A Fool-Proof Formula: CATCH THE NORTHERN LIGHTS

The guide for absolute beginners *Melissa F. Kaelin*

Many methods of forecasting

There are many ways to forecast Aurora, and each method uses different tech and varying knowledge. Which method interests you?

- Webcams
- Live sightings
- Visual forecast tools
- Mobile apps
- Data right from the source
- Your own combination of resources

The Northern Lights are rare in the middle latitudes a display is never guaranteed! So, watching key

indicators can help, as well as social media.

It also helps to have something else to look forward to, such as shooting the Milky Way or visiting waterfalls.

How does activity become a dud?

Knowing when NOT to view Northern Lights can be almost as important as knowing when to view them. Often, these factors become show stoppers:

- Midnight Sun or Daylight
- Rain or Cloud Cover *
- Wildfire Smoke
- Fog or Mist*
- The Full Moon *
- Bz, when it tips to northward/positive, ie: Bz +7

^{*} Viewing may be possible during these conditions, with persistence or a camera.

What you're about to see...

I take full responsibility for this formula

a creature of my own design!



The formula!

A Fool-Proof Formula

My own fool-proof formula to catch Aurora:

- 1. Starry Skies
- 2. Negative Bz
- 3. Your Desired Kp
- 4. A Mapped Visual
- 5. Eye-Witness Account: One Live Sighting

1. Starry Skies

Find skies that are both **clear and dark**.

- Clear Skies
 Check the weather & satellite maps
- Avoid Light Pollution
 Use light pollution maps to find true dark sky.
- → Watch for Fog, Mist & Smoke

 Even a small amount of fog or smoke in the air can obscure the view.
- → The Wild Card: Full Moons Full moonlight could wash out the view

Weather apps are available in many types and some have **SATELLITE**MAPS that can lead you to clear skies.



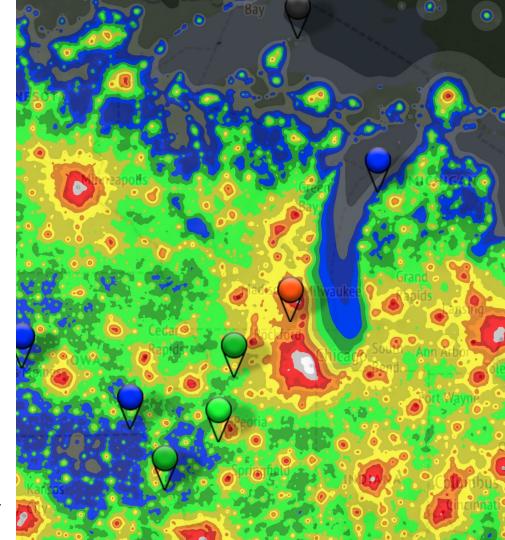
Maps and other tools can help you identify the

DARKEST SKIES

near you, and how far you may have to travel to reach the location.

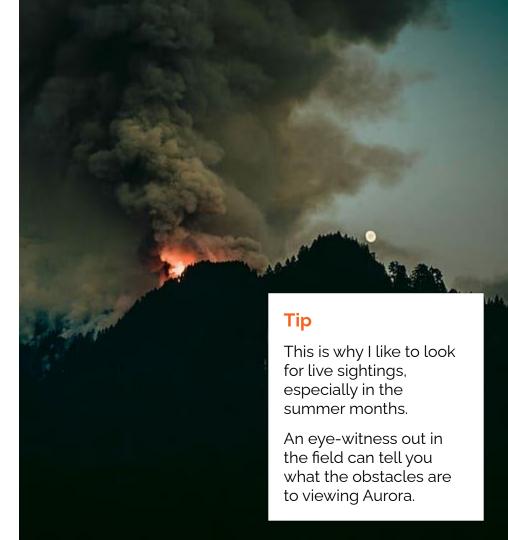
Dark Sky Map:

https://darksitefinder.com/maps/world.html#12/43.2592/-84.4438

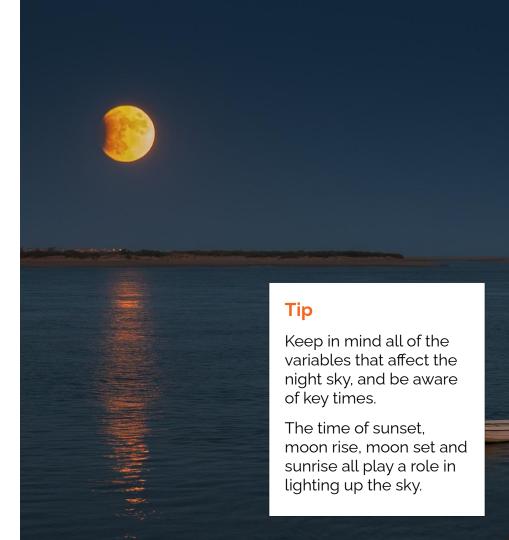


Not seeing Aurora? It may not be your fault. Other factors like fog, mist and wildfire smoke might

OBSCURE THE VIEW.



