



SUCCESSFUL OBSERVING
BEGINS LONG BEFORE
YOU SET UP YOUR
TELESCOPE

CHOOSING THE RIGHT NIGHT

Every amateur astronomer has experienced the disappointment of setting up a telescope only to discover that the conditions are far from ideal. Thin cloud, turbulent air, strong winds or a bright Moon can quickly turn an eagerly anticipated observing session into a frustrating experience.

Fortunately, most observing conditions can be predicted before leaving home. By understanding a handful of key weather and astronomical factors, you can quickly decide whether the night is best suited to deep-sky observing, planetary viewing or perhaps postponing altogether.

PRACTICAL ASTRONOMY GUIDE #2

This guide will help you to recognise favourable conditions, saving time, reduce frustration and ensure every clear night is used to its full potential.

Choosing the right night is about understanding the weather, seeing conditions, transparency and moon phases.



NOT ALL CLEAR
NIGHTS ARE CREATED
EQUAL

CLOUD COVER I

Understanding the type of cloud can be just as important as the amount. Cloud cover is often the first thing astronomers check before heading out, but a simple percentage forecast rarely tells the whole story. The altitude, thickness and movement of cloud all influence whether an observing session is likely to be worthwhile.

LOW CLOUD. Often the most opaque, completely obscuring the sky where it occurs. However, it is also more likely to be broken into individual cloud banks that move with the prevailing surface winds, sometimes creating useful periods of clear sky between them. If you're observing from home or a nearby location, these breaks may be worth waiting for.

MID-LEVEL CLOUD. Generally thinner but can extend across much larger areas of the sky. Although brighter stars and planets may remain visible through it, the reduced contrast can make galaxies and nebulae difficult to observe. Mid-level cloud also tends to change more slowly, so improvements in conditions are often less predictable.

HIGH CLOUD. Thin cirrus clouds, can be the most deceptive. The sky may appear largely clear to the naked eye, yet a fine veil of ice crystals can scatter light and noticeably reduce transparency. Faint deep-sky objects often lose contrast long before the cloud itself becomes obvious.

A cloudless sky doesn't always guarantee excellent observing. Transparency and seeing determine which objects are best suited to the night's conditions.



SOMETIMES YOU'LL BE
LUCKY - AT LEAST
YOU'LL BE OUT IN THE
FRESH AIR

CLOUD COVER II

As a general guide:

- **CLOUD-FREE:** What are you waiting for? Get out there!
- **BROKEN CLOUD WITH FREQUENT CLEAR INTERVALS:** Often worth setting up and waiting for gaps in the cloud, particularly when observing close to home. You can always change to a target that is not obscured.
- **THIN, PATCHY CLOUD:** Usually acceptable for the Moon, planets and brighter deep-sky objects.
- **PERSISTENT LAYERS OF MID- OR HIGH-LEVEL CLOUD:** Can significantly reduce contrast, even if much of the sky appears clear.
- **OVERCAST CONDITIONS:** Usually best reserved for planning, equipment maintenance or simply waiting for a better opportunity.

Cloud forecasts should always be considered alongside satellite imagery and animated weather maps. They provide valuable insight into how cloud systems are developing and whether conditions are likely to improve or deteriorate as the night progresses.



A RAINSTORM EARLIER
IN THE DAY HELPS
REDUCE THE AMOUNT
OF DUST IN THE AIR

TRANSPARENCY

How clear is the atmosphere? Transparency describes how effectively light passes through the atmosphere. Even on cloudless nights, moisture, dust, smoke and airborne pollution can scatter light and reduce contrast, making faint deep-sky objects more difficult to detect.

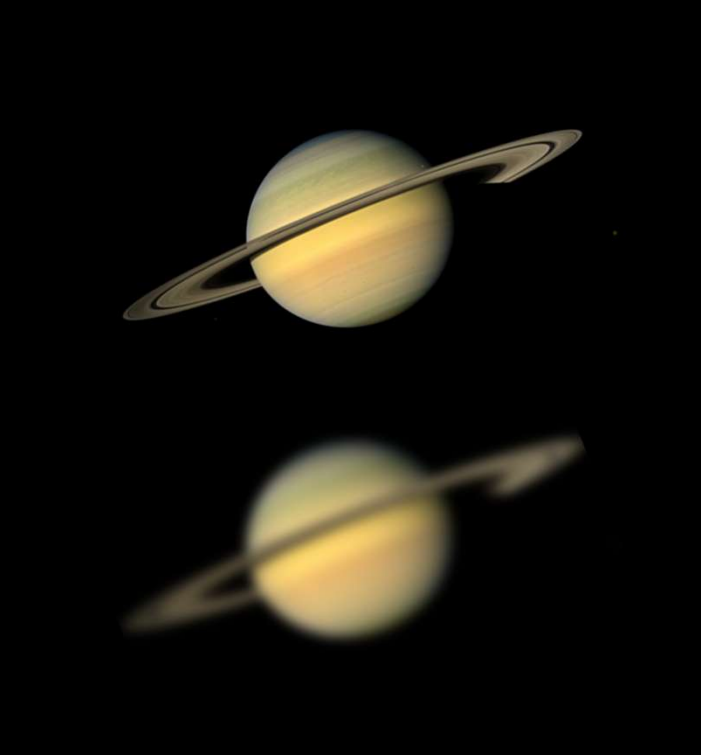
Excellent transparency is particularly important for galaxies, nebulae and other low-contrast objects, while the Moon and planets are generally less affected.

