June 2023

ALPO Comet News

A Publication of the Comets Section of the Association of Lunar and Planetary Observers

40 Years and 1 Month Ago…
C/1983 H1 (IRAS-Araki-Alcock)

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On the Front Cover:

John D. Sabia photographed C/1983 H1 (IRAS-Araki-Alcock) on 1983 May 9. The 1983 apparition of IRAS-Araki-Alcock was the closest known approach of a long-period comet to Earth at 0.0312 au. John's image was taken 2 days before close approach when the comet was being reported at 2nd to 3rd magnitude.

The monthly ALPO Comet News PDF can be found on the ALPO Comets Section website (http://www.alpo-astronomy.org/cometblog/). A shorter version of this report is posted on a dedicated Cloudy Nights forum (https://www.cloudynights.com/topic/878707-alpo-comet-news-for-june-2023/) All are encouraged to join the discussion over at Cloudy Nights. The ALPO Comets Section welcomes all comet-related articles, observations, images, drawings, magnitude estimates, or spectra. One does not have to be a member of ALPO to submit material, though membership is appreciated.

Please send your observations to the Comets Section at < comets@alpo-astronomy.org >, Coordinator Carl Hergenrother < carl.hergenrother@alpo-astronomy.org >, and/or Acting Assistant Coordinator Michel Deconinck < michel.deconinck@alpo-astronomy.org >.

To learn more about the ALPO, please visit us @ http://www.alpo-astronomy.org.

Summary

May was a quiet month for comet watchers as the sky was lacking in bright or even semi-bright comets. June should bring some improvement. C/2020 V2 (ZTF), which has been around magnitude 9.0 to 9.5 for most of the year, is again visible after passing solar conjunction. C/2021 T4 (Lemmon) and C/2023 E1 (ATLAS) are expected to start the month at 10th magnitude and reach magnitude 9 by the end of the month. C/2021 T4 (Lemmon) is primarily an object for southern hemisphere observers, while C/2023 E1 (ATLAS) is a northern-only object.

Last month the ALPO Comets Section received 60 magnitude estimates and images/sketches of comets C/2023 E1 (ATLAS), C/2023 A3 (Tsuchishan-ATLAS), C/2021 T4 (Lemmon), C/2020 K1 (PANSTARRS), C/2019 U5 (PANSTARRS), C/2019 T4 (ATLAS), C/2019 L3 (ATLAS), C/2017 K2 (PANSTARRS), 364P/PANSTARRS, 263P/Gibbs, 237P/LINEAR, 199P/Shoemaker, 133P/Elst-Pizarro, 130P/McNaught-Hughes, 99P/Kowal, 96P/Machholz, 81P/Wild, 219P/LINEAR, 103P/Hartley, 80P/Peters-Hartley, 77P/Longmore, 71P/Clark, and 12P/Pons-Brooks. A big thanks to our May contributors: J. J. Gonzalez, Jose Guilherme de Souza Aguiar, Carl Hergenrother, John Maikner, and Chris Wyatt.

Request for Observations

As always, the Comet Section is happy to receive all comet observations, whether textual descriptions, images, drawings, magnitude estimates, or spectra. Please send your observations via email to the Comets Section < comets @ alpo-astronomy . org >, Comets Section Coordinator Carl Hergenrother < carl.hergenrother @ alpo-astronomy . org > and/or Comets Section Acting Assistant Coordinator Michel Deconinck < michel.deconinck @ alpo-astronomy . org >.

Photometric Corrections to Magnitude Measurements

We include up-to-date lightcurves for the comets discussed in these reports and apply aperture and personal corrections to the visual observations and only personal corrections to digital observations. All magnitude estimates are affected by many factors, including instrumental (aperture, focal length, magnification, type of optics), environmental (sky brightness due to moonlight, light pollution, twilight, aurora activity, zodiacal light, etc.), cometary (degree of condensation, coma color, strength and type of gas emission lines, coma-tail interface) and personal (sensitivity to different wavelengths, personal technique, observational biases). The first

correction used here corrects for differences in aperture [Charles S. Morris, On Aperture Corrections for Comet Magnitude Estimates. Publ Astron Soc Pac 85, 470, 1973]. Visual observations are corrected to a standard aperture of 6.78 cm by 0.019 magnitudes per centimeter for refractors and 0.066 magnitudes per centimeter for reflectors. After applying the aperture correction and if a sufficient number of visual observations are submitted for a particular comet, we also determine personal corrections for each observer for each comet; for digital observations, only a personal correction is applied. A single observer submitting both visual and digital magnitude measurements may also have separate corrections for each observing method. If the magnitudes shown in the text don't match those plotted in the lightcurves, it is because of the application of these corrections.

Acknowledgments

In addition to observations submitted directly to the ALPO, we occasionally use data from other sources to augment our analysis. Therefore, we acknowledge with thanks observations submitted directly to the ALPO and those submitted initially to the International Comet Quarterly, Minor Planet Center, and COBS Comet Observation Database. In particular, we have been using observations submitted to the COBS site by Thomas Lehmann for our analysis, so we would like to thank Thomas for his COBS observations. We would also like to thank the Jet Propulsion Laboratory for making their Small-Body Browser and Orbit Visualizer available and Seiichi Yoshida for his Comets for Windows programs that produced the lightcurves and orbit diagrams in these pages. And last but not least, we'd like to thank Syuichi Nakano and the Minor Planet Center for their comet orbit elements, the asteroid surveys and dedicated comet hunters for their discoveries, and all of the observers who volunteer their time to add to our knowledge of these fantastic objects.

Thank you to everyone who contributed to the ALPO Comets Section!