Many Aurora Chasers avoid the **FULL MOON** but it can give light to your photos or help you see better in the dark.



2. Negative Bz

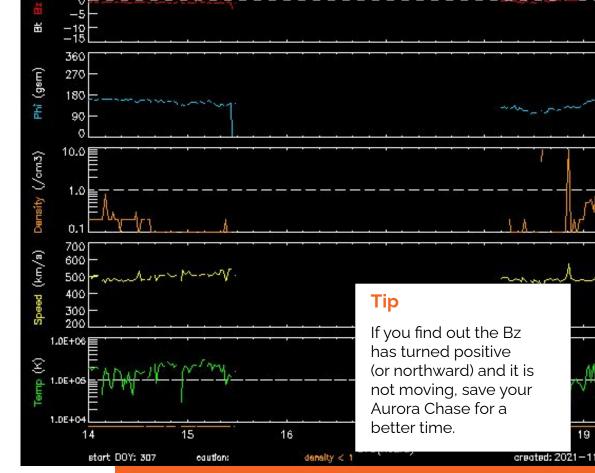
To avoid a dud, check for **negative Bz**.

- → The Game Changer
 This factor can stop activity in its tracks.
- → Like a Funnel

 When Bz drops, the "funnel" opens to let the Aurora flow into our atmosphere.
- → Negative or Southward
 If Bz switches back and forth or drops southward, conditions are better.
- Kp at Your Latitude Know your latitude and the Kp needed to view Aurora in your area.

What is Bz?

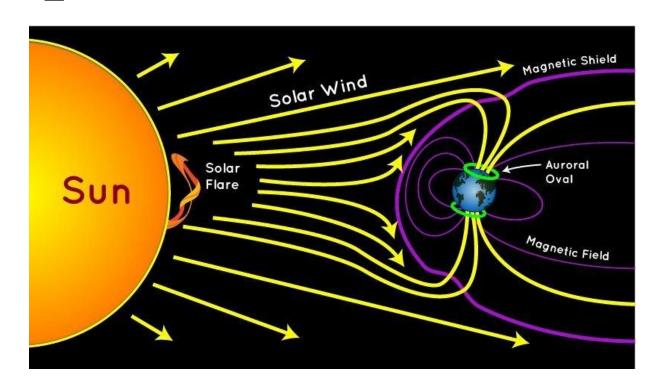
"A measure of the North/South orientation of the interplanetary magnetic field measured perpendicular to the ecliptic plane. When Bz is southward, or antiparallel to the Earth's magnetic field, geomagnetic disturbances become much more severe, than when Bz is northward."



Begin: 2021-11-03

ACE RTSW (Estimated) MAG & SWEPAM

Source: NOAA's Space Weather Prediction Center



The "Funnel"

Earth is designed to protect the planet from solar impacts. So, the Interplanetary Magnetic Field is crucial to determining whether solar wind reaches our skies. When the Bz turns positive, a.k.a. northward, it can block the Aurora Borealis, instantly.

3. Your Desired Kp

Know your **latitude and the Kp** (or K) that's needed to view Aurora at your latitude.

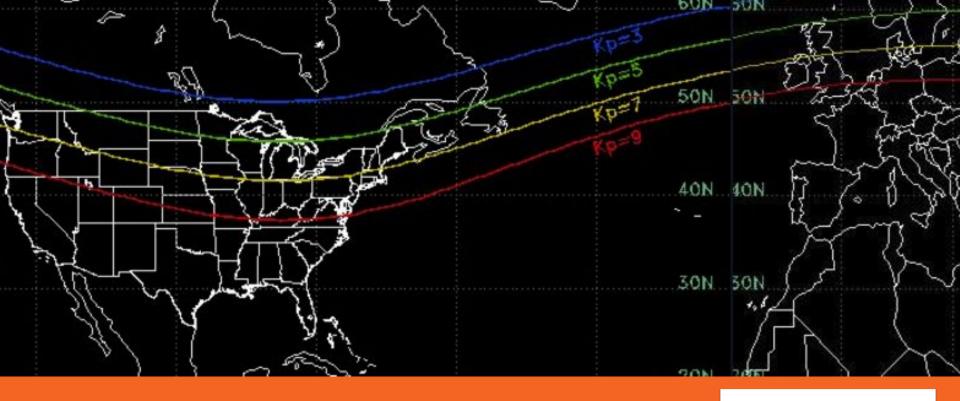
→ What is Kp?