VISUAL ASSESSMENT

Transparency can often be judged before setting up your telescope. Look for: (1) good distant visibility during twilight, (2) a deep-dark blue sky with little or no milky appearance, (3) bright stars that appear crisp rather than slightly diffused, (4) the overall visibility of faint stars near the zenith (i.e. directly overhead), and (5) little or no glow (halo) around the Moon or bright planets.

TARGET SUITABILITY

TRANSPARENCY LEVEL	TARGETS
Excellent	Ideal for galaxies, nebulae and faint deep-sky objects
Good	Suitable for most targets
Average	Brighter deep-sky objects remain accessible
Poor	Focus on the Moon, planets, open star clusters



COOLER NIGHTS WITH
LOW HUMIDITY
MINIMIZE THERMAL
CONVECTION

SEEING

How steady is the atmosphere? Seeing describes the stability of the atmosphere. Turbulent air bends incoming light, causing stars to twinkle and fine detail on the Moon and planets to shimmer or blur.

Unlike transparency, seeing has little influence on whether faint objects are visible. Instead, it determines how much magnification your telescope can use effectively.

VISUAL ASSESSMENT

One of the simplest ways to judge seeing conditions is to look at bright stars. If stars twinkle vigorously overhead, seeing is usually poor. If they appear steady with only occasional flickering, seeing is likely to be good. If stars remain almost motionless, conditions are often excellent.

You can also assess seeing through your telescope (moderate magnification) or a pair of binoculars. Are stars pinpoints or constantly dancing? Does Jupiter appear sharp or does it shimmer? Can you focus cleanly, or is the image continually changing?

MAGNIFICATION BY SEEING LEVEL

SEEING	RECOMMENDATIONS
Excellent	Supports high magnification suitable for fine planetary detail
Good	Ideal for most lunar and planetary observations
Average	Patience and moderate magnification work best
Poor	Concentrate on wide-field deep sky objects; open star clusters

WIND & DEW FORMATION

WIND

Steady telescopes produce steadier images in the eyepiece / camera. Even moderate winds can introduce vibration, particularly when using large telescopes or lightweight mounts.

As a general guide:

- Less than 10 km/h (6 mph): Excellent
- 10-20 km/h (6-12 mph): Usually acceptable.
- 20-30 km/h (12-19 mph): Challenging for larger telescopes.
- Over 30 km/h (19 mph): Consider postponing.

Local shelter can often improve observing conditions considerably.

HUMIDITY

Dew formation can end an observing session early. High humidity increases the likelihood of dew forming on optical surfaces, particularly the corrector plates found in SCTs, MCTs, RASAs, on finder / guide scopes and eyepieces.

If the forecast temperature approaches the dew point, consider using:

- Dew heater bands wrapped around risk areas; remember you'll need a suitable power supply.
- Dew shields.
- Spare lens cloths.

Planning ahead can extend an observing session by several hours.



A GOOD QUALITY
TRIPOD WILL HELP
REDUCE WOBBLE ON
A BREEZY DAY

	Clouds				Index			Bad Layers		
	Low	Mid	High	Arc Sec.	1	2	Jet Stream	Bot (km)	Top (km)	K/100m
Fri 2026-08-07 sunrise: 06:17 sunset: 21:23 moonrise: ---- moonset: 17:22 moonphase: 34%										
2	0	0	0	3.24	4	3	16 m/s	02.1	04.4	0.7 K
3	0	0	0	3.24	4	3	14 m/s	01.6	04.4	0.7 K
4	0	0	0	3.30	4	3	14 m/s	01.6	04.4	0.7 K
5	0	0	0	3.57	4	2	13 m/s	01.6	04.4	0.7 K
6	0	0	28	4.00	4	3	12 m/s	02.0	04.3	0.8 K
7	30	19	67	4.15	4	3	12 m/s	02.0	03.7	0.9 K
8	63	13	95	4.24	4	3	12 m/s	02.0	03.7	0.9 K
9	45	8	100	4.22	4	3	12 m/s	02.0	03.7	0.9 K
10	5	5	100	4.10	4	3	12 m/s	02.1	03.7	0.9 K
11	41	29	98	4.02	4	3	13 m/s	02.1	03.7	0.8 K
12	35	43	79	4.00	4	3	14 m/s	02.1	03.7	0.8 K
13	34	48	52	4.00	4	3	15 m/s	02.1	04.4	0.8 K
14	29	54	30	4.05	4	3	15 m/s	02.1	03.7	0.8 K
15	31	43	16	4.11	4	3	15 m/s	02.1	03.7	0.8 K
16	14	38	6	4.25	4	3	15 m/s	02.1	03.7	0.8 K
17	16	39	0	4.07	5	4	17 m/s	02.1	03.2	1.0 K
18	19	35	0	3.99	5	4	18 m/s	02.1	02.6	1.3 K
19	12	58	0	3.75	5	4	20 m/s	03.1	03.7	0.5 K
20	23	55	0	3.34	5	4	21 m/s	03.1	03.7	0.6 K
21	28	11	0	3.18	4	3	21 m/s	02.1	04.4	0.7 K
22	13	0	0	3.19	4	3	21 m/s	02.1	04.4	0.7 K
23	20	0	0	3.32	4	3	20 m/s	02.1	04.4	0.7 K

