

# Meteor Activity Outlook for October 21-27, 2023

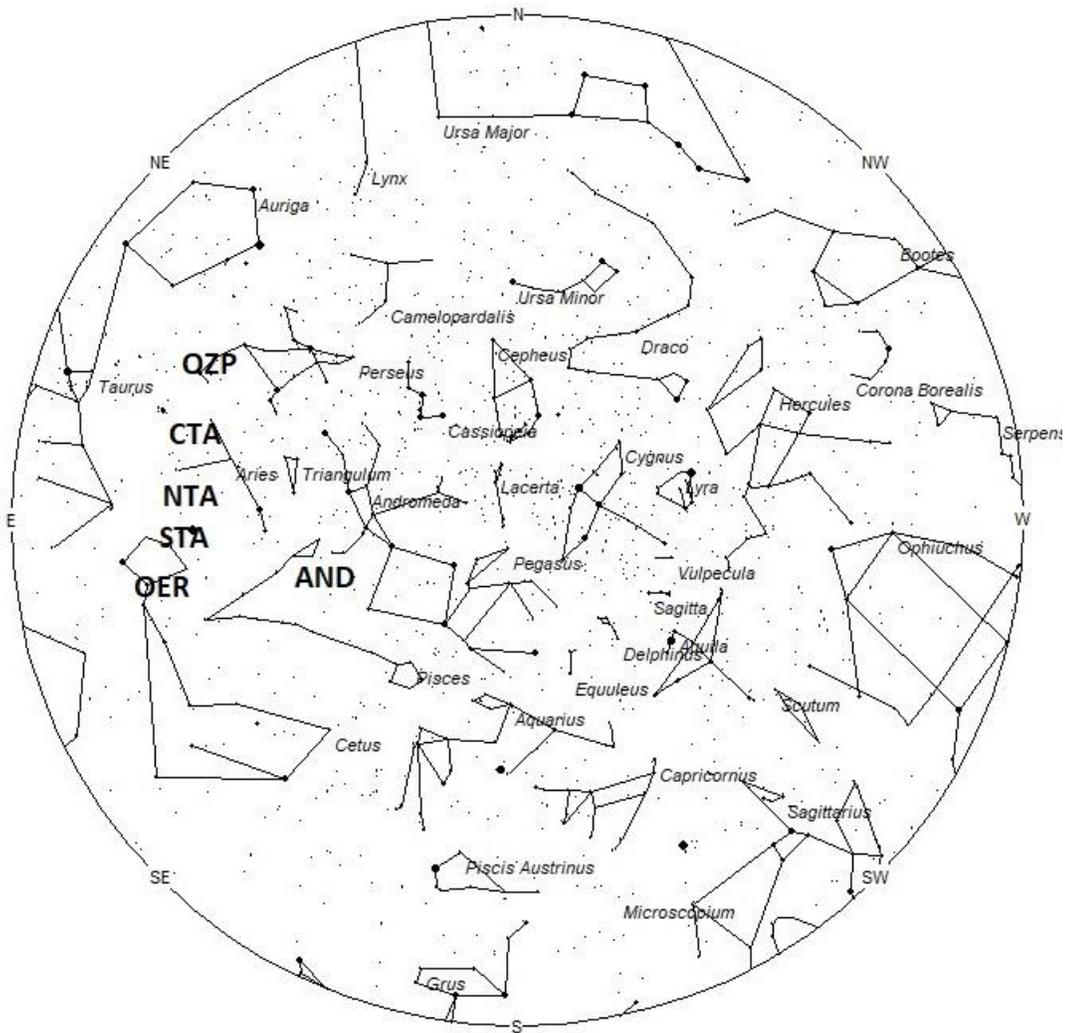


Mike Lewinski captured this bright fireball at 00:48 MDT on April 6, 2023 (06:48 UT), from Crestone, Colorado USA. While it looks like daytime it's actually the full moon illuminating the landscape. ©Mike Lewinski

