A Skeptics View of Global Warming 'Science' Questioning the CAGW* hypothesis

* Catastrophic Anthropogenic Global Warming (global climate destruction caused by human emissions of greenhouse gasses)

Leonard Weinstein LAA, January 2016

Chronology

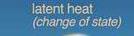
- James Hansen talked to congress 1988. He blames CO₂ for warming, starts major global warming interest.
- My interest started with Hansen's presentation and I initially accepted claims.
- My in depth review of literature, IPCC reports, and others sources led to my skepticism, which became very strong by early 2002.
- I posted two blogs on "The Air Vent" with my analysis May 19 & 21, 2009. The blogs were reposted on other sites and widely commented on.
- Climategate occurred November 2009 showed flaws in presented claims and bias of several climatologists that dominated the IPCC process.
- 2015: COP21 –World leaders agree to stop global warming by reducing CO2 production. They also propose taking money from rich nations and giving it to the poor nations to compensate them for damages.







The Earth's energy budget describes the various kinds and amounts of energy that enter and leave the Earth system. It includes both radiative components (light and heat), that can be measured by CERES, and other components like conduction, convection, and evaporation which also transport heat from Earth's surface. On average, and over the long term, there is a balance at the top of the atmosphere. The amount of energy coming in (from the sun) is the same as the amount going out (from reflection of sunlight and from emission of infrared radiation).



atmospheric

window

40.1

evapotranspiration

86.4

Loeb et al., J. Clim. 2009 Trenberth et al., BAMS, 2009

NP-2010-05-265-LaRC

All values are fluxes in Wm2 and are average values based on ten years of data

0.6

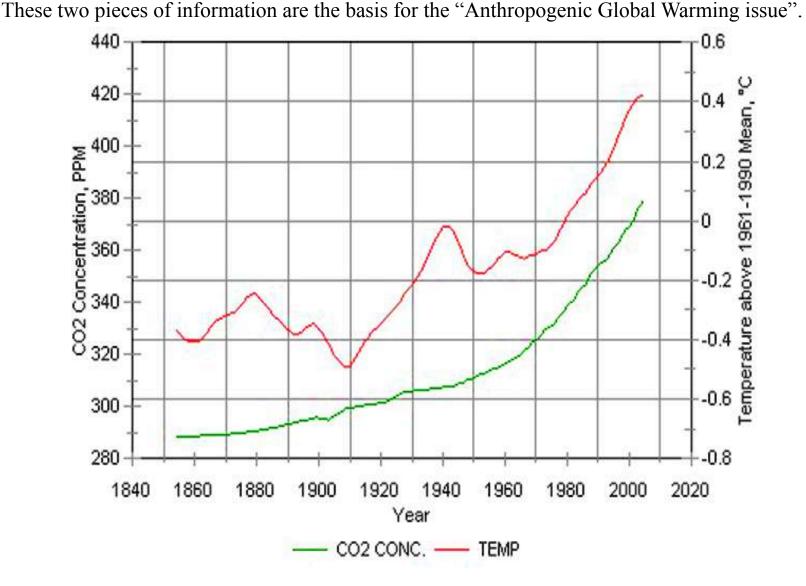
The Issue

It is not obvious what an ideal temperature and CO₂ level should be for mankind. We tend to assume that the average of whatever has occurred in the recent past is the ideal level, since we have adjusted to that level, and changes from that level can cause disruptions in living conditions and activities. Significant temperature and CO₂ increases in recent years have raised the issue of whether these were possibly related and were due to human activity, and whether this is a potentially significant problem.

The increase in CO_2 level seems to be mainly due to increasing use of fossil fuels along with extensive deforestation. It is likely that this level will continue to increase as long as large amounts of the fossil fuel continue to be used.

Earth's temperature has only been directly measured at enough locations to give a reasonably accurate global average for about the last 150 years, with the greatest accuracy (from satellites) only going back about 37 years. The "reliable" CO₂ background level has only been directly continuously measured at one location (Mauna Loa) for about 58 years, and at a much larger number of locations for about 38 years. Some other direct and indirect CO₂ measurements were made prior to 58 years ago, and the measurements thought to be most reliable were used to extend the CO₂ curve back to 1850.

The figure below is a commonly used figure to show smoothed global variations of the temperature and CO_2 concentration data from 1850 through 2000 AD. This data indicates the Earth's surface has warmed about 0.78 °C (1.4 °F) and the atmospheric CO_2 appears to have increased by over 30%.



Fossil Fuels

"For thousands of years only a small fraction of mankind lived well while the rest faced poverty, filth, hunger and disease. That has all changed over the past century and half, thanks to the use of fossil fuels. The benefits of low-cost and abundant energy from fossil fuels have permitted a standard of living for much of mankind that exceeds the wildest dreams of past elites. Today China, India and other developing countries are lifting hundreds of millions of people out of deprivation by the greater use of fossil fuels. In spite of these clear benefits, a *Cult of an Imminent Apocalypse* has emerged that demonizes use of fossil fuels and also anyone who questions the dogma that a near-term **climate apocalypse** is upon us. "

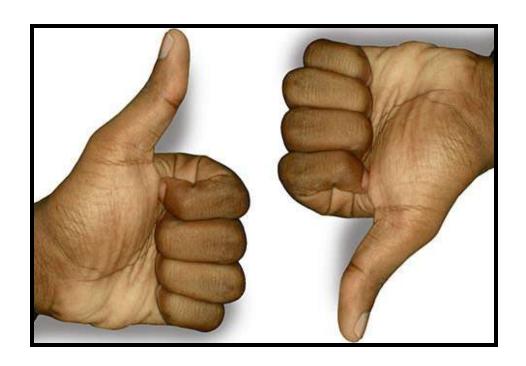
"Fossil fuels must be used responsibly, deploying technologies that minimize emissions of fly ash, oxides of sulfur and nitrogen, ozone, and heavy metals. However, for several decades members of this **Cult (alarmists)** have mounted a vigorous, extensive and expensive propaganda campaign to demonize CO_2 . At current atmospheric CO_2 levels of about 400 parts per million, the Earth remains in a low CO_2 state compared to levels of 2000 parts per million or higher that have prevailed over most of the time since the Cambrian period, some 550 million years ago. The world has already shown noticeable "greening" because plants are growing better due to the modest increases of atmospheric CO_2 seen over the past century."

Scientists Agree:



- Temperatures have increased since 1850
- CO2 has increased since 1850
- CO2 is an infrared warmer
- •With no +/- feedbacks, $2x \text{ CO2} \rightarrow 1.1^{\circ}\text{C}$ increase (~2°F)

Skeptics Disagree On:



- •If there really is a problem
- Consequences of proposed solutions

- How much T has risen
- •T increase due to CO2
- •T increase due to urbanization
- Nature's Influence
- Model Representation
- Projected Warming Trend
- Climate sensitivity
- Integrity of Data
- Extreme-weather correlation

The Feedback Issue

The CO₂ increase alone only causes a small temperature increase per doubling, so the main disagreement between alarmists and skeptics is about the feedback.

