

Meteor Activity Outlook for January 13-19, 2024

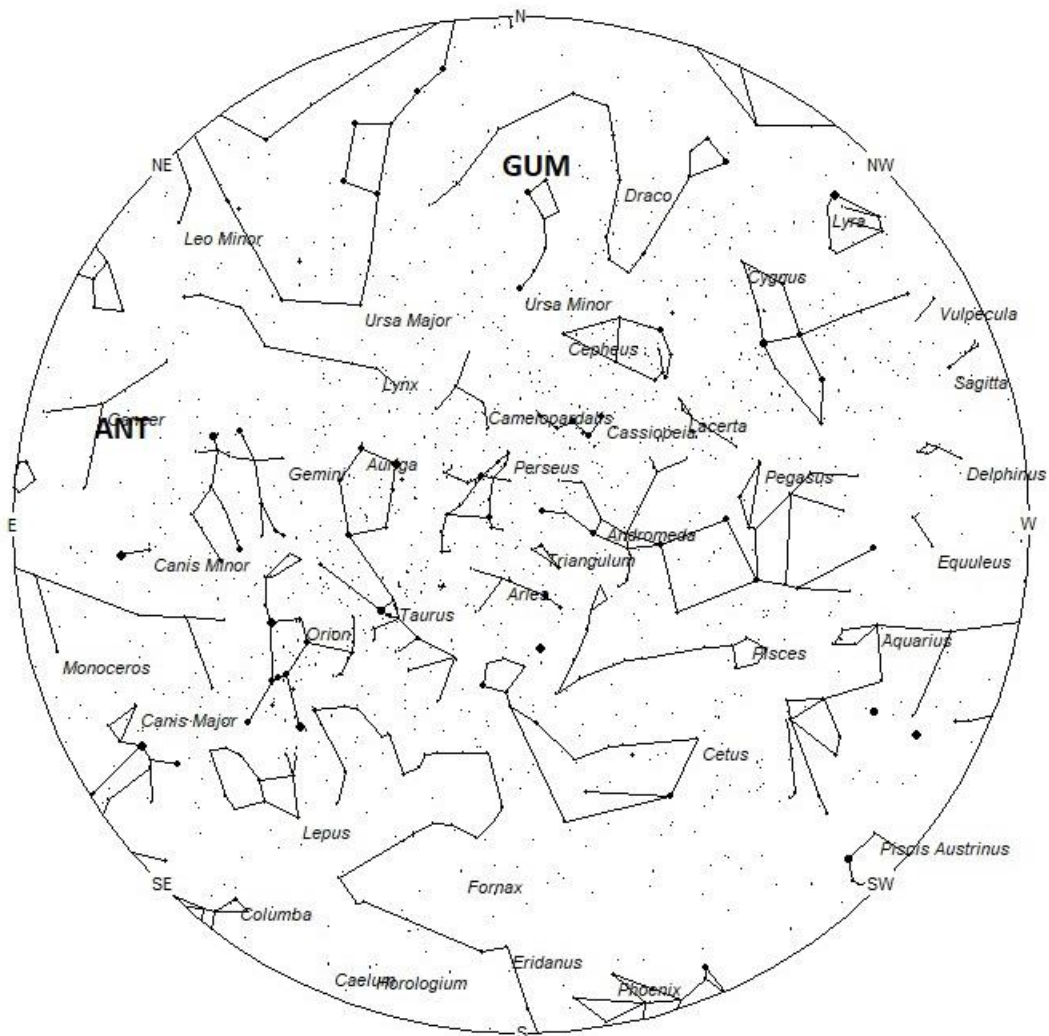


Mike Lewinski captured this beautiful fireball on July 25, 2023, at 00:03 MDT (06:03 UT) from Crestone, Colorado, USA. ©Mike Lewinski