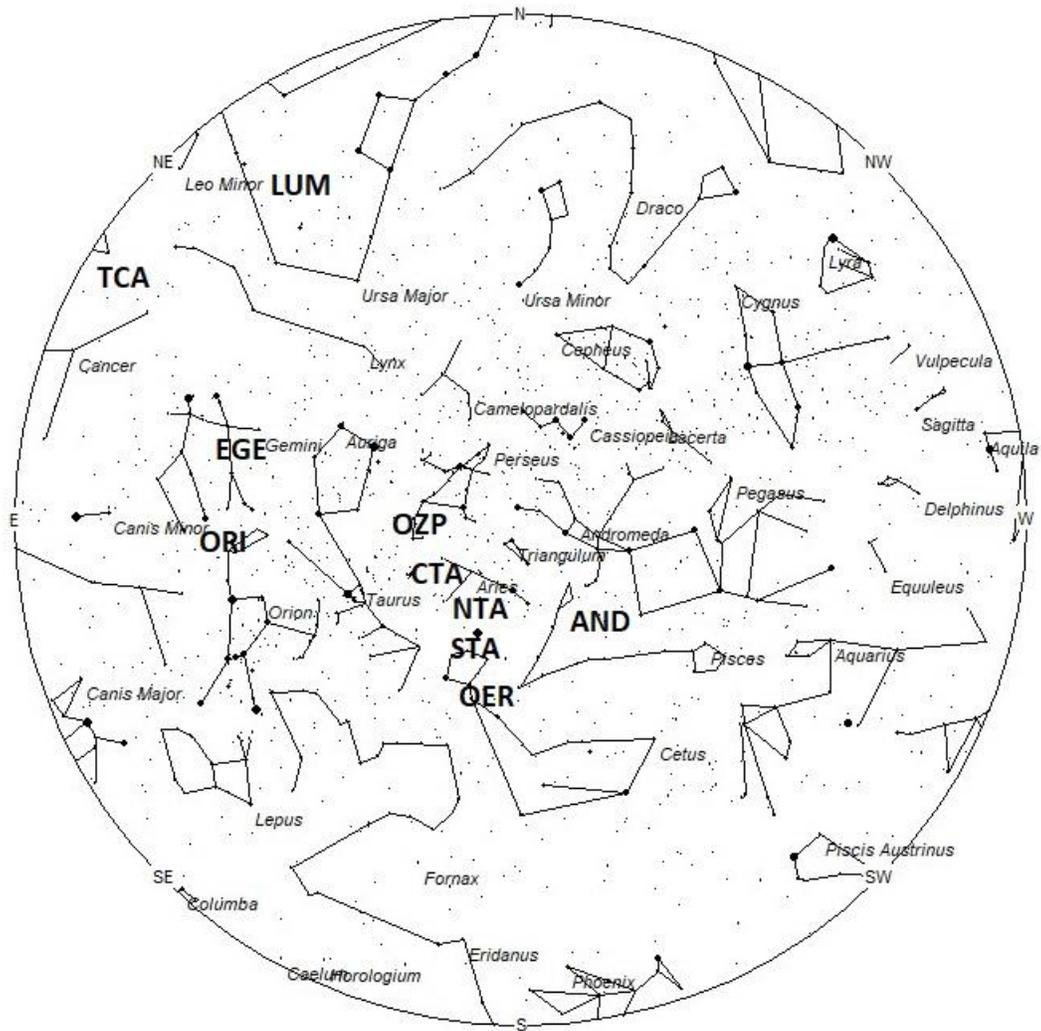
During this period, the moon reaches its first quarter phase on Sunday October 22nd. At this time it will set near midnight local daylight-saving time (LDST). As the week progresses, the moon will intrude more into the morning sky, limiting the availability of dark skies. By the end of this period the moon will lie above the horizon all night long. The estimated total hourly rates for evening observers this week should be near 3 as seen from mid-northern latitudes (45N) and 2 as seen from tropical southern locations (25S). For morning observers, the estimated total hourly rates should be near 35 as seen from mid-northern latitudes (45N) and 25 as seen from tropical southern locations (25S). Evening rates are reduced by moonlight. The actual rates seen will also depend on factors such as personal light and motion perception, local weather conditions, alertness, and experience in watching meteor activity. Note that the hourly rates listed below are estimates as viewed from dark sky sites away from urban light sources. Observers viewing from urban areas will see less activity as only the brighter meteors will be visible from such locations.