Used in Aurora forecasting, Kp indicates average Aurora strength measured on a scale of 0 to 9.

Finding Your Latitude Look up the latitude for your location.

→ Hemispheric Power

Hemispheric Power may be an easier factor for you to watch, based on models.



The K-index indicates Aurora strength on a scale of 0-9.

Tip

When shown as Kp, this means it is a planetary average taken over the last 3 hours.





4. Mapped Visual

Often, a good **visual on a map** is all you need.

- Ovation Model With the right URL, the Ovation Model shows actual, current conditions.
- → Geophysical Institute Maps

 This interactive forecasting tool can be changed based on day or location.
- → Weather Maps & Soft Serve News Some news outlets will produce maps that combine information, such as clear skies and Aurora potential. Take these with a grain of salt.



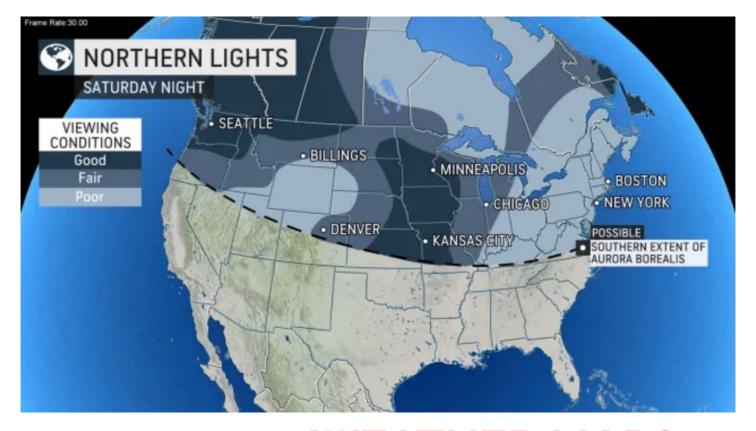
Explore these options for Aurora maps and choose one that works best for you.

The K-index and the Auroral Arc stay the same, but maps vary.



Tip

Visit your favorite forecast website or app often, and compare it with what you actually experience, to determine which resource is most accurate for you.



Some sources will publish **WEATHER MAPS** showing both clear skies potential for Aurora.

Source: Accuweather

November 5, 2021 Universal Time

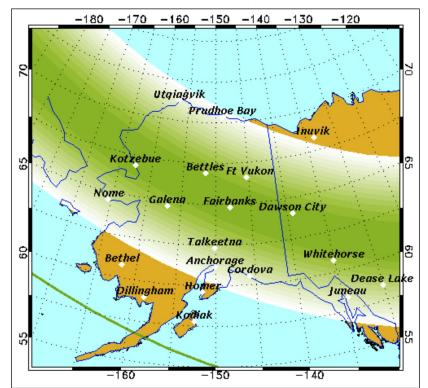
ACTIVE ACTIVITY

KP INDEX: 0 1 2 3 **4** 5 6 7 8 9

If you want to use an

INTERACTIVE

MAP to try to predict the Aurora, check out the Geophysical Institute at the University of Alaska — Fairbanks.



The aurora forecast is updated daily at midnight UTC.









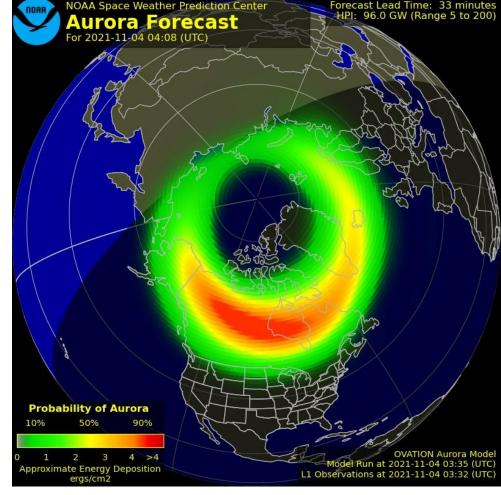


Geophysical Institute:

https://www.gi.alaska.edu/monitors/aurora-forecast

The stronger the Northern Lights are, the farther south they extend.

ONCE, THE AURORA DANCED IN CUBA BUT SUCH SHOWS ARE EXTREMELY RARE.



