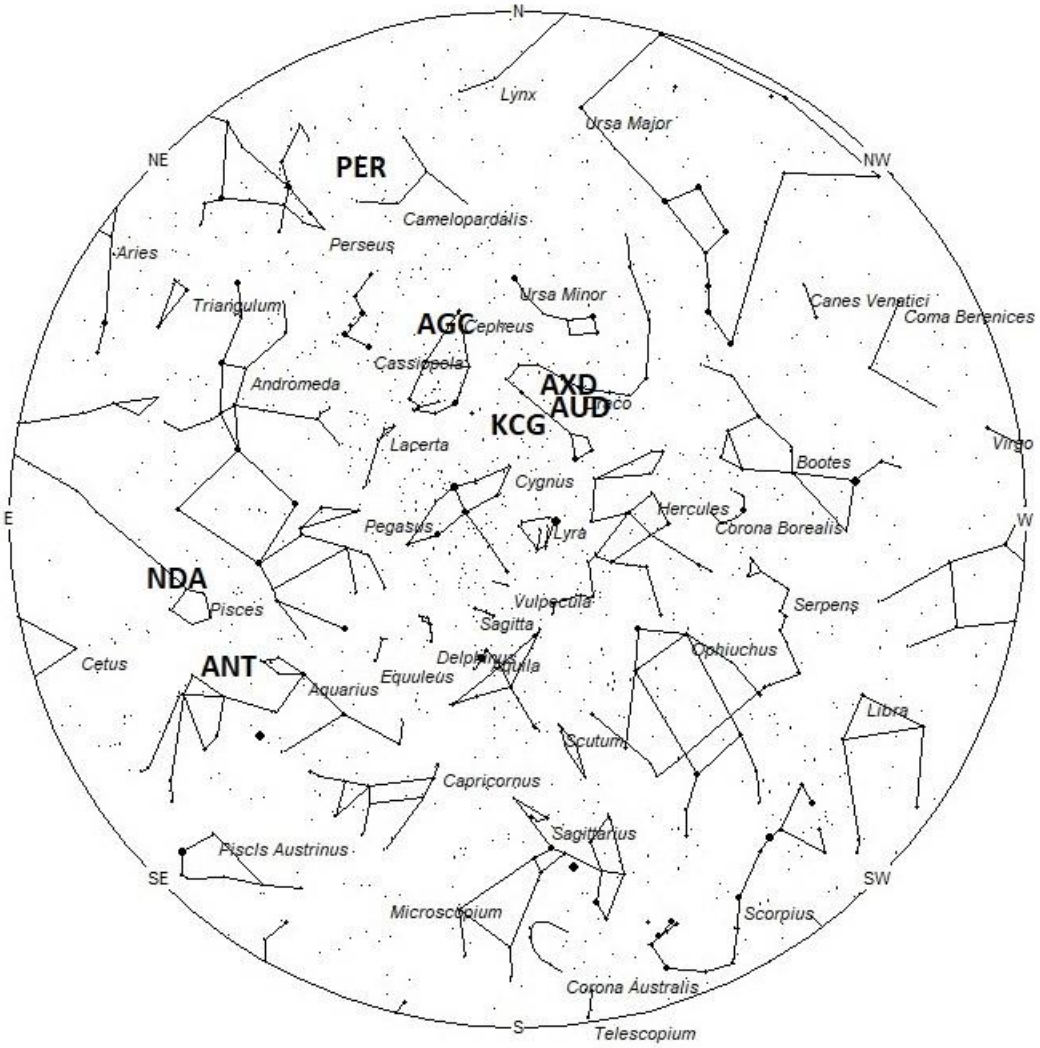
Meteor Activity Outlook for August 25-September 1, 2023

Peter Meadows captured this brilliant fireball from Chelmsford, England, on November 24, 2022 at 06:13 GMT using a GMN/UKMON Camera UK007U ©Peter Meadows