Clear skies!
- Carl Hergenrother

Comets Calendar

Lunar Phases

June 03 - Full Moon
June 10 - Last Quarter Moon
June 17 - New Moon
June 26 - First Quarter Moon

Comets at Perihelion

Jun 10 - C/2021 Q4 (Fuls) [q = 7.56 au, V ~ 17-18]
Jun 15 - 72P/Denning-Fujikawa [q = 0.78 au, 9.0-yr period, V ~ 15-16, bright visual discoveries in 1881 and 1978, both years in outburst, also seen though fainter in 2014 and now 2023]
Jun 22 - C/2022 W3 (Leonard) [q = 1.40 au, V ~ 13-14]
Jun 28 - 121P/Shoemaker-Holt [q = 3.73 au, 9.8-yr period, V ~ 20, discovered in 1988, 5th observed return, perihelion increased from 2.65 to 3.75 au in 2008, close to Sun at perihelion]
Jun 28 - C/2023 F1 (PANSTARRS) [q = 1.71 au, V ~ 18-19, peaked in April at V ~ 16-17]

Photo Opportunities

Jun 01-03 - C/2023 E1 (ATLAS) within ~30' of 10th mag galaxy NGC 4236
Jun 11-12 - C/2023 E1 (ATLAS) within ~30' of 11th mag galaxy NGC 4750
Jun 12 - C/2023 A3 (Tsuchinshan-ATLAS) passes between 11-13th mag galaxies NGC 5574, 5576, and 5577 as well as 30' south of impressive galaxy triplet, NGC 5560, 5566, and 5569

Recent Magnitudes Contributed to the ALPO Comets Section

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA Dia	DC	TAIL LENG	PA	ICQ CODE	Observer Name
C/2023 E1 (ATLAS)												
2023E1	2023 05 12.94	S 10.8	TK	20.3T10		77	7	1/			ICQ XX GON05	Juan Jose Gonzalez Suarez
C/2023 A3 (Tsuchinshan-ATLAS)												
2023A3	2023 05 18.10	C 16.7	BG	30.5H	4A500						ICQ XX MAIab	John Maikner
2023A3	2023 05 16.97	V 16.9	U4	50.0Y	7a480		0.4		6.0m	120	ICQ xx HER02	Carl Hergenrother
C/2021 T4 (ZTF)												
2021T4	2023 05 23.80	Z 11.0	U4	10.6R	5a480		8.5				ICQ xx HER02	Carl Hergenrother
2021T4	2023 05 20.33	M 13.2	AQ	30.0L	5	121	1	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2021T4	2023 05 18.32	M 13.4	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2020 K1 (PANSTARRS)												
2020K1	2023 05 23.46	xM 12.5	AQ	40.0L	4	108	1.7	4			ICQ XX WYA	Christopher Wyatt
2020K1	2023 05 20.28	M 12.1	AQ	30.0L	5	100	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 05 19.30	M 12.2	AQ	30.0L	5	100	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 05 18.29	M 12.2	AQ	30.0L	5	100	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 05 13.29	M 12.4	AQ	30.0L	5	100	2	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 05 12.28	M 12.4	AQ	30.0L	5	100	2	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 05 02.29	M 12.5	AQ	30.0L	5	121	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2019 U5 (PANSTARRS)												
2019U5	2023 05 23.43	xM 13.7	AQ	40.0L	4	182	0.7	6	3	m 68	ICQ XX WYA	Christopher Wyatt
2019U5	2023 05 20.99	M 13.2	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 17.99	M 13.2	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 16.98	M 13.1	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 15.99	M 13.1	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 14.99	M 13.0	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 13.99	M 13.0	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 12.99	M 12.9	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 05 12.92	S 11.5	AQ	20.3T10		77	2	3/			ICQ XX GON05	Juan Jose Gonzalez Suarez
2019U5	2023 05 11.99	M 12.9	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2019 T4 (Lemmon)												
2019T4	2023 05 23.45	xM 13.3	AQ	40.0L	4	59	2	6			ICQ XX WYA	Christopher Wyatt
2019T4	2023 05 20.25	M 13.7	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019T4	2023 05 18.25	M 13.7	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2019 L3 (ATLAS)												
2019L3	2023 05 23.42	xM 12.7	AQ	40.0L	4	182	1	4/			ICQ XX WYA	Christopher Wyatt
2019L3	2023 05 20.99	M 13.6	AQ	30.0L	5	121	1	2/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 17.98	M 13.5	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 16.97	M 13.5	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 15.98	M 13.4	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 14.98	M 13.4	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 13.98	M 13.3	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 12.99	M 13.3	AQ	30.0L	5	121	1	2/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019L3	2023 05 11.98	M 13.2	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2017 K2 (PANSTARRS)												
2017K2	2023 05 01.93	xM 10.3	TK	30.0L	5	58	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
364P/PANSTARRS												
364	2023 05 20.31	M 12.9	AQ	30.0L	5	100	1	2			ICQ XX DES01	Jose Guilherme de Souza Aguiar
364	2023 05 19.31	M 12.7	AQ	30.0L	5	100	1	2/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
364	2023 05 18.30	M 12.7	AQ	30.0L	5	100	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
364	2023 05 13.31	M 12.6	AQ	30.0L	5	100	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
364	2023 05 12.31	M 12.6	AQ	30.0L	5	121	2	2/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
364	2023 05 02.30	M 12.4	AQ	30.0L	5	121	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
263P/Gibbs												
263	2023 05 18.08	C 18.8	BG	30.5H	4A500						ICQ XX MAIab	John Maikner
263	2023 05 11.07	C 19.1	BG	30.5H	4a900						ICQ XX MAIab	John Maikner
237P/LINEAR												
237	2023 05 20.28	M 13.3	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
237	2023 05 18.28	M 13.3	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
237	2023 05 13.28	M 13.4	AQ	30.0L	5	121	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
237	2023 05 02.29	M 13.4	AQ	30.0L	5	121	1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
219P/LINEAR												
219	2023 05 26.25	C 17.6	BG	30.5H	4A740						ICQ XX MAIab	John Maikner
219	2023 05 25.26	C 18.6	BG	30.5H	4C000						ICQ XX MAIab	John Maikner
103P/Hartley												
103	2023 05 18.34	C 19.2	BG	30.5H	4C600						ICQ XX MAIab	John Maikner
80P/Peters-Hartley												
80	2023 05 26.34	C 18.9	BG	30.5H	4A020						ICQ XX MAIab	John Maikner

