

# Meteor Activity Outlook for November 04-10, 2023

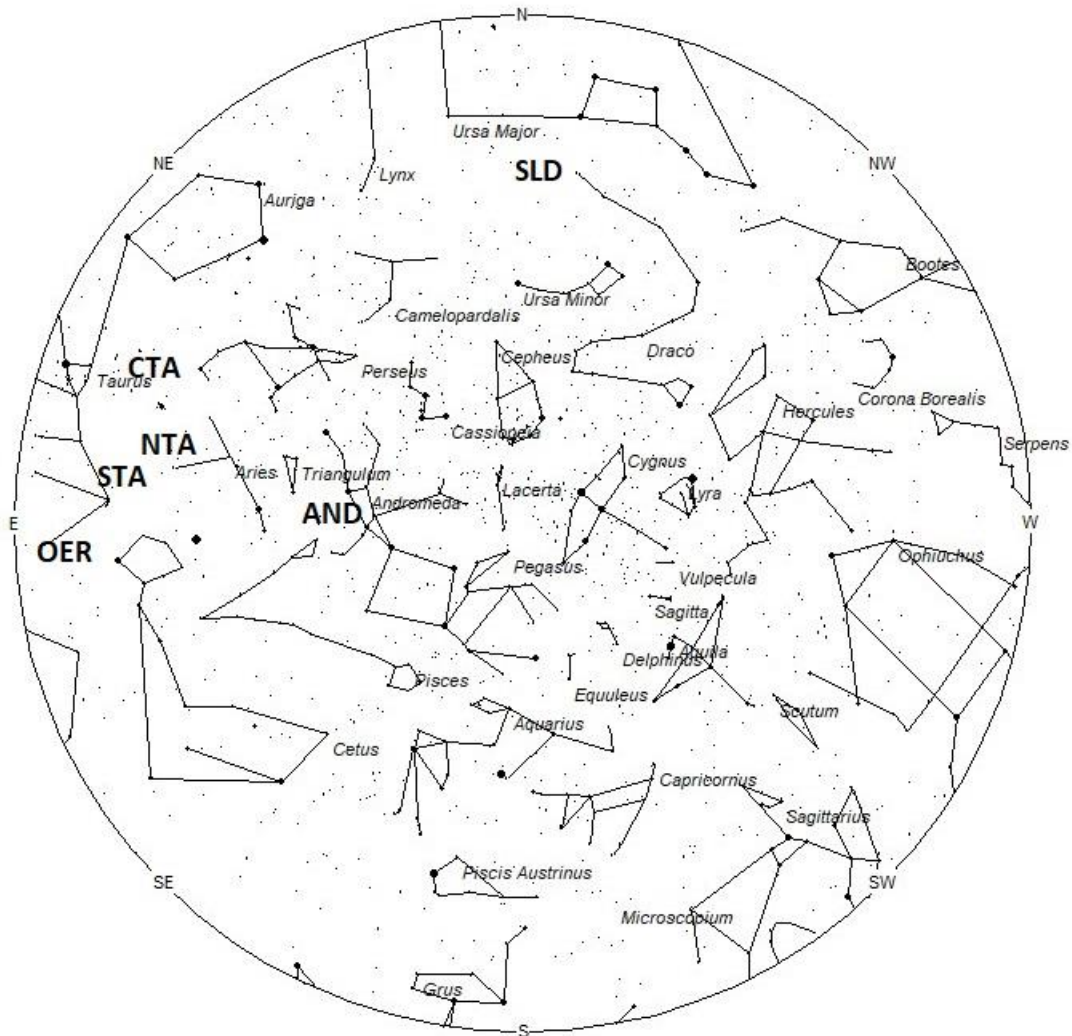


Ed Albin captured this bright fireball using a [AllSky 7 Camera System](#) at 21:27 EDT (01:47 on May 29 UT) on May 28, 2023, from Covington, Georgia USA. ©Ed Albin

