



# Layman's Guide to Global Warming Science

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# Layman's Guide to Global Warming Science

Scope:

- What this presentation is and is not
- Who am I to give this presentation?
- Rules of Science
- Short history of Global Warming (GW), now Climate Change
- What is the Greenhouse Effect?
- Does CO<sub>2</sub> drive temperature or does temperature drive CO<sub>2</sub>?
- Is this the hottest we have ever been?
- Will CO<sub>2</sub> cause runaway temperatures?
- Surface temperatures increasing?
- Ice caps and polar bears?
- What drives temperature?
- Close

## Layman's Guide to Global Warming Science

- This is an top-level summary of the state of climate science as of 2013; a view “from 10,000 feet.”
- It is not and cannot be an exhaustive presentation of climate science
- People have spent their lives and careers working on each element presented here – the subject material is **not** trivial
- Sources for this material have not been provided for simplicity and clarity of presentation but are easily obtained
- This presentation will be posted on the web for your convenience at <http://www.howtoteaparty.org/>
- Please be skeptical and validate the information and conclusions presented here; can be done by copying and searching key words, phrases, etc. found in this presentation through a search engine on the internet

## Layman's Guide to Global Warming Science

### Who am I?

- Just a regular person who happens to be in the Tea Party and one of the people who attends City Council meetings as a conservative advocate
- Not a scientist nor a deep-theory technologist

### Qualifications to investigate Global Warming:

- I can read, reason and investigate
- *I am just like all of you...*
- The unreliability of science and the press requires all of us to:
  - Fact-check everything
  - Develop a working expertise in new subject-matter areas (uncomfortable)
  - Speak-up against untruths and unproven conclusions presented as fact

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## Rules of Science (Scientific Method):

- One observer providing data verifiable by reference to the real world.
- The data must withstand peer review

- What about the other “stuff?”
    - Theory, experiment design, analysis, publishing, etc. – not trivial
    - What is **not** a part of the scientific method?
      - “Belief” - Religious term
      - “The debate is over” – Political rhetoric
      - “Consensus science” or “scientific consensus” - Political terms
- con·sen·sus** (kn-sns)*n.***1.** An opinion or position reached by a group as a whole.  
**2.** General agreement or accord: *government by consensus.*
- Examples – Galileo, DDT [Rachel Carson *Silent Spring* (1962)]
- My nonscientific method or The Miller Method:
    - Basic “sniff test” – is it plausible?

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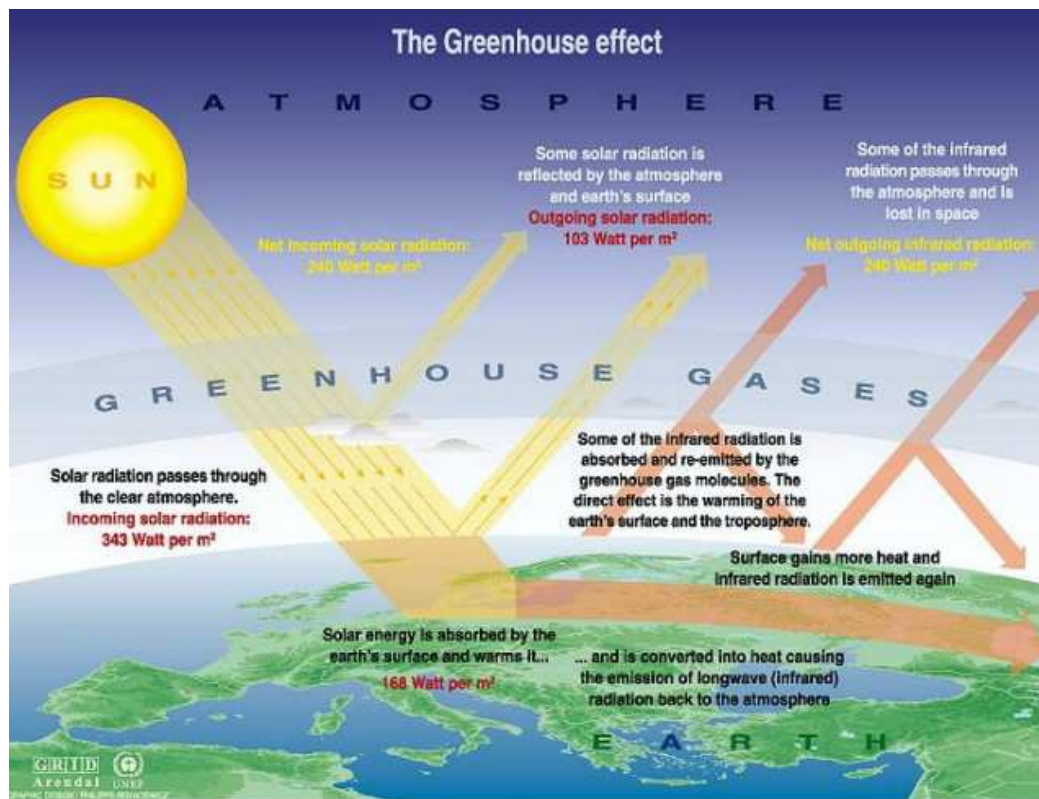
## History of Global Warming