FORECASTS

A single forecast can save a wasted journey. Before deciding whether to head out, it's worth consulting an astronomy-specific weather forecast rather than relying solely on a general weather app. One of the most comprehensive free resources is Meteoblue's Astronomy Seeing forecast, which combines cloud cover, transparency, seeing, jet stream, wind and other observing conditions into a single easy-to-read forecast.

RECOMMENDED RESOURCES

Astronomical Seeing
www.meteoblue.com/en/weather/outdoorsports/seeing/

Guide to Interpreting the Astronomical Seeing Forecast
<https://content.meteoblue.com/en/private-customers/website-help/outdoor-and-sports/astronomy-seeing>

Guide to Interpreting Cloud Cover Forecasts
<https://content.meteoblue.com/en/research-education/specifications/weather-variables/clouds>

TREAT LONG-RANGE
 FORECASTS AS A GUIDE,
 NOT A DECISION.
 MAKE YOUR FINAL CALL
 ON THE DAY.



**THE MOON ...
ALSO KNOWN AS THE
DEEP-SKY OBLITERATOR**

MOON PHASE

The Moon is brightest object in the night sky and it influences everything around it. Moonlight significantly brightens the background sky, reducing contrast and making faint deep-sky objects increasingly difficult to observe. When chasing faint deep-sky objects such as nebulae and galaxies, the new Moon period and nights either side are your best friend. Not surprisingly, as the level of illumination coming from the Moon increases it becomes increasingly more difficult to see faint objects. The First and Last Quarter still offer good conditions, while they are actually the best time to observe the Moon - crater rim and mountain shadows close to the terminator on the Moon are at their best, and you can observe other fine surface details. By the time we reach a Waxing or Waning Gibbous Moon, only brighter objects (planets) can be realistically seen. Full moons are best spent focusing on rig maintenance and planning.

That said, the Moon's phase is only part of the story. Its position in the sky is equally important. At certain times, the Moon sets early in the evening reducing the level of illumination reaching above the horizon, potentially leaving several hours of dark skies for observing. Check <https://www.timeanddate.com/moon/> for Moonset and Moonrise times, altitude and illumination levels.



REMEMBER ...
IF YOU WAIT FOR THE
PERFECT NIGHT,
YOU'LL NEVER SETUP
YOUR TELESCOPE

SUMMARY

Every season offers something different. The changing seasons determine which constellations and celestial objects are visible throughout the year. They also influence observing conditions. Winter often provides excellent transparency but colder temperatures. Summer offers comfortable observing but shorter periods of astronomical darkness. Spring is renowned for galaxies, while autumn brings many beautiful open clusters and nebulae. Rather than waiting for perfect conditions, learn which targets are best suited to the season and prevailing weather.

GO / NO GO QUESTIONS

We recommend running through a simple Go / No-Go checklist of questions before you leave home. Ask yourself:

- ✓ Is the cloud cover forecasted to be low?
- ✓ Is transparency good?
- ✓ Are the seeing conditions going to be suitable for tonight's targets?
- ✓ Is the wind manageable?
- ✓ Will the Moon phase and illumination level affect my observing?

If the answer to most of these questions is yes, it's probably worth heading out.

Remember every session involves balancing weather, sky conditions and the objects you hope to observe. By understanding the difference between cloud cover, transparency, seeing, wind and moonlight, you'll quickly learn which nights favour galaxies, which reward planetary observing and which are best spent planning your next session. The more often you compare forecasts with real observing conditions, the better you'll become at recognising opportunities that others might overlook.

ABOUT NSO

Our Vision

We envision a world where anyone with an interest in astronomy can begin their journey with confidence and enjoy rewarding first light experiences. Where choosing equipment is exciting rather than overwhelming, expert guidance is always within reach, and every astronomer has a trusted partner throughout their journey under the stars.

Our Commitment

We believe our responsibility doesn't end with a sale. We are committed to supporting our customers throughout their astronomy journey.

- Expert Guidance
- Carefully Selected Stock
- Accessible Value
- Long-Term Partnership

