

# The Latest & Greatest in Northern Lights Chasing

Get details about some of the greatest tools & new events!



3:30am

YELLOWKNIFE, CA

Photo by Cristiano Saturno

# Overview of Tonight's Topics

- New tools to add to your collection
- Stats, indicators & stars to follow
- Beat FOMO: Four Ways to Get Alerted Awake
- New Opportunities in Astrotourism
- Travel Recommendations & Upcoming Events

# Tools for Aurora Chasers Everywhere

*Presenting ARC! A Never-Before-Seen Free Aurora Alerts Platform*

# Glendale App (Channel)

- We recommend the Glendale App!
- Download the free Telegram App
- Subscribe to  
@GlendaleApp (Aurora Alerts-UK)
- Download the full app:  
<https://aurora-alerts.uk/>





# Michigan Aurora Alerts

- Download the free Telegram App
- Subscribe to @MichiganAuroraAlerts
- Let us know if you live in Michigan and would like to be a Spotter!



# NEW! Presenting the Aurora Relay Channel (ARC)

- Get free GLOW Alerts!
- Download the free Telegram App
- Subscribe to @AuroraRelayChannel
- We welcome new Spotters!

## ARC: Great Lakes Official Webalerts

Get Aurora alerts across this U.S.A. region from the Great Lakes Official Webalerts (GLOW) with Aurora Relay Channel, provided by the Michigan Aurora Chasers!

## Become a Spotter:

[MichiganAuroraChasers.com/alerts](https://MichiganAuroraChasers.com/alerts)



# Interested in Being a Spotter?

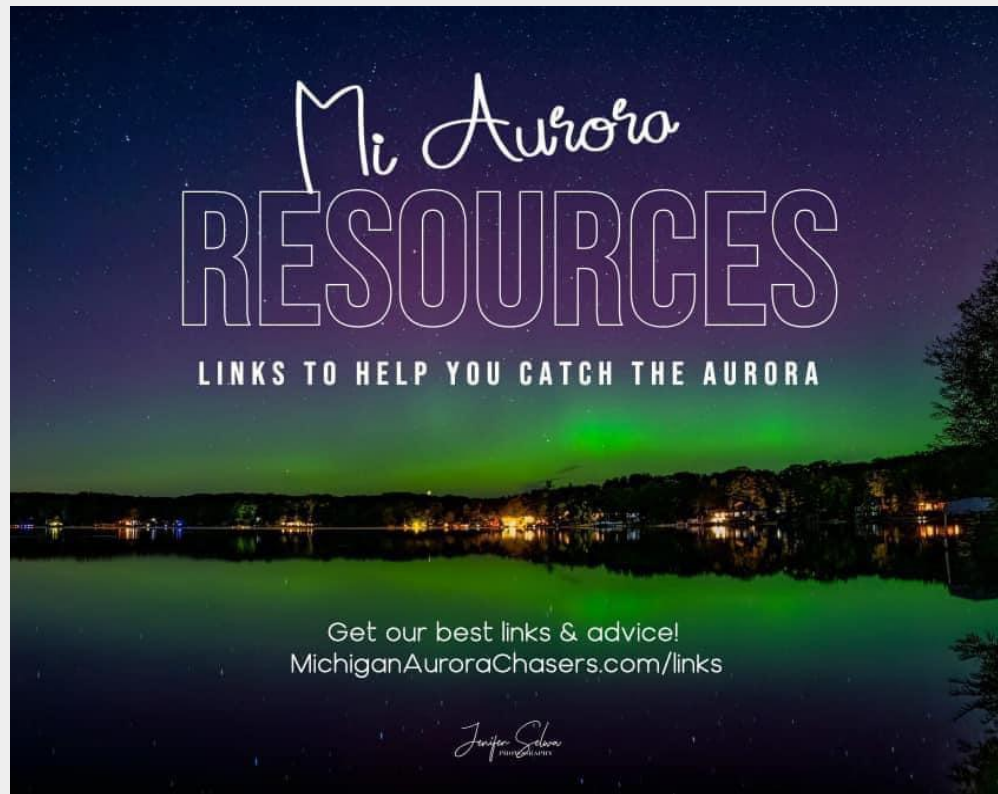
*Let me know if you see an area you would like to get involved in!*

# Camera Note Card



# MI Aurora Resources

- Recommended Apps
- Live Aurora Webcams
- General Resources Used Everywhere
- Resources Developed by the Group & the Founder
- Fun Stuff