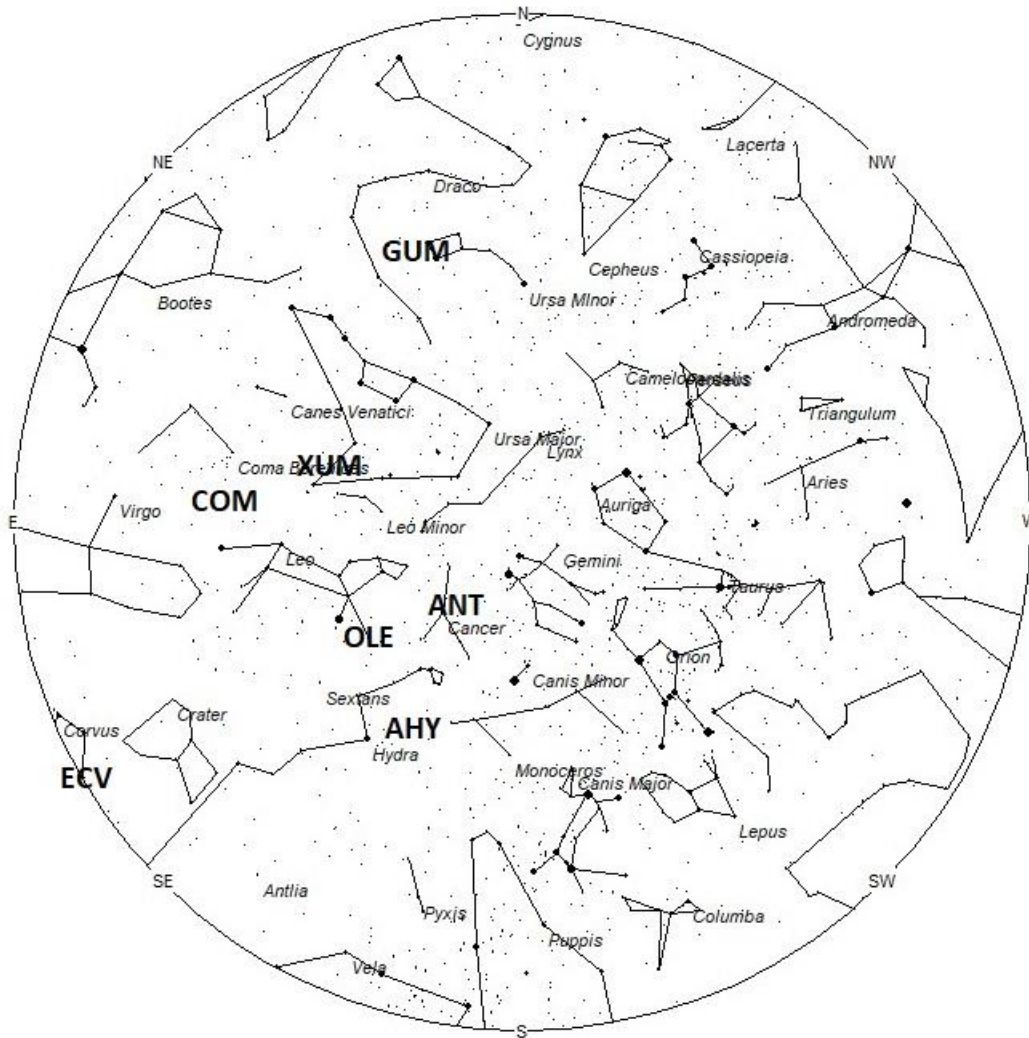
During this period, the moon reaches its first quarter phase on Wednesday January 17th. At that time the moon will lie 90 degrees east of the sun and will set between midnight and 01:00 (on Jan 18). This weekend the waxing crescent moon will set during the early evening hours and will not cause any problems with meteor observing as the phase is quite small. The estimated total hourly rates for evening observers this weekend should be near 4 as seen from mid-northern latitudes (45N) and 3 as seen from tropical southern locations (25S). For morning observers, the estimated total hourly rates should be near 15 as seen from mid-northern latitudes (45N) and 11 as seen from tropical southern locations (25S). 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 January 13/14. 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