The radiant (the area of the sky where meteors appear to shoot from) positions and rates listed below are exact for Saturday night/Sunday morning October 21/22. These positions do not change greatly day to day so the listed coordinates may be used during this entire period. Most star atlases (available at science stores and planetariums) will provide maps with grid lines of the celestial coordinates so that you may find out exactly where these positions are located in the sky. I have also included charts of the sky that display the radiant positions for evening, midnight, and morning. The center of each chart is the sky directly overhead at the appropriate hour. These charts are oriented for facing south but can be used for any direction by rotating the charts to the desired direction. A planisphere or computer planetarium program is also useful in showing the sky at any time of night

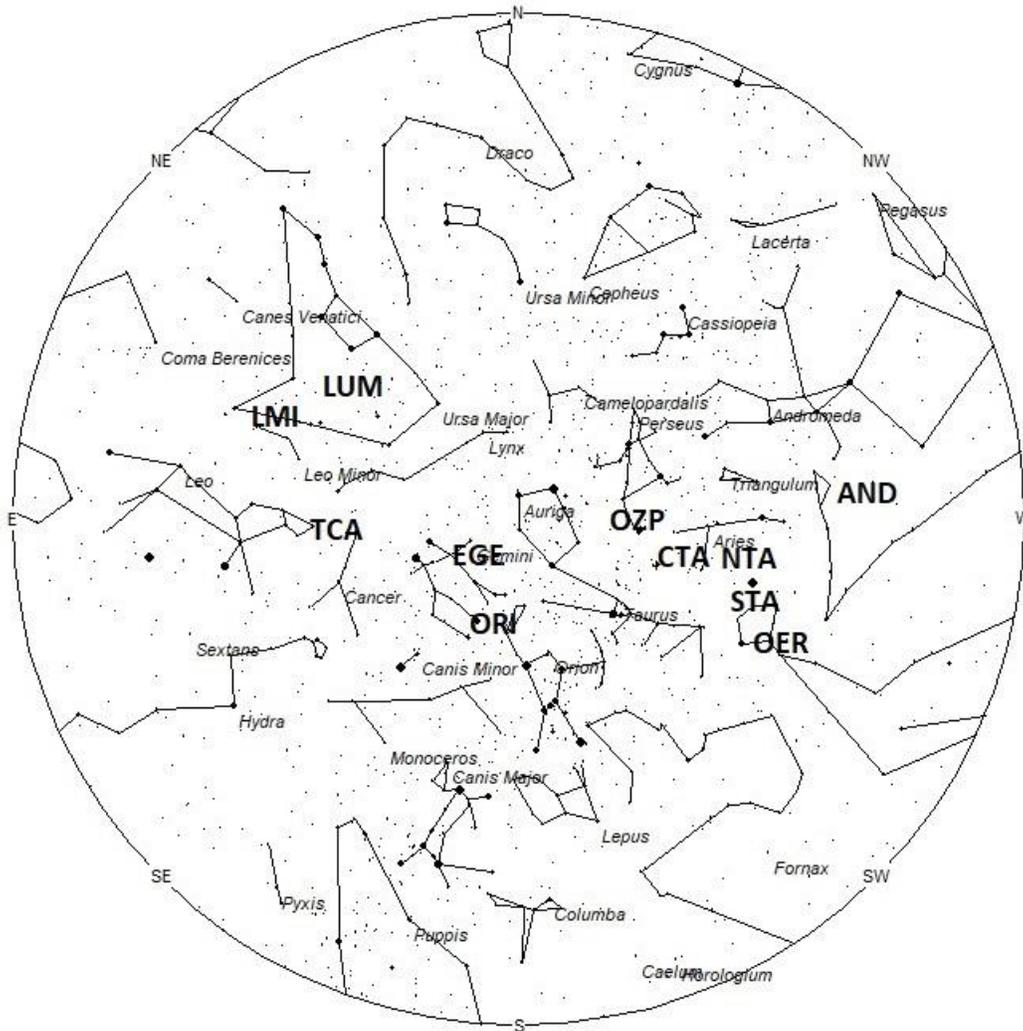
on any date of the year. Activity from each radiant is best seen when it is positioned highest in the sky, either due north or south along the meridian, depending on your latitude. Radiants that rise after midnight will not reach their highest point in the sky until daylight. For these radiants, it is best to view them during the last few hours before dawn. It must be remembered that meteor activity is rarely seen at its radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies toward the edge and not the center. Viewing there will allow you to easily trace the path of each meteor back to the radiant (if it is a shower member) or in another direction if it is sporadic. Meteor activity is not seen from radiants that are located far below the horizon. The positions below are listed in a west to east manner in order of right ascension (celestial longitude). The positions listed first are located further west therefore are accessible earlier in the night while those listed further down the list rise later in the night.