*Photo by Jen Selwa*



# The Greatest Stats, Indicators & Stars

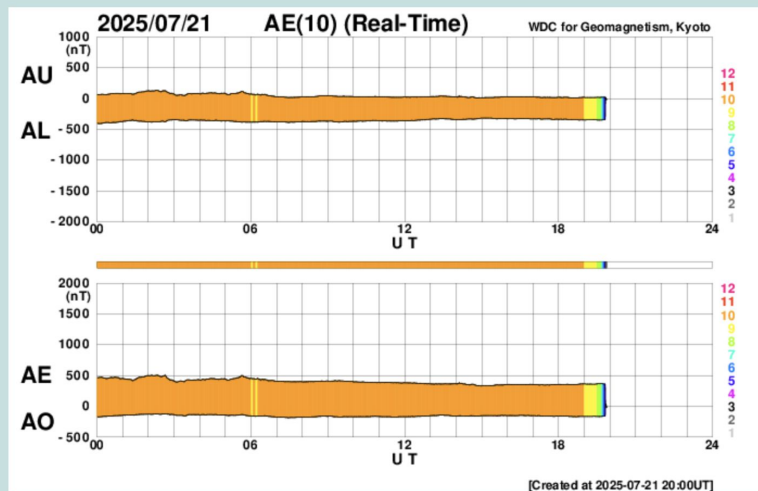
*Turn to the Resources Used by Seasoned Aurora Chasers*

# Real-Time Bursts of Activity: Auroral Electrojets (AE)

- Auroral Electrojets — The AE index is designed to provide a global, quantitative measure of magnetic activity in the auroral zone
- Real-time AE from Kyoto
- Colors indicate the number of stations used
- Not useful in long-term forecasting

**Favorite Aurora Chasing Hacks:**  
[KaelinArt.com/Aurora](https://KaelinArt.com/Aurora)

Link to [Data Center Top Page](#), [Top Page](#), [Prev Day](#)



Colors in the plot indicate the number of stations used to derive the indices. The color scale is displayed at the right of the plot.

Digital values of the real-time AE indices (in a wdc-like format) are published to the [data repository](#).

# Tracking Substorms: GOES Magnetometer

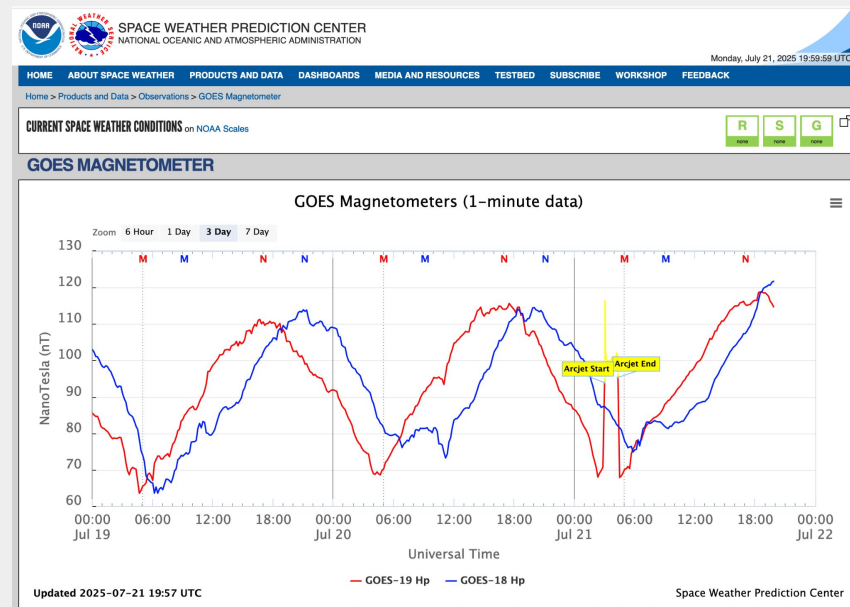
- Useful for detecting moderate and powerful substorms
- Watch for the snap!
- Beware the pseudo-breakup!
- Best resource for tracking Substorms in real time

NOAA's Geostationary Operational Environmental Satellites (GOES) monitor the geomagnetic field and its variations.

We can use GOES East and GOES West, though at times, data are available from more than the two prime operational satellites.

**Link:**

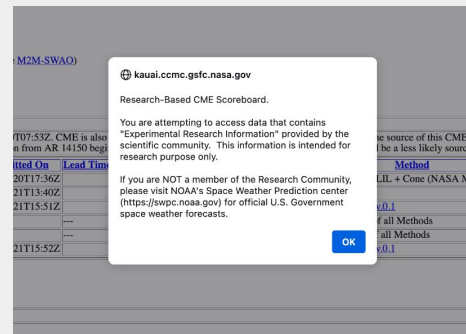
<https://www.swpc.noaa.gov/products/goes-magnetometer>




# CME Scoreboard from the Community Modeling Center

- Forecasts from PROFESSIONAL scientists
- Predict next CME arrival at Earth & impacts
- Machine learning models, too

Link: <https://kauai.ccmc.gsfc.nasa.gov/CMEScoreboard/>





**Community Coordinated Modeling Center**

**CCMC CME Scoreboard**

[Login](#)

**CCMC CME Scoreboard**

The CME Scoreboard is part of the the [CME Arrival Time and Impact Working Team](#) within the COSPAR [International Space Weather Action Teams \(ISWAT\)](#).

Developed by the [Community Coordinated Modeling Center \(CCMC\)](#), the CME Scoreboard serves as a **research-based pre-event forecasting validation platform**.

