



HURTIGRUTEN

Astronomy Voyage

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LECTURE PROGRAMME

- Tonight's Night Sky
- Astrophotography
- **The Aurora**
- **The Scale of the Universe**
- **The birth & death of stars & galaxies**
- **The violent Universe**
- **Modern Astronomy: Life as a
Astronomer & Tools of the Trade**
- **Why We Are Here: A 13.8-billion
year-old story**



The Aurora

- The Sun constantly emits gas – the **solar wind**
- This wind is occasionally enhanced
- When it hits Earth, it distorts our magnetosphere...
- ...Allowing particles to hit the upper atmosphere

The resulting glow is the **aurora**



THE SUN



White light
photograph
of the Sun

25th September, 2025

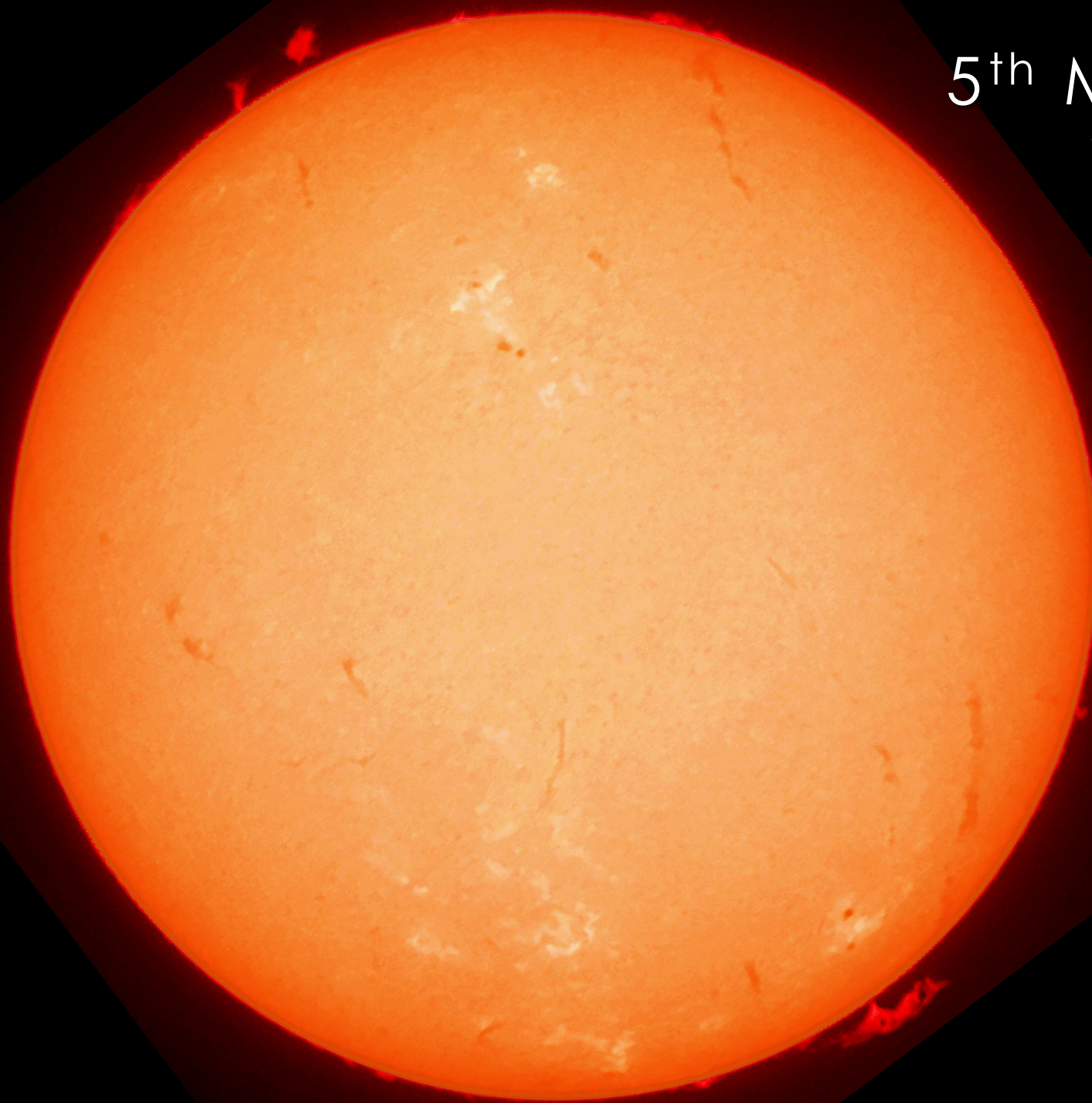
THE SUN



4th August, 2024

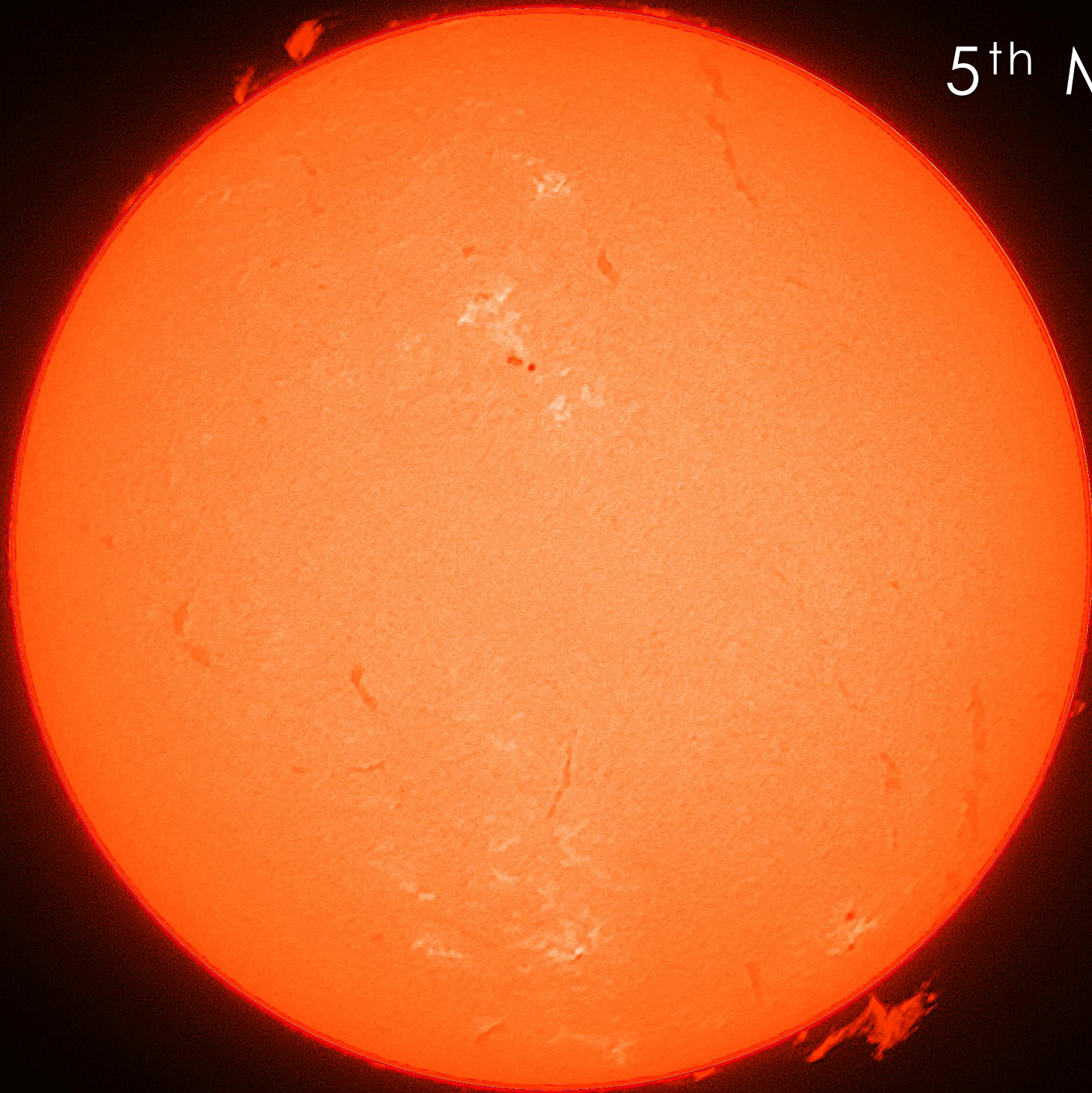
THE SUN

5th March, 2025
10:32 UT



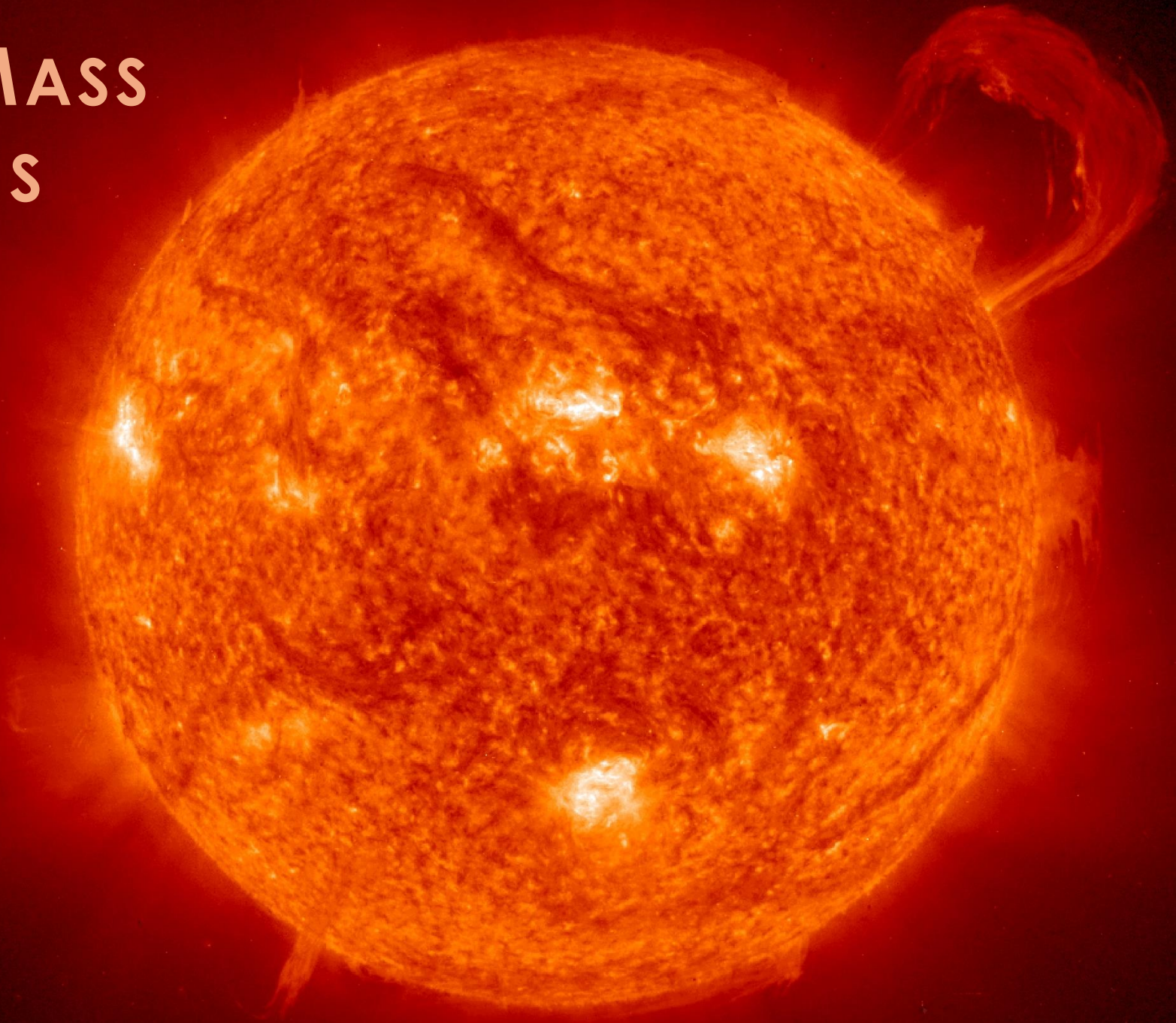
THE SUN

5th March, 2025
14:57 UT



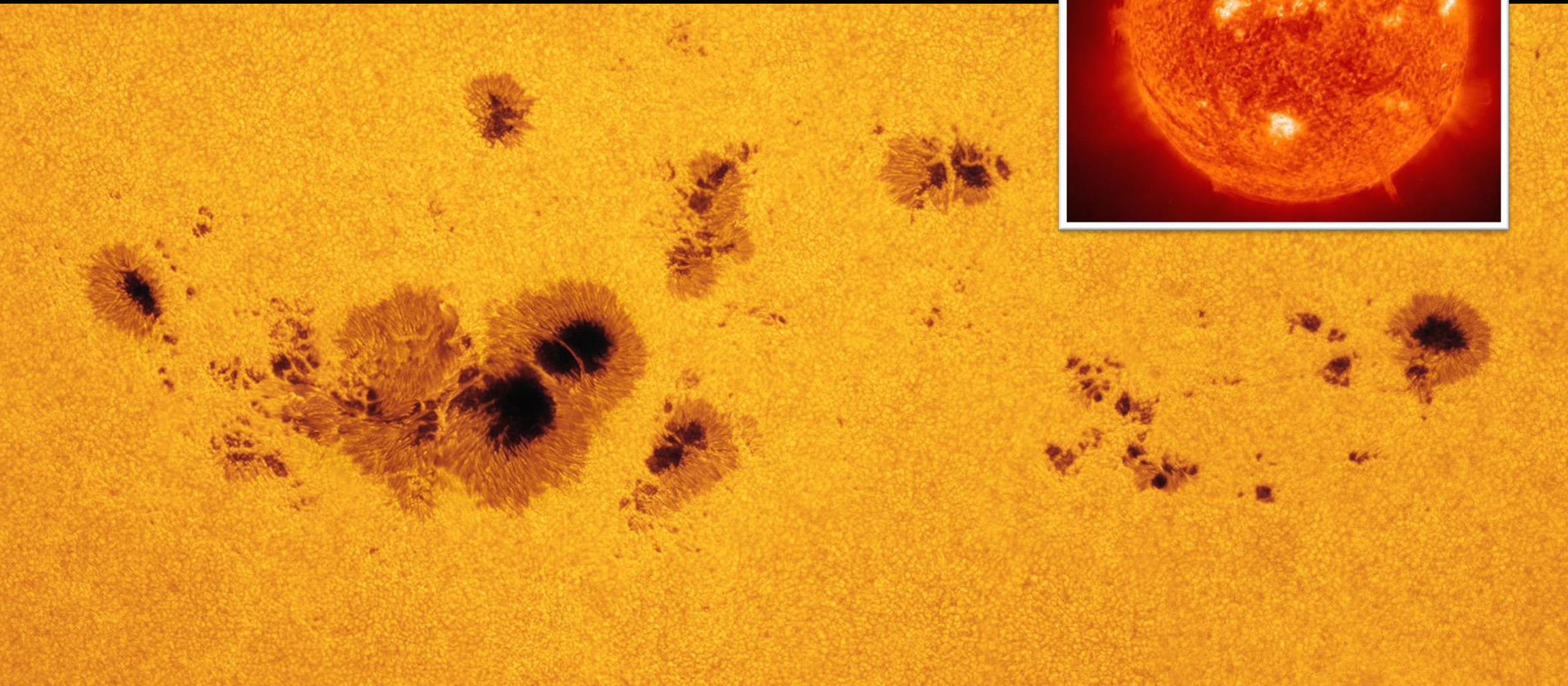
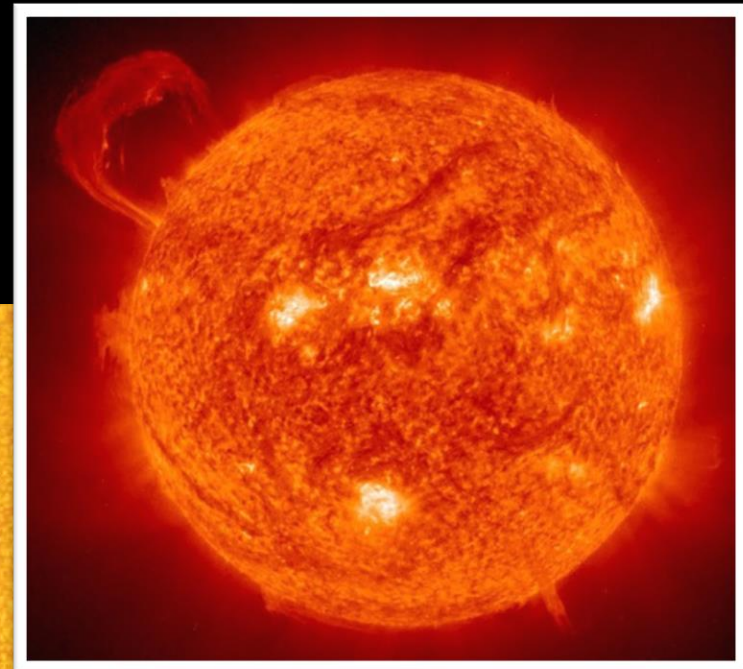


