

Rapid increase in global light pollution

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London at night, seen from the International Space Station. Different colors are visible, showing different lighting technologies. Credit A.Sánchez de Miguel, ESA, NASA

Global light pollution has increased by at least 49% over 25 years, new research shows.

This figure only includes light visible via satellites, and scientists estimate the true increase may be significantly higher—up to 270% globally, and 400% in some regions.

The study, led by the University of Exeter, examined light emissions from 1992 to 2017.

The findings show differing regional trends, but emissions have increased almost everywhere and there is "limited evidence" that improved technology has cut light pollution.

"The global spread of artificial light is eroding the natural night-time environment," said first author Dr. Alejandro Sánchez de Miguel, of the Environment and Sustainability Institute on Exeter's Penryn Campus in Cornwall.

"This study provides clear evidence not only of how bad light pollution has become as a global problem, but also that it is continuing to get worse, and probably at a faster and faster rate."

The study highlights the "hidden impact" of the transition to solid-state light emitting diode (LED) technology.

LEDs emit more blue light than previous lamp technologies, but [satellite sensors](#) are blind to this blue light and so underestimate the level of emissions.

Correcting for this, the authors say the actual increase in the power emitted by outdoor lighting, and thus of light pollution, may be as high as 270%.

The study finds persistently increasing light pollution in Asia, South America, Oceania and Africa.

In Europe, detected light increased until around 2010 and then leveled off, and in North America it appears to be in decline.

However, the researchers say the shift towards blue-rich LEDs masks the fact that light pollution has increased in most locations.

"To take the UK as an example, if you ignore the effect of the switch to LEDs—which has been extensive—you get the false impression that light pollution has recently declined," said Dr. Sánchez de Miguel.

"However, correcting for this effect shows it has really increased, and potentially very markedly.

"Contrary to popular belief, the installation of 'broad white' LED streetlights, whilst potentially providing some energy savings, has increased light pollution and also the impacts on organisms such as moths."

Ruskin Hartley, Executive Director of the International Dark-Sky Association, said, "Over the past 25 years, the transition to solid-state LED lighting has been accompanied by rapid increases in light pollution globally.

"Without concerted action to reverse this trend, the impact on the natural environment will accelerate, further exacerbating the biodiversity crisis, wasting energy, and meaning a whole generation will grow up in perpetual twilight."

Many studies have now shown that light pollution, from streetlights and other sources, can have major impacts on the natural environment.

Such pollution is likely to have played a role in the massive declines of insect populations.

The paper, published in the journal *Remote Sensing*, is entitled "First estimation of global trends in nocturnal power [emissions](#) reveals

acceleration of light pollution."

The University of Exeter has launched a Green Futures campaign and website to drive action on the environment and climate emergency.

More information: Alejandro Sánchez de Miguel et al, First Estimation of Global Trends in Nocturnal Power Emissions Reveals Acceleration of Light Pollution, *Remote Sensing* (2021). [DOI: 10.3390/rs13163311](https://doi.org/10.3390/rs13163311)

Provided by University of Exeter

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