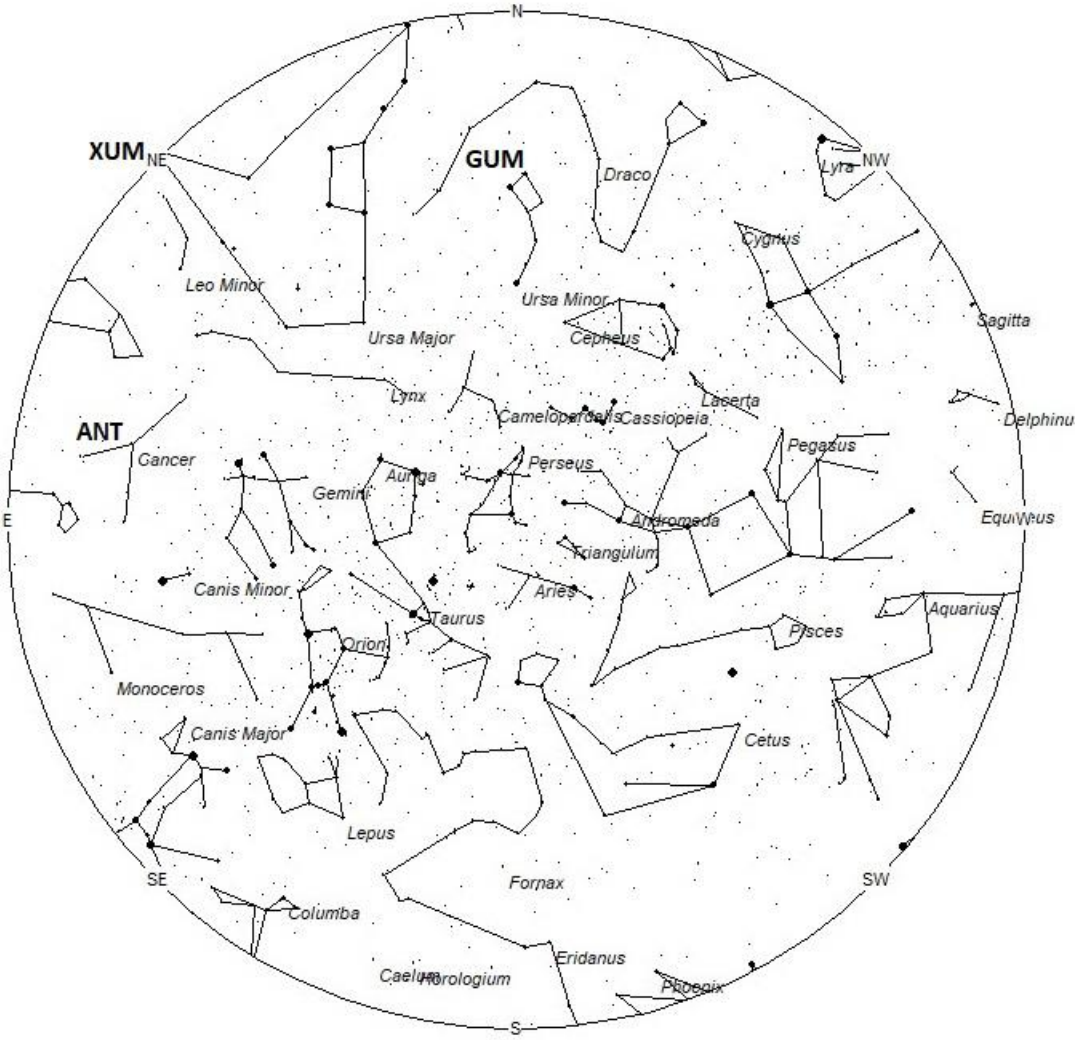
Meteor Activity Outlook for January 21-27, 2023

Marie Helene Cousin captured this Perseid fireball at 0:33 CEST on August 13, 2022 (22:33 UT on August 12), from Thémines, Occitanie, France. ©Marie Helene Cousin

