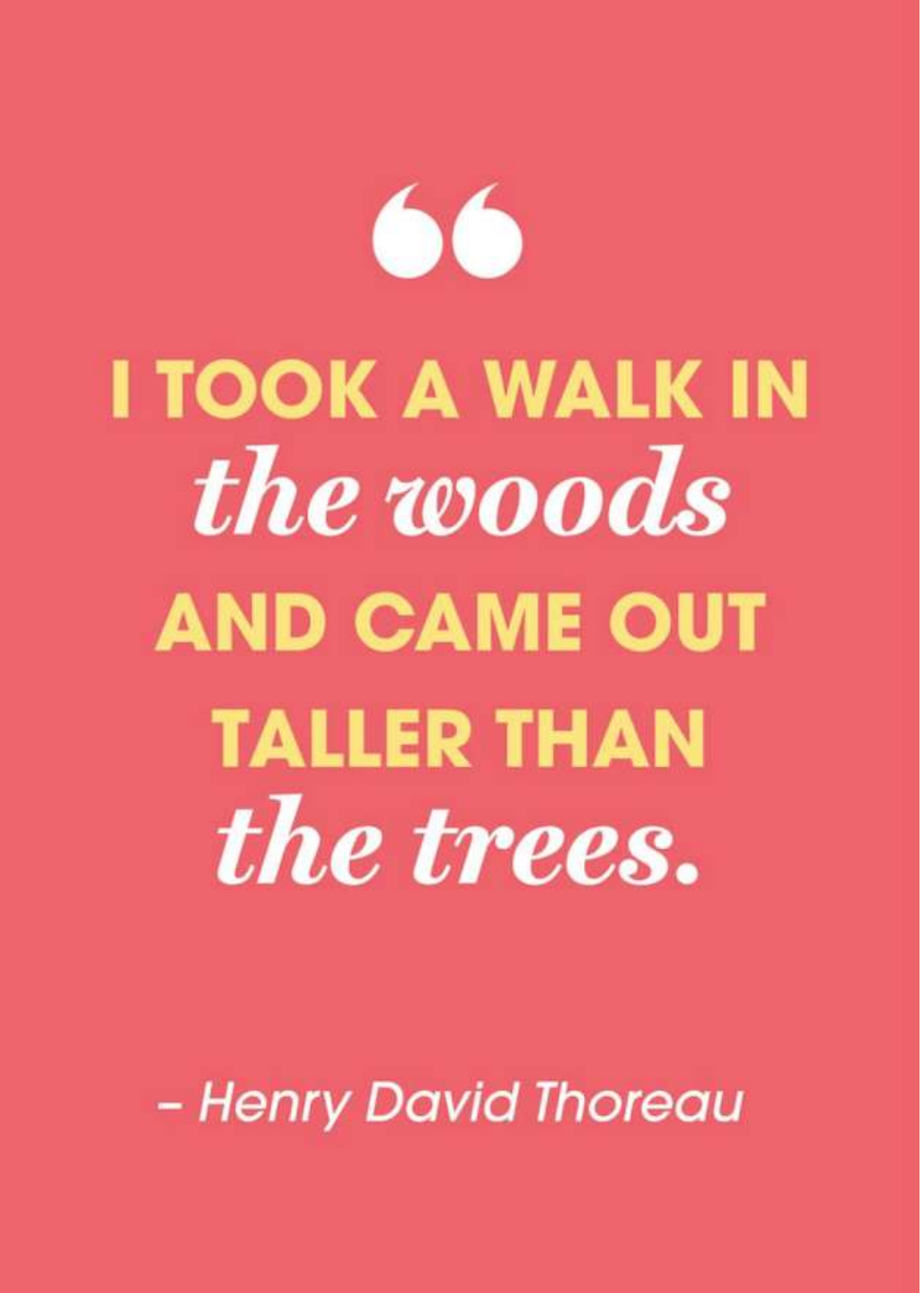
Thomas Kurz

March 5, 2024

EXAMINING CLIMATE CHANGE USING THE SCIENTIFIC METHOD



OUR RESPONSIBILITY

Protect and sustain our earth for our children, grandchildren, and future generations

Eliminate pollution and implement recycling

Protect our forests and endangered species

Preserve the beauty of nature

Help people in poor nations out of poverty

CLIMATE CHANGE MITIGATION SPENDING

Diverted from Other Pressing Issues

- **Inflation Reduction Act** - $391 billion for climate and related energy areas
- **EPA** - $4.6 billion in grants to reduce greenhouse gas emissions
- **Foreign Aide** - 20% of all aide to developing nations is to fight climate change - $89.6 billion in 2021
- **Scientific Research** - $44.6 billion on climate research, 1990 to 2018.

Photo: pixelstalk.net

"It is difficult to get a man to understand something if his salary depends on him not understanding."

Upton Sinclair

AUDUBON SOCIETY

Established to Protect Birds

- Audubon Society supports windmills to fight climate change
- Windmills kill 140,000 to 679,000 birds each year
- Birds killed include endangered species
- Endangered species have declined by 10-fold in 100 years, as the globe warms. **Studies show cold causes past extinctions**. Warmth aids biodiversity.

Image: stopthesethings.com

Sri Lankan Insurrection, storming the Presidential Palace
Photo: @The_inner_asent

SRI LANKA ESG STORY

Corrupt Sri Lankan president seeks foreign loans

Increases ESG score to qualify for loans from western banks

Eliminates synthetic fertilizers to reduce greenhouse gases, which boosted the ESG score to 98 (70 is considered good)

Impacts of eliminating synthetic fertilizers:

- Reduced crop yields – up to 50%
- Food scarcity and starvation
- Increased food prices
- Overthrow of the President of Sri Lanka

NO FOSSIL FUELS

Wood Burning Fuel Catastrophes

- 3 million people die each year of indoor air pollution – burning wood and dung for cooking
- Wood burning leads to deforestation
  - Haiti (left) relies on wood as fuel
  - Dominican Republic (right) relies on fossil fuels for heating and cooking
- Impacts of wood burning for fuel
  - Indoor pollution
  - Deforestation
  - Loss of endangered species

Source: Brian Gitt, author of the book In the Dark, Fixing Energy Policies That Hurt People and the Planet

AIR POLLUTION

Air Pollution is Not Carbon Dioxide

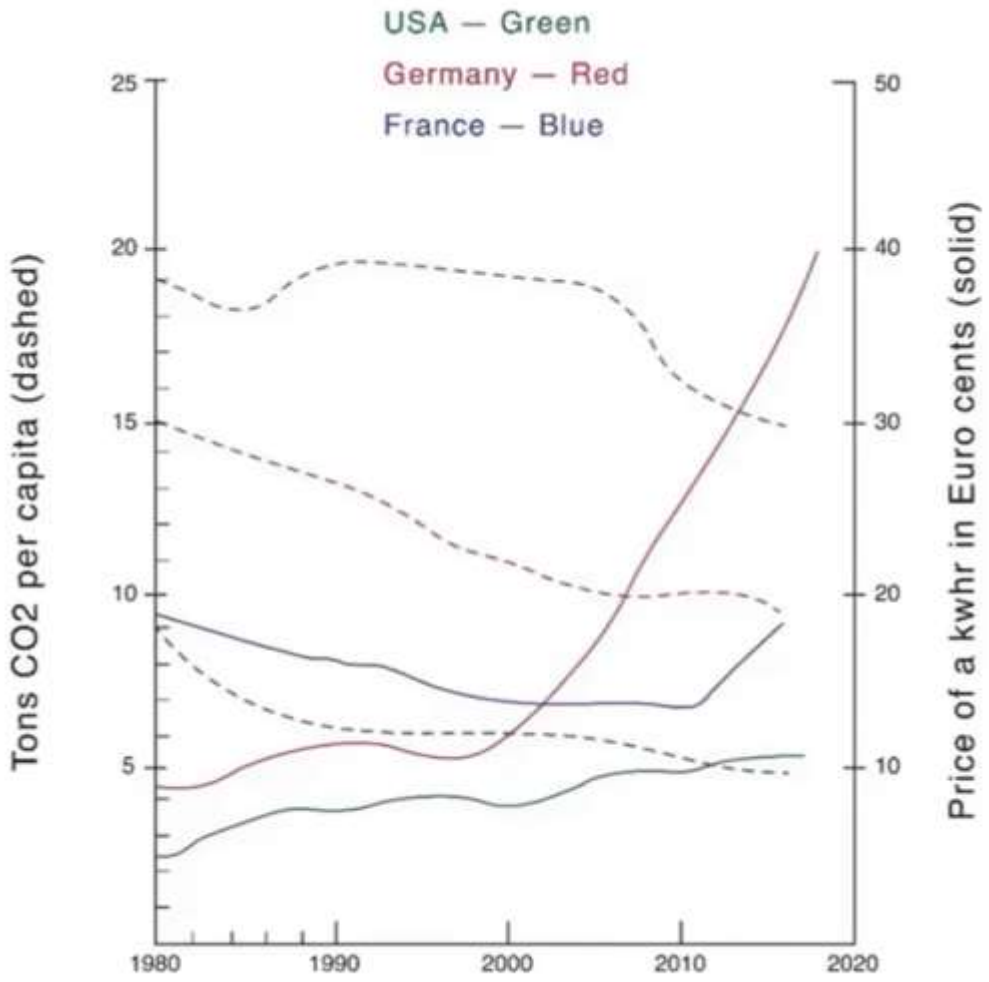
- CO_2 is odorless, colorless, non-toxic, and the staff of life for plants – "If you can see it or smell it, it is not CO_2" – Will Happer.
- Pollution Footprint vs. Carbon Footprint
- Limited focus on pollution reducing technologies – diverted to CO_2 reduction
- Manufacture of "green energy" is increasing pollution footprint in China

Photo: PBS News Hour

COST OF GREEN ENERGY

Banning Fossil Fuels Hurts the Poor

- Green Energy drives costs up as witnessed in Germany: from 0.05 to 0.40 Euros per kWhr
- Green energy hurts the poor and middle class
  - <$50,000 income: 10% of budget on energy
  - <$20,000 income: 40% of budget on energy
- Developing countries are energy poor
  - 1.3 billion people have no electricity
  - 3 billion people have minimal electricity
- World Bank and other western banks will not loan money to build coal and gas power plants.