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77P/Longmore
 77        2023 05 23.44 xM 14.3 AQ 40.0L 4 182   1.4  5/           ICQ XX WYA   Christopher Wyatt
 77        2023 05 14.07  M 14.0 AQ 30.0L 5 121        4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
 77        2023 05 13.08  M 13.9 AQ 30.0L 5 121        4/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
71P/Clark
 71        2023 05 20.31  M 13.7 AQ 30.0L 5 121   1    2/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
 71        2023 05 18.31  M 13.5 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
 71        2023 05 02.30  M 13.3 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
12P/Pons-Brooks
 12        2023 05 25.23  C 17.8 BG 30.5H 4A560                     ICQ XX MAIab John Maikner
 12        2023 05 11.22  C 17.4 BG 30.5H 4B400                     ICQ XX MAIab John Maikner
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New Discoveries, Recoveries, and Other Comets News

New Periodic Comet Numberings

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460P/2016 BA14 = P/2020 U6 (PANSTARRS)       MPC 162027
459P/2010 VH95 (Catalina)                    MPC 162027
458P/2023 C1 = P/2016 C3 (Jahn)              MPC 162027
457P/2020 O1 = P/2016 N7 (Lemmon-PANSTARRS)  MPC 162027
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New Discoveries and Recoveries

C/2023 H3 (PANSTARRS) – Pan-STARRS found the 20th-21st magnitude comet on 2023 April 28 with their Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala. Perihelion is next year on February 18 at 5.23 au. With an orbital period of 50 years and aphelion at 22 au, its orbit ranges from Jupiter's to just beyond Uranus's. S. Nakano notes in CBET 5267 that the comet may have passed within 0.005 au of Uranus in November 1938 though the exact close approach distance is still uncertain. [CBET 5267, MPEC 2023-K195]

C/2023 H2 (Lemmon) – The Mount Lemmon Survey discovered C/2023 H2 (Lemmon) as an asteroidal object on 2023 April 23 at 20-21st magnitude. The latest Comet Lemmon could become a nice small telescope object thanks to a small perihelion and close approach to Earth. Perihelion will be on 2023 October 29, at 0.89 au, and closest approach to Earth 2 weeks later on November 10 at 0.19 au. During that time, the comet will be a northern hemisphere object located north of the Sun moving from the morning into the evening sky.

Currently around 19th magnitude, a conservative 2.5n = 8 brightening trend brings the comet to around 10th magnitude. Since it is dynamically old with an orbital period of ~4000 years, it may brighten even faster, resulting in a brighter peak magnitude. This is one to keep an eye, or detector, on. [CBET 5264, MPEC 2023-K122]

C/2023 H1 (PANSTARRS) – This large perihelion object (q = 4.44 au) was found by the Pan-STARRS survey on 2023 April 17 at 20th magnitude with their Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala. Perihelion occurs on 2024 November 27, though the comet shouldn't become much brighter than 18th magnitude. [CBET 5256, MPEC 2023-J101]

C/2023 F2 (SOHO) – Hanjie Tan found A new Meyer-group comet in public SOHO C3 coronagraph images. C/2023 F2 (SOHO) was observed for half a day on 2023 March 21, when it reached a peak brightness around magnitude 5.5. Perihelion was on the same day it was discovered at 0.034 au. [CBET 5261, MPEC 2023-K46]

C/2022 V2 (Lemmon) – The Mount Lemmon Survey also discovered C/2022 V2. Another apparently asteroidal object at discovery, C/2022 V2 was found on 2022 November 2 at 20-21st magnitude. More recent observations found evidence of cometary activity resulting in its announcement on May 24. C/2022 V2 has a perihelion on 2023 November 1, at 2.06 au, and a relatively short orbital period, at least for a long-period comet, of ~220 years.

It should reach a peak brightness of around 15th magnitude in January 2024 when it comes within 1.6 au of Earth. Like C/2023 H2, it may also brighten faster than expected based on its dynamically old orbit. [CBET 5263, MPEC 2023-K121]

C/2019 M4 (TESS) – A comet observed by the Transiting Exoplanet Survey Satellite (TESS) between 2019 June 27 and July 17 was reported to the MPC in June 2022. Sam Deen found several images of this comet in

publicly available archival images between 2019 July 19 and December 22 with the Cerro Tololo 4-m telescope and DECam instrument. During 2019, C/2019 M4 was a far southern object with perihelion on 2019 September 13 at a very distant 9.18 au. It peaked at 18-19th magnitude at that time. [CBET 5257, MPEC 2023-J102]

C/2018 HT3 (NEOWISE) – Near-Earth asteroid 2018 HT3 was discovered by the Near-Earth Object Wide-field Infrared Survey Explorer (or NEOWISE) spacecraft on 2018 April 22. Observations from 2018 showed no evidence of cometary activity. The first sign of 2018 HT3's activity was made by Robert Matson of Irvine, CA, who detected an 11th magnitude comet in public hydrogen Lyman-alpha images obtained during 2023 April 5-16 with the Solar Wind Anisotropies (SWAN) camera on the Solar and Heliospheric Observer (SOHO) spacecraft. Additional images from 2022 and 2012 (which also showed cometary activity) were also identified.

C/2018 HT3 was at perihelion on 2023 March 29, at 0.52 au. It has a 5.13-year orbital period and will be next at perihelion on 2028 May 15. [CBET 5252]

P/2014 OL465 (PANSTARRS) – Another example of an object discovered years ago but not recognized as a comet is P/2014 OL465 (PANSTARRS), found on 2014 July 25 at 21st magnitude. Cometary activity was first noted in images taken by the "Asteroid Terrestrial-Impact Last Alert System" (ATLAS) search program's 0.5-m f/2 Schmidt reflector at Rio Hurtado, Chile, on 2023 February 1 and 3. The comet has a 10.2-year orbital period and arrived at perihelion on 2023 February 28, at 3.37 au. It is currently fading from its peak at 17-18th magnitude. [CBET 5262, MPEC 2023-K66]

C/1951 G2 = C/1952 C1 (Groeneveld-Palomar) – Two months ago, we reported on new observations of two X/ comets, C/1951 G1 (Groeneveld) and C/1971 G1 (Edwards) due to the sleuthing work of Maik Meyer and former ALPO Comets Section coordinator Gary Kronk during their research for their two-volume "Catalogue of Unconfirmed Comets" books.