Radiant Positions at 9pm Local Daylight-Saving Time



Radiant Positions at 1am Local Daylight-Saving Time



Radiant Positions at 5am Local Daylight-Saving Time

## **These sources of meteoric activity are expected to be active this week.**

The **Andromedids (AND)** are the annual debris encountered from the remains of comet 3D/Biela. These meteors should not be mistaken for the great meteor storms of the 19<sup>th</sup> century as those meteors are in a slightly different orbit and irregularly encountered in early December. They are known as the December phi Cassiopeiids (DPC). It is interesting that during November, this radiant moves northward toward the area of the DPC's but ends before reaching the DPC radiant. The radiant currently is located near 01:05 (016) +18. This position lies in eastern Pisces, 5 degrees northwest of the 4th magnitude star known as eta Piscium. This part of the sky is best placed near midnight local LDST, when the radiant lies highest above the horizon. Face toward the north at this time to best see these meteors. With the November 6<sup>th</sup> maximum still two weeks away, current rates would most likely be less than 1 per hour no matter your location. With an entry velocity of 22 km/sec., the average Andromedid meteor would be of very slow velocity.

The **Southern Taurids (STA)** are active from a wide radiant centered near 02:44 (041) +12. This position lies in southern Aries, 2 degrees north of the 4<sup>th</sup> magnitude star known as mu Ceti. This position also lies 2 degrees southeast of the brilliant planet Jupiter. These meteors are best seen near 01:00 LDST when the radiant lies highest in the southern sky. Rates are expected to be near 3 per hour no matter your location. With an entry velocity of 29 km/sec., the average STA meteor would be of medium-slow velocity.

The **omicron Eridanids (OER)** was discovered by the Japanese video meteor network SonotaCo from video data obtained during 2007-2008. These meteors are active from October 23 through December 2<sup>nd</sup>. Maximum activity is ill-defined and may occur anytime from November 3-27. The date listed in the table represents the midpoint of the activity curve and not the actual date of maximum activity. The radiant is currently located at 02:45 (41) +01, which is located in northeastern Cetus, 2 degrees northwest of the 4th magnitude star known as delta Ceti. This radiant is best placed near 0100 LDST, when it lies on the meridian and is located highest in the southern sky. Face toward the south at this time to best see these meteors. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 31 km/sec., the average OER meteor would be of medium-slow velocity.

The **Northern Taurids (NTA)** are active from a radiant located at 02:48 (42) +18. This area of the sky is located in central Aries, near the spot occupied by the faint star known as pi Arietis. To best see these meteors, one should face southward near 01:00 LDST. Note that this radiant is only 6 degrees north of the STA radiant so care must be taken to separate these two showers. Maximum activity is not until November 12<sup>th</sup> so rates at this time should be near 1 per hour no matter your location. With an entry velocity of 31 km/sec., the average NTA meteor would be of medium-slow velocity.

The **chi Taurids (CTA)** were discovered by Dr. Peter Brown during his 7-year survey using the Canadian Meteor Orbit Radar (CMOR). This source is active from October 24 through November 13 with a maximum occurring near November 5<sup>th</sup>. The radiant is currently located at 03:24 (051) +25, which places it near the Taurus/Aries border, 5 degrees west of the naked eye open cluster known as the Pleiades. These meteors may be seen all night long but the radiant is best placed near 0300 LDST when it lies on the meridian and is located highest in the sky. Face toward the south

at this time to best see these meteors. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 43 km/sec., the average chi Taurid meteor would be of medium velocity.