Source: Tom Nelson Podcast, Wallace Manheimer #143

BEAUTY OF NATURE

"*I think having land and not ruining it is the most beautiful art that anyone could ever want.*"

Artist Andy Warhol

Taihang mountain in China
Photo: pintrest.com

San Gorgonio Pass, California
Photo: steveandirene.us

EXISTENTIAL QUESTION OF OUR TIME

Are We Facing a Climate Crisis?

- 97% of scientists agree, the science is settled
- Climate change is causing severe weather
- Temperatures today are unprecedented
- The temperature will increase by 3.2 degrees Centigrade by the year 2100

Important Follow-up Questions

- What do scientist agree upon?
- What does the data say about severe weather?
- What is the historical temperature record?
- How is this number derived?

"The best way to get a sure thing on a fact is to go and examine it for yourself, and not take anybody's say-so."

Mark Twain

THERE IS NO CLIMATE CRISIS

Scientist	Focus	University	Awards
Dyson Freeman	Physics	Cornell, Princeton	Enrico Ferme Award, Max Planck Medal
Edward Teller	Physics	Chicago, UC Berkley, Lawrence Livermore Lab	National Medal of Science, Enrico Ferme Award
Ivar Giaever	Physics	Rensselaer Polytechnic Institute	Nobel Prize, 1973
John Clauser	Physics	UC Berkley, Lawrence Livermore Lab	Nobel Prize, 2022
William Happer	Physics	Princeton	Davisson-Germer Prize
Richard Lindzen	Atmospheric Science	Chicago, Harvard, MIT	Alfred P. Sloan Fellowship AMS Charney Award
Steven Koonin	Physics	Caltech, NYU	Provost, Caltech Under Secretary for Science, DOE

97% OF SCIENTISTS AGREE

Human Impact	Contributes to Warming	Most of Warming	Is Dangerous
Cook Study (published papers)	97%	1%	0%
Verheggen (paper authors)	NA	66%	NA
Stenhous (meteorologists)	83%	52%	NA
Lynas (published papers)	99%	NA	NA

- 9 peer-reviewed papers attribute 40% to 87% of recent climate change from natural variation
- Recent paper in Climate by 37 authors indicates 70% to 87% of warming since 1850 is from natural variation (Soon, et al, Climate, 28-August-2023, 11/(9), 179

"… editors of these journals have made it abundantly clear, both by what they publish and what they reject, that they want climate papers to support a certain preapproved narrative…"

Patrick Brown, Johns Hopkins University

SEVERE WEATHER

Climate Alarmist Claims of Severe Weather

- ***"Extreme weather and climate disasters are increasing in frequency and intensity."*** - UN Secretary-General António Guterres

- *"Our weather is becoming more extreme, with a clear and demonstrable impact on socio-economic development."* - United Nations Press Release titled, "Rate and impact of climate change surges dramatically in 2011-2020." The press release continues to list such extreme weather events including **floods** and **tropical cyclones (hurricanes).**

- "*As Earth's climate changes, it is impacting extreme weather across the planet. Record breaking heat waves on land and in the ocean, drenching rains, severe* ***floods****, years-long* ***droughts****, extreme* ***wildfires****, and widespread* ***flooding*** *during hurricanes are all becoming more frequent and more intense."* – NASA website

"Bad news is good news and good news is no news."

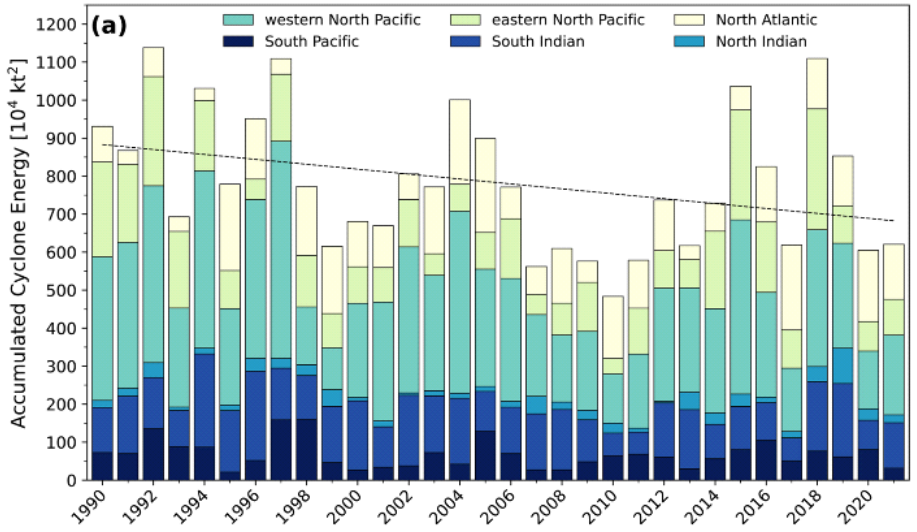
Newspaper owner, William Randolph Hearst

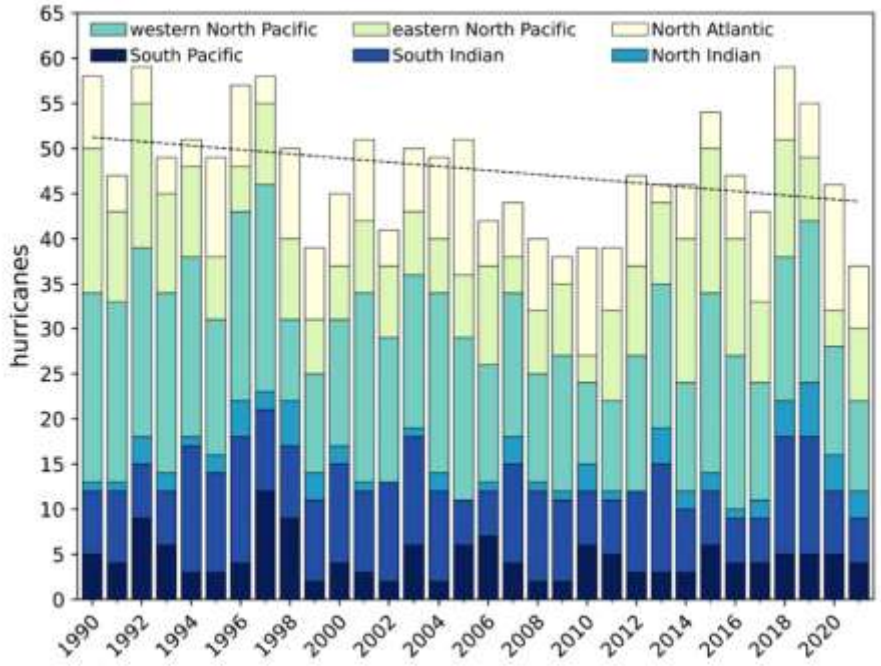
SEVERE WEATHER TRENDS

Event	Getting Worse	No Trend	Fewer/Less Severe
Hurricanes			Slight Decline
Strong Tornadoes			Significant Decline
Heat Waves			Significant Decline
Droughts			Less Severe
Wildfires			Significant Decline
Floods		No Trend	

"In God we Trust, everyone else bring data."

Edwards Deming





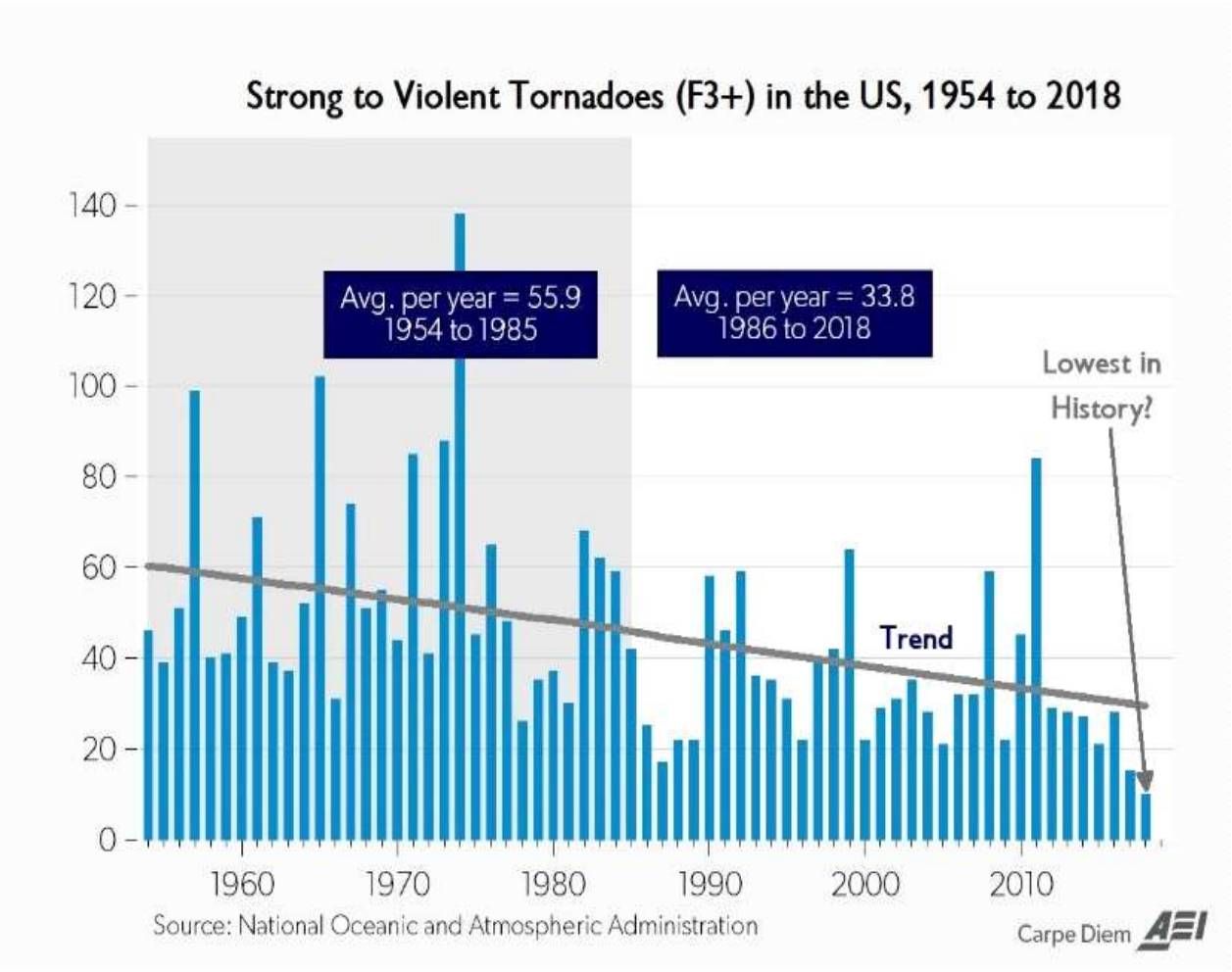
HURRICANES

- The Accumulated Cyclone Energy (ACE) has declined since 1990. ACE is a metric accounting for the frequency, intensity, and duration of hurricanes

- The number of hurricanes has declined globally since 1990.