- [About CME Scoreboard](#)
- [See Latest News](#)
- [Accessing/Using the system](#)
- [Concerning the determination of CME arrival time](#) (primarily provided by the [M2M-SWAO](#))
- [Join the mailing list](#)

**Active CMEs:**

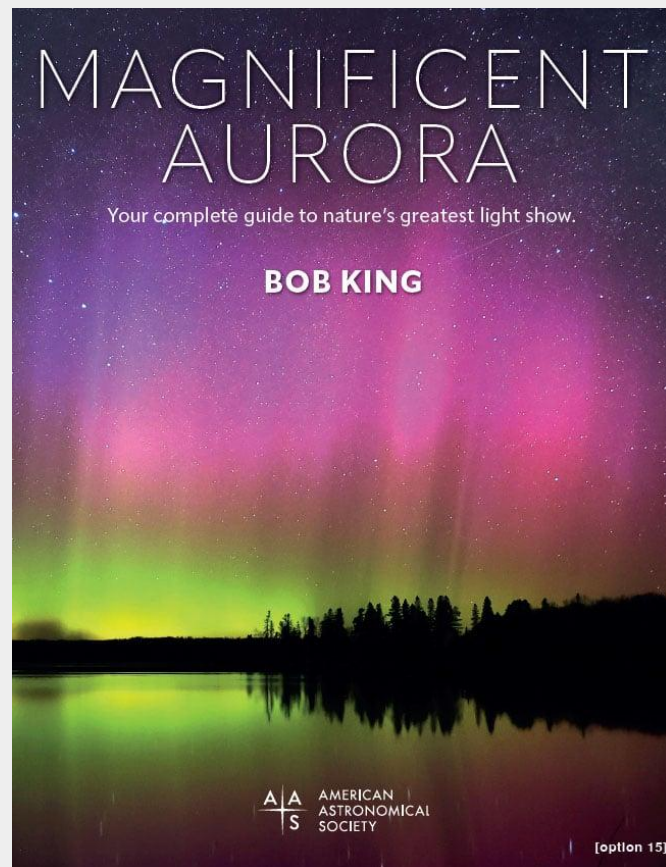
**CME: 2025-07-20T07:53:00-CME-001**

CME Note: CME first seen to the ESE in STEREO A COR2 starting at 2025-07-20T07:53Z. CME is also seen to the SE in SOHO LASCO C2/C3 and GOES CCOR-1. The source of this CME is likely a small filament eruption centered around S25E17 best seen in GOES SUVI 304 beginning around 2025-07-20T07:00Z. It is also worth noting an eruption from AR 14150 beginning around 2025-07-20T05:00Z in GOES SUVI 304 that could be a less likely source candidate. Measurement of this CME indicates some eastern deflection.

Predicted Shock Arrival Time	Difference (hrs)	Confidence (%)	Submitted On	Lead Time (hrs)	Predicted Geomagnetic Storm Parameter(s)	Method	Submitted By	
2025-07-23T02:00Z (-7.0h, +7.0h)	----	----	2025-07-20T17:36Z	56.40	Max Kp Range: 4.0 - 6.0	WSA-ENLIL + Cone (NASA M2M)	Elizabeth Juef's (LASSOS)	<a href="#">Detail</a>
2025-07-23T00:01Z	----	----	2025-07-21T13:40Z	34.35	Max Kp Range: 3.0 - 5.0	<a href="#">SARM</a>	Marlon Nunez (UMA)	<a href="#">Detail</a>
2025-07-23T00:53Z (-4.22h, +5.89h)	----	66.0	2025-07-21T15:51Z	33.03	----	<a href="#">CMEFM v0.1</a>	Garrett Imhoff (Other)	<a href="#">Detail</a>
2025-07-23T07:22Z	----	49.5	---	---	Max Kp Range: 3.5 - 5.5	Average of all Methods	Auto Generated (CCMC)	<a href="#">Detail</a>
2025-07-23T01:26Z	----	49.5	---	---	Max Kp Range: 3.5 - 5.5	Median of all Methods	Auto Generated (CCMC)	<a href="#">Detail</a>
2025-07-24T02:35Z (-4.79h, +6.4h)	----	33.0	2025-07-21T15:52Z	58.72	----	<a href="#">CMEFM v0.1</a>	Garrett Imhoff (Other)	<a href="#">Detail</a>

# Authors & Aurora Chasing Stars

- **Hendrik Anne Zwart**, “Aurora: How to Prepare, Predict, Photograph,” Your Step by Step Guide  
<https://www.auroraphotographysettings.com>
- **Vincent Ledvina**, Blog; Visit “eBooks”  
<https://theauroraguy.com/>
- **Bob King**, “Magnificent Aurora: Your complete guide to nature’s greatest light show”  
<https://shopatsky.com/products/magnificent-aurora>
- **Adrien Mauduit**, Night Lights Films,  
[Instagram.com/nightlightsfilms](https://www.instagram.com/nightlightsfilms)
- **Space Weather Unplugged**, by UMAC Admins  
<https://www.youtube.com/@Shelbydiamondstar>
- **Yours truly, Melissa F. Kaelin**, “Beyond the 45th Parallel” for beginners [TinyURL.com/AuroraAuthor](https://TinyURL.com/AuroraAuthor)