Last month, they announced further observations of two more X/ comets. The first, C/1951 G2 = C/1952 C1 (Groeneveld-Palomar), links two X/comets. X/1951 G2 was found by Ingrid Groeneveld on plates taken on 1951 April 9, with the 0.25-m Ross-Fecker telescope at McDonald Observatory but not reported till 1954. X/1952 C1 was reported in 1978 after R. Weinberger found the comet on two plates taken during the first Palomar Observatory Sky Survey. Maik Meyer found four more nights of observations from McDonald Observatory.

C/Groeneveld-Palomar appears to be a long-period comet that arrived at perihelion on 1950 July 11 at 3.64 au. It peaked around magnitude 13, though that is based on photographs meaning it may have been brighter visually. [CBET 5254]

C/1808 R1 (Pons) – The second X/ comet to be elevated to the ranks of C/ comets is quite an old find. Nearly 215 years ago, Jean-Louis Pons reported the discovery of a 9th magnitude comet on 1808 September 11. While not widely known then, Pons observed his new find on seven nights between September 11 and 18. Based on his positions, a rough orbit finds C/1808 R1 to be a long-period comet with perihelion on 1808 September 14 at 1.06 au. [CBET 5258]

Comets Brighter than Magnitude 10

C/2023 E1 (ATLAS)

Discovered 2023 March 1 by the Asteroid Terrestrial-Impact Last Alert System program from Sutherland, South Africa.
Halley-family comet

Orbit (from Minor Planet Center, MPEC 2023-L10)

```
    C/2023 E1 (ATLAS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 July 1.10677 TT                                  Rudenko
q   1.0265966            (2000.0)            P               Q
n   0.01157824      Peri.  105.89375     +0.06328297     +0.98427862
a  19.3511899       Node   164.57537     -0.97142785     +0.02288113
e   0.9469492       Incl.   38.31469     +0.22874266     -0.17513437
P  85.1
From 836 observations 2022 Dec. 25-2023 June 1, mean residual 0".4.
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Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

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C/2023 E1 (ATLAS)                                                    Max El
                                                                     (deg)
    Date       R.A.   Decl.      r       d    Elong  Const  Mag  40N  40S
2023-Jun-01  12 20  +68 56   1.139   0.757    78E   Dra  10.2   59    0
2023-Jun-06  12 28  +70 51   1.106   0.748    76E   Dra   9.9   56    0
2023-Jun-11  12 40  +72 43   1.079   0.734    74E   Dra   9.6   54    0
2023-Jun-16  12 57  +74 34   1.056   0.718    72E   Dra   9.4   52    0
2023-Jun-21  13 20  +76 22   1.040   0.697    72E   Cam   9.2   51    0
2023-Jun-26  13 53  +78 04   1.030   0.673    71E   UMi   9.0   50    0
2023-Jul-01  14 39  +79 33   1.027   0.646    72E   UMi   8.9   50    0
2023-Jul-06  15 43  +80 32   1.030   0.616    73E   UMi   8.8   49    0
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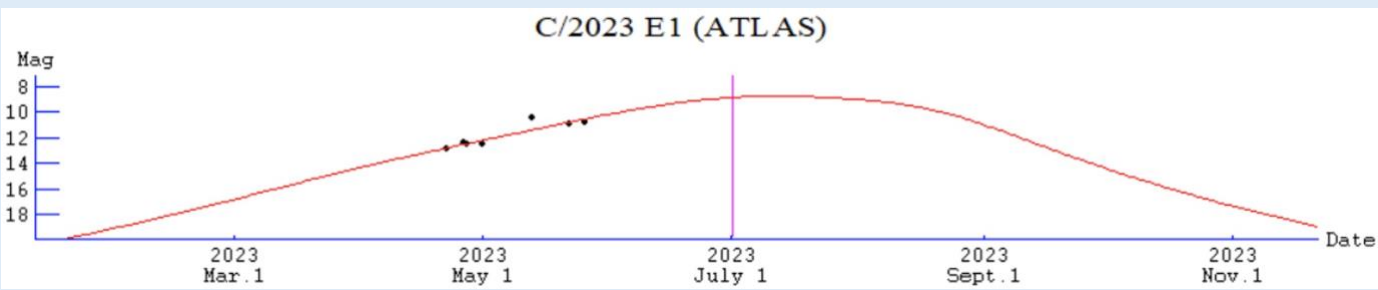
Comet Magnitude Formula (from ALPO and COBS data)

```
m1 = 11.4 + 5 log d + 10.0 log r [assumed]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

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Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
                (UT)                    T         Dia  DC  LENG  PA
   2023E1  2023 05 12.94  S 10.8 TK 20.3T10  77   7    1/          ICQ XX GON05 Juan Jose Gonzalez Suarez
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The "Asteroid Terrestrial-Impact Last Alert System" (ATLAS) program discovered C/2023 E1 (ATLAS) at 18th magnitude on 2023 March 1, with their 0.5-m f/2 Schmidt reflector at Sutherland, South Africa. C/2023 E1 is a Halley family comet with a perihelion on 2023 July 1 at 1.03 au and an orbital period of 85.1 years. The comet will pass 0.37 au from Earth a few weeks after perihelion on August 18.

As is typical with Halley family comets, C/2023 E1 is brightening rapidly and should start June at magnitude 10.2 and 8.9 by the end of the month, which should be close to its peak brightness. E1 is a northern-only object moving through Draco (Jun 1-17), Ursa Minor (17-20), Camelopardalis (20-23), and Ursa Minor (23-30).

An image taken on May 13 by Eliot Herman with the iTelescopes T2 0.15-m refractor shows the comet to be primarily a gassy object with a diffuse coma and no sign of a tail.

