National Aeronautics and Space Administration

NASA EARTH NEWS

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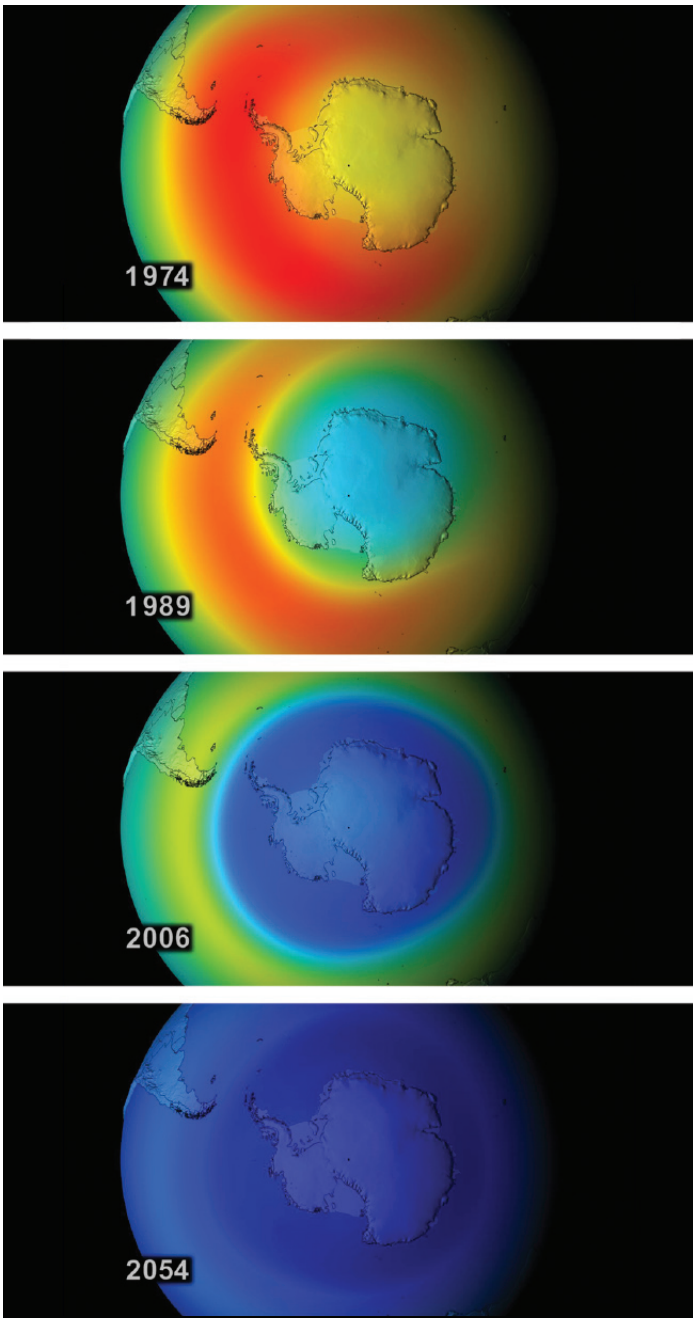


New Simulation Shows Consequences of a World without Earth's Natural Sunscreen

The year is 2065. Nearly two-thirds of Earth's ozone is gone—not just over the poles, but everywhere. The infamous ozone hole over Antarctica, first discovered in the 1980s, is a year-round fixture, with a twin over the North Pole. The ultraviolet (UV) radiation falling on mid-latitude cities like Washington, D.C. is strong enough to cause sunburn in just five minutes. DNA-mutating UV radiation is up 650 percent, with likely harmful effects on plants, animals, and human skin cancer rates.

Such is the world we would have inherited if 193 nations had not agreed to ban ozone-depleting substances, according to atmospheric chemists at NASA's Goddard Space Flight Center, Johns Hopkins University, and the Netherlands Environmental Assessment Agency.

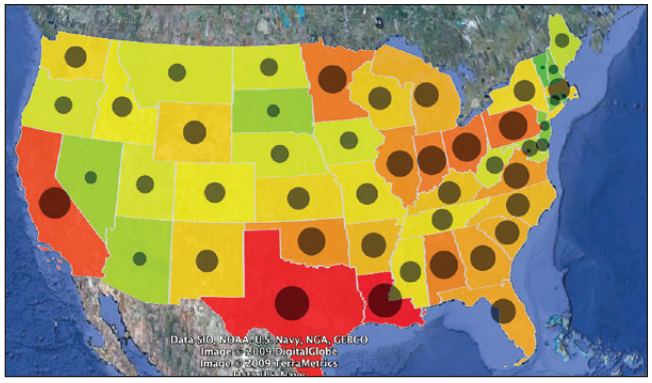
Led by Goddard scientist Paul Newman, the team simulated "what might have been" if chlorofluorocarbons (CFCs) and similar chemicals were not banned through the treaty known as the Montreal Protocol. The simulation used a comprehensive model that included atmospheric chemical effects, wind changes, and radiation changes. The analysis has been published online in the journal *Atmospheric Chemistry and Physics*.

"Ozone science and monitoring has improved over the past two decades, and we have moved to a phase where we need to be accountable," said Newman, who is co-chair of the United Nations Environment Programme's Scientific Assessment Panel to review the state of the ozone layer and the environmental impact of ozone regulation.

