

CLIMATE: Is water vapour more important than carbon dioxide?

Polluter retrial appeal demanded by concerned scientists and citizens after the evidence for global warming predictions is deemed to be fundamentally flawed.

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Abstract

Climate change/global warming has occupied considerable public and scientific attention over much of the last two decades. An apparent majority of scientists, politicians, environmentalist lobbyists and the public have deemed greenhouse gases, and especially carbon dioxide, as polluters responsible for plunging planet earth into a climate crisis with dire consequences. The verdict has already been handed down even though the trial is still in progress. All that remains is for the evidence to be selectively collected to vindicate the verdict and justify the concern and considerable expense in saving the planet. The problem is that the broader body of evidence does not support the verdict. The strength and weakness of Science lies in its ability to use data to make predictions. Faulty data that omits or undervalues the contribution of water leads to fundamentally flawed climate change modelling and a retrial is demanded.

How do Greenhouse Gases Work?

Greenhouse gases are the culprits behind the alleged climate change and global warming crisis facing planet earth. Greenhouses work by allowing short wave (ultra-violet and visible) light from the sun to penetrate glass (or plastic) panes. As the light passes through the glass it loses some energy and is converted into longer wave infra-red radiation which cannot easily escape through the glass. This results in a buildup of infra-red radiation and an increase in the temperature within the glass house. Hence gases which contribute to warming of the environment are called greenhouse gases, even though the mechanism for heating is different. The incident solar radiation that is absorbed by the earth is transformed and radiated as infra-red radiation. Without greenhouse gases much of the infra-red radiation would be lost from planet earth. Greenhouse gases absorb some of the radiated infra-red then reradiate it to warm the atmosphere (1,2). (See diagram on next page)

The effective temperature of the earth calculated using the Stefan-Boltzman law is -18°C (4) based on 30% of incident solar ultra-violet and visible radiation being reflected by the earth's surface. The presence of greenhouse gases in the atmosphere raises the earth's temperature by 33°C to a livable average 15°C (2). We should be very thankful to God for greenhouse gases and the natural greenhouse effect, or the earth would be uninhabitable!

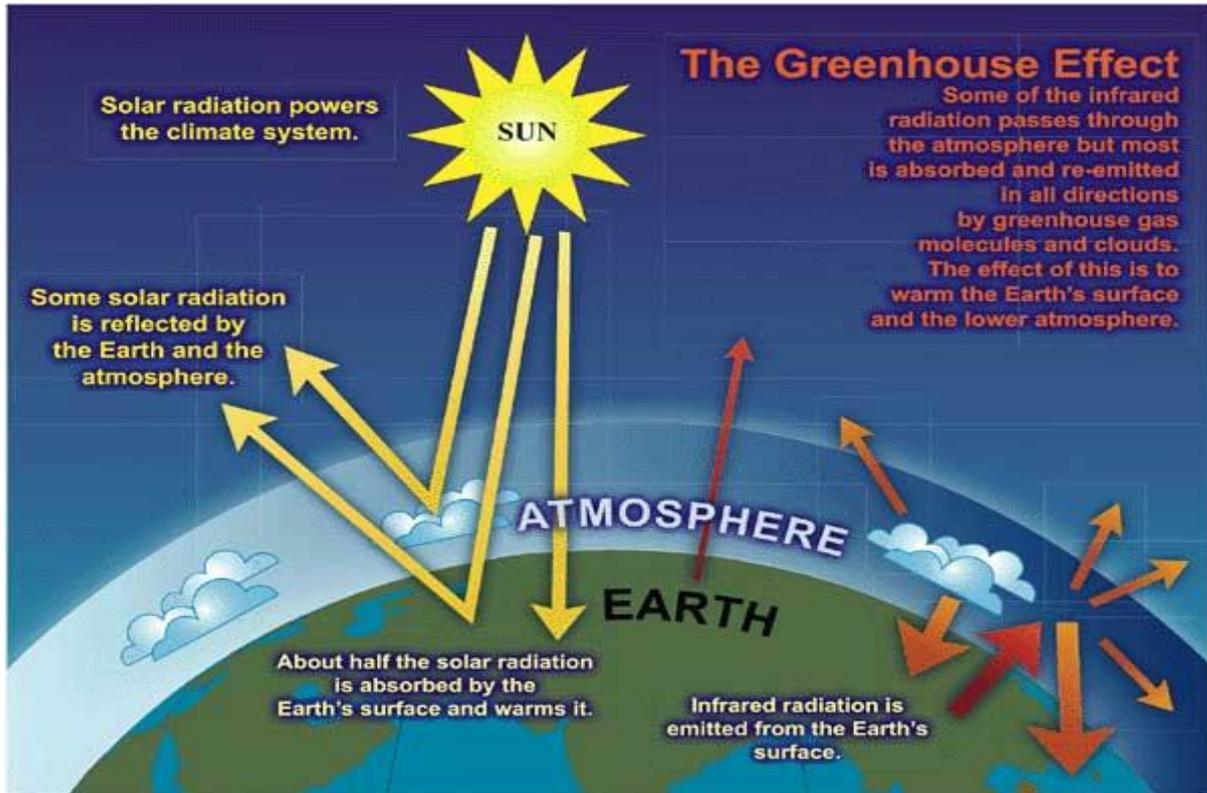


Figure 1: Simplified diagram illustrating the greenhouse effect (2,3)

