



International Dark-Sky Association

"... to preserve and protect the nighttime environment and our heritage of dark skies"

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CITY LIGHT POLLUTION AFFECTS AIR POLLUTION

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Excess light at night can contribute to air pollution, according to a study by scientists at the National Oceanic and Atmospheric Administration (NOAA) and the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado. Findings presented at the American Geophysical Union in San Francisco on Monday indicate that uplight from outdoor lighting that contributes to sky glow over cities also interferes with chemical reactions that naturally clean the air during nighttime hours.

Every night, chemicals from vehicle exhaust and other human created sources are broken down and prevented from becoming smog, ozone, or other irritants by a form of nitrogen oxide called the nitrate radical. Sunlight destroys the naturally occurring nitrate radical, so this process occurs only in hours of darkness.

Measurements taken over Los Angeles by aircraft show that light pollution from cities is suppressing the radical. Though the lights are 10,000 times dimmer than the Sun, the study's first results indicate that city lights can slow down the nighttime cleansing by up to 7% and they can increase the starting chemicals for ozone pollution the next day by up to 5%.

As many cities are close to their limits of allowable ozone levels, this news is expected to generate immediate interest in light pollution reduction as a way to improve air quality among city, state, and federal bodies, including the Environmental Protection Agency.

"[This effect] is more important up in the air than it is directly on the ground so if you manage to keep the light pointing downward and not reflected back up into sky, into the higher parts of the air, then you would certainly have a much smaller effect of this," NOAA investigator Harald Stark told BBC News.

International Dark-Sky Association (IDA) Executive Director Bob Parks is hopeful that results of this study will encourage cities to adopt environmentally responsible dark sky lighting practices that include using fully shielded fixtures, minimum lighting levels, and lighting only when necessary. "The impending transition to LED outdoor lighting will also allow cities to utilize adaptive lighting controls to dim or turn off lights when not needed. Not only will this vastly reduce energy consumption, based on this new research, it could also improve air quality. This reinforces IDA's long term goal to reduce total lumens in the environment," adds Parks.

Starting in 2008, IDA has held yearly educational briefings for both houses of U.S. Congress to raise federal awareness of light pollution. After the 2008 event, eleven members of Congress signed a letter to EPA Administrator Johnson requesting support for research and education on the environmental, health, and safety effects artificial light at night. On 9 October 2008 EPA was petitioned to review light pollution to monitor and reduce atmospheric discoloration of the night sky under the Clean Air Act. The EPA has made no formal response to the petition.

[Read IDA's correspondence with the EPA >>](#)

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