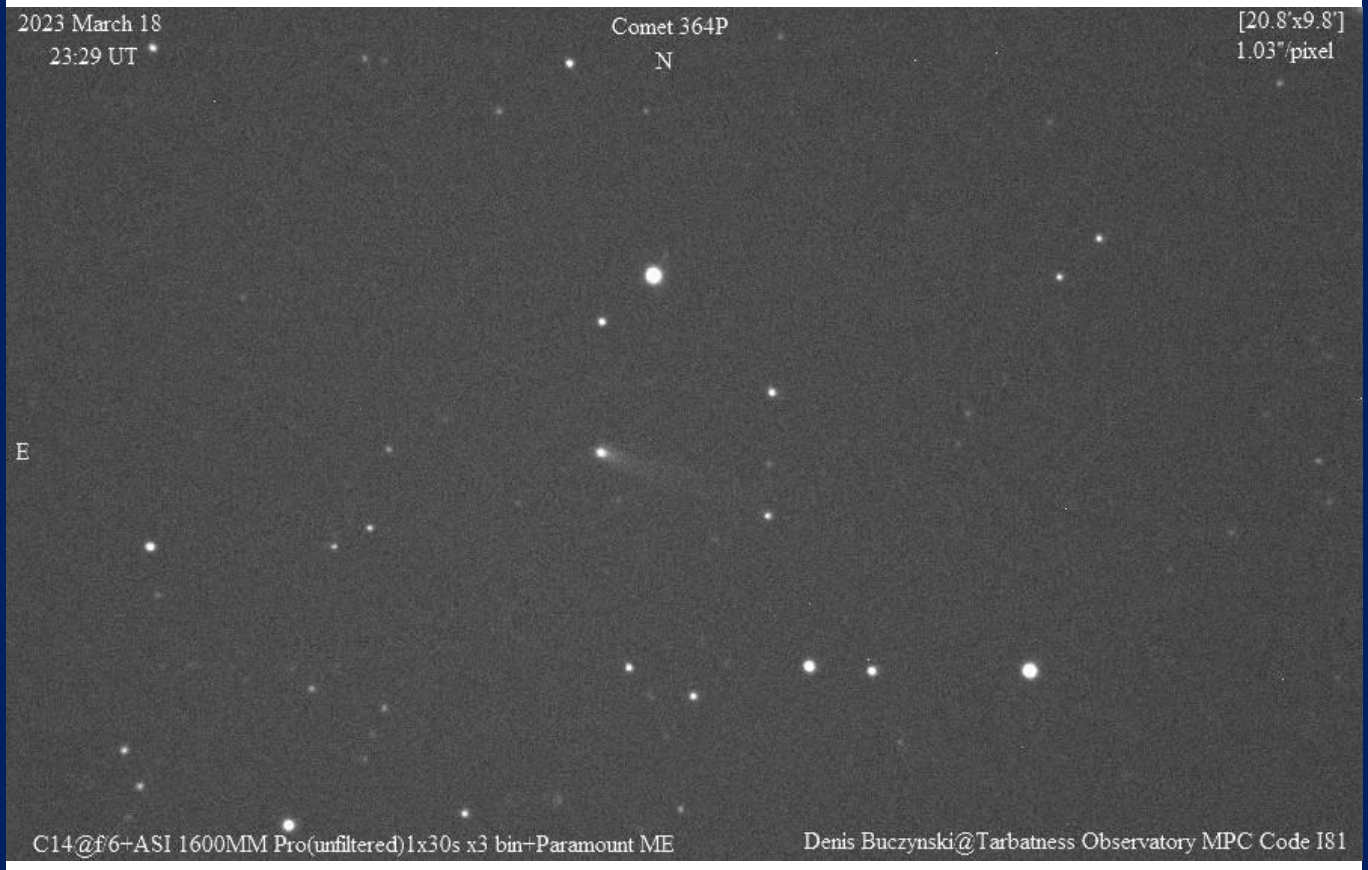
April 2023

ALPO Comet News

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

Low-activity is better than no activity!



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On the Front Cover:

Two high numbered short-period comets are having their best returns in years over the next month or two. One of these comets, 364P/PANSTARRS, is an example of a low-activity comet that only shows activity when close to the Sun.

Denis Buczynski imaged 364P/PANSTARRS on 2023 March 18 with his Celestron C14 f/6 SCT and ZWO ASI1600MM Pro camera at Tarbatness Observatory in Scotland.

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/870654-alpo-comet-news-for-april-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

The brightest comets in April are all expected to be around 9th magnitude, so not very bright. The lack of any bright comets is balanced by a number of interesting objects between magnitude 10 and 12. Two high numbered short-period comets, 237P/LINEAR and 364P/PANSTARRS, are making their best returns in years and should peak around 10-11th magnitude. Both comets have relatively large nuclei and are only active in the months around perihelion.

Of the 9th magnitude comets, there are three and they are all of the long-period variety. C/2017 K2 (PANSTARRS) is still a southern hemisphere only object and should become fainter than magnitude 10.0 for the first time in a year. C/2022 A2 (PANSTARRS) is a northern hemisphere only comet but will also become fainter than magnitude 10.0 early this month. The other 9th magnitude comet is C/2020 V2 (ZTF). With an upcoming solar conjunction in early May, everyone will have lost V2 to the glare of the Sun by mid-April. We'll be able to pick V2 up again in June or July when it will still be a mid-9th magnitude object.

Last month the ALPO Comets Section received 101 magnitude estimates and 49 images/sketches of comets C/2022 E3 (ZTF), C/2022 A2 (PANSTARRS), C/2021 Y1 (ATLAS), C/2021 S3 (PANSTARRS), C/2020 V2 (ZTF), C/2020 K1 (PANSTARRS), C/2019 U5 (PANSTARRS), C/2019 T4 (ATLAS), C/2019 L3 (ATLAS), C/2019 K7 (Smith), C/2017 K2 (PANSTARRS), 452P/Sheppard-Jewitt, 451P/Christensen, 423P/Lemmon, 364P/PANSTARRS, 263P/Gibbs, 256P/LINEAR, 237P/LINEAR, 211P/Hill, 169P/NEAT, 129P/Shoemaker-Levy, 96P/Machholz, 89P/Russell, 81P/Wild, 77P/Longmore, 48P/Johnson, 19P/Borrelly, 12P/Pons-Brooks, and 4P/Faye. 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 individual 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.

Acknowledgements

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 analyzes 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 adding 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

Apr 05 - Full Moon
Apr 13 - Last Quarter Moon
Apr 19 - New Moon
Apr 27 - First Quarter Moon

Comets at Perihelion

Apr 03 - 77P/Longmore [q = 2.35 au, 6.9-yr period, V ~ 14, discovered in 1974, 8th observed return]
Apr 07 - A/2019 O2 [q = 9.68 au, 434-yr period, continues to appear to be an inactive object]
Apr 11 - 300P/Catalina [q = 0.83 au, 4.4-yr period, V ~ 15, discovered in 2005 when it reached 9-10th mag, 5th observed return]
Apr 17 - D/1978 R1 (Haneda-Campos) [q = 1.28 au, 6.0-yr period, V ~ ??, visual discovery in August 1978 when in outburst at 9-10th mag, has not been seen since November 1978, perihelion date and orbit may be incorrect]
Apr 17 - 5D/Brorsen [q = 0.59 au, 5.6-yr period, V ~ ??, visual discovery in 1846, also observed at returns in 1857, 1868, 1873, and 1879, unexpected rapid fading in 1879, not seen since, perihelion date and orbit may be incorrect]
Apr 19 - 279P/La Sagra [q = 2.15 au, 6.8-yr period, V ~ 20-21, discovered in 2009, also seen in 2002-2003 and 2016, yet to be recovered at current return,]
Apr 20 - 170P/Christensen [q = 2.92 au, 8.6-yr period, V ~ 18, discovered in 2005, also seen at 1997, 2014, and 2023 returns]
Apr 22 - P/2014 A3 (PANSTARRS) [q = 3.47 au, 9.9-yr period, V ~ 20?, discovered in 2014, yet to be observed at current return]
Apr 25 - 452P/Sheppard-Jewitt [q = 4.18 au, 19.7-yr period, V ~ 18, discovery apparition, also seen in 2003]
Apr 30 - C/2021 Y1 (ATLAS) [q = 2.03 au, V ~ 13]

Photo Opportunities

Apr 11-15 - C/2022 E3 (ZTF) passes in front of the Witch Head Nebula
Apr 13 - C/2017 K2 (PANSTARRS) comes within 20' of 10th magnitude galaxy NGC 1532
Apr 31 - C/2022 A2 (PANSTARRS) within ~2.5' from center of Andromeda Galaxy (M31)