The main greenhouse gas is water vapor. The claim is made by the alarmists that the small increase in temperature from increased CO_2 causes more water vapor to be held in the atmosphere*, which causes more temperature increase, which feeds back for more increase, until a net gain of about 3 times the temperature increase due to the CO_2 alone is reached.

(* Clausius-Clapeyron equation: used to estimate the saturated water vapor pressure, which increases rapidly with increasing temperature.)

However, in real physical systems, the feedbacks generally tend to limit increases*. Otherwise any small perturbation would tend to lead to instability, and extreme conditions.

(* Le Châtelier's principle: When a system at equilibrium is subjected to change in concentration, temperature, volume, or pressure, then the system readjusts itself to (partially) counteract the effect of the applied change and a new equilibrium is established.)

Why Pay Attention to Skepticism, Isn't the Issue Settled?

"It might be of interest to know that skepticism has historically fueled forward movement of scientific discovery. Conversely, certainty has squelched it. Certainty entrenches paradigms. Examples dot history of paradigms kept on life support with increasingly complicated constructs to explain phenomena or occurrences inconsistent with hypothesized dynamics and behavior. New evidence reveals surprises – those "unknown unknowns". Ironically, those most educated in a field often are not the ones in history to have revolutionized thought. Laypersons and scientists of different specialties often were the ones who "saw" what was hidden from the hardened mental filters of those overly invested in a paradigm's survival. Skepticism has gotten a bad rap in recent years. Instead, it should be embraced. It is skepticism – not conformity – that provides the checks and balances to humans' tendency to see the expected."

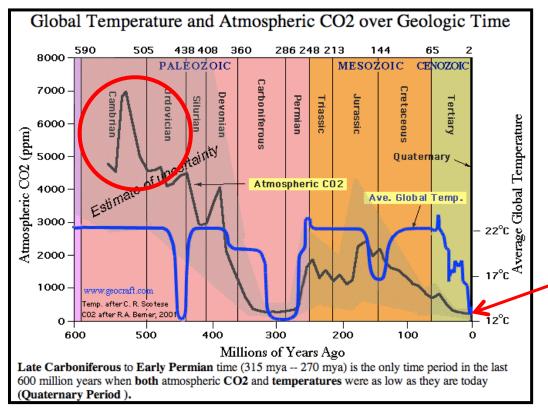
Physics Nobel Laureate, Richard Feynman: "If it disagrees with experiments, it's wrong." In that simple statement is the key to science. Experiments—observations—do not support the "Cult of an Imminent Apocalypse" guesses.

Proxy Temperature Data Background

- •Examples of proxies include geological strata data, ice cores, sub-fossil pollen, ocean and lake sediments, carbonate speleothems, corals, written historical comments and drawings.
- •Tree rings have been used, but generally proved unreliable.

Looking back 600 million years

Atmospheric Carbon Dioxide was likely 18 times today's concentration, during the Cambrian period when life's diversity was at its greatest expansion (red circle). It was 4 times the current level when the dinosaurs were killed by an asteroid. The only other extended time CO2 was low, (like today) was a period 300 million years ago.



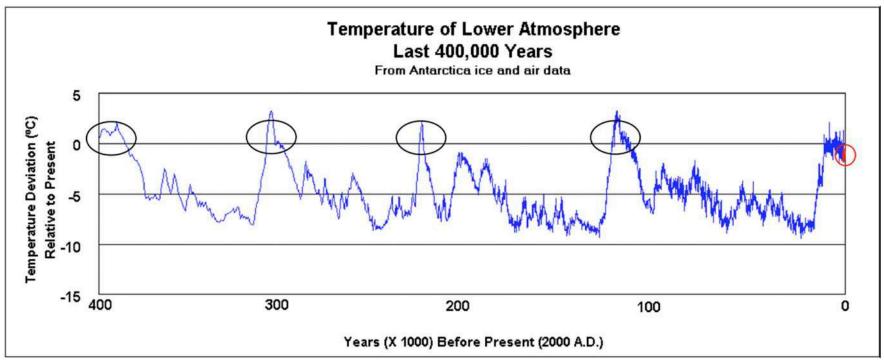
In the big picture we are now in a **low** CO_2 period. The 20th century increase shows as an insignificant dot at this scale.

Now

More Recent Global Temperature Data Looking Back 400,000 years

The current, 11,000-year non-glacial warm period is the longest running and the **COLDEST** one in the last half million years. The four previous interglacial warm periods were all **warmer** than the current one (data in the black ovals).

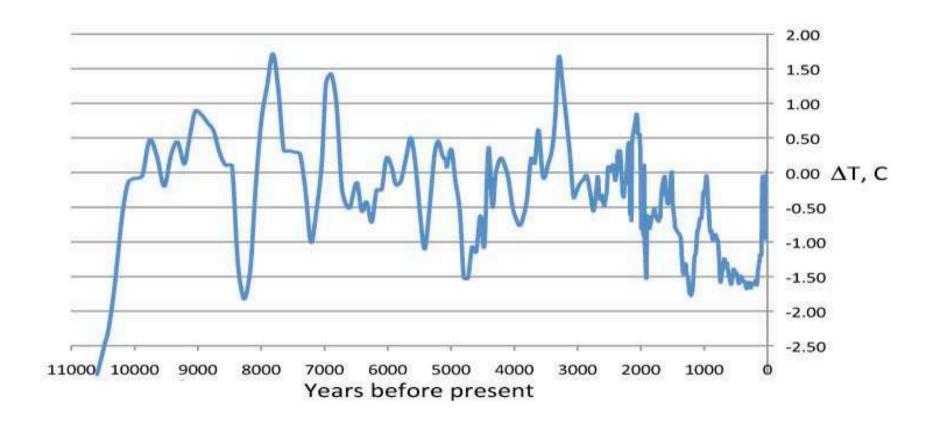
The recent 1,000 years' temperatures were completely **normal** (red line)



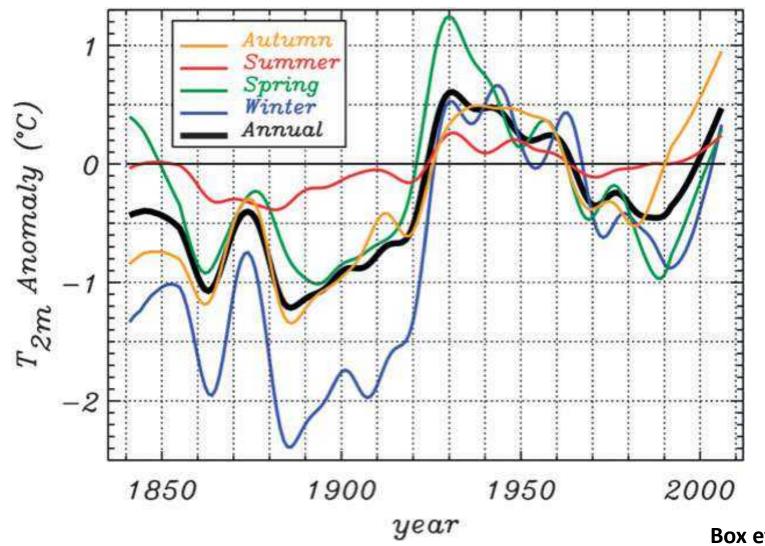
Remember; recent CO_2 increase **is** unusual, but **not** global temperature – indication that emissions are **not** the main driver of Global Warming.