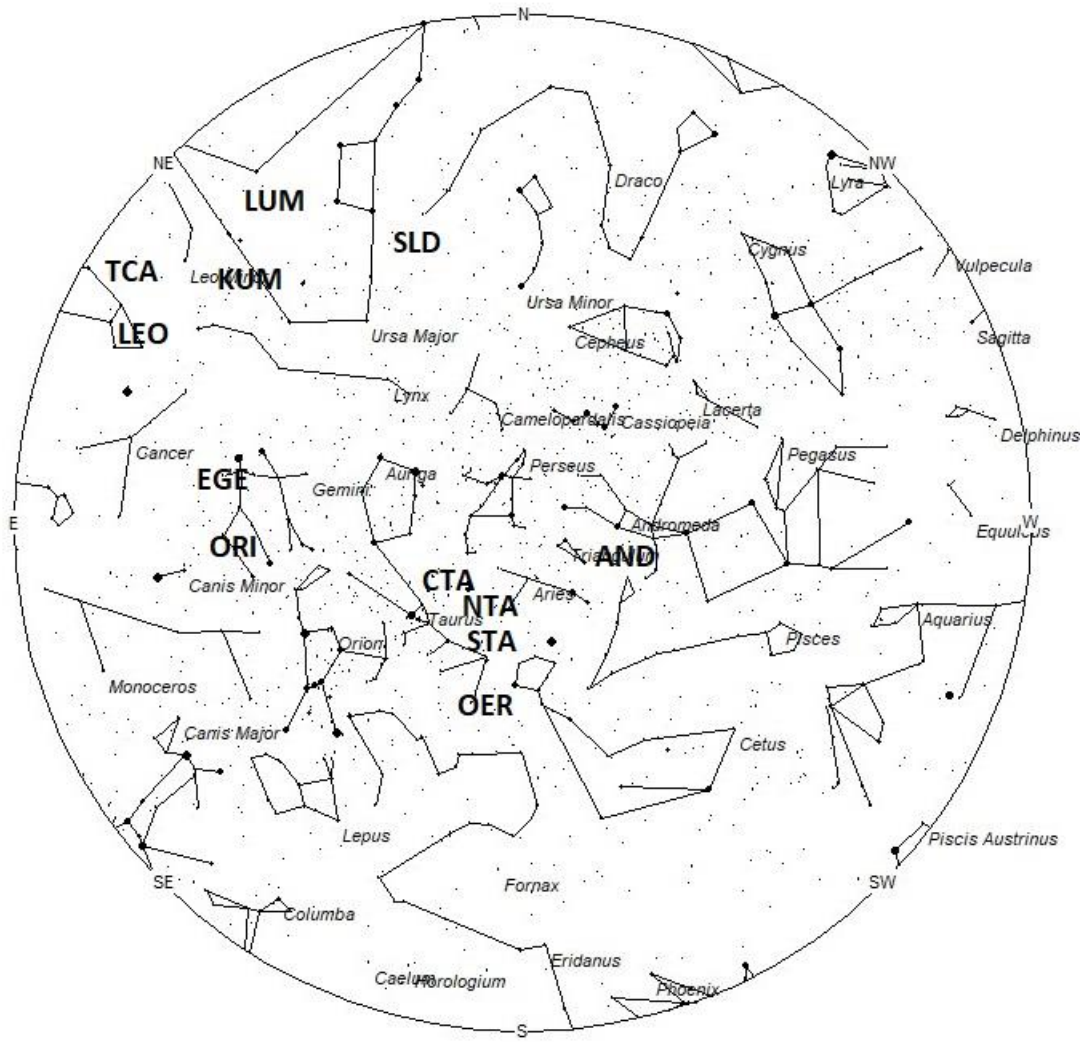
During this period, the moon reaches its last quarter phase on Sunday November 5th. At that time the moon will rise near 2300 local standard time (on Nov 4th) and will illuminate the skies the remainder of the night. With each passing night the moon's phase will wane and it will rise later in the morning becoming less of a nuisance. The estimated total hourly rates for evening observers this weekend 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 20 as seen from mid-northern latitudes (45N) and 12 as seen from tropical southern locations (25S). Morning 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 November 4/5. 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. Radianths that rise after midnight will not reach their highest point in the sky until daylight. For these