# Substorm Alerts!!

*Via Glendale App (Aurora Alerts - UK)*

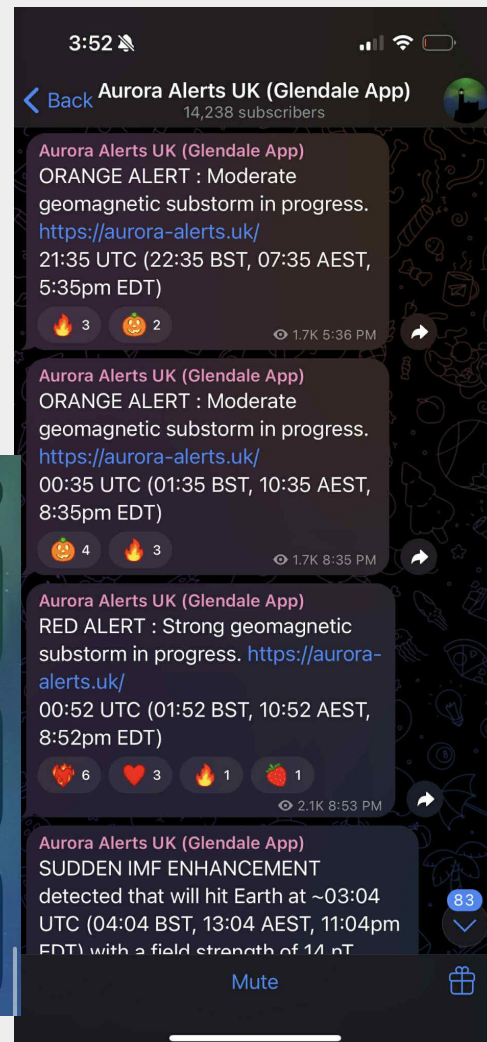
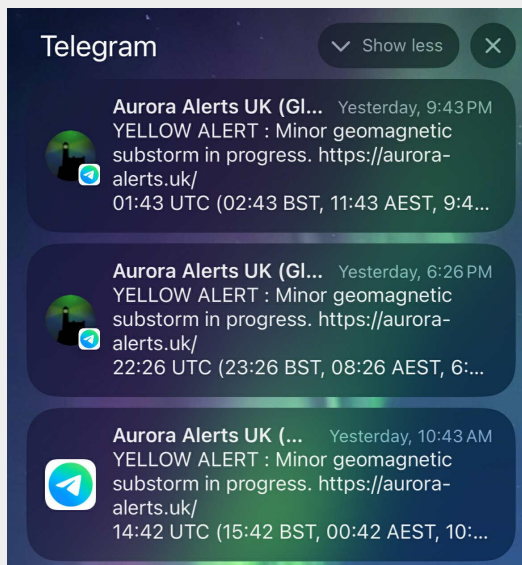
# Beat FOMO: Four Ways to Get Alerted Awake

*Let your phone or device do the work & alert you to wake up!  
(Telegram substorms, SWL app, SWPC emails, ARC)*

# 1. Get Substorm Alerts: Glendale on Telegram

- Beware the Psuedo-breakup!
- Understanding the color code and when it reaches your latitude
- Substorms tell you to go outside now — Don't delay
- Substorms —

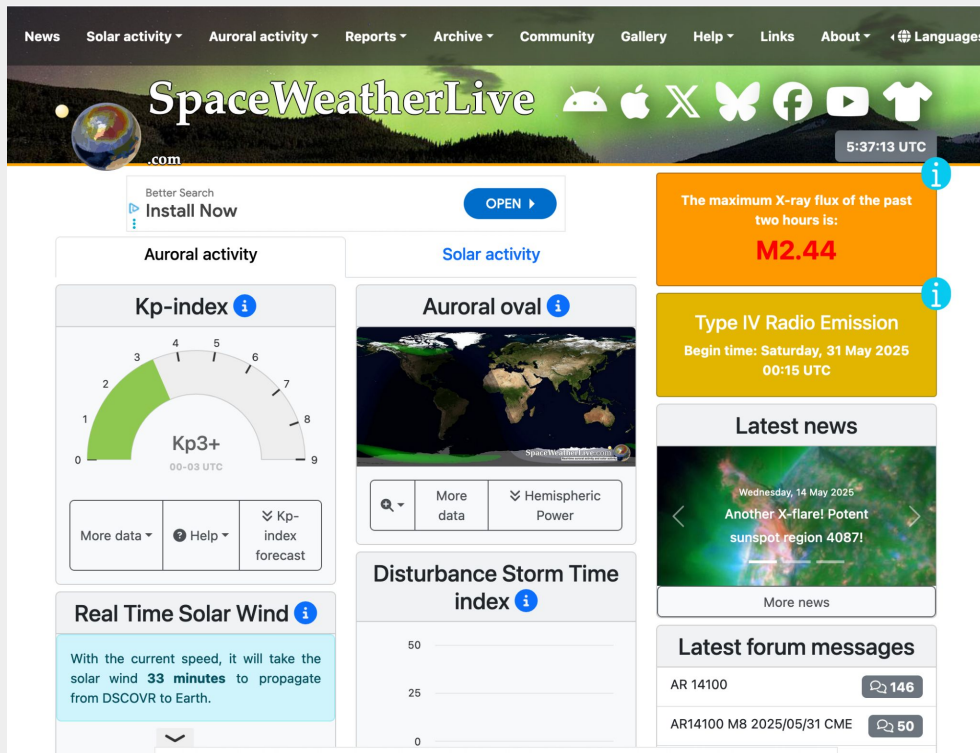
Learn the Trending Set of Alerts:  
[KaelinArt.com/aurora-blog](https://KaelinArt.com/aurora-blog)



