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# SKY & TELESCOPE

THE ESSENTIAL GUIDE TO ASTRONOMY

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## ASTRONOMY &amp; SOCIETY

## Light Pollution Increasing Faster Than Thought

**HOW MANY STARS** can you see at night? According to results from a study appearing in the January 20th *Science*, that number is likely less than it was just a few years ago.

To arrive at that conclusion, Christopher Kyba (GFZ German Research Centre for Geosciences) and his collaborators looked to the Globe at Night citizen-science project. Using data reported from users on the ground, the researchers found that the average brightness of the night sky around the globe increased by 9.6% every year between 2011 and 2022.

Until now, our best global view of light pollution came from satellite measurements, which had indicated that scattered light was growing on average 2.2% per year between 2012 and 2016. The new result from citizen scientists suggests that satellites have vastly underestimated the increase.

The new estimate differs from earlier results in part because the instruments aboard the current generation of satellites are effectively blind to blue light. LEDs emit much more in the blue part of the spectrum than earlier light sources did, and that light scatters more efficiently in the atmosphere than other colors do. Also, because LEDs use much less energy than earlier light sources did, regions tend to install more

▲ The greater the light pollution, and therefore skyglow, the fewer the stars that are visible.

(and brighter) fixtures. But satellites missed the magnitude of these changes. Satellite measurements also don't fully account for light emitted toward the horizon, such as from windows and illuminated signs.

Visual observations like those collected by Globe at Night can account for at least some of the "missing" light. By counting the number of visible stars in the night sky, citizen scientists include the influences of both increasing light emissions and the shift toward generally bluer light sources.

Participants contributed more than 50,000 individual observations during the study period. Yet even that mountain of data could sample night-sky conditions only on large scales.

"We were only able to look at continental trends, because we don't have sufficient data to look at smaller regions," Kyba explains. Increasing the number of Globe at Night observations by a factor of 10 would make it possible to focus on smaller scales, he says, which would help provide more targeted information to policymakers.

■ JOHN BARENTINE

Join the Globe at Night project:  
<https://is.gd/GlobeatNight>.

## IN BRIEF

### Observatories Not Immune

Light pollution is creeping up even on astronomical observatories. According to a study published in the February *Monthly Notices of the Royal Astronomical Society*, only a handful of all large observatories are in truly dark sites, with skyglow less than 1% brighter than assumed natural levels. And two-thirds have already seen their night skies brighten 10% over natural levels, report Fabio Falchi (University of Santiago de Compostela, Spain) and colleagues. Analyzing satellite data around major, historic, and potential observatory sites, the researchers computed skyglow at different altitudes above the horizon and compared it to natural levels. Even distant, seemingly inoffensive lights can be a bother. For example, a single highway 40 kilometers (25 miles) away contributes more than 50% of the overhead radiance in the otherwise dark desert skies over the Las Campanas Observatory, home of the twin 6.5-meter Magellan telescopes and future site of the Giant Magellan Telescope. Of course, remote astronomical observatory sites are the least affected by light pollution, which makes them the proverbial canary in the coal mine. "If we are not able to keep this canary alive," Falchi says, "then we can forget being able to solve the problem of light pollution as a global environmental issue."

■ JAN HATTENBACH