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In this issue:

NEWS NOTES: CAMS@SA Five years of meteor captures

Recent Southern African Fireball Observations Events # 475-483

Rate profiles of the eta-Aquariids during the 2021-2024 apparitions

Colloquia

MNASSA download site: www.mnassa.org.za

Cover : The main telescope of the HESS gamma-ray telescope in Namibia, seen on a recent visit by Ian Glass. The dish measures 32.6 x 24.3m, equivalent to 36m in diameter and is made up of 875 segments. The focal plane camera allows a field of 3.2 degrees across. The detector (at left) is an array of 2048 photomultipliers and their signals are processed with nanosecond time resolution to search for the faint sausage-like glows of Cerenkov light produced when an ultra-high energy gamma ray interacts with the Earths atmosphere.

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Vol 83 Nos 5-6 June 2024

ASSA AGM Information

The ASSA AGM is scheduled for Monday 26 August at 5pm via JitsiMeet. All Members are welcome to attend and can send a request for the meeting link to info@ assa.saao.ac.za.

News Note: IAU Access

The IAU local organisers inform us that they will set up free streaming via YouTube and will publish the links on the GA website. You can link to the website for now https://astronomy2024.org/ for more information about the programmes etc.

News Note: ROTSE follow-up visit

Following on from the report in the December *MNASSA* regarding the refurbishment of the ROTSE (Robotic Optical Transient Search Experiment) at the HESS site in Namibia, a return visit was undertaken in May 2024 by David Buckley, Nic Erasmus, Willie Koorts (SAAO) and Pat van Heerden (UFS & Boyden Observatory). During their 4-night visit the team were able to achieve on-sky tests with the replacement CMOS camera and perform time resolved photometry.

Prior to the visit, Nic had designed an interface for the camera to mount it at the focus of the telescope, which is inside the primary mirror baffle. A proof of concept was fabricated with a 3D printer and a final version was produced by a supplier in Windhoek. Before camera installation, they first removed the optical "tower", containing the correcting lenses, shutter and filter. The latter two items were not needed since the camera is shutterless and operates in white light. The opportunity was taken to clean the last element of the corrector, a plano-convex lens in front of the camera, and completely seal the optical tower.

The first on-sky tests showed that the telescope was not properly collimated, so they adjusted the secondary mirror tip/tilt and achieved good collimation and focus across the entire 1 degree field of view, as shown in the images presented below. These images show some vignetting in the corners, due to the C-mount of the camera, which will be removed in future.

Pat managed to fully resurrect the ROTSE mount control computer and to install all of the missing drivers, which allowed the mount encoders to be read and the RA and Dec motors to be run at selected velocities. This was achieved using the GUI on the mount control computer. This approach was taken because the ROTSE observatory control computer had been removed on its earlier decommissioning in 2013 and thus pointing commands could not be sent to the telescope. The initial focus tests were therefore undertaken by manually pointing and moving the telescope, while taking short exposures.

On subsequent nights the team devised a clever method to "trick" the telescope mount to track by entering a low RA slew velocity to match the sidereal rate. Getting to a target still required a combination of manual movement, slewing by changing velocity values, and "star-hopping". Nonetheless, it was possible to take tracked images on several objects and perform photometry on the variable star AR Sco, as a test.

The team achieved all their goals during this recent visit and is now planning the next trip in late October, where it is hoped to install a new observatory control computer and a modified camera mount. This will hopefully culminate in remote observing.

Obituary: Tom Jarrett (Died 3 July 2024)

We regret to announce the unexpected death of Prof Tom Jarrett who spent the years 2013-2023 at UCT and was a leading figure on the South African astronomical scene. Tom was a SARChI Professor in the Department of Astronomy and was Director of the Visualisation Lab which he founded as well as Head Astronomer of the Iziko Planetarium 2015-2023. He also taught the NASSP Master's course on Extragalactic Astronomy from 2013 – 2023. After retiring from UCT last year, he took up the position of Deputy Director of the NASA Infrared Telescope Facility at the University of Hawaii, Hilo.

Earlier in his life, Tom, a native Californian, joined the Infrared Processing and Analysis Center (IPAC) at Caltech in 1991 after completing his BA in Physics from Pomona College and a PhD in astrophysics at the University of Massachusetts.
In 1994 he joined the Two-micron All Sky Survey (2MASS) team. Using the 2MASS 'galaxy' catalogs, he conducted research in the large scale structure that comprises the local universe. In 2003, he joined the Spitzer Legacy teams "SINGS" and "SWIRE", focusing his research on star formation in low-redshift galaxies. Participating in and/or leading a number of Spitzer GO projects, he made a study of interacting galaxies.
[Information: Sarah Blyth and Internet]

News Note: CAMS@SA achieves five years of meteor captures

Tim Cooper (Director, Comet, Asteroid and Meteor Section, ASSA. Coordinator, Cameras for All-sky Meteor Surveillance South Africa (CAMS@SA))

The Cameras for Allsky Meteor Surveillance South Africa (CAMS@SA) is celebrating five years of operation and now has measured more than 49,000 meteoroids, all triangulated to determine their orbits and radiant positions on the sky. (CAMS@SA) operates sixteen Watec Wat902 H2 Ultimate cameras, with eight cameras at Bredell Observatory (station BR) operated by Tim Cooper and eight cameras at Hartebeesthoek Radio Astronomy Observatory (South African Radio Astronomy Observatory, HartRAO, station HA) under the supervision of Philip Mey. CAMS@SA has participated in the detection of several new meteor streams in the past five years, most recently in the confirmation of the 51-Sagittids meteor stream, when on the night of 14/15 May 2024 several CAMS stations globally and including South Africa detected activity from the shower as announced in eMeteor News (Jenniskens et al 2024).