Source: P. Klotzbach, et al, "Trends in Tropical Cyclone Activity 1990-2021," Geophysical Research Letters, March 17, 2022

TORNADOES



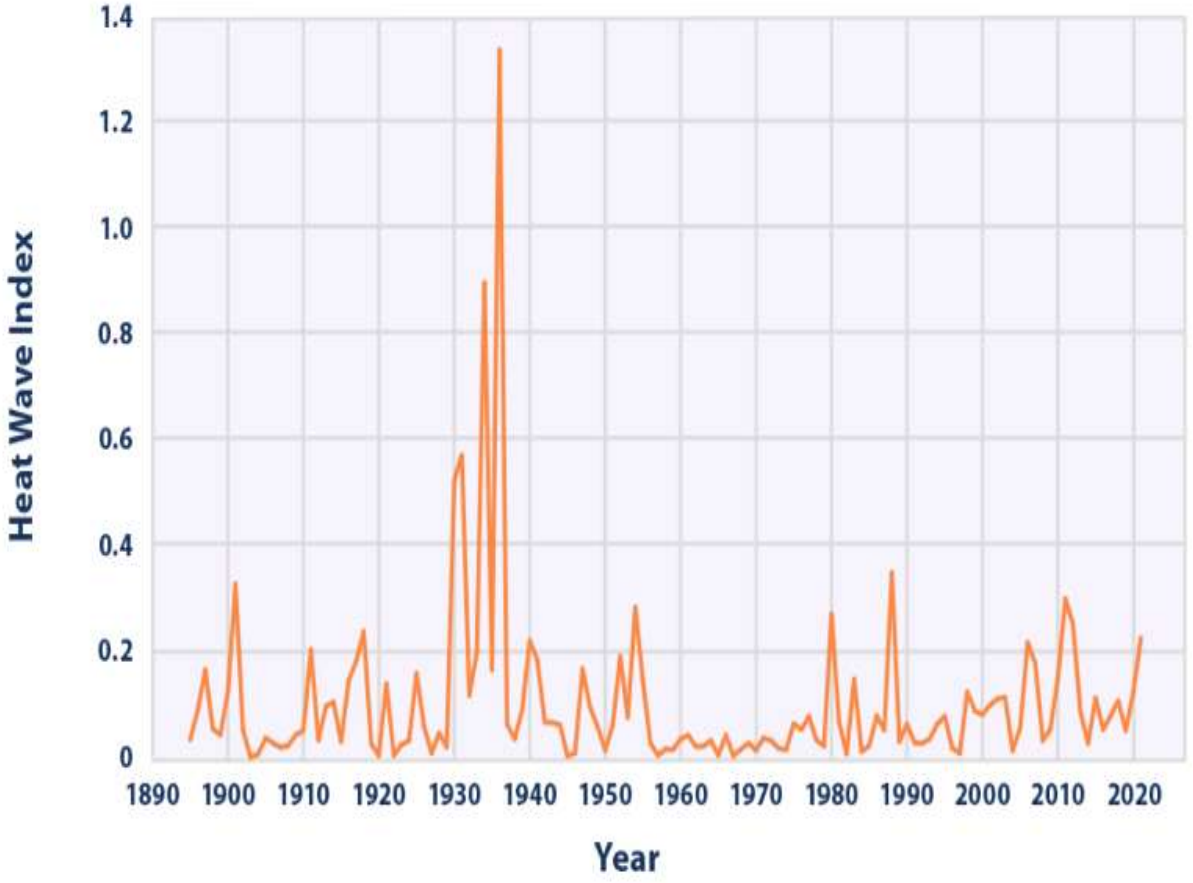
- The number of strong (F3+) tornadoes has significantly declined since the 1950s.

- Global warming has warmed the Arctic twice as fast as the Tropics, moderating the temperature. contrast. **Severe storms are caused when hot moist air collides with cold air. As cold Arctic air moderates, storms are less severe.**

Source: The U.S. National Oceanic and Atmospheric Administration (NOAA). Chart created by Dr. Roy Spencer, University of Alabama, Huntsville.

HEAT WAVES

Figure 3. U.S. Annual Heat Wave Index, 1895–2021

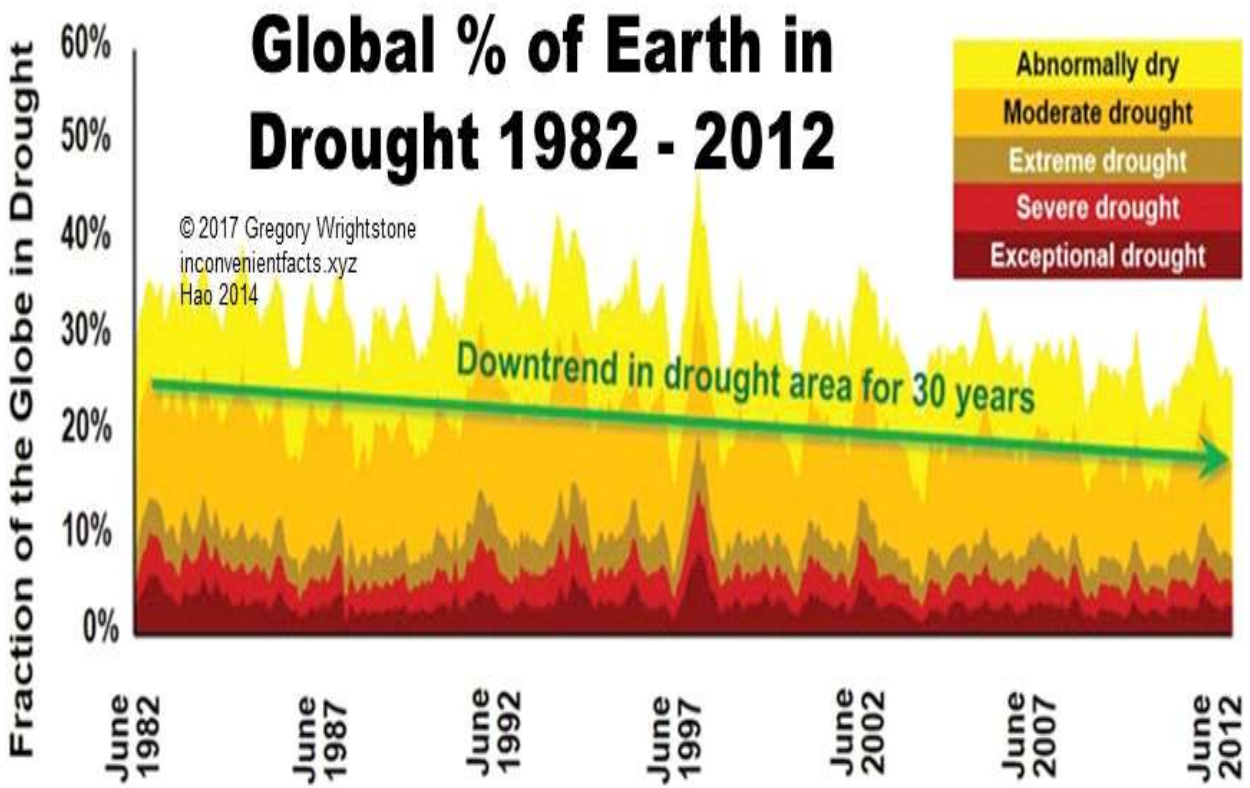


- Heat waves are significantly less intense than in the "Dustbowl" 1930s.

- Heat waves follow the hot and cold cycles of the Atlantic Multidecadal Oscillation, which was warm in the 1930s, cool in the 1970s and warm today.

Source: The United States Environmental Protection Agency (EPA) Climate Change Indicators Heat Waves

DROUGHTS



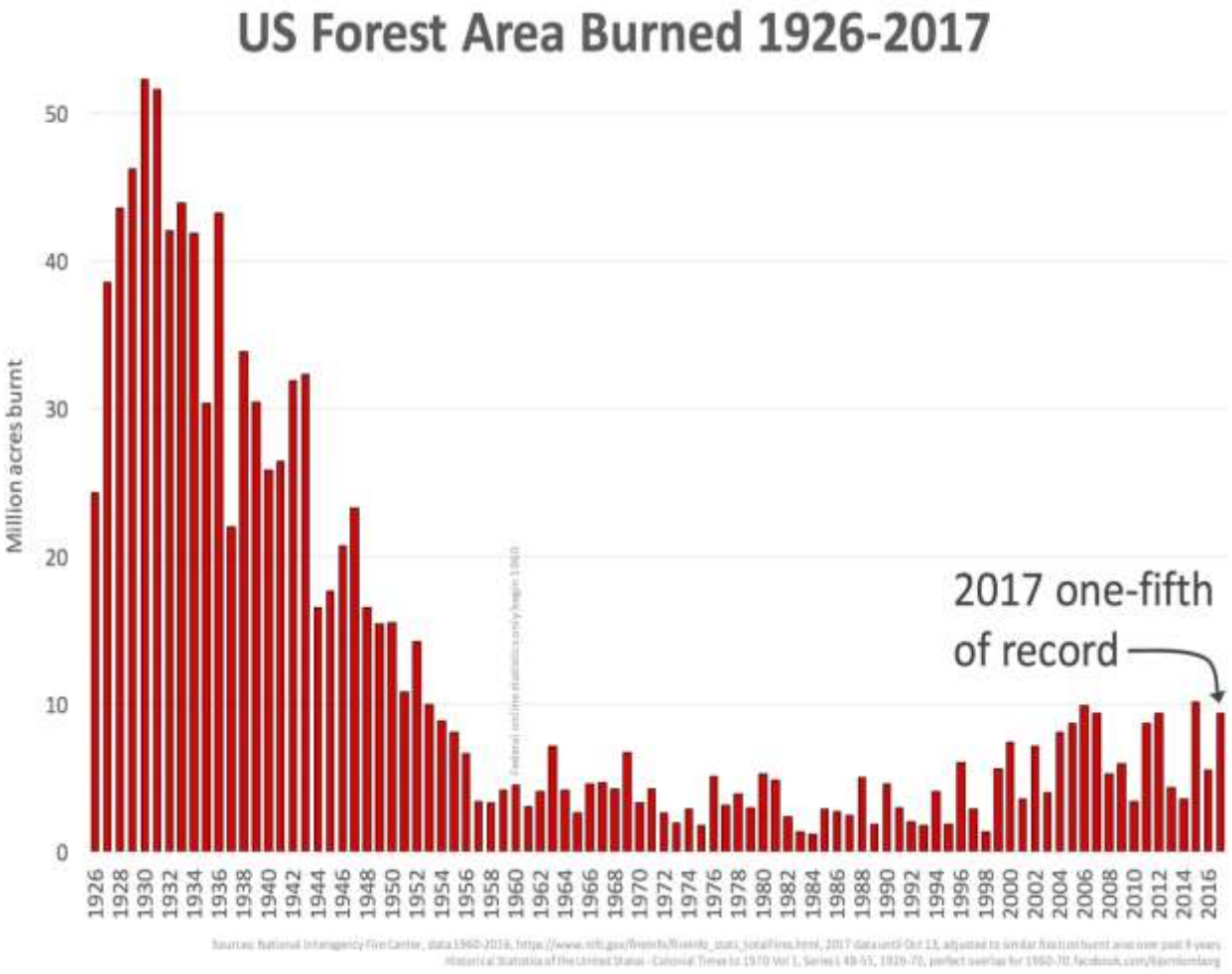
- Droughts have declined as temperatures have risen.

