



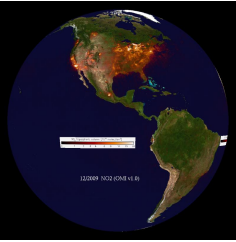

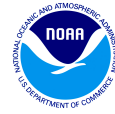
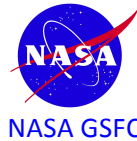



ClimateBits: Air Quality

Narration	Visuals
<p>Air quality is important for the environment and human health. We all breathe air.</p>	 <p>Air Quality</p>
<p>Air pollution comes in the form of fine particles and gases. They cause acid rain and pollute rivers and lakes. Breathing it puts people at risk for asthma and worse. Air pollution can be dust, haze, smoke, and something called <i>smog</i> because it looks like a mixture of smoke and fog. Some cities, famously Los Angeles, have ground level ozone that burns the lungs.</p> <p>From space, Earth lights up at night where most people live. Watch the lights change over 20 years from 1992, 2002, and 2012. More people. More cities. More lights. More energy being used to power those lights.</p> <p>Where does most of the energy we use come from? Burning fossil fuels. In addition to producing energy, burning fossil fuels produces air pollution Can you guess where most air pollution is found?</p>	 <p>CDC photo</p> <p>Lights at night: 1992, 2002, 2012</p>  
<p>Satellites in space <i>measure</i> chemical components of Earth's air pollution, including <i>nitrogen dioxide</i>. Nitrogen Dioxide makes Los Angeles-type smog. Here is monthly NO₂, nitrogen dioxide, superimposed over the lights at night. Notice how most pollution is found near the biggest cities and industrial areas. Burning forests and fields also causes pollution.</p> <p>In recent years, air pollution in many places especially India and China has reached epic levels.</p> <p>There is however some good news too. During the past 10 years over the United States and western Europe, air quality has improved. Emissions controls, more alternative energy, switching power plants from coal to natural gas –</p>	<p>OMI monthly (2004-2014)</p>   <p>EPA photo</p>



<p>these all help. A modern car in good repair produces only about 5% of the pollution that your grandfather's car might have in 1960. There is still more to do and we can all improve air quality around the world.</p>	
<p>We all share the Earth, its atmosphere, and everyone needs to breathe clean air.</p> <p>For more information, visit climatebits.umd.edu.</p>	

Credits:

NASA GSFC Aura Mission

Lights at night satellite data: DMSP (1992, 2002) and NPP (2012)

Nitrogen dioxide satellite data: OMI

More information:

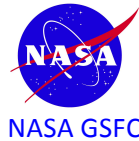
From space, Earth lights up at night where most people live and work. In regions where fossil fuels (coal and natural gas) are used to generate electricity, the lights at night correspond to increased air pollution. There are other places on Earth where human activity is impacting air quality, such as burning fires to clear land for agriculture, even though these areas do not show up in the lights at night. Some examples of air pollution caused by humans:

- Slash-and-burn deforestation over Central and South America
- Los Angeles smog from burning fossil fuels (industrial activity and vehicles)
- Smog over China
- Haze over India and Bangladesh from fire and burning fossil fuels
- West Africa fires and smoke from agricultural clearing
- Smog over Europe
- Smog over U.S. East Coast

Natural air pollution can be caused by: volcanoes, sand storms, fires started by lightening

Nitrogen Dioxide (NO₂) is released into the air primarily by burning fossil fuels. It is unhealthy to breathe and reacts with other gases to produce ground-level ozone, which is also unhealthy to breathe. Globally, the greatest NO₂ emissions are from industrial, urban centers (from power plants fired by coal or gas and vehicles) and forest fires. The strong seasonal patterns in NO₂ levels result from the longer pollutant lifetime in winter because of colder temperatures. High levels of NO₂ contribute to:

- haze that reduces visibility
- irritation of the eyes, nose, throat, and lungs
- acid rain
- polluted rivers and lakes



- unhealthy levels of "nose-level" ozone

Emissions controls have successfully decreased NO₂ in some areas, such as the US and Europe, but more people and industry correspond to increasing NO₂ and degraded air quality in other places, especially in places like China and India with growing populations and development.

References:

NASA Air Quality Quiz

<http://climate.nasa.gov/quizzes/Air-quiz>

New NASA images highlight US air quality improvement:

<http://www.nasa.gov/content/goddard/new-nasa-images-highlight-us-air-quality-improvement/>

NASA Earth Observatory feature: A clearer view of hazy skies

<http://earthobservatory.nasa.gov/Features/AirQuality/>

NASA Aura Mission air quality:

<http://aura.gsfc.nasa.gov/airquality.html>

NASA Aura "Breathable" movie:

<http://www.youtube.com/watch?v=2yd2s5vdQeQ>

Today's Air Quality Index from the Environmental Protection Agency:

<http://www.airnow.gov/>

Instrument information:

NASA Aura's Ozone Monitoring Instrument (OMI):

<http://aura.gsfc.nasa.gov/scinst/omi.html>