

View of Humanity from Space

Christopher D. ELVIDGE, Ph.D.

**Earth Observation Group
NOAA-NESDIS National Geophysical Data Center E/GC2, USA**

The widespread use of outdoor lighting is a relatively recent phenomenon, tracing its roots back to the electric light bulb, commercialized by Thomas Edison in the early 1880s. Nocturnal lighting has emerged as one of the hallmarks of modern development and provides a unique attribute for identifying the presence of development or human activity that can be sensed remotely. Although there are some cultural variations in the quantity and quality of lighting in various countries, there is a remarkable level of similarity in lighting technology and lighting levels around the world. The primary factor affecting the quantity of lighting is wealth. Regions with high per capita income have much more lighting than regions with low per capita income. Even within affluent regions, however, lighting technology (lamps and lighting fixtures) is gradually changing, as pressure is applied to reduce night-time sky brightness and conserve energy. In some applications, night-time lights are used as a proxy for variables that are difficult to measure in a globally consistent manner, including many socio-economic variables, such as population density and gross domestic product. In other applications, the spatial distribution and quality of lighting is used as a variable directly, such as the analyses of ecological effects of nocturnal lighting, the analysis of artificial sky brightness impacts on the visibility of stars and planets, and human health effects of lighting. In this presentation we review satellite observation of nighttime lights from the U.S. Air Force Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) and the International Space Station.

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