- As temperatures have risen, more water from the oceans evaporates forming clouds. There has been more rain in recent years and droughts have declined. Historically, there are more droughts during cold times when the air is more arid.

- Satellites prove the earth has greened by 20% since 1982 and the greening has accelerated since 2001. **The world is getting greener, not browner.**

- **Plants close stomata in higher concentrations of CO_2 and lose less water. The soil has more moisture which deters fires. USGS TOPFIRE system tracks soil moisture to monitor fire risk.**

Source: Gregory Wrightstone using data from Hao, Z, AghaKouchak, A, Nakhiri N et al (2014) Global integrated drought monitoring and prediction system.



WILDFIRES

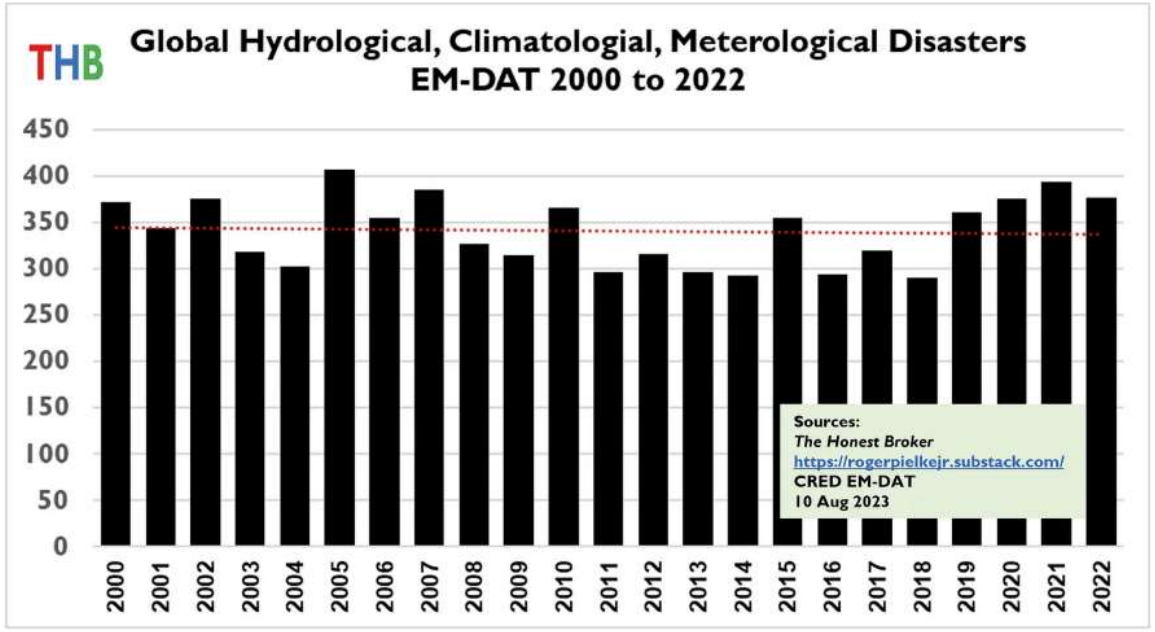
- Acreage burned from wildfires in the US is one fifth the number from the "Dustbowl" 1930s.

- Studies from throughout the world show a similar trend that fires have declined.

- Wildfires follow the hot and cold cycles of the Atlantic Multidecadal Oscillation, which was warm in the 1930s, cool in the 1970s, and warm today.

Source: National Interagency Fire Center

FLOODS



- Despite more rain, there has been no trend in floods since 2000.

- This result is surprising, since there has been a rise in precipitation as temperatures have risen. Perhaps better flood mitigation efforts, such as dikes, have minimized flooding.

Source: Roger Pielke using data from the EM-DAT of the International Disaster Database

OTHER CLIMATE CRISIS TRENDS

Event	Getting Worse	No Trend	Less Severe
Sea level rise		Same for 150 years	
Endangered species			Fewer extinctions
Polar Bears			Growing populations
Great Barrier Reef			Record growth
Deaths from heat/cold			Cold kills far more
Climate related deaths			Far less deaths

"It ain't what you don't know that gets you into trouble, it's what you know for sure that just ain't so."

