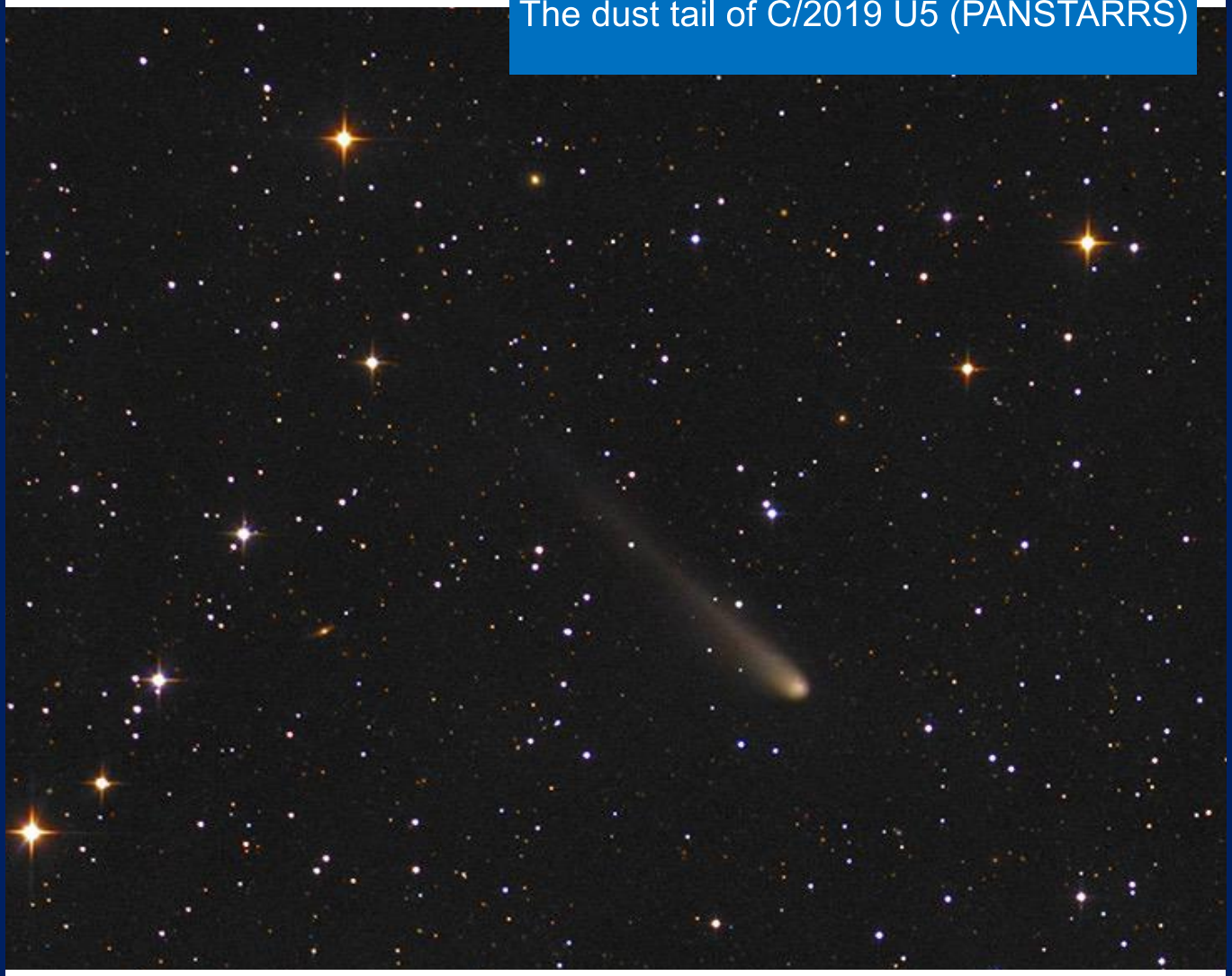
May 2023

ALPO Comet News

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

The dust tail of C/2019 U5 (PANSTARRS)



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On the Front Cover:

While May lacks any bright comets, several fainter objects have proved interesting to follow. One of these fainter comets, C/2019 U5 (PANSTARRS) has just recently passed a rather distant perihelion back in March but it showing a nice long dust tail. This image by Chris Schur was taken on 2023 April 15 with a 10" f/3.9 Orion astrograph reflector and Atik 16200 camera.

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/874401-alpo-comet-news-for-may-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

We are in a bit of a bright comet drought at the moment. Most of the brighter comets of early 2023 have now faded with only one still brighter than magnitude 10, C/2020 V2 (ZTF), which is too close to the Sun in May to observe.

There are several fainter comets visible between magnitude 10 and 12 this month. Two new comets to this newsletter are breaking the magnitude 12 barrier on their way to becoming even brighter in the months ahead. Though C/2021 T4 has been unobservable for much of the last 3 months, its brightening trend up till January suggested a peak brightness around magnitude 8.0 in July. Newly discovered C/2023 E1 (ATLAS) is on an 85-year orbit and has rapidly brightened to around 12-13th magnitude. It should peak at magnitude 10 or even brighter in July and August.

Last month the ALPO Comets Section received 108 magnitude estimates and 16 images/sketches of comets C/2023 E1 (ATLAS), P/2023 B1 (PANSTARRS), C/2023 A3 (Tsuchishan-ATLAS), C/2022 E3 (ZTF), C/2022 A2 (PANSTARRS), C/2020 V2 (ZTF), C/2020 K1 (PANSTARRS), C/2019 U5 (PANSTARRS), C/2019 T4 (ATLAS), C/2019 L3 (ATLAS), C/2017 K2 (PANSTARRS), P/2010 WJ5 (Catalina), P/2010 VH95 (Catalina), 452P/Shappard-Jewitt, 393P/Spacewatch-Hill, 364P/PANSTARRS, 299P/Catalina-PANSTARRS, 263P/Gibbs, 237P/LINEAR, 199P/Shoemaker, 133P/Elst-Pizarro, 130P/McNaught-Hughes, 99P/Kowal, 96P/Machholz, 81P/Wild, 77P/Longmore, 71P/Clark, 67P/Churyumov-Gerasimenko, 19P/Borrelly, and 12P/Pons-Brooks. A big thanks to our March contributors: Dan Bartlett, Denis Buczynski, J. J. Gonzalez, Jose Guilherme de Souza Aguiar, Christian Harder, Carl Hergenrother, John Maikner, Martin Mobberley, Mike Olason, Uwe Pilz, Efrain Morales Rivera, Gregg Ruppel, Greg T. Shanos, 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 try to include up-to-date lightcurves for the comets discussed in these reports as well as applying aperture and personal corrections to the visual observations and personal just 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. We would like to acknowledge with thanks observations submitted directly to the ALPO as well as those originally submitted 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 available their Small-Body Browser and Orbit Visualizer and Seiichi Yoshida for his Comets for Windows programs that are used to produce 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 amazing objects.