- **1896:** The “natural greenhouse effect” theory was introduced
  - Claimed that combustion of fossil fuels (i.e., carbon-based) by man would result in enhanced global warming called the “natural greenhouse effect.”
  - It was not taken seriously by science.
- **1979:** Margaret Thatcher becomes PM of Great Britain
  - Looking for a way to force Britain away from domestic coal and fossil fuels and to nuclear power – (coal strikes)
  - Her UN ambassador suggested use of the 1896 man-driven global warming theory and that, since most people are largely scientifically illiterate, they could be easily manipulated using science. (*Carson DDT model*)
  - Thatcher, a chemical engineer by education, adopted global warming and, using her knowledge of chemistry, promoted the villainization of fossil fuels nationally and internationally.
  - Environmentalists picked-up on her ruse and the rest is history.

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## Greenhouse Effect

The foundation of the “global warming” argument is that solar energy enters and passes through the earth's atmosphere and reflects back into the troposphere and space. Some of that energy is absorbed by gases in the lower troposphere, warming it.



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

### Key concepts:

- Source of energy = the Sun
- Low altitude clouds influence the effect
- “Greenhouse gases” absorb energy
- Greenhouse gases heat the troposphere
- ***The Greenhouse Effect is measured by determining the temperature of the troposphere, not the earth***

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## Greenhouse Gases: (gases responsible for heating the troposphere)

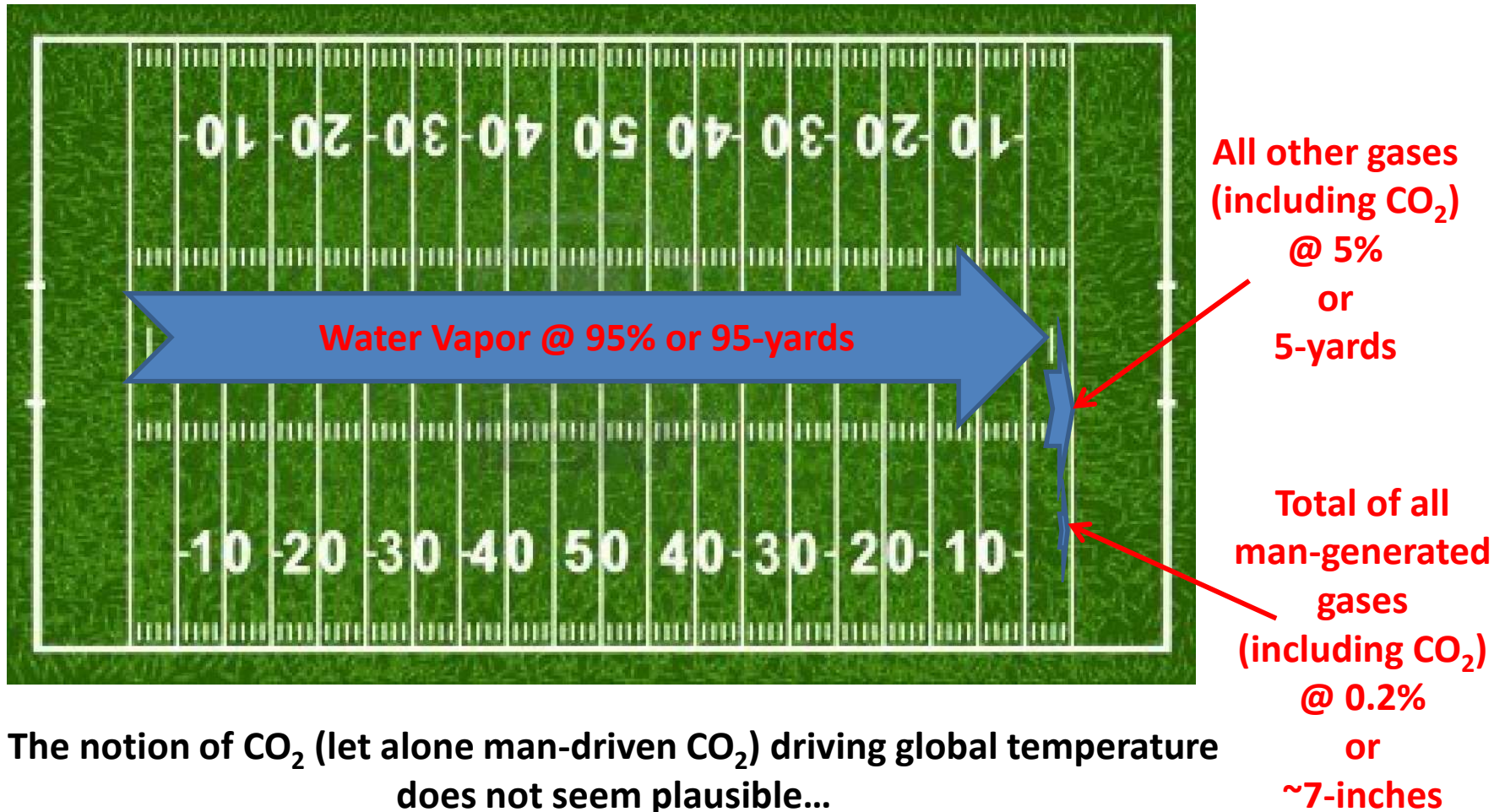
Gas	Relative contribution to the greenhouse effect
Water vapor	95%
CO <sub>2</sub>	3.6%
All others	1.4%