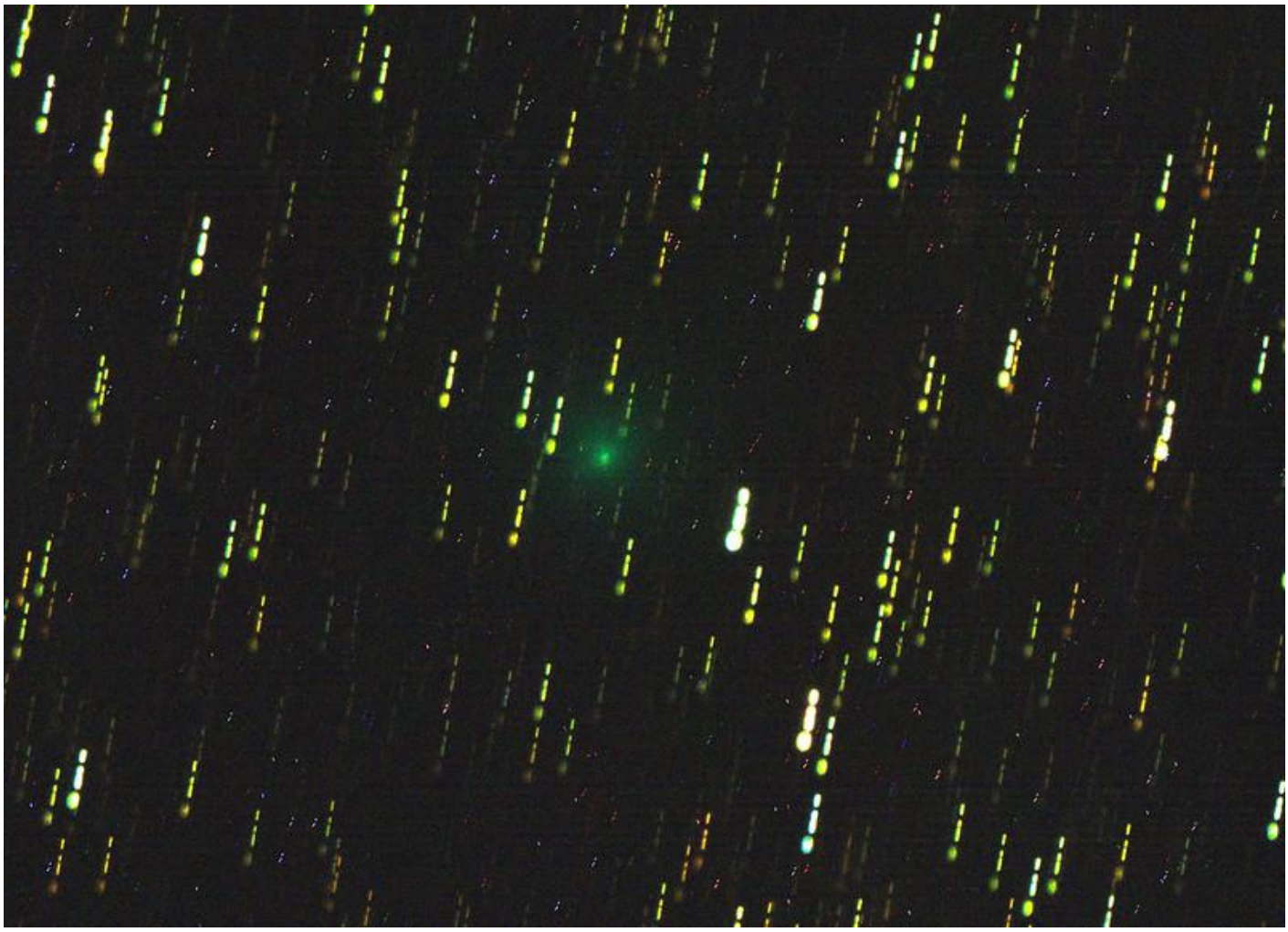


Figure 1: Eliot Herman (Tucson, AZ) imaged C/2023 E1 (ATLAS) on 2023 May 13 with the iTelescopes T2 150mm refractor.

C/2021 T4 (Lemmon)

Discovered 2021 October 7 by the Mount Lemmon Survey
Dynamically new long-period comet

Orbit (from Minor Planet Center, MPEC 2023-L10)