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

Clear skies!
- Carl Hergenrother

Comets Calendar

Lunar Phases

May 05 - Full Moon
May 12 - Last Quarter Moon
May 19 - New Moon
May 27 - First Quarter Moon

Comets at Perihelion

May 04 - 291P/NEAT [q = 2.56 au, 9.7-yr period, V ~ 18, observed at 2004, 2013, and 2023 returns]
May 08 - C/2020 V2 (ZTF) [q = 2.23 au, V ~ 9, more below]
May 09 - C/2020 K1 (PANSTARRS) [q = 3.07 au, V ~ 12-13]
May 11 - P/2008 L2 (Hill) [q = 2.33 au, 14.7-yr period, V ~ 17, not seen at current return, only seen at discovery return]
May 14 - 364P/PANSTARRS [q = 0.80 au, 4.9-yr period, V ~ 11, found in 2013, also observed at 2018 return, only active within ~60-70 days of perihelion, passes 0.12 au from Earth in early April, more below]
May 14 - 237P/LINEAR [q = 1.99 au, 6.6-yr period, V ~ 12-13, found in 2002, also seen at 2009, 2016, and current returns, more below]
May 21 - 94P/Russell [q = 2.23 au, 6.6-yr period, V ~ 16, found in 1984, 7th observed return]
May 27 - C/2021 X1 (Maury-Attard) [q = 3.23 au, V ~ 14]

Photo Opportunities

May 01-07 - C/2022 A2 (PANSTARRS) within ~2.5' from center of Andromeda Galaxy (M31)
May 06 - 237P/LINEAR within 30' of 9th mag PN NGC 6818 and 1 deg of low surface brightness 8th mag galaxy NGC 6822 (Barnard's Galaxy)
May 17-19 - C/2021 T4 (Lemmon) about 1 deg from 11th mag PN NGC 246

Recent Magnitudes Contributed to the ALPO Comets Section

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA Dia	COMA DC	TAIL LENG	TAIL PA	ICQ CODE	Observer Name
C/2023 E1 (ATLAS)												
2023E1	2023 04 26.85	S 13.0	HS	32.0L	5	80	1.5				ICQ XX	PIL01 Uwe Pilz
P/2023 B1 (PANSTARRS												
P2023B1	2023 04 25.05	C 17.5	BG	30.5H	4	A800					ICQ XX	MAIab John Maikner
P2023B1	2023 04 14.15	C 18.4	BG	30.5H	4	B400					ICQ XX	MAIab John Maikner
C/2023 A3 (Tsuchinshan-ATLAS)												
2023A3	2023 04 25.17	C 16.8	BG	30.5H	4	a420					ICQ XX	MAIab John Maikner
C/2022 E3 (ZTF)												
2022E3	2023 04 23.94	M 11.6	TK	30.0L	5	88	2	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 21.93	M 11.5	TK	30.0L	5	88	2	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 20.93	M 11.5	TK	30.0L	5	88	2	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 16.93	M 11.3	TK	30.0L	5	88	2	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 03 27.93	M 10.4	TK	30.0L	5	88	2	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 15.94	M 11.3	TK	30.0L	5	88	2	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 12.93	M 11.0	TK	30.0L	5	88		3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 11.94	M 10.9	TK	30.0L	5	88	2	4			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 10.93	M 10.9	TK	30.0L	5	88	2	4			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 09.93	M 10.8	TK	30.0L	5	88	2	4/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 04 03.93	M 10.6	TK	27.0L	5	79	2	4/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 03 31.94	M 10.5	TK	30.0L	5	88	2	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2022E3	2023 03 30.94	M 10.5	TK	30.0L	5	88	2	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
C/2022 E2 (ATLAS)												
2022E2	2023 04 19.49	xM 15.2	AQ	40.0L	4	261	0.3	4/			ICQ XX	WYA Chris Wyatt
C/2022 A2 (PANSTARRS)												
2022A2	2023 04 15.13	S 9.8	TK	20.3T	10	77	4	3			ICQ XX	GON05 Juan Jose Gonzalez Suarez
C/2020 V2 (ZTF)												
2020V2	2023 04 14.86	S 9.4	TK	20.3T	10	100	3	5			ICQ XX	GON05 Juan Jose Gonzalez Suarez
C/2020 K1 (PANSTARRS)												
2020K1	2023 04 25.28	M 12.7	AQ	30.0L	5	121	2	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2020K1	2023 04 21.30	M 12.7	AQ	30.0L	5	121	2	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2020K1	2023 04 16.30	M 12.8	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2020K1	2023 04 03.30	M 13.0	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2020K1	2023 04 01.30	M 13.1	AQ	30.0L	5	121	1	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2020J1	2023 04 24.00	C 20.6	BG	30.5H	4	E640	0.45	2			ICQ XX	MAIab John Maikner
C/2019 U5 (PANSTARRS)												
2019U5	2023 04 25.11	M 12.8	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 23.12	M 12.7	AQ	30.0L	5	121	1	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 22.11	M 12.7	AQ	30.0L	5	121	1	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 21.16	M 12.7	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 21.00	S 12.3	TI	53.1L		139	1.4	2/			ICQ XX	HAR11 Christian Harder
2019U5	2023 04 20.87	S 11.9	TI	29.8L	4	92	1.4	2			ICQ XX	HAR11 Christian Harder
2019U5	2023 04 19.47	xM 13.0	AQ	40.0L	4	108	1.4	6			ICQ XX	WYA Chris Wyatt
2019U5	2023 04 18.87	S 12.1	TI	35.3L		122	1.8	3			ICQ XX	HAR11 Christian Harder
2019U5	2023 04 17.04	M 12.6	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 16.04	M 12.6	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 14.91	S 10.6	TK	20.3T	10	77	5	3			ICQ XX	GON05 Juan Jose Gonzalez Suarez
2019U5	2023 04 13.85	S 11.7	TI	29.8L	4	92	1.2	3			ICQ XX	HAR11 Christian Harder
2019U5	2023 04 11.85	S 12.4	TI	35.3L		122	0.9	3			ICQ XX	HAR11 Christian Harder
2019U5	2023 04 11.02	M 12.6	AQ	30.0L	5	121	1	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019U5	2023 04 10.01	M 12.5	AQ	30.0L	5	100	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
C/2019 T4 (PANSTARRS)												
2019T4	2023 04 25.14	M 13.3	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019T4	2023 04 23.13	M 13.3	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019T4	2023 04 22.13	M 13.2	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019T4	2023 04 21.90	S 12.3	TI	53.1L		139	1.8	2			ICQ XX	HAR11 Christian Harder
2019T4	2023 04 21.17	M 13.2	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019T4	2023 04 20.89	S 12.7	TI	29.8L	4	108	0.7	2/			ICQ XX	HAR11 Christian Harder
2019T4	2023 04 19.50	xM 13.2	AQ	40.0L	4	108	1.2	4/			ICQ XX	WYA Chris Wyatt
2019T4	2023 04 18.88	S 12.8	TI	35.3L		144	1.2	2			ICQ XX	HAR11 Christian Harder
2019T4	2023 04 16.26	M 13.2	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019T4	2023 04 13.88	S 12.7	TI	29.8L	4	108	1.2	2			ICQ XX	HAR11 Christian Harder
2019T4	2023 04 11.87	S 13.0	TI	35.3L		144	0.5	2/			ICQ XX	HAR11 Christian Harder
2019T4	2023 04 01.27	M 13.1	AQ	30.0L	5	121	1	3/			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
C/2019 L3 (ATLAS)												
2019L3	2023 04 23.99	M 12.8	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019L3	2023 04 21.98	M 12.7	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar
2019L3	2023 04 20.97	M 12.7	AQ	30.0L	5	121	1	3			ICQ XX	DES01 Jose Guilherme de Souza Aguiar