- The total of all **man-generated greenhouse gases**, excluding water vapor, is **0.2%**, a miniscule contribution to the greenhouse effect.
- Global warming proponents and their **climate models ignore water vapor** and claim that the **temperature of the troposphere increases directly with an increase in CO<sub>2</sub>**.
- A uniform 1.8% change in water vapor has the same greenhouse effect as a 10% change in CO<sub>2</sub>. (water vapor is 5X more powerful)
- The greenhouse effect has increased 0.2% since 1960.
- CO<sub>2</sub> is plant food. A 300-ppm CO<sub>2</sub> increase would raise a forest's productivity by about 50%.



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Greenhouse Gases scaled onto a football field where:  
100-yards represents 100% of atmospheric greenhouse gases



The notion of CO<sub>2</sub> (let alone man-driven CO<sub>2</sub>) driving global temperature does not seem plausible...

*Remember: Climate models do not include water vapor*

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## Does CO<sub>2</sub> drive temperature or does temperature drive CO<sub>2</sub>?

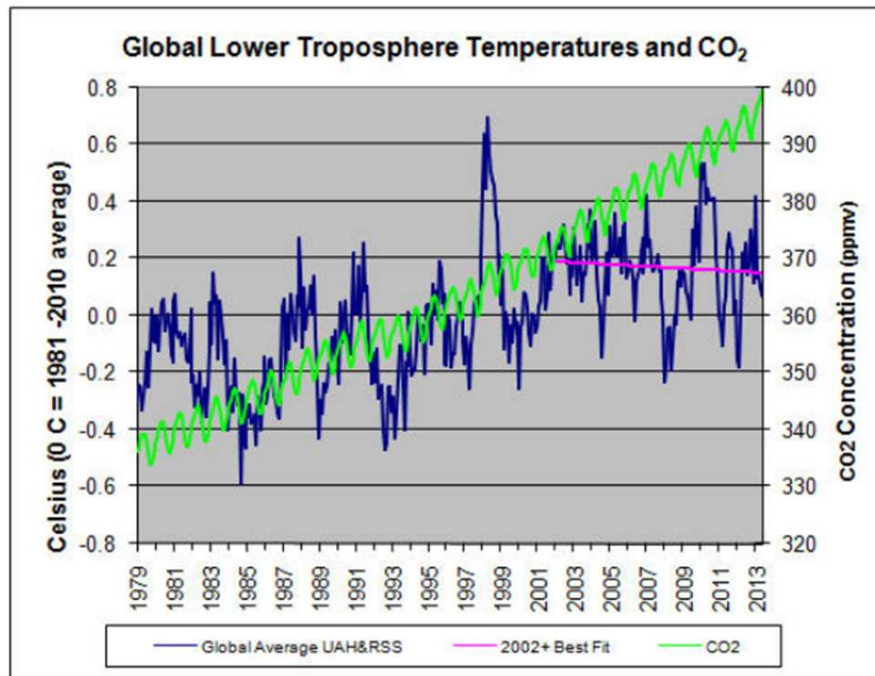


- Air trapped in glacial ice can be used as a proxy for determining concentrations of atmospheric gases in the past (200 to 10,000's of years)
- In the 1990's, Antarctica (Vostok) ice cores showed temperature and carbon in lock step – **CO<sub>2</sub> appeared to effect temperature directly**
- Peer review found that the data did not account for gas loss when samples, which are under high pressure, are brought to the surface.
- By 2003, the new data clearly indicated that ***carbon (CO<sub>2</sub>) lags behind temperature by an average of 800 years.***
- This lag means that CO<sub>2</sub> cannot be a significant driver of temperature.

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## Does CO<sub>2</sub> drive temperature or does temperature drive CO<sub>2</sub>?