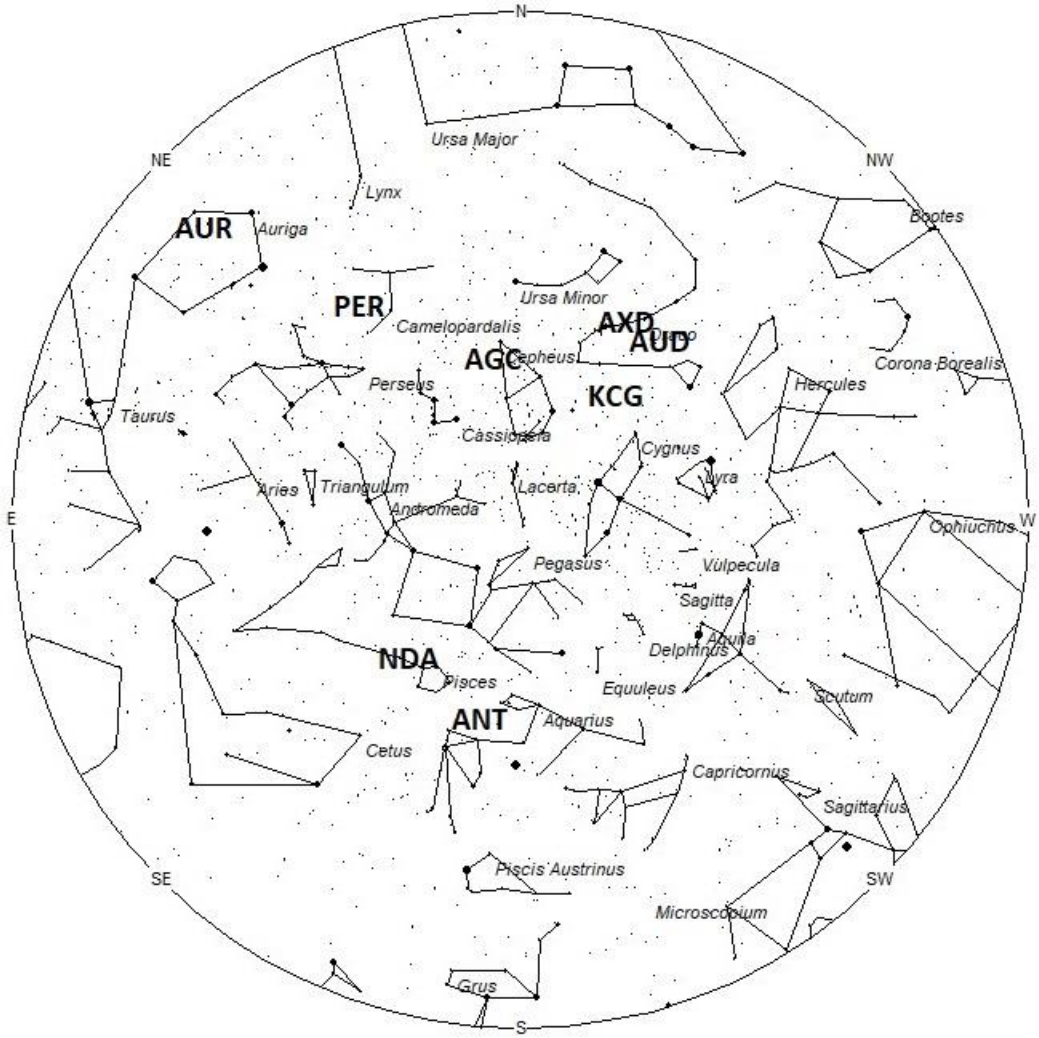
During this period, the moon reaches its full phase on Thursday August 31st. At that time the moon will be located opposite the sun and will lie above the horizon all night long. This weekend the waxing gibbous moon will set during the early morning hours, providing a small window of opportunity to view under dark skies between moon set and dawn. The estimated total hourly rates for evening observers this week should be near 2 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 13 as seen from mid-northern latitudes (45N) and 8 as seen from tropical southern locations (25S). Evening rates are reduced due to 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 August 26/27. 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