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   2019L3  2023 04 19.47 xM 12.3 AQ 40.0L 4  59   1.3  4           ICQ XX WYA   Chris Wyatt
   2019L3  2023 04 16.99  M 12.6 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 04 15.98  M 12.5 AQ 30.0L 5 121   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 04 14.90  S 11.4 TK 20.3T10 100   1.5  3/          ICQ XX GON05 Juan Jose Gonzalez Suarez
   2019L3  2023 04 11.97  M 12.5 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 04 10.98  M 12.4 AQ 30.0L 5 100   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 04 09.99  M 12.4 AQ 30.0L 5 100   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 30.99  M 12.2 AQ 30.0L 5 100   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 27.99  M 12.1 AQ 30.0L 5 100   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
C/2017 K2 (PANSTARRS)
   2017K2  2023 04 23.92  M 10.2 TK 30.0L 5  61   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 21.93  M 10.2 TK 30.0L 5  61   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 20.92  M 10.1 TK 30.0L 5  61   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 16.92  M  9.9 TK 30.0L 5  61   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 15.92  M  9.9 TK 30.0L 5  61   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 12.92  M  9.8 TK 30.0L 5  61        4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 11.93  M  9.8 TK 30.0L 5  61   2    4/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 10.92  M  9.8 TK 27.0L 5  79   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 09.92  M  9.7 TK 27.0L 5  79   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 03.92  M  9.7 TK 27.0L 5  79   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 02.92  M  9.6 TK 27.0L 5  79   3    4/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 01.92  M  9.6 TK 10.0B    25   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 31.93  M  9.5 TK 10.0B    25   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 30.92  M  9.5 TK 10.0B    25   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 27.92  M  9.5 TK 10.0B    25   3    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
P/2010 WJ5 (Catalina)
  P2020WJ5 2023 04 24.13  C 18.1 BG 30.5H 4B400                   ICQ XX MAIab John Maikner
P/2010 VH95 (Catalina)
  P2010VH952023 04 10.01  C 17.7 BG 30.5H 4C500          30   s 90 ICQ XX MAIab John Maikner
452P/Shappard-Jewitt
452       2023 04 10.19  C 20.0 BG 30.5H 4E520  45               ICQ XX MAIab John Maikner
393P/Spacewatch-Hill
393       2023 04 14.08  C 21.0 BG 30.5H 4F600                   ICQ XX MAIab John Maikner
364P/PANSTARRS
364       2023 04 25.28  M 12.2 AQ 30.0L 5 121   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
364       2023 04 21.29  M 12.4 AQ 30.0L 5 121   2    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
364       2023 04 16.29  M 12.7 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
364       2023 04 15.16  S 11.3 TK 20.3T10 100   2.5  4   0.05 270 ICQ XX GON05 Juan Jose Gonzalez Suarez
364       2023 04 03.29  M 13.5 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
364       2023 04 01.29  M 13.6 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
299P/Catalina-PANSTARRS
299       2023 04 20.05  C 19.0 BG 30.5H 4C600                   ICQ XX MAIab John Maikner
263P/Gibbs
263       2023 04 20.09  C 18.1 BG 30.5H 4A860                   ICQ XX MAIab John Maikner
237P/LINEAR
237       2023 04 03.28  M 13.8 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
237       2023 04 01.28  M 13.8 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
199P/Shoemaker
199       2023 04 24.35  C 16.9 BG 30.5H 4A200                   ICQ XX MAIab John Maikner
133P/Elst-Pizarro
133       2023 04 25.14  C 19.5 BG 30.5H 4C900                   ICQ XX MAIab John Maikner
130P/McNaught-Hughes
130       2023 04 10.33  C 19.6 BG 30.5H 4E040                   ICQ XX MAIab John Maikner
99P/Kowal
 99       2023 04 14.35  C 17.8 BG 30.5H 4a900                   ICQ XX MAIab John Maikner
96P/Machholz
 96       2023 04 25.32  C 17.7 BG 30.5H 4A800                   ICQ XX MAIab John Maikner
81P/Wild
 81       2023 04 03.27  M 13.9 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
 81       2023 04 01.27  M 13.8 AQ 30.0L 5 121   1    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
77P/Longmore
 77       2023 04 19.51 xM 14.6 AQ 40.0L 4 182   0.8  5/          ICQ XX WYA   Chris Wyatt
71P/Clark
 71       2023 04 25.29  M 13.0 AQ 30.0L 5 100   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
 71       2023 04 21.28  M 12.9 AQ 30.0L 5 100   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
67P/Churyumov-Gerasimenko
 67       2023 04 26.10  C 20.3 BG 30.5H 4D800                   ICQ XX MAIab John Maikner
19P/Borrelly
 19       2023 04 24.18  C 19.7 BG 30.5H 4D200                   ICQ XX MAIab John Maikner
12P/Pons-Brooks
 12       2023 04 24.29  C 17.5 BG 30.5H 4a300                   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 F1 (PANSTARRS) – The PANSTARRS program discovered C/2023 F1 (PANSTARRS) on 2023 March 27 with one of their 1.8-m telescopes at Haleakala. The comet was 20th-21st magnitude at discovery. Pre-discovery observations by Pan-STARRS surveys were found back to March 18.

C/2023 F1 is a dynamically old long-period comet with perihelion on 2023 June 28 at 1.71 au. The comet rapidly brightened to 18th magnitude by the end of April as it came within 0.92 au of Earth. Though it is still approaching perihelion, it is receding from the Earth and has likely already peaked in brightness. [CBET 5248, MPEC 2023-H184]

C/2022 JK5 (PANSTARRS) – You'll notice a common theme about the remaining discoveries, they were all discovered or observed in previous years but only recognized as comets recently.

Another discovery by PANSTARRS, C/2022 JK5 was discovered last year in images taken on 2022 May 9 and 23. At the time, the object was observed to be stellar and was subsequently designated as an asteroid. On 2023 April 3, the object was observed at magnitude 17-18 and showed cometary activity in images taken by the ATLAS program.

Perihelion just occurred days ago on April 28 at 2.69 au. It should brighten to around magnitude 16.5-17.0 in July and August when it passes around 2.0 au from Earth. An orbit published by S. Nakano on CBET 5247 finds that C/2022 JK5 was last at perihelion 283 years ago. [CBET 5247, MPEC 2023-H180]

P/2022 BV9 (Lemmon) – This object was discovered with the Mount Lemmon 1.5-m on 2022 January 30 at 20th magnitude and designated as asteroid 2022 BV9. On comets-ml, P. VanWylen called attention to the fact that if this object was an asteroid, it should have been observable in archival images taken between 2010 and 2014. Rob Weryk (University of Western Ontario) then found images showing cometary activity in the Pan-STARRS archive. M. S. P. Kelley and Q.-z. Ye (University of Maryland) found the same in "Zwicky Transient Facility" (ZTF) images.

P/2022 BV9 (Lemmon) is a short-period comet with a 9.1-year orbit. Perihelion was back on 2020 October 22 at 3.33 au. It is currently 19th magnitude. [CBET 5251, MPEC 2023-H240]

C/2020 H11 (PANSTARRS-Lemmon) – D. Rankin, D. Bamberger, and B. Gray found five separate single-night observations in the Minor Planet Center's public "isolated tracklet file" between 2020 April 21 and May 20 that belong to a previously unrecognized comet. Eventually, observations obtained between 2019 June 9 and 2021 May 8 were linked to the comet now designated C/2020 H11 (PANSTARRS-Lemmon). Perihelion was back on 2020 September 15 at 7.63 au. At its brightest, C/2020 H11 was around 21st magnitude. [CBET 5249, MPEC 2023-H237]

460P/PANSTARRS = P/2016 BA14 = P/2020 U6 – Rob Weryk recovered P/2016 BA14 (PANSTARRS) in images taken by the Pan-STARRS1 1.8-m at Haleakala on 4 nights in October, November, and December 2020 and January 2021. The comet was stellar at 22nd to 23rd magnitude at the time. Due to being located far from Earth at perihelion, this intrinsically faint comet was missed at its 2021 June 17 perihelion at 1.01 au.