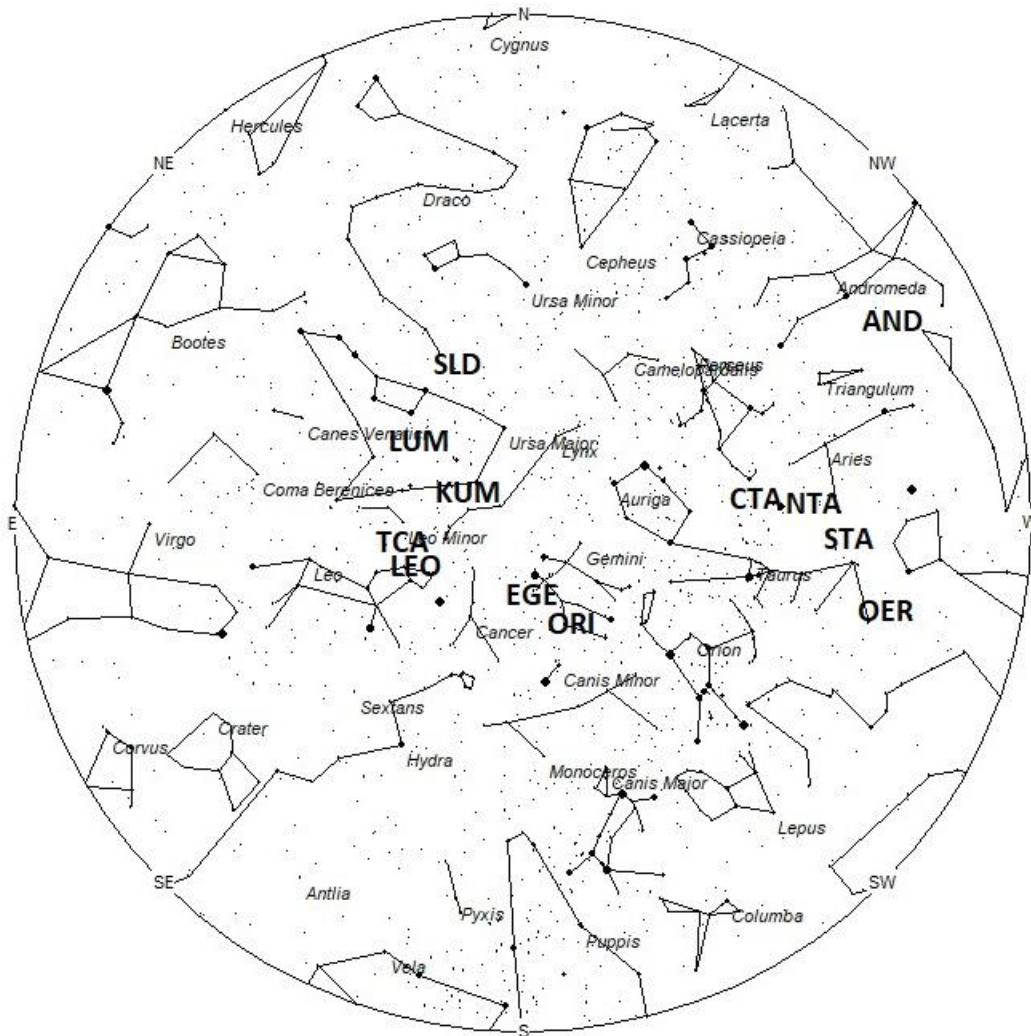
radiants, it is best to view them during the last few hours before dawn. It must be remembered that meteor activity is rarely seen at its radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies toward the edge and not the center. 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 7pm Local Standard Time



Radiant Positions at Midnight Local Standard Time



Radiant Positions at 5am Local Standard 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). The AND radiant currently is located near 01:21 (020) +27. This position lies in northeastern Pisces, near the spot occupied by the faint star known as nu Piscium. This part of the sky is best placed near 2300 LST, when the radiant lies highest above the southern horizon. Current rates would most likely be less than 1 per hour no matter your location. With an entry velocity of 19 km/sec., the average Andromedid meteor would be of very slow velocity.

The **Southern Taurids (STA)** are active from a radiant located at 03:28 (052) +15. This position lies in western Taurus, 2 degrees north of the 4th magnitude star known as 5 Tauri. To best see these meteors one should face southward near 01:00. Rates at this time should be near 3 per hour from the northern hemisphere and 2 per hour from south of the equator. With an entry velocity of 26 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 03:29 (052) +00, which is located in extreme southwestern Taurus, 2 degrees west of the 4th magnitude star known as 10 Tauri. This radiant is best placed near 0100 LST, when it lies on the meridian and is located highest in the southern sky. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 29 km/sec., the average OER meteor would be of medium-slow velocity.

The **Northern Taurids (NTA)** are active from a radiant located at 03:30 (053) +21. This area of the sky is located in western Taurus, 5 degrees southwest of the Pleiades. Like the STA's, to best see these meteors, one should face southward near 01:00. Maximum activity is on November 12<sup>th</sup> so rates at this time should be near 2 per hour as seen from the northern hemisphere and 1 as seen from south of the equator. With an entry velocity of 29 km/sec., the average NTA meteor would be of medium-slow velocity.

The **chi Taurids (CTA)** are active from a radiant located at 04:16 (064) +27, which places it in northern Taurus, 5 degrees northeast of the Pleiades star cluster. These meteors may be seen all night long but the radiant is best placed near 0100 LST when it lies on the meridian and is located highest in the southern sky. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 40 km/sec., the average chi Taurid meteor would be of medium velocity.

The **Orionids (ORI)** are active from September 26 through November 22, with maximum activity occurring on October 21st. The radiant is currently located at 07:04 (106) +16, which places it in southern Gemini, 3 degrees west of the 4th magnitude star known as lambda Geminorum. To best see these meteors, face toward the south during the last hours prior to dawn. Current rates are expected to be near 2 per hour as seen from the northern hemisphere and 1 as seen from south of

the equator. With an entry velocity of 65 km/sec., the average ORI meteor would be of swift velocity.