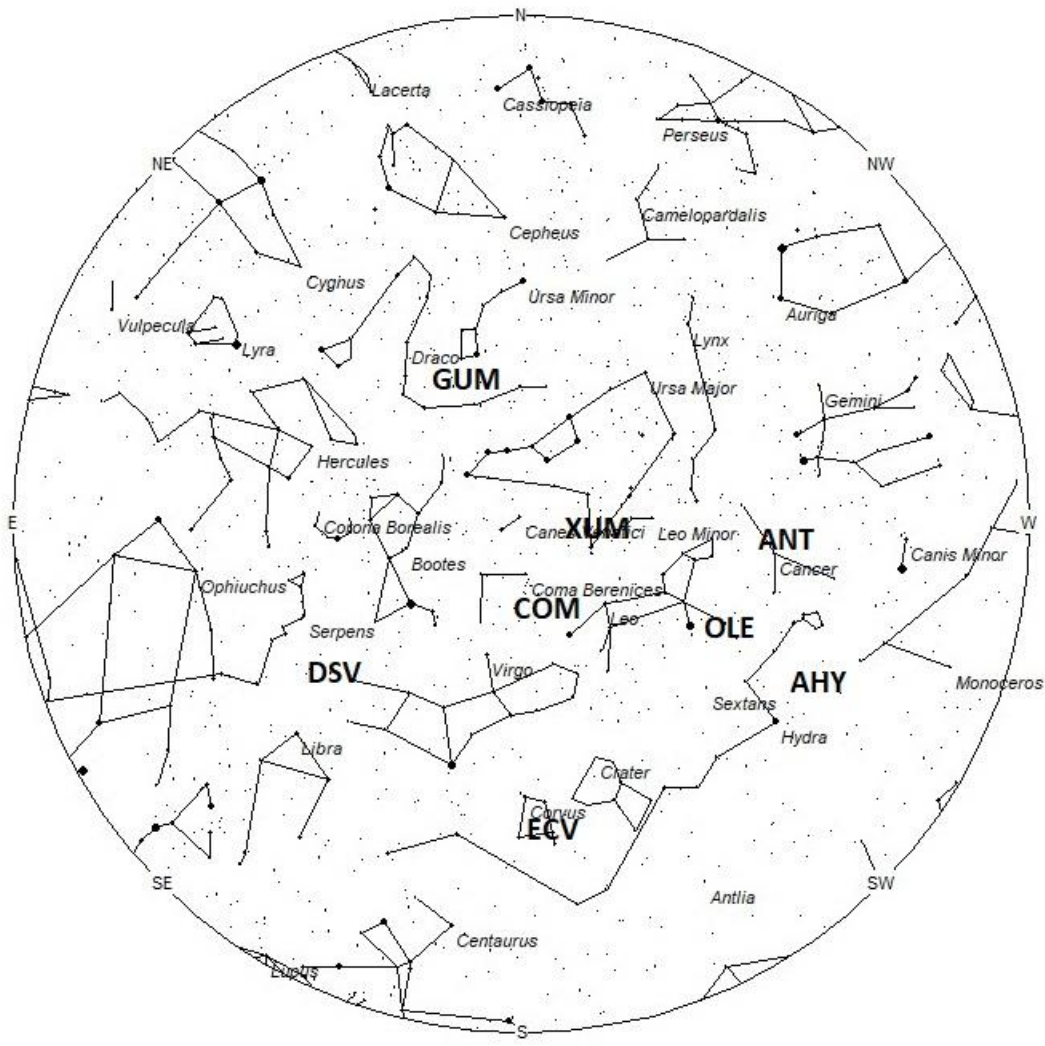
it is positioned highest in the sky, either due north or south along the meridian, depending on your latitude. Radiants that rise after midnight will not reach their highest point in the sky until daylight. For these radiants, it is best to view them during the last few hours before dawn. It must be 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 19:00 Local Standard Time



Radiant Positions at Midnight Local Standard Time



Radiant Positions at 05:00 Local Standard Time

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

The large **Anthelion (ANT)** is currently centered at 08:24 (126) +19. This position lies in central Cancer, 2 degrees west of the faint star known as theta Cancri. Due to the large size of this radiant, these meteors may also be seen from eastern Gemini as well as Cancer. This radiant is best placed near 01:00 local standard time (LST) when it lies on the meridian and is highest in the sky. Rates at this time should be near 3 per hour as seen from the northern hemisphere and 2 per hour as seen from south of the equator. With an entry velocity of 30 km/sec., the average Anthelion meteor would be of slow velocity.