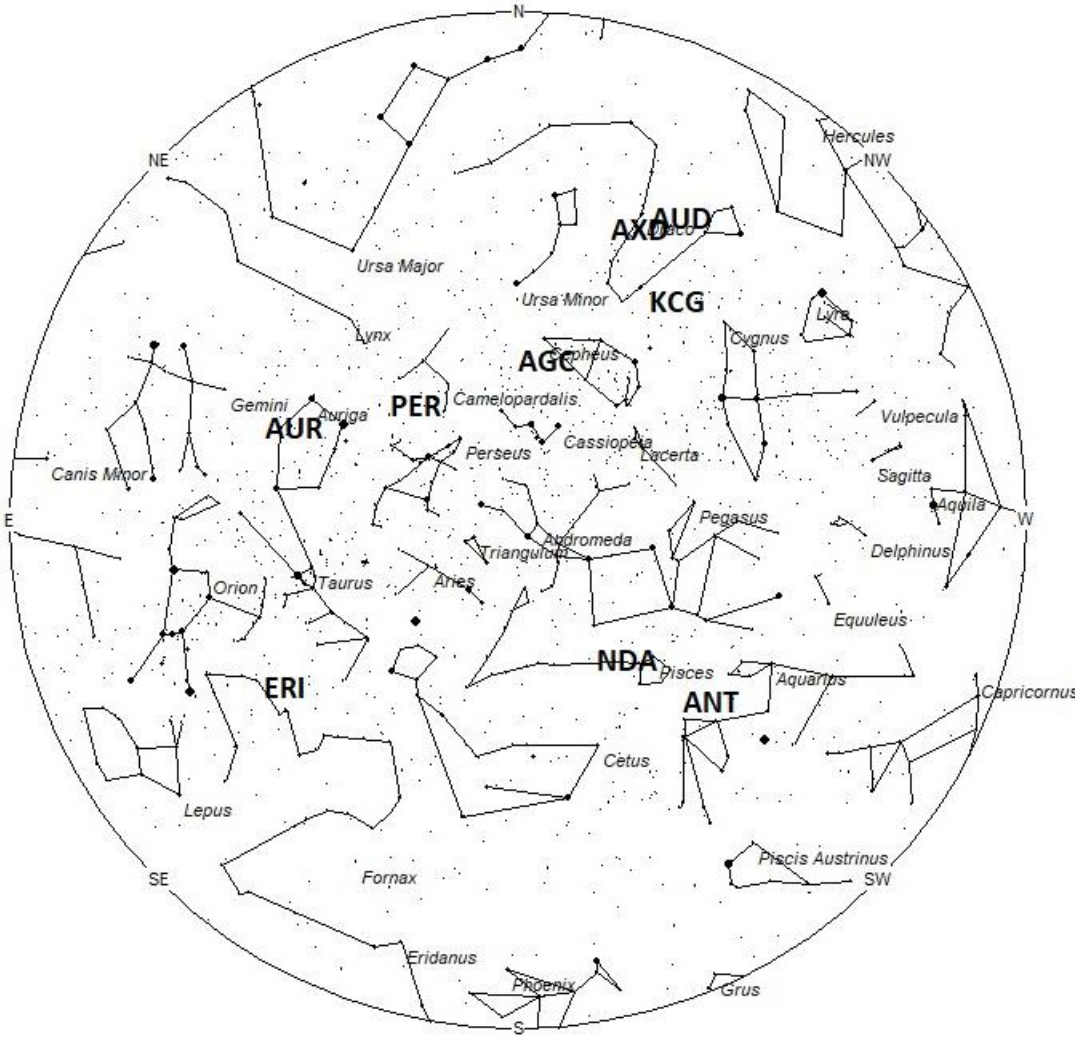
until daylight. For these radiants, it is best to view them during the last few hours before dawn. It must be remembered that meteor activity is rarely seen at its radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies toward 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 10pm Local Daylight-Saving Time



Radiant Positions at 1am Local Daylight-Saving Time



Radiant Positions at 4am Local Daylight-Saving Time

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

The **zeta Draconids (AUD)** were discovered by Zdenek Sekanina in his study of meteor streams using radio methods. This stream is active from August 12-September 5 with maximum activity occurring on August 26. The radiant is currently located at 17:04 (256) +63, which places it in southeastern Draco, 3 degrees south of the 3rd magnitude star known as Aldhibah (zeta Draconis A). This radiant is best placed near 2000 Local Daylight-Saving Time (LDST), when it lies on the meridian and is located highest in the northern sky. With an entry velocity of 22 km/sec., the average zeta Draconid meteor would be of slow velocity. Rates this week are expected to be less than 1 no matter your location. Due to the high northern declination these meteors are difficult to observe from the southern hemisphere. This position is close to that of the August xi Draconids radiant so care should be taken to differentiate between these meteors. These meteors are synonymous with the August Draconids (AUD).

The last of the **August xi Draconids (AXD)** are expected this weekend. These meteors were long considered part of the kappa Cygnids but Masahiro Koseki states that they are clearly distinct*. This stream is active from August 4-28 with maximum activity occurring on the 15th. The radiant is currently located at 17:28 (262) +66, which places it in central Draco, 3 degrees east of the 3rd magnitude star known as Aldhibah (zeta Draconis A). To best see these meteors, face low toward the north near 2000 DLST, when it lies on the meridian and is located highest in the northern sky. With an entry velocity of 22 km/sec., the average August Draconid meteor would be of slow velocity. Rates this week are expected to be less than 1 no matter your location. Due to the high northern declination these meteors are difficult to observe from the southern hemisphere.

*The activity of meteor showers recorded by SonotaCo video observations 2007–2018, Masahiro Koseki, 2021, https://www.meteornews.net/2021/02/09/february-2021-special-issue-of-emeteornews-online/ Page 147

The last of the **kappa Cygnids (KCG)** are expected this weekend from a radiant located at 19:27 (292) +61. This area of the sky is located in eastern Draco, 8 degrees northeast of the 4th magnitude star known as kappa Cygni. To best see these meteors, face low toward the north near 2200 LDST when it lies on the meridian and is located highest in the northern sky. With a high northern declination, these meteors are difficult to view from the southern hemisphere. Expected hourly rates this week are less than 1 no matter your location. With an entry velocity of 25 km/sec., the average meteor from this source would possess a slow velocity.