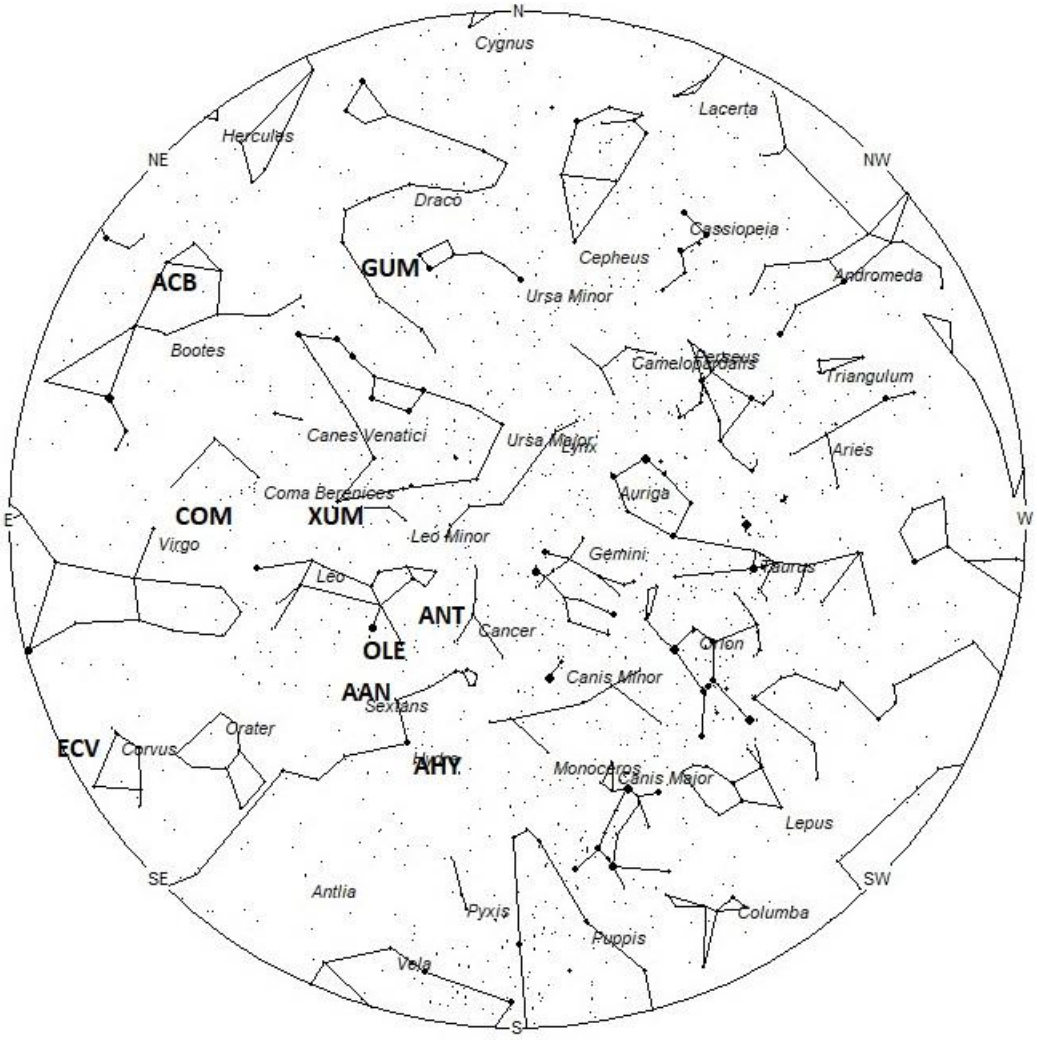
During this period, the moon reaches its new phase on Saturday January 21st. At that time the moon will lie near the sun and will be invisible at night. As the week progresses the moon will enter the evening sky as a waxing crescent but will not interfere with meteor observing. The estimated total hourly rates for evening observers this week should be near 3 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 13 as seen from mid-northern latitudes (45N) and 9 as seen from tropical southern locations (25S). The actual rates 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 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

