National Aeronautics and Space Administration

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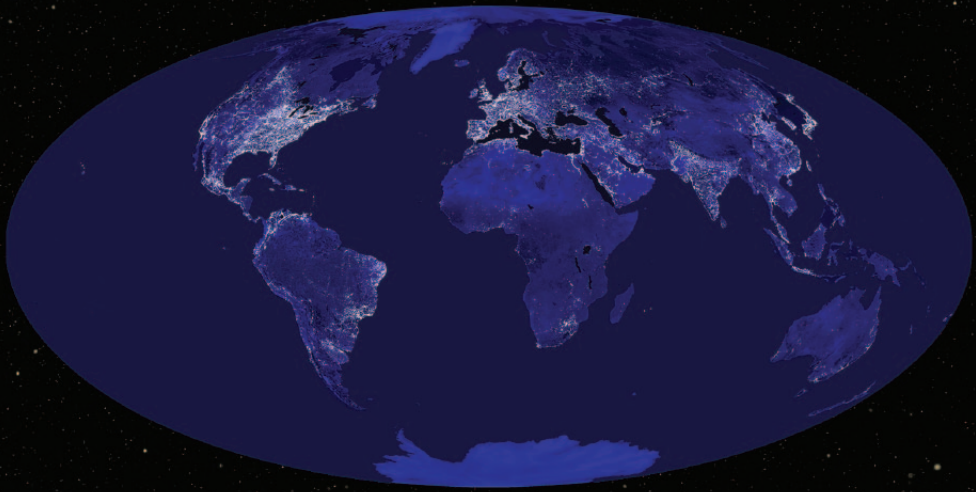

Earth by Day, Earth by Night

A major concern for society is the rapid rate of urbanization of the planet. The world has undergone a steady process of urbanization as a larger and larger percentage of the population has moved towards the cities. Urban sprawl completely transforms the landscape and the soil and alters the surrounding ecosystem. Scientists at NASA seek to quantify the impact of urbanization on Earth's climate, and they can use information from Earth observing satellites to assist them.

The "daytime image" of the globe—see front—comes from the most detailed true-color image of the entire Earth to date. Using a collection of satellite-based observations, scientists and visualizers stitched together months of observations of the land surface, oceans, sea ice, and clouds into a seamless, true-color mosaic of every square kilometer (0.386 square mile) of our planet. Most of the information comes from the Moderate Resolution Imaging Spectroradiometer (MODIS) that flies on both Terra and Aqua.

The "blue marble" is a stunning image and we can learn something about how humans impact the planet's surface by looking at how the land surface changes with time in urban and sub-urban areas, but one of the most compelling visual pictures of urbanization comes out after the sun goes down. The "nighttime" image—see front—shows Earth's city lights. Originally designed to view clouds by moonlight, researchers also found that on very dark nights, they could use the Defense Meteorological Satellite Program's (DMSP) Operational Linescan System (OLS) to map the locations of permanent lights on Earth's surface. NASA scientists have created a method of mapping urbanization on a countrywide scale by using these satellite images of nighttime lights, and are now zeroing in on the impacts that urban sprawl has on the food we eat, the air we breathe, and the ecosystem within which we live.