CORONAL MASS EJECTIONS



SOHO Solar Observatory (Nasa/ Esa)

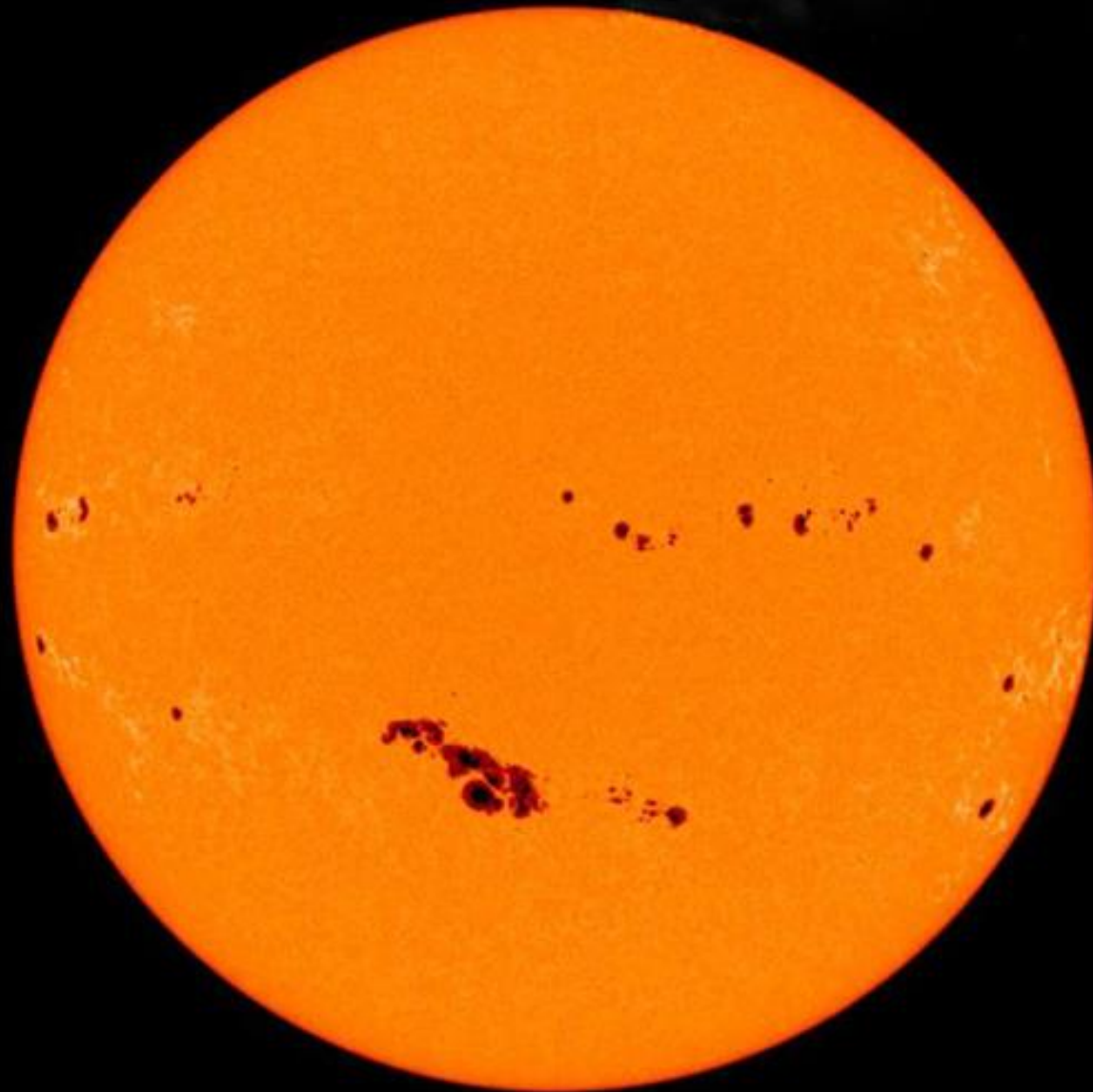
SUN SPOTS



SUN SPOTS

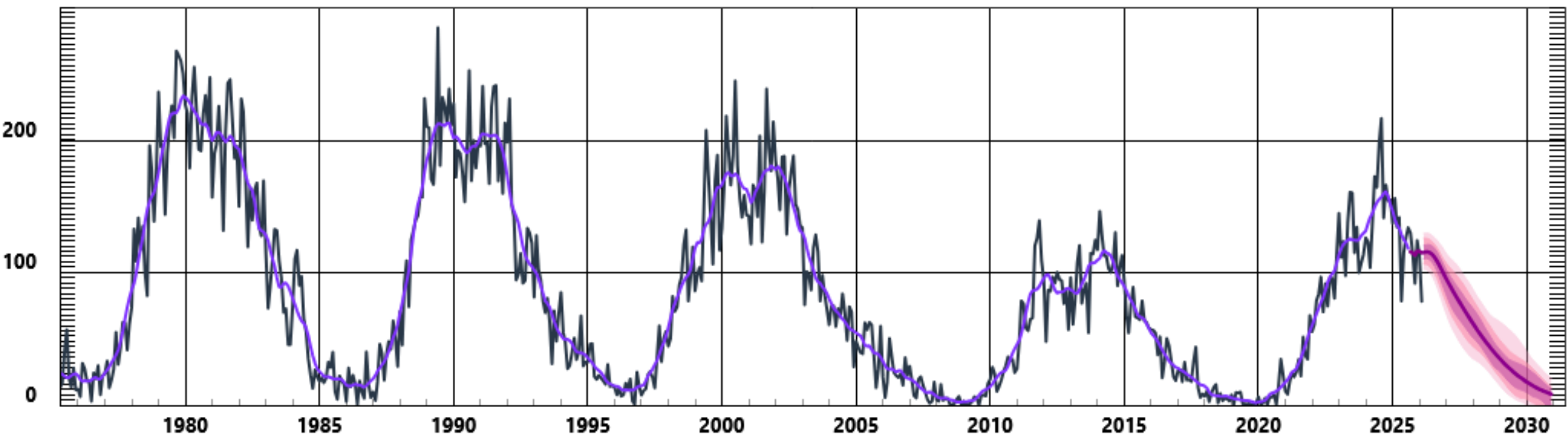


Solar Minimum



Solar Maximum

SOLAR CYCLE



SUN SPOTS

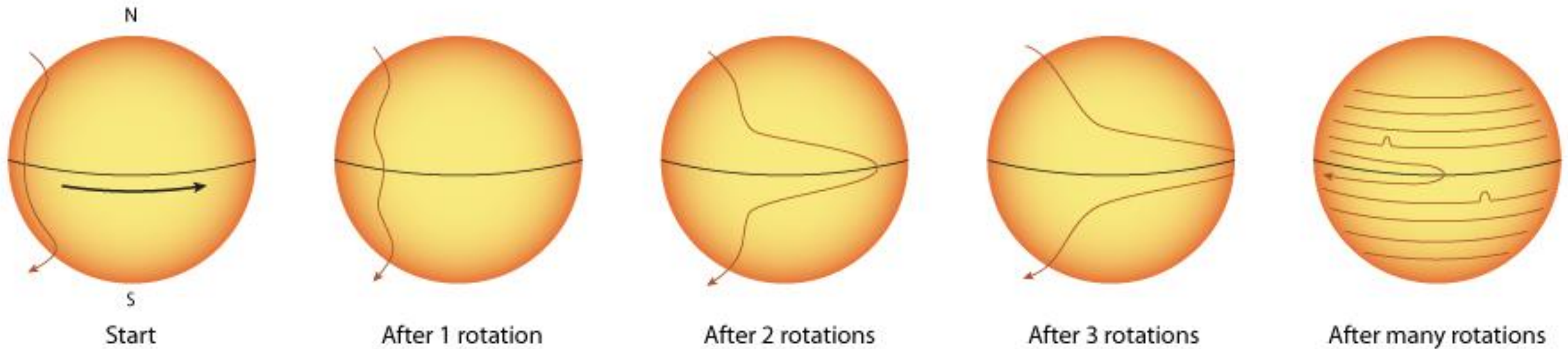
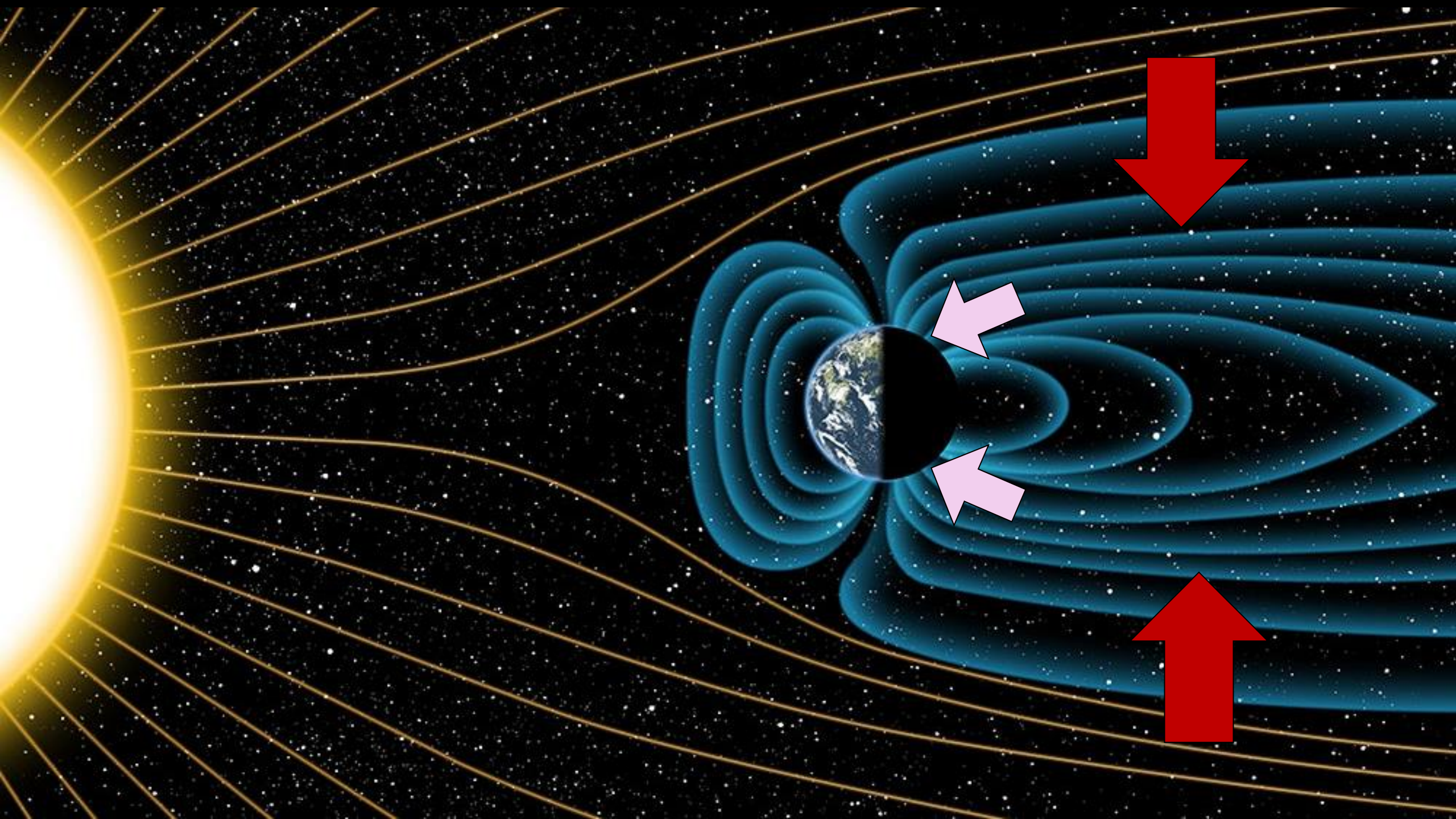


Illustration by José Francisco Salgado, PhD (Adler Planetarium)