The large **Anthelion (ANT)** radiant is currently centered at 23:04 (346) -06. This position lies in northern Aquarius, 2 degrees northwest of the 4th magnitude star known as phi Aquarii. This radiant is best placed near 02:00 LDST when it lies on the meridian and is highest in the northern sky. Rates at this time should be near 2 per hour no matter your location. With an entry velocity of 30 km/sec., the average Anthelion meteor would be of medium-slow velocity.

The **August beta Piscids (NDA)** are part of the Northern delta Aquariid complex, active from August 18-September 8. This second peak of the NDA's occurs on August 21st, when the radiant lies well within the boundaries of the constellation of Pisces. The radiant currently is located near 23:47 (357) +07. This area of the sky is located in western Pisces, 2 degrees west of the 4th

magnitude star known as omega Piscium. To best see these meteors, look high in the northern sky near 0300 LDST, when it lies on the meridian and is located highest in the sky. Hourly rates at this time should be near 1 no matter your location. With an entry velocity of 38 km/sec., the average meteor from this source would be of medium velocity.

The **August gamma Cepheids (AGC)** are a recent discovery by Damir Šegon and the Croatian Meteor Network team based on studying SonotaCo and CMN observations (SonotaCo 2007-2011, CMN 2007-2010). Meteors from this source are expected from August 17 through September 6, with maximum activity occurring on August 29. The current position lies at 23:53 (358) +76, which lies in northern Cepheus, 2 degrees southeast of the 3rd magnitude star known as Errai (gamma Cephei A). To best see these meteors, face half-way up toward the north near 0300 LDST, when it lies on the meridian and is located highest in the northern sky. Rates at this time should be less than 1 per hour as no matter your location. With an entry velocity of 44 km/sec., the average meteor would be of medium velocity. These meteors are not visible south of latitude 20 South.

The **eta Eridanids (ERI)** are active from a radiant near 03:53 (058) -07. This position lies in northwestern Eridanus, 3 degrees northeast of the 4th magnitude star known as Rana (delta Eridani). This source is active until September 10th, with maximum activity occurring on August 7th. Current rates are expected to be less than 1 per hour no matter your location. These meteors are best seen during the last dark hour prior to dawn when the radiant lies highest above the southeastern horizon in a dark sky. With an entry velocity of 64 km/sec., the average meteor from this source would be of swift speed.

The last of the **Perseids (PER)** are expected this week from a radiant located at 04:38 (070) +60. This position lies in southern Camelopardalis, 3 degrees west of the 4th magnitude star known as beta Camelopardalis. Current rates are expected to be near 1 per hour as seen from the Northern Hemisphere and less than 1 as seen from southern tropical locations. Observers concentrating on this activity should face half-way up in the northern sky during the last dark hour prior to dawn to best view these meteors. Observers in the northern hemisphere are better situated to view this activity as the radiant rises much higher in the sky before dawn compared to southern latitudes. With an entry velocity of 59 km/sec., the average meteor from this source would be of swift velocity.

The **Aurigids (AUR)** are active from August 26 through September 4, peaking on September 1st. The radiant is currently located at 05:44 (086) +38. This position lies in eastern Auriga, 3 degrees west of the 3rd magnitude star known as Mahasim (theta Aurigae A). To best see these meteors, it is suggested to view half-way up in the northeastern sky during the last hour prior to dawn. Normally, hourly rates are less than 1 except on the night of maximum activity. With an entry velocity of 66 km/sec., the average meteor from this source would be of swift velocity.

As seen from the mid-northern hemisphere (45N) one would expect to see approximately 10 **sporadic** meteors per hour during the last hour before dawn as seen from rural observing sites. Evening rates would be near 1 per hour. As seen from the tropical southern latitudes (25S), morning rates would be near 6 per hour as seen from rural observing sites and 1 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 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 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 Daylight-Saving Time	North-South	
zeta Draconids (AUD)	Aug 26	17:04 (256) +63	22	20:00	<1 - <1	IV
August xi Draconids (AXD)	Aug 15	17:28 (262) +66	21	20:00	<1 - <1	IV
kappa Cygnids (KCG)	Aug 14	19:27 (292) +61	25	22:00	<1 - <1	II
Anthelion (ANT)	-	23:04 (346) -06	30	02:00	2 - 2	II
August beta Piscids (NDA)	Aug 21	23:47 (357) +07	38	03:00	<1 - <1	IV
August gamma Cepheids (AGC)	Aug 17	23:53 (358) +76	44	03:00	<1 - <1	IV
eta Eridanids (ERI)	Aug 07	03:53 (058) -07	64	07:00	<1 - <1	II
Perseids (PER)	Aug 13	04:38 (070) +60	59	08:00	1 - <1	I

Aurigids (AUR)	Sep 01	05:44 (086) +38	66	09:00	<1 - <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.