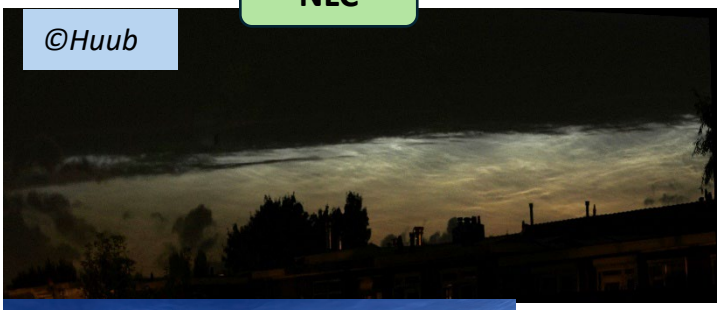
Observing Noctilucent Clouds – Field Guide

Noctilucent Clouds or NLC are clouds that occur in the upper atmosphere around ~82-88 km; i.e., **edge of space**. These clouds are a separate phenomenon from normal clouds that we see every day.

NLC



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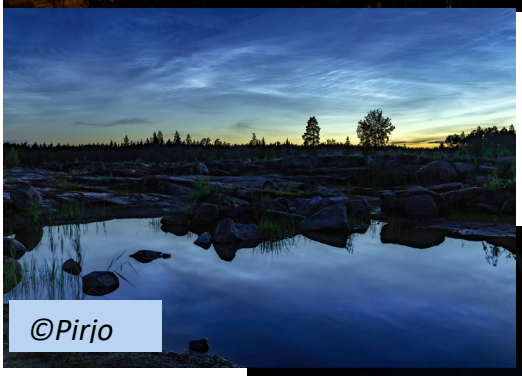

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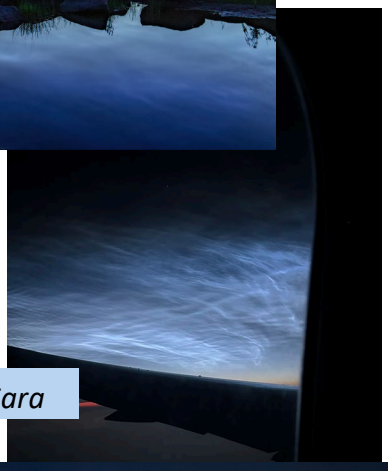

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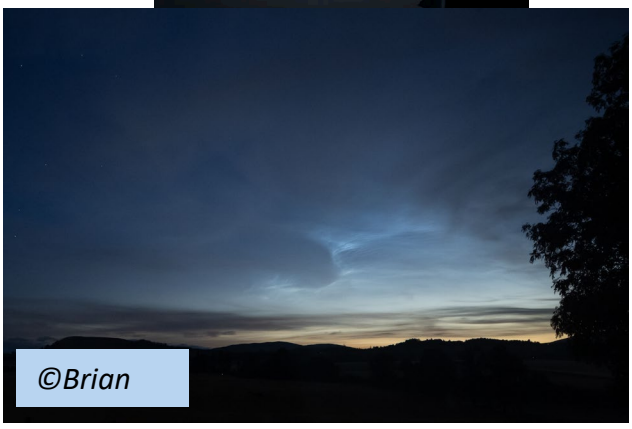
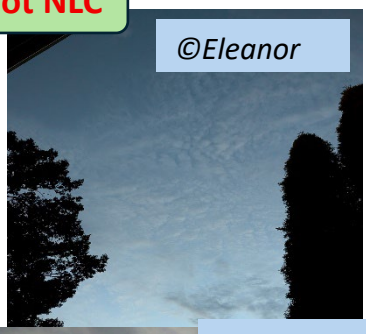


©Brian

Not NLC



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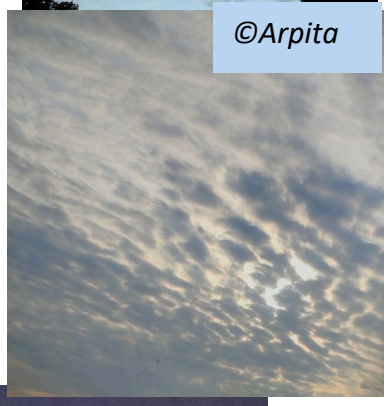