- Global Warming is measured by determining the temperature of the troposphere – what is the real world data?
- NASA satellite data of the lower troposphere temperature:



- January 2002 to May 2013
- “**Best fit line**” indicates 0.03° C/decade decline or 0.05° F/decade decline
- The sharp temperature spikes in 1998 and 2010 are El Nino events
- Sun’s magnetic activity peaked in 1992 and is decreasing (current cycle started increasing in 1900)
- **CO<sub>2</sub>** continues to increase as it is released from the warm oceans (measured at Mauna Loa, Hawaii) (examples: fish tank dissolved gas management, soda carbonation)

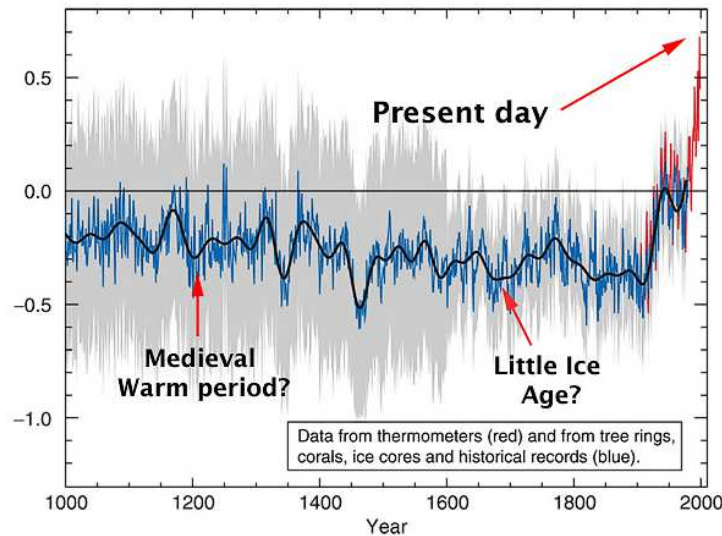
**Conclusion: Temperature drives CO<sub>2</sub>**

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## Is this the hottest we have ever been?

- The “Hockey Stick Curve”

### 2001 IPCC report



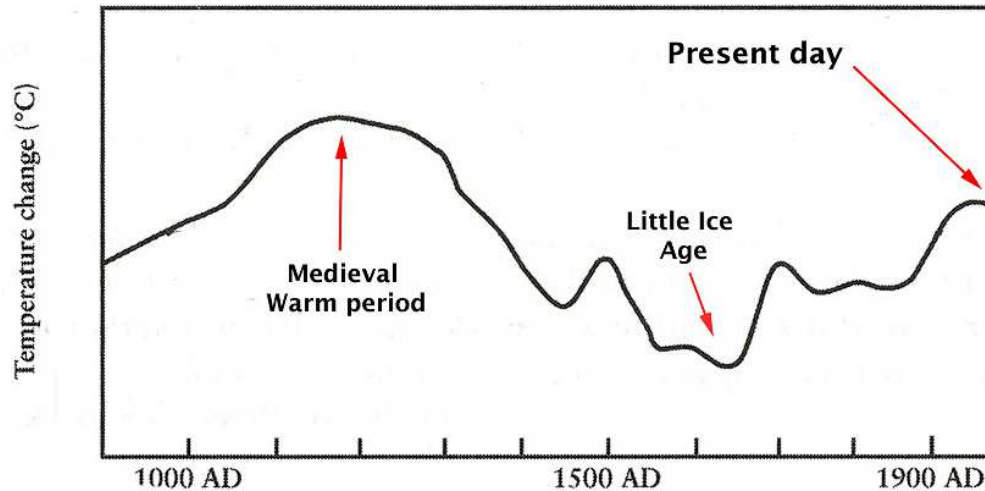
- A fraudulent computer model by Mann, Bradley and Hughes that was **not** peer reviewed before it was widely promoted (*beware of Dr. Michael Mann of Pennsylvania State University*)
- Chart argues that there has been little natural climate change over the last 1,000 years, so that the temperature change over the last 100 years is unusual and likely caused by human activities.
- According to “Climategate” emails, the Medieval Warm Period was eliminated by overweighting tree data (proxies) by 390 times and leaving out data sets.
- Peer review revealed that the program almost always drew hockey-sticks even if random “noise” data was fed in because the algorithm was faulty.



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## Is this the hottest we have ever been?

Actual temperature history:



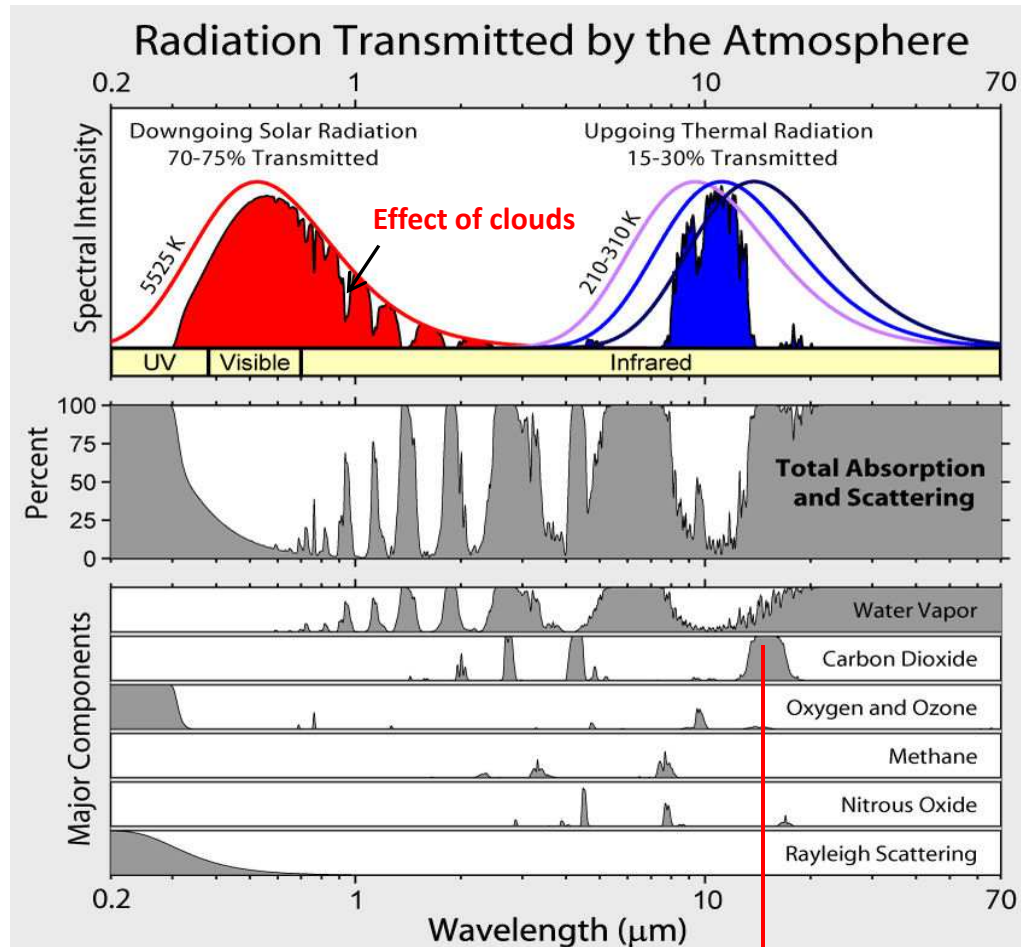
- The Medieval Warm Period or "Medieval Optimum" was a 400-year period from 95 to 1220 A.D.
- The Medieval Warm Period is a profound problem for those who claim that man's 20th- and 21st-century CO<sub>2</sub> emissions are warming the earth.
- During the Medieval Warm Period:
  - Greenland was "green"
  - The Vikings colonized and farmed Greenland
  - Tapestries anecdotally suggest that wine was produced in Great Britain
  - Syracuse University scientists found evidence that this period was a global event, affecting even Antarctica.
- The "Roman Warm Period" AD 1-300 was believed to be even warmer

*(Note: Little Ice Age)*

**Conclusion: Present era is not the hottest in history**

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## Will CO<sub>2</sub> cause runaway temperatures?



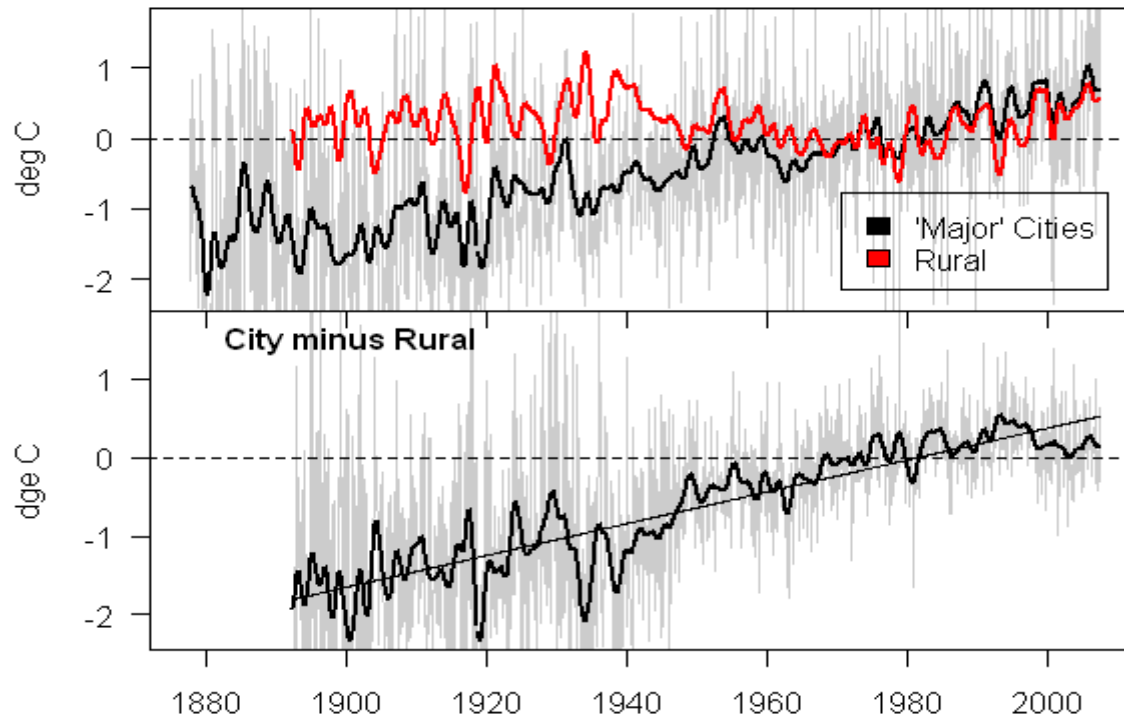
- Greenhouse gases heat the troposphere by absorption of reflected infrared solar energy – this is the “greenhouse effect.”
- Since water vapor overlaps the absorption spectra of carbon dioxide and methane, a “runaway” condition is not possible.
- There is already sufficient CO<sub>2</sub> in the atmosphere to saturate most of the principal CO<sub>2</sub> infrared absorption bands