The Greenland ice core data (plus recent temperatures used to update to present)

Today's climate is not even close to being the "warmest on record"

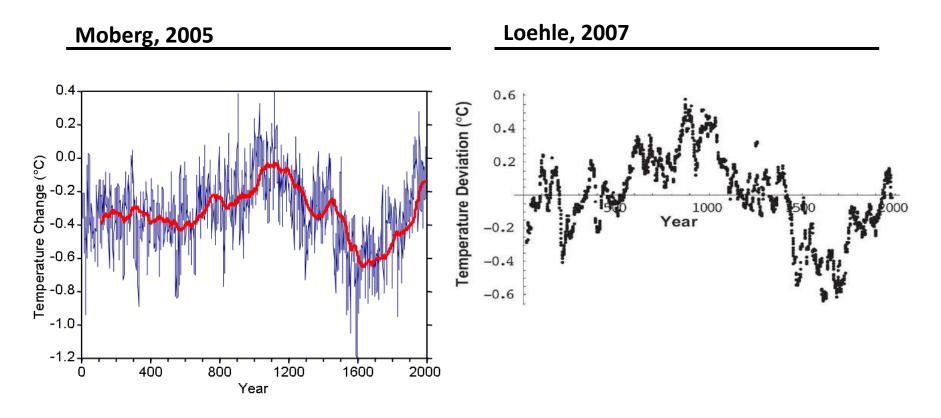


Greenland Ice Sheet Temperatures By No Means Unprecedented



Not to mention the Viking experience – Called Greenland not Glacierland

Proxy Studies Over Last 2000 Years Show Global Average Temperatures



Medieval Warm Period, Little Ice Age, and Temperatures Today That

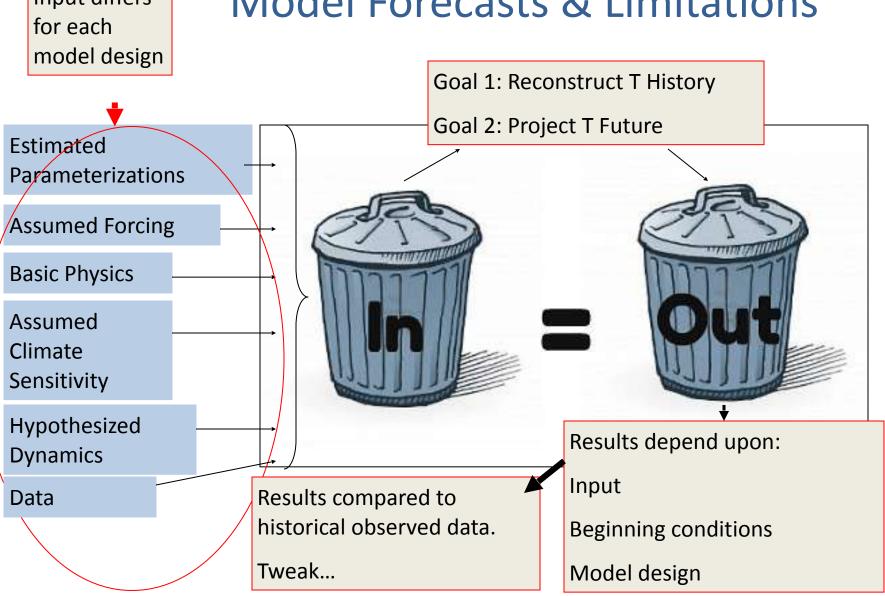
Are Not Unprecedented

Using Computer Models to Predict Future Climate Changes

Engineers and Scientists know that you cannot merely extrapolate data that are scattered due to chaotic effects. So, scientists propose a hypothesis, model it to predict and then turn the dials to match the model to the historic data. They then use the model to predict a likely future.

Input differs

Model Forecasts & Limitations



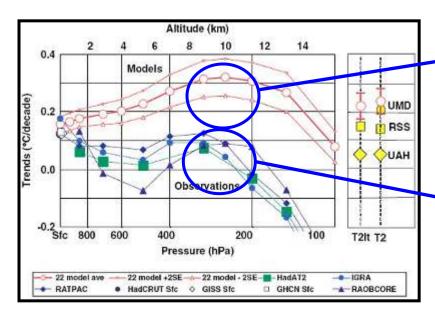
One Problem With Greenhouse Warming Models

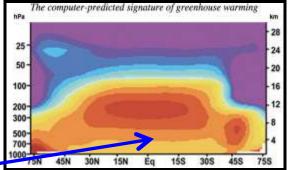
The character and distribution of the warming in the atmosphere (as measured) is dramatically different than predicted by the climate computer models. This brings the model's assumptions into question. How can we rely on the warming predictions, if the models **incorrectly** predict atmosphere warming?

Model predicts hot spot at 8 to

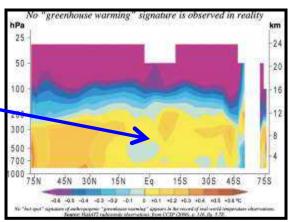
13 km for mid latitudes

Models show warming rate (deg C per decade) at 4 to 14 km altitude, while measurements show rate is flat to 10km, then cool above.



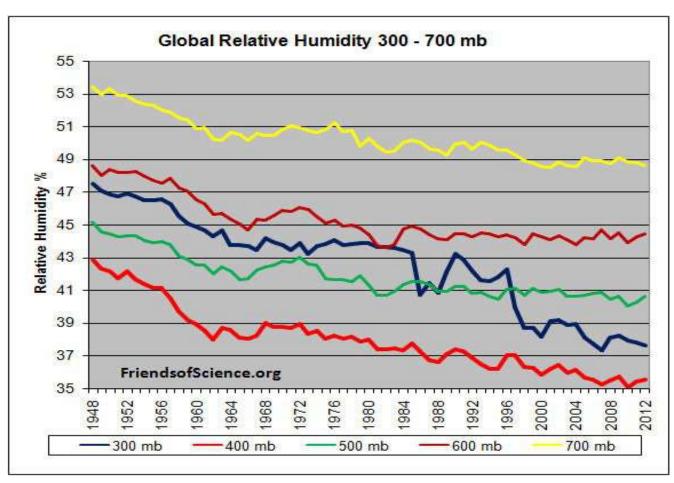


But, the atmosphere does **not** warm at 8 to 13 km altitude

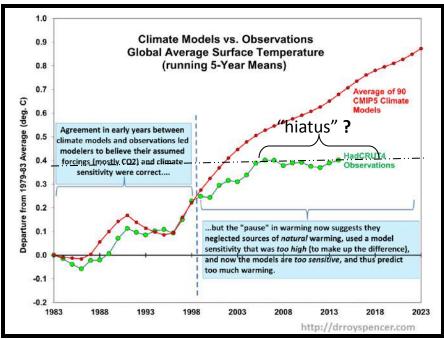


Declining Humidity Is Defying Global Warming Models

Relative humidity has substantially declined in recent decades, defying global warming computer models predicting higher amounts of atmospheric water vapor that will exacerbate global warming. The decline in relative humidity indicates global warming will be much more moderate than claimed by global warming activists.