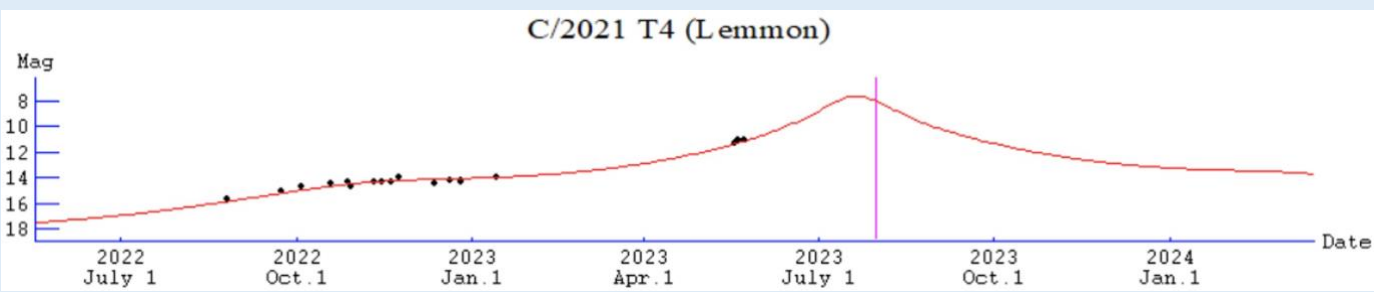
```
    C/2021 T4 (Lemmon)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 July 31.51595 TT                                   Rudenko
q   1.4832958            (2000.0)            P                Q
z  -0.0000316       Peri.  329.80237     +0.28277720     -0.90355268
 +/-0.0000020       Node   257.87357     -0.80094123     -0.40708989
e   1.0000469       Incl.  160.77598     -0.52775960     +0.13368015
From 1197 observations 2021 Aug. 7-2023 June 1, mean residual 0".5.
1/a(orig) = +0.000007 AU**-1, 1/a(fut) = +0.000950 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2021 T4 (Lemmon)                                                Max El
                                                                   (deg)
    Date       R.A.   Decl.     r       d    Elong  Const  Mag  40N  40S
2023-Jun-01  00 43  -13 55   1.706   1.829    66M   Cet  10.7    0   48
2023-Jun-06  00 42  -15 02   1.673   1.677    72M   Cet  10.5    0   53
2023-Jun-11  00 39  -16 28   1.642   1.523    77M   Cet  10.2    1   58
2023-Jun-16  00 36  -18 20   1.614   1.366    83M   Cet   9.9    4   63
2023-Jun-21  00 30  -20 47   1.588   1.208    90M   Cet   9.6    6   68
2023-Jun-26  00 22  -24 04   1.564   1.053    98M   Cet   9.2    8   74
2023-Jul-01  00 08  -28 33   1.543   0.902   106M   Scl   8.8   10   79
2023-Jul-06  23 45  -34 39   1.525   0.764   117M   Scl   8.4    9   85
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  7.5 + 5 log d +  8.3 log r [Since perihelion, assumed]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
               (UT)                    T          Dia  DC  LENG  PA
   2021T4  2023 05 23.80  Z 11.0 U4 10.6R 5a480   8.5               ICQ xx HER02 Carl Hergenrother
   2021T4  2023 05 20.33  M 13.2 AQ 30.0L 5 121   1    4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2021T4  2023 05 18.32  M 13.4 AQ 30.0L 5 121   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

C/2021 T4 (Lemmon) may be vying with C/2023 E1 for the title of the brightest comet of June. After spending most of 2023 too close to the Sun for observation, observations in May suggest the comet may still be brightening at a steady rate of 2.5n ~ 8.3. C/2021 T4 (Lemmon) was found with the Mt Lemmon 1.5-m on 2021 October 7 at 20th magnitude and is still inbound to a July 31 perihelion at 1.48 au. It will come closest to Earth a week or two before that (July 20 at 0.54 au).

Assuming it continues its recent brightness trend, C/2021 T4 should start June around magnitude 10.7 and brighten to 8.8 by the end of the month. The opposite of C/2023 E1, T4 is a better southern object as it moves through the morning constellations of Cetus (Jun 1-26) and Sculptor (26-30).

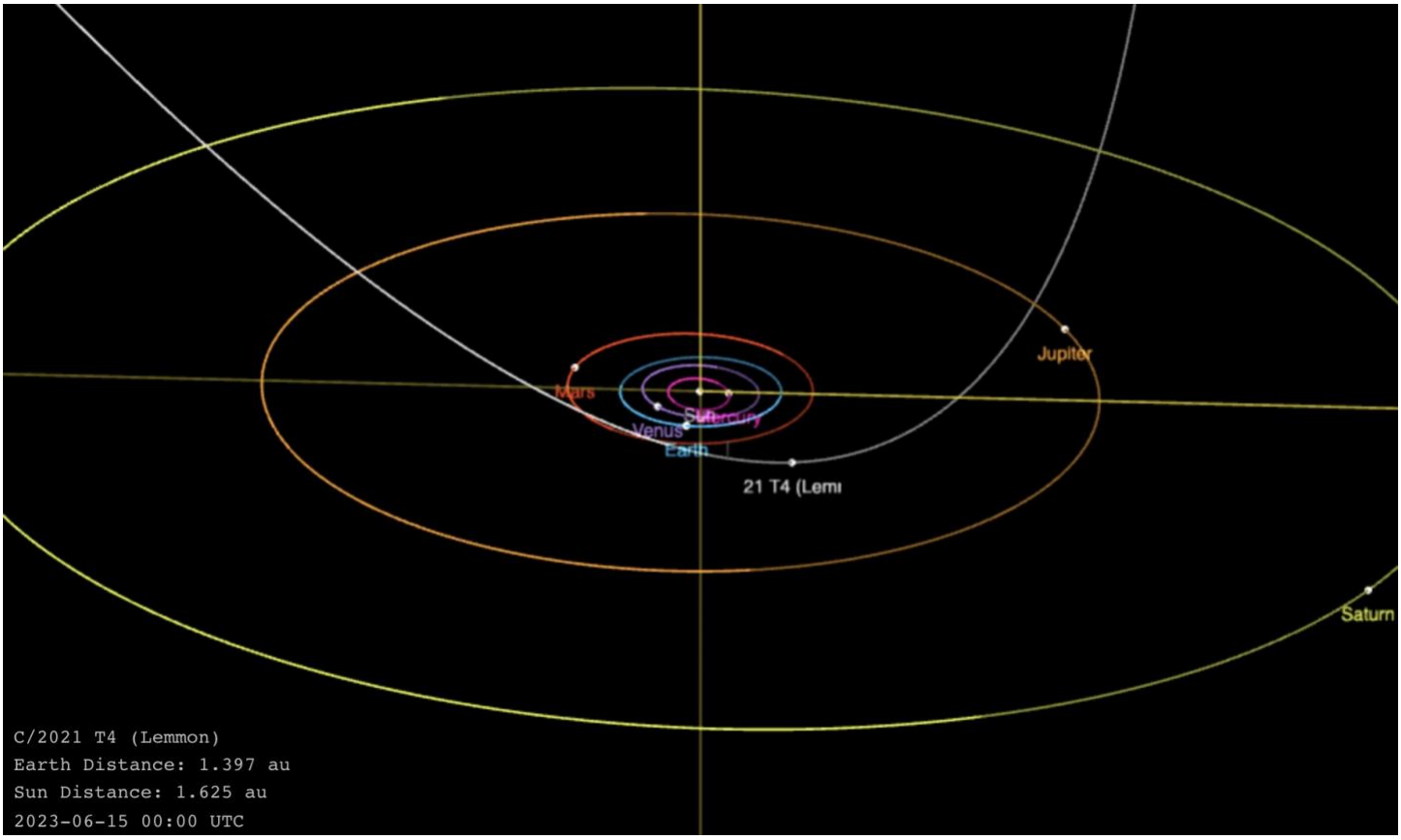


Figure 2: Orbit of C/2021 T4 (Lemmon). Position valid for 2023 June 15. Diagram produced with the JPL Small-Body Orbit Viewer. Not sure why the comet is labeled as '21 T4 (Lem)'.

C/2020 V2 (ZTF)

Discovered 2020 November 2 by the ZTF survey
Dynamically new long-period comet

Orbit (from Minor Planet Center, MPEC 2023-K136)

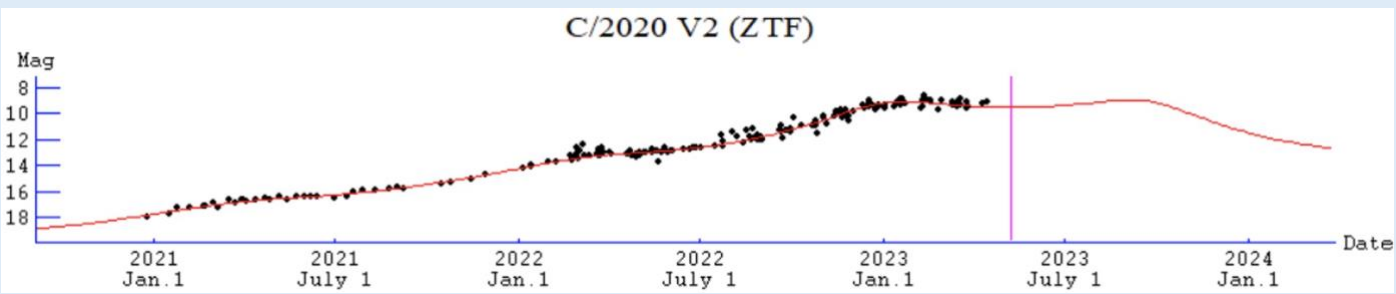
```
    C/2020 V2 (ZTF)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 8.56972 TT                                    Rudenko
q   2.2278426            (2000.0)            P               Q
z  -0.0004176      Peri.  162.43151     +0.69787219     +0.59390403
 +/-0.0000002      Node   212.37212     +0.53387550     -0.05876962
e   1.0009304      Incl.  131.61090     +0.47744252     -0.80238652
From 4333 observations 2020 Apr. 18-2023 Apr. 18, mean residual 0".5.
1/a(orig) = -0.000142 AU**-1, 1/a(fut) = -0.000380 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2020 V2 (ZTF)                                                    Max El
                                                                    (deg)