## 2. Space Weather Live App: Push Notifications

- Radio Blackout alerts
- Geomagnetic Storm alerts (G Storms)
- Sudden Geomagnetic Impulse alert — Often indicates a CME Arrival
- Ovation Model notifications

Easy Ways to Track a Solar Flare:  
[KaelinArt.com/aurora-blog](https://KaelinArt.com/aurora-blog)



# Using Space Weather Live: Website and App

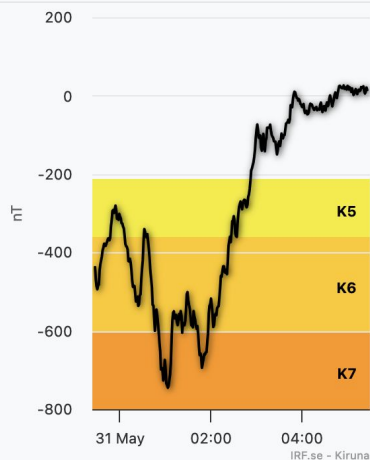
## Magnetometers

Kiruna (Sweden)

[Stackplot \(Europe\)](#)

[CANMOS \(Canada\)](#)

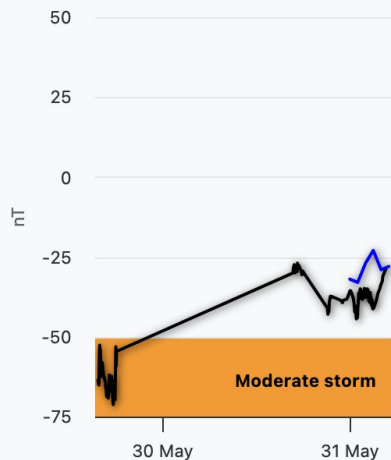
[Hobart \(Australia\)](#)



[More data](#)

[Info](#)

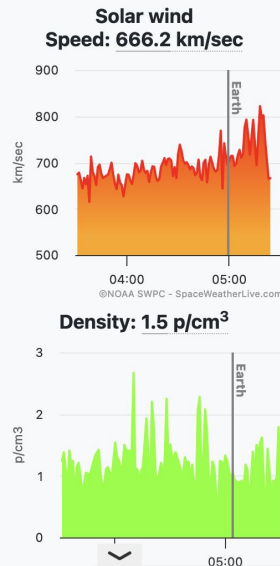
## Disturbance Storm Time index



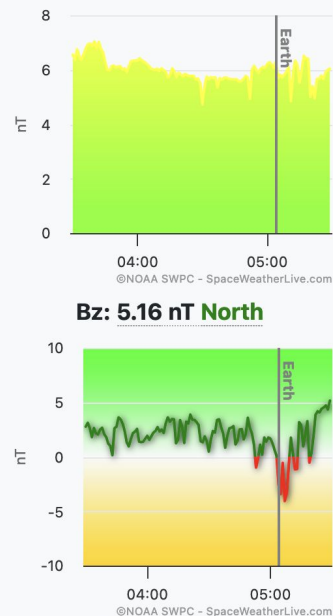
[More data](#)

## Real Time Solar Wind

With the current speed, it will take the solar wind **31 minutes** to propagate from DSCOVR to Earth.