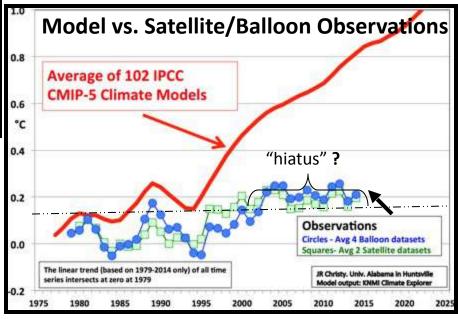
Comparing Data: Model vs. Surface & Troposphere

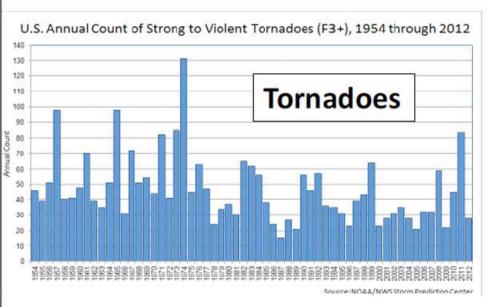


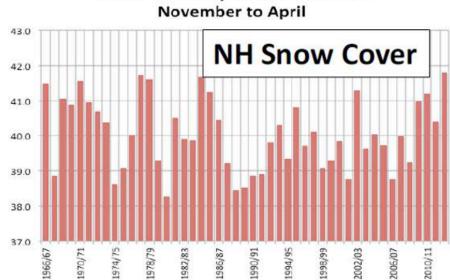
<u>Divergence</u> between satellite-derived and surface T anomalies

Modeled "Average" T-trend Different from all other T records

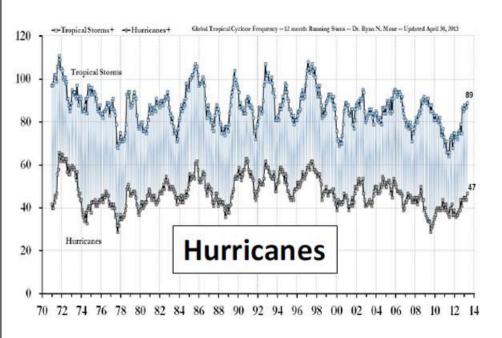
<u>Divergence</u> between model and observed T anomalies (Ta)

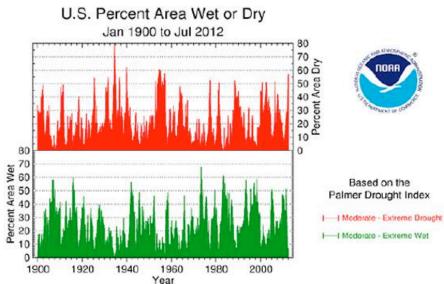






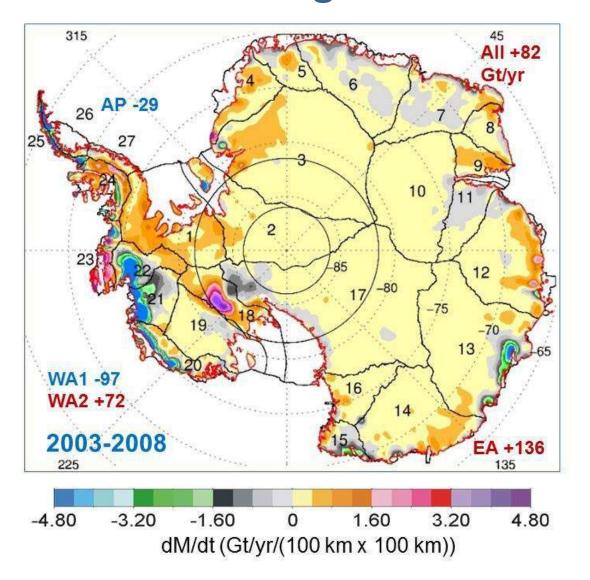
Northern Hemisphere Snow Extent





National Climatic Data Center / NESDIS / NOAA

Ooops! New NASA study: Antarctica isn't losing ice mass after all!