**Conclusion: CO<sub>2</sub>-driven temperature runaway is not possible**

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## Surface temperatures increasing?

- Yes, but have slowed down over the last 15 years ( $0.03^{\circ}\text{C}/\text{decade}$ )
- Urban Heat Islands skew surface temperature monitoring



- The Urban Heat Island Effect is caused by the heat-retaining properties of concrete and asphalt in urban areas
- Artificially increases local temperatures.
- Temperatures in or near urban centers are warmer than rural areas.
- Conversely, irrigation skews rural temperatures cooler

**Conclusion: Surface temperatures are not raising significantly**

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Surface temperatures increasing?

- Urban Heat Islands (cont.)



MMTS = Maximum/Minimum Temperature Sensor

- Poor siting of temperature sensors (MMTS) near artificial heating or radiative heat surfaces further exaggerate the urban heat island effect.
- Artificial heating sources:
  - Air conditioning system
  - Building exhaust vents
  - Machinery
- Radiative heat surfaces:
  - Concrete, building walls and sidewalks
  - Asphalt
  - Heating and cooling ducts

***Correcting the surface temperature record for the effects of urban development would reduce the warming trend over land from 1980 by half.***



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## Retreating glaciers and the calving of ice shelves are proof of global warming?

- Glaciers recede and grow cyclically
- Recent glacier melting is post Little Ice Age warming
- Ice shelves have been breaking off (“calving”) for centuries
- There have been at least 33 periods of glaciers growing and then retreating
- Glacier growth/recession is also dependent on local precipitation



## The polar ice caps are melting and the sea level rising?

- The Arctic warmed between 1966 to 2005, no warming since 2005
  - Cyclic events in the Pacific Ocean and soot from Asia darkening the ice
  - Current temperatures are the same as in 1943.
  - Some parts of Antarctica is getting warmer, while the main Antarctic continent is cooling
  - Ice cap thicknesses in both Greenland and Antarctica are increasing.

**Conclusion: Ice caps and ocean levels do not validate CO<sub>2</sub>-driven climate change**

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- **Polar bears are becoming extinct?**



- The short answer that their population growth in Canada has become a serious problem:
  - Higher litters (3 vs. 1-2)
  - Hunting ban
  - Numbers are pressuring bears to migrate south into populated areas/towns

## **Conclusion:**

Quotes from Canadian experts:

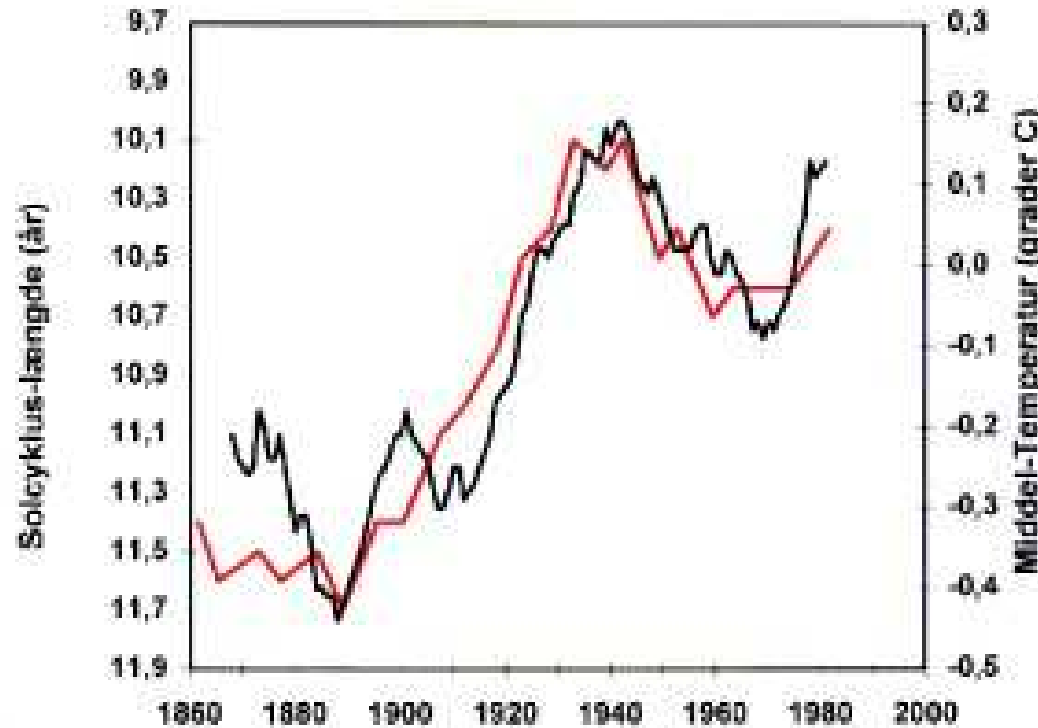
“Polar bears are very intelligent . . . they have adapted through many climate changes for thousands of years. They are not going to wait around for the ice to freeze to start hunting. They live on more than just seals,”

