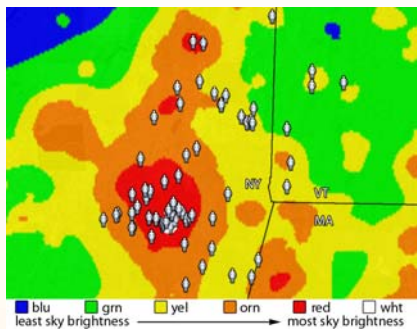


# Satellite Photometry Is Not a Good Predictor of Actual Light Exposure

There has been a growing interest in the health effects of light at night, especially after the World Health Organization identified shift work as a probable carcinogen. Scientists at the Lighting Research Center (LRC) are among many groups working to identify factors that lead to the higher incidence of cancer among night-shift workers. One theory is that light at night may lead to serious health problems such as cancer.



A recent study conducted by the LRC calls into question the validity of previous studies by other groups linking high levels of sky brightness measured by satellite imagery of outdoor lighting, or satellite photometry, with increased incidences of breast cancer.

## Experiment

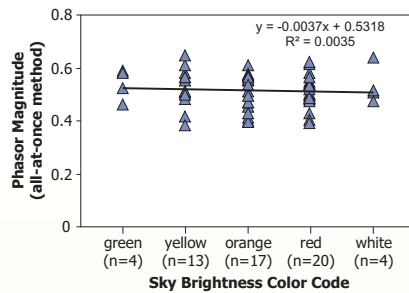
The LRC measured actual light exposures of 72 female school teachers over the course of seven days. These women worked regular day shifts and were expected to maintain normal circadian rhythms. The participants lived in a range of areas with both high and low amounts of satellite measured sky brightness.

In order to obtain accurate light exposure measurements, each teacher wore a Daysimeter, a head-mounted device developed by the LRC to measure an individual's daily exposure to circadian light, as well as rest and activity patterns. The researchers also obtained light levels within each bedroom and at each bedroom window. Light exposures of the female school teachers were compared to satellite measurements of sky brightness.

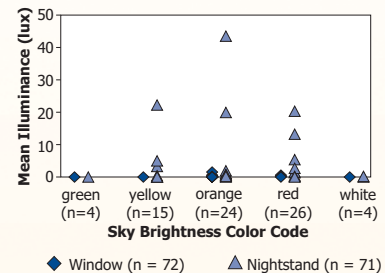


## Publication

Rea MS, Brons JA, Figueiro MG. 2011. Measurements of light at night (LAN) for a sample of female school teachers. *Chronobiology International*, 28(8).



Nighttime light measurements vs. sky brightness categories. Illuminance levels were recorded from window-Daysimeters and nightstand-Daysimeters. "Night" is defined here as midnight (00:00 h) to 04:00 h.



## Results

Using phasor analysis, researchers found that the teachers were all in synch with a regular 24-hour cycle, as expected, regardless of the sky brightness outside their homes. Light levels in the bedrooms and at the windows were always low and unrelated to sky brightness.

The researchers concluded that satellite photometry is not a reliable measure of actual evening circadian light exposures that might disrupt the circadian system, illustrating the importance of measuring light at the eye when conducting circadian disruption research. Satellite sky brightness measurements do not take into account the spectrum, intensity, and duration of light exposure reaching the retina, all of which must be considered in order to determine the effect of light on human health. Therefore, the statistical association between sky brightness and breast cancer appears to be coincidental with other factors affecting the likelihood of breast cancer.

## Sponsors

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