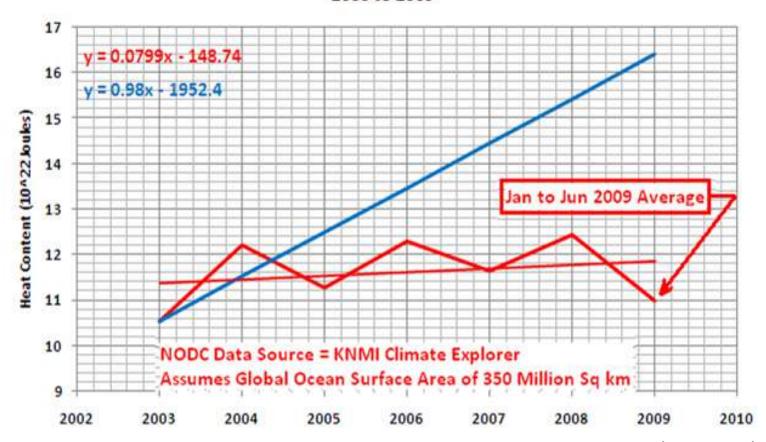


Is the Heat Hiding? Ocean Heat Content Hasn't Risen

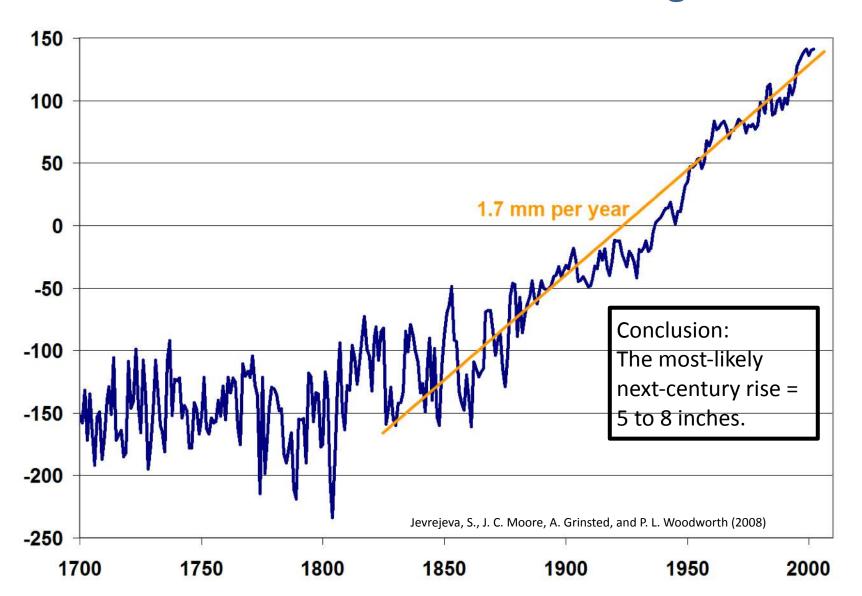
Annual Ocean Heat Content (0-700m) & Linear Trends

NODC (Levitus et al 2009) Through KNMI vs GISS Projection

2003 to 2009

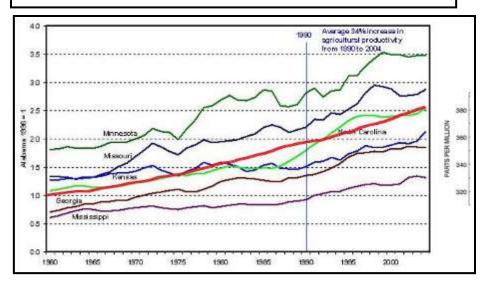


Sea Levels Have Risen At A Fairly Constant Rate Since the Little Ice Age



Agricultural productively increased an average of 34% from 1990 to 2004. Much of that increase was due to the increase in atmospheric CO₂.

Plants need less water, with more CO₂.



A claim:

Many people are alive today, who wouldn't be, if carbon dioxide had not risen in the last century.

A Pollutant? No, CO₂ is critical for life

A doubling of CO₂ would greatly improve crop yields & forest growth. Decreasing CO₂ to half the current % would be catastrophic (plants die, humans starve.

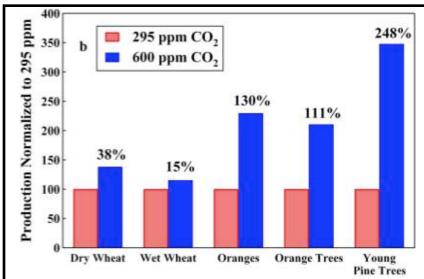
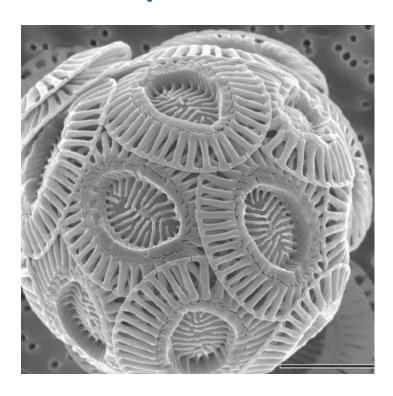


Figure 24: Calculated (1,2) growth rate enhancement of wheat, young orange trees, and very young pine trees already taking place as a result of atmospheric enrichment by CO₂ from 1885 to 2007 (a), and expected as a result of atmospheric enrichment by CO₂ to a level of 600 ppm (b).

Rising Carbon Dioxide Causes Rapid Growth of Coccolithophores in the Ocean



There's something strange happening in the world's oceans due to an excess of carbon dioxide. Plankton is, apparently, growing rapidly in spite of scientific predictions.

"What is worrisome is that our result points out how little we know about how complex ecosystems function."

They Said it Was Hot:

The Arctic Ocean is warming up, icebergs are growing scarcer and in some places the seals are finding the water too hot.... Reports from fishermen, seal hunters and explorers all point to a radical change in climate conditions and hitherto unheard-of temperatures in the Arctic zone... Great masses of ice have been replaced by moraines of earth and stones. At many points well-known glaciers have entirely disappeared. Very few seals and no white fish are found in the eastern Arctic, while vast shoals of herring and smelts, which have never before ventured so far north, are being encountered in the old seal fishing grounds.

America in longest warm spell since 1776; temperature line records a 25 year rise.

A mysterious warming of the climate is slowly manifesting itself in the Arctic, engendering a "serious international problem," -

They Said it Was Hot:

1920s-1940s

Washington Post 11/2/1922 -

The Arctic Ocean is warming up, icebergs are growing scarcer and in some places the seals are finding the water too hot.... Reports from fishermen, seal hunters and explorers all point to a radical change in climate conditions and hitherto unheard-of temperatures in the Arctic zone... Great masses of ice have been replaced by moraines of earth and stones. At many points well-known glaciers have entirely disappeared. Very few seals and no white fish are found in the eastern Arctic, while vast shoals of herring and smelts, which have never before ventured so far north, are being encountered in the old seal fishing grounds.

New York Times 3/27/1933 -

America in longest warm spell since 1776; temperature line records a 25 year rise.

New York Times <u>May 30, 1947</u> -

A mysterious warming of the climate is slowly manifesting itself in the Arctic, engendering a "serious international problem," -

Then They Said it Was Cold:

The United States and the Soviet Union are mounting large-scale investigations to determine why the Arctic climate is becoming more frigid, why parts of the Arctic sea ice have recently become ominously thicker and whether the extent of that ice cover contributes to the onset of ice ages.

"There is very important climatic change (Global Cooling) going on right now, and it's not merely something of academic interest. It is something that, if it continues, will affect the whole human occupation of the earth – like a billion people starving. The effects are already showing up in a rather drastic way."

Consensus: Global cooling is upon us... It is a cold fact: that global cooling presents humankind with the most important social, political, and adaptive challenge we have had to deal with for 10,000 years."

Then They Said it Was Cold:

1970s

New York Times –July 18, 1970 :

The United States and the Soviet Union are mounting large-scale investigations to determine why the Arctic climate is becoming more frigid, why parts of the Arctic sea ice have recently become ominously thicker and whether the extent of that ice cover contributes to the onset of ice ages.

• <u>Fortune Magazine – February 1974</u>:

"There is very important climatic change (Global Cooling) going on right now, and it's not merely something of academic interest. It is something that, if it continues, will affect the whole human occupation of the earth – like a billion people starving. The effects are already showing up in a rather drastic way."

Lowell Ponte (science writer: The Cooling 1976):

Consensus: Global cooling is upon us... It is a cold fact: that global cooling presents humankind with the most important social, political, and adaptive challenge we have had to deal with for 10,000 years."