The 51-Sagittids were first discovered last year by cameras of the Global Meteor Network (Vida et al 2023), and activity was subsequently detected in video data going back to 2012. This meteor shower from an as-yet unknown long-period comet appears to be active annually at low levels. As mentioned in Jenniskens et al (2024), ‘if the 1-revolution dust trail of this comet wanders in Earth’s path on occasion, which is expected to happen only once or twice every 60 years if the comet orbit passes close enough to Earth, then this would make this comet a Potentially Hazardous Comet’.

The Cameras for Allsky Meteor Surveillance (CAMS) is a global network of low light video cameras set up to validate the IAU Working List of Meteor Showers. It is curated by Dr Peter Jenniskens (NASA Ames and the SETI Institute). CAMS saw first light in October 2010 and has now grown to a network of over 500 cameras in 12 different countries. Recent expansions in New Zealand, Australia, Chile, Brazil, Namibia and

South Africa have enabled CAMS to improve our knowledge of the southern hemisphere meteor activity. Now, Peter Jenniskens has collected data from the global CAMS networks, supplemented by video and radar data from other similar networks, and presented details of 513 known meteor showers in his 'Atlas of Earth's Meteor Showers' (Jenniskens 2023). The Atlas presents data for each meteor shower, including IAU name, code, shower number, shower type, orbital elements, associated parent body, radiant details, and activity, as well as additional data on light curves, spectral composition and meteoroid density.

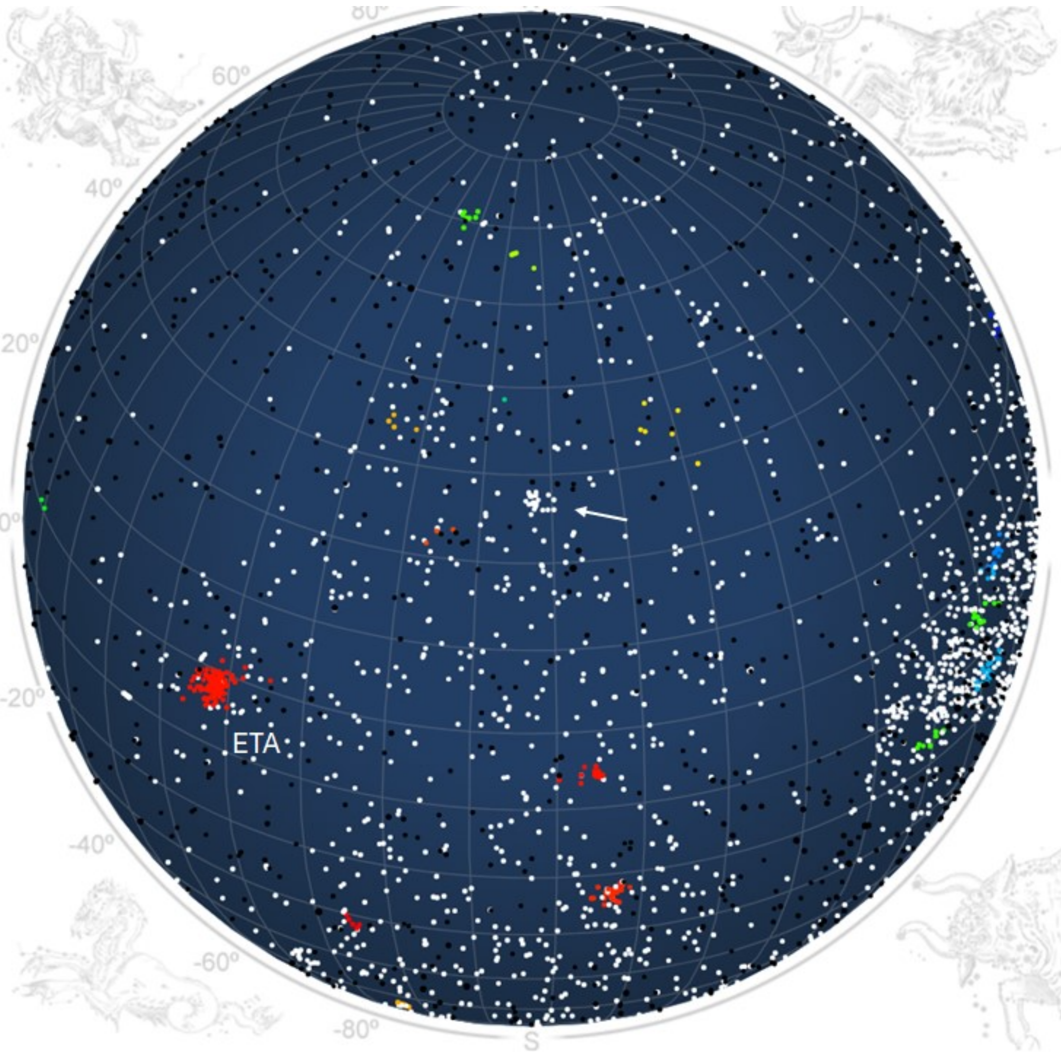

Fig 1: Detections of 51-Sagittids (arrowed) by all CAMS stations on the night of 14/15 May 2024. Meteors are coloured or white dots. Stars are black dots. Meteors from known showers are coloured, with different colours representing meteor speed, red dots are fastest, blue dots are slowest. White dots are sporadic. Now confirmed, the 51-Sagittids will be added to the list of known meteor showers. Other showers were active that night including the eta-Aquariids (ETA), which peaked just over one week earlier. The large concentration on the right are mainly Anthelion meteors, amongst which there are Northern and Southern May Ophiuchids, May psi Scorpiids and epsilon Scorpiids. The sphere is reproduced in Sun-centred ecliptic coordinates.