    Date       R.A.   Decl.     r       d    Elong  Const  Mag  40N  40S
2023-Jun-01  02 55  +21 02   2.244   3.145    22M   Ari   9.5    0    0
2023-Jun-06  02 58  +20 09   2.252   3.109    26M   Ari   9.5    0    4
2023-Jun-11  03 00  +19 14   2.261   3.066    31M   Ari   9.5    0    8
2023-Jun-16  03 03  +18 15   2.272   3.018    35M   Ari   9.5    1   12
2023-Jun-21  03 05  +17 14   2.283   2.963    40M   Ari   9.4    3   15
2023-Jun-26  03 07  +16 09   2.297   2.903    44M   Ari   9.4    6   19
2023-Jul-01  03 09  +14 59   2.311   2.837    49M   Ari   9.4    9   23
2023-Jul-06  03 10  +13 44   2.327   2.767    54M   Ari   9.4   13   26
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 = -1.4 + 5 log d + 15.9 log r [up to T-580 days
m1 =  3.2 + 5 log d + 10.1 log r [between T-580 and T-220 days]
m1 =  4.0 + 5 log d +  8.6 log r [T-220 days and onward, assumed]
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
                (UT)                    T         Dia  DC  LENG  PA
None
```

C/2020 V2 (ZTF) will likely be another comet brighter than 10th magnitude in June. But it will be a difficult object for many observers as it is slowly climbing higher in the morning sky after solar conjunction.

Though only a month from its May 8 perihelion at 2.23 au, being near solar conjunction means it is currently a somewhat distant 3.1 to 2.8 au from Earth in June. Southern hemisphere observers should reacquire V2 during the first half of the month. Northern observers may need to wait till the second half of the month. The comet will be around magnitude 9.4 to 9.5 in Aries all month. It should continue to slowly brighten by another few tenths of a magnitude through September of this year.

Comets Between Magnitude 10 and 12

C/2017 K2 (PANSTARRS)

Discovered 2017 May 21 by the Pan-STARRS survey with the Pan-STARRS1 1.8-m on Haleakala
Dynamically ??? long-period comet

Orbit (from Minor Planet Center, MPEC 2023-H131)

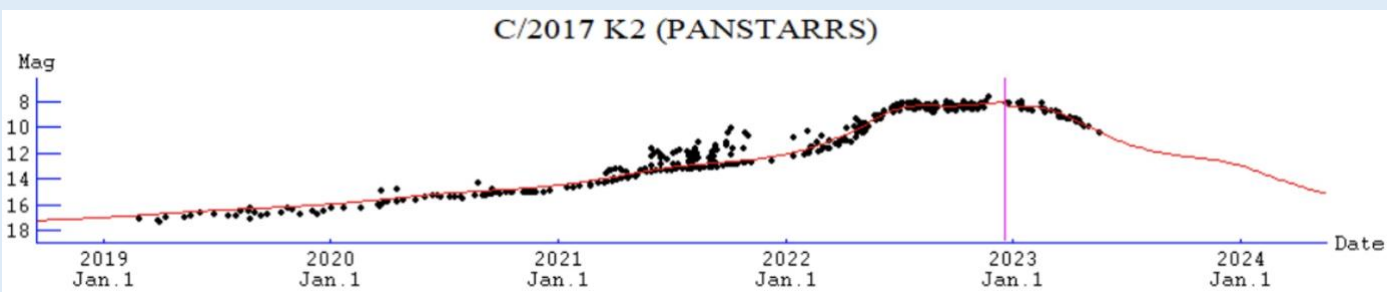
```
    C/2017 K2 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2022 Dec. 19.68872 TT                                  Rudenko
q   1.7968936            (2000.0)            P                Q
z  -0.0004373      Peri.  236.20152     +0.01818934     +0.04921873
 +/-0.0000001      Node    88.23602     -0.18087333     +0.98247050
e   1.0007857      Incl.   87.56336     -0.98333819     -0.17980330
From 11224 observations 2015 Nov. 23-2022 Sept. 27, mean residual 0".5.
1/a(orig) = +0.000059 AU**-1, 1/a(fut) = +0.001150 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2017 K2 (PANSTARRS)                                              Max El
                                                                    (deg)
    Date       R.A.   Decl.      r       d    Elong  Const  Mag  40N  40S
2023-Jun-01  05 25  -16 31   2.695   3.384    40E   Lep  10.7    0   17
2023-Jun-06  05 31  -15 28   2.738   3.449    39E   Lep  10.8    0   14
2023-Jun-11  05 37  -14 31   2.782   3.511    37E   Lep  10.9    0   11
2023-Jun-16  05 43  -13 40   2.825   3.569    37E   Lep  11.0    0    8
2023-Jun-21  05 49  -12 53   2.869   3.623    36M   Lep  11.1    0    7
2023-Jun-26  05 54  -12 12   2.913   3.674    35M   Lep  11.2    0    9
2023-Jul-01  05 59  -11 34   2.957   3.720    35M   Lep  11.2    0   11
2023-Jul-06  06 04  -11 01   3.002   3.761    36M   Lep  11.3    0   14
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  4.4 + 5 log d +  6.4 log r [Before perihelion]
m1 =  4.2 + 5 log d +  8.9 log r [After perihelion]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Estimates submitted to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ CODE Observer Name
               (UT)                    T         Dia  DC  LENG  PA
   2017K2  2023 05 01.93 xM 10.3 TK 30.0L 5  58   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