The **alpha Hydrids (AHY)** were discovered by Dr. Peter Brown and are mentioned in his article "A meteoroid stream survey using the Canadian Meteor Orbit Radar". This shower is active from December 15 through January 22 with maximum activity occurring on January 6th. The radiant is currently located at 08:52 (133) -10. This position lies in western Hydra, 7 degrees southwest of the 2nd magnitude star known as Alphard (alpha Hydrae). These meteors are best seen near 0200 LST when the radiant lies highest above the horizon. At 42 km/sec. the alpha Hydrids produce meteors of medium velocity. The expected rates this week are less than 1 per hour no matter your location.

The **omicron Leonids (OLE)** were also discovered by Damir Šegon and the Croatian Meteor Network team based on studying SonotaCo and CMN observations (SonotaCo 2007-2011, CMN 2007-2010). These meteors are active from December 20 through January 22. Maximum activity occurs on January 9th. The radiant is currently located at 09:26 (142) +09. This position lies in southwestern Leo, 2 degrees southwest of the 4th magnitude star known as omicron Leonis. These meteors are best seen near 0200 LST when the radiant lies highest above the horizon. At 42 km/sec. the omicron Leonids produce meteors of medium velocity. Expected rates this week are less than 1 per hour no matter your location.

The **January xi Ursae Majorids (XUM)** were discovered by Japanese observers of SonotaCo based on video observations in 2007-2008. This shower is active from January 10-25, with maximum activity occurring on the 19th. The radiant is currently located at 11:06 (166) +35, which lies on in southern Ursa Major, 2 degrees northwest of the 3rd magnitude star known as Alula Borealis (nu Ursae Majoris). These meteors are best seen near 04:00 LST when the radiant lies nearly overhead. Hourly rates may reach 1 later in this period as seen from the Northern Hemisphere. These meteors encounter the atmosphere at 43 km/sec., which would produce meteors of medium velocity.

The **Comae Berenicids (COM)** is a shower of long duration active from December 5th all the way through February 4th. Maximum occurred near December 15th when rates may have reached 3 an hour. During this period, I would expect hourly rates of 2 from a radiant located at 12:12 (183) +20. This position lies in western Coma Berenices, 7 degrees northeast of the 2nd magnitude star known as Denebola (beta Leonis). These meteors are best seen near 0500 LST when the radiant lies highest above the horizon. At 63 km/sec. the Comae Berenicids produce mostly swift meteors.

The **eta Corvids (ECV)** were recently discovered by Sirko Molau and the IMO Video Meteor Network Team. This stream is active from January 7-February 5, with maximum activity occurring on January 21st. The current position of the radiant is 12:16 (184) -17, which places the radiant in western Corvus, near the spot occupied by the 3rd magnitude star known as Gienah (gamma Corvi A). These meteors are best seen near 0500 LST when the radiant lies highest above the horizon. Current hourly rates would be less than 1 per hour no matter your location. At 67 km/sec. these meteors would be fast.

The **December sigma Virginids (DSV)** was discovered by John Greaves using the data of SonotaCo. This source is active from November 28 through January 24 with peak rates occurring near December 21st. The current radiant location is at 15:04 (226) +01 which places it in extreme eastern Virgo, 1 degree north of the faint star known as 110 Virginis. Current hourly rates would be less than 1 no matter your location. These meteors are best seen during the last dark hour before dawn, when the radiant lies highest above the horizon in a dark sky. At 66 km/sec. the December Sigma Virginids would produce mostly swift meteors.