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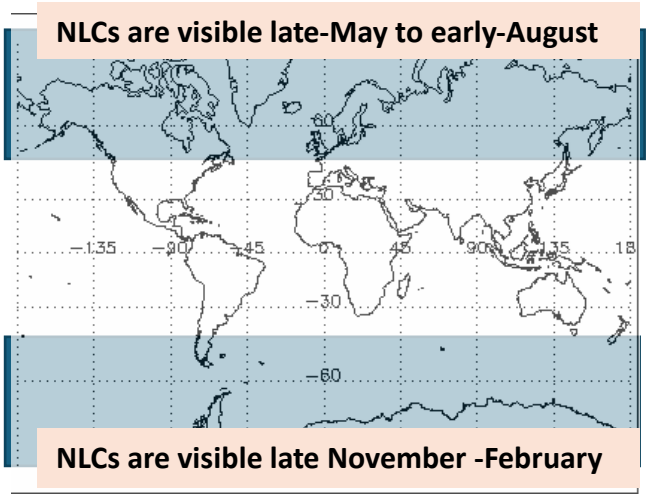
NLCs are a mid- high-latitude phenomena

NLCs occur 45-85° north of the equator. These clouds have been reported from northern United States, Europe, Russia, and other regions over the mid- high-latitudes. *The atmospheric conditions (temperature, water vapor etc.) are not ideal for these clouds to form in the tropical regions like India, UAE, Florida etc*.



Mid- and low latitude (<50 °N) NLC sightings are rare. We need your reports at all locations!

As far as we are aware, the record for the lowest latitude observation is from California, USA (at 34.1° N: https://spaceweatherarchive.com/2019/06/17/low-latitude-noctilucent-clouds/).

GUIDE FOR VIEWING NLCs

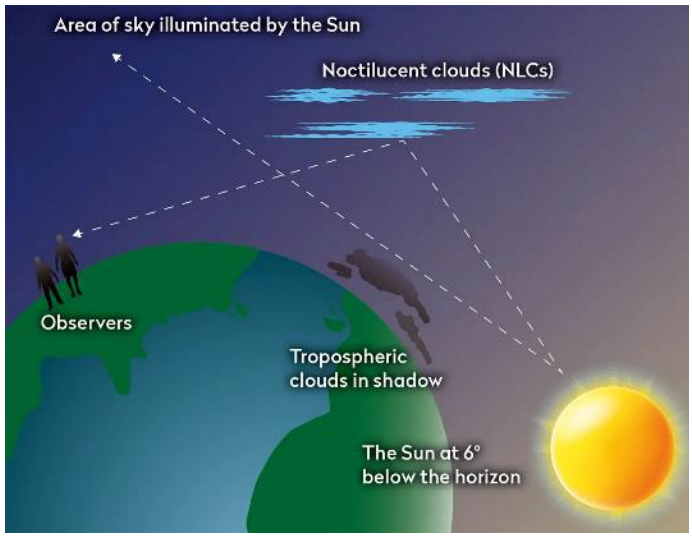
Late-May, June, July, early-August*

*December-February in the Southern Hemisphere

1-2 hours after sunset or before sunrise

Clear nights

Look to the Sunward horizon



From BBC Sky at Night Magazine. Credit: Paul Wootton

See 'Resources' in https://citsci.org/projects/space-cloud-watch for more information

NLCs or NOT?

While bright NLC displays are obvious sometimes they might be obscured by normal clouds. Other times high-cirrus clouds might appear as NLCs.

We welcome all reports!

©EZ L (USA; 7-June-2025; 47°N)

©Dorien T (Netherlands; 7-June-2025; 52°N)

Vivid Displays

NLCs can be observed with bright city lights

©Daniel F (Germany; 3-June-2025; 51°N)

You don't need a professional camera

Our members Sarah and Sigrid took this image from an airplane and train?, respectively, with their smartphones..

©Sarah K (Netherlands; 5-August-2022; somewhere over the Atlantic Ocean)

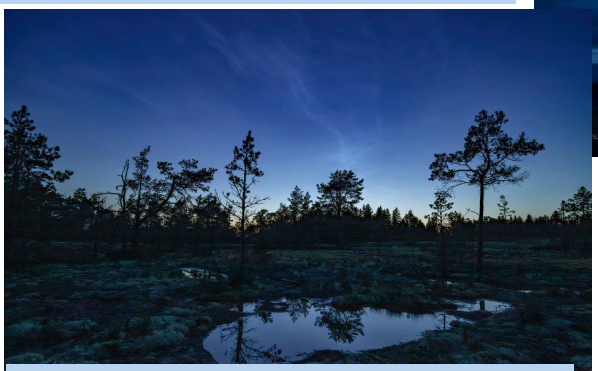
©Sigrid D (Denmark; 18-June-2024; 55°N)

Faint Displays of NLCs

©SK N (Netherlands; 2-June-2025; 52°N)

©Christos D (Greece; 2-June-2021; 38°N)

©Brian, S (Scotland; 4-June-2025; 56°N)



©Pirjo K (Finland; 4-June-2025; 60°N)

Sometimes normal (cirrus) clouds may look like NLCs.