Then They Said it Was Hot Again and a Near Term Climate Apocalypse is Upon Us: 1978-1998

Then Additional Heating Stopped:

1998-present (2016)

The Pause lengthens



Final Thoughts and Concluding Remarks

Greenhouse CO₂ Effect is, at most, a **minor** player in global warming

- NONE of the dozens of computer models predicted the last decades of flat temperature. Excuses and dial-tweaks were made after the fact.
- The important climate thermostats are too chaotic to model:
 - Precipitation and Cloud formation; A <2% precipitation change more than offsets a **doubling** of CO₂, but rain and clouds are too chaotic to model, even short term.
 - The Pacific heat vent; observed and powerful, but cannot be modeled. It is also a stable, temperature control thermostat.
 - Variation in Ocean Currents; Transports low latitude heating to higher latitudes, but varies over time.
- Water vapor is the primary greenhouse gas, overwhelming CO₂, but does not show the expected positive feedback.

Some Final Thoughts

We know from many records that significant changes in temperature and climate have frequently occurred through historical as well as Geological time periods, and often result in significant consequences. Previous interglacial periods tended to last 8,000 to 12,000 years, and in fact most did not have temperatures as slow changing as the present one. Since the present interglacial reached the plateau about 11,000 years ago, we probably should be more concerned with a possible impending glacial period than a fraction of a degree or so of warming. In fact, the best possible outcome would be that the small contribution from AGW might help delay the onset of the glacial phase.

Is the debate over? "It is **error** only, and not **truth**, that shrinks from inquiry." The present manmade catastrophic global warming scare only exists in the minds of grant-seeking scientists and academics, ratings-obsessed media and opportunistic eco/political-activists.

Concluding Remarks

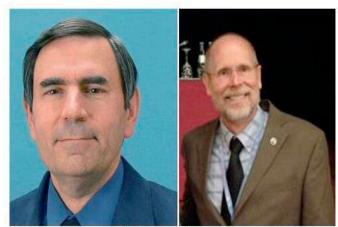
- Climate Change is real. The earth has been warming since the "Little Ice Age", but the warming has likely been mainly from natural variation.
- The alarmist's agenda is supported with failed science claims. In spite of recent, human-caused atmospheric CO₂ increases, there is nothing out of the ordinary happening with our climate.
- Fossil fuel use adds to the level of an important trace gas, that is not only beneficial, but is the essence of life itself.
- We cannot burn fossil fuels to prevent the next glacial age; the added CO₂ greenhouse gas effect is far too weak for that. However, it may delay it slightly.
- Current fuels will become naturally constrained by cost as they become scarce. Government activity is **not** required.
- If Man, in the future, achieves a capability to change global temperatures, he
 will likely use that technology to warm the planet, not to cool it.

Extra Slides

Dissent in the climate ranks over Karl's "pause buster" temperature data tweaking

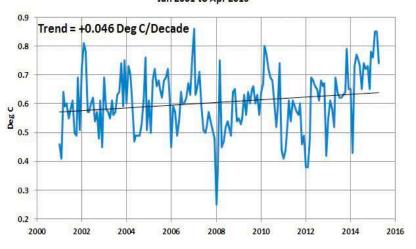
Despite attempts to erase it globally, "the pause" still exists in pristine US surface temperature data

NCDC/NCEI's Karl and Peterson refuse congressional subpoena on flawed 'pausebuster' paper



Thomas Karl, Director NCEI/NCDC Thomas Peterson, NCEI/NCDC

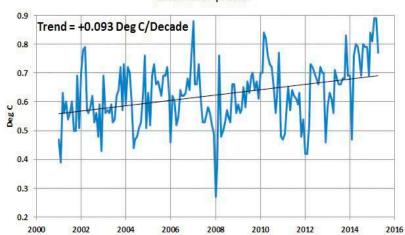
Former Data NCEI Monthly Global (Land and Ocean) Surface Temperature Anomalies Jan 2001 to Apr 2015



New Pause-Buster Data

NCEI Monthly Global (Land and Ocean) Surface Temperature Anomalies

Jan 2001 to Apr 2015



Economic Effect of Possible Global Warming

Opening statement in the Executive Summary of IPCC AR5 WGII Chapter 10:

For most economic sectors, the impact of climate change (for warming of 3° C or less) will be small relative to the impacts of other drivers (*medium evidence*, *high agreement*). Changes in population, age, income, technology, relative prices, lifestyle, regulation, governance, and many other aspects of socioeconomic development will have an impact on the supply and demand of economic goods and services that are large relative to the impact of climate change.

Not only will these other factors have a bigger impact on our socioeconomic wellbeing, they will be <u>much</u> bigger.

A Few of the Many Skeptics of CAGW:

Richard S. Lindzen (Climatologist Professor MIT)

Frederick Seitz (Former Head of the NAS and Rockefeller U)

Michael Griffin (Former NASA Administrator)

Harrison Schmitt (Astronaut, Senator)

Buzz Aldrin (Astronaut)

Walter Cunningham (Astronaut)

Burt Rutan (Engineer, Innovator, Environmentalist)

Edward Teller (Physicist)

Freeman Dyson (Physicist/Futurist)

Hendrik Tennekes (Former Director Royal Dutch Meteorological Institute)

William Gray (Professor Atmospheric Science CSU)

John H. Christy (U of Alabama & State Climatologist)

Roy Spencer (Climatologist U of Alabama & Satellite expert)

Ivar Giaever (Nobel Prize Physicist)

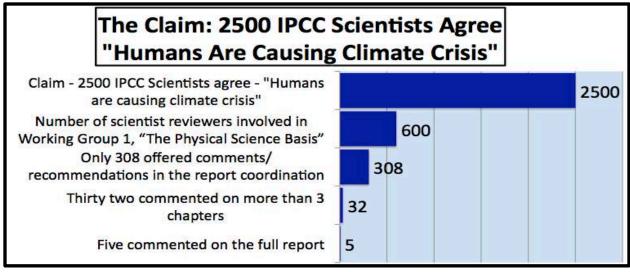
Hal Lewis (Physicist)

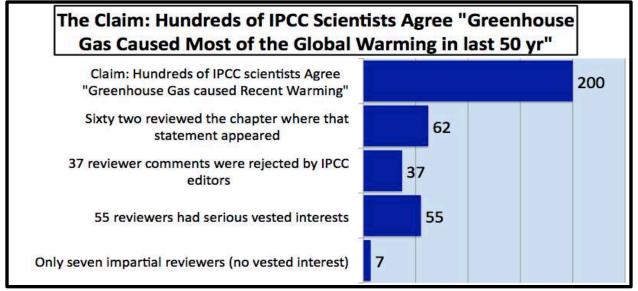
Patrick Moore (Early Greenpeace Major Player)

James Lovelock (Environmentalist)

Scientist Consensus?

Under pressure, the UN released the comments and recommendations of its in-house scientist reviewers who coordinated the drafts of the latest IPCC report. This is what it revealed.