During its discovery apparition in 2016, P/2016 BA14 passed within 0.024 au of Earth but only reached 10th magnitude due to its very low activity. Another close approach to Earth (0.052 au) is predicted in March 2048. [CBET 5243]

P/2010 OE101 = P/2021 LJ31 (WISE) – This object was discovered and announced as an asteroid in 2010 when it was discovered by the WISE spacecraft at 19-20th magnitude and in 2021 when it was found by the Mount Lemmon Survey at 21st magnitude. Recent observations and inspection of past observations detected cometary activity. Its last perihelion was on 2021 October 4 at 1.35 au when it reached 16th magnitude. The comet will be back at perihelion on 2027 May 3. [CBET 5250, MPEC 2023-H227]
\

Comets Between Magnitude 10 and 12

237P/LINEAR

Discovered 2022 June 6 by LINEAR
Short-period Jupiter-family comet
Nucleus diameter ~ 6.6 km

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

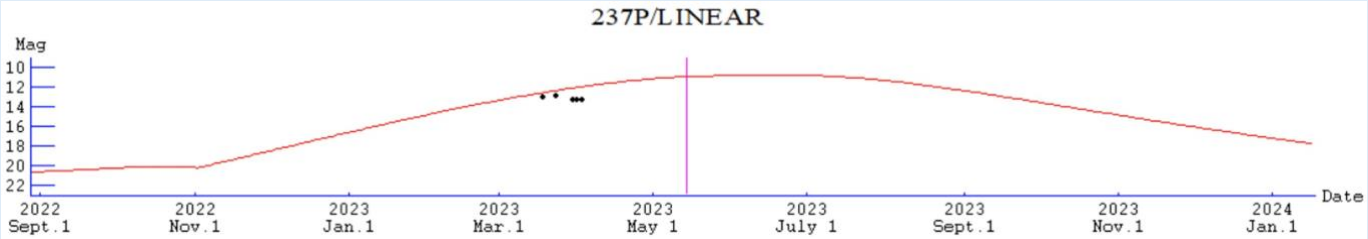
```
237P/LINEAR
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 14.67830 TT                                  Rudenko
q   1.9870431            (2000.0)            P             Q
n   0.14981664     Peri.   25.26159     -0.00072497     +0.97546654
a   3.5109880      Node   245.35860     -0.95368217     -0.06689790
e   0.4340502      Incl.   14.01658     -0.30081522     +0.20973723
P   6.58
From 682 observations 2002 June 18-2023 Apr. 19, mean residual 0".7.
```

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

```
237P/LINEAR                                                          Max El
                                                                      (deg)
    Date       R.A.    Decl.      r        d     Elong  Const  Mag    40N  40S
2023-May-01  19 37  -15 05    1.989    1.455    106M    Sgr  11.2     30   65
2023-May-06  19 43  -13 57    1.987    1.407    109M    Sgr  11.1     31   64
2023-May-11  19 48  -12 47    1.986    1.362    112M    Sgr  11.0     33   63
2023-May-16  19 52  -11 35    1.986    1.319    116M    Aql  11.0     35   61
2023-May-21  19 55  -10 23    1.987    1.278    119M    Aql  11.0     37   60
2023-May-26  19 58  -09 10    1.988    1.240    123M    Aql  10.9     39   59
2023-May-31  20 00  -07 58    1.990    1.205    127M    Aql  10.9     41   58
2023-Jun-05  20 01  -06 47    1.994    1.173    131M    Aql  10.8     43   57
```

Comet Magnitude Formula (from Seiichi Yoshida)

```
m1 = -12.0 + 5 log d + 75.0 log r [T-194 days to perihelion]
m1 =   0.0 + 5 log r + 35.0 log r [From perihelion to T+380 days]
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
237        2023 04 03.28  M 13.8 AQ 30.0L 5 121   1    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
237        2023 04 01.28  M 13.8 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

Short-period comet 237P/LINEAR is making its 4th observed return since its discovery in 2002 (currently on an orbit with a 6.6-year period). During the 2002 and 2009 returns, the comet appeared inactive or with little activity. Since then, its perihelion distance has dropped from 2.42 to 1.98 au. Perhaps due to the closer perihelion, 237P became a surprisingly bright object during its 2016 return with a peak brightness around magnitude 10. The current return should be even better than in 2016 with a similar perihelion (both at 1.98 au) but a smaller minimum Earth-comet distance (1.06 vs 1.40 au). This makes the current return the best-known return for this comet.

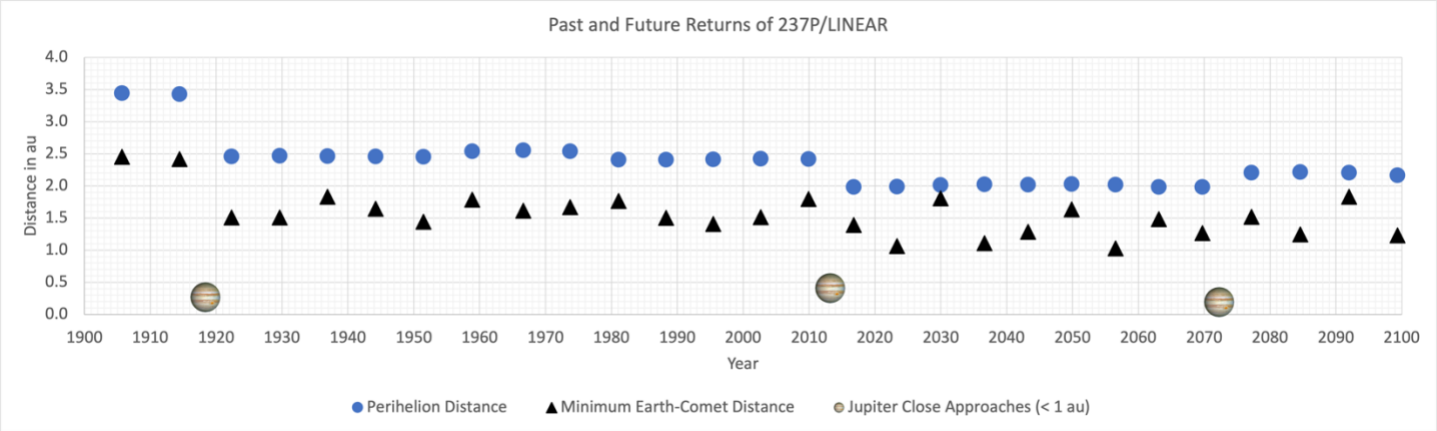


Figure 1 - Orbital evolution of comet 237P/LINEAR between 1900 and 2100. Orbit data from the JPL Horizons service.

The predicted magnitudes in the above ephemeris are from Seiichi Yoshida and are based on the comet's behavior in 2016. Some observers in 2016 found 237P up to 2 magnitudes brighter than the values predicted by Yoshida photometric parameters.

So far during the current return, 237P has been underperforming Seiichi's prediction by ~2 magnitudes. So instead of being around magnitude 11, it may be closer to magnitude 13 this month. Time will tell if 237P is just slow to develop or if the 2016 return was abnormally bright, perhaps due to being the first return after the drop in perihelion distance.

This month, 237P will be a morning object in Sagittarius (May 1-15) and Aquila (15-31) and visible from both hemispheres.

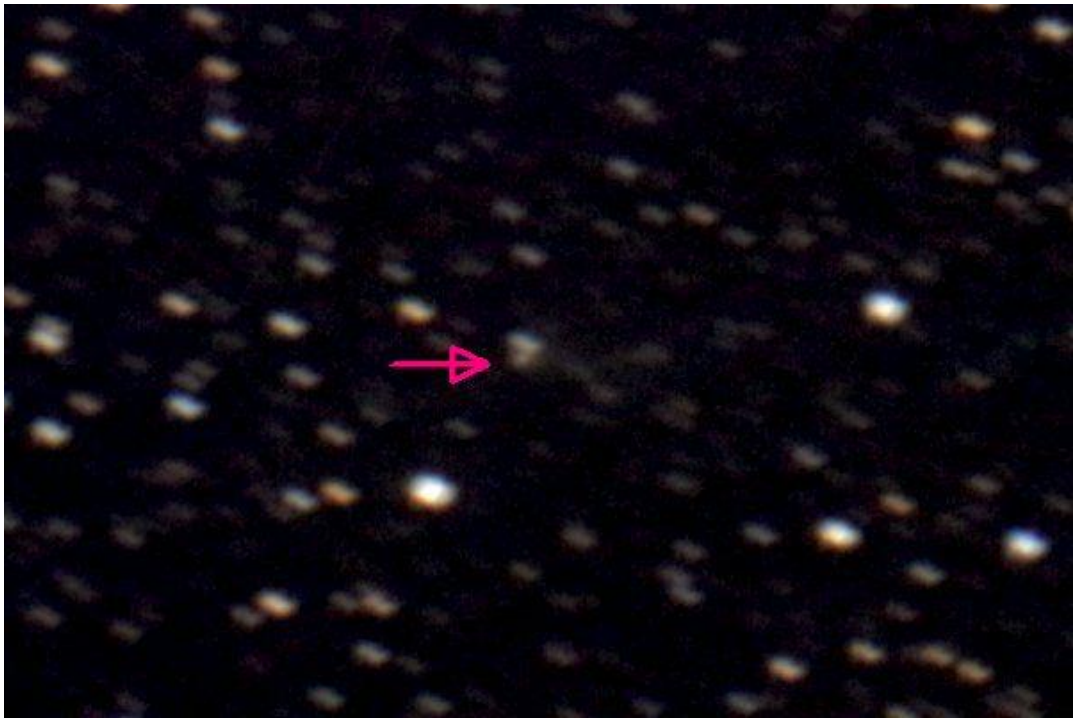


Figure 2 - 237P/LINEAR was imaged on 2023-Apr-16 by Tenho Tuomi with a 0.3-m f/4 reflector. The image is a co-add of 19 x 60-second exposures.

364P/PANSTARRS

Discovered on 2013 February 1 by Pan-STARRS
Jupiter-family comet
Nucleus diameter ~ 3.3 km

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

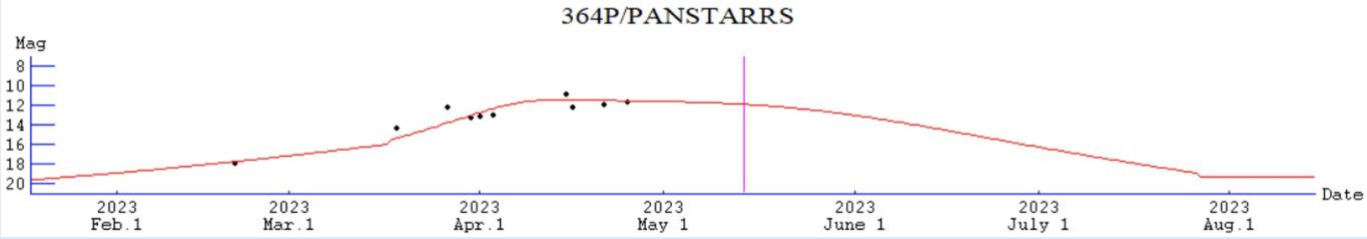
```
364P/PANSTARRS
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 14.01607 TT                                  Rudenko
q   0.8013034            (2000.0)            P              Q
n   0.20161986     Peri.  212.00963     -0.21364485     +0.96507519
a   2.8803627      Node    46.15487     -0.84612605     -0.10523043
e   0.7218047      Incl.   12.13498     -0.48828945     -0.23990921
P   4.89
From 1380 observations 2013 Feb. 1-2023 Apr. 19, mean residual 0".7.
     Nongravitational parameters A1 = +0.01, A2 = -0.0004.
```

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