Ovation Model: https://services.swpc.noaa.gov/images/aurora-forecast-northern-hemisphere.jpg

5. One Eye-Witness

The only way to know with certainty is to find information from an eye-witness, so try to find **one alert or live sighting** before going out.

- → Is Aurora Low on the Horizon?

 Know how high Aurora are visible.
- → Is Aurora Naked-Eye Visible?

 This detail may be key to your success.
- → Is the View Obscured?
 Live sightings usually include tips like this.
- → Is Aurora Activity Sustained?

 This can help you determine if the display will last until you arrive or fizzle out.

From Outer Space to Earth

Seasoned Aurora Chasers have learned what conditions they need to see Aurora from experience, and they know how it changes over time. Follow experts, join groups and research the answers to your questions so you can catch the Aurora!

qiT

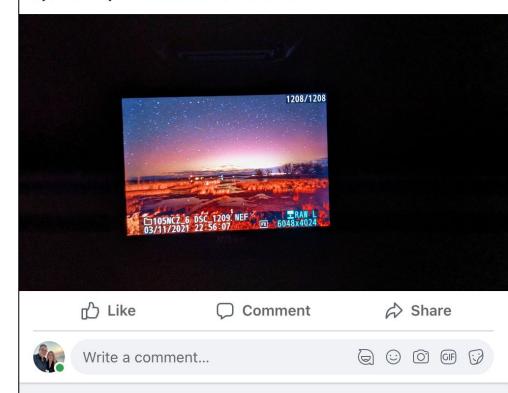
Light pollution looks surprisingly similar to Aurora in some cases. Other false alarms you might see include light pillars, air glow, or the colors of twilight.

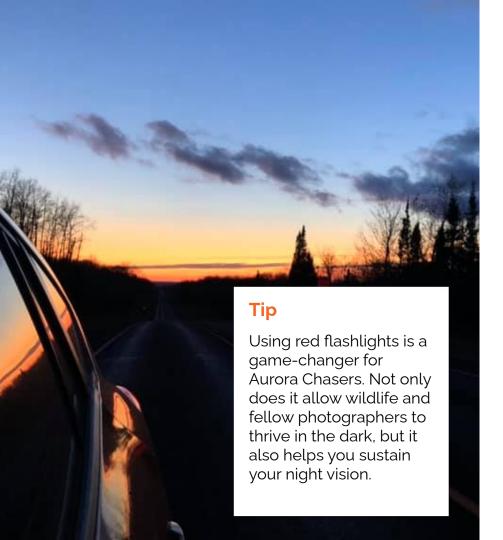
PROOF that the

Northern Lights are active. They may not last, but this shows the data has held steady long enough for a chaser to take a photo.



Test shot. Downtown Ashland, Wisconsin. Off us2. Faint naked eye visibility. We need that bz to tank!





A simple gesture

As a newcomer, it's important to chase Aurora the right way — with respect for the land, dark skies, and other people you may encounter.

Check out our Night Sky Etiquette tips from the Aurora Summit, and remember these on your journey.

Night Sky Etiquette:

TheAuroraSummit.com/Etiquette

Reasons you might not see it:

Turn out the lights! Then let your eyes adjust to the dark for a full minute.

Know what you are looking for, beginning with the arc low on the northern horizon.

How much is visible to the naked eye? It takes more to see color versus "grey clouds."

Resources

Ovation Model Live:

https://services.swpc.noaa.gov/images/aurora-forecast-northern-hemisphere.jpg

Geophysical Institute (Interactive Forecast):

https://www.gi.alaska.edu/monitors/aurora-forecast

SWPC Amateur Space Weather Enthusiast Dashboard:

https://www.swpc.noaa.gov/communities/space-weather-enthusiasts

SWPC's Glossary of Terms:

https://www.swpc.noaa.gov/content/space-weather-glossary

3-Day Forecast:

https://www.swpc.noaa.gov/products/3-day-forecast

27-Day Outlook (low confidence):

https://www.swpc.noaa.gov/products/27-day-outlook-107-cm-radio-flux-and-geomagnetic-indices

Tip

Use only the best sources. Avoid apps and websites that have hype but no credibility.

Good luck!

I hope these tips help you to chase — and catch — your first Aurora! Let me know if you have questions or want more ideas for apps or websites to use on your adventures.

For more information, visit:

TheAuroraSummit.com/Resources

#AuroraSummit21

Check out my work at:

<u>Melissa F. Kaelin: Writer, Artist & Stargazer</u> & KaelinArt.com

CHASE THE AURORA

TheAuroraSummit.com