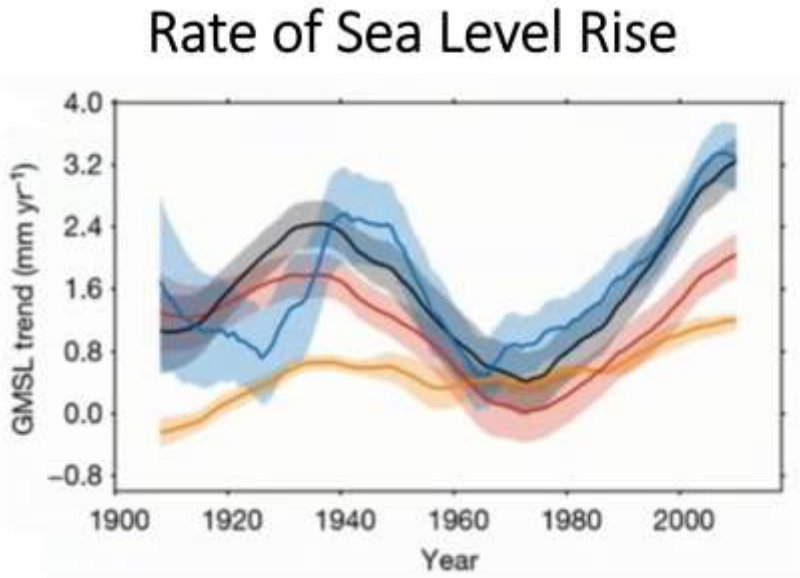
Mark Twain

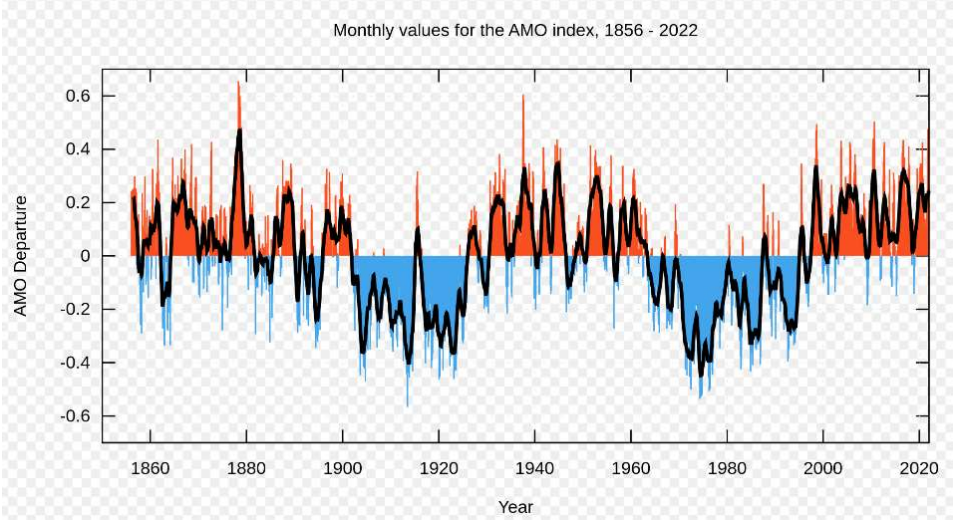
SEA LEVEL RISE

Sea level rise is cyclical

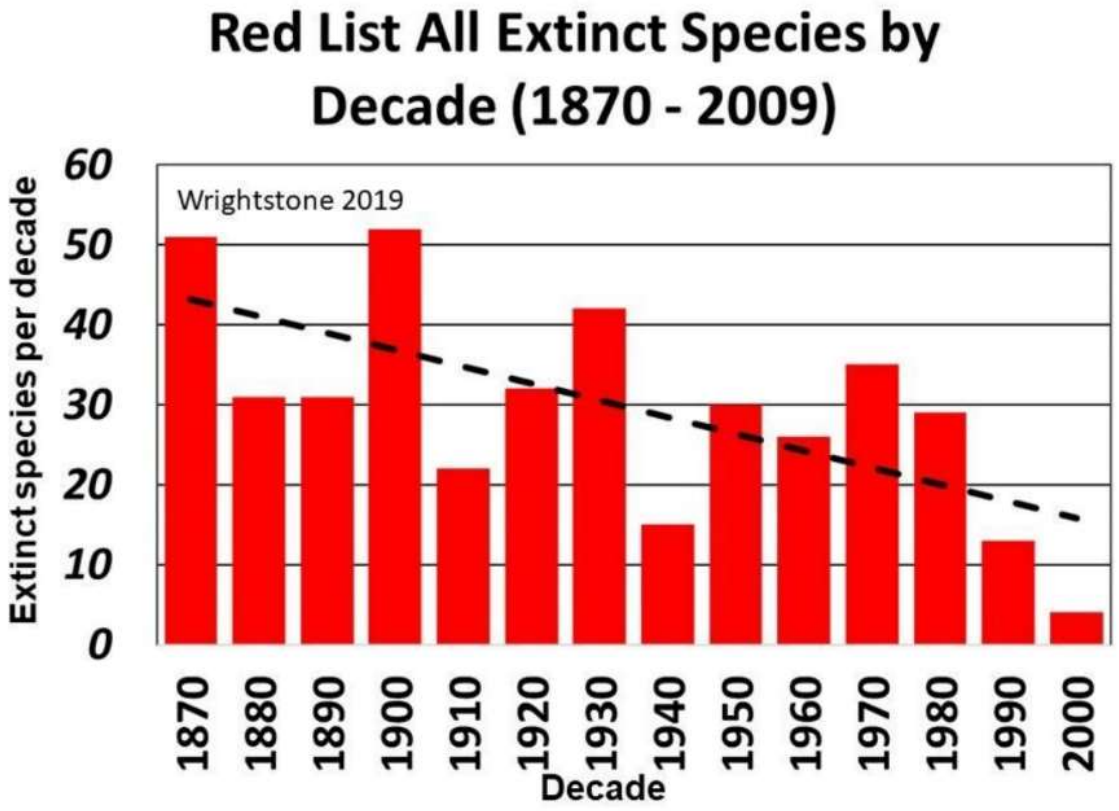
- Accelerates with ocean oscillations
- Tide gauge and GRACE satellite – 7 inches by 2100
- JASON satellite – 10.6 inches by 2100
- Sea level has been rising by one foot per century for 150 years.
- **Never extrapolate off the top of a cyclical curve**

Source: Thomas Federike, "The cause of sea-level rise since 1900," Nature, 2020. AMO from Wikipedia.





ENDANGERED SPECIES



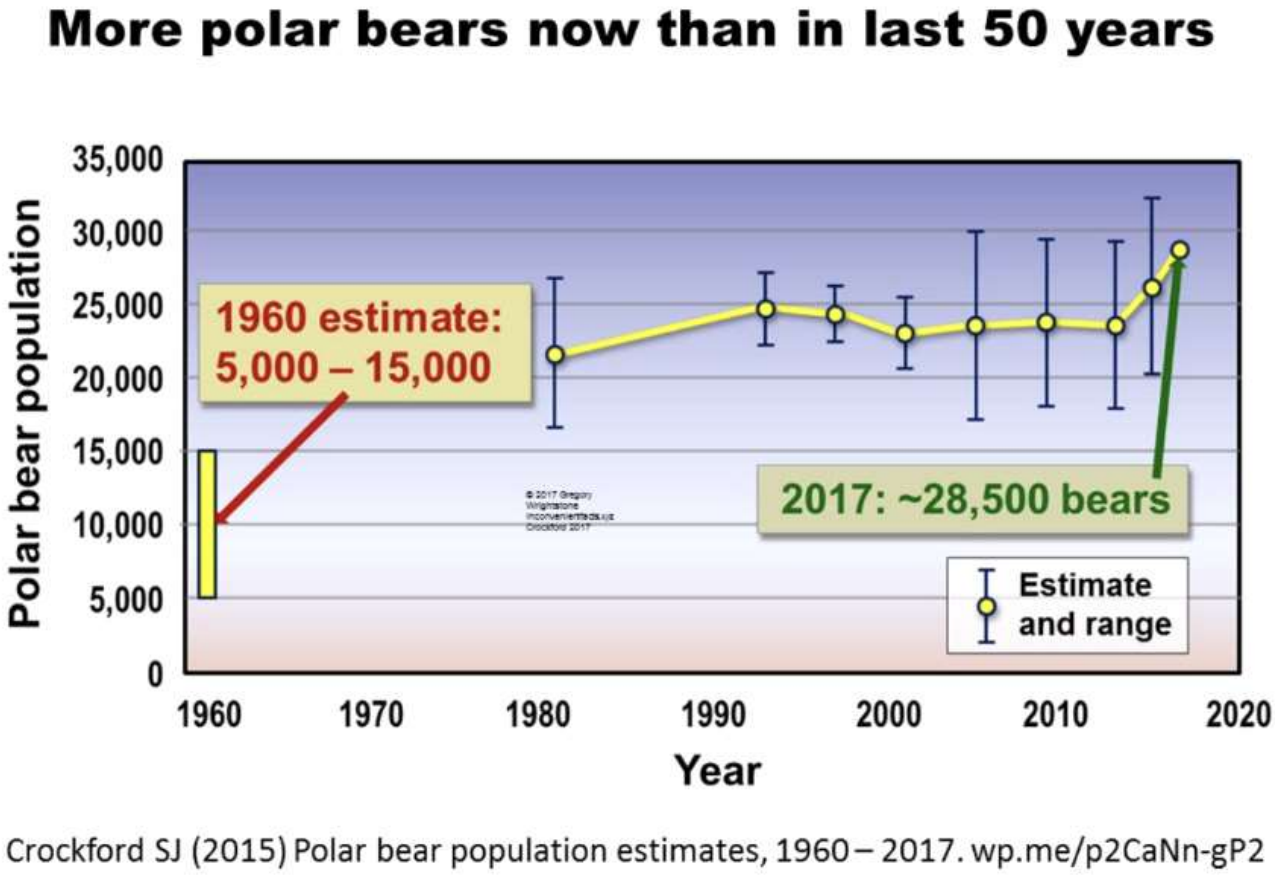
- **Documented Extinctions have declined by 10-fold** in 100 years from 50 to 5 per decade.

- There are undocumented wild claims of hundreds of extinctions in recent years, but the Red List is considered the authoritarian source, as each case is documented.

- Protections of endangered species may have driven the decline in extinctions, but global warming has certainly not given rise to large numbers of extinctions. This is not surprising has **historically cold has led to extinctions and biodiversity is generally higher in warm climates**.

Source: Chart by Gregory Wrightstone from the data taken from the International Union for Conservation Nature's Red List of Threatened Species.

POLAR BEARS



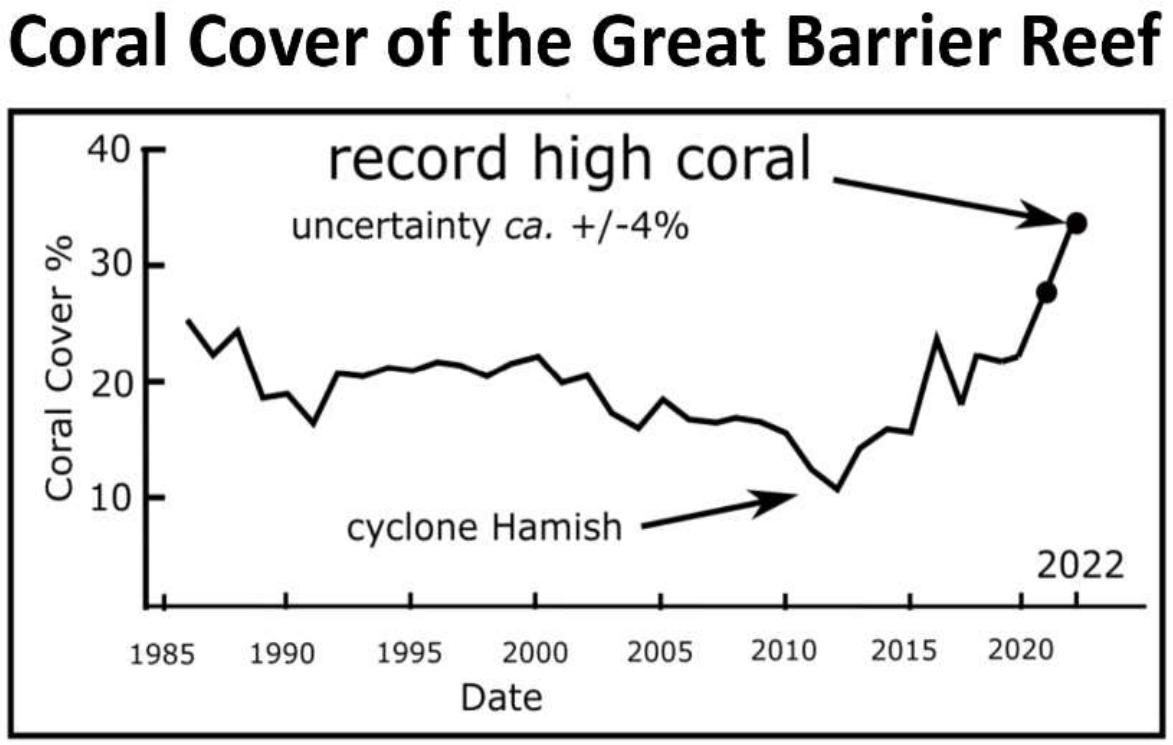
- The Polar Bear, the poster mascot for climate change, is thriving in a warmer climate.

- Zoologist Susan Crockford's research on polar bears demonstrates populations have doubled since 1960.

- International Union for Conservation of Nature's 2015 Red List of Threatened species puts polar bear numbers between 22,000 to 31,000.

Source: Gregory Wrightstone using data from Crockford SJ (2015).