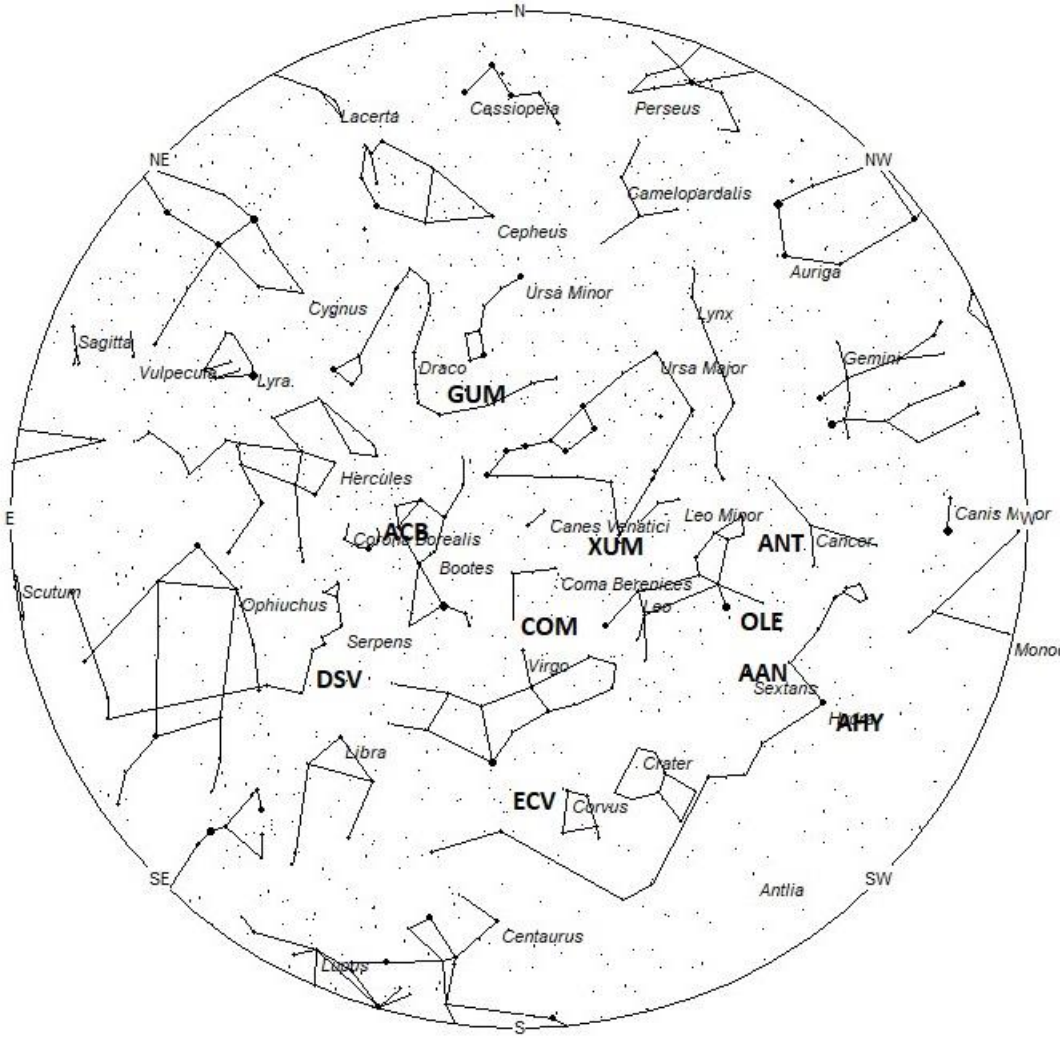
coordinates so that you may find out exactly where these positions are located in the sky. I have also included charts of the sky that display the radiant positions for evening, midnight, and morning. The center of each chart is the sky directly overhead at the appropriate hour. These charts are oriented 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. It must be remembered that meteor activity is rarely seen at the radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies at 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 large **Anthelion (ANT)** is currently centered at 08:56 (134) +19. This position lies in eastern Cancer, 3 degrees southeast of the 4th magnitude star known as Asellus Australis (delta Cancri). Due to the large size of this radiant, these meteors may also be seen from western Leo 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 southern 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 last of the **alpha Hydrids (AHY)** are expected this weekend from a radiant located at 09:20 (140) -12. This position lies in western Hydra, 3 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 southern horizon. At 41 km/sec. the alpha Hydrids produce meteors of medium velocity. Expected rates this week are less than 1 per hour no matter your location.

The **alpha Antliids (AAN)** were discovered by D. P. Galligan and W. J. Baggaley by using the Advanced Meteor Orbit Radar in New Zealand*. This very weak display is active from January 20 through February 10. There are two weak maximums occurring near January 26 and February 1. On January 26, the radiant lies at 09:56 (149) -05. This position lies in western Sextans, 6 degrees northeast of the 2nd magnitude star known as Alphard (alpha Hydrae). I'm not certain why these meteors were called alpha Antliids as this position lies 20 degrees north of the constellation of Antlia. These meteors are best seen near 0200 LST when the radiant lies highest above the southern horizon. At 44 km/sec. the alpha Antliids produce meteors of medium velocity. Expected rates this week are less than 1 per hour no matter your location.