Greenhouse Gases

The three major greenhouse gas contributors to the heating of the earth's atmosphere are carbon dioxide, methane and water (5). According to Schmidt, "The relative contributions of atmospheric long-wave absorbers to the present-day global greenhouse effect are among the most misquoted statistics in public discussions of climate change" (6). Chemistry textbooks pointed to water contributing about 30°C to overall warming. Schmidt (6) estimates that water contributes 75% (24°C) while Carlson (7) attributes 98% (32°C) of the 33°C of warming. Whatever the real contribution percentages, water is the largest contributor to the natural greenhouse effect followed by carbon dioxide. The lack of reference to water as a greenhouse gas when explaining the greenhouse effect by NASA is deplorable example of deliberate misinformation (8). On a local level we understand the moderating effect of water in the atmosphere on evening temperatures. The difference between cloudless skies over-night and cloudy skies is large with sizable differences in the resultant minimum temperatures due to increased local levels of water in the atmosphere. So why is there so much focus on carbon dioxide when water is the most important greenhouse gas? A sample look at the discussions that occur on a technical level about global temperature influences indicates how complex interactions between greenhouse gases and global temperature are thought to be (9, 10, 11). However, the simple answer is that historical data for carbon dioxide levels can be determined from ice core samples whereas historical water vapour concentrations cannot be measured so they are ignored, presumed to have remained constant. This assumption is not reasonable as places such as Antarctica, the Sahara Desert, Greenland, Iceland and the United Kingdom are commonly known to have been much wetter and more humid at times than they are currently.

The US National Ice Core Lab has published data stating, "Over 400,000 years, and even longer, levels of carbon dioxide (CO₂) have risen and fallen from about 180 parts per million to 280, varying from colder in the Ice Ages to warmer in interglacial periods. Today,

however, for the first time in more than 400,000 years, CO₂ is at 390 parts per million and continuing to rise at 2 parts per million (ppm) per year. Alley relates the onset of this change to the Industrial Revolution” (12). Historic carbon dioxide levels are determined by analysing air bubbles trapped in the ice cores taken mostly from the Antarctic and Greenland. Since the air is trapped in ice it is saturated with water vapour that varies in concentration with temperature and pressure. Ironically, water levels cannot be frozen in ice due to rapid natural exchange occurring between water in the ice and air so no historical variations in atmospheric water levels can be determined via ice cores. The time data is inferred from conductivity levels of the water produced by melting sample ice cores, subject to the presumption that annual cycles can be determined from the data. A simple calculation of the deepest core length of 3.4km divided by the supposed 400,000 years indicates 8.5mm of ice accumulates on average per year. That does not equate well with the approximate 300mm per year indicated by a researcher in a film on the website (12). Even ignoring the timescale problem in the published data, cycles of rising and falling CO₂ levels are evident. The unanswered, but critical question is, “What happened to the levels of water vapour at the same time?” Scientists have no data to answer the question, only presumptions or silence.

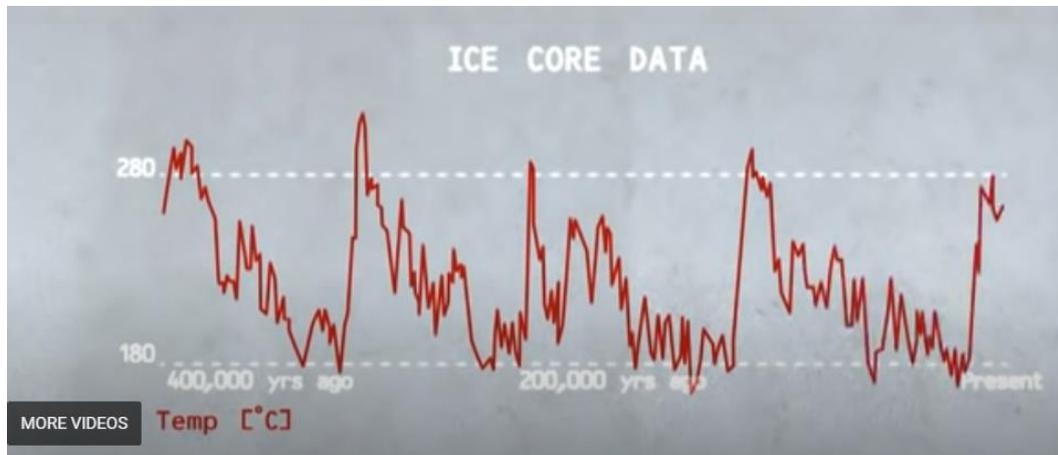


Figure 2: Ice Core Data taken from [About Ice Cores | NSF Ice Core Facility](https://icecores.org/about-ice-cores), <https://icecores.org/about-ice-cores> (12)