## Interplanetary Magnetic Field Bt: 6.04 nT



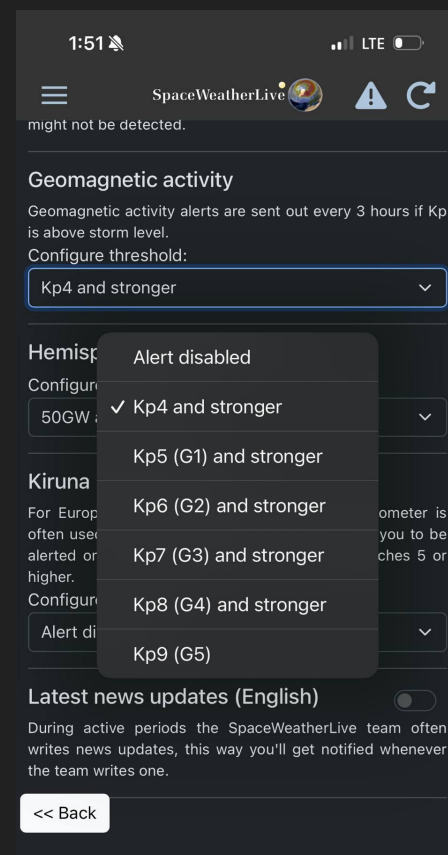
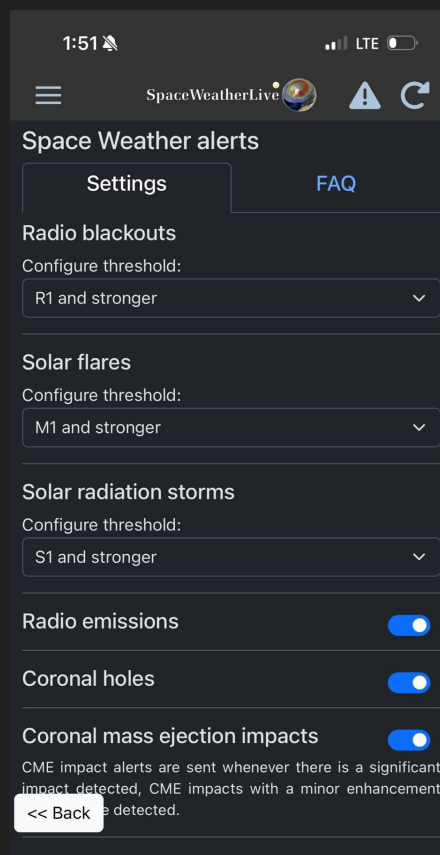
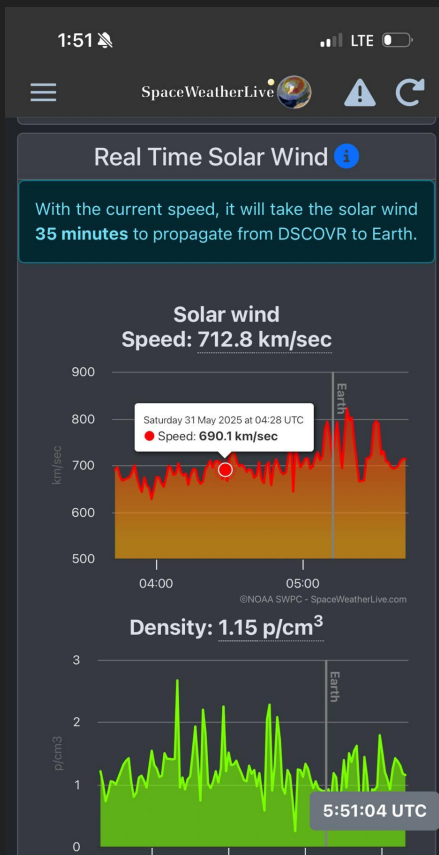
[Info](#)

[More data](#)

[Help](#)



# Using Space Weather Live: Manage Push Alerts



### 3. NOAA Space Weather Prediction Center: Email Service



- Subscribe for free email notifications
- Choose from 3-day forecasts, outlooks, “Forecast Discussion,” etc
- Sign up for Watches & Alerts — K-index & G-Storm thresholds
- Paid Texting Service...



**Watch a Video Tutorial on How to Sign Up:**

[YouTube.com/@MelissaTheAuroraChaser](https://www.youtube.com/@MelissaTheAuroraChaser)

# How to Subscribe to SWPC Alerts



PRODUCT SUBSCRIPTION SERVICE  
SPACE WEATHER PREDICTION CENTER

SWPC Main Menu FAQ Help Logout

Subscriptions: 19 Notifications: on

Forecasts and Summaries	Description
<input type="checkbox"/> Geoalert	A coded message containing a summary of solar-geophysical activity and selected indices for the previous day. It is a consensus of the advice received from as many as eleven Regional Warning Centers (RWCs) of the International Space Environment Service (ISES).
<input type="checkbox"/> Solar & Geophysical Activity Summary (SGAS)	A daily brief list of solar and geophysical events for the previous UTC day.
<input type="checkbox"/> Solar Region Summary (SRS)	A daily report compiled by SWPC about the active solar regions observed during the preceding day. It contains a detailed description of the active regions currently visible on the solar disk.
<input type="checkbox"/> Forecast Discussion	A free form, technical forecast discussion that details observed data, analysis, and forecast rationale. Issued every 12 hours.
<input checked="" type="checkbox"/> NOAA 3-Day Forecast	Plain language 3-day forecast product.
<input type="checkbox"/> NOAA Geomagnetic Forecast	Provides NOAA estimated Ap index for the previous UT day, NOAA forecast Ap for the current day and next 3 days. Also includes the planetary geomagnetic activity probabilities for the next 3 days and the NOAA Kp forecast for the next 3 days.
<input checked="" type="checkbox"/> Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)	Space data
<input type="checkbox"/> Report of Solar Geophysical Activity (RSGA)	The
<input type="checkbox"/> Geophysical Alert Message (WWV)	Issu

Submit Clear Cancel

Gmail

Compose

Inbox7,758

Starred

Search mail

1-50 of 12,236

Primary

Pro...6 new

Soc...1 new

Up...13 new

SWPC Product Subscr.

WATCH: Geomagnetic Storm C...