Fig 2: A copy of Atlas of Earth's Meteor Showers was handed over to HartRAO in recognition of its contribution to the CAMS network. Left to right are Philip Mey (Functional Manager: HartRAO), Tim Cooper (Director Comet, Asteroid and Meteor Section, Coordinator CAMS@SA) and Pieter Stronkhorst (Special Projects Officer: HartRAO). Photo by Janet Cooper.

data on light curves, spectral composition and meteoroid density.

The Atlas includes contributions from the two South African stations at HartRAO and Bredell. HartRAO has played an important role in CAMS@SA's achievements, including both the design and construction of the camera mounts and enclosures, and together with Peter Jenniskens, and Dave Samuels (SETI Institute) maintaining the operation of the cameras and daily uploads to the NASA server. In recognition of this contribution, Tim Cooper handed over a copy of the Atlas of Earth's Meteor showers for addition to the HartRAO library.

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Jenniskens, P. (2023), Atlas of Earth's Meteor Showers, published by Elsevier, 24 October 2023, 838 pages. ISBN 978-0-443-23577-1.

Jenniskens, P., Odeh, M., Johannink, C., Breukers, M., Baggaley, J., Scott, J., Moskovitz, N., Cooper, T., Devillepoix, H., Rollinson, D., and Samuels, D., (2024), 51-Sagittids Meteor Shower Confirmed by CAMS, published on eMeteorNews.net on 23 May 2024.

Vida D., Segon D., Roggemans P. (2023), A possible new meteor shower in Sagitta, eMeteorNews 8, 246–251.

Recent Southern African Fireball Observations Events # 475-483

Tim Cooper (Director, Comet, Asteroid and Meteor Section, ASSA)

This article continues the sequential numbering of reported fireball sightings from southern Africa. By definition, a fireball is any meteor event with brightness equal to or greater than visual magnitude (m_v) -4. The following events were reported to the author and details are reproduced as given by the observer [any comments by the author are given in brackets]. Where the report originated from the American Meteor Society Fireball page, the corresponding AMS event number is given. All times were converted to UT unless stated, and all coordinates are for epoch J2000.0. Solar longitudes for dates and times of events were calculated using SollongCalc. Azimuth angles are reckoned from north = 0° through east = 90°.

Event 475 – 2024 February 24 – Gqeberha, Eastern Cape
Observed by Juliana Blignaut, shortly before 11pm local time [21h00 UT], bright meteor like a burning ball with 'neon green' coloured tail, duration 1-2 seconds. Said to be brighter than the Moon, which was then full, magnitude -12.6, located 45° to the left of the path. From a sketch provided path approximately from close to the stars Hadar to Procyon. The path does not coincide with any known radiants and was probably sporadic.
Event 476 – 2024 March 16 – Wierda Park and Edenvale, Gauteng
Observed by Marina and Guy Snelling at 17h11, solar longitude 356.3°, Marina saw the entire passage, and Guy saw the last part before disappearance. Duration 3-4 seconds, very bright white fireball which left a persistent train for 1 second. No disintegration, but the tail had the appearance of being split into two. Said to be brighter than the Moon, which was then 45% illuminated and magnitude -10, altitude 31° in azimuth 338°. Path from az/alt 51°, 60° to 137°, 49°, that is RA/Decl. 08h14, -06° to 09h36, -49°, from near the bright star Procyon to Vela.
Observed by Sheryl and Joshua Herring at 17h10, duration 3-4 seconds, large bright yellow-orange object with a tail and a halo surrounding it. The Moon was to the left and the fireball moved from the Moon's vicinity horizontally from left to right at

altitude approximately 60°, passing Procyon and terminating in azimuth about 120°. The fireball was sporadic. AMS Event 1447-2024

Event 477 – 2024 April 22 – Alberton, Gauteng
Observed by Tiaan Niemand at 22h40, solar longitude 33.0°, during an imaging session as he walked outside to check his setup, saw a very bright fireball, duration about 2 seconds, with orange head surrounded by a green halo, showing flares in brightness before descending below roof level. The fireball was brighter than any other object in the sky, but fainter than the Moon, which was then near-full, magnitude -12.1, altitude 53° in azimuth 303°. Path from RA/Decl. 19h30, -74.0° to 21h14, -61.8°. The path does not coincide with any known radiants and the event was sporadic.

Event 478 – 2024 April 23 – Hartebeesthoek, Gauteng
Observed by Pieter Stronkhorst just after 17h00, solar longitude 33.7°, bright green colour, duration about 5 seconds, slow-moving. m_v estimated as -10, not as bright as the Moon, which was then near-full, magnitude -12, altitude 21° in azimuth 94°. The path was recreated from an image taken at the location, from az/alt 116°, 40° to 150°, 5°, that is from RA/Decl. 12h50, -36° to 17h10, -54°. Path length 50°, angular velocity 10°/sec. The fireball was sporadic.

