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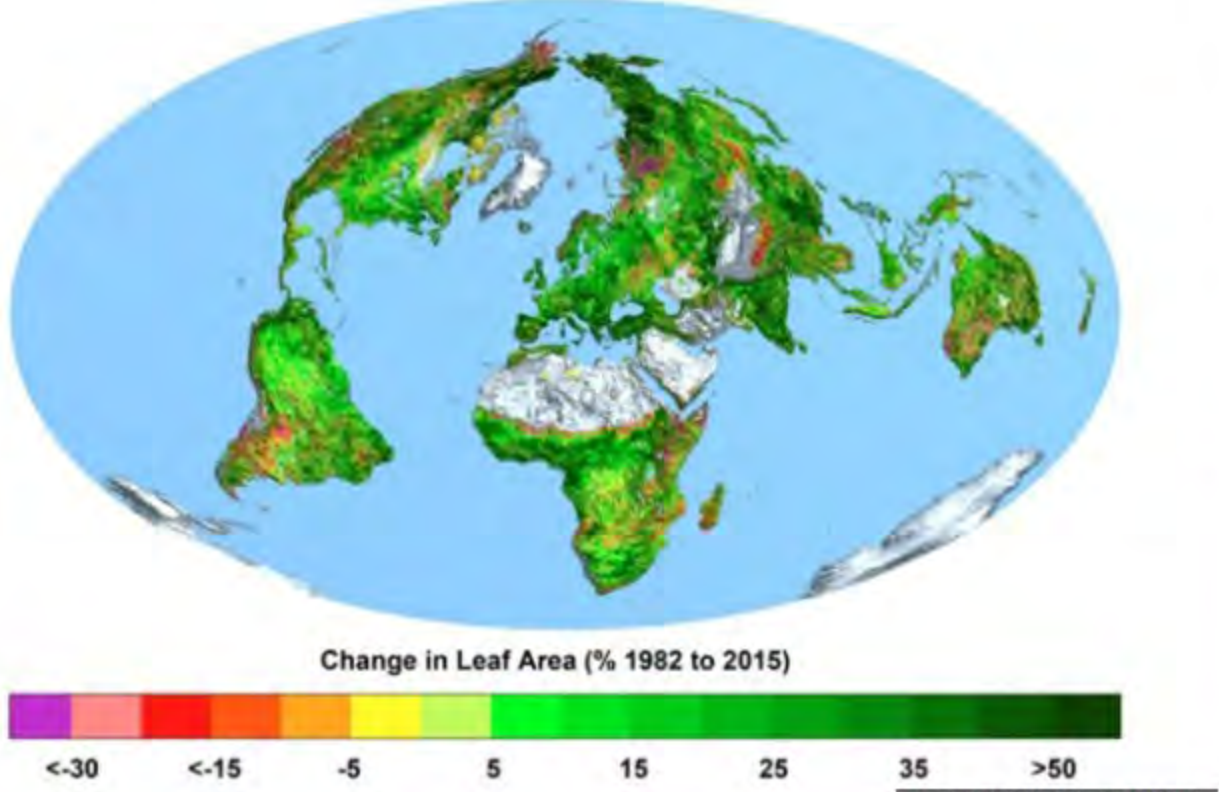
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Rise in CO2 has 'greened Planet Earth'

By Roger Harrabin
BBC environment analyst

25 April 2016 | Science & Environment



Carbon dioxide emissions from industrial society have driven a huge growth in trees and other plants.

A new study says that if the extra green leaves prompted by rising CO2 levels were laid in a carpet, it would cover twice the continental USA.

Climate sceptics argue the findings show that the extra CO2 is actually benefiting the planet.

But the researchers say the fertilisation effect diminishes over time.

They warn the positives of CO2 are likely to be outweighed by the negatives.

The lead author, Prof Ranga Myneni from Boston University, told BBC News the extra tree growth would not compensate for global warming, rising sea levels, melting glaciers, ocean acidification, the loss of Arctic sea ice, and the prediction of more severe tropical storms.

The new study is **published in the journal Nature Climate Change** by a team of 32 authors from 24 institutions in eight countries.

It is called Greening of the Earth and its Drivers, and it is based on data from the Modis and AVHRR instruments which have been carried on American satellites over the past 33 years. The sensors show significant greening of something between 25% and 50% of the Earth's vegetated land, which in turn is slowing the pace of climate change as the plants are drawing CO2 from the atmosphere.

