



# THE ATMOSPHERIC RESERVOIR

*Examining the Atmosphere and Atmospheric Resource Management*

# A FLARE FOR SOLAR ACTIVITY

Photo taken by Mark Schneider on November 4, 2021 outside of Bismarck.

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Solar Cycle 25 began in December 2019 and is predicted to peak in July 2025. It is the 25th cycle to be catalogued since 1755 when recording officially began. Solar scientists monitor sunspots and when a solar minimum occurs, it marks the start of a new solar cycle. Each solar cycle lasts 11 years, with 2008 marking the beginning of the last solar cycle and December 2019 the end. A solar maximum is reached between the minimums.

Sunspots serve as precursors to solar flares and Coronal Mass Ejections (CMEs) that can send charged particles 93 million miles to Earth's thermosphere and create light shows like the Aurora Borealis (Northern Lights) and Aurora Australis (Southern Lights). The thermosphere begins between 90-100 kilometers above the Earth's surface and extends into outer space. It includes the exosphere and most of the ionosphere, which we commonly associate with charged particles from the sun. The electrons, protons, and ions from the sun collide with the atoms in Earth's thermosphere and shed energy by emitting light. Normally, only geographic locations in the northern latitudes are able to view the Northern Lights. When a stronger CME occurs like the one on November 4 of last year, people in locations as far south as Northern California were able to observe the phenomenon.

Sometimes unusually strong sunspots can lead to geomagnetic storms that interfere with satellite communications and power grids. We've been fortunate during the last decade that only a couple of significant solar events have occurred and their effects to us have been minimal. With our modern-day reliance on technology, it's estimated that a direct hit from one of our sun's strong CMEs could cause over two trillion dollars in damage (mainly due to electrical transformers being affected).

Will North Dakotans see an increase in Northern Lights viewing over the next few years? The odds favor that to occur because of the approaching solar maximum in 2025. However, in comparison to some of the stronger solar cycles of the past, Solar Cycle 25's strength is predicted to be modest. If this verifies then we could expect just a few stronger sunspot events where the Northern Lights are visible at mid-latitudes.

You can monitor solar activity by visiting [spaceweather.com](https://spaceweather.com) or through many different apps such as Aurora Forecast. In the words of the late astronomer Jack Horkheimer, "Remember to keep looking up!"

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