*Gary Kronk, Meteor Showers-An Annotated Catalog, 2nd Edition Page 45

The last of the **omicron Leonids (OLE)** are expected this weekend from a radiant located at 10:00 (150) +07. This position lies in southwestern Leo, 4 degrees southwest of the 1st magnitude star known as Regulus (alpha Leonis). These meteors are best seen near 0200 LST when the radiant lies highest above the southern horizon. At 44 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 SonotoCo 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 11:25 (171) +31, which lies on in southern Ursa Major, 1 degree southeast of the 4th magnitude star known as Alula Australis (xi Ursae Majoris). These meteors are best seen near 04:00 LST when the radiant lies nearly overhead. Hourly rates should be near 1 as seen from the Northern Hemisphere and less than 1 as seen from south of the equator. These meteors encounter the atmosphere at 40 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 19th when rates may have reached 3 an hour. During this period, I would expect hourly rates of 1 from a radiant located at 12:42 (191) +16. This position lies in southern Coma Berenices near the faint star known as 27 Comae Berenices. These meteors are best seen near 0400 LST when the radiant lies highest above the southern horizon. At 63 km/sec. the Comae Berenicids produce mostly swift meteors. These meteors are also known as the December Leonis Minorids.

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 12:46 (192) -18, which places the radiant in eastern Corvus, 3 degrees southeast of the 3rd magnitude star known as Algorab (delta Corvi). These meteors are best seen near 0500 LST when the radiant lies highest above the southern horizon. Current hourly rates would be less than 1 per hour no matter your location. At 68 km/sec. these meteors would be fast.

The **alpha Coronae Borealids (ACB)** were discovered by John Greaves using data from SonotoCo. Activity from this source spans from January 26 to February 5 with maximum activity occurring on January 27. The radiant is currently located at 15:04 (226) +33. This position lies in in eastern Bootes, 2 degrees west of the 3rd magnitude star known as Princeps (delta Bootis). These meteors are best seen during the last few hours before dawn, when the radiant lies highest in a dark sky above the southern horizon. As seen from the Northern Hemisphere, rates should be near 1 per hour late this week. Rates would be less than 1 per hour as seen from south of the equator. These meteors encounter the atmosphere at 54 km/sec., which would produce meteors of medium-swift velocity.

The last of the **gamma Ursae Minorids (GUM)** are expected from a radiant located at 15:20 (230) +66, which places it southern Ursa Minor 6 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 above the northern horizon. Rates are expected to be less than 1 per hour no matter your location. Unfortunately, these meteors are not visible from the Southern Hemisphere. These meteors encounter the atmosphere at 31 km/sec., which would produce meteors of medium-slow velocity.

The last of the **December sigma Virginids (DSV) are expected this week from a** radiant located at 15:34 (234) -01 which places it in southern Serpens Caput, 2 degrees northwest of the 4th star known as mu Serpentis. 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 southeastern horizon. At 66 km/sec. the December Sigma Virginids would produce mostly swift meteors.

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.

As seen from the mid-northern hemisphere (45N) one would expect to see 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 also be near 8 per hour as seen from rural observing sites and 2 per hour during the evening hours.

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 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 per **night** away from maximum, so the showers listed in these outlooks are not as weak as they seem. Rates and positions are exact for Saturday night/Sunday morning except where noted in the shower descriptions.

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	
Anthelions (ANT)	-	08:56 (134) +19	30	01:00	3 - 2	II
alpha Hydrids (AHY)	Jan 05	09:20 (140) - 12	41	01:00	<1 - <1	IV
alpha Antliids (AAN)	Jan 26	09:56 (149) - 05	44	02:00	<1 - <1	IV

omicron Leonids (OLE)	Jan 10	10:00 (150) +07	44	02:00	<1 - <1	IV
January xi Ursae Majorids (XUM)	Jan 19	11:25 (171) +31	40	04:00	1 - <1	IV
Comae Berenicids (COM)	Dec 16	12:42 (191) +16	63	05:00	1 - <1	II
eta Corvids (ECV)	Jan 21	12:46 (192) - 18	68	05:00	<1 - <1	IV
alpha Coronae Borealids (ACB)	Jan 27	15:04 (226) +33	54	08:00	1 - <1	IV
gamma Ursae Minorids (GUM)	Jan 18	15:20 (230) +66	31	08:00	<1 - <1	IV
December sigma Virginids (DSV)	Dec 21	15:34 (234) - 01	66	08:00	<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.