```
364P/PANSTARRS                                                        Max El
                                                                       (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag    40N  40S
2023-May-01  23 46  -07 10   0.829   0.299     46M    Aqr  11.6      0   27
2023-May-06  00 05  -08 30   0.812   0.356     47M    Cet  11.7      0   29
2023-May-11  00 21  -09 04   0.803   0.415     49M    Cet  11.8      0   31
2023-May-16  00 36  -09 06   0.802   0.475     50M    Cet  12.0      0   33
2023-May-21  00 49  -08 46   0.809   0.534     52M    Cet  12.2      0   34
2023-May-26  01 01  -08 11   0.825   0.591     54M    Cet  12.6      0   36
2023-May-31  01 12  -07 27   0.847   0.646     56M    Cet  13.0      0   37
2023-Jun-05  01 23  -06 37   0.876   0.697     58M    Cet  13.4      0   39
```

Comet Magnitude Formula (from Seiichi Yoshida)

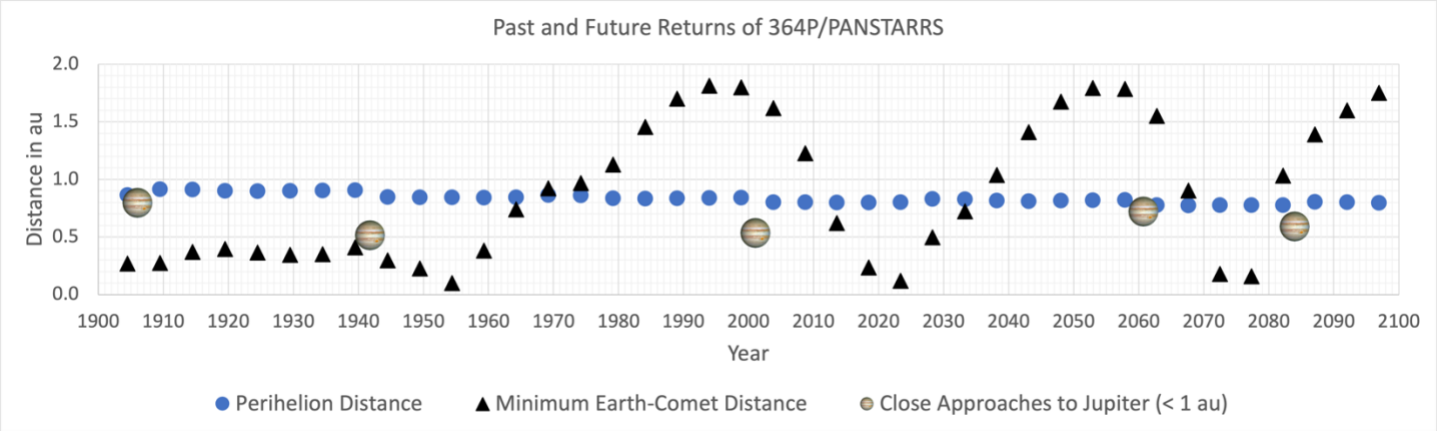
```
m1 = -12.0 + 5 log d + 75.0 log r [T-194 days to perihelion]
m1 =   0.0 + 5 log r + 35.0 log r [From perihelion to T+380 days]
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au
```



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
364        2023 04 25.28  M 12.2 AQ 30.0L 5 121   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
364        2023 04 21.29  M 12.4 AQ 30.0L 5 121   2    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
364        2023 04 16.29  M 12.7 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
364        2023 04 15.16  S 11.3 TK 20.3T10 100   2.5  4   0.05 270 ICQ XX GON05 Juan Jose Gonzalez Suarez
364        2023 04 03.29  M 13.5 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
364        2023 04 01.29  M 13.6 AQ 30.0L 5 121   1    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

364P/PANSTARRS is an example of a small number of Jupiter-family comet that only becomes active at small heliocentric distances. Last month, 364P made a close approach to Earth on April 7 at 0.12 au. This month it will be at perihelion on May 14 at 0.80 au. The close approach to Earth makes 2023 its best return since 1954 (close approach to Earth of 0.10 au).



364P has been brightening on schedule. Jose Guilherme de Souza Aguiar observed 364P in April and found the comet brightening from magnitude 13.6 on the 1st to 12.2 on the 25th. Juan Jose Gonzalez Suarez made a brighter estimate on the 15th at magnitude 11.3. J. J. also detected a visual 3' tail.

Northern hemisphere observers are out of luck this month as the comet is located in the southern morning constellations of Aquarius (May 1-3) and Cetus (3-31). It is much better placed for southern observers. Northerners will get their next chance to see 364P in June or July, though it will no longer be a visual object at 15-16th magnitude.

Figure 3 - Tenho Tuomi also imaged 364P/PANSTARRS last month. This co-added 20 x 60-second image was taken on 2023 April 15 with the same set-up used for his image of 237P/LINEAR.

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)

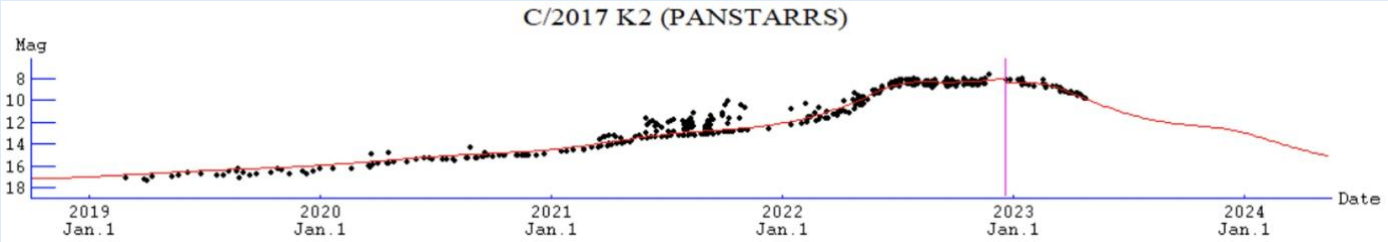
```
    C/2017 K2 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2022 Dec. 19.68872 TT                                  Rudenko
q   1.7968936           (2000.0)            P              Q
z  -0.0004373      Peri.  236.20152     +0.01818934     +0.04921873
 +/-0.0000001      Node    88.23602     -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-May-01   04 40   -25 30    2.438    2.937     51E    Eri  10.0      0   33
2023-May-06   04 48   -23 43    2.478    3.012     49E    Eri  10.1      0   30
2023-May-11   04 56   -22 05    2.519    3.087     47E    Lep  10.2      0   28
2023-May-16   05 03   -20 34    2.560    3.160     45E    Lep  10.3      0   26
2023-May-21   05 10   -19 10    2.602    3.233     44E    Lep  10.4      0   23
2023-May-26   05 17   -17 54    2.644    3.303     42E    Lep  10.6      0   20
2023-May-31   05 24   -16 44    2.687    3.371     40E    Lep  10.7      0   17
2023-Jun-05   05 30   -15 40    2.730    3.436     39E    Lep  10.8      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 04 23.92  M 10.2 TK 30.0L 5  61   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 21.93  M 10.2 TK 30.0L 5  61   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 20.92  M 10.1 TK 30.0L 5  61   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 16.92  M  9.9 TK 30.0L 5  61   2    3/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 15.92  M  9.9 TK 30.0L 5  61   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 12.92  M  9.8 TK 30.0L 5  61        4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 11.93  M  9.8 TK 30.0L 5  61   2    4/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 10.92  M  9.8 TK 27.0L 5  79   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 09.92  M  9.7 TK 27.0L 5  79   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 03.92  M  9.7 TK 27.0L 5  79   3    4           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 02.92  M  9.6 TK 27.0L 5  79   3    4/          ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 04 01.92  M  9.6 TK 10.0B    25   2    3           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