For longer exposures with a phone I use a bag of rice to hold my camera/phone steady. You can put it on top of a car roof to take your photos.
Tip from Dorien

...in Finland, there is so much humidity at night that the roof of the car gets wet, so the bag go wet naturally, too. Also lens is getting wet easy so I recommed lens heater.
Tip from Pirjo

Tips from Huub:

1. NLC's always move more or less east to west, and they do so very slowly. If you are in doubt about seeing an NLC or cirrus, just watch the movement. Cirrus always moves faster than an NLC, even if the cirrus is moving slow itself. Cirrus can move in all directions of course.

2. NLC's are so thin that you can always see stars through them.

3. Because NLS's are at such a high altitude compared to cirrus, in binoculars or camera zoom cirrus will get fuzzy very quickly, while structures in NLC's remain sharp.

4. When NLC's turn out to be extended in elevation in the sky, it's very worthwhile to try and get an impression of how high in the sky they are. This can be more successful in early morning than after sunset. In early morning your eyes have had plenty of time to adjust (if you start observing very early). As the sun climbs gradually below the horizon and the NLC's are indeed extended you can see them appear as very faint whitish-blue ever higher in the sky the closer you get to sunrise. Of course there are instances that the NLC's are so extended and intense that you can see them in the evening within half an hour after sunrise already. I had the luck of experiencing that several times.

5. Just for concept: NLC's are very flat and effectively form a two-dimensional flat curved (because of the curvature of the earth) sheet. This means that NLC's (depending of course on their geographical distribution) will appear higher when you start observing in the evening, and lower in the sky when you start before sunrise. Sometimes people describe NLC's in the late evening receding towards the northern horizon. This is of course mainly caused by the earth's shadow proceeding north the later it gets (and visa-versa in the morning).

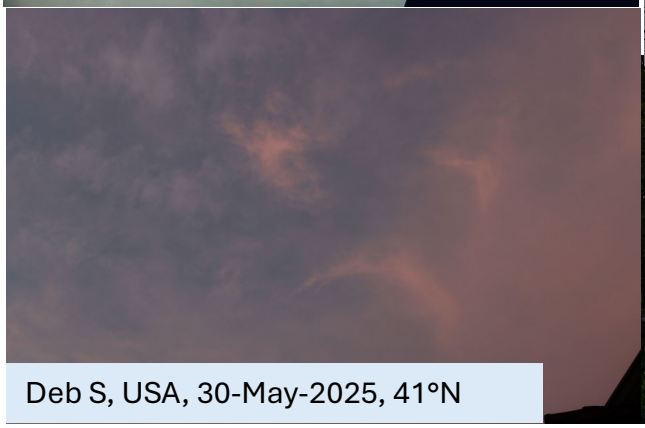
It can be difficult to distinguish between cirrus clouds and NLCs. One way to distinguish the two clouds is that, after sunset, NLCs will appear as pearly blue color while cirrus clouds are already dark.

NOT NLCs

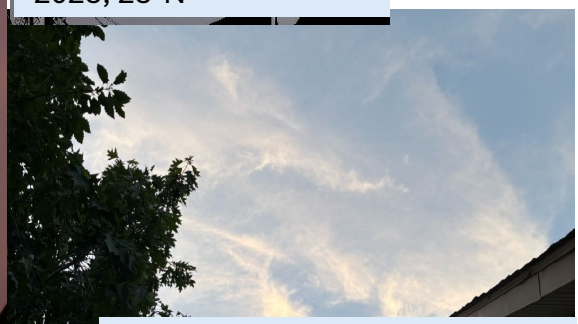
Examples of Cirrus (normal) Clouds. **Thank you to our volunteers!**

