

Thanks for the feedback! [Undo](#)
We'll use your feedback to review ads on this site.



Science News

from research organizations

Print Email Share

El Nino drives fastest annual increase on record of carbon dioxide

Date: June 13, 2016
Source: University of Exeter
Summary: The rising concentration of atmospheric carbon dioxide has passed a symbolic threshold early due to the fastest annual increase on record, report scientists.
Share: Facebook Twitter Google+ LinkedIn + Email

RELATED TOPICS

- Earth & Climate
- Global Warming
 - Climate
 - Forest
- Science & Society
- Ocean Policy
 - Resource Shortage
 - Environmental Policies

RELATED TERMS

- Carbon dioxide
- Forest
- Ocean acidification
- Fossil fuel
- Climate model
- Attribution of recent climate change

Thanks for the feedback! [Undo](#)
We'll use your feedback to review ads on this site.



The rising concentration of atmospheric carbon dioxide has passed a symbolic threshold, report experts.
Credit: © Tomasz Zajda / Fotolia

The human-caused rise in atmospheric concentration of carbon dioxide is being given an extra boost this year by the natural climate phenomena of El Niño, say climate scientists in a paper published in today's edition of the journal *Nature Climate Change*. As a result, 2016 will be the first year with concentrations above 400 parts per million all year round in the iconic Mauna Loa carbon dioxide record.

Lead author Professor Richard Betts, of the Met Office Hadley Centre and University of Exeter, said: "The atmospheric carbon dioxide concentration is rising year-on-year due to human emissions, but this year it is getting an extra boost due to the recent El Niño event -- changes in the sea-surface temperature of the tropical Pacific Ocean. This warms and dries tropical ecosystems, reducing their uptake of carbon, and exacerbating forest fires. Since human emissions are now 25 per cent greater than in the last big El Niño in 1997/98, this all adds up to a record CO₂ rise this year."

The rising trend in CO₂ was seen by Charles David Keeling when he began recording CO₂ at Mauna Loa, Hawaii, in 1958. His early measurements were around 315 parts per million of carbon dioxide, 60 years later this has been rising at an average rate of 2.1 parts per million, but using a seasonal climate forecast model and statistical relationship with sea temperatures, Professor Betts and colleagues forecast the rise this year to be a record 3.15 + -- 0.53 parts per million. The average concentration in 2016 is forecast to be 404.45 +/-0.53 parts per million, dropping to 401.48 +/- 0.53 in September before resuming their ongoing rise next year. The scientists already successfully predicted this year's maximum concentration of 407 parts per million last month.

Carbon dioxide concentrations also show modest ups-and-downs with the seasons. Plants draw down CO₂ in the summer and release it again in the autumn and winter. Professor Betts said: "Carbon dioxide at Mauna Loa is currently above 400 parts per million, but would have been expected to drop back down below this level in September. However, we predict that this will not happen now, because the recent El Niño has warmed and dried tropical ecosystems and driven forest fires, adding to the CO₂ rise."

Since natural processes only remove carbon dioxide from the atmosphere gradually, levels will remain high even if human emissions began to decline. Scientists expect the concentrations to now remain above 400 parts per million for at least a human lifetime.

Prof Ralph Keeling of the Scripps Institution of Oceanography, who is a co-author on the paper, said: "Back in September last year, we suspected that we were measuring CO₂ concentrations below 400 parts per million for the last time. Now it is looking like this was indeed the case." The ongoing CO₂ measurements at Mauna Loa used in this study are made by the Scripps Institution of Oceanography, and an independent set of measurements are made by the US National Oceanographic and Atmospheric Administration, which runs the Mauna Loa Observatory.

Chris Jones, also of the Met Office Hadley Centre and another co-author, said: "Studying how these natural cycles interact with human influences is an important part of climate science. Making and testing predictions like this helps us build our understanding and further develop climate models."

Story Source:

The above post is reprinted from materials provided by **University of Exeter**.
Note: Materials may be edited for content and length.

Journal Reference:

- John J. Kennedy et al. **El Niño and a record CO₂ rise**. *Nature Climate Change*, June 2016 DOI: 10.1038/nclimate3063

Cite This Page:

MLA APA Chicago

University of Exeter. "El Nino drives fastest annual increase on record of carbon dioxide." ScienceDaily. ScienceDaily, 13 June 2016.
<www.sciencedaily.com/releases/2016/06/160613130700.htm>.