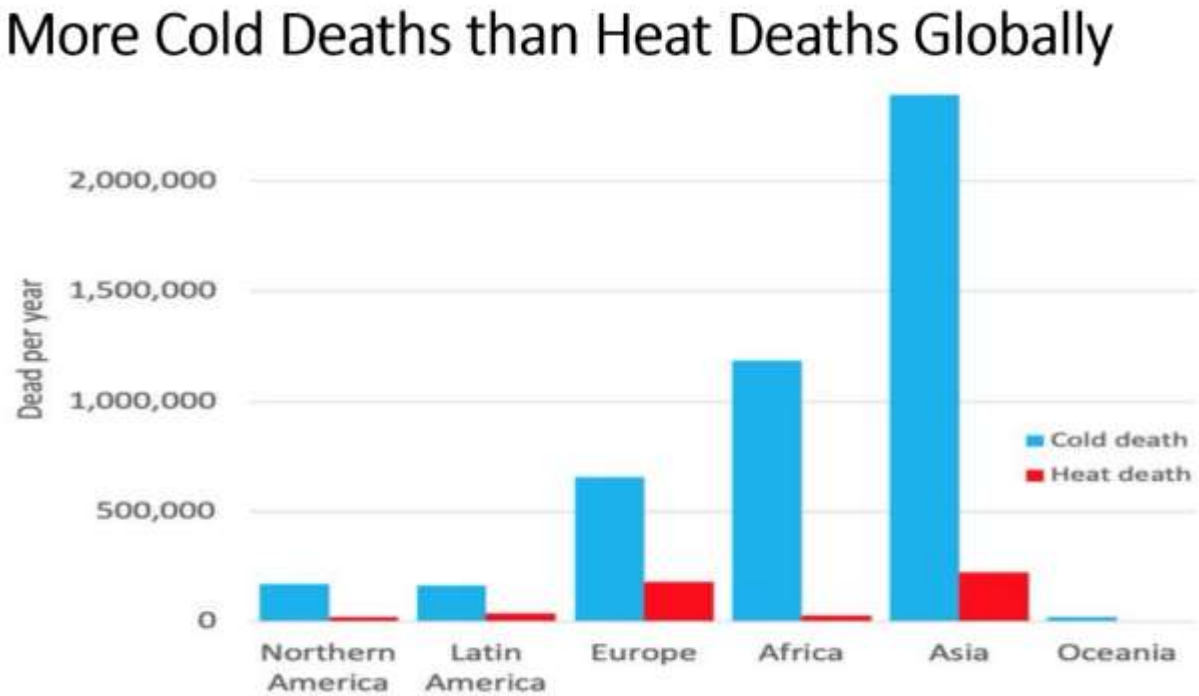
GREAT BARRIER REEF



- Another poster child of climate alarmism has been the killing by climate change of the Great Barrier Reef. Bleaching of the reef was experienced in 1998 and 2002 and a decline in coral cover was seen between 2000 to 2012, especially after cyclone Hamish.
- **Coral grows well and even faster in warm water**. Some of the most beautiful coral in the world is found in the Red Sea, an area of hot waters.
- Overall, coral has been growing in the Great Barrier Reef for over 10 years. The growth in 2021 was a record and 2022 exceeded this growth figure to set a new record. 2023 growth has been at near record levels.

Source: Peter Ridd, using data from the Australian Institute of Marine Science.

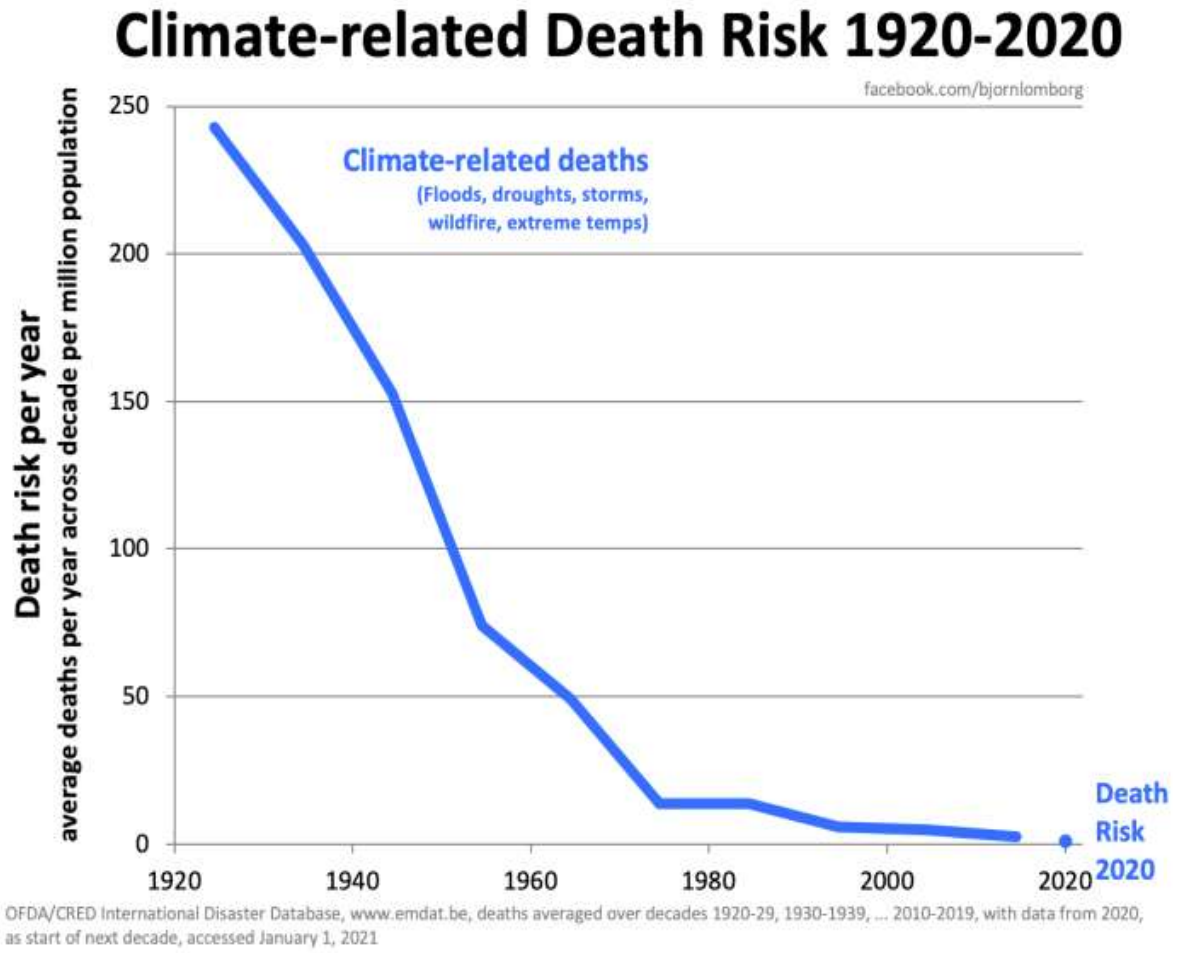
DEATHS FROM HEAT



- **Cold kills nine times more people each year than heat.**
- This is especially true in poor countries of Africa and Asia.
- Global warming has saved may lives and should be celebrated.

Source: Qi Zho, et al, "Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019, a three-stage modeling study," The Lancet, July 2021.

CLIMATE RELATED DEATHS



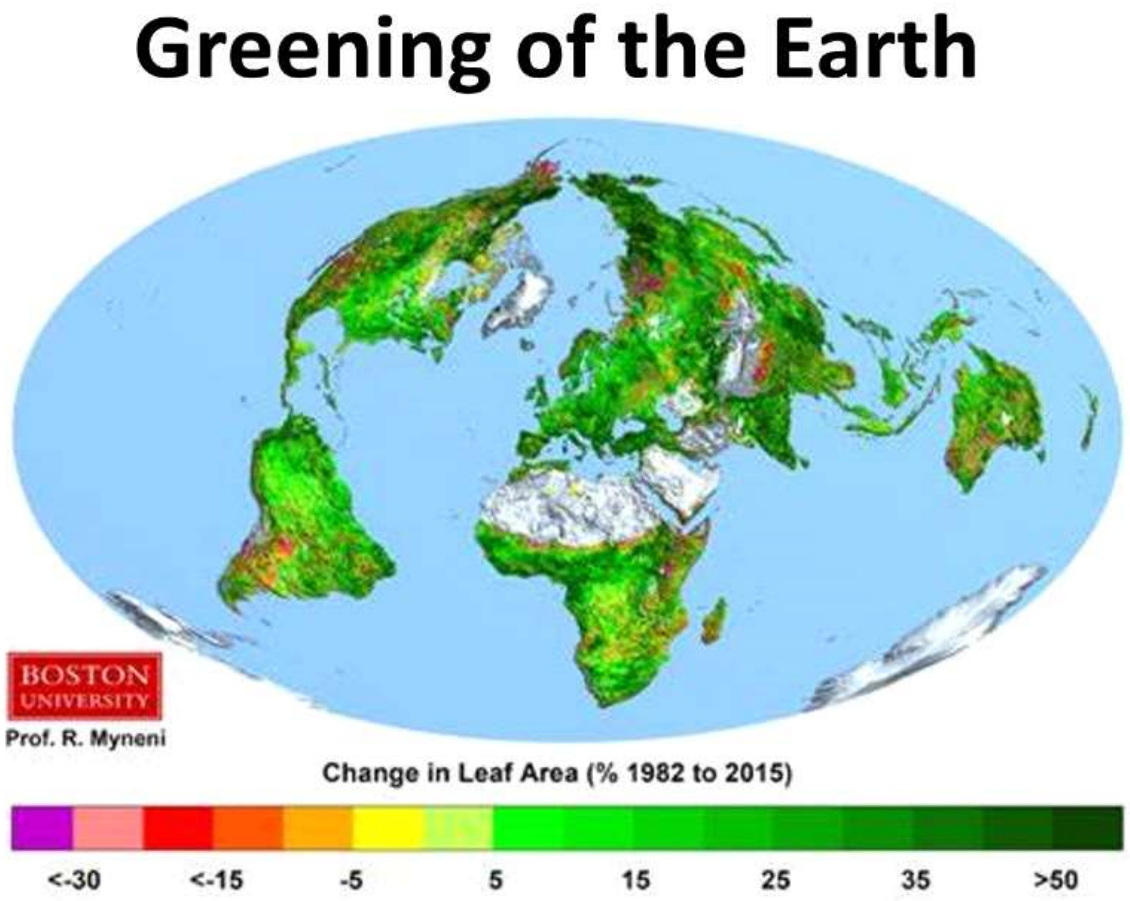
- **Climate and weather-related deaths have plummeted by 50-fold since 1920.**

- This may suggest warmer temperatures have been good for humankind; **the larger implication is the power of adapting to climate.**

- Many of these life saving adaptions have been possible due to fossil fuels.

Source: FDA/CRED International Disaster Database (2021).