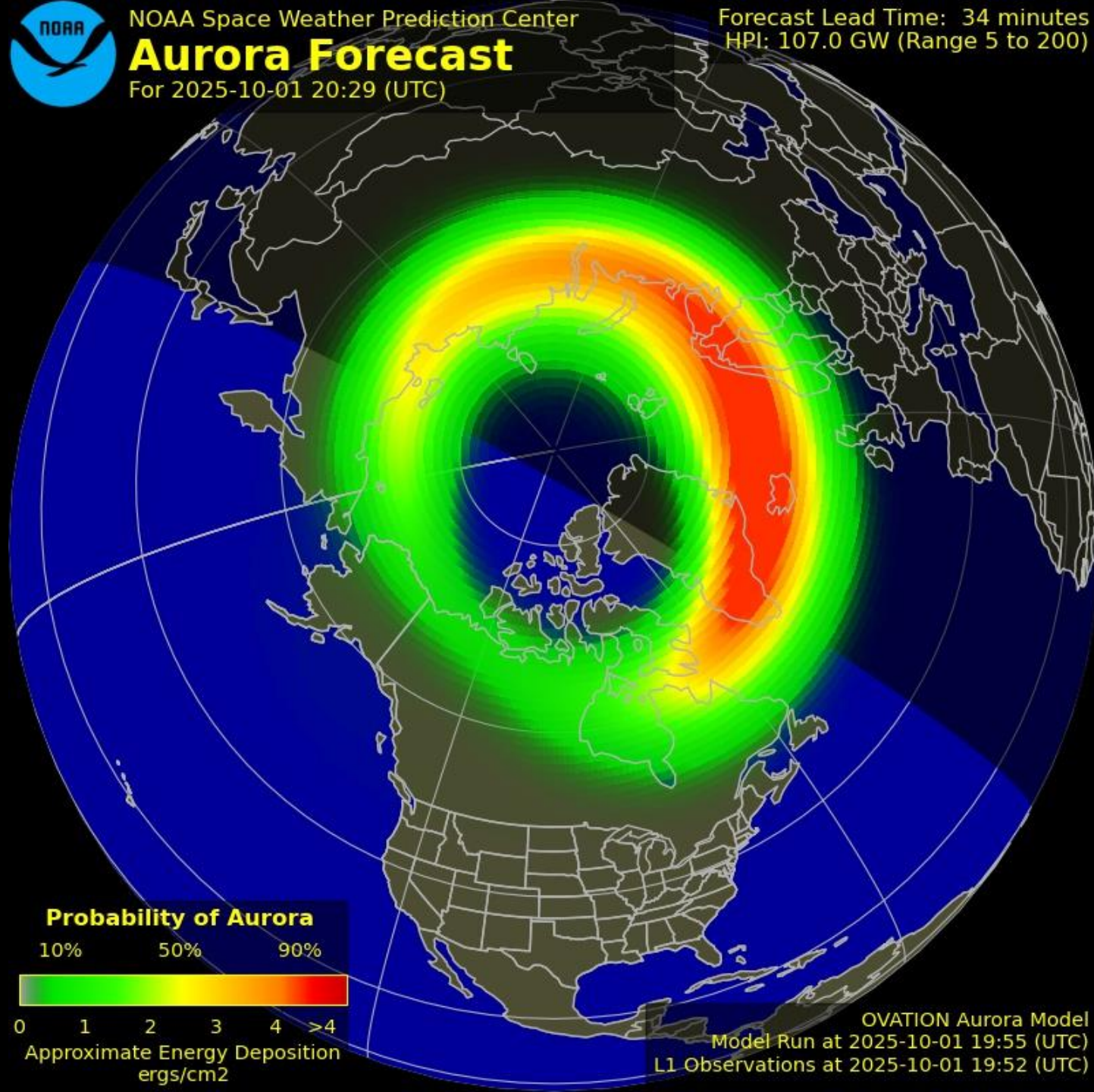
NOAA Space Weather Prediction Center

Aurora Forecast

For 2025-10-01 20:29 (UTC)

Forecast Lead Time: 34 minutes

HPI: 107.0 GW (Range 5 to 200)



Probability of Aurora

10% 50% 90%



0 1 2 3 4 >4

Approximate Energy Deposition
ergs/cm²

OVATION Aurora Model

Model Run at 2025-10-01 19:55 (UTC)

L1 Observations at 2025-10-01 19:52 (UTC)