Rather than consider the influence of varying water vapour levels on climate, most scientific and media attention is focused on CO₂. That has been cemented with the concept of the **enhanced greenhouse effect** (1,2) which refers to the extra, non-natural (anthropogenic = human caused) addition of heat trapping gases to the atmosphere. According to the Bureau of Meteorology, “These extra greenhouse gases are not 'natural' in origin, and are primarily due to the burning of fossil fuels (coal, oil and natural gas), with smaller contributions from land use changes, such as land clearing. The increased concentrations of greenhouse gases in the atmosphere are contributing to a warming of the earth's surface (1)”. The enhanced greenhouse effect ignores water vapour! According to Britannica, water is the most potent greenhouse gas but carbon dioxide is the most significant greenhouse gas (5). The elaborate discussion about potency versus significance is used to support the focus on carbon dioxide to the exclusion of water (5). However, a NASA article in 2008 confirmed that water vapour is a major component of climate change (13). Another article stresses the contribution of anthropogenic (human caused) water vapour as the major contributor to climate (14).

A Retrial Needed

The strength and weakness of Science lies in its ability to use data to make predictions. Climate scientists utilize computer run climate models to make predictions about the earth's future climate. According to Carbon Brief, "A global climate model typically contains enough computer code to fill 18,000 pages of printed text; it will have taken hundreds of scientists many years to build and improve; and it can require a supercomputer the size of a tennis court to run. The models themselves come in different forms – from those that just cover one particular region of the world or part of the climate system, to those that simulate the atmosphere, oceans, ice and land for the whole planet" (15). Whilst the climate models have become more sophisticated over time, they are totally reliant on CO₂ level data provided from ice cores. Therefore, the modelling can never be accurate because it ignores variations in the most influential greenhouse gas (water vapour). It is claimed that the output from these models drives forward climate science, help scientists understand how human activity affects the Earth's climate, and have underpinned climate policy decisions on national and international scales for the past five decades (15).

Challenging the validity of the popular science behind global warming will not be supported by those who have multi-million-dollar investments in ice core analysis and climate modelling or with others promoting specific change agendas. However, the reality is that the predictions based on climate modelling are so fundamentally flawed that a just law court would have to rescind the guilty verdict and order a retrial.

References

1. Climate Glossary - Greenhouse effect (bom.gov.au), <http://www.bom.gov.au/climate/glossary/greenhouse.shtml>
2. The greenhouse effect | NIWA, <https://niwa.co.nz/our-science/climate/information-and-resources/clivar/greenhouse>
3. Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson and M. Prather, 2007: Historical Overview of Climate Change. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. http://www.ipcc.ch/publications_and_data/publications_and_data_reports.s...
4. Stefan-Boltzmann law | Definition & Facts | Britannica, <https://www.britannica.com/science/Stefan-Boltzmann-law>
5. greenhouse gas | Definition, Emissions, & Greenhouse Effect | Britannica, <https://www.britannica.com/science/greenhouse-gas>
6. Schmidt, G.A., R. Ruedy, R.L. Miller, and A.A. Lacis, 2010: The attribution of the present-day total greenhouse effect. *J. Geophys. Res.*, **115**, D20106, doi:10.1029/2010JD014287
7. (PDF) Climate GHG Max CO2 Calc 29Jul19 (3) (researchgate.net), https://www.researchgate.net/publication/335210185_Climate_GHG_Max_CO2_Calc_29Jul19_3
8. What is the greenhouse effect? – Climate Change: Vital Signs of the Planet (nasa.gov), <https://climate.nasa.gov/faq/19/what-is-the-greenhouse-effect/>

9. [Water Vapour: The Big Wet Elephant In The Room – Watts Up With That?](https://wattsupwiththat.com/2015/10/24/water-vapour-the-big-wet-elephant-in-the-room/), <https://wattsupwiththat.com/2015/10/24/water-vapour-the-big-wet-elephant-in-the-room/>
10. [RealClimate: Water vapour: feedback or forcing?](https://www.realclimate.org/index.php/archives/2005/04/water-vapour-feedback-or-forcing/), <https://www.realclimate.org/index.php/archives/2005/04/water-vapour-feedback-or-forcing/>
11. [ACP - Water vapour adjustments and responses differ between climate drivers \(copernicus.org\)](https://acp.copernicus.org/articles/19/12887/2019/), <https://acp.copernicus.org/articles/19/12887/2019/>
12. [About Ice Cores | NSF Ice Core Facility](https://icecores.org/about-ice-cores), <https://icecores.org/about-ice-cores>
13. [NASA - Water Vapor Confirmed as Major Player in Climate Change](https://www.nasa.gov/topics/earth/features/vapor_warming.html), https://www.nasa.gov/topics/earth/features/vapor_warming.html
14. [The Role of Water Vapor in the Earth's Climate \(sisu.edu\)](https://www.sjsu.edu/faculty/watkins/watervapor01.htm), <https://www.sjsu.edu/faculty/watkins/watervapor01.htm>
15. [Q&A: How do climate models work? | Carbon Brief](https://www.carbonbrief.org/qa-how-do-climate-models-work), <https://www.carbonbrief.org/qa-how-do-climate-models-work>