Event 479 – 2024 April 29 – Cape Town, Western Cape
Observed by Ludick Bezuidenhout at 17h35, solar longitude 39.6°, m_v = -7, duration 3-4 seconds, colours seen were white, green and blue. The fireball fragmented into one larger and two smaller pieces towards the end of its path. Path from az/alt 131°, 11° to 134°, 10°, that is RA/Decl. 16h24, -39° to 16h32, -42°, and was possibly an Anthelion meteor. AMS Event 2158-2024.

Event 480 – 2024 May 7 – Inhassoro, Mozambique
Observed by Peter van Deventer at approximately 15h41 [solar longitude 47.2°], time uncertain but about half an hour after sunset, he and a group of people were meeting outdoors when he saw a very bright white meteor, said to be brighter than the Moon [which was not visible at the time]. Duration about 8 seconds, facing the ocean the path was downwards from right to left from approximately az/alt 86°, 45° to 50°, 25°, and Peter said the object appeared to be 'at relatively low altitude'. No persistent train observed, and no sounds were heard. The fireball was sporadic.

Event 481 – 2024 May 13 – Mana Pools, Zimbabwe
Observed by Mark van Zuydam at Mana Source, Mana Pools National Park, at 17h04, solar longitude 53.1°, very bright meteor, though not bright enough to cast shadows, distinct tail left a persistent train, no fragmentation and 'the fireball just burnt up'. Path from [very approximately] az/alt 90°, 30° to 315°, 50°, from Virgo to Cancer where it

faded close to the Moon, then a 33% waxing crescent, magnitude –9, altitude 39° in azimuth 324°. The fireball was probably Anthelion.

Event 482 – 2024 May 13 – Cape Town, Western Cape
Observed by Kobus Kapp at 18h39, solar longitude 53.2°, while driving in direction 300°, bright white-blue fireball, with duration 3-4 seconds. m_v = -8, slightly fainter than the crescent Moon which was then 33% illuminated, magnitude -9, and just above the point the fireball terminated. From a sketch provided, path from az/alt 336°, 23° to 319°, 12°, that is RA/Decl. 09h40, +29° to 08h13, +30°. No persistent train or disintegration. There is a good coincidence with the Anthelion radiant.

Event 483 – 2024 May 14 – Pretoria, Gauteng
Observed by Tanya Coetzee at 19h26, solar longitude 54.1°, seen while driving in direction 349° on Witdoring Avenue, Moreleta Park, bright white, looked like a long stripe lasting 2-3 seconds and then suddenly vanished. Not as bright as the Moon, which was then 42% illuminated, magnitude -10, altitude 21° in azimuth 307°. Path travelling horizontally right to left, very approximately from az/alt 45°, 20° to 30°, 20°, and the meteor was possibly Anthelion.

Acknowledgments
Thanks to Peter Morris for forwarding reports of fireballs from Zimbabwe and Mozambique, and to Bob Lunsford for forwarding fireballs reported to the AMS website. Solar longitudes were calculated from the SollongCalc app by Kristina Veljkovic (Department of Probability and Statistics, Faculty of Mathematics, University of Belgrade, Serbia), accessed through the International Meteor Organization webpage at https://www.imo.net/resources/solar-longitude-tables/.

Rate profiles of the eta-Aquariids during the 2021-2024 apparitions

Tim Cooper (Director, Comet, Asteroid and Meteor Section, ASSA)

Summary
The eta-Aquariids meteor shower occurs when Earth encounters debris left behind by Comet 1P/Halley, with maximum activity occurring during the first week of May. The stream is the most active shower south of the celestial equator. The shower normally produces activity at its peak in the region ZHR~40-60, but in some years enhancements to more than double this have been observed. A prediction was made for possible enhanced rates during either 2023 or 2024, due to a 1:6 mean-motion resonance of the

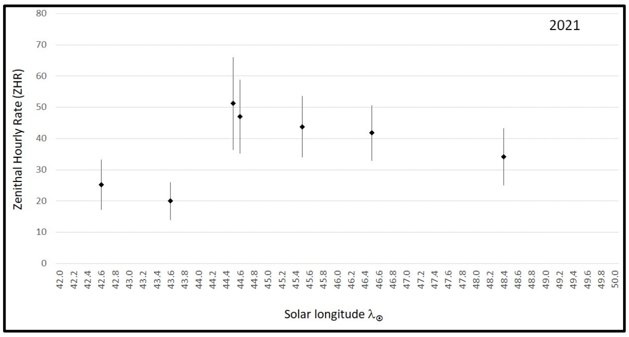
stream with Jupiter. Therefore, observations were made during both years, and were compared to observations made in previous years to determine if any enhanced rates occurred. No enhanced eta-Aquariid visual rates were observed in either 2023 or 2024.