Recent Magnitudes Contributed to the ALPO Comets Section

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER T	FL	POW	COMA Dia	COMA DC	TAIL LENG	TAIL PA	ICQ CODE	Observer Name
C/2022 E3 (ZTF)												
2022E3	2023 03 26.87	S 9.9	TK	20.3T10	77		4	5			ICQ XX GON05	Juan Jose Gonzalez Suarez
2022E3	2023 03 24.81	S 10.7	TI	29.8L 4	92		2	3			ICQ XX HAR11	Christian Harder
2022E3	2023 03 23.93	M 10.3	TK	30.0L 5	89		2	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2022E3	2023 03 21.94	M 10.2	TK	30.0L 5	89		2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2022E3	2023 03 19.81	S 9.6	TI	29.8L 4	79		2.5	3/			ICQ XX HAR11	Christian Harder
2022E3	2023 03 18.93	M 10.2	TK	30.0L 5	89		2	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2022E3	2023 03 18.44	xM 9.3	TK	7.0B	15		7.5	4/			ICQ XX WYA	Christopher Wyatt
2022E3	2023 03 16.93	M 10.1	TK	30.0L 5	89		2	4/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2022E3	2023 03 16.44	xM 9.3	TK	7.0B	15		5.5	4			ICQ XX WYA	Christopher Wyatt
2022E3	2023 03 15.86	S 9.4	TK	20.3T10	77		5	5	0.2	60	ICQ XX GON05	Juan Jose Gonzalez Suarez
2022E3	2023 03 15.81	S 9.9	TI	35.3L	105		2.8	3/	6 m	77	ICQ XX HAR11	Christian Harder
2022E3	2023 03 11.82	S 8.8	TI	35.3L	88		3.5	4	4.5 m	80	ICQ XX HAR11	Christian Harder
2022E3	2023 03 11.77	S 9.6	TK	10.5R 6	53		2		0.07	80	PIL01	Uwe Pilz
2022E3	2023 03 06.95	M 9.9	TK	30.0L 5	89		2	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2022 A2 (PANSTARRS)												
2022A2	2023 03 26.85	S 9.4	TK	20.3T10	77		4	3/			ICQ XX GON05	Juan Jose Gonzalez Suarez
2022A2	2023 03 24.82	S 10.0	TI	29.8L 4	92		2.5	3			ICQ XX HAR11	Christian Harder
2022A2	2023 03 19.82	S 10.1	TI	29.8L 4	79		2.8	3			ICQ XX HAR11	Christian Harder
2022A2	2023 03 18.79	S 10.7	TK	32.0L 5	80		1.5	3			PIL01	Uwe Pilz
2022A2	2023 03 15.83	S 9.3	TK	20.3T10	77		5	4			ICQ XX GON05	Juan Jose Gonzalez Suarez
2022A2	2023 03 15.81	S 9.8	TI	35.3L	105		2.5	3/			ICQ XX HAR11	Christian Harder
2022A2	2023 03 11.83	S 9.7	TI	35.3L	105		2	3/			ICQ XX HAR11	Christian Harder
C/2021 Y1 (ATLAS)												
2021Y1	2023 03 18.42	xM 14.6	AQ	40.0L 4	182		0.9	4/			ICQ XX WYA	Christopher Wyatt
2021Y1	2023 03 16.40	xM 14.6	AQ	40.0L 4	182		1.2	6			ICQ XX WYA	Christopher Wyatt
C/2021 S3 (PANSTARRS)												
2021S3	2023 03 18.42	xM 14.6	AQ	40.0L 4	182		0.7	5/			ICQ XX WYA	Christopher Wyatt
2021S3	2023 03 16.45	xM 14.7	AQ	40.0L 4	182		0.7	5/			ICQ XX WYA	Christopher Wyatt
C/2020 V2 (ZTF)												
2020V2	2023 03 26.86	S 9.8	TK	20.3T10	77		3	5/			ICQ XX GON05	Juan Jose Gonzalez Suarez
2020V2	2023 03 24.83	S 10.0	TI	29.8L 4	79		2.8	3/			ICQ XX HAR11	Christian Harder
2020V2	2023 03 19.82	S 9.8	TI	29.8L 4	79		2.7	3/			ICQ XX HAR11	Christian Harder
2020V2	2023 03 18.79	S 9.4	TK	32.0L 5	80		2	4	0.07	50	PIL01	Uwe Pilz
2020V2	2023 03 15.85	S 9.7	TK	20.3T10	77		3.5	4/	0.1	20	ICQ XX GON05	Juan Jose Gonzalez Suarez
2020V2	2023 03 15.82	S 10.0	TI	35.3L	105		2	4			ICQ XX HAR11	Christian Harder
2020V2	2023 03 11.83	S 9.9	TI	35.3L	105		2	3/			ICQ XX HAR11	Christian Harder
C/2020 K1 (PANSTARRS)												
2020K1	2023 03 30.68	xM 13.1	AQ	40.0L 4	108		1.6	5/			ICQ XX WYA	Christopher Wyatt
2020K1	2023 03 24.28	M 13.1	AQ	30.0L 5	121		1	2			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 03 19.28	M 12.9	AQ	30.0L 5	121		1	2/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2020K1	2023 03 18.69	xM 13.3	AQ	40.0L 4	182		0.9	5			ICQ XX WYA	Christopher Wyatt
2020K1	2023 03 17.27	M 12.7	AQ	30.0L 5	121		1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2019 U5 (PANSTARRS)												
2019U5	2023 03 30.65	xM 12.0	AQ	40.0L 4	59		1.2	6	7.3 m	53	ICQ XX WYA	Christopher Wyatt
2019U5	2023 03 27.08	S 10.3	TK	20.3T10	77		6	3			ICQ XX GON05	Juan Jose Gonzalez Suarez
2019U5	2023 03 26.94	S 11.4	TI	29.8L 4	92		2	3	4 m	45	ICQ XX HAR11	Christian Harder
2019U5	2023 03 24.83	S 11.5	TI	29.8L 4	108		2.7	3			ICQ XX HAR11	Christian Harder
2019U5	2023 03 24.14	M 12.0	AQ	30.0L 5	100		1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 03 22.13	M 12.0	AQ	30.0L 5	100		1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 03 19.84	S 11.0	TI	29.8L 4	92		1.5	2/			ICQ XX HAR11	Christian Harder
2019U5	2023 03 19.14	M 11.9	AQ	30.0L 5	100		1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 03 19.10	S 11.5	TI	29.8L 4	108		2	2			ICQ XX HAR11	Christian Harder
2019U5	2023 03 18.44	xM 12.2	AQ	40.0L 4	59		1.5	6	5.6 m	53	ICQ XX WYA	Christopher Wyatt
2019U5	2023 03 17.13	M 11.8	AQ	30.0L 5	100		1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019U5	2023 03 16.46	xM 12.1	AQ	40.0L 4	59		1.3	5/			ICQ XX WYA	Christopher Wyatt
2019U5	2023 03 15.89	S 10.5	TK	20.3T10	77		6	2			ICQ XX GON05	Juan Jose Gonzalez Suarez
C/2019 T4 (ATLAS)												
2019T4	2023 03 30.69	xM 13.4	AQ	40.0L 4	108		1.2	4/			ICQ XX WYA	Christopher Wyatt
2019T4	2023 03 26.95	S 12.7	TI	29.8L 4	108		1	3			ICQ XX HAR11	Christian Harder
2019T4	2023 03 24.17	M 12.3	AQ	30.0L 5	100		1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019T4	2023 03 19.18	M 12.0	AQ	30.0L 5	100		1	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2019T4	2023 03 19.12	S 11.8	TI	29.8L 4	108		1.8	2			ICQ XX HAR11	Christian Harder
2019T4	2023 03 18.67	xM 13.0	AQ	40.0L 4	59		1.9	4/			ICQ XX WYA	Christopher Wyatt
C/2019 L3 (ATLAS)												
2019L3	2023 03 30.64	xM 12.2	AQ	40.0L 4	59		1.6	4			ICQ XX WYA	Christopher Wyatt
2019L3	2023 03 23.99	M 12.0	AQ	30.0L 5	100		1	2/			ICQ XX DES01	Jose Guilherme de Souza Aguiar