“At the end of the day, the King of the North will always be here. When we hear that polar bears are headed towards extinction, we just kind of smile at ourselves.”

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## What drives temperature?

- Solar activity versus Earth's temperature



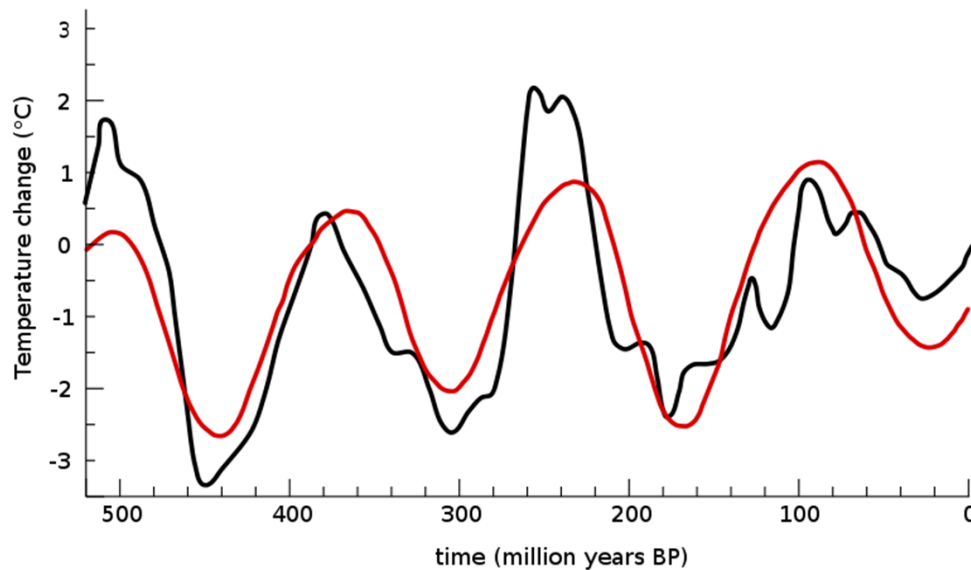
- The **red** curve is solar activity (sunspots, **solar cycles**, solar wind, solar flares, etc.)
- The **blue/black** curve is the Earth's average temperature
- The Sun's increased energy output may have contributed directly to about 1/3 of the warming seen over the last 100 years. The change in solar output is too small to directly account for most of the observed warming.

**A solar energy multiplier is required.**

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## Solar energy multiplier:

- One such multiplier is the interaction between the Sun and galactic cosmic rays; i.e., a small change in solar energy will have a large effect on climate.
- In 1997, Svensmark popularized a theory that linked galactic cosmic rays and climate change by postulating that climate change is primarily caused by small variations in the intensity of the Sun's magnetic field, termed cosmoclimatology.
- Evidence is growing that this theory will be validated.