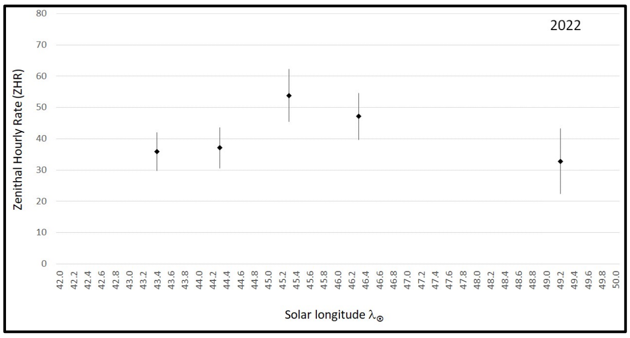
Background

The eta-Aquariids are one of two meteor showers which have Comet 1P/Halley as the parent body, the other being the Orionids which peak in October. The eta-Aquariids have benefited from more intense study in recent years by meteor researchers, and ASSA observations continue to make a significant contribution to those studies due to our favourable southerly location. The observing window is narrow, the radiant is located close to the celestial equator, rising in the early morning and is only sufficiently high enough to observe in the last couple of hours before morning twilight intervenes. The shower generally produces a fine display of fast meteors at maximum, the brighter members often leaving persistent trains, and typically peaks around solar longitude $\lambda_{\odot}$ ~45.5°, which normally occurs about the mornings of 5 or 6 May.

The author reviewed the history of the eta-Aquariids and their relationship to Comet 1P/Halley in Cooper (2021). That article drew attention to possible enhancements in eta-Aquariid activity following observations for example in 1993, when the rate increased unexpectedly to ZHR >100 on the morning of May 3 (Cooper 1996). Dubietis (2003) investigated the long-term activity from both the eta Aquariids and the Orionids, and concluded the activity might be cyclical with a period of 12 years. However, Egal et al (2020) studied the eta-Aquariids and concluded that no periodicity in the annual rate at maximum could be inferred from their analysis, but that outbursts occur due to encounters with meteoroids trapped in resonant orbits with Jupiter, as was the case in 2004, and 2013 when the ZHR exceeded 100. Both outbursts occurred at $\lambda_{\odot}$ = 45.1° (Jenniskens 2023). The 2013 outburst had been predicted earlier by Sato (2013) following orbital modelling which indicated the earth would make a close approach to filaments of particles ejected from comet 1P/Halley at its –910 and –1197 apparitions, and indeed enhanced rates were observed over a period of several days (Cooper 2013).

In the decade since the 2013 enhanced activity, the eta-Aquariids have shown rates in the range ZHR ~40-80, with a possible trend towards lower rates (Rendtel 2023). ZHRs for the last three years (2021 to 2023) were 43.6, 41.8 and 39.3 respectively (data from the Visual Meteor Data Base (VMDB) of the IMO, downloaded 15 June 2024). Note these rates were determined from all observers globally, and included observers in the northern hemisphere where the radiant typically reaches lower elevations than in the southern hemisphere, and often results in higher correction factors in the ZHR computation.





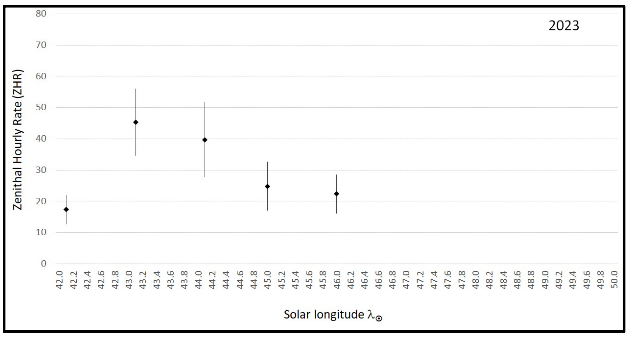


Fig 1 a-c: Rate profiles for the eta-Aquariids, 2021-2023

Observations by the author for the same years are shown in Figure 1 a-c. Rates peaked at 51.2 ± 14.8, 53.8 ± 8.4 and 45.3 ± 10.7 respectively and all three years may be considered as being within the normal range of activity. Egal (2020) predicted that enhanced rates due to the aforesaid mean-motion resonance might again be observed in 2023 or 2024. The 2023 campaign was affected by the Moon, which was full on 5 May, and resulted in a bright sky with limiting magnitudes about 0.5 magnitude lower than would be in the absence of moonlight. Nevertheless, no enhanced rates were observed in 2023, and consequently observations were carried out again in 2024 to see if rates were higher than normal.

Observations and methodology

Visual observations were carried out from the same observing site on mornings between 2 and 9 May, corresponding to $\lambda_\odot$ = 42-49° so as to bracket the peak at $\lambda_\odot$ ~45-46°. Weather conditions were clear throughout, allowing complete coverage of the intended period. Slight hindrance from the waning crescent Moon was experienced on the mornings of 2 to 4 May, on the latter morning the Moon being 20% illuminated and 16° below right of the radiant. After this date any interference from the Moon was negligible or absent. Observing conditions for each observing period were calibrated by measuring the limiting magnitude, which is the faintest star that could just be discerned by the naked eye. For all observing sessions, the number of eta-Aquariids were counted, along with other showers known to be active at the same time, and any meteor which could not be traced to any known radiants was recorded as sporadic.

Apart from the eta-Aquariids, activity was detected from the Anthelion radiants, including the alpha-Scorpiids, as well as the eta-Lyrids, beta-Aquariids and Daytime Arietids meteor showers. Zenithal hourly rates for the eta Aquariids were calculated for each observing period from

$$ZHR = \frac{N.F.r^{(6.5-LM)}}{T_{eff}\ .\sin(h)} \qquad (1)$$

N = number of eta-Aquariids observed,
F = factor correcting for obscuration by clouds etc.,
r = population index for the shower,
h = mean altitude of radiant above horizon
LM = limiting magnitude for the watch period,
T_{eff} = observing time in hours corrected for breaks.