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   2019L3  2023 03 21.99  M 11.9 AQ 30.0L 5 100   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 18.98  M 11.8 AQ 30.0L 5 100   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 18.45 xM 12.0 AQ 40.0L 4  59   2    5/           ICQ XX WYA   Christopher Wyatt
   2019L3  2023 03 16.98  M 11.7 AQ 30.0L 5  89   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 16.46 xM 12.0 AQ 40.0L 4  59   2.3  4/           ICQ XX WYA   Christopher Wyatt
C/2019 K7 (Smith)
   2019K7  2023 03 16.18  C 18.7 BG 30.5H 4A800                     ICQ XX MAIab John Maikner
 C/2017 K2 (PANSTARRS)
   2017K2  2023 03 23.92  M  9.4 TK 10.0B    25   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 21.93  M  9.4 TK 10.0B    25   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 19.93  M  9.3 TK 10.0B    25   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 18.92  M  9.3 TK 10.0B    25   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 18.43 xM  9.1 TK  7.0B    15   7.5  5  15   m214 ICQ XX WYA   Christopher Wyatt
   2017K2  2023 03 16.92  M  9.2 TK 10.0B    25   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 16.40 xM  9.2 TK  7.0B    15   9    4  21   m199 ICQ XX WYA   Christopher Wyatt
   2017K2  2023 03 06.93  M  8.7 TK 10.0B    25   3    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
452P/Sheppard-Jewitt
452        2023 03 20.11  C 19.5 BG 30.5H 4F000          2.5 m205 ICQ XX MAIab John Maikner
451P/Christensen
451        2023 03 01.11  C 19.7 BG 30.5H 4                       ICQ XX MAIab John Maikner
423P/Lemmon
423        2023 03 27.14  C 22.5 BG 30.5H 4G200                   ICQ XX MAIab John Maikner
364P/PANSTARRS
364        2023 03 30.70 xM 13.9 AQ 40.0L 4 182   0.3  6            ICQ XX WYA   Christopher Wyatt
364        2023 03 27.03  S 12.6 AQ 20.3T10  77   2.5  3            ICQ XX GON05 Juan Jose Gonzalez Suarez
364        2023 03 18.66 xM 15.0 AQ 40.0L 4 182   0.3  6            ICQ XX WYA   Christopher Wyatt
263P/Gibbs
263        2023 03 20.20  C 17.3 BG 30.5H 4A800          1   m185 ICQ XX MAIab John Maikner
256P/LINEAR
256        2023 03 01.30  C 19.7 BG 30.5H 4C240                   ICQ XX MAIab John Maikner
237P/LINEAR
237        2023 03 30.67 xM 14.1 AQ 40.0L 4 182   0.4  5            ICQ XX WYA   Christopher Wyatt
237        2023 03 18.69 xM 13.9 AQ 40.0L 4 182   0.2  4/           ICQ XX WYA   Christopher Wyatt
211P/Hill
211        2023 03 16.15  C 18.6 BG 30.5H 4D200                   ICQ XX MAIab John Maikner
169P/NEAT
169        2023 03 21.16  C 19.8 BG 30.5H 4A500                   ICQ XX MAIab John Maikner
129P/Shoemaker-Levy
129        2023 03 01.08  C 19.3 BG 30.5H 4C000                   ICQ XX MAIab John Maikner
96P/Machholz
 96        2023 03 21.38  C 15.6 BG 30.5H 4A320                   ICQ XX MAIab John Maikner
89P/Russell
 89        2023 03 21.30  C 20.9 BG 30.5H 4F000                   ICQ XX MAIab John Maikner
81P/Wild
 81        2023 03 30.67 xM 14.1 AQ 40.0L 4 182   0.4  5/           ICQ XX WYA   Christopher Wyatt
 81        2023 03 24.11  M 13.6 AQ 30.0L 5 121   1    2/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
 81        2023 03 22.11  M 13.6 AQ 30.0L 5 121   1    2/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
 81        2023 03 19.10  M 13.5 AQ 30.0L 5 121   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
 81        2023 03 18.68 xM 13.9 AQ 40.0L 4 182   0.6  4   2.8 m270 ICQ XX WYA   Christopher Wyatt
 81        2023 03 17.09  M 13.3 AQ 30.0L 5 121   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
77P/Longmore
 77        2023 03 30.65 xM 14.4 AQ 40.0L 4 261   0.6  4/           ICQ XX WYA   Christopher Wyatt
 77        2023 03 18.65 xM 14.9 AQ 40.0L 4 182   0.8  5/           ICQ XX WYA   Christopher Wyatt
 77        2023 03 16.47 xM 15.1 AQ 40.0L 4 261   0.3  4/           ICQ XX WYA   Christopher Wyatt
 71        2023 03 30.75 &M 13.2 AQ 40.0L 4 182   1.3  3/           ICQ XX WYA   Christopher Wyatt
48P/Johnson
 48        2023 03 27.27  C 20.7 BG 30.5H 4C720                   ICQ XX MAIab John Maikner
19P/Borrelly
 19        2023 03 16.25  C 19.6 BG 30.5H 4C420          4   m305 ICQ XX MAIab John Maikner
12P/Pons-Brooks
 12        2023 03 21.35  C 18.5 BG 30.5H 4C240                   ICQ XX MAIab John Maikner
4P/Faye
  4        2023 03 21.12  C 19.2 BG 30.5H 4a 70                   ICQ XX MAIab John Maikner
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New Discoveries, Recoveries and Other Comets News

Recent Periodic Comet Numberings

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Published in CBET 5227
456P/2021 L4   = P/2012 Q3 (PANSTARRS)
455P/2017 S9   = P/2011 Q5 = P/2022 R7 (PANSTARRS)
454P/2022 U5   = P/2013 W3 (PANSTARRS)
453P/2022 V1   = P/2010 BN109 (WISE-Lemmon)
452P/2003 CC22 = P/2022 B5 (Sheppard-Jewitt)
451P/2007 A2   = P/2006 WY182 = P/2022 S2 (Christensen)
450P/2004 A1   = P/2022 Q3 (LONEOS)
449P/2020 S6   = P/1987 A2 = P/2013 Y3 (Leonard)
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New Discoveries and Recoveries

C/2023 E1 (ATLAS) – The "Asteroid Terrestrial-Impact Last Alert System" (ATLAS) program discovered C/2023 E1 (ATLAS) on 2023 March 1 with their 0.5-m f/2 Schmidt reflector at Sutherland, South Africa. The comet was 18th magnitude at discovery. Pre-discovery observations by the Mount Lemmon, Bok, and Pan-STARRS surveys extended the observational arc back to 2022 December 25.

C/2023 E1 is a Halley family comet with perihelion on 2023 July 1 at 1.03 au and an orbital period of 85 years. The comet will pass 0.37 au from Earth on August 18. A conservative brightening trend of 2.5n = 8 sees a peak brightness achieved in late July to early August at 14th magnitude. As a Halley family comet, it is possible it will brighten rapidly. It is not out of the realm of possibility that C/2023 E1 will become a faint visual object in July and August. [CBET 5233, MPEC 2023-E59]

C/2023 C2 (ATLAS) – The ATLAS program found another comet on 2023 February 1. C/2023 C2 (ATLAS) was 19th magnitude and located 6.7 au from the Sun when first seen with their 0.5-m f/2 Schmidt reflector at Rio Hurtado, Chile. Perihelion occurs next year on 2024 November 16 at 2.37 au. A peak brightness around 12th magnitude should be reached during the 2nd half of 2024 when the comet will be located deep in the southern sky. [CBET 5238, MPEC 2023-F141]

P/2023 C1= P/2016 C3 (Jahn) – Jost Jahn of Amrum, Germany made his first comet discovery on images taken on 2023 February 14 while observing remotely with the 60-cm ROTAT telescope of the Universitaet Tuebingen located at the Observatoire de Haute Provence. Though the observations were made on February 14, Jahn was not able to inspect the data, and report his discovery, until some four weeks after the observations were made.

Pre-discovery observations were not only found earlier in 2023 but also in 2022, 2021, 2016, 2014, and 2013. P/2023 C1 (Jahn) is a short-period comet with perihelion on 2022 October 30 at 2.63 au and an orbital period of 7.6 years. The comet has passed it brightest and should be fading.

P/2010 VH95 (Catalina) – This object was discovered on 2010 November 7 at 19th magnitude with the Catalina Sky Survey 0.68-m Catalina Schmidt north of Tucson, Arizona. Peter Veres, director of the Minor Planet Center, found the object to be cometary in archival images taken by ATLAS in January, February, and March of this year.

P/2010 VH95 (Catalina) is currently just past a 2023 February 21 perihelion at 1.37 au and around 18th magnitude and fading. Its next perihelion will be on 2028 December 23, also at 1.37 au from the Sun. [CBET 5241, MPEC 2023-F167]

The next two comets were reported and announced as suspected comets but due to their unconfirmed nature were designated X/ comets. Maik Meyer and Gary Kronk have been hunting down additional observations of these X/ suspects elevating them to official C/ status.

C/1971 G1 (Edwards) – This X/ comet was photographed on 1971 June 19 by Leonard R. Edwards on three 45-s exposures with a Baker-Nunn camera at Timaru, New Zealand. He reported his discovery roughly a year after the observations were made. Maik Meyer and Gary Kronk have recently identified 11 additional observations taken on 1971 June 20, 22, 23 and July 18, 21, and 25 by J. A. Bruwer and M. Klerk with the 25-cm Franklin-Adams Star Camera located at the Leiden Southern Station of Union/Republic Observatory at Hartbeespoort, South Africa and with a 4.2-cm Damon South Patrol camera located at the Bloemfontein station of Boyden Observatory (and run by the Harvard and Smithsonian Observatories).

