

Lunar Meteor Schedule and Observing Plan for 2019

This form outlines the plan to monitor the moon on a regular basis both inside and outside normal annual showers. Each month, for a total of up to 14 days per month, we are coordinating observations of the Earthshine portion of the moon for background (including the minor showers when they fall during this time) meteor impact flux. A typical run of observations starts three days after New Moon and continues until two days past First Quarter. The run resumes a two days before Last Quarter and continues until three days prior to New Moon. The actual interval will depend on the lunar elevation and elongation as well as the ability of the observer to control stray light in one's system.

Shower	Activity	Maximum Date	Radiant			V_{∞} km/s	r	ZHR
			λ_{\odot}	α	δ			
Antihelion Source (ANT)	Dec 10 – Sep 10	Mar-Apr, late May, late June				30	3.0	4
Quadrantids (QUA)	Dec 28 - Jan 12	Jan 04	283.16°	230°	+49°	41	2.1	110
γ -Ursae Minorids (GUM)	Jan 10 - Jan 22	Jan 18	298°	228°	+67°	31	3.0	3
α-Centaurids (ACE)	Jan 31 - Feb 20	Feb 08	319.2°	210°	-59°	58	2.0	6
γ-Normids (GNO)	Feb 25 - Mar 28	Mar 15	354°	239°	-50°	56	2.4	6
Lyrids (LYR)	Apr 14 - Apr 30	Apr 23	32.32°	271°	+34°	49	2.1	18
π -Puppids (PPU)	Apr 15 – Apr 28	Apr 24	33.5°	110°	-45°	18	2.0	Var
η -Aquariids (ETA)	Apr 19 - May 28	May 06	45.5°	338°	-01°	66	2.4	50
η -Lyrids (ELY)	May 03 - May 14	May 09	48.0°	287°	+44°	43	3.0	3
June Bootids (JBO)	Jun 22 - Jul 02	Jun 27	95.7°	224°	+48°	18	2.2	Var
Piscis Austrinids (PAU)	Jul 15 - Aug 10	Jul 28	125°	341°	-30°	35	3.2	5
South. δ-Aqr (SDA)	Jul 12 - Aug 23	Jul 30	127°	340°	-16°	41	2.5	25
α-Capricornids (CAP)	Jul 03 - Aug 15	Jul 30	127°	307°	-10°	23	2.5	5
Perseids (PER)*	Jul 17 - Aug 24	Aug 13	140.0°	48°	+58°	59	2.2	110
κ -Cygnids (KCG)	Aug 03 - Aug 25	Aug 18	145°	286°	+59°	25	3.0	3
Aurigids (AUR)	Aug 28 - Sep 05	Sep 01	158.6°	91°	+39°	66	2.5	6
September ϵ -Per (SPE)	Sep 05 - Sep 21	Sep 09	166.7°	48°	+40°	64	3.0	5
Oct. Camelopard. (OCT)	Oct 05 – Oct 06	Oct 06	192.58°	164°	+79°	47	2.5	5
Draconids (DRA)	Oct 06 - Oct 10	Oct 09	195.4°	262°	+54°	20	2.6	10
Southern Taurids (STA)	Sep 10 - Nov 20	Oct 10	197°	32°	+09°	27	2.3	5
δ -Aurigids (DAU)	Oct 10 - Oct 18	Oct 11	198°	84°	+44°	64	3.0	2
ϵ-Geminids (EGE)	Oct 14 - Oct 27	Oct 19	205°	102°	+27°	70	3.0	3
Orionids (ORI)	Oct 02 - Nov 07	Oct 22	208°	95°	+16°	66	2.5	15
Leo Minorids (LMI)	Oct 19 – Oct 27	Oct 25	211°	162°	+37°	62	3.0	2
Northern Taurids (NTA)	Oct 20 - Dec 10	Nov 13	230°	58°	+22°	29	2.3	5
Leonids (LEO)	Nov 06- Nov 30	Nov 18	235.27°	152°	+22°	71	2.5	15
α-Monocerotids (AMO)	Nov 15 - Nov 25	Nov 22	239.32°	117°	+01°	65	2.4	Var
Nov. Orionids (NOO)	Nov 13 – Dec 06	Nov 28	246°	91°	+16°	44	3.0	3
Phoenicids (PHO)	Nov 28 - Dec 09	Dec 02	250.0°	18°	-53°	18	2.8	Var
Puppids-Velids (PUP)	Dec 01 - Dec 15	(Dec 07)	(255°)	123°	-45°	40	2.9	10
Monocerotids (MON)	Dec 05 - Dec 20	Dec 09	257°	100°	+08°	41	3.0	2
σ -Hydrids (HYD)	Dec 03 - Dec 15	Dec 12	260°	127°	+02°	58	3.0	3
Geminids (GEM)	Dec 04 - Dec 17	Dec 14	262.2°	112°	+33°	35	2.6	140
Comae Berenicids (COM)	Dec 12 - Dec 23	Dec 16	264°	175°	+18°	65	3.0	3
Dec. Leo Minorids (DLM)	Dec 05 - Feb 04	Dec 20	268°	161°	+30°	64	3.0	5
Ursids (URS)	Dec 17 - Dec 26	Dec 23	270.7°	217°	+76°	33	2.8	10