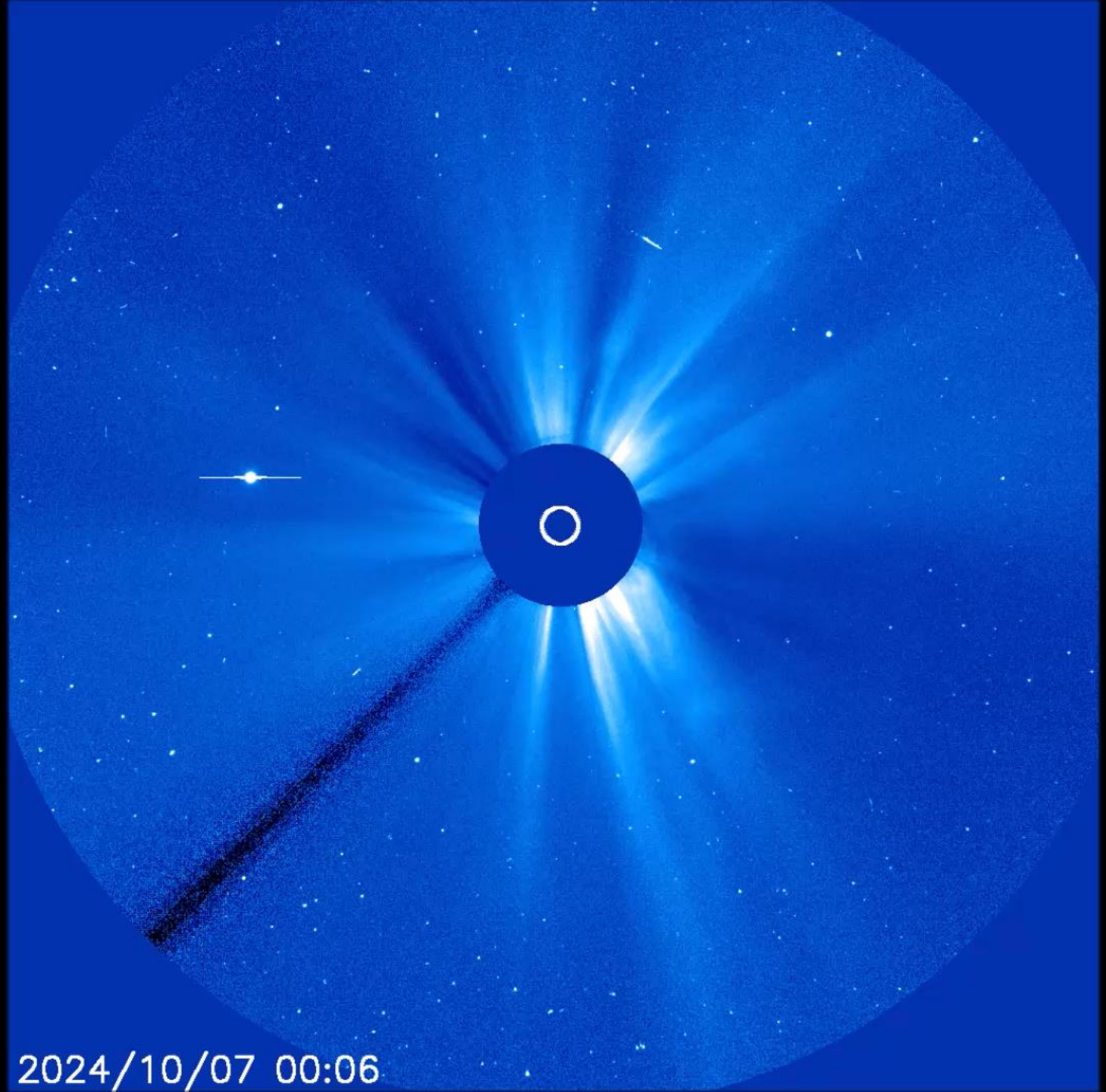
Aurora

A photograph capturing the Aurora Borealis (Northern Lights) over Brighton. The sky is filled with vibrant, vertical curtains of light in shades of purple, magenta, and pink, set against a backdrop of a starry night sky. The foreground is dominated by the dark silhouettes of trees and bushes, with some distant city lights visible on the horizon. The overall scene is a beautiful display of natural light.