The comet was a bright object at 10-11th magnitude in the 1971 images. With a parabolic orbit and perihelion on 1971 December 7 at 2.86 au, C/1971 G1 (Edwards) should have remained bright (12th mag or brighter) for most of 1971 and 1972. The fact that it wasn't imaged outside of June and July 1971 or seen by any visual comet hunters suggest that it was in outburst at the time of discovery and fainter for much of 1971/72. [IAUC 2432, CBET 5239, MPEC 2023-F148]

C/1951 G1 (Groeneveld) – The other newly confirmed X/ object is comet C/1951 G1 (Groeneveld) which was found by Ingrid Groeneveld on plates taken by H. Rubingh on 1951 April 2 during a survey of minor planets undertaken at McDonald Observatory with the Cook Observatory's 25-cm f/7 Ross-Fecker astrograph. The comet was only imaged on a single night and reported to the CBAT in 1954, three years after it was imaged.

M. Meyer, G. W. Kronk, and W. H. Osborn remeasured the discovery image and found additional images of the comet taken with the discovery telescope on 1951 March 31, April 1, 2, 3, 4, and 7 with the comet was around 14-15th magnitude. No trace of the comet was found in other plate archives. A parabolic orbit with a perihelion on 1951 November 7 at 3.65 au was derived for its 9 positions. [IAUC 1437, CBET 5234, MPEC 2023-F18]

Comets Between Magnitude 6 and 10

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-F200)

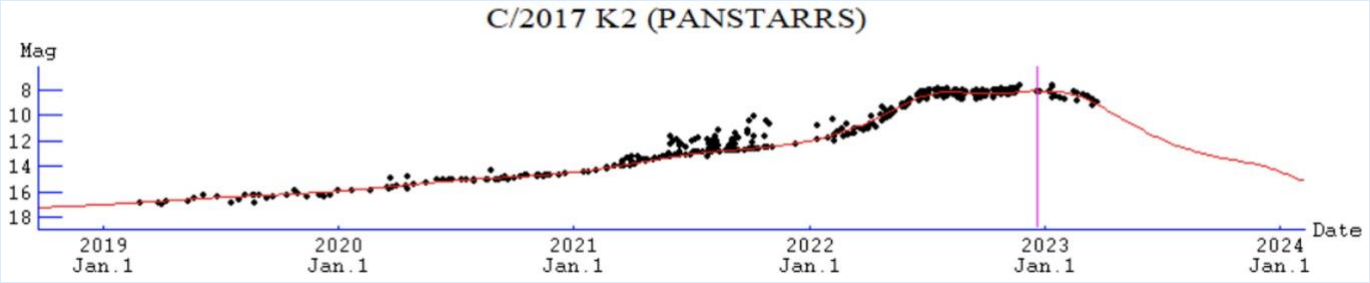
```
    C/2017 K2 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2022 Dec. 19.68887 TT                                  Rudenko
q   1.7968942           (2000.0)            P               Q
z  -0.0004370      Peri.  236.20153     +0.01818936     +0.04921870
 +/-0.0000001      Node    88.23602     -0.18087315     +0.98247054
e   1.0007853      Incl.   87.56336     -0.98333822     -0.17980312
From 11448 observations 2013 May 12-2022 Dec. 30, mean residual 0".6.
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-Apr-01  03 43  -39 19   2.211   2.519     60E    Eri    9.4      0   43
2023-Apr-06  03 54  -36 39   2.247   2.582     59E    Eri    9.5      0   41
2023-Apr-11  04 05  -34 07   2.283   2.648     58E    Eri    9.7      0   40
2023-Apr-16  04 14  -31 44   2.321   2.718     56E    Eri    9.8      0   38
2023-Apr-21  04 23  -29 30   2.359   2.790     54E    Eri   10.0      0   37
2023-Apr-26  04 32  -27 26   2.398   2.863     53E    Eri   10.1      0   35
2023-May-01  04 40  -25 30   2.438   2.937     51E    Eri   10.3      0   33
2023-May-06  04 48  -23 43   2.478   3.012     49E    Eri   10.4      0   30
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  4.2 + 5 log d +  6.6 log r [Through T-150 days]
m1 =  4.8 + 5 log d +  5.0 log r [From T-150 days to perihelion]
m1 =  2.9 + 5 log d + 13.0 log r [Since 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 03 23.92  M  9.4 TK 10.0B    25   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 21.93  M  9.4 TK 10.0B    25   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 19.93  M  9.3 TK 10.0B    25   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 18.92  M  9.3 TK 10.0B    25   2    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 18.43 xM  9.1 TK  7.0B    15   7.5  5  15   m214 ICQ XX WYA   Christopher Wyatt
   2017K2  2023 03 16.92  M  9.2 TK 10.0B    25   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2017K2  2023 03 16.40 xM  9.2 TK  7.0B    15   9    4  21   m199 ICQ XX WYA   Christopher Wyatt
   2017K2  2023 03 06.93  M  8.7 TK 10.0B    25   3    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

C/2017 K2 (PANSTARRS) should continue to fade from around magnitude 9.4 to 10.3 in April. Jose Guilherme de Souza Aguiar and Chris Wyatt consistently found K2 between magnitude 8.7 to 9.4 in March. In 25x100 binoculars, Jose measured a small 2-3' while Chris noted a larger 7.5-9' coma in 15x70 binoculars. Chris also detected a 15 to 21 arc min tail. K2 remains visible only to southern hemisphere observers. It is an evening object moving through Eridanus.

C/2020 V2 (ZTF)

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

Orbit (from Minor Planet Center, MPEC 2023-F200)

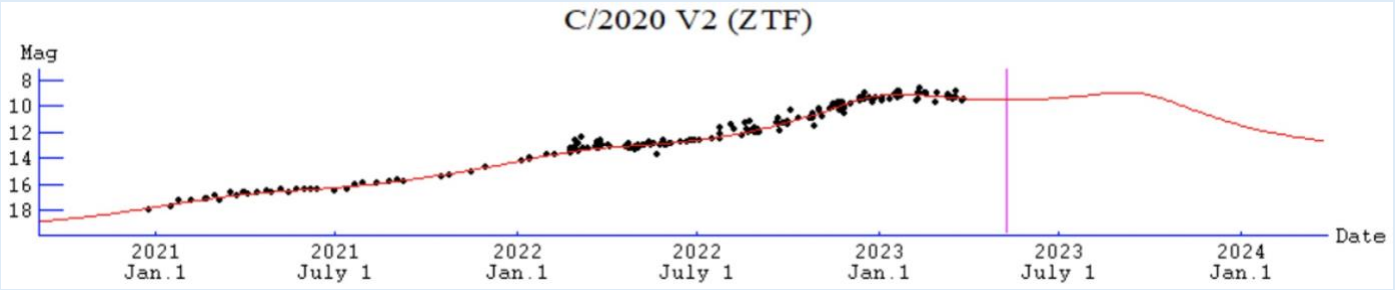
```
    C/2020 V2 (ZTF)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 8.56972 TT                                  Rudenko
q   2.2278416           (2000.0)            P              Q
z  -0.0004175      Peri.  162.43154     +0.69787244     +0.59390371
 +/-0.0000002      Node   212.37213     +0.53387554     -0.05876990
e   1.0009301      Incl.  131.61090     +0.47744211     -0.80238674
From 4292 observations 2020 Apr. 18-2023 Mar. 27, 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-Apr-01  02 10  +32 13    2.270   3.012     35E   Tri    9.5    17    0
2023-Apr-06  02 14  +31 05    2.259   3.060     30E   Tri    9.5    13    0
2023-Apr-11  02 18  +30 01    2.251   3.103     26E   Tri    9.5     8    0
2023-Apr-16  02 22  +29 00    2.243   3.139     22E   Tri    9.5     4    0
2023-Apr-21  02 26  +28 03    2.237   3.169     18E   Tri    9.5     0    0
2023-Apr-26  02 30  +27 09    2.233   3.192     14E   Ari    9.5     0    0
2023-May-01  02 34  +26 16    2.230   3.208     11E   Ari    9.5     0    0
2023-May-06  02 37  +25 25    2.228   3.217      9M   Ari    9.5     0    0
```

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
   2020V2  2023 03 26.86  S  9.8 TK 20.3T10  77   3    5/           ICQ XX GON05 Juan Jose Gonzalez Suarez
   2020V2  2023 03 24.83  S 10.0 TI 29.8L 4  79   2.8  3/           ICQ XX HAR11 Christian Harder
   2020V2  2023 03 19.82  S  9.8 TI 29.8L 4  79   2.7  3/           ICQ XX HAR11 Christian Harder
   2020V2  2023 03 18.79  S  9.4 TK 32.0L 5  80   2    4   0.07  50       PIL01 Uwe Pilz
   2020V2  2023 03 15.85  S  9.7 TK 20.3T10  77   3.5  4/  0.1   20 ICQ XX GON05 Juan Jose Gonzalez Suarez
   2020V2  2023 03 15.82  S 10.0 TI 35.3L   105  2    4            ICQ XX HAR11 Christian Harder
   2020V2  2023 03 11.83  S  9.9 TI 35.3L   105  2    3/           ICQ XX HAR11 Christian Harder
```