Just 4% of vegetated land has suffered from plant loss.



This is in line with the Gaia thesis promoted by the maverick scientist James Lovelock who proposed that the atmosphere, rocks, seas and plants work together as a self-regulating organism. Mainstream science calls such mechanisms "feedbacks".

The scientists say several factors play a part in the plant boom, including climate change (8%), more nitrogen in the environment (9%), and shifts in land management (4%).

But the main factor, they say, is plants using extra CO2 from human society to fertilise their growth (70%).

Harnessing energy from the sun, green leaves grow by using CO2, water, and nutrients from soil.

"The greening reported in this study has the ability to fundamentally change the cycling of water and carbon in the climate system," said a lead author Dr Zaichun Zhu, from Peking University, Beijing, China.

The authors note that the beneficial aspect of CO2 fertilisation have previously been cited by contrarians to argue that carbon emissions need not be reduced.

Co-author Dr Philippe Ciais, from the Laboratory of Climate and Environmental Sciences in Gif-sur-Yvette, France (also an IPCC author), said: "The fallacy of the contrarian argument is two-fold. First, the many negative aspects of climate change are not acknowledged.

"Second, studies have shown that plants acclimatise to rising CO2 concentration and the fertilisation effect diminishes over time." Future growth is also limited by other factors, such as lack of water or nutrients.



A co-author Prof Pierre Friedlingstein, from Exeter University, UK, told BBC News that carbon uptake from plants was factored into Intergovernmental Panel on Climate Change (IPCC) models, but was one of the main sources of uncertainty in future climate forecasts.

Warming the Earth releases CO2 by increasing decomposition of soil organic matter, thawing of permafrost, drying of soils, and reduced photosynthesis - potentially leading to tropical vegetation dieback.

He said: "Carbon sinks (such as forests, where carbon is stored) would become sources if carbon loss from warming becomes larger than carbon gain from fertilisation.

"But we can't be certain yet when that would happen. Hopefully, the world will follow the Paris agreement objectives and limit warming below 2C."

Nic Lewis, an independent scientist often critical of the IPCC, told BBC News: "The magnitude of the increase in vegetation appears to be considerably larger than suggested by previous studies.

"This suggests that projected atmospheric CO2 levels in IPCC scenarios are significantly too high, which implies that global temperature rises projected by IPCC models are also too high, even if the climate is as sensitive to CO2 increases as the models imply."

And Prof Judith Curry, the former chair of Earth and atmospheric sciences at the Georgia Institute of Technology, added: "It is inappropriate to dismiss the arguments of the so-called contrarians, since their disagreement with the consensus reflects conflicts of values and a preference for the empirical (i.e. what has been observed) versus the hypothetical (i.e. what is projected from climate models).

"These disagreements are at the heart of the public debate on climate change, and these issues should be debated, not dismissed."

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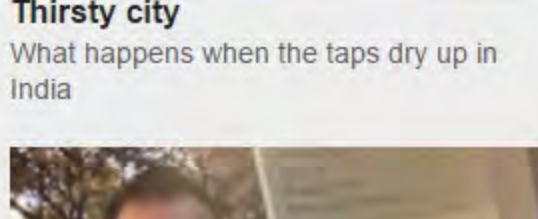
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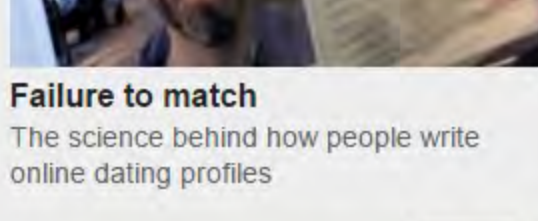
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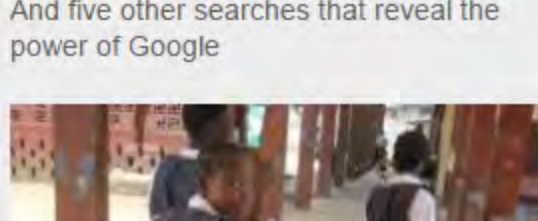
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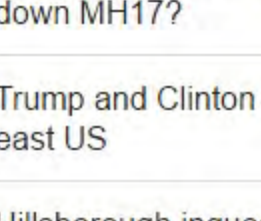
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