3:47 PM



## PRODUCT SUBSCRIPTION SERVICE SPACE WEATHER PREDICTION CENTER

SWPC Main Menu FAQ Help Logout

Subscriptions: 19 Notifications: on

### Geomagnetic Storm Products

### Description

<input type="checkbox"/> ALERT: Geomagnetic K-index of 4	Minor system effects.
<input checked="" type="checkbox"/> WARNING: Geomagnetic K-index of 4 expected	Minor system effects expected.
<input checked="" type="checkbox"/> ALERT: Geomagnetic K-index of 5 (G1)	Weak power grid fluctuations, minor satellite operations impact.
<input checked="" type="checkbox"/> WARNING: Geomagnetic K-index of 5 (G1)	Weak power grid fluctuations, minor satellite operations impact.
<input checked="" type="checkbox"/> ALERT: Geomagnetic K-index of 6 (G2)	High latitude power systems affected, satellite drag effect, high-latitude HF radio, high-latitude aurora.
<input checked="" type="checkbox"/> WARNING: Geomagnetic K-index of 6 (G2)	High latitude power systems affected, satellite drag effect, high-latitude HF radio, high-latitude aurora.
<input checked="" type="checkbox"/> ALERT: Geomagnetic K-index of 7 (G3)	Power system voltage effects, satellite surface charging, HF radio, mid-latitude aurora.
<input checked="" type="checkbox"/> WARNING: Geomagnetic K-index of 7 or greater (G3 or Greater)	Power system voltage effects, satellite surface charging, HF radio, mid-latitude aurora.
<input checked="" type="checkbox"/> ALERT: Geomagnetic K-index of 8 (G4)	Voltage problems, satellite surface charging, HF and low-frequency communication degraded, possible aurora near tropics.
<input checked="" type="checkbox"/> ALERT: Geomagnetic K-index of 9 (G5)	Grid System can collapse, extensive satellite surface charging, extended degraded. HF communication and low-frequency navigation.
<input checked="" type="checkbox"/> SUMMARY: Geomagnetic Sudden Impulse	Marks the possible beginning of a geomagnetic storm.
<input checked="" type="checkbox"/> WARNING: Geomagnetic Sudden Impulse expected	Marks the possible beginning of an expected geomagnetic storm.
<input checked="" type="checkbox"/> WATCH: Geomagnetic Storm Category G1 Predicted	Minor system effects.
<input checked="" type="checkbox"/> WATCH: Geomagnetic Storm Category G2 Predicted	Weak power grid fluctuations, minor satellite operation impact. Possible high-latitude power systems affected, satellite drag effect, high-latitude HF radio, high-latitude aurora.
<input checked="" type="checkbox"/> WATCH: Geomagnetic Storm Category G3 Predicted	High-latitude power systems affected, satellite drag effect, high-latitude HF radio, high-latitude aurora. Possible voltage problems, satellite surface charging, HF and low-frequency communication degraded, possible aurora near tropics.
<input checked="" type="checkbox"/> WATCH: Geomagnetic Storm Category G4 or Greater Predicted	Grid system can collapse, extensive satellite surface charging, extended degraded. HF communication and low-frequency navigation.

Submit Clear Cancel

# Watches, Warnings & Alerts Using NOAA Scales

Subscribe for free:

[swpc.noaa.gov](https://swpc.noaa.gov)

> Subscribe

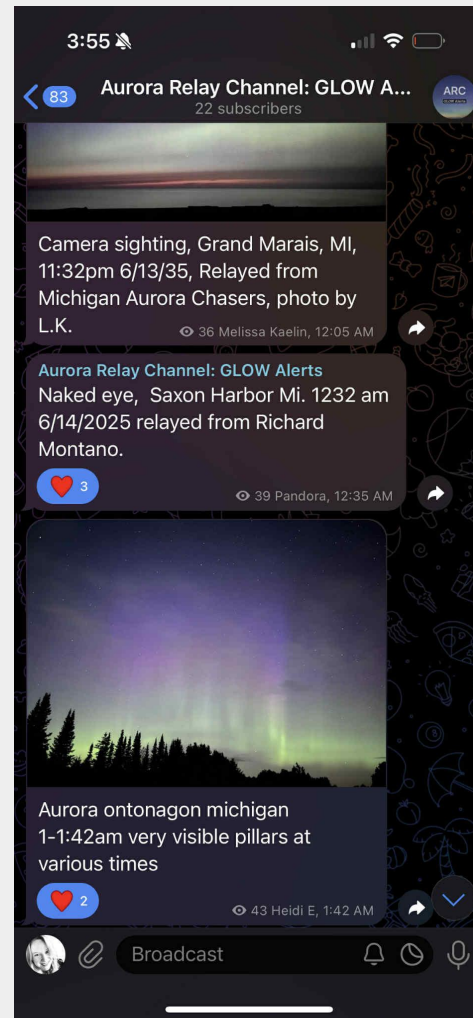
## 4. Aurora Relay Channel: GLOW Alerts

- Push Notifications in Real-Time
- These alerts will ping your phone
- Participants in Minnesota, Wisconsin, Michigan
- Thank you to our Spotters!!!