C/2020 V2 (ZTF) is a month out from a 2023 May 8 perihelion at 2.23 au from the Sun. V2 will stay brighter than magnitude 10 for most of 2023. This month, C/2022 V2 is a far northern evening object in Triangulum (Apr 1-22) and Aries (22-30). It is approaching solar conjunction and as a result all observers, even northern ones, will lose sight of the comet by mid-month. It will reappear in the morning sky for most observers in June or July when it should still be around its current 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-F200)

```
    C/2022 A2 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Feb. 18.26663 TT                                  Rudenko
q   1.7352949           (2000.0)            P              Q
z  -0.0001874      Peri.   88.36673     +0.01739534     +0.99011804
 +/-0.0000001      Node   171.57949     -0.09144952     -0.13701558
e   1.0003251      Incl.  108.14697     +0.99565777     -0.02988321
From 984 observations 2022 Jan. 9-2023 Mar. 28, mean residual 0".5.
1/a(orig) = -0.000051 AU**-1, 1/a(fut) = -0.000068 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-Apr-01  23 48  +43 53   1.818   2.447     41M    And    9.8    17    0
2023-Apr-06  23 57  +43 00   1.838   2.502     39M    And    9.9    17    0
2023-Apr-11  00 05  +42 12   1.861   2.552     37M    And   10.0    17    0
2023-Apr-16  00 13  +41 29   1.885   2.596     36M    And   10.2    17    0
2023-Apr-21  00 19  +40 49   1.911   2.635     35M    And   10.3    17    0
2023-Apr-26  00 25  +40 12   1.938   2.666     35M    And   10.5    18    0
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
```

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]
```

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 02 26.79  S  9.5 TI 35.3L   105   2.2  3           ICQ XX HAR11 Christian Harder
   2022A2  2023 02 25.82  S  9.2 TI 29.8L 4  79   3.2  3           ICQ XX HAR11 Christian Harder
   2022A2  2023 02 16.91  S  8.4 TK  7.0B    15   6    4           ICQ XX GON05 Juan Jose Gonzalez Suarez
   2022A2  2023 02 16.89  S  8.6 TK 20.3T10  77   5    4           ICQ XX GON05 Juan Jose Gonzalez Suarez
   2022A2  2023 02 14.79  S  9.2 TI 53.1L   111   3.5  3/          ICQ XX HAR11 Christian Harder
   2022A2  2023 02 10.87  S  8.5 TK  7.0B    15   7    4           ICQ XX GON05 Juan Jose Gonzalez Suarez
   2022A2  2023 02 08.75  S  9.6 TI 29.8L 4  92   2.4  3/          ICQ XX HAR11 Christian Harder
```

C/2022 A2 (PANSTARRS) is a dynamically new long-period comet which 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 been the case for the past few months, C/2022 A2 is a northern object limited to northern hemisphere observers. It is currently observable low in the morning sky as it moves through Andromeda.

Comets Between Magnitude 10 and 12

237P/LINEAR

Discovered 2022 June 6 by LINEAR
Short-period Jupiter-family comet

Orbit (from Minor Planet Center, MPEC 2023-F200)

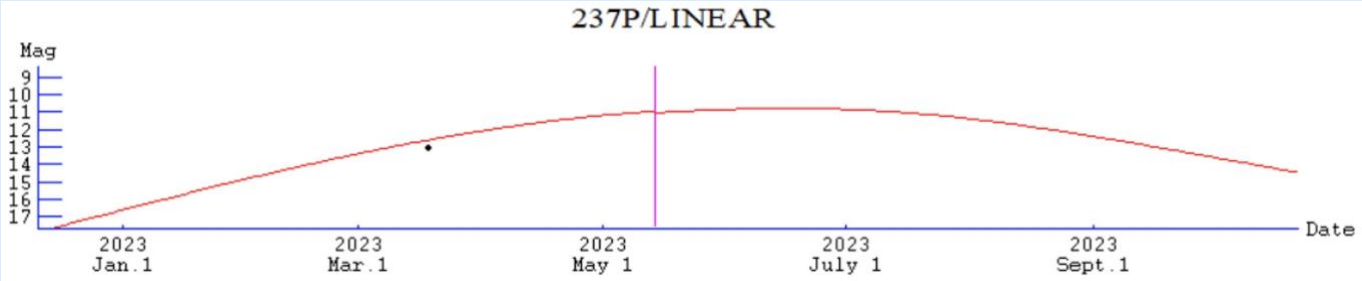
```
237P/LINEAR
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 14.67856 TT                                  Rudenko
q   1.9870432            (2000.0)            P              Q
n   0.14981663     Peri.   25.26157     -0.00072435     +0.97546658
a   3.5109881      Node   245.35866     -0.95368211     -0.06689731
e   0.4340502      Incl.   14.01657     -0.30081541     +0.20973723
P   6.58
From 617 observations 2002 June 18-2023 Mar. 28, mean residual 0".8.
```

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-Apr-01  18 51  -20 57   2.016   1.774    88M    Sgr  12.1     23   63
2023-Apr-06  19 00  -20 06   2.010   1.718    91M    Sgr  11.9     24   64
2023-Apr-11  19 08  -19 12   2.004   1.662    94M    Sgr  11.7     25   66
2023-Apr-16  19 16  -18 15   1.999   1.608    97M    Sgr  11.6     26   66
2023-Apr-21  19 24  -17 14   1.995   1.555   100M    Sgr  11.5     27   66
2023-Apr-26  19 31  -16 11   1.991   1.504   103M    Sgr  11.3     28   66
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
```

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 03 30.67 xM 14.1 AQ 40.0L 4 182   0.4  5           ICQ XX WYA   Christopher Wyatt
237        2023 03 18.69 xM 13.9 AQ 40.0L 4 182   0.2  4/          ICQ XX WYA   Christopher Wyatt
```

Short-period comet 237P/LINEAR was discovered on 2002 June 6 by the Lincoln Near-Earth Asteroid Research, or LINEAR, program with their 0.5-m telescope at Socorro, New Mexico. At the time the object was observed to be asteroidal and given the asteroid designation 2002 LN13. Its cometary nature was identified one orbit, and almost exactly 8 years, later on 2010 June 10 by the WISE spacecraft.

The few observations made during the 2002 return were all taken more than 1 month before perihelion and presumably didn't show any activity. All of the observations during the 2010 return were taken 7 or more months after perihelion. During those returns, perihelion was at a distance of 2.42 au. A close approach to

Jupiter in March 2013 at 0.41 au resulted in perihelion dropping to 1.98 au. Perhaps due to the closer distance to the Sun, 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) and a smaller minimum Earth-comet distance (1.06 vs 1.40 au). This makes the current return the best-known return for this comet though returns in 2036 and 2056 will only be slightly worse.

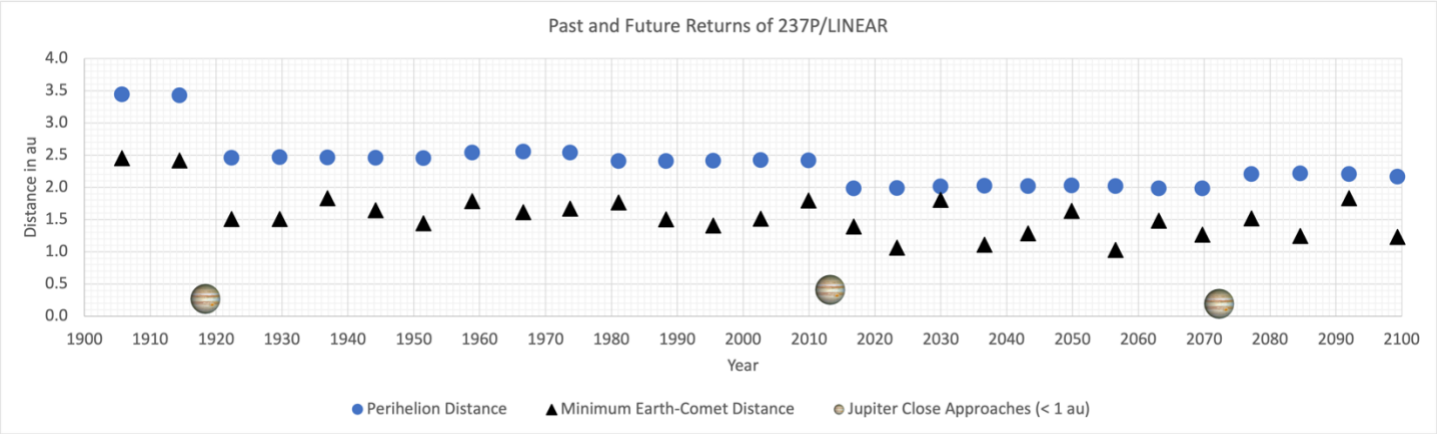


Figure 1 - Orbital evolution of comet 237P/LINEAR between 1900 and 2100. Orbit data from the JPL Horizons service.

The predicted magnitudes in the above ephemeris above are based on values from Seiichi Yoshida. The prediction finds 237P brightening from magnitude 12.1 to 11.2 this month on its way to a peak brightness around magnitude 10.8 in June. Note, that in 2016 some observers found 237P up to 2 magnitudes brighter than that predicted by Yoshida photometric parameters. If those bright reports were correct then 237P may become brighter than magnitude 10.8.