Over Brighton

The Solar activity
that sparked
aurora over
southern England

October 2024

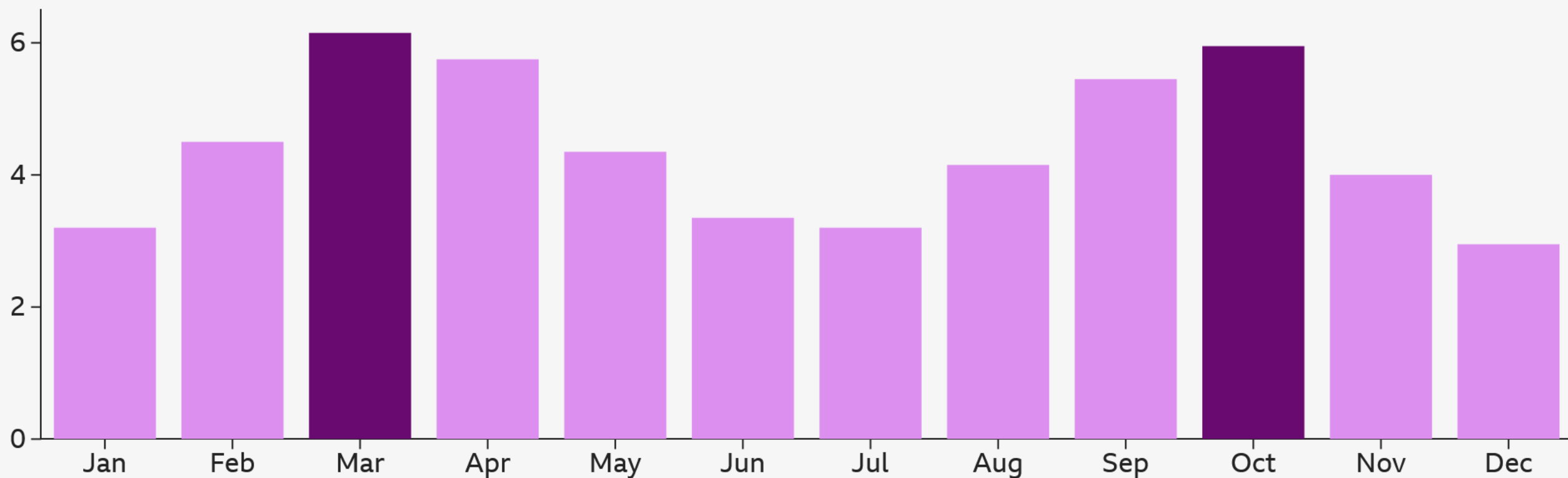


2024/10/07 00:06

Stronger aurora more likely in spring and autumn

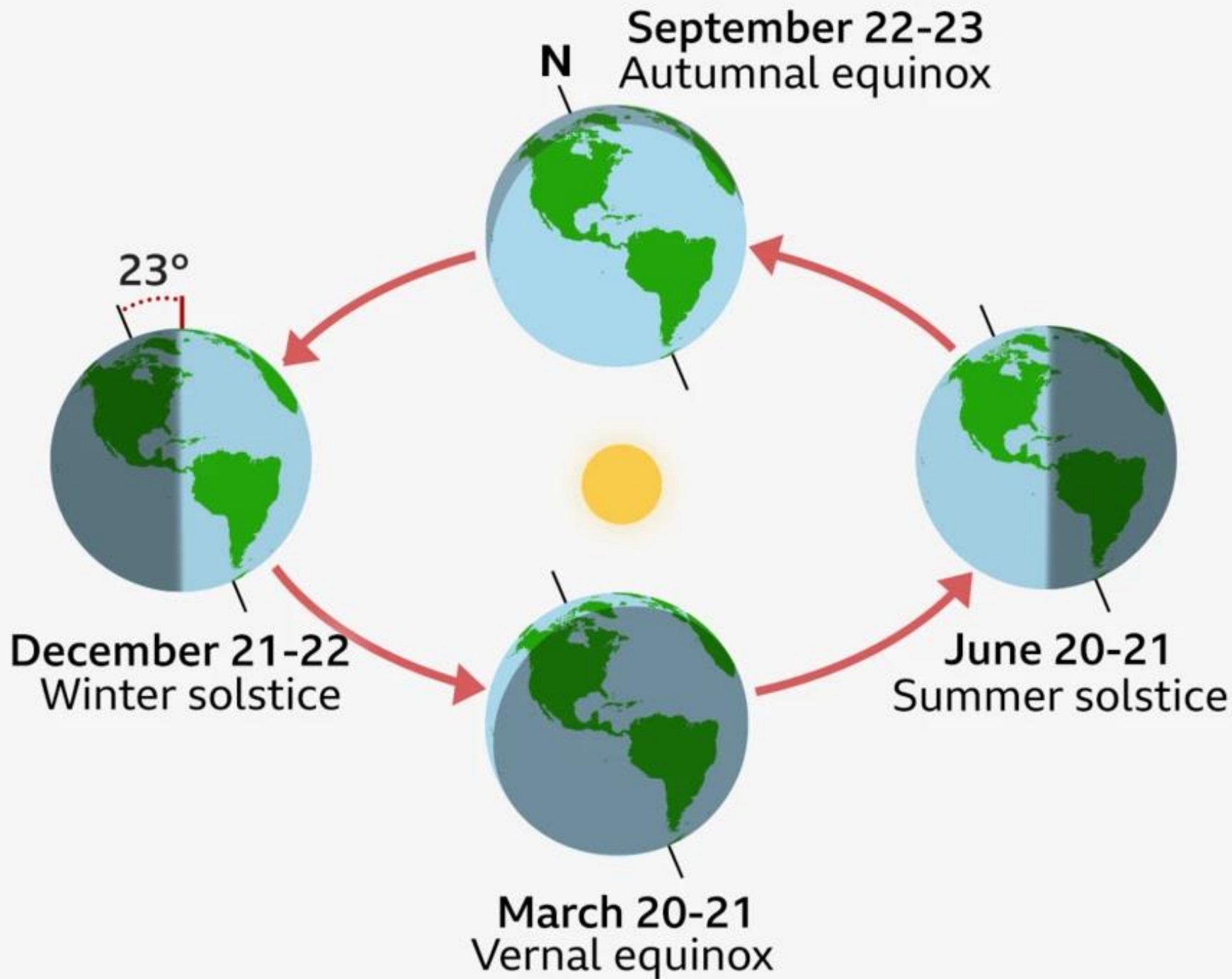
Effects are caused by 'geometric disturbances' - which increase around **equinox months**

Average number of geometrically disturbed days each month 1932-2007



Source: Nasa physicist David Hathaway

EQUINOXES



The Colours of the aurora

200km
(125 miles)

100km
(60 miles)

10km
(6 miles)



Red

High-altitude oxygen >200km, visible during strong solar activity.

Green

Common due to the abundance of Oxygen between 100-200 km.

Pink, purples & blues

Nitrogen molecules emit red and blue colours when energetic particles reach lower altitude.



© Dr Das Baskill, Brighton, 10/11 May, 2024

AURORA TYPES

Only really two types...

- Discrete (Arcs, curtains, etc)
- Diffuse (patchy & pulsating

But these can look very different from different angles.

AURORA TYPES



Discrete:

Arcs, bands, curtains, pillars, rays, etc

AURORA TYPES

Diffuse:

Corona, Patches, etc



AURORA TYPES

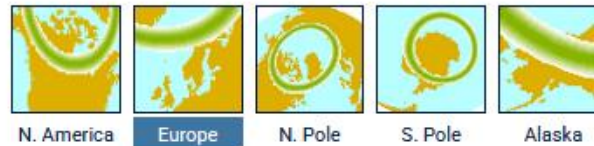
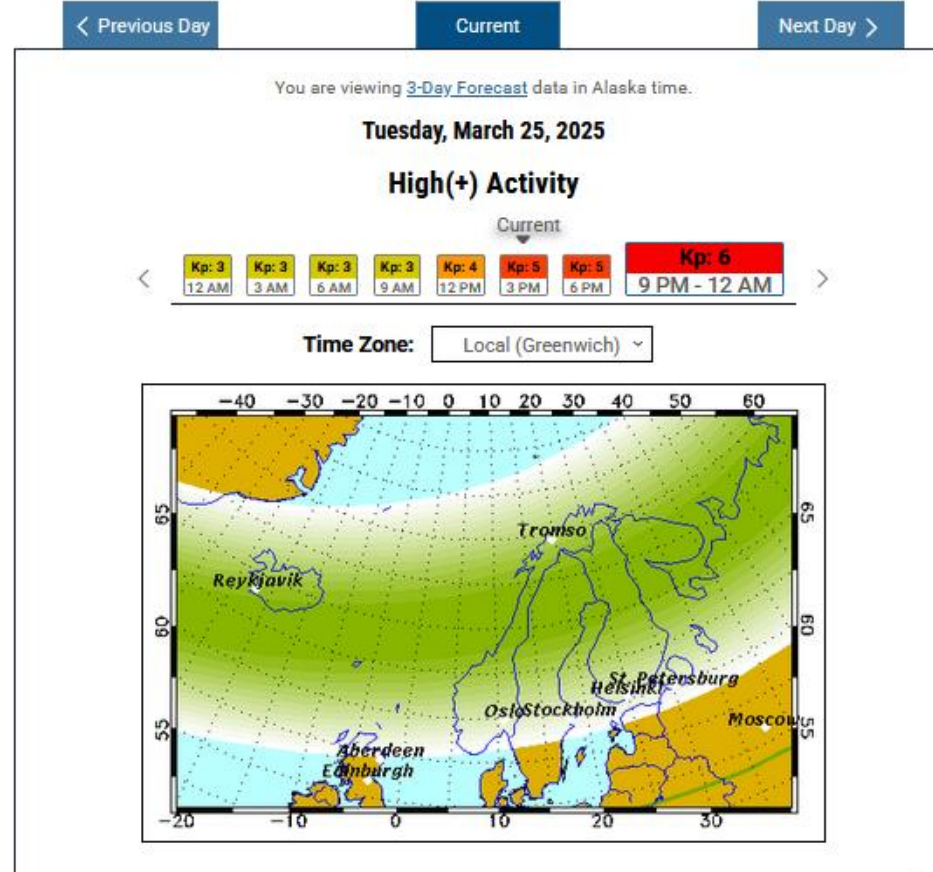
A night sky photograph showing a diffuse aurora in shades of green and yellow, with a starry background and a dark horizon. The aurora is a broad, glowing band of light stretching across the sky. In the foreground, there are some faint lights and a tripod-like structure.

Diffuse:

Corona, Pulsating, Patches, etc

WEBSITES

AURORA FORECAST



Forecast: High(+) aurora activity forecasted. If skies are clear, highly active auroral displays may be visible overhead from Tromsø, Norway to as far south as Oslo, Norway, and visible low on the horizon from Moscow, Russia.

FAQ

Read our FAQs to learn about these common questions [and more](#):

Viewing the Aurora

- [What time of year is best for seeing aurora?](#)
- [Can I see aurora during the summer months?](#)
- [Where is the best place to see aurora?](#)
- [Where should I view the aurora when I'm in Fairbanks, AK?](#)

Science of the Aurora

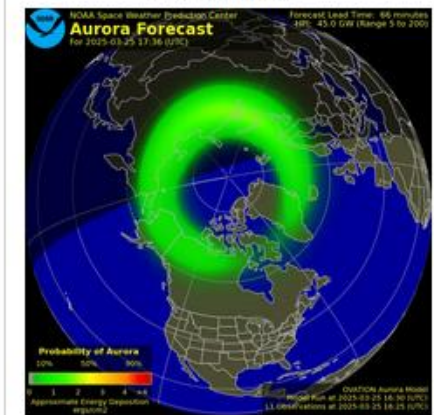
- [What are Kp numbers?](#)
- [What does the 2024-25 solar maximum mean for aurora?](#)
- [Can you predict where there will be aurora?](#)

Forecasting the Aurora

- [How accurate is the 3-day forecast?](#)

Current Activity

Watch the last few seconds of the animation to see what is predicted over your location in the next 30 minutes.