The **October zeta Perseids (OZP)** produced a short-lived outburst centered at 21:00 Universal Time on October 24, 2021. That outburst only lasted three hours and was witnessed over Europe. If a repeat performance occurs in 2023, it is expected to peak near 9:00 UT on October 25<sup>th</sup>. This timing favors North America with the timing ranging from 3am EDT to midnight PDT on October 25<sup>th</sup>. The radiant is located at 03:53 (058) +34, which is located in southern Perseus, 3 degrees northwest of the 3<sup>rd</sup> magnitude star known as zeta Persei. A total of 14 bright meteors were recorded in 2021 on video cameras operated by the Global Meteor Network\*. Undoubtedly there were many more to be seen. If a repeat performance occurs, no matter your location, it would be best to face toward the northeast at the times mentioned above. Other areas in the northern hemisphere are encouraged to also try and verify any activity from this source on the nights of October 23-26. At 48km/sec., most of these meteors would possess medium-swift velocities.

\*October zeta Perseid meteor shower (OZP #1131), posted by Denis Vida, Global Meteor Network, <https://www.meteornews.net/2021/10/28/october-zeta-perseid-meteor-shower-ozp01131/>

The **Orionids (ORI)** are active from September 26 through November 22, with maximum activity occurring on October 22<sup>nd</sup>. The radiant is currently located at 06:21 (095) +16, which places it in northeastern Orion, 2 degrees northeast of the 4<sup>th</sup> magnitude star known as xi Orionis. This area of the sky is best placed for observing during the last dark hour prior to dawn, when it lies highest in the southern sky. Current rates are expected to be near 15 per hour as seen from the northern hemisphere and near 12 as seen from south of the equator. With an entry velocity of 66 km/sec., the average ORI meteor would be of swift velocity.

The **epsilon Geminids (EGE)** are active from September 27 through November 8 with maximum activity occurring on October 19<sup>th</sup>. The radiant is currently located at 06:54 (103) +28. This area of the sky lies in central Gemini, 3 degrees northeast of the 3<sup>rd</sup> magnitude star known as Mebsuta (epsilon Geminorum). To best see these meteors face toward the southeast during the last dark hour prior to dawn. Rates at this time should be near 2 per hour as seen from the northern hemisphere and one as seen from south of the equator. With an entry velocity of 68 km/sec., the average EGE meteor would be of swift velocity.

The **tau Cancrids (TCA)** are a weak shower with a long activity period of seven weeks. They are active from September 23 through November 12 with maximum activity occurring on October 21<sup>st</sup>. The radiant currently lies at 09:13 (138) +30, which places it in northern Cancer, near the spot occupied by the faint star known as tau Cancri. To best see these meteors face eastward during the last two hours of the morning prior to dawn. Expected hourly rates are near 1 per hour from the northern hemisphere and less than 1 as seen from south of the equator. With an entry velocity of 67 km/sec., the average TCA meteor would be of swift velocity.

The **lambda Ursa Majorids (LUM)** were discovered by Željko Andreić and the Croatian Meteor Network team based on studying SonotaCo and CMN observations (SonotaCo 2007-2011, CMN

2007-2010). These meteors are active from October 18 through November 7, with maximum activity occurring on October 28<sup>th</sup>. The current location of the LUM radiant lies near 10:02 (151) +52. This area of the sky lies in western Ursa Major, 5 degrees east of the 3<sup>rd</sup> magnitude star known as theta Ursae Majoris. This area of the sky is best placed in the sky during the last hour before dawn, when it lies highest above the northeastern horizon in a dark sky. Current rates should be less than 1 per hour no matter your location. Due to the high northern location of this radiant, these meteors are difficult to see from the Southern Hemisphere. With an entry velocity of 61km/sec., most activity from this radiant would be of swift speed.