237P's low activity at small heliocentric distances has allowed direct observation of its nucleus. Its absolute magnitude of 15.0 combined with an assumed albedo of 0.04 yields a rather large nucleus diameter of 6.6 km.

This month, 237P will be a morning object in Sagittarius visible from both hemispheres.

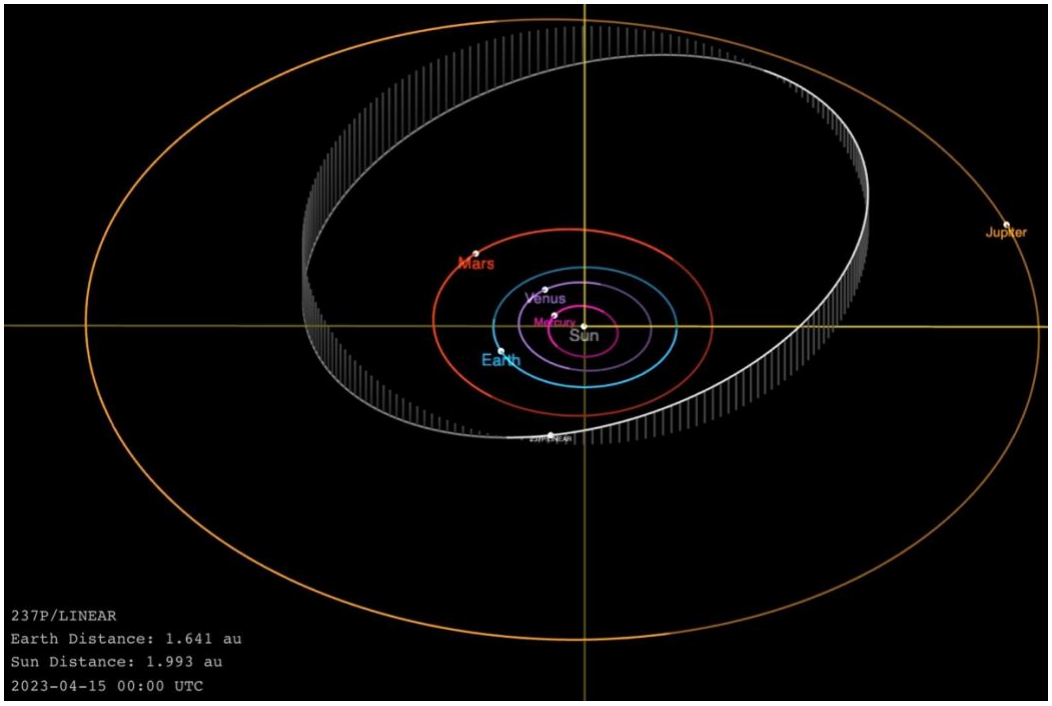


Figure 2 - The orbit of comet 237P/LINEAR from the JPL Small Body Browser service.

364P/PANSTARRS

Discovered on 2013 February 1 by Pan-STARRS
Jupiter-family comet

Orbit (from Minor Planet Center, MPEC 2023-F200)

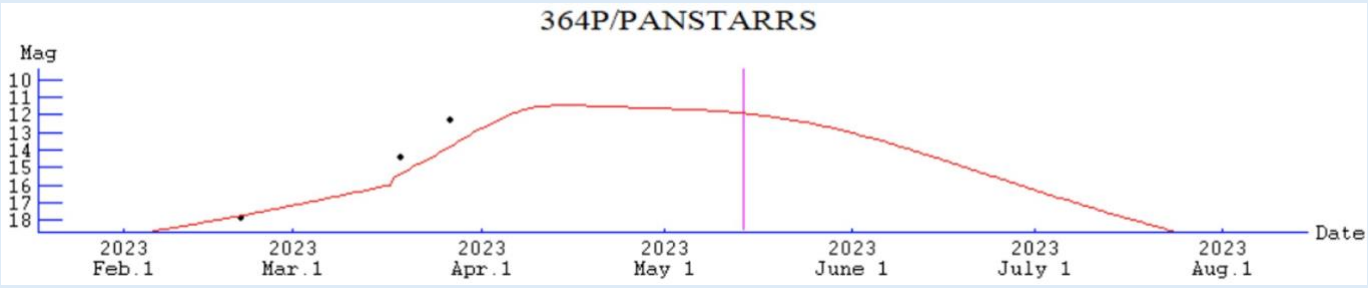
```
364P/PANSTARRS
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 May 14.01611 TT                                  Rudenko
q   0.8013037            (2000.0)            P              Q
n   0.20161966     Peri.  212.00956     -0.21364467     +0.96507520
a   2.8803646      Node    46.15494     -0.84612619     -0.10523022
e   0.7218048      Incl.   12.13498     -0.48828928     -0.23990928
P   4.89
From 1115 observations 2013 Feb. 1-2023 Mar. 28, mean residual 0".6.
     Nongravitational parameters A1 = -0.00, 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-Apr-01  17 09  +32 06   1.049   0.143    106M    Her   12.8    80   18
2023-Apr-06  18 56  +27 50   1.002   0.122     87M    Lyr   12.0    61   20
2023-Apr-11  20 44  +17 24   0.959   0.126     66M    Del   11.5    37   22
2023-Apr-16  22 01  +06 47   0.919   0.153     52M    Peg   11.5    18   23
2023-Apr-21  22 50  -00 22   0.883   0.195     46M    Aqr   11.5     7   24
2023-Apr-26  23 23  -04 40   0.853   0.244     45M    Aqr   11.6     0   26
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
```

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
```



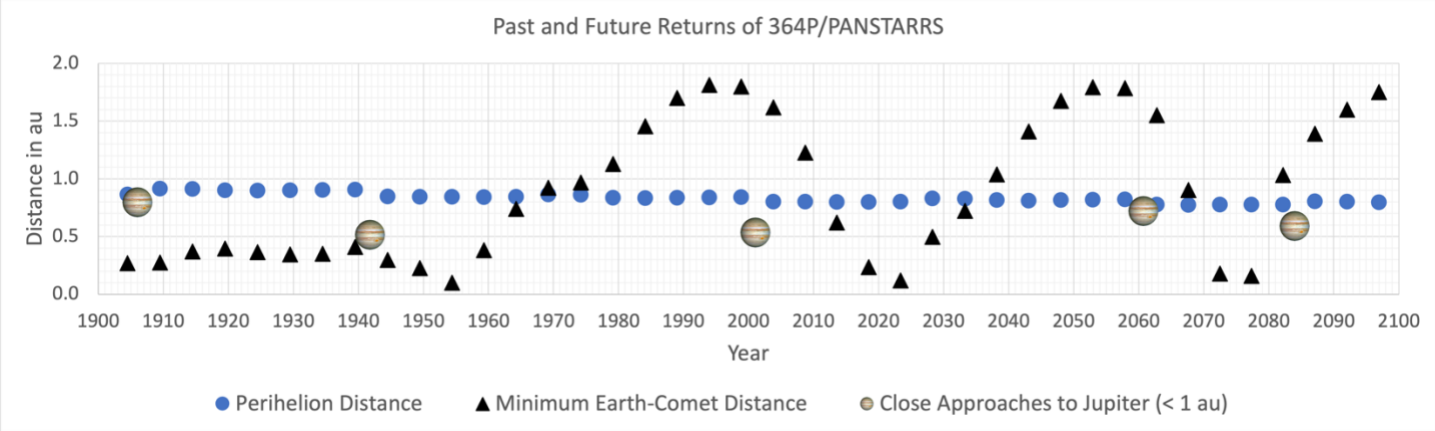
Recent Magnitude Measurements Contributed to the ALPO Comets Section

