

July
TEAM
LEADER

September
GLOBAL
LEADER

A SHORT PROGRAMME CAN MAKE A BIG DIFFERENCE.
execed.nus.edu/leadership



https://www.sciencedaily.com/releases/2016/07/160711151319.htm

Science News

from research organizations

Print Email Share

Scientists find evidence for climate change in satellite cloud record

Date: July 11, 2016
Source: DOE/Lawrence Livermore National Laboratory
Summary: Scientists have found that changes in cloud patterns during the last three decades match those predicted by climate model simulations. These cloud changes are likely to have had a warming effect on the planet.
Share: Facebook Twitter Google+ LinkedIn + Email

RELATED TOPICS

- Earth & Climate
- > Climate
 - > Weather
 - > Global Warming
 - > Environmental Issues
 - > Environmental Awareness
 - > Severe Weather

RELATED TERMS

- > Waterspout
- > Global warming controversy
- > Effects of global warming
- > Cloud
- > Computer simulation
- > Temperature record of the past 1000 years

FULL STORY



Changes in cloud patterns during the last three decades, which likely have had a warming effect on the planet, sync up with climate model simulations.
Credit: Image courtesy of NASA Goddard Space Flight Center

Scientists have found that changes in cloud patterns during the last three decades match those predicted by climate model simulations. These cloud changes are likely to have had a warming effect on the planet.

Records of cloudiness from satellites originally designed to monitor weather are plagued by erroneous variability related to changes in satellite orbit, instrument calibration and other factors, so the team used a new technique to remove the variability from the records. The corrected satellite records exhibited large-scale patterns of cloud change between the 1980s and 2000s that are consistent with climate model predictions, including poleward retreat of mid-latitude storm tracks, expansion of subtropical dry zones and increasing height of the highest cloud tops.

The research from Lawrence Livermore National Laboratory, Scripps Institution of Oceanography, University of California, Riverside and Colorado State University appears in the July 11 edition of the journal, *Nature*.

"What this paper brings to the table is the first credible demonstration that the cloud changes we expect from climate models and theory are currently happening," said study lead author Joel Norris, a climate researcher at Scripps.

Clouds substantially impact Earth's energy budget by reflecting solar radiation back to space (the albedo effect) and by restricting emission of thermal radiation to space. Most of the uncertainty in how much the planet will warm in response to greenhouse gas emissions is due to uncertainty in how clouds will respond and impact Earth's energy budget.

"After the spurious trends were removed, we saw consistent responses among several independent datasets and with model simulations," said Mark Zelinka, an LLNL scientist and co-author of the paper. "That is a nice confirmation of the models' predictions, at least for the types of cloud changes that models agree on."

The authors also were able to assess the causes of the observed cloud trends using a variety of climate model simulations with and without influences of humans, volcanoes and other factors.

"If models are correct, the observed cloud trends are very unlikely to have been caused by natural climate variability," said Stephen Klein, another LLNL scientist involved in the research. "Rather, we found that increasing greenhouse gas concentrations and a recovery from volcanic radiative cooling are the primary causes in these decades."

The scientists expect the cloud trends to continue in the future as the planet continues to warm due to increasing greenhouse gas concentrations.

The research is funded by the National Oceanic and Atmospheric Administration, the Department of Energy Office of Science and NASA.

Story Source:

The above post is reprinted from materials provided by **DOE/Lawrence Livermore National Laboratory**. *Note: Materials may be edited for content and length.*

Journal Reference:

- Joel R. Norris, Robert J. Allen, Amato T. Evan, Mark D. Zelinka, Christopher W. O'Dell & Stephen A. Klein. **Evidence for climate change in the satellite cloud record.** *Nature*, 2016; DOI: 10.1038/nature.2016.20230

Cite This Page:

MLA APA Chicago

DOE/Lawrence Livermore National Laboratory. "Scientists find evidence for climate change in satellite cloud record." ScienceDaily. ScienceDaily, 11 July 2016. <www.sciencedaily.com/releases/2016/07/160711151319.htm>.

Share This Page:

Facebook Twitter Google+ LinkedIn + Email

Powered by Google



Facebook® Account Sign Up

Ad facebook.com



Earth's lower atmosphere is warming, review of ...

sciencedaily.com



How To Design A Garden

Ad gardeningenthusiast.com



Dust in the clouds: Cirrus clouds form around m...

sciencedaily.com

September
GLOBAL
LEADER

A SHORT LEADERSHIP PROGRAMME CAN MAKE A BIG DIFFERENCE.
execed.nus.edu



More Coverage

Clouds Are Moving Higher, Subtropical Dry Zones Expanding, According to Satellite Analysis

July 11, 2016 — Changes in global cloud distribution, predicted by climate models, can now be seen in reprocessed satellite observations of clouds, and suggests that rising greenhouse gas concentrations are partly ... **read more »**

Related Stories



Climate Models Underestimate Global Warming by Exaggerating Cloud Brightening

Apr. 7, 2016 — Researchers have found that climate models are aggressively making clouds 'brighter' as the planet warms. This may be causing models to underestimate how much global warming will occur due ... **read more »**



Study of Cloud Cover in Tropical Pacific Reveals Future Climate Changes

Nov. 4, 2015 — A new analysis using changes in cloud cover over the tropical Indo-Pacific Ocean showed that a weakening of a major atmospheric circulation system over the last century is due, in part, to increased ... **read more »**



Picture of How Our Climate Is Affected by Greenhouse Gases Is a 'Cloudy' One

Jan. 26, 2014 — The warming effect of human-induced greenhouse gases is a given, but to what extent can we predict its future influence? That is an issue on which science is making progress, but the answers are ... **read more »**

Aerosols Affect Climate More Than Satellite Estimates Predict

Aug. 1, 2011 — Aerosol particles, including soot and sulfur dioxide from burning fossil fuels, essentially mask the effects of greenhouse gases and are at the heart of the biggest uncertainty in climate change ... **read more »**

September
GLOBAL
LEADER

A SHORT PROGRAMME CAN MAKE A BIG DIFFERENCE.
execed.nus.edu



Strange & Offbeat

PLANTS & ANIMALS



Germes Add Ripples to Make 'Groovy' Graphene



If Life Can Make It Here, It Can Make It Anywhere



Monkeys in Brazil 'Have Used Stone Tools for Hundreds of Years at Least'



Tiny Bacteria-Powered 'Windfarm' for Your Phone?

EARTH & CLIMATE



Lush Venus? Searing Earth? It Could Have Happened



Ostrich Relative Lived in North America About 50 Million Years Ago



In Times of Great Famine, Microalgae Digest Themselves



Humans Artificially Drive Evolution of New Species

FOSSILS & RUINS



Robot Helps Study How First Land Animals Moved 360 Million Years Ago



The Secret to an Oesia Life: Prehistoric Worm Built Tube-Like 'Houses' on Sea Floor



Infant Bodies Were 'Prized' by 19th Century Anatomists, Study Suggests



A 6,000 Year Old Telescope Without a Lens: Prehistoric Tombs Enhanced Astronomical Viewing

A SHORT LEADERSHIP PROGRAMME CAN MAKE A BIG DIFFERENCE.
execed.nus.edu



Print Email Share

Free Subscriptions

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

- Email Newsletters
- RSS Feeds

Follow Us

Keep up to date with the latest news from ScienceDaily via social networks:

- Facebook
- Twitter
- Google+
- LinkedIn

Mobile Apps

Get the latest news from ScienceDaily via our free mobile apps, available for download on the following platforms:

- iPhone/iPad
- Android

Have Feedback?

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

- Leave Feedback
- Contact Us

Powered by Trend MD