Source: [Space Weather Prediction Center](#)

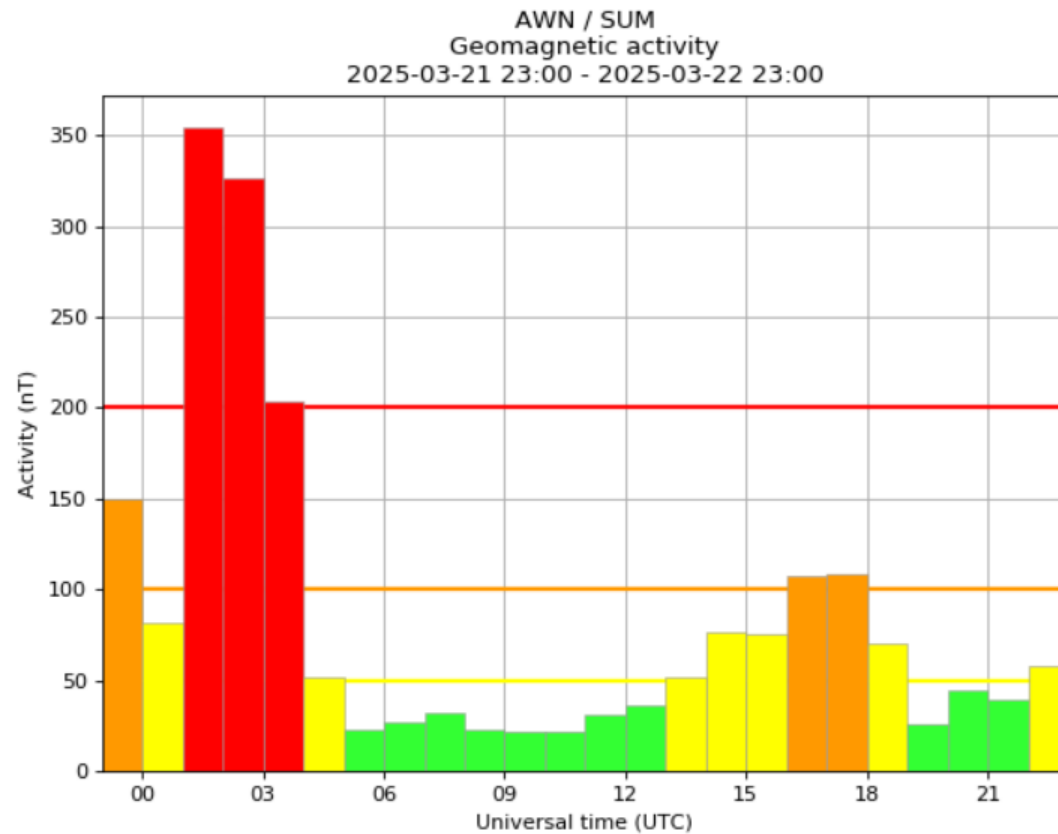
- Home
- Alerts
- Shetland alerts
- Plots
- Map
- Build
- FAQs
- Contact Us
- Blog
- Twitter
- Telegram
- Facebook
- Flickr
- Instagram
- YouTube



AuroraWatch UK

See the aurora borealis from the UK

AuroraWatch UK status:
Minor geomagnetic activity



Activity plot

Magnetogram

Stackplot



Current Conditions

Solar wind

speed: **377.1** km/sec

density: **9.35** protons/cm³

more data: [ACE](#), [DSCOVR](#)

Updated: Today at 0406 UT

X-ray Solar Flares

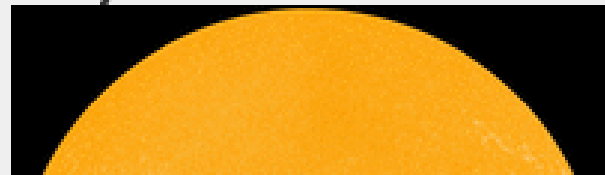
6-hr max: **C9** 1229 UT Mar25

24-hr: **C9** 1229 UT Mar25

[explanation](#) | [more data](#)

Updated: Today at: 1610 UT

Daily Sun: 25 Mar 25



What's up in space

Tuesday, Mar. 25, 2025

This is an AI Free Zone: Text created by Large Language Models is engulfing the Internet. It's slick, prolific, and some readers say it makes them feel seasick. For better or worse, all of the text on Spaceweather.com was written by a real human being.



CO-ROTATING INTERACTION REGION: NOAA forecasters say that [G2](#)-class geomagnetic storms are possible later today, **March 25th**, when a [co-rotating interaction region](#) (CIR) is expected to hit Earth. CIRs are transition zones between fast- and slow-moving streams of solar wind. They contain shock waves akin to CMEs. Today's CIR is powered by [a giant hole](#) in the sun's atmosphere. **Aurora alerts:** [SMS Text](#).

A SPYSAT SPACEX SPIRAL: Yesterday, SpaceX [launched a spy satellite](#) for the US National Reconnaissance Office (NRO). Two hours after the Falcon 9 rocket

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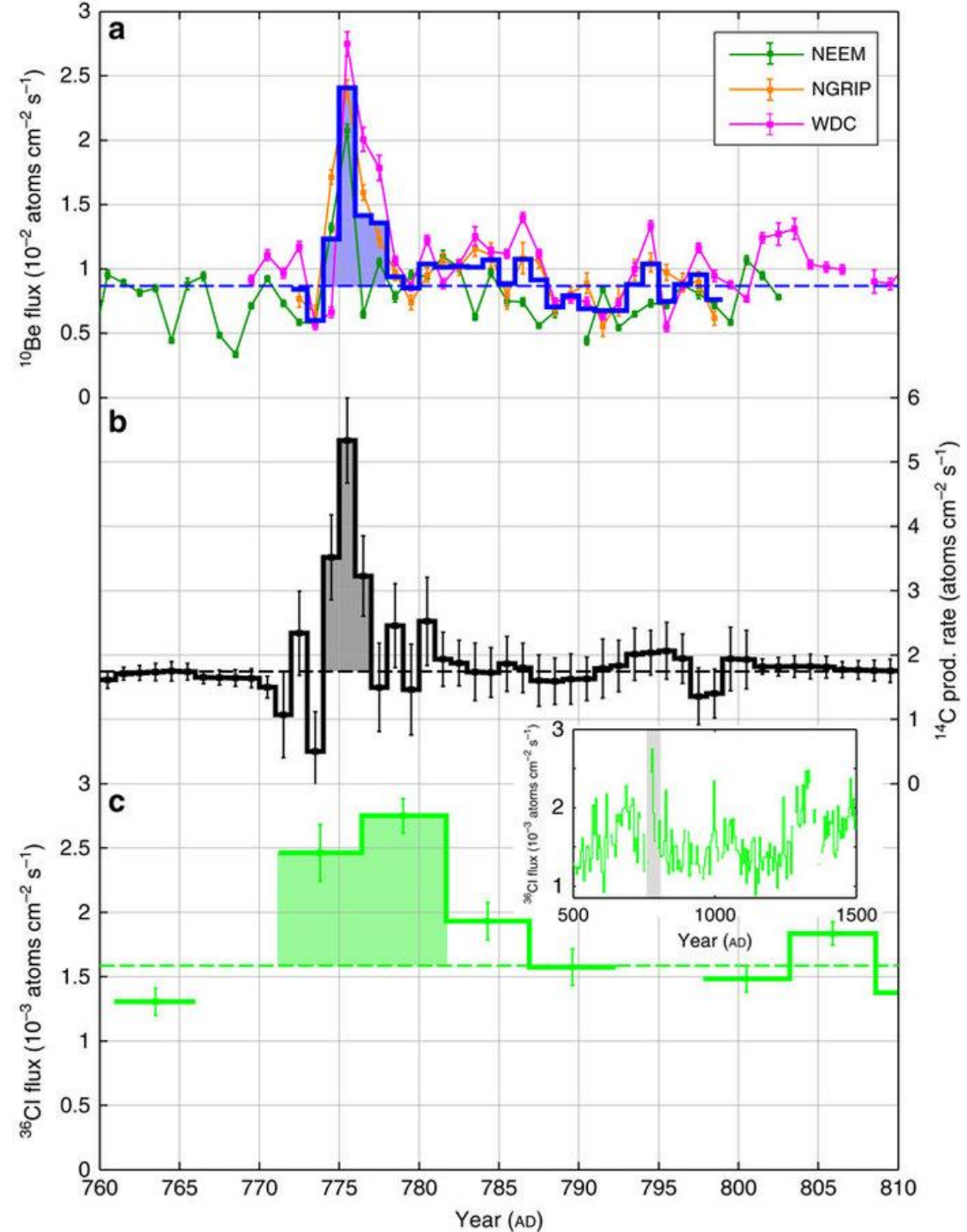
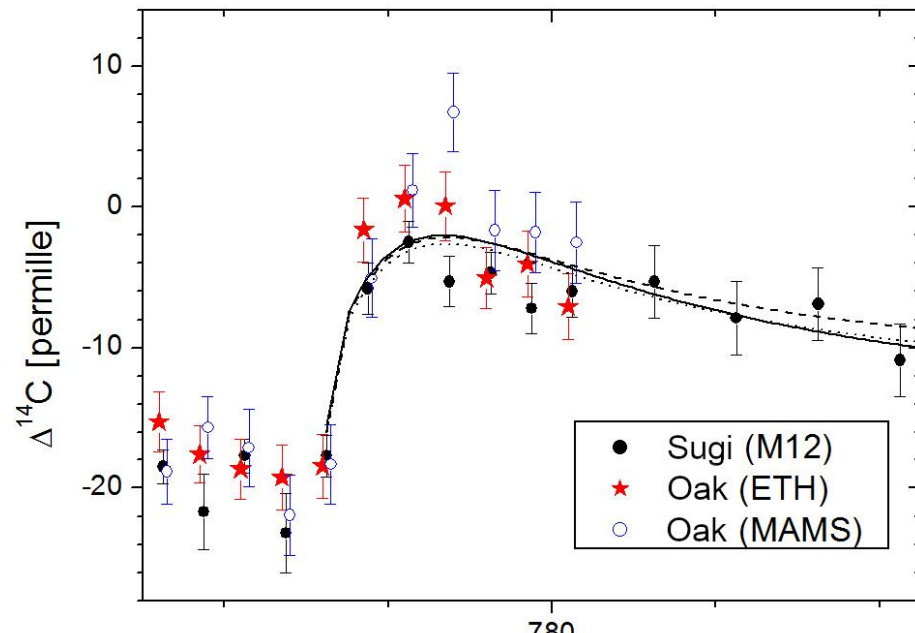
2