```
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 03 30.70 xM 13.9 AQ 40.0L 4 182   0.3  6           ICQ XX WYA   Christopher Wyatt
364        2023 03 27.03  S 12.6 AQ 20.3T10  77   2.5  3           ICQ XX GON05 Juan Jose Gonzalez Suarez
364        2023 03 18.66 xM 15.0 AQ 40.0L 4 182   0.3  6           ICQ XX WYA   Christopher Wyatt
```

364P/PANSTARRS is another high numbered periodic comet becoming brighter than usual in 2023. Like 237P, 364P was also originally designated as an asteroid having been found by the PANSTARRS program on 2013 February 1 and designated 2013 CU129. In June 2013, about 2 months before perihelion, it sprouted a tail and was redesignated comet P/2013 CU129. It has since been observed at a return in 2018 when it was rechristened 364P/PANSTARRS and at this year's return.

364P is one of a small number of Jupiter-family comets that only become active at small heliocentric distances. Other examples include 162P/Siding Spring, 169P/NEAT, 209P/LINEAR, 249P/LINEAR, and 300P/Catalina. A dynamical study of these objects suggests that they may not have originated in the Kuiper Belt like most Jupiter family comets, but rather are volatile-rich asteroids from the Main Belt, perhaps escaped "Active Asteroids" (Fernandez & Sosa, "Jupiter family comets in near-Earth orbits: Are some of them interlopers from the asteroid belt?", Planetary & Space Science 118, 14-24, 2015).

2023 sees 364P making a close approach to Earth on April 7 at 0.12 au and perihelion on May 14 at 0.80 au. This makes 2023 its best return since 1954 (close approach to Earth of 0.10 au). During its last return in 2018 it passed 0.24 au from Earth and reached 11th magnitude. Its next return in 2028 will be more distant from Earth at a minimum of 0.50 au. The comet is currently in a cycle that brings it close to Earth roughly every 50-70 years. After this year, its next good returns won't be till 2072 and 2077 at 0.18 and 0.16 au, respectively.



Juan Jose Gonzalez Suarez and Chris Wyatt both observed 364P in March. They observed a rapidly brightening comet at an aperture corrected magnitude of 14.4 on the 18th, 12.3 on the 27th, and 13.3 on the 30th. These measurements are running brighter than Seiichi Yoshida's photometric parameters which predict a peak brightness of 11.5 in mid-April.

Just like with 237P, 364P's inactivity at small heliocentric distances mean its nucleus can be observed rather easily. An absolute magnitude of 16.5 and assumed albedo of 0.04 means the nucleus of 364P is about 3.3 km in diameter, half the diameter and assuming the same density, ~1/8th the mass of 237P/LINEAR.

This month, 364P is a morning object rapidly moving through Hercules (Apr 1-4), Lyra (4-7), Vulpecula (7-9), Delphinus (9-12), Equuleus (12-13), Pegasus (13-18), Aquarius (18-21), Pisces (21-24), and Aquarius again (24-30). At the beginning of the month, it will be observable from both hemispheres but due to its southerly motion will be lost to northern observers by the end of the month. It will remain well placed for southern observers for the duration of its time as a visual object.

C/2019 L3 (ATLAS)

Discovered 2019 June 10 by the ATLAS survey with one of their 0.5-m f/2 Schmidt
Dynamically old long-period comet

Orbit (from Minor Planet Center, MPEC 2023-F200)

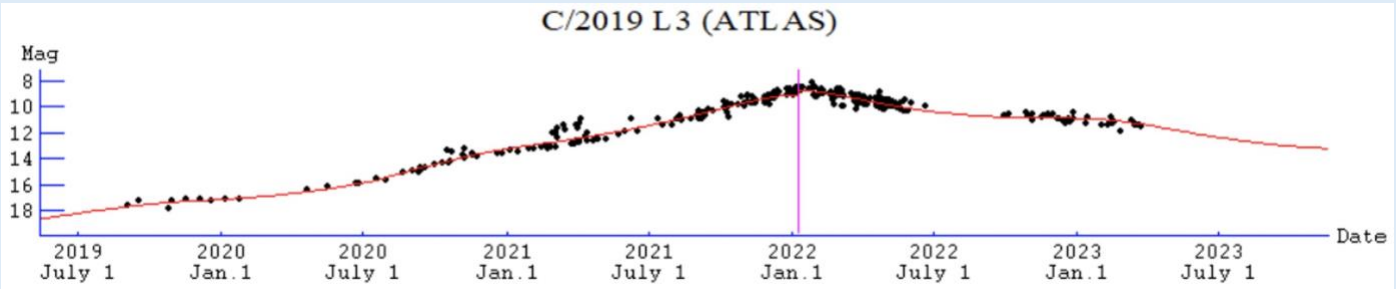
```
    C/2019 L3 (ATLAS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2022 Jan.  9.64920 TT                                  Rudenko
q   3.5544200           (2000.0)            P              Q
z  -0.0005755      Peri.  171.61731     -0.26040725     -0.66641989
 +/-0.0000001      Node   290.77988     +0.83684009     +0.20510134
e   1.0020455      Incl.   48.35090     +0.48154619     -0.71681098
From 6078 observations 2019 June 10-2023 Mar. 28, mean residual 0".5.
1/a(orig) = +0.000108 AU**-1, 1/a(fut) = -0.000875 AU**-1.
```

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

```
C/2019 L3 (ATLAS)                                                  Max El
                                                                    (deg)
    Date       R.A.    Decl.     r       d     Elong  Const  Mag   40N  40S
2023-Apr-01  09 03  -33 42   5.285   4.688    121E   Pyx  11.4    16   84
2023-Apr-06  09 02  -33 21   5.315   4.753    119E   Pyx  11.5    17   83
2023-Apr-11  09 01  -32 59   5.346   4.822    116E   Pyx  11.5    17   83
2023-Apr-16  09 01  -32 38   5.376   4.895    113E   Pyx  11.6    17   83
2023-Apr-21  09 01  -32 17   5.407   4.970    110E   Pyx  11.6    16   82
2023-Apr-26  09 02  -31 57   5.438   5.047    107E   Pyx  11.7    14   82
2023-May-01  09 03  -31 37   5.468   5.127    104E   Pyx  11.8    13   82
2023-May-06  09 04  -31 19   5.499   5.209    101E   Pyx  11.8    11   80
```

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

```
m1 =  2.5 + 5 log d + 12.1 log r [Until T-550 days]
m1 = -4.9 + 5 log d + 21.7 log r [Between T-550 and T+0 days]
m1 =  2.3 + 5 log d +  8.0 log r [Since T+0 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
   2019L3  2023 03 30.64 xM 12.2 AQ 40.0L 4  59   1.6  4            ICQ XX WYA   Christopher Wyatt
   2019L3  2023 03 23.99  M 12.0 AQ 30.0L 5 100   1    2/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 21.99  M 11.9 AQ 30.0L 5 100   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 18.98  M 11.8 AQ 30.0L 5 100   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 18.45 xM 12.0 AQ 40.0L 4  59   2    5/           ICQ XX WYA   Christopher Wyatt
   2019L3  2023 03 16.98  M 11.7 AQ 30.0L 5  89   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019L3  2023 03 16.46 xM 12.0 AQ 40.0L 4  59   2.3  4/           ICQ XX WYA   Christopher Wyatt
```

C/2019 L3 (ATLAS) is still with us now a year since its 2022 January 9 perihelion at 3.55 au. At that time the comet reached a peak magnitude of ~8.5 to 9.0. Since perihelion, it has faded at a slow though normal rate of 8.0 log r. Visual observers found L3 at magnitude 11.7 to 12.2 (aperture and bias corrected to 11.0 to 11.6) with a small 1-2.3' poorly to moderately condensed (DC = 2.5 to 5.5) coma. This month, the comet is visible from both hemispheres though low in the south for northerners as it moves through the southern constellation of Pyxis in the evening sky.

C/2019 U5 (PANSTARRS)

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

Orbit (from Minor Planet Center, MPEC 2023-F200)

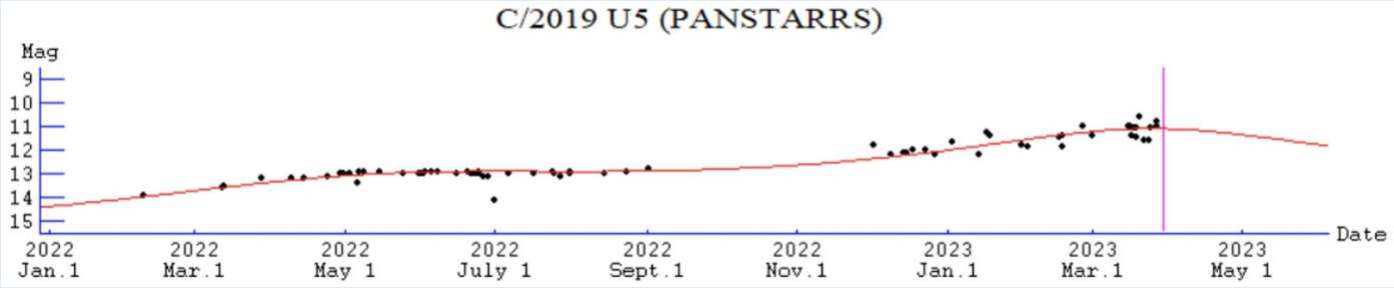
```
    C/2019 U5 (PANSTARRS)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Mar. 29.85175 TT                                  Rudenko
q   3.6242012            (2000.0)            P              Q
z  -0.0004087      Peri.  181.49726     -0.99907954     +0.00774435
 +/-0.0000002      Node     2.63735     -0.02311588     +0.73134183
e   1.0014813      Incl.  113.52059     -0.03613493     -0.68196711
From 3591 observations 2019 Oct. 11-2023 Mar. 28, 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-Apr-01  11 50   -01 38    3.624   2.642    167E   Vir   11.1     48   52
2023-Apr-06  11 40   -01 50    3.625   2.667    160E   Vir   11.1     48   52
2023-Apr-11  11 30   -02 03    3.626   2.705    152E   Leo   11.2     48   52
2023-Apr-16  11 20   -02 15    3.628   2.753    145E   Leo   11.2     48   52
2023-Apr-21  11 11   -02 29    3.630   2.811    139E   Leo   11.3     47   53
2023-Apr-26  11 03   -02 43    3.632   2.878    132E   Leo   11.3     47   53
2023-May-01  10 56   -02 57    3.636   2.953    125E   Leo   11.4     47   53
2023-May-06  10 49   -03 13    3.640   3.034    119E   Leo   11.4     45   53
```

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