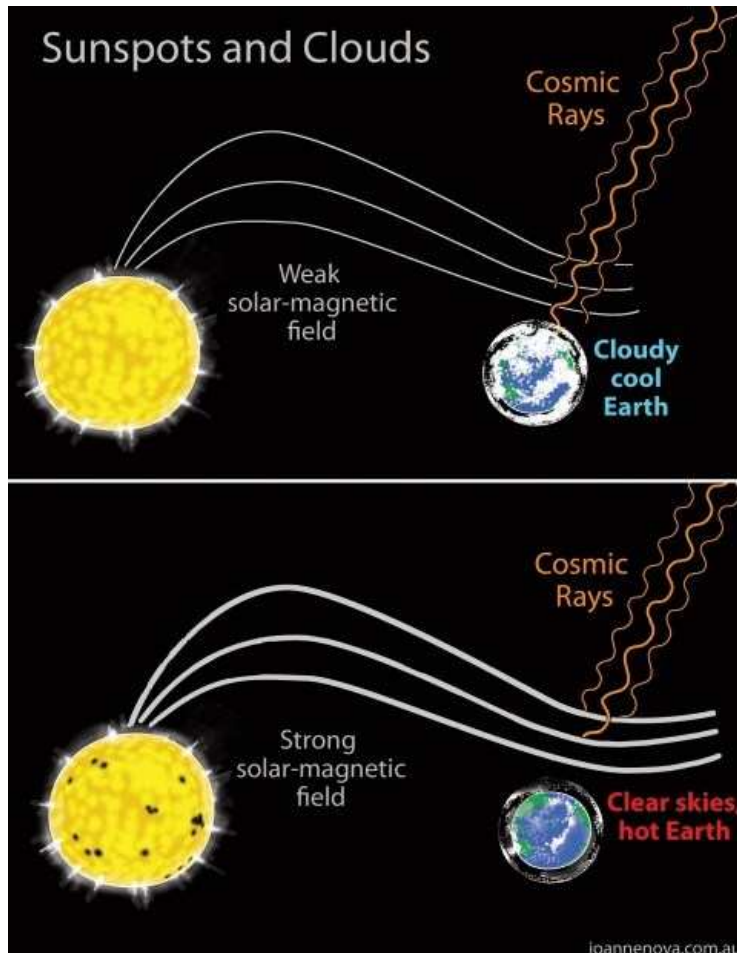


- Correlation between variations:
  - Cosmic ray flux (red)
  - Sea temperature (black).

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Solar energy multiplier (cont.):

## The interaction between the Sun and galactic cosmic rays modulates cloud generation that block solar warming



A simplified explanation of the process is:

- **Cosmic rays** are very high-energy particles, mainly originating outside the Solar System, probably from supernovae of massive stars.
- Cosmic rays stream into the earth's atmosphere from the galaxy.
- Electrons are released in the atmosphere by cosmic rays that act as a catalyst in the formation of sulphuric acid and water molecules, the building blocks for the low altitude cloud formation.
- The Sun's solar wind and magnetic field modulates the density of the cosmic rays penetrating the earth's atmosphere

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## CO<sub>2</sub> Versus the Sun/Cosmic Ray Warming Theories

*How verifiable "by reference to the real world" are they?*

<u>Issue</u>	<u>Prediction – CO2 Theory</u>	<u>Prediction - Sun/Cosmic Ray Theory</u>	<u>Actual Data</u>	<u>Which Theory Wins</u>
• <b>Antarctic &amp; Arctic temps</b>	Temps in the Arctic and Antarctic will rise symmetrically	Temps will initially move in opposite directions	Temps move in opposite directions	Sun/ Cosmic Ray
• <b>Troposphere temps</b>	Fastest warming will be in the troposphere rather than the surface	The troposphere warming will be uniform w/surface warming	The surface warming is similar or greater than troposphere warming	Sun/ Cosmic Ray
• <b>Timing of CO2 &amp; temp changes @ end of the Ordovician period (Ice Age)</b>	CO2 increases (leads) then temperature increases	Temperature increases (leads) then CO2 increases	CO2 concentrations increase ~800 years after temperature increases (leads)	Sun/ Cosmic Ray

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## CO<sub>2</sub> Versus the Sun/Cosmic Ray Warming Theories (cont.)

<u>Issue</u>	<u>Prediction – CO2 Theory</u>	<u>Prediction - Sun/Cosmic Ray Theory</u>	<u>Actual Data</u>	<u>Which Theory Wins</u>
• <b>Temps correlate w/driver over last 400 years</b>	(Driver = CO2)	(Driver = Cosmic ray flux and Sun activity)	Cosmic ray flux and Sun activity correlates with temperature, CO2 does not	Sun/ Cosmic Ray
• <b>Temps during Ordovician period (Ice Age)</b>	Very hot due to CO2 levels > 10X present	Very cold due to high cosmic ray flux	Very cold ice age	Sun/ Cosmic Ray
• <b>Other planets' climate</b>	N/A - No change	Other planets will warm	Warming has been detected on several other planets	Sun/ Cosmic Ray

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## Conclusion:

- Science has rules to control chaos. “Consensus” and “belief” are not part of the Scientific Method.
- Global Warming/Climate Change has always been a political ruse
- The Greenhouse Effect's #1 gas, water vapor, is ignored by GW alarmists
- Temperature drives CO<sub>2</sub> which follows after an 800 year delay
- The Roman and Medieval Warm Periods were hotter than our present climate
- Water vapor prevents CO<sub>2</sub> from causing runaway temperatures
- Surface temperatures are increasing in urban areas due to Urban Heat Island Effects and poor temperature monitor sitings
- Ice caps growth and decay cycle like the rest of the planet
- Polar bear populations are on the rise and have doubled in some regions
- What drives temperature? Best guess: The Sun with help from Cosmic Rays
- What is next? Possibly another cooling period similar to the Little Ice Age.