The **gamma Ursae Minorids (GUM)** are another source discovered by Dr. Peter Brown and associates. These meteors are active from January 9-20, with maximum activity occurring near January 18. The radiant is currently located at 15:11 (228) +70, which places it southern Ursa Minor, 2 degrees south of the 3rd magnitude star known as Pherkad (gamma Ursae Minoris). These meteors are best seen during the last few hours before dawn, when the radiant lies highest in a dark sky. Current rates are less than 1 per hour no matter your location. These meteors encounter the atmosphere at 30 km/sec., which would produce meteors of medium-slow velocity.

The last of the **Quadrantids (QUA)** should be seen this week from a radiant located at 15:48 (237) +50. This position lies in extreme northeastern Bootes. The nearest star of note is 3rd magnitude Edasich (iota Draconis), which lies 9 degrees to the northwest. These meteors are best seen during the last hour before dawn when the radiant lies highest above the horizon in a dark sky. Current rates are expected to be less than 1 per hour no matter your location. At 39 km/sec. the Quadrantids produce meteors of moderate velocity. These meteors are visible from the southern tropics but not seen from the deep southern hemisphere.

The **xi Coronae Borealis (XCB)** are yet another source discovered by Dr. Peter Brown and associates. These meteors are active from January 9-20 with maximum occurring near January 15. The radiant is currently located near 16:33 (248) +30, which actually places it in western Hercules, 1 degree southeast of the faint star known as xi Coronae Borealis. Hourly rates would be less than 1 per hour no matter your location. These meteors are best seen during the last hour before dawn, when the radiant lies highest above the eastern horizon in a dark sky. At 45 km/sec. this source would produce meteors of medium velocity. These meteors are not well seen from the Southern Hemisphere as the radiant lies low in the northeastern sky at dawn.

Those interested in detecting meteor via radio waves may start noticing activity from the **Capricornid/Sagittarids (DCS)**. These meteors can be detected from January 13 through February 4, with maximum activity occurring near February 1st. These meteors would be best detected during the morning hours of 8-10am, when the radiant lies approximately half-way up in the sky. It should be noted that meteors do not emit radio waves, but they act as mirrors and reflect

radio waves from distant transmitters which aren't heard otherwise. This is called forward scatter, opposed to backscatter where the transmitter and receiver are at the same place (radar). For practical reasons the frequency range 50 – 150 MHz (wavelength 6 m – 2 m) is used. This includes amongst others the FM band and TV transmitters which haven't switched yet to digital. Most reflections are short (less than a second), but brighter meteors can cause reflections lasting minutes. The shortest radio reflections are caused by faint meteors, fainter than visual ones. Radio reflections can be observed regardless of daylight or clouds, allowing more complete views of streams. For those interested in meteor observing via radio waves we invite you to visit [RMOB](#).

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 8 sporadic meteors per hour during the last hour before dawn as seen from rural observing sites. Evening rates would be near 2 per hour. As seen from the tropical Southern latitudes (25S), morning rates would be near 9 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.

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	
Anthelion (ANT)	-	08:24 (126) +18	30	01:00	3 - 2	II
alpha Hydrids (AHY)	Jan 06	08:52 (133) -10	42	02:00	<1 - <1	IV

Omicron Leonids (OLE)	Jan 10	09:26 (142) +09	42	02:00	<1 - <1	IV
January xi Ursae Majorids (XUM)	Jan 19	11:06 (166) +35	43	04:00	<1 - <1	IV
Comae Berenids (COM)	Dec 16	12:12 (183) +20	63	05:00	2 - 1	II
eta Corvids (ECV)	Jan 21	12:16 (184) -17	67	05:00	<1 - <1	IV
December sigma Virginids (DSV)	Dec 21	15:04 (226) +01	66	08:00	<1 - <1	IV
gamma Ursids (GUM)	Jan 18	15:11 (228) +70	30	09:00	<1 - <1	II
Quadrantids (QUA)	Jan 04	15:48 (237) +50	39	10:00	<1 - <1	I
xi Coroneae Borealis (XCB)	Jan 15	16:33 (248) +30	45	11:00	<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.