```
m1 =  3.8 + 5 log d +  9.3 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 03 30.65 xM 12.0 AQ 40.0L 4  59   1.2  6   7.3 m 53 ICQ XX WYA   Christopher Wyatt
   2019U5  2023 03 27.08  S 10.3 TK 20.3T10  77   6    3            ICQ XX GON05 Juan Jose Gonzalez Suarez
   2019U5  2023 03 26.94  S 11.4 TI 29.8L 4  92   2    3   4   m 45 ICQ XX HAR11 Christian Harder
   2019U5  2023 03 24.83  S 11.5 TI 29.8L 4 108   2.7  3            ICQ XX HAR11 Christian Harder
   2019U5  2023 03 24.14  M 12.0 AQ 30.0L 5 100   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 03 22.13  M 12.0 AQ 30.0L 5 100   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 03 19.84  S 11.0 TI 29.8L 4  92   1.5  2/           ICQ XX HAR11 Christian Harder
   2019U5  2023 03 19.14  M 11.9 AQ 30.0L 5 100   1    3            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 03 19.10  S 11.5 TI 29.8L 4 108   2    2            ICQ XX HAR11 Christian Harder
   2019U5  2023 03 18.44 xM 12.2 AQ 40.0L 4  59   1.5  6   5.6 m 53 ICQ XX WYA   Christopher Wyatt
   2019U5  2023 03 17.13  M 11.8 AQ 30.0L 5 100   1    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2019U5  2023 03 16.46 xM 12.1 AQ 40.0L 4  59   1.3  5/           ICQ XX WYA   Christopher Wyatt
   2019U5  2023 03 15.89  S 10.5 TK 20.3T10  77   6    2            ICQ XX GON05 Juan Jose Gonzalez Suarez
```

C/2019 U5 (PANSTARRS) was discovered by the Pan-STARRS at 21st magnitude and 10.4 au from the Sun. The comet is only days from a March 29 perihelion at 3.62 au. It is an evening object in Virgo (Apr 1-7) and Leo (7-30) and should still be at its best around magnitude 11.1 to 11.4 this month. Most visual observers in March saw U5 as a poorly condensed object with a small 1-2' coma and short tail.

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-F200)

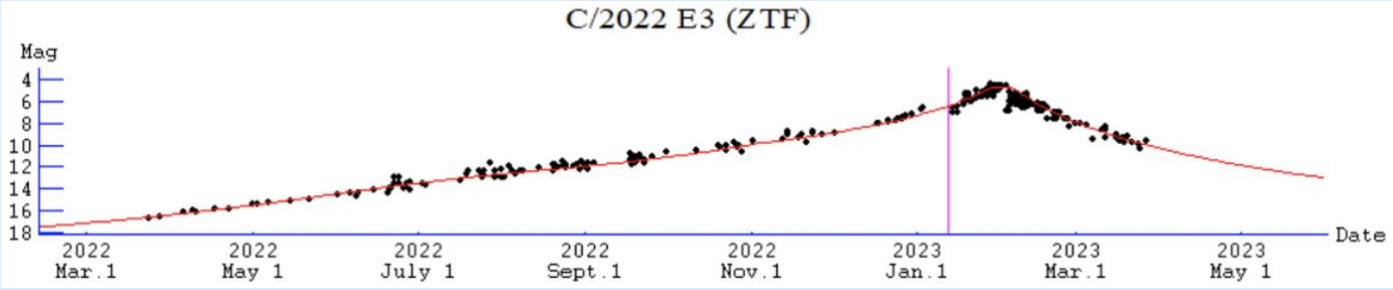
```
    C/2022 E3 (ZTF)
Epoch 2023 Feb. 25.0 TT = JDT 2460000.5
T 2023 Jan. 12.78522 TT                                  Rudenko
q   1.1122477           (2000.0)            P               Q
z  -0.0002897      Peri.  145.81574     -0.60064654     -0.07340467
 +/-0.0000003      Node   302.55566     +0.33753023     +0.87940739
e   1.0003222      Incl.  109.16851     +0.72477381     -0.47037687
From 7449 observations 2021 July 10-2023 Mar. 27, 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-Apr-01  04 52  -07 39   1.654   1.822     64E    Eri   10.3    21   38
2023-Apr-06  04 55  -08 23   1.708   1.950     61E    Eri   10.6    17   37
2023-Apr-11  04 59  -09 04   1.764   2.073     58E    Eri   10.9    12   36
2023-Apr-16  05 02  -09 42   1.820   2.190     55E    Eri   11.2     8   35
2023-Apr-21  05 06  -10 19   1.876   2.303     52E    Eri   11.4     3   34
2023-Apr-26  05 10  -10 55   1.933   2.410     50E    Lep   11.6     0   32
2023-May-01  05 14  -11 31   1.990   2.511     48E    Lep   11.8     0   31
2023-May-06  05 18  -12 07   2.047   2.607     46E    Lep   12.1     0   29
```

Comet Magnitude Formula (from ALPO and COBS data)

```
m1 =  5.8 + 5 log d + 12.3 log r [Through T-70 days]
m1 =  6.9 + 5 log d +  6.8 log r [T-70 to perihelion]
m1 =  6.8 + 5 log d + 10.2 log r [Since perihelion, 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
   2022E3  2023 03 26.87  S  9.9 TK 20.3T10  77   4    5            ICQ XX GON05 Juan Jose Gonzalez Suarez
   2022E3  2023 03 24.81  S 10.7 TI 29.8L 4  92   2    3            ICQ XX HAR11 Christian Harder
   2022E3  2023 03 23.93  M 10.3 TK 30.0L 5  89   2    4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 03 21.94  M 10.2 TK 30.0L 5  89   2    3/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 03 19.81  S  9.6 TI 29.8L 4  79   2.5  3/           ICQ XX HAR11 Christian Harder
   2022E3  2023 03 18.93  M 10.2 TK 30.0L 5  89   2    4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 03 18.44 xM  9.3 TK  7.0B    15   7.5  4/           ICQ XX WYA   Christopher Wyatt
   2022E3  2023 03 16.93  M 10.1 TK 30.0L 5  89   2    4/           ICQ XX DES01 Jose Guilherme de Souza Aguiar
   2022E3  2023 03 16.44 xM  9.3 TK  7.0B    15   5.5  4            ICQ XX WYA   Christopher Wyatt
   2022E3  2023 03 15.86  S  9.4 TK 20.3T10  77   5    5    0.2   60 ICQ XX GON05 Juan Jose Gonzalez Suarez
   2022E3  2023 03 15.81  S  9.9 TI 35.3L   105   2.8  3/   6   m 77 ICQ XX HAR11 Christian Harder
   2022E3  2023 03 11.82  S  8.8 TI 35.3L    88   3.5  4    4.5 m 80 ICQ XX HAR11 Christian Harder
   2022E3  2023 03 11.77  S  9.6 TK 10.5R 6  53   2         0.07  80        PIL01 Uwe Pilz
   2022E3  2023 03 06.95  M  9.9 TK 30.0L 5  89   2    4            ICQ XX DES01 Jose Guilherme de Souza Aguiar
```

C/2022 E3 (ZTF) was discovered on 2022 March 2 at 17th magnitude by the Zwicky Transient Facility (ZTF) with the 1.2-m f/2.4 Schmidt on Mount Palomar when it was 4.3 au from the Sun. ZTF is a dynamically old

long-period comet which means this is not its first time approaching close to the Sun. Based on the latest orbit published by the Minor Planet Center, it was last at perihelion nearly 47,000 years ago. Perturbations by the major planets do result in this possibly being its last trip through the inner solar system. The negative 1/a(fut) value means it will recede back into the depth of deep space on a hyperbolic orbit and may ultimately leave our solar system forever.

C/2023 E3 currently holds the title of Best Comet of 2023, at least so far. Since its January/February peak at 4th magnitude it has faded significantly. Its peak brightness was mainly due to a close approach to the Earth on February 1 at 0.29 au. Since then, E3 has rapidly moved away from the Earth, starting April at 1.82 au and ending the month at 2.51 au from Earth. As a result, it should fade even further from magnitude 10.3 to 12.1 this month.

The show will end for northern hemisphere observers by mid-month. Due to its location south of the Sun in the evening sky, it will remain visible to southern observers as it moves through Eridanus (Apr 1-25) and Lepus (25-30) in the evening sky.

Figure 3 - Christian Harder sketched C/2022 E3 (ZTF) on 2023 March 11 as it shared the stage with 10th magnitude galaxy NGC 1637. Christian used a 14" dobsonian at 88x.