Share This Page:



Powered by Google



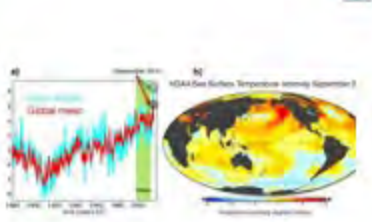
PROMOTED ON [astell.com](#)
Need a New Autoclave?



[sciencedaily.com](#)
High Hormone Levels In Women May Lead To Infide...



PROMOTED ON [elabscience.com](#)
Biotin Labeling Kit



[sciencedaily.com](#)
Warmest oceans ever recorded

NEXT >

Recommended Articles

Carbon dioxide at NOAA's Mauna Loa Observatory reaches new milestone: Tops 400 parts per million
National Oceanic and Atmospheric Administration, ScienceDaily, 2013

Seasonal carbon dioxide range expanding as more is added to Earth's atmosphere
National Science Foundation, ScienceDaily, 2013

Earth absorbing more carbon, even as CO₂ emissions rise
University of Colorado at Boulder, ScienceDaily, 2012

Record global carbon dioxide concentrations surpass 400 parts per million in March 2015
NOAA, ScienceDaily, 2015

Tropical ecosystems regulate variations in Earth's carbon dioxide levels
CSIRO Australia, ScienceDaily, 2013

Long-term relationships among atmospheric CO₂, stomata, and intrinsic water use efficiency in individual trees. [↗](#)

Abraham J Miller-Rushing et al., Am J Bot, 2009

Stomatal frequency responses in hardwood-swamp vegetation from Florida during a 60-year continuous CO₂ increase. [↗](#)

Friederike Wagner et al., Am J Bot, 2005

Stomatal frequency adjustment of four conifer species to historical changes in atmospheric CO₂. [↗](#)

Lenny L R Kouwenberg et al., Am J Bot, 2003

Plant response to a global greenhouse event 56 million years ago. [↗](#)

Scott L Wing et al., Am J Bot, 2013

Disequilibrium vegetation dynamics under future climate change. [↗](#)

Jens-Christian Svenning et al., Am J Bot, 2013

Related Stories

Increased Atmospheric Carbon Dioxide Limits Soil Storage

Apr. 15, 2015 — Soil carbon may not be as stable as previously thought, scientists report, adding that soil microbes exert more direct control on carbon buildup than global climate models represent. This study, ... [read more »](#)



Tropical Ecosystems Regulate Variations in Earth's Carbon Dioxide Levels

July 23, 2013 — Rising temperatures, influenced by natural events such as El Niño, have a corresponding increase in the release of carbon dioxide from tropical forest ecosystems, according to a new ... [read more »](#)



Elevated Carbon Dioxide Concentrations Can Increase Carbon Storage in the Soil

Mar. 5, 2012 — Elevated carbon dioxide concentrations can increase carbon storage in the soil, according to results from a 12-year carbon dioxide-enrichment ... [read more »](#)



Baltic Sea Contributes Carbon Dioxide to the Atmosphere, Study Shows

Oct. 10, 2011 — The Baltic Sea emits more carbon dioxide than it can bind. Local variations have increased the exposure of the Bay of Bothnia. These are the results from a study of how carbon dioxide flows between ... [read more »](#)

See fewer ads and support this site.

Contributor works on millions of sites and all of your devices.



Strange & Offbeat

PLANTS & ANIMALS



Bird Brain? Ounce for Ounce Birds Have Significantly More Neurons in Their Brains Than Mammals or Primates



Relationship Advice from a Gender-Bending Fish That Mates for Life

Why Hierarchy Exists in Biological Networks: New Insight Will Aid Development of Artificial Intelligence



One Snake's Prey Is Another's Poison: Scientists Pinpoint Genetics of Extreme Resistance

EARTH & CLIMATE



Sea Snakes Have Extra Sense for Water Living



Minecraft Tree 'Probably' the Tallest Tree in the Tropics



Underwater 'Lost City' Found to Be Geological Formation

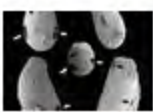


Methane-Producing Microbes in California Rocks

FOSSILS & RUINS



Electric Eels Make Leaping Attacks



Tiny 'Vampires': Paleobiologist Finds Evidence of Predation in Ancient Microbial Ecosystems



New Horned Dinosaur Species With 'Spiked Shield'



Ancient Irish Musical History Found in Modern India

See fewer ads and support this site.

Contributor works on millions of sites and all of your devices.



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