### ARC: Great Lakes Official Webalerts

Get Aurora alerts across this U.S.A. region from the Great Lakes Official Webalerts (GLOW) with Aurora Relay Channel, provided by the Michigan Aurora Chasers!

**Details:** [MichiganAuroraChasers.com/alerts](https://MichiganAuroraChasers.com/alerts)





# Know a New Tool? Let us know!

*Feel free to drop some knowledge or a link in the comments!*

*If you're a member of the Michigan Aurora Chasers, our group has also challenged subject matter experts to write four tutorials to win free gear, up to a \$50 value!*

# New Opportunities in Astrotourism

*Get in on these new opportunities to learn the game & celebrate the night sky!*

# With Michigan Aurora Chasers

**We lead an engaged and active community!**

- MI Aurora Experience
- Annual Michigan Workshop
- MI Aurora Socials
- Live Chase
- Night Sky Festivals

**[MichiganAuroraChasers.com/events](https://MichiganAuroraChasers.com/events)**  
**[#MIAuroraChasers](https://twitter.com/MIAuroraChasers)**



*MI Aurora*  
**EXPERIENCE**

**LEARN THE CHASE!**

# NEW! Inaugural Great Lakes Aurora & Dark-sky Jamboree

Attend the GLAD Jam!!!

- Speakers
- Observatory Tours
- Night Sky Chases
- Family friendly
- Potential Lake Cruise!
- \$100 for the weekend, includes Saturday lunch

September 12-14, 2025  
Houghton, Michigan

**Register:** [KaelinArt.com](https://KaelinArt.com)



*Featuring Keynote Speaker Melissa F. Kaelin*

# Interested in Speaking at an Event?

*Let's connect if you have an interest in presenting on astro topics!  
These may range from astronomy and Aurora Chasing, to dark sky  
preservation and light painting — and beyond!*



# New! Stargazers' Campout

- Stargazing Talk
- Aurora Mythology
- Telescopes & Aurora Chasing
- Family friendly
- Dinner, Campfires
- Lodging included

September 20-21, 2025  
Ocqueoc Outdoor Center  
Millersburg, Michigan

**Register:** [KaelinArt.com](https://KaelinArt.com)



**STARGAZERS' CAMP EVENT**

Historic Ocqueoc Outdoor Center  
**Saturday, September 20, 2025**

One night only...a dark sky event!  
Presentations from Michigan Aurora Chasers and  
the Headlands Dark Sky Park  
Includes dinner, campfire, tent site or bunkhouse,  
presentations, guided night viewing,  
and Sunday morning breakfast

\$25/person or  
\$75/family

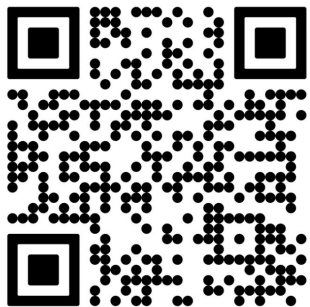
Fundraiser for  
the Ocqueoc  
Outdoor Center

Link to the QR code for more information  
and to reserve your space



# Aurora Summit

- Camera Clinics
- Breakout Sessions
- Panel Discussions
- Diverse Speakers
- Trivia & Prizes



*Featuring Keynote Speaker Dan Zafra*

*Optional Add-on: AS25 Photography Bootcamp*





# More Events



# #WorkshopWednesdays

*Our community in Michigan Aurora Chasers always encourages experienced photographers, astronomers and Aurora Chasers to post about workshops open to the public on Wednesdays!*

# Be Featured in an Exhibit!

Submit your photo of Aurora in  
Michigan to be featured.  
TWO OPPORTUNITIES!

Browse our Exhibits:

The logo features a stylized map of Michigan in the background, with a color gradient from light blue at the top to dark purple at the bottom. Silhouettes of evergreen trees are overlaid on the map. The word "Michigan" is written in a large, white, cursive script across the center of the map.

Michigan

AURORA CHASERS

# Offering Tours?

*Drop a link in the comments! If I know you and I can vouch for your tours and your Aurora savvy, I will promote any tours of yours I'm aware of. New blog coming soon, hopefully!*



# Connect

Follow @mfkaelin  
FB.com/KaelinArt



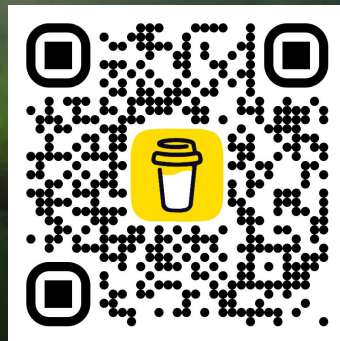
*Photo by Cristiano Saturno*

*Thank you!*

## Buy Me A Coffee

My forecasts, alerts,  
tutorials are free!

Show your support  
with this digital tip jar!



⇒ [coff.ee/mfkaelin](https://coff.ee/mfkaelin)

*Photo by "Live Chase Nate" Stovall*



# Beyond the 45th Parallel: Aurora Chaser & Author

- Aurora Advice Blog
- Events & Guides
- 45th Parallel Series

KaelinArt.com