THE EARTH HAS GREENED



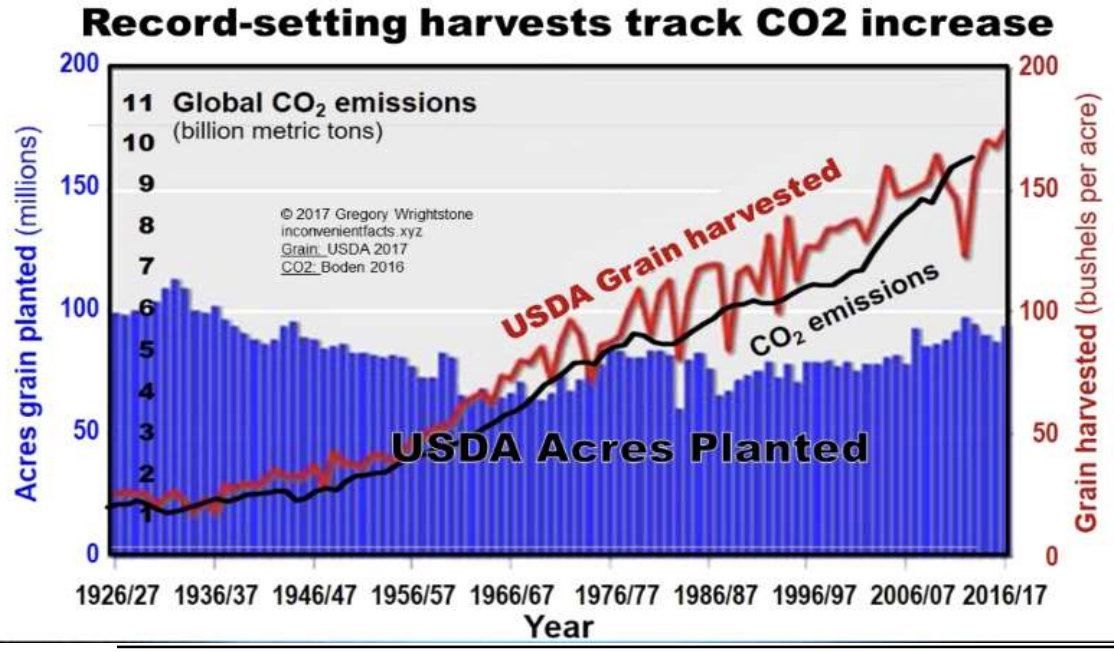
- **Satellite measurements of leaf coverage reveal the world has greened by 20% since 1982** and the greening has accelerated since 2001. The world is not browning

- This new green area is twice the size of the United States.

- Causes of greening include: CO_2 70%, nitrogen fertilizers 9%, global warming 8%, and land use 4% (see Zhou Xaichun, et al, Nature Climate Change, 25 April 2016).

Source: NASA (2016) Carbon Dioxide Fertilization Greening Earth and R. Myneni, Boston University.

It is a ridiculous irony that we call "green energy" the very energy that will result in less greening.



INCREASED AGRICULTURE

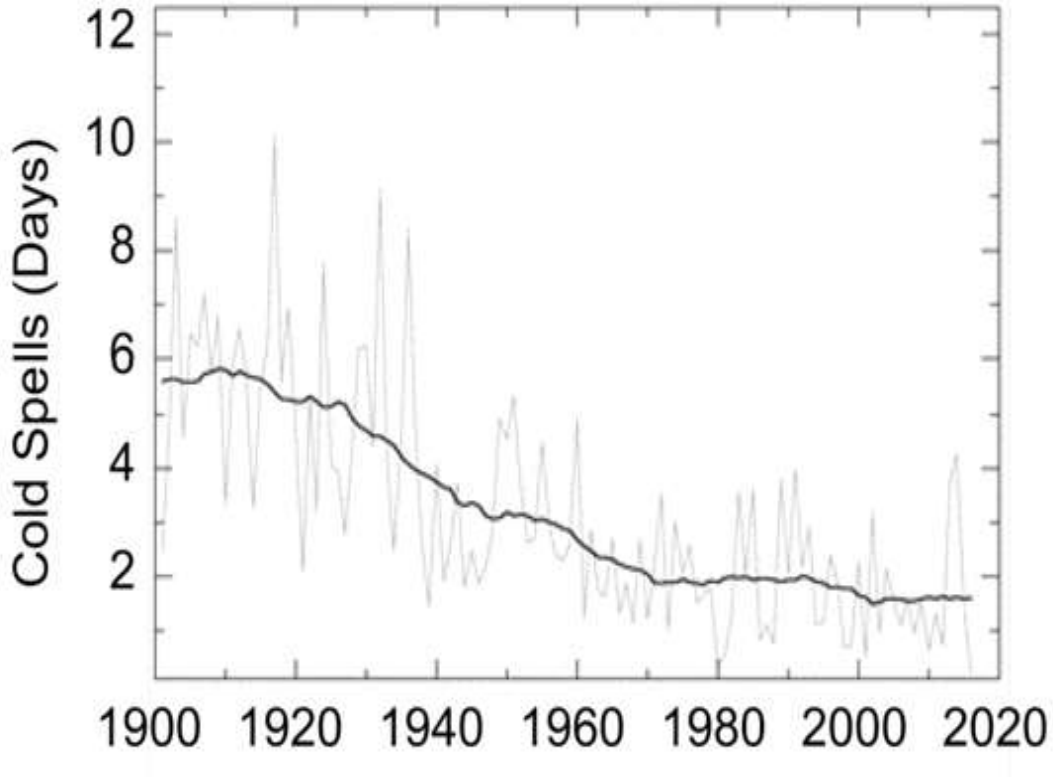
- The great benefit of more CO_2 is the tremendous increase in agricultural production to feed a growing population.

- Some commercial greenhouses triple CO_2 levels to 1,200 ppm to stimulate crop growth.

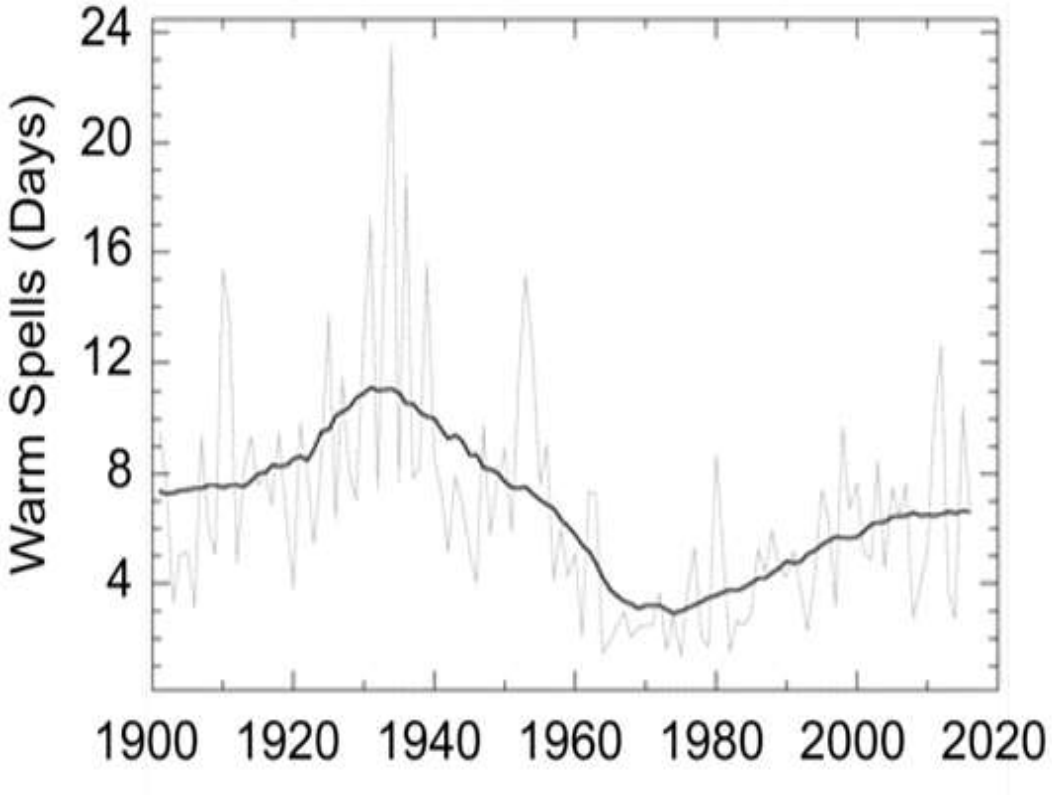
- CO^2 enhanced greenhouses have worked out how to use fertilizers to maximize increased CO_2 levels.

Sources: CO2 Science; and Gregory Wrightstone using data from the USDA (2017), World Agricultural Outlook Board.

MODERATING TEMPERATURES



Winters are milder



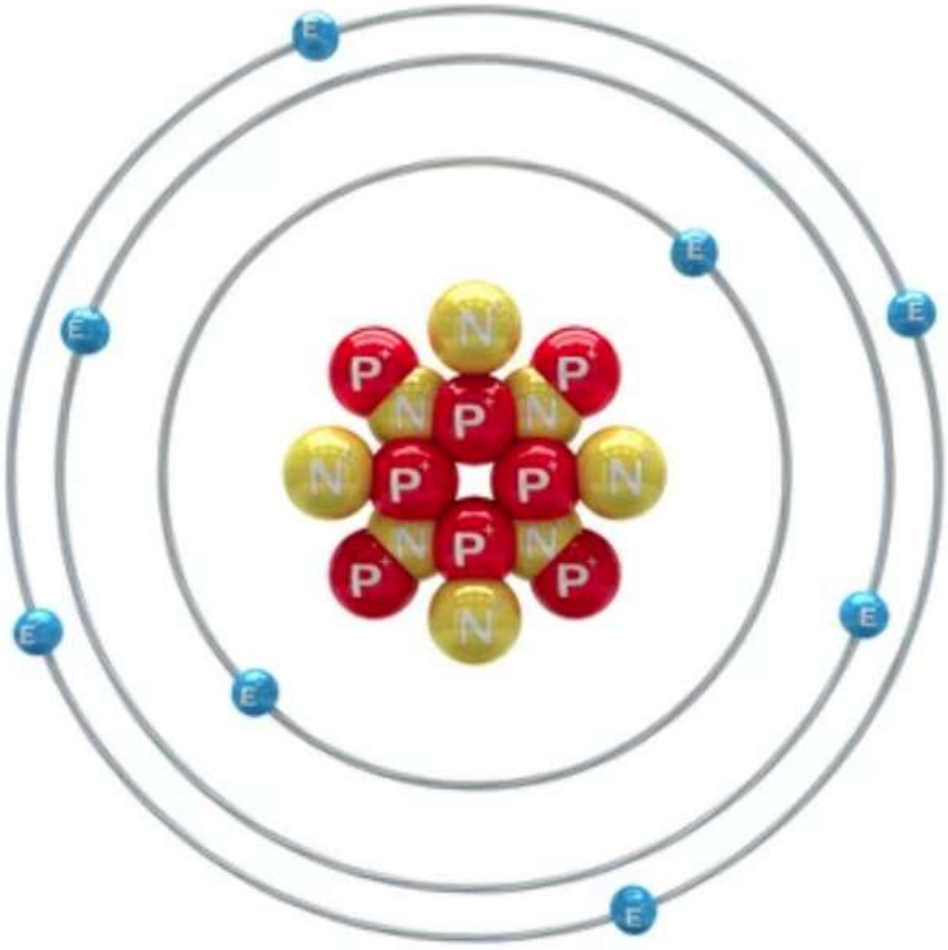
Summers are Not Hotter

Source: The Fourth National Climate Assessment (NCA4)