Table. Working list of meteor showers, courtesy of the International Meteor Organization.

Observations of the moon during annual showers will occur during routine monthly observations, but observers who are limited in terms of time spent observing are encouraged to plan for annual showers first of all and to observe for a day or two either side of (and including) shower maximum..

The table on the previous page, from the Working list of meteor showers published annually at www.imo.net (the International Meteor Organization) shows information about the annual showers. Entries in bold delineate a shower that is favored for lunar activity. The shower name and IMO designation is given in the first column. The interval of activity is presented in the second column with the date of maximum (Earth-based) in the third column. The velocity of the meteoroids at infinity is presented in the next column, which is followed by the population index. The population index, r , is a measure of the distribution of meteoroid sizes at maximum. A larger value of r indicates a larger proportion of smaller particles, and is less favorable for lunar meteor studies. Smaller r -values indicate more large particles, translating into a greater probability of observing lunar impacts. Finally, the Zenithal Hourly Rate, as observed on Earth, is given.

We encourage observers to watch the moon a day or two before and after the predicted peak date. The difference in ZHR peak time from Earth to the moon is up to ± 7 hours...later for evening phase, earlier for morning phase. Some showers, such as the Orionids, have a broader peak, while others like the Quadrantids have a narrower peak. The dates of monthly observations are given in the next table. The cut-off dates for one's observing program will vary with year and latitude of observer, which affects the ecliptic angle and the lunar visibility.

Last Quarter	Observing Interval	New Moon	Observing Interval	First Quarter
Jan. 27	Jan. 25 - Feb. 1	Feb. 4	Feb. 7 - 14	Feb. 12
Feb. 26	Feb. 24 - Mar. 2	Mar. 5	Mar. 8 - 16	March 14
Mar. 28	Mar. 26 - Apr. 2	Apr. 5	Apr. 8 - 14	Apr. 12
Apr. 26	Apr. 24 - May 1	May 4	May 7 - 14	May 12
May 26	May 24 - 31	June 3	June 6 - 12	June 10
June 25	June 23 - 29	July 2	July 5 - 11	July 9
July 25	July 23 - 29	Aug. 1	Aug. 4 - 9	Aug. 7
Aug. 23	Aug. 21 - 27	Aug. 30	Sep. 2 - 8	Sep. 6
Sep. 22	Sep. 20 - 25	Sep. 28	Oct. 1 - 7	Oct. 5
Oct. 21	Oct. 19 - 25	Oct.28	Oct. 31 - Nov. 6	Nov. 4
Nov. 19	Nov. 17 - 23	Nov. 26	Nov. 29 - Dec. 6	Dec. 4
Dec. 19	Dec. 17 - 23	Dec. 26	Dec. 29 - Jan. 4	Jan. 2 '20
Jan. 17, '20	Jan. 15 - 21	Jan. 24	Jan. 27 - Feb. 3	Feb. 1

Any questions concerning this plan can be directed to the ALPO Lunar Meteoritic Impact Search Coordinator, Mr. Brian Cudnik, at bmcudnik@gmail.com.