The population index (r) is an estimation of how many more meteors of magnitude m+1 appear compared to magnitude m. For this article, r was assumed as 2.46 to enable comparison with previous work (see Egal et al 2020). Error bars were calculated for each observing period by dividing the calculated ZHR by the square root of the number of eta-Aquariids counted:

$$\Delta ZHR = ZHR/\sqrt{N} \qquad (2)$$

The mean solar longitude for the period of each observing session was determined using the SollongCalc app by Kristina Veljkovic. Finally, Zenithal Hourly Rates and their errors were plotted against solar longitude to give activity profiles.

Results

Observations were made in 20–30-minute periods, reduced to 15-minute periods for the morning of predicted maximum, as well as for the preceding and following mornings.

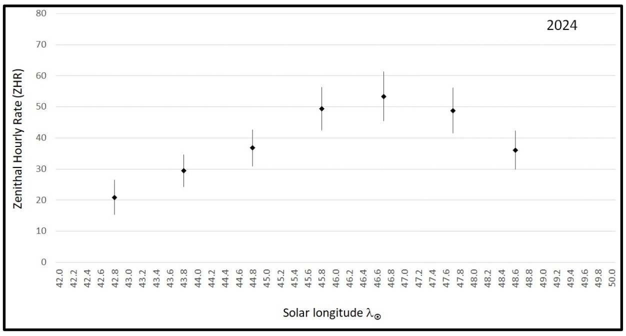


Fig 2: Rate profile for the eta-Aquariids in 2024.

The activity profile based on observations by the author during 2024 is shown in Figure 2 and shows the mean ZHR of all sessions during individual mornings. The activity shows a broad maximum peaking at ZHR = 53.4 ± 9.3 on the morning of 7 May, corresponding to $\lambda_\odot$ = 46.7 ± 0.9°. The rate for the morning of 6 May was however only slightly lower, and the actual peak may have occurred between these two mornings. The result is in good agreement with the global maximum from the VMDB, data from:

https://www.imo.net/members/imo_live_shower?shower=ETA&year=2024

accessed on 16 June 2024) of ZHR = 48.5 ± 6.7 at $\lambda_\odot$ = 45.7°, which assumed a population index r = 2.3. Normalising the VMDB rate to r = 2.46 gives a ZHR of 50.2 ± 6.9. Considering these results, no enhanced visual rates were observed in 2024 and the observed activity would again be considered as falling within the normal range.

Reducing the observing periods to 15-minute bins allows closer inspection of structure within the meteor stream. Figures 3 a-c. show rate profiles in bins of 0.01 $\lambda_\odot$ for the mornings of 6, 7 and 8 May 2024.

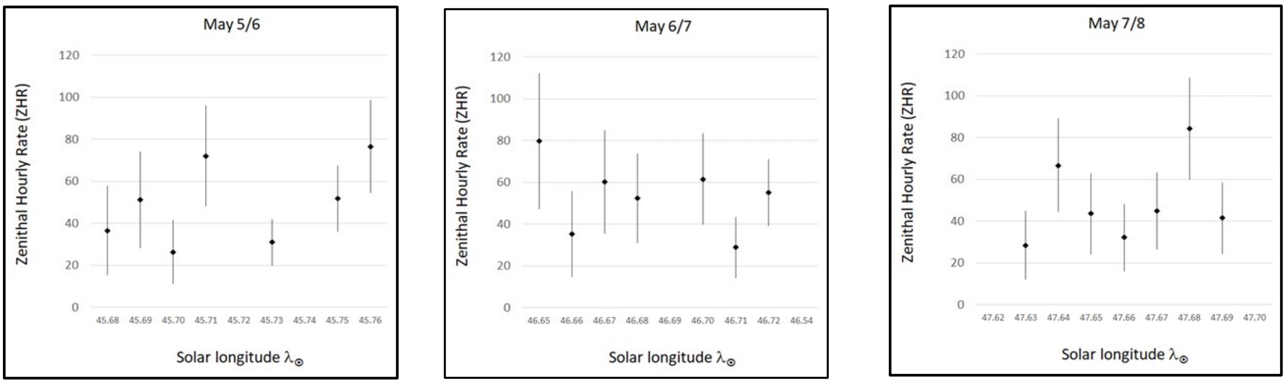


Figure 3 a-c Rate profiles for the mornings of 6-8 May. Bin size 0.01° solar longitude ($\lambda_\odot$).

It might be expected that observed meteor rates on each morning would increase as the radiant rises in altitude, with highest rates just before dawn when the radiant is at its highest elevation. The computation of the ZHR accounts for different radiant elevations by dividing by the sine of the radiant elevation. Considering a homogenous stream of particles, one might expect the rate profile should be fairly distributed about the mean ZHR for any individual morning. Inspection of Figure 3 however shows the rates to fluctuate considerably between these narrow bins in solar longitude, and the stream is found to show considerable inhomogeneity. By way of example, considering the morning of 6 May in Figure 3a, rates increased as expected from start of observing and reached ZHR = 72 for the 15 minutes centred on $\lambda_\odot$ = 45.71, decreasing to 31 at $\lambda_\odot$ = 47.73, and increasing again to 77 at $\lambda_\odot$ = 45.76 just before morning twilight halted observations. These rate fluctuations are also very evident in the observations on the morning of 8 May in Figure 3c, when the ZHR increased briefly to 84 at $\lambda_\odot$ = 47.68. In this bin, eleven eta-Aquariids were seen between 0252-0258 UT, with four observed in one minute at 0254 UT. No doubt the encounter with this briefly-higher particle flux elevated the mean ZHR for the morning of 7 May as seen from our unique observing location, and the presence or absence of these fluctuations, coupled with the short observing window before dawn must influence the determination of the exact date and time of maximum of the eta-Aquariids.