—Goddard Space Flight Center, March 18

This time series from the ozone "world avoided" model shows the concentration of ozone over the South Pole at four key times. Reds represent normal to high concentrations; blues show depleted areas. The discovery that CFCs deplete ozone was first announced in 1974, when the ozone layer was still relatively robust. By 1989, an "ozone hole" had opened over Antarctica, peaking in size in 2006. By year 2054 in the model, the ozone hole is permanent, and global ozone has dropped by 67 percent. Credit: NASA

Google Earth Releases NASA-Funded CO_2 Map of U.S.



A Vulcan Project map of the United States indicates carbon dioxide emissions in 2002 by state in metric tons emitted. Credit: Purdue University

Interactive maps that detail carbon dioxide emissions from fossil fuel combustion are now available on the popular Google Earth platform. The maps, funded by NASA and the U.S. Department of Energy through the joint North American Carbon Program, can display fossil fuel emissions by the hour, geographic region, and fuel type.

Researchers from the project, named "Vulcan" for the Roman god of fire, constructed an unprecedented inventory of carbon dioxide that results from the burning of 48 different types of fossil fuel. The data-based maps show estimates of the hourly carbon dioxide outputs of factories, power plants, vehicle traffic, and residential and commercial areas.

—NASA Headquarters, February 19

NASA Technologies Predict Stored Carbon in U.S. Forests

Forest ecosystems store enormous amounts of carbon in their standing trees, which until 2000 measured about 54 tons of carbon per every two and a half acres in the United States. As our forest trees grow, mature, and die, they contribute to stabilizing the global carbon cycle through photosynthesis, respiration, decomposition, and combustion. To monitor and predict the carbon cycle of our new and maturing forests, scientists are working to establish a biomass baseline for the amount of carbon stored in our forests.

By using satellite remote sensing, ecosystems modeling, carbon changes, and forest inventory data, NASA scientists are making great strides in augmenting national carbon mapping efforts and developing new modeling approaches using satellite data.

—Ames Research Center, February 2

Drought, Urbanization Stirred Up Atlanta's Perfect Storm

On March 14, 2008, a tornado swept through downtown Atlanta, its 130 mile-per-hour winds ripping holes in the roof of the Georgia Dome, blowing out office windows and trashing parts of Centennial Olympic Park. It was an event so rare in an urban landscape that researchers immediately began to examine NASA satellite data and historical archives to see what weather and climatological ingredients may have combined to brew such a storm.

The 2008 Atlanta tornado—the first in the city's recorded history—was also unique because it developed during extreme drought conditions. In a NASA-funded study, researchers found that intermittent rain in the days before the storms may have moistened some areas enough to create favorable conditions for severe storms to form and intensify. Additionally, the sprawling urban landscape may have given the storms the extra, turbulent energy needed to spin up a tornado.

—Goddard Space Flight Center, March 11

NASA Study Predicted Outbreak of Deadly Virus

An early warning system, more than a decade in development, successfully predicted the 2006-2007 outbreak of the deadly Rift Valley fever in northeast Africa, according to a new study led by NASA scientists.

Rift Valley fever is unique in that its emergence is closely linked to climate volatility over time. Utilizing that link, researchers used a blend of NASA and National Oceanic and Atmospheric Administration measurements of sea surface temperatures, precipitation, and vegetation cover to predict when and where an outbreak would occur.

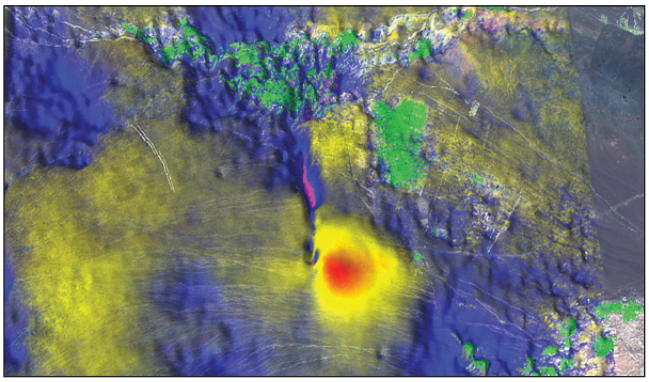
—Goddard Space Flight Center, February 13

Scientists Expose 'Buried' Fault That Caused Deadly 2003 Quake

Using satellite radar data, NASA-funded scientists have observed, for the first time, the healing of subtle, natural surface scars from an earthquake that occurred on a "buried" fault several miles below the surface—a fault whose fractures are not easily observed at Earth's surface.

Reporting in the March 5 issue of *Nature*, NASA geophysicist Eric Fielding describes how so-called "buried" faults are not so hidden after all. Using the magnitude 6.6 earthquake that devastated Bam, Iran, in 2003 as a case study, Fielding and his university colleagues analyzed radar images from the European Space Agency's Envisat satellite to study the land surface above a fault that is buried about half a mile under Earth's surface. They discovered a shallow, narrow surface depression that formed and evolved after the quake, which killed more than 30,000 people.

—Jet Propulsion Laboratory, March 4



Three-dimensional perspective view of vertical displacement of the land surface south of Bam, Iran during the 3.5 years after the December 26, 2003 earthquake, derived from analysis of radar images. Blue and magenta colors show where the ground surface moved downward; yellow and red colors show upward motion. Displacements are superimposed on a false-color Landsat Thematic Mapper image taken on October 1, 1999. Vegetation in the city of Bam is green and stone-covered desert has various tones of gray. Credit: NASA JPL/ESA