Scientist Consensus? (2)

Of the seven IPCC impartial scientists that coordinated and commented on the statement that "human greenhouse gas caused the recent warming", two of them accepted interviews:

- 1.Dr Ross McKitrick University of Guelph: "A categorical summary statement like this is **not supported by the evidence** in the IPCC WG-I report"
- 2. Dr Vincent Gray of New Zealand: "Typical IPCC doubletalk...The text of the IPCC report shows that this is **decided by a guess** from persons with a conflict of interest, not from a tested model"

Quote of the month: "I'm sticking with the 2,500 scientists"

Carol Browner, Director of the White House Office of Energy and Climate Change Policy

Scientist Consensus?

Petition signed by 31,000 scientists, 9,100 with PhDs

"There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth" www.petitionproject.org/index.php

The Manhattan Declaration Endorsed by scientists in 40 countries

"Attempts by governments to legislate costly regulations on industry and individual citizens to encourage CO2 reduction will slow development while having no appreciable impact on the future trajectory of global climate change. Such policies will markedly diminish future prosperity and so reduce the ability of societies to adapt to inevitable climate change, thereby increasing, not decreasing human suffering."

www.climatescienceinternational.org/

Meteorologists Reject U.N.'s Global Warming Claims

Small minority of AMS members agree with AMS Position Statement.

24% agree that "Most of the warming since 1950 is likely human-induced"

19% agree that "Global Climate Models can reliably predict"

 $http://www.heartland.org/publications/environment \%20 climate/article/26794/Meteorologists_Reject_UNs_Global_Warming_Claims.html$

Back To The Dark Ages: Top French Weatherman Fired Over Climate Change Book

From: France 24, 1 November 2015 (h/t to The GWPF)

A popular weatherman announced Saturday evening he has been sacked by leading French news channel France Télévisions for publishing a book which accused top climate change experts of misleading the world about the threat of global warming.

Philippe Verdier, a household name in France for his daily weather reports on the France 2 channel, announced in an online video that he had received a letter of dismissal.



"My book 'Climate Investigation' was published one month ago. It got me banned from the air waves," said the weatherman, who was put "on leave" from the TV station on October 12.

"I received this letter this morning and decided to open it in front of you because it concerns everybody- in the name of freedom of expression and freedom of information."

De Telegraaf

Sacked KNMI Director wiped the floor with the climate know-it-alls as early as the 1990's

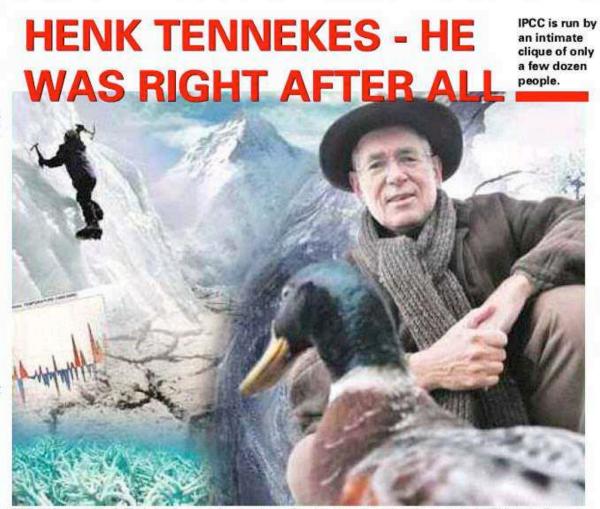
agged! Thrown out on the street! In the nineties, Henk

Tennekes was made to clear his desk and resign as Director of the KNMI (Dutch Meteorological Institute).

His sin? In a newspaper column the world-renowned meteorologist had disproved all the bold claims about climate change.

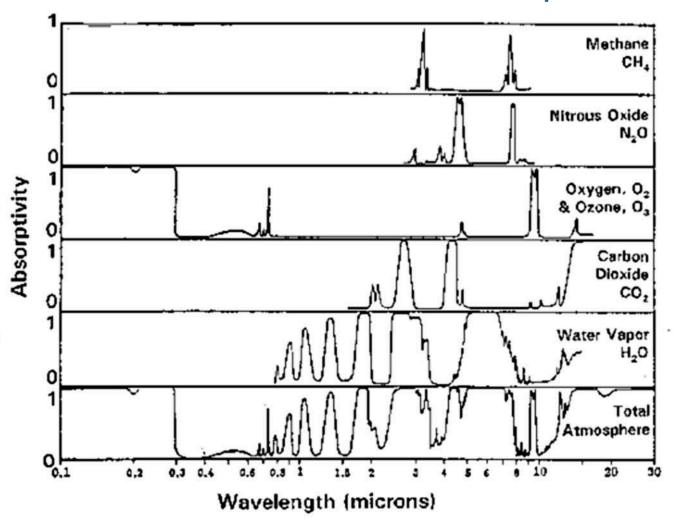
Swearing in high places! And in the meantime, "hard proof" for the greenhouse effect evaporated.

After all the scandal surrounding the UN IPCC panel, the sceptics voice can finally be heard. Time for the rehabilitation of Holland's first climate exile?



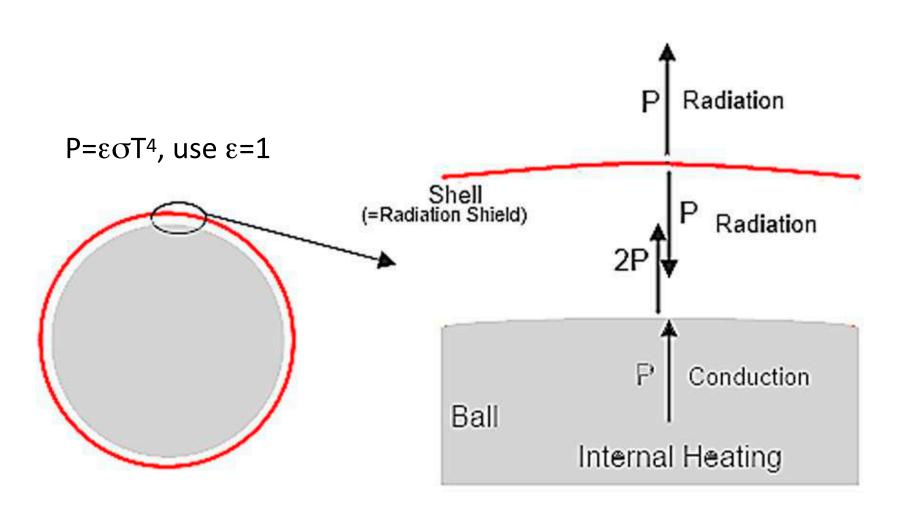
KNMI-director Henk Tennekes has put the cat among the pigeons years ago and was sacked. "Former collegues still avoid me like the plague because I say something different from the group dogma"

Absorption Spectra for Major Greenhouse Gases in the Earth's Atmosphere



[After J. N. Howard, 1959: Proc. I.R.E. 47, 1459; and R. M. Goody and G. D. Robinson, 1951: Quart. J. Roy. Meteorol. Soc. 77, 153]

Radiation Insulation Effect



Atmospheric Greenhouse Effect

Black body radiation with 239.9 W/m² corresponds to a temperature of 254.4 °K The surface radiates 398.2 W/m² corresponds to a black body temperature of 288.7 °K The difference of these temperatures (34.3 °K) is due to the atmospheric greenhouse effect.