The **Leonis Minorids (LMI)** are active from October 13<sup>th</sup> to November 3<sup>rd</sup>, with maximum activity occurring on October 22<sup>nd</sup>. The radiant is located at 10:35 (159) +37, which places it in northeastern Leo Minor, 2 degrees east of the 4<sup>th</sup> magnitude star known as beta Leonis Minoris. These meteors are best seen by facing toward the east during the last couple of hours prior to dawn. This shower is better for observers situated in the northern hemisphere where the radiant rises far higher into the northeastern sky before the start of morning twilight. Current rates should be near 2 per hour from the northern hemisphere and less than 1 from south of the equator. At 61km/sec., the average Leonis Minorid is swift. From my personal experience this minor shower produces a high proportion of bright meteors.

**Sporadic** meteors are those meteors that cannot be associated with any known meteor shower. All meteor showers are evolving and disperse over time to the point where they are no longer recognizable. Away from the peaks of the major annual showers, these sporadic meteors make up the bulk of the activity seen each night. As seen from the mid-northern hemisphere (45N) one would expect to see during this period approximately 10 sporadic meteors per hour during the last hour before dawn as seen from rural observing sites. Evening rates should be near 2 per hour. As seen from the tropical southern latitudes (25S), morning rates would be near 7 per hour as seen from rural observing sites and 1 per hour during the evening hours. Locations between these two extremes would see activity between these listed figures. Evening rates are reduced due to moonlight.

You can keep track of the activity of these meteor showers as well as those beyond the limits of visual observing by visiting the [NASA Meteor Shower Portal](#). You can move the sky globe to see different areas of the sky. Colored dots indicate shower meteors while white dots indicate sporadic (random) activity. The large orange disk indicates the position of the sun so little activity will be seen in that area of the sky.

The list below offers the information in tabular form of the showers that I feel are within reach of the visual observer to discern. Hourly rates are often less than 1 but noting parameters such as the duration, radiant distance and the elevation of each meteor, one can compute the probability of shower association. Most showers discovered by video means have rates less than 1 meteor per **night** away from maximum, so the showers listed in these articles are not as weak as they seem. Rates and positions are exact for Saturday night/Sunday morning.

SHOWER	DATE OF MAXIMUM ACTIVITY	CELESTIAL POSITION	ENTRY VELOCITY	CULMINATION	HOURLY RATE	CLASS
		RA (RA in Deg.) DEC	Km/Sec	Local Daylight- Saving Time	North- South	
Andromedids (AND)	Nov 06	01:05 (016) +18	22	01:00	<1 - <1	IV
Southern Taurids (STA)	Nov 07	02:44 (041) +12	29	02:00	3 - 3	II
omicron Eridanids (OER)	Nov 14	02:45 (041) +01	31	02:00	<1 - <1	IV
Northern Taurids (NTA)	Nov 12	02:48 (042) +18	31	02:00	1 - 1	II
chi Taurids (CTA)	Nov 05	03:24 (051) +25	32	03:00	1 - 1	II
October zeta Perseids (OZP)	Oct 25	03:53 (058) +34	48	04:00	?	III
Orionids (ORI)	Oct 22	06:21 (095) +16	66	06:00	15- 12	I
epsilon Geminids (EGE)	Oct 19	06:54 (103) +28	68	07:00	1 - <1	II
tau Cancrids (TCA)	Oct 21	09:13 (138) +30	67	09:00	<1 - <1	IV
lambda Ursa Majorids (LUM)	Oct 28	10:02 (151) +52	61	10:00	<1 - <1	IV
Leonis Minorids (LMI)	Oct 22	10:35 (159) +37	61	11:00	2 - 1	II

**Class Explanation:** A scale to group meteor showers by their intensity:

- **Class I:** the strongest annual showers with Zenith Hourly Rates normally ten or better.
- **Class II:** reliable minor showers with ZHR's normally two to ten.
- **Class III:** showers that do not provide annual activity. These showers are rarely active yet have the potential to produce a major display on occasion.
- **Class IV:** weak minor showers with ZHR's rarely exceeding two. The study of these showers is best left to experienced observers who use plotting and angular velocity estimates to determine shower association. These weak showers are also good targets for video and photographic work. Observers with less experience are urged to limit their shower associations to showers with a rating of I to III.