The last of the **epsilon Geminids (EGE)** are expected this week from a radiant located at 07:40 (115) +25. This area of the sky lies in eastern Gemini, 3 degrees south of the 1<sup>st</sup> magnitude star known as Pollux (beta Geminorum). This area of the sky is best placed in the eastern sky during the last dark hour prior to dawn. Rates are expected to be less than 1 no matter your location. With an entry velocity of 67 km/sec., the average EGE meteor would be of swift velocity.

The **kappa Ursae Majorids (KUM)** were discovered by cameras of the SonotaCo network in Japan during an outburst of activity on November 5, 2009. This radiant is active from October 28-November 17, with maximum activity occurring on the 6th. The radiant is currently located at 09:32 (143) +46. This position lies in southwestern Ursa Majoris, 6 degrees south of the 3<sup>rd</sup> magnitude star known as theta Ursae Majoris. Rates are expected to near 1 per hour as seen from the northern hemisphere and less than 1 per hour as seen from south of the equator. These meteors are best seen during the last hour before dawn when the radiant lies highest above the northern horizon in a dark sky. With an entry velocity of 67 km/sec., the average Kappa Ursae Majorid meteor would be of swift velocity. Due to the high northern location of this radiant, these meteors are not well seen from the southern hemisphere.

The **Leonids (LEO)** are active from November 3<sup>rd</sup> to December 2<sup>nd</sup> with maximum activity occurring on November 18<sup>th</sup>. The radiant is currently located at 09:42 (146) +27. This position lies in northwestern Leo, 3 degrees north of the 3<sup>rd</sup> magnitude star known as Algenubi (epsilon Leonis). The Leonid radiant is best placed in the eastern sky during the last hour before morning twilight when the radiant lies highest in a dark sky. Leonids may be seen from the southern hemisphere, but the viewing conditions are not quite as favorable as those north of the equator. Current rates are expected to be near 1 per hour as seen from the northern hemisphere and less than 1 as seen from south of the equator. With an entry velocity of 69 km/sec., most activity from this radiant would be of swift speed with numerous persistent trains on the brighter meteors.

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 10:03 (151) +29, which places it in southwestern Leo Minor, 4 degrees northeast of the 4<sup>th</sup> magnitude star known as Rasalas (mu Leonis). To best see these meteors face eastward during the last two hours of the morning prior to dawn. Expected hourly rates are less than 1 per hour no matter your location. With an entry velocity of 67 km/sec., the average TCA meteor would be of swift velocity.

The **Southern lambda Draconids (SLD)** 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 29-November 8 with maximum activity occurring on November 4<sup>th</sup>. The radiant is currently located at: 10:49 (162) +68. This area of the sky is currently located in northern Ursa Major, 3 degrees west of the 4<sup>th</sup> magnitude star known as Giasar (lambda Draconis). This area of the sky is best placed in the sky during the last hour before dawn, when it lies highest above the northern horizon in a dark sky. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 49km/sec., most activity



from this radiant would be of medium speed. Due to the high northern location, these meteors are poorly seen from the southern hemisphere.

The last of the **lambda Ursa Majorids (LUM)** are expected this week from a radiant located near 11:02 (166) +47. This area of the sky lies in southern Ursa Major, 3 degrees northwest of the 3<sup>rd</sup> magnitude star known as psi 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 northern horizon in a dark sky. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 61km/sec., most activity from this radiant would be of swift speed. Like the other showers located in Ursa Major and Draco, these meteors are not well seen from the southern hemisphere.

**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 would be near 3 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 2 per hour during the evening hours. Locations between these two extremes would see activity between these listed figures. Morning rates are reduced during this period 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 Standard Time	North- South	
Andromedids (AND)	Nov 07	01:21 (020) +27	19	23:00	<1 - <1	IV
Southern Taurids (STA)	Nov 07	03:28 (052) +15	26	01:00	3 - 2	II
omicron Eridanids (OER)	Nov 14	03:29 (052) +00	29	01:00	<1 - <1	IV
Northern Taurids (NTA)	Nov 12	03:30 (053) +21	29	01:00	1 - <1	II
chi Taurids (CTA)	Nov 05	04:16 (064) +27	40	02:00	<1 - <1	IV
Orionids (ORI)	Oct 22	07:04 (106) +16	65	05:00	2- 1	I
epsilon Geminids (EGE)	Oct 19	07:40 (115) +25	67	06:00	<1 - <1	II
kappa Ursae Majorids (KUM)	Nov 06	09:32 (143) +46	67	08:00	1 - <1	IV
Leonids (LEO)	Nov 18	09:42 (146) +27	69	08:00	1 - <1	I
tau Cancrids (TCA)	Oct 21	10:03 (151) +29	67	09:00	<1 - <1	IV
Southern lambda Draconids (SLD)	Nov 04	10:49 (162) +68	49	10:00	<1 - <1	IV
lambda Ursa Majorids (LUM)	Oct 28	11:02 (166) +47	61	10:00	<1 - <1	IV

**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.