A critical additional item for this analysis is the property of the atmosphere called the lapse rate. This is due to the pressure drop with increasing altitude. The effective lapse rate for our atmosphere that include the transport of energy in the form of latent heat of water vapor to the altitudes where it condenses, is about 6.4 ^oK drop per km increase in altitude.

For a lapse rate of 6.4 °K per km altitude, the average altitude where the temperature is 254.4 °K is 5.4 km. Adding more optically absorbing gases would increase the average altitude required before the radiation could escape to space. The increase in effective altitude times the lapse rate is the cause of the increased temperature due to adding of more greenhouse gases.

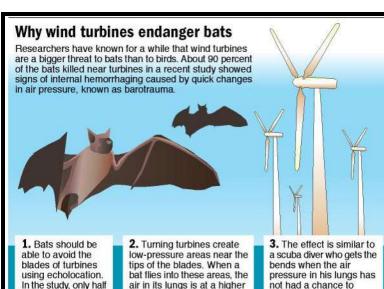
"We Are Now Starting To See A Dramatic Cooling In The Arctic", Says Former NOAA Meteorologist ..." Extremely Cold" From 2025 To 2050!

Many billions are being spent on the completely wrong scenario, an independent veteran meteorologist implies. Instead of warming, we need to worry about the coming cool period, which has already begun. A former National Weather Service (NWS) meteorologist has spoken out in <u>a just released 49-minute video</u> that looks at climate change and what lies ahead.

The recent cold winters and expanding polar ice caps are ominous signs of a global cooling that has already begun, maintains <u>David Dilley</u>, now President and Founder of Global Weather Oscillations, Inc. Claims of warming have not been properly founded.

Dilley has forty-two years of professional experience in the meteorology and climatology and many publications. He was with NOAA for twenty years. Not only is the government wrong with its claims of a coming warming, Dilley accuses the federal government of fiddling with global temperature data with the aim of producing a false picture of what is going on.

Do We Act "Just in Case"?



Sources: Current Biology, National Geographic, Science Daily

pressure than the

surrounding air. It expands

around the lungs. In effect,

the bat's lungs explode.

and can rupture tiny vessels

of the dead bats had

been hit by blades,

and they may have

been hit after they

hemorrhaged.

Press graphic by Tim Faherty

equalize with the pressure at the surface. Birds do not

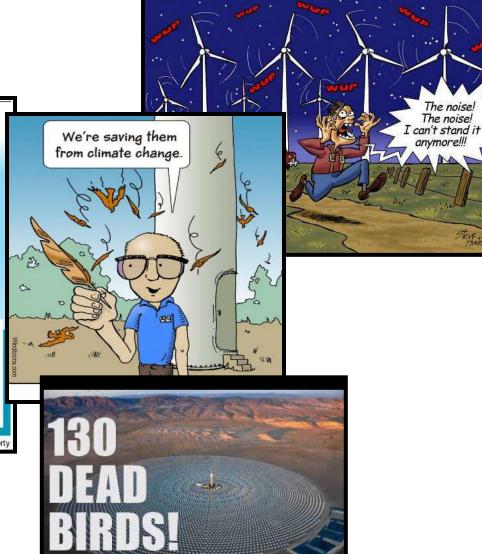
have the same problems.

Their lungs are different

than those of mammals.

Good Intentions
Unintended Consequences

Trade-offs come with all "Solutions"

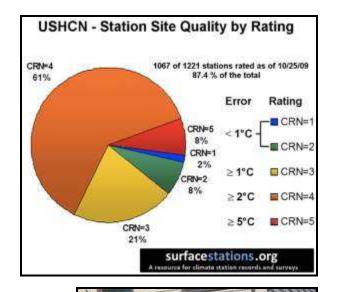


Surface Thermometer Measurement (2)

90% of US sensors do not meet site quality standards.











Air conditioner in window

Tueson AZ

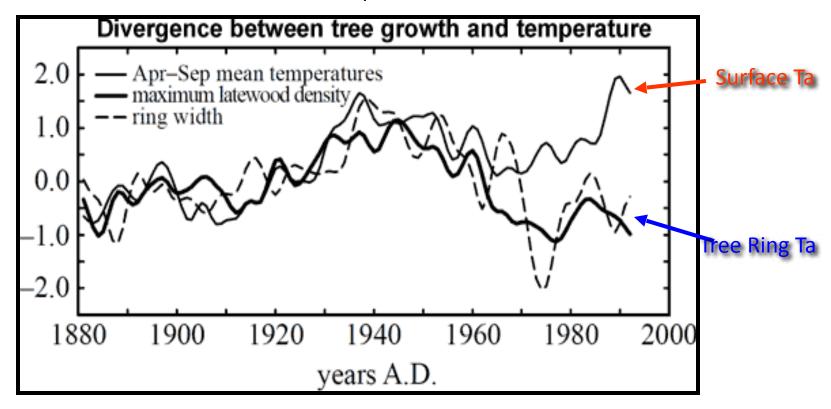
A station at Tocson, AZ, in a parking lot on pavement.

(Photo by Warren Meyer, courtesy of surfacestations.org.)

Local effects, added recently, all bias the temperature higher.

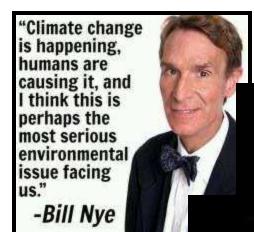
Surface T ≠ Tree-Ring Data:

Summer temperatures



Ta = temperature anomalies

Hard Evidence Must Exist!





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Climate Change Is A Terrible Problem, And It Absolutely Needs To Be Solved. It Deserves To Be A Huge Priority.

(Bill Gates)

"I'm often asked whether
I believe in global warming.
I now just reply with the question:

Do you believe in gravity?"

-Neil deGrasse Tyson

Director, Hayden Planetarium,
American Museum of Natural History





No challenge poses a greater threat to future generations than climate change.

~ President Obama

Charisma Spreads Consensus

And memories are short...



"...we are not just scientists, but human beings... "

"...we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have..."

Stephen Schneider, NCAR, Stanford 1989 interview with Discover Magazine

"We should not talk to the politicians about our doubt or the uncertainties of our model output; we should keep that among ourselves, when we are talking to other scientists. It is our moral duty to express certainty."

as quoted from a well-known NCAR scientist presenting at a class of mine on the deficiencies of computer modeling being done for the IPCC. (2007)