The magnitude of all meteors observed was estimated in comparison with stars of known brightness, and the magnitude distribution of all observed eta-Aquariids is shown in Figure 4. The difference (Δm) between the mean magnitude and the limiting magnitude for each observation period was determined and converted to the population index (r) using the method given in Rendtel and Arlt (2017). The population index is also related to the mass distribution index (s = 1 + 2.5 log(r)), which gives an indication of the size of particles which enter Earth's atmosphere.

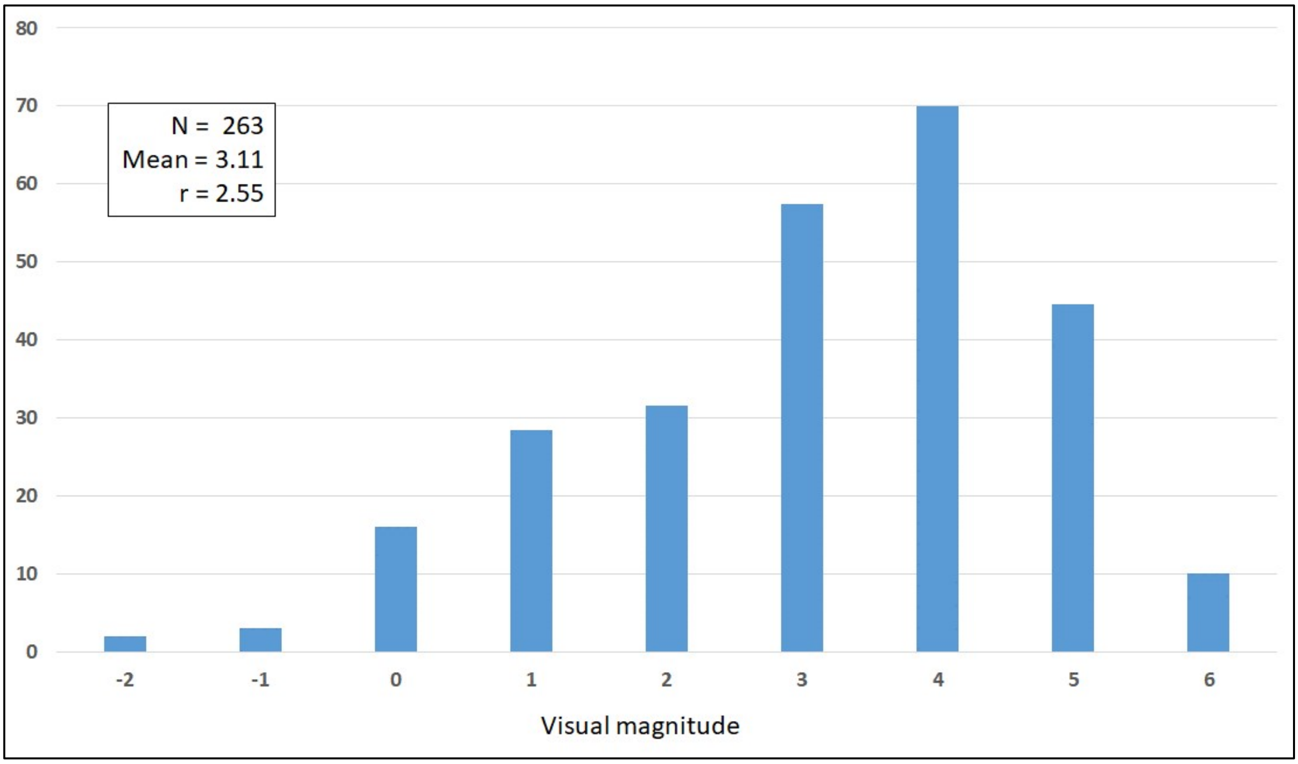


Fig 4: Magnitude distribution of all eta-Aquariids observed in 2024.

The aim was to draw conclusions as to whether any enhanced activity was accompanied by larger or smaller particles than normal, but seeing that no enhanced activity was observed, no conclusions could be made in this regard. Nevertheless, the observations gave a mean magnitude of 3.14, with r = 2.55 for N=263 eta-Aquariids, and the magnitude distribution shows a high number of magnitude 3 and 4 meteors. The mean magnitude is certainly fainter than in the years 2017 to 2021 (2.22, 2.70, 2.55, 2.18, 2.63 respectively), all years based on observations by the author (Cooper

2021). The mean magnitude in the outburst year 2013 was 2.24, with that for the mornings of 4 and 5 May being 1.86, possibly indicating slightly larger meteoroids were encountered just before the peak than after. The mean magnitude for all eta-Aquariids since the author started observing the shower more than three decades ago is 2.52 (N=2983). Considering these results, the eta-Aquariids appear to have shown a higher proportion of fainter meteors (smaller particle sizes) in 2024.