Like C/2020 V2, C/2017 K2 (PANSTARRS) is another comet near solar conjunction. In the case of K2, it is far enough south of the Sun that it remains visible through conjunction, albeit at a small solar elongation. Only one visual observation was reported to the ALPO in May. Guilherme de Souza Aguiar found the comet on May 1 at magnitude 10.3 with a diffuse 2' coma.

Since perihelion, it has consistently faded at a 2.5n ~ 8.9 rate. If that continues, it will fade from around magnitude 10.7 to 11.2 this month. K2 is only visible to southern hemisphere observers this month as it moves through Lepus. Imagers may want to image the comet on June 20 as we cross its orbital plane.

C/2022 A2 (PANSTARRS)

Discovered 2022 January 10 by Pan-STARRS with the Pan-STARRS2 telescope at Haleakala
Dynamically new long-period comet

Orbit (from Minor Planet Center, MPEC 2022-L10)

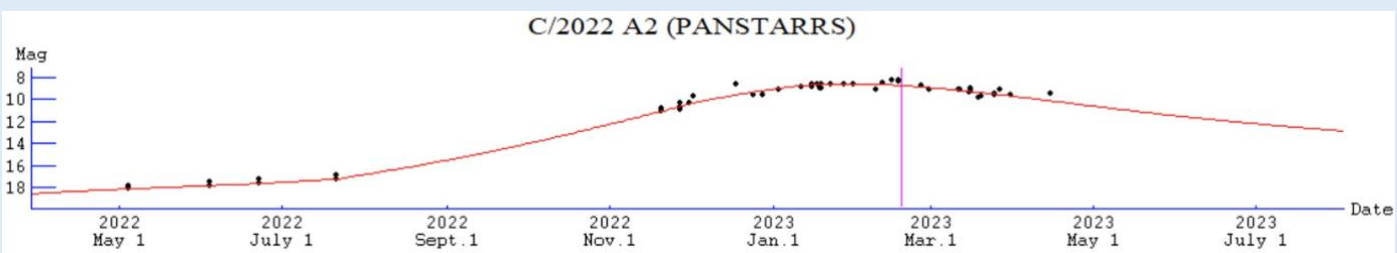
```
    C/2022 A2 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Feb. 18.26573 TT                                  Rudenko
q   1.7353045            (2000.0)            P               Q
z  -0.0001947      Peri.   88.36618     +0.01738551     +0.99011823
 +/-0.0000003      Node   171.57951     -0.09144951     -0.13701630
e   1.0003379      Incl.  108.14689     +0.99565794     -0.02987350
From 1084 observations 2022 Jan. 9-2023 June 1, mean residual 0".6.
1/a(orig) = -0.000054 AU**-1, 1/a(fut) = -0.000071 AU**-1.
```

Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

```
C/2022 A2 (PANSTARRS)                                          Max El
                                                                (deg)
    Date       R.A.    Decl.      r       d    Elong  Const  Mag  40N  40S
2023-Jun-01  00 55  +36 44   2.176   2.701    49M   And  11.5   25    5
2023-Jun-06  00 57  +36 17   2.214   2.680    52M   And  11.6   28    7
2023-Jun-11  00 58  +35 50   2.252   2.654    56M   And  11.8   30    9
2023-Jun-16  00 59  +35 21   2.291   2.622    60M   And  11.9   33   11
2023-Jun-21  01 00  +34 51   2.331   2.586    64M   And  12.0   36   13
2023-Jun-26  00 59  +34 18   2.372   2.546    68M   And  12.1   40   14
2023-Jul-01  00 58  +33 41   2.413   2.502    73M   And  12.2   44   16
2023-Jul-06  00 57  +33 01   2.455   2.456    78M   Psc  12.3   49   27
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  7.6 + 5 log d + 13.6 log r [Through T-220 days]
m1 = -0.2 + 5 log d + 29.4 log r [Between T-220 and T-80 days]
m1 =  2.7 + 5 log d + 19.7 log r [After T-80 days, assumed]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
Recent Magnitude Measurements in ICQ format:
Comet Des  YYYY MM DD.DD     Mag SC APER FL POW    COMA     TAIL    ICQ    CODE  Observer Name
               (UT)                    T         Dia  DC  LENG  PA
None
```

No observations of C/2022 A2 (PANSTARRS) were submitted to the ALPO last month. Luckily there were a few observations submitted to COBS. After peaking at 8-9th magnitude in January and February, the comet continues to fade as it is also a few months past its February 18 perihelion at 1.74 au. Primarily a northern object, southern observers should be able to observe A2 under improving conditions in June as a morning object in Andromeda. This will probably be the last month for this comet in these pages as it fades from around magnitude 11.5 to fainter than 12.