PALEOCLIMATE

Proxies from Isotopes

- Oxygen has a molecular weight of 16 from 8 protons and 8 neutrons; Naturally occurring isotope Oxygen 18 has 8 protons and 10 neutrons
- Water containing Oxygen 18 is heavier and evaporates slower than Oxygen 16. The ratio of Oxygen 16 to 18 is a proxy of the water temperature in the layers of a sample when they were deposited.
- C13 to C12 ratio is a proxy for CO_2 levels
- C14 and Be10 are proxies to cosmic rays and solar cycles

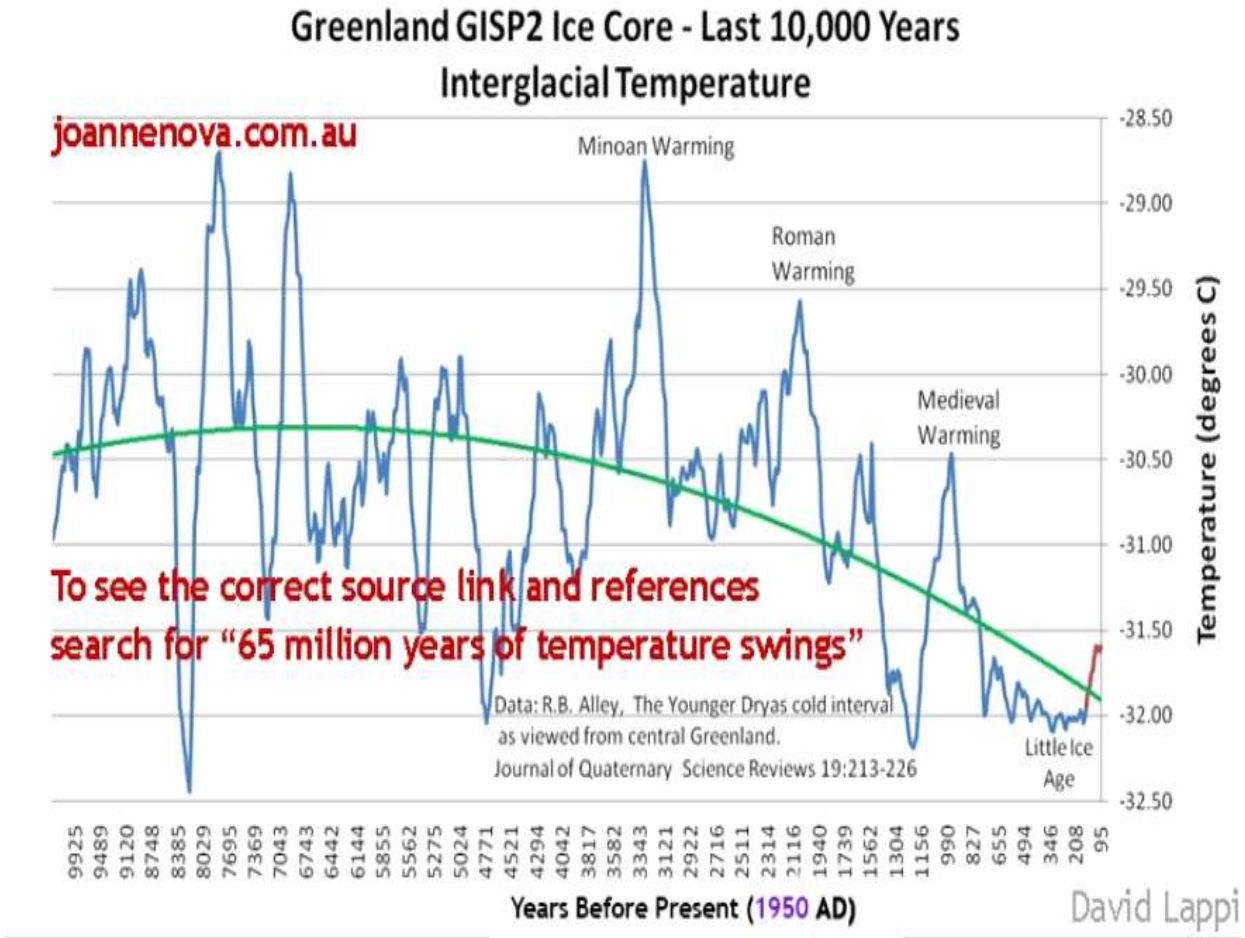


Adobe Stock Photo

CLIMATE CYCLES

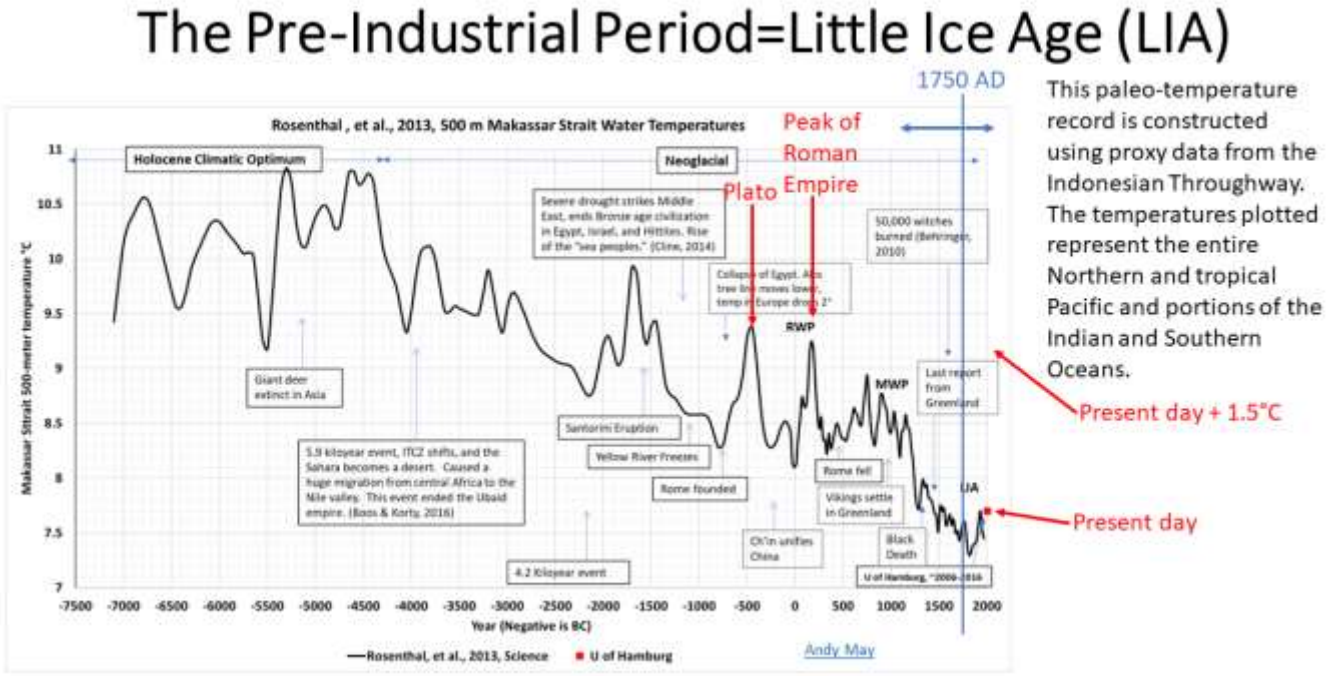
Millennial Climate Cycles

- **Warm Periods every 1,000 years**: Modern Warming, Medieval Warm Period, Roman Warm Period, Minoan Warm Period (Bronze Age)
- Cold Periods every 1,000 years: Little Ice Age, Dark Ages, Greek Dark Ages
- **Climate cycles do not correspond with CO_2, but do coincide with the 1000-year Eddy Solar Cycles Maximums and Miniums**
- Greenland was warmer during the Medieval Warm Period, Roman Warm Period, and Minoan Warm Period that today. The Holocene Optimum was even warmer.

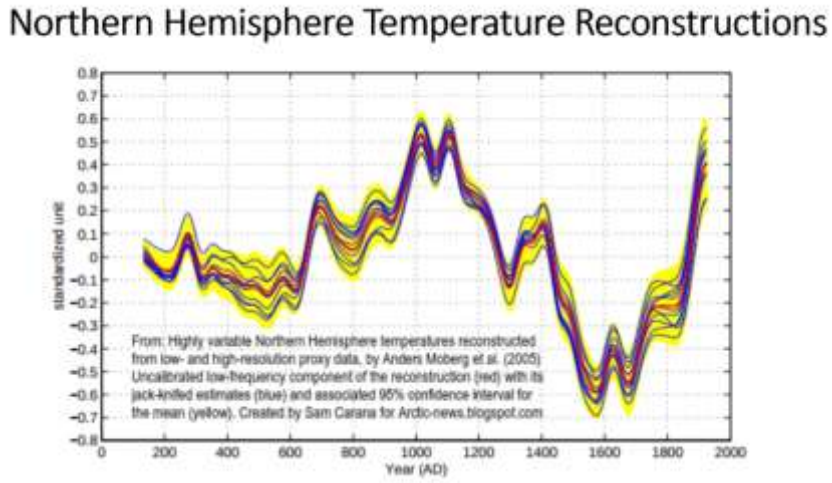


Source: Historical temperatures in blue, R.B. Alley, 2004, Journal of Quaternary Science Reviews 19:213-226, joanenova.com.au

