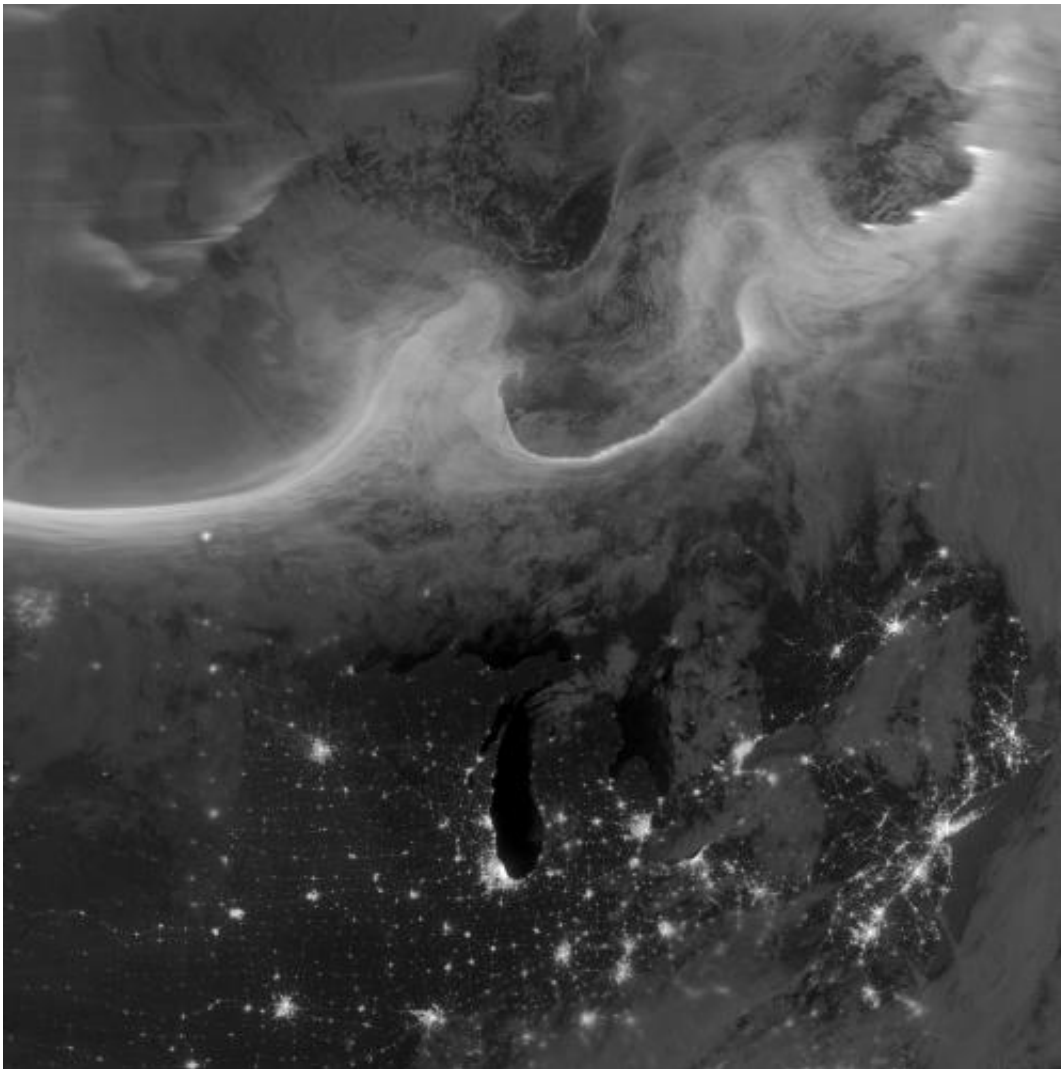


# Suomi NPP satellite sees auroras over North America

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Using the "day-night band" of the Visible Infrared Imaging Radiometer Suite , the Suomi National Polar-orbiting Partnership satellite acquired this view of the aurora borealis early on the morning of October 8, 2012. The northern lights stretch across Canada's Quebec and Ontario provinces in the image, and are part

of the auroral oval that expanded to middle latitudes because of a geomagnetic storm. Credit: NASA Earth Observatory image by Jesse Allen and Robert Simmon, using VIIRS Day-Night Band data from the Suomi National Polar-orbiting Partnership (Suomi NPP) and the University of Wisconsin's Community Satellite Processing Package. Suomi NPP is the result of a partnership between NASA, the National Oceanic and Atmospheric Administration, and the Department of Defense.

(Phys.org)—Overnight on October 4-5, 2012, a mass of energetic particles from the atmosphere of the Sun were flung out into space, a phenomenon known as a coronal mass ejection. Three days later, the storm from the Sun stirred up the magnetic field around Earth and produced gorgeous displays of northern lights. NASA satellites track such storms from their origin to their crossing of interplanetary space to their arrival in the atmosphere of Earth.

Using the "day-night band" (DNB) of the Visible Infrared Imaging Radiometer Suite (VIIRS), the Suomi National Polar-orbiting Partnership (Suomi NPP) satellite acquired this view of the [aurora borealis](#) early on the morning of October 8, 2012. The northern lights stretch across Canada's Quebec and Ontario provinces in the image, and are part of the auroral oval that expanded to middle latitudes because of a geomagnetic storm.

The DNB sensor detects dim [light signals](#) such as auroras, airglow, gas flares, city lights, and reflected moonlight. In the case of the image above, the sensor detected the visible light emissions as [energetic particles](#) rained down from Earth's magnetosphere and into the gases of the upper atmosphere. The images are similar to those collected by the Operational Linescan System flown on U.S. Defense [Meteorological Satellite Program](#) (DMSP) satellites for the past three decades.

Auroras typically occur when [solar flares](#) and coronal [mass ejections](#)—or even an active solar wind stream—disturb and distort the magnetosphere, the cocoon of space protected by Earth's magnetic field. The collision of [solar particles](#) and pressure into our planet's magnetosphere accelerates particles trapped in the space around Earth (such as in the radiation belts). Those particles are sent crashing down into Earth's upper atmosphere—at altitudes of 100 to 400 kilometers (60 to 250 miles)—where they excite oxygen and nitrogen molecules and release photons of light. The results are rays, sheets, and curtains of dancing light in the sky.

Auroras are a beautiful expression of the connection between Sun and Earth, but not all of the connections are benign. Auroras are connected to geomagnetic storms, which can distort radio communications (particularly high frequencies), disrupt electric power systems on the ground, and give slight but detectable doses of radiation to flight crews and passengers on high-latitude airplane flights and on spacecraft.

The advantage of images like those from VIIRS and DMSP is resolution, according to space physicist Patrick Newell of the Johns Hopkins University Applied Physics Laboratory. "You can see very fine detail in the aurora because of the low altitude and the high resolution of the camera," he said. Most aurora scientists prefer to use images from missions dedicated to aurora studies (such as Polar, IMAGE, and ground-based imagers), which can offer many more images of a storm (rather than one per orbit) and can allow researchers to calculate the energy moving through the atmosphere. There are no science satellites flying right now that provide such a view, though astronauts regularly photograph and film auroras from the International Space Station.

Provided by NASA's Goddard Space Flight Center

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