2

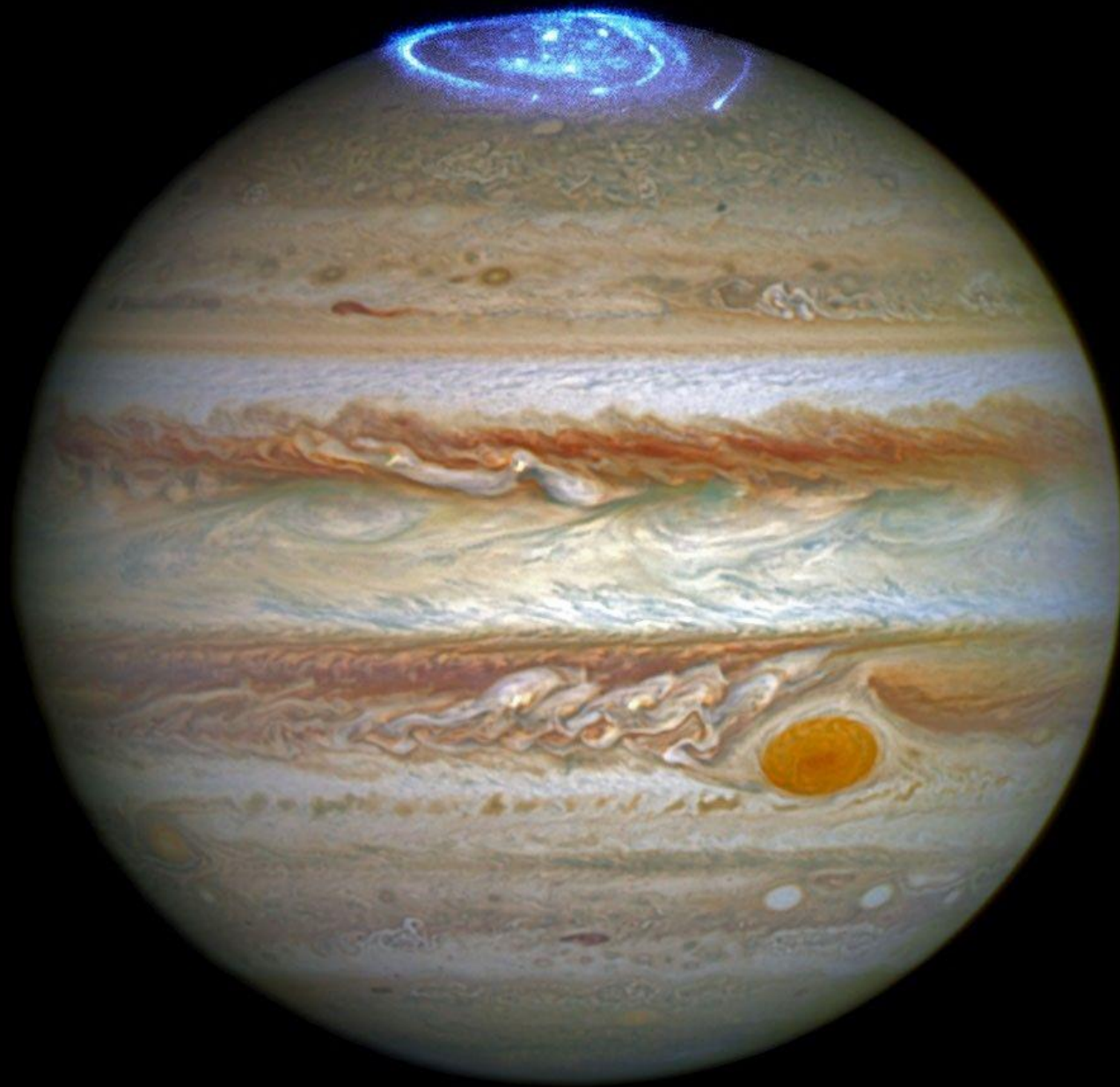


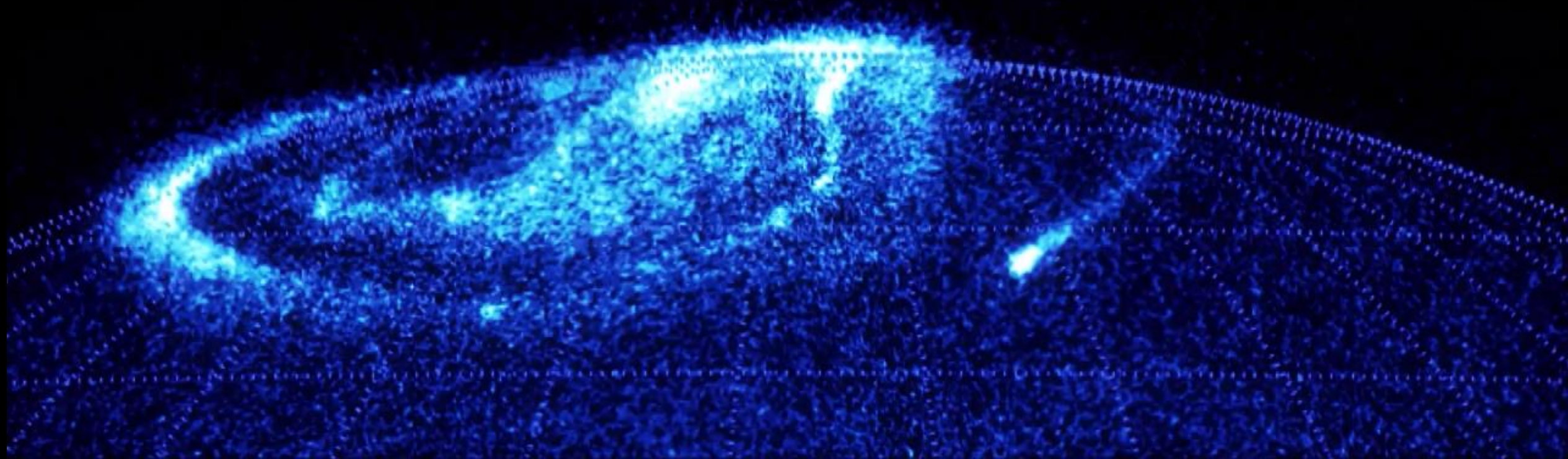
HISTORICAL EVENTS

A carbon-14 spike is seen in tree rings and ice cores world wide from year 774/5. The 1.2% increase in ^{14}C is 20x expected.



JUPITER





SATURN



Exoplanets have been discovered through the low-frequency radio-waves ($\lesssim 150$ MHz) emitted by their aurora.

YZ Ceti

$<12\text{ly}$, $0.7 M_{\oplus}$, $0.9 R_{\oplus}$, 0.02AU [2017]

SIMP J0136+0933

20ly , $13 M_{\oplus}$, $14 R_{\oplus}$ [2003]

GJ 1151

26ly , $\leq 5 M_{\oplus}$, $0.91 R_{\oplus}$ [2023]



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