Lavanya K, USA, 12-June-2025, 42.6°N

Arpita S, India, 12-June-2025, 23°N



Deb S, USA, 30-May-2025, 41°N



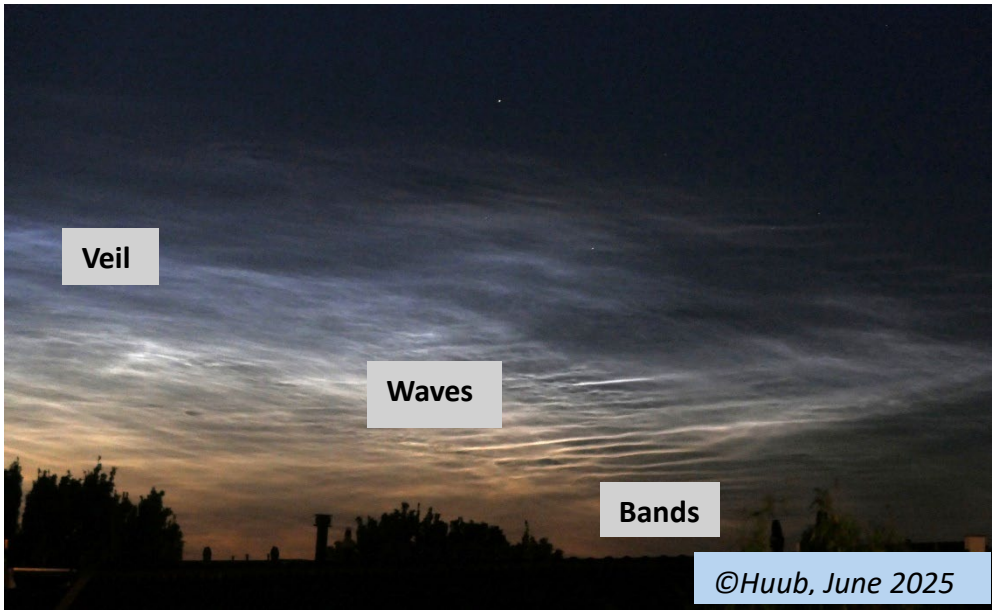
Mac L, USA, 4-Jun-2025, 39°N

More information

Types of NLC: Veil, Bands, Waves, Whirls or Complex

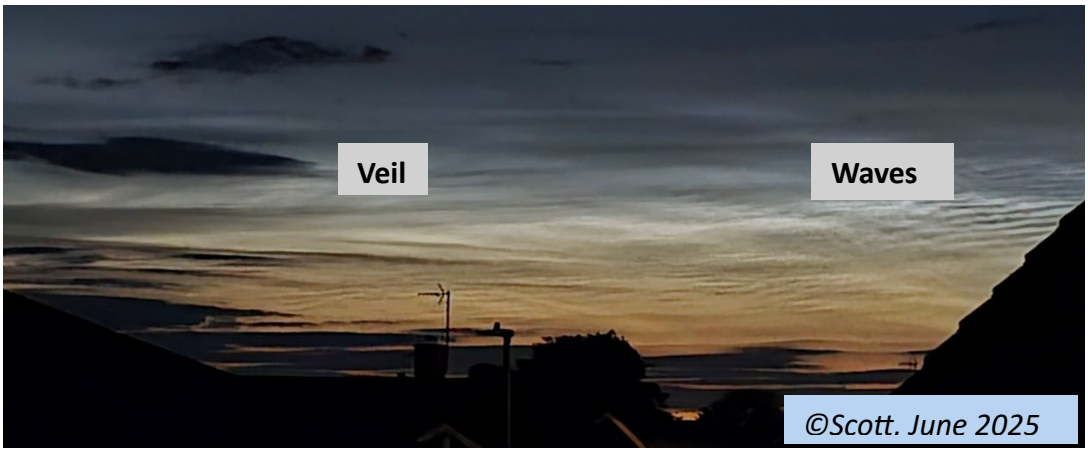
NLC Structures are classified into five basic structures, examples of which are shown in Figure 3:

- Type I: Veil - A simple structureless sheet, sometimes as background to other forms.



- Type II: Bands - Lines or streaks, parallel or crossing at small angles.

- Type III: Waves - Fine herring-bone structure like the sand ripples on a beach at low tide. Very characteristic of NLC.



- Type IV: Whirls - Large-scale looped or twisted structures.

- Complex Structure: No definite structure and does not fit into types I-IV

Photography Tips:
NLCs are observed during the summer months and are most likely to appear during the hours after sunset when the Sun is below the horizon but still illuminating the clouds from below. Here are some suggestions when using a camera, but experiment with different settings to get a good photograph.

1) Consider using a camera on a tripod with manual settings and a wide-angle lens to capture a larger portion of the sky.
2) Longer focal length (between 50 mm and 200 mm)
3) fast shutter speed so it's not blurry (between 2 and 10 seconds)
4) Aperture (f/2.8, f/5,6 or f/4 depending on background)
5) ISO around 400 or 800
6) Use image stabilization if available, and manual focusing

ISO 100-250 works especially in Finland, where there is enough light at night until mid-July. Depending on the lens, the aperture should be f7.1-11 due to vignetting and the exposure times should be 2.5s-10s.

Tip from Pirjo

You do not need an expensive camera to take photographs of NLCs. Many smartphones have cameras that are more than capable of taking awesome NLC pictures.

1) If available, use a smartphone tripod or hold your phone as steady as possible
2) Try to use the night mode setting
3) Including foreground objects give scale to the NLC display

Last updated by B. Thurairajah, C. Cullens, and Space Cloud Watch contributors; 20-June-2025