Conclusions

Highest activity from the 2024 eta-Aquariids was observed with ZHR = 53.4. This compares to the previous years of 51.2 in 2021, 53.8 in 2022 and 45.3 in 2023, noting that rates in the latter were conducted under conditions of full Moon. No enhanced rates were observed in either 2023 or 2024, and Zenithal Hourly Rates in both years are seen to be as normal. Considerable variability was found within a single morning's observations however, independent of radiant altitude, and probably caused by fluctuations in particle density within the stream over short timescales. The appearance of these fluctuations can significantly influence the average ZHR for any given morning due to the narrow observing window. The magnitude distribution in 2024 shows a preponderance of magnitude 3 and 4 eta-Aquariids, and the average shower member was probably fainter than normal.

The eta-Aquariids did not produce enhanced rates either last year or this, and any periodicity in their rates could not be confirmed. Clearly there is still much to learn about the eta-Aquariids, and with southern Africa favourably placed to observe, a call is made for more ASSA members to contribute observations of this important meteor shower.

Acknowledgements

I would like to convey my grateful thanks to Magda Streicher for her continued support and observing companionship over a period of many years. Her observations of the eta-Aquariids and other meteor showers are also included in the VMDB. Solar longitudes were calculated from the SollongCalc app by Kristina Veljkovic (Department of Probability and Statistics, Faculty of Mathematics, University of Belgrade, Serbia), accessed through the IMO webpage at https://www.imo.net/resources/solar-longitude-tables/.

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Colloquia

Colloquia and Seminars (now Webinars) form an important part of a research facility, often as a sort of pre-publication discussion or a discussion of an individual's current research, and as such it is virtually impossible to "publish" this material. However by recording the topics discussed in the form below does indicate to those, who are unable to attend, what current trends are and who has visited to do research: it keeps everyone 'in the loop' so to speak

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With the passing of CV19, these Colloquia and Seminars are returning slowly to their normal face-to-face format, but a spin-off from the pandemic is that Colloquia and Seminars are often Hybrid sessions. It has also meant that now these Webinars on interesting topics from around the globe! The editor however still focusses very much on sessions held locally, by South African astronomers or visitors to South Africa.

Title: NEVO: illuminating the dark cosmos
Speaker: Dr Farbod Hassani, Institute of Theoretical Astrophysics, University of Oslo
Date: 23 May 2024
Venue: UWC Room 1.35 and Zoom
Time: 11h00

Abstract: The Universe has entered an accelerating expansion phase in the last few billion years of its evolution, a phenomenon that is caused by the mysterious entity known as dark energy.

To understand the nature of dark energy, we must carefully investigate different candidates and observe how they affect the Universe at various stages. Then we may utilize data to select the best candidate. However, the consistent and accurate modelling of dark energy candidates has been largely neglected so far due to significant challenges, including the absence of relativistic N-body codes, the immense computational costs involved, and the limited availability of relevant data to date. To address this gap, we have proposed the development of a novel framework, called NEVO, that utilizes state-of-the-art "relativistic" N-body simulations along with the advanced Boltzmann codes, to accurately model dark energy candidates in both linear and non-linear scales.

In this presentation, I will go into detail about the recently awarded NEVO proposal and discuss its challenges in depth.

Title: Optical outflow signatures in outbursting dwarf novae
Speaker: Dr Yusuke Tampo Postdoc fellow at SAAO
Date: 6 June 2024
Venue: SAAO Auditorium
Time: 11h00

Abstract: Cataclysmic variables (CVs) are a close binary hosting an accreting white dwarf. Many high-state CVs exhibit disk wind signatures in their UV spectra. However, the impact of these outflows on optical spectra is still not well understood. We present the optical spectroscopic observations of the eclipsing dwarf nova V455 And during its outburst. At outburst maximum, this system displays strong Balmer and He II emission lines whose cores are much narrower than expected for lines formed in a Keplerian disk. In addition, these lines are characterised by the lack of detectable radial velocities and the steady line profiles during the eclipses, suggesting disk wind origin overall. We also find that disk wind models similar to those used to describe UV observations can reproduce this type of spectrum, but only if the wind is highly mass-loaded and/or clumpy. We finally discuss that optically thick disk winds provide a promising framework for explaining multiple observational signatures in V455 and high-state CVs

Title: 21cm Cosmology: tracing neutral hydrogen across cosmic time
Speaker: Dr. Marta Spinelli Observatoire de la Côte d'Azur (OCA)
Date: 15 March 2024
Venue: UKZN
Time: 15h00

The **Astronomical Society of Southern Africa** (ASSA) was formed in 1922 by the amalgamation of the Cape Astronomical Association (founded 1912) and the Johannesburg Astronomical Association (founded 1918). It is a body consisting of both amateur and professional astronomers.

Publications: The Society publishes its electronic journal, the *Monthly Notes of the Astronomical Society of Southern Africa (MNASSA)* bi-monthly, the annual *Sky Guide Southern Africa*.

Membership: Membership of the Society is open to all. Potential members should consult the Society's web page : https://assa.saao.ac.za for details. Joining is possible via one of the local Centres or as a Country Member.

Local Centres: Local Centres of the Society exist at Bloemfontein, Cape Town, Durban, Hermanus, Johannesburg, Pretoria and the Garden Route Centre; membership of any of these Centres automatically confers membership of the Society.

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Volume 83 Nos 5-6 **June 2024**

Table of Contents