Guilherme de Souza Aguiar observed C/2017 K2 on 12 nights in April and watched as it faded from magnitude 9.6 to 10.2. Before perihelion, K2 was a slow-brightening object with a photometric parameter of 2.5n ~ 6.4. Since perihelion, it is fading a bit faster than it brightened at 2.5n ~ 8.9. As a result, it is now fainter than magnitude 10.0 for the first time in a year. K2 is only visible to southern hemisphere observers this month as it moves through the evening sky in Eridanus (May 1-10) and Lepus (10-31).

C/2019 U5 (PANSTARRS)

Discovered 2019 October 22 with the Pan-STARRS1 1.8-m on Haleakala

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

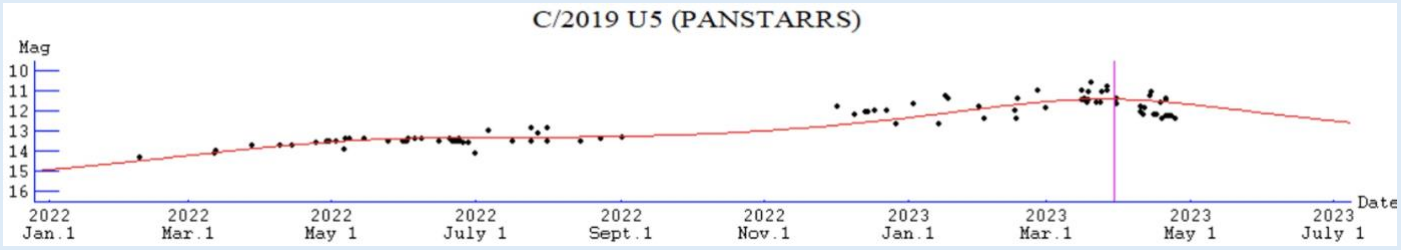
```
    C/2019 U5 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Mar. 29.85197 TT                                  Rudenko
q   3.6242003           (2000.0)            P               Q
z  -0.0004083      Peri.  181.49729     -0.99907954     +0.00774494
 +/-0.0000006      Node     2.63735     -0.02311537     +0.73134190
e   1.0014797      Incl.  113.52059     -0.03613525     -0.68196704
From 3940 observations 2019 Oct. 11-2023 Apr. 21, mean residual 0".4.
1/a(orig) = +0.000090 AU**-1, 1/a(fut) = -0.000091 AU**-1.
```

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

```
C/2019 U5 (PANSTARRS)                                                  Max El
                                                                        (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag    40N  40S
2023-May-01  10 56   -02 57    3.636   2.953    125E    Leo   11.7     47   53
2023-May-06  10 49   -03 13    3.640   3.034    119E    Sext  11.8     45   53
2023-May-11  10 43   -03 29    3.644   3.121    113E    Sext  11.8     43   54
2023-May-16  10 38   -03 47    3.649   3.212    107E    Sext  11.9     39   54
2023-May-21  10 34   -04 06    3.655   3.305    102E    Sext  12.0     35   54
2023-May-26  10 30   -04 26    3.661   3.401     96E    Sext  12.0     31   55
2023-May-31  10 27   -04 47    3.667   3.498     91E    Sext  12.1     26   55
2023-Jun-05  10 25   -05 10    3.675   3.596     86E    Sext  12.2     21   54
```

Comet Magnitude Formula and Lightcurve (from ALPO and COBS data)

```
m1 =  3.4 + 5 log d + 10.6 log r
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
   2019U5  2023 04 25.11  M 12.8 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 23.12  M 12.7 AQ 30.0L 5 121   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 22.11  M 12.7 AQ 30.0L 5 121   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 21.16  M 12.7 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 21.00  S 12.3 TI 53.1L   139   1.4  2/           ICQ XX HAR11 Christian Harder
   2019U5  2023 04 20.87  S 11.9 TI 29.8L 4  92   1.4  2            ICQ XX HAR11 Christian Harder
   2019U5  2023 04 19.47 xM 13.0 AQ 40.0L 4 108   1.4  6            ICQ XX WYA   Chris Wyatt
   2019U5  2023 04 18.87  S 12.1 TI 35.3L   122   1.8  3            ICQ XX HAR11 Christian Harder
   2019U5  2023 04 17.04  M 12.6 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 16.04  M 12.6 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 14.91  S 10.6 TK 20.3T10  77   5    3            ICQ XX GON05 Juan Jose Gonzalez Suarez
   2019U5  2023 04 13.85  S 11.7 TI 29.8L 4  92   1.2  3            ICQ XX HAR11 Christian Harder
   2019U5  2023 04 11.85  S 12.4 TI 35.3L   122   0.9  3            ICQ XX HAR11 Christian Harder
   2019U5  2023 04 11.02  M 12.6 AQ 30.0L 5 121   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 04 10.01  M 12.5 AQ 30.0L 5 100   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

Surprisingly for a distant 11-12th magnitude comet, C/2019 U5 (PANSTARRS) was visually well observed in April. Jose Guilherme de Souza Aguiar, Juan Jose Gonzalez Suarez, Christian Harder, and Chris Wyatt made 15 observations in April finding U5 to possess a small (usually 1-2' coma) and between magnitude 10.6 and 13.0 (aperture and personal bias corrected to 11.1 to 12.4). Sometimes my use of aperture and personal bias corrections tightens up a comet's lightcurve. Other times not so much. U5 is a comet that visual observers are

having a difficult time agreeing on how bright it is. Images are consistently showing a long straight tail. Perhaps this tail is complicating things as observers using different telescopes under different observing conditions are including varying lengths of the tail in their magnitude estimates.

In May, C/2019 U5 will continue to be well placed for all observers in the evening sky as it moves through Leo (May 1-4) and Sextens (4-31). Now a month or more past perihelion (3.62 au on March 29) and closest approach to Earth (2.63 au on March 24), U5 will slowly fade. Taking the average of recent visual magnitudes suggests a May fading from around magnitude 11.7 to 12.1.

Figure 4 - Gregg Ruppel imaged C/2019 U5 (PANSTARRS) and its tail on 2023 April 26 from Animas, New Mexico. Gregg's image consists of several exposures (LRGB 18:18:18:18 min) taken with an ASA 10N f/3.7 reflector and STL11000M camera.

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-H131)

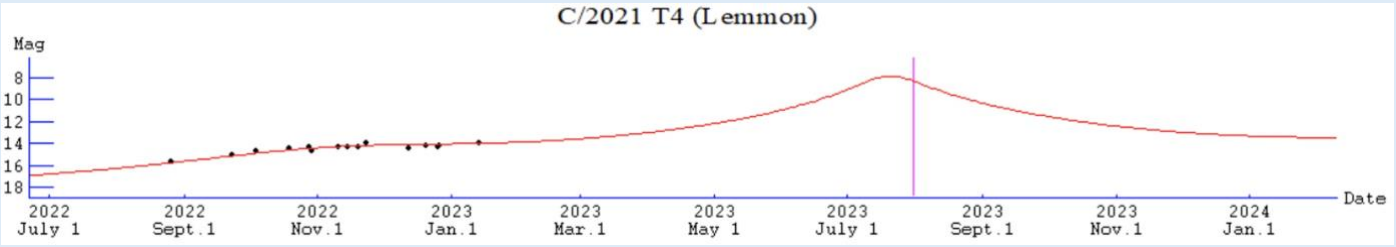
```
    C/2021 T4 (Lemmon)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 July 31.51594 TT                                  Rudenko
q   1.4832980           (2000.0)            P              Q
z  -0.0000322      Peri.  329.80207     +0.28277796     -0.90355210
 +/-0.0000023      Node   257.87334     -0.80093983     -0.40709130
e   1.0000478      Incl.  160.77590     -0.52776133     +0.13367978
From 1186 observations 2021 Aug. 7-2023 Apr. 19, mean residual 0".5.
1/a(orig) = +0.000007 AU**-1, 1/a(fut) = +0.000949 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-May-01  00 40  -10 57   1.945   2.643     37M    Cet   12.2     0   20
2023-May-06  00 41  -11 08   1.903   2.529     41M    Cet   12.0     0   24
2023-May-11  00 42  -11 25   1.862   2.408     46M    Cet   11.8     0   29
2023-May-16  00 43  -11 47   1.822   2.279     51M    Cet   11.6     0   33
2023-May-21  00 43  -12 16   1.784   2.145     55M    Cet   11.4     0   38
2023-May-26  00 43  -12 55   1.748   2.004     60M    Cet   11.2     0   43
2023-May-31  00 43  -13 44   1.713   1.858     65M    Cet   11.0     0   47
2023-Jun-05  00 42  -14 47   1.679   1.708     71M    Cet   10.8     0   52
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  7.9 + 5 log d +  7.5 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
None
```

C/2021 T4 (Lemmon) was found with the Mt Lemmon 1.5-m on 2021 October 7 at 20th magnitude. Solar conjunction has limited observations of this comet since January. As a result, we are not certain how bright it will become. The comet may peak around magnitude 8.0 in late July when it passes closest to Earth (July 20 at 0.54 au) and to the Sun (July 31 at 1.48 au).

Assuming it has continued to follow its brightening trend from last year, C/2021 T4 should start May around magnitude 12.2 and brighten to 11.0 by the end of the month. This will primarily be a southern hemisphere object. In May it is not visible from the northern hemisphere as it is a morning object in Cetus. By next month, observers at northern mid-latitudes should get a glimpse of the comet though it will always remain a southern horizon hugger and even slip back below the horizon for a week or two around the time of peak brightness.

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-H131)

```
    C/2022 A2 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Feb. 18.26637 TT                                  Rudenko
q   1.7352982           (2000.0)            P              Q
z  -0.0001894      Peri.   88.36656     +0.01739228     +0.99011810
 +/-0.0000015      Node   171.57950     -0.09144955     -0.13701578
e   1.0003286      Incl.  108.14694     +0.99565782     -0.02988019
From 1036 observations 2022 Jan. 9-2023 Apr. 16, mean residual 0".5.
1/a(orig) = -0.000054 AU**-1, 1/a(fut) = -0.000071 AU**-1.
```

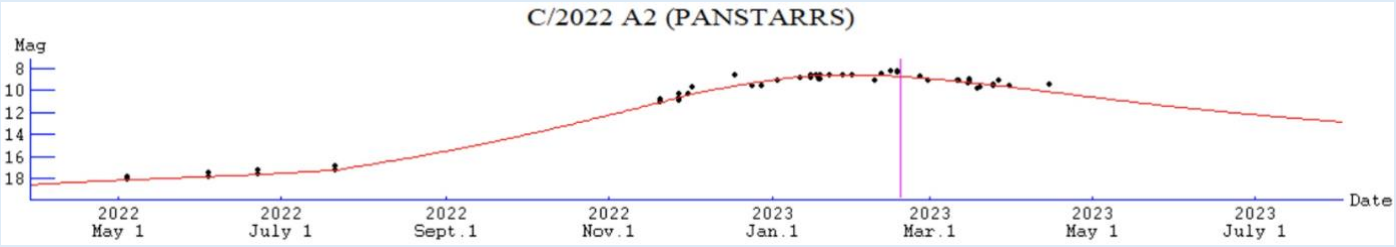
Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

C/2022 A2 (PANSTARRS)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg) 40N	40S
2023-May-01	00 31	+39 38	1.967	2.691	35M	And	10.6	18	0
2023-May-06	00 36	+39 07	1.997	2.710	36M	And	10.8	19	0
2023-May-11	00 41	+38 37	2.029	2.722	38M	And	10.9	19	0
2023-May-16	00 45	+38 09	2.062	2.727	40M	And	11.1	20	0
2023-May-21	00 48	+37 42	2.097	2.726	42M	And	11.2	22	0
2023-May-26	00 52	+37 16	2.132	2.718	45M	And	11.3	23	2
2023-May-31	00 54	+36 49	2.169	2.704	48M	And	11.5	25	4
2023-Jun-05	00 56	+36 23	2.206	2.685	51M	And	11.6	27	7

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
   2022A2  2023 04 15.13  S  9.8 TK 20.3T10  77   4    3           ICQ XX GON05 Juan Jose Gonzalez Suarez
```

C/2022 A2 (PANSTARRS) is a dynamically new long-period comet that rapidly brightened from 18-19th magnitude at discovery in January 2022 to a peak around 8-9th magnitude in January and February of this year. Now past its perihelion on February 18 at 1.74 au, it is expected to fade from magnitude 9.8 to 10.6 this month. As has been the case for the past few months, C/2022 A2 is a northern object limited to northern hemisphere observers until the very end of the month when it peaks above the horizon from the southern hemisphere. It is currently observable low in the morning sky as it moves through Andromeda though its placement in the sky gets progressively better with time.

C/2022 E3 (ZTF)

Discovered 2022 March 2 by the Zwicky Transient Facility (ZTF)
Dynamically old long-period comet

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

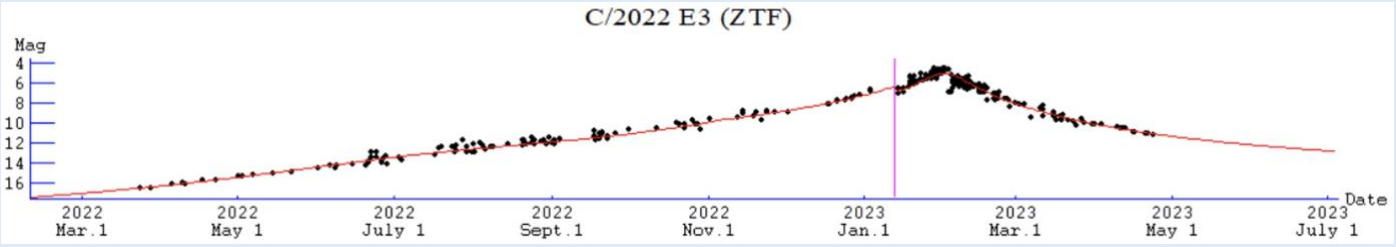
```
    C/2022 E3 (ZTF)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Jan. 12.78521 TT                                  Rudenko
q   1.1122478           (2000.0)            P               Q
z  -0.0002900      Peri.  145.81573     -0.60064648     -0.07340476
 +/-0.0000001      Node   302.55566     +0.33753009     +0.87940746
e   1.0003225      Incl.  109.16851     +0.72477393     -0.47037673
From 7634 observations 2021 July 10-2023 Apr. 20, mean residual 0".6.
1/a(orig) = +0.000769 AU**-1, 1/a(fut) = -0.000021 AU**-1.
```

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

```
C/2022 E3 (ZTF)                                                    Max El
                                                                    (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag   40N  40S
2023-May-01  05 14   -11 31    1.990   2.511     48E    Lep   11.3     0   31
2023-May-06  05 18   -12 07    2.047   2.607     46E    Lep   11.5     0   29
2023-May-11  05 22   -12 45    2.105   2.697     44E    Lep   11.7     0   27
2023-May-16  05 26   -13 23    2.163   2.782     43E    Lep   11.8     0   26
2023-May-21  05 31   -14 03    2.220   2.861     42E    Lep   11.9     0   24
2023-May-26  05 35   -14 44    2.278   2.935     41E    Lep   12.1     0   22
2023-May-31  05 39   -15 28    2.336   3.003     41E    Lep   12.2     0   20
2023-Jun-05  05 43   -16 14    2.393   3.066     40E    Lep   12.3     0   17
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  5.8 + 5 log d + 12.3 log r [Through T-70 days]
m1 =  6.8 + 5 log d +  6.8 log r [T-70 to perihelion]
m1 =  7.4 + 5 log d +  6.5 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
   2022E3  2023 04 23.94  M 11.6 TK 30.0L 5  88   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 21.93  M 11.5 TK 30.0L 5  88   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 20.93  M 11.5 TK 30.0L 5  88   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 16.93  M 11.3 TK 30.0L 5  88   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 15.94  M 11.3 TK 30.0L 5  88   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 12.93  M 11.0 TK 30.0L 5  88        3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 11.94  M 10.9 TK 30.0L 5  88   2    4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 10.93  M 10.9 TK 30.0L 5  88   2    4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 09.93  M 10.8 TK 30.0L 5  88   2    4/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 04 03.93  M 10.6 TK 27.0L 5  79   2    4/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

May will probably be the last month to see the "Best Comet, so far, of 2023" at brighter than magnitude 12.0. And that's only for southern hemisphere observers as it is already lost to northern observers as it is located far to the south of the Sun as an evening object in Lepus. It is amazing to think that this comet was 4th magnitude only 3 months ago. That's what an increase in the Earth-comet distance from 0.28 to 2.51-3.02 au and an increase in Sun-comet distance from 1.11 to 1.99-2.35 au will do to a comet's brightness.

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-H131)

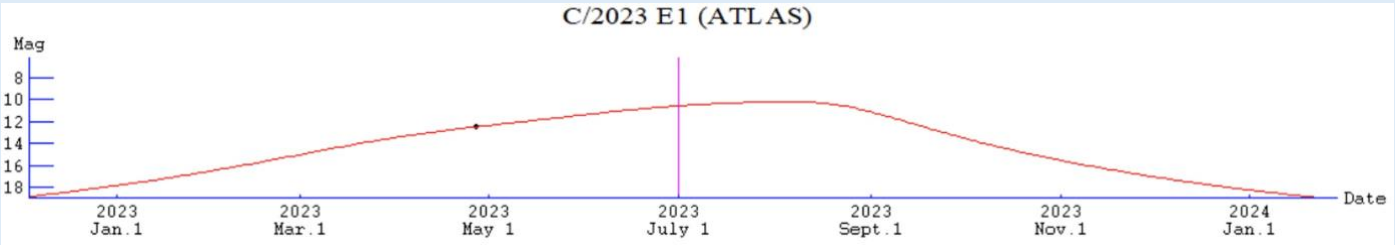
```
    C/2023 E1 (ATLAS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 July 1.10669 TT                                  Rudenko
q   1.0265971            (2000.0)            P             Q
n   0.01157688     Peri.  105.89366     +0.06328190     +0.98427869
a  19.3527085      Node   164.57538     -0.97142763     +0.02287988
e   0.9469533      Incl.   38.31475     +0.22874390     -0.17513416
P  85.1
From 400 observations 2022 Dec. 25-2023 Apr. 20, mean residual 0".4.
```

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

```
C/2023 E1 (ATLAS)                                                      Max El
                                                                       (deg)
    Date       R.A.    Decl.      r       d     Elong  Const  Mag    40N  40S
2023-May-01  12 16  +54 18    1.416   0.766    105E    UMa   12.3     76    0
2023-May-06  12 13  +57 12    1.365   0.767     99E    UMa   12.2     73    0
2023-May-11  12 10  +59 50    1.316   0.768     94E    UMa   12.0     70    0
2023-May-16  12 10  +62 15    1.269   0.769     89E    UMa   11.9     68    0
2023-May-21  12 11  +64 29    1.225   0.768     85E    UMa   11.7     65    0
2023-May-26  12 13  +66 34    1.183   0.765     82E    UMa   11.5     62    0
2023-May-31  12 18  +68 33    1.146   0.759     79E    UMa   11.4     59    0
2023-Jun-05  12 26  +70 28    1.112   0.750     76E    UMa   11.2     57    0
```

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

```
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 04 26.85  S 13.0 HS 32.0L 5  80   1.5              ICQ XX PIL01 Uwe Pilz
```

The "Asteroid Terrestrial-Impact Last Alert System" (ATLAS) program discovered C/2023 E1 (ATLAS) two months ago on 2023 March 1 with their 0.5-m f/2 Schmidt reflector at Sutherland, South Africa. At discovery, the comet was at 18th magnitude. Pre-discovery observations by the Mount Lemmon, Bok, and Pan-STARRS surveys extended its arc back to 2022 December 25 when the comet was even fainter at 21st magnitude. C/2023 E1 is a Halley family comet with 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.

Visual and imaging observations at the end of April found the comet to be much brighter at 12-13th magnitude. An assumed 2.5n ~ 10 brightening trend brings E1 to around magnitude 10.2 in late July and early August. If it brightens at a faster rate, a definite possibility for a Halley-family comet, it could become a nice binocular or small telescope object. This month, E1 is a northern hemisphere-only object riding high in the northern evening constellation of Ursa Major.