown	Microscopium	T	21/09/1981	Puerto Rico, Gran Canaria
Cygnus	chi	23/05/1975	Boothstown	Sculptor	R	23/09/1981	Puerto Rico, Gran Canaria
Delphinus	U	01/08/1975	Boothstown	Phoenix	SX	26/09/1981	Puerto Rico, Gran Canaria
Scutum	R	27/06/1976	Boothstown	Pisces Australis	V	26/09/1981	Puerto Rico, Gran Canaria
Cepheus	T	17/08/1976	Boothstown	Fornax	RZ	26/09/1981	Puerto Rico, Gran Canaria
Vulpecula	NQ	23/10/1976	Boothstown	Caelum	T	26/09/1981	Puerto Rico, Gran Canaria
Aquarius	R	23/10/1976	Boothstown	Grus	pi 1	26/09/1981	Puerto Rico, Gran Canaria
Cetus	omicron	16/11/1976	Boothstown	Indus	T	27/09/1981	Puerto Rico, Gran Canaria
Taurus	T	24/12/1976	Boothstown	Sextans	RT	22/03/1982	Boothstown
Ursa Major	Markarian 421	29/01/1977	Salford Observatory	Centaurus	T	13/09/1982	Kadoma, Zimbabwe
Hydra	R	29/01/1977	Salford Observatory	Triangulum Australe	R	13/09/1982	Kadoma, Zimbabwe
Leo Minor	R	27/02/1977	Boothstown	Musca	BO	14/09/1982	Kadoma, Zimbabwe
Leo	R	09/03/1977	Boothstown	Apus	theta	14/09/1982	Kadoma, Zimbabwe
Virgo	R	06/04/1977	Boothstown	Pavo	lambda	14/09/1982	Kadoma, Zimbabwe
Libra	RS	16/04/1977	Boothstown	Puppis	L2	15/09/1982	Kadoma, Zimbabwe
Hercules	X	27/04/1977	Boothstown	Pictor	R	15/09/1982	Kadoma, Zimbabwe
Canes Venatici	Y	27/04/1977	Boothstown	Doradus	WZ	22/09/1982	Kadoma, Zimbabwe
Draco	UX	20/06/1977	Boothstown	Carina	eta	22/09/1982	Kadoma, Zimbabwe
Cassiopeia	V465	20/06/1977	Boothstown	Antlia	U	22/09/1982	Kadoma, Zimbabwe
Scorpius	BM	20/06/1977	Boothstown	Coma Berenices	FS	13/05/1983	Boothstown
Aquila	V	14/07/1977	Boothstown	Corvus	SV	13/05/1983	Boothstown
Sagittarius	R	09/08/1977	Boothstown	Canis Major	W	06/10/1983	Playa de las Americas, Tenerife
Perseus	X	08/09/1977	Boothstown	Lupus	GO	02/06/1984	Silver Sands, Barbados
Pisces	TX	08/09/1977	Boothstown	Crux	AO	05/06/1984	Silver Sands, Barbados
Camelopardalis	U	18/09/1977	Boothstown	Vela	GK	14/04/1986	Ayers Rock, Australia
Auriga	UU	18/09/1977	Boothstown	Horologium	V	14/04/1986	Ayers Rock, Australia
Lepus	R	18/09/1977	Boothstown	Sagitta	SV	24/07/1990	Boothstown
Cancer	RS	13/12/1977	Boothstown	Reticulum	R	28/11/1995	Mombasa, Kenya
Andromeda	R	30/01/1978	Boothstown	Hydrus	VW	10/03/1999	Mount Victoria, Australia
Gemini	TV	01/10/1978	Boothstown	Pyxis	T	11/03/1999	Gilgandra, Australia
Monoceros	U	13/10/1978	Boothstown	Mensa	W	12/03/1999	Gilgandra, Australia
Orion	U	13/10/1978	Boothstown	Norma	RT	14/03/1999	Siding Spring Observatory, Australia
Serpens	tau 4	01/01/1979	Boothstown	Corona Australis	V	14/03/1999	Siding Spring Observatory, Australia
Lynx	Y	02/02/1979	Boothstown	Chamaeleon	Z	15/03/1999	Nyngan, Australia
Ursa Minor	RR	02/02/1979	Boothstown	Telescopium	RX	24/03/1999	Gilgandra, Australia
Crater	R	24/02/1979	Boothstown	Aries	V	03/12/1999	Cressage
Ophiuchus	X	04/07/1979	Boothstown	Equuleus	S	28/09/2005	Cressage
Pegasus	AG	24/08/1979	Boothstown	Tucana	CY	26/02/2025	Pringle Bay, South Africa
Triangulum	R	28/08/1979	Boothstown	Columba	T	26/02/2025	Pringle Bay, South Africa
Bootes	RX	17/02/1980	Boothstown	Volans	WW	26/02/2025	Pringle Bay, South Africa
Lacerta	SX	23/08/1980	Boothstown	Octans	X	27/02/2025	Pringle Bay, South Africa
Capricornus	RT	30/08/1980	Boothstown	Circinus	CY	27/02/2025	Pringle Bay, South Africa
Eridanus	RR	28/11/1980	Boothstown	Ara	T	01/03/2025	Pringle Bay, South Africa
Lyra	XY	03/06/1981	Boothstown	Canis Minor	BQ	01/04/2025	Cressage

Table 1: A list of the first observations made in each constellation taken from the BAA VSS database. Only positive observations are included. Boothstown (11km west of Manchester) was my observing base prior to 1993.

Section Publications

Hard Copy Charts	Order From	Charge
Telescopic	Chart Secretary	Free
Binocular	Chart Secretary	Free
Eclipsing Binary	Chart Secretary	Free
Observation Report Forms	Director/Red Star Co-ordinator	Free
Chart Catalogue	Director	Free
Binocular VS charts Vol 2	Director or BAA Office	Free

Charts for all stars on the BAAVSS observing programmes are freely available to download from the VSS Website www.britastro.org/vss

Contributing to the VSS Circular

Written articles on any aspect of variable star research, observing or letters are welcomed for publication in these *circulars*. The article must be your own work and should not have appeared in any other publication. Acknowledgement for light curves, images and extracts of text must be included in your submission if they are not your own work! References should be applied where necessary. Authors are asked to include a short abstract of their work when submitting to these *circulars*.

Please make sure of your spelling before submitting to the editor. English (not US English) is used throughout this publication.

Articles can be submitted to the editor as text, RTF or MS Word formats. Light curves, images etc. may be submitted in any of the popular formats. Please make the font size for X & Y axes on light curves large enough to be easily read.

Email addresses will be included in each article unless the author specifically requests otherwise.

Deadlines for contributions are the 15th of the month preceding the month of publication. Contributions received after this date may be held over for future circulars. *Circulars* will be available for download from the BAAVSS web pages on the 1st day of March, June, September and December.

Deadline for the next VSSC is August 15th 2025.

BAA www.britastro.org
BAAVSS www.britastro.org/vss
BAAVSS Database https://www.britastro.org/photdb/
BAA Spectroscopic Database https://britastro.org/specdb/
BAAVSS *Circular* Archive http://www.britastro.org/vss/VSSC_archive.htm

Section Officers

Director
Prof. Jeremy Shears
Pemberton, School Lane, Tarporley, Cheshire CW6 9NR
Tel: 07795 223869 E-mail bunburyobservatory@hotmail.com

Assistant Director, CV's & Eruptive Stars Co-ordinator,
***Circulars* Editor & Webmaster**
Gary Poyner
67 Ellerton Road, Kingstanding, Birmingham B44 0QE
Tel: 07876 077855 E-mail garypoyner@gmail.com

Secretary
Bob C. Dryden
21 Cross Road, Cholsey, Oxon OX10 9PE
Tel: 01491 201620 E-mail visual.variables@britastro.org

Chart Secretary
John Toone
Hillside View, 17 Ashdale Road, Cressage, Shrewsbury SY5 6DT
Tel: 07495 330255 E-mail enootnhoj@btinternet.com

Pulsating Stars Co-ordinator
Shaun Albrighton
4 Walnut Close, Hartshill, Nuneaton, Warwickshire CV10 0XH
Tel: 02476 397183 E-mail shaunalbrighton93@gmail.com

Nova/Supernova Secretary
Guy Hurst BEM
16 Westminster Close, Basingstoke, Hants RG22 4PP
Tel: 01256 471074 E-mail guy@tahq.org.uk

Eclipsing Binary Secretary
Des Loughney
113 Kingsknowe Road North, Edinburgh EH14 2DQ
Tel: 0131 477 0817 E-mail desloughney@blueyonder.co.uk

Database Secretary
Dr. Andrew Wilson

Tel: 01934 830683 E-mail andyjwilson_uk@hotmail.com

Telephone Alert Numbers for Nova and Supernova discoveries telephone Denis Buczynski 01862 871187. Variable Star alerts call Gary Poyner or post to BAAVSS-Alert – **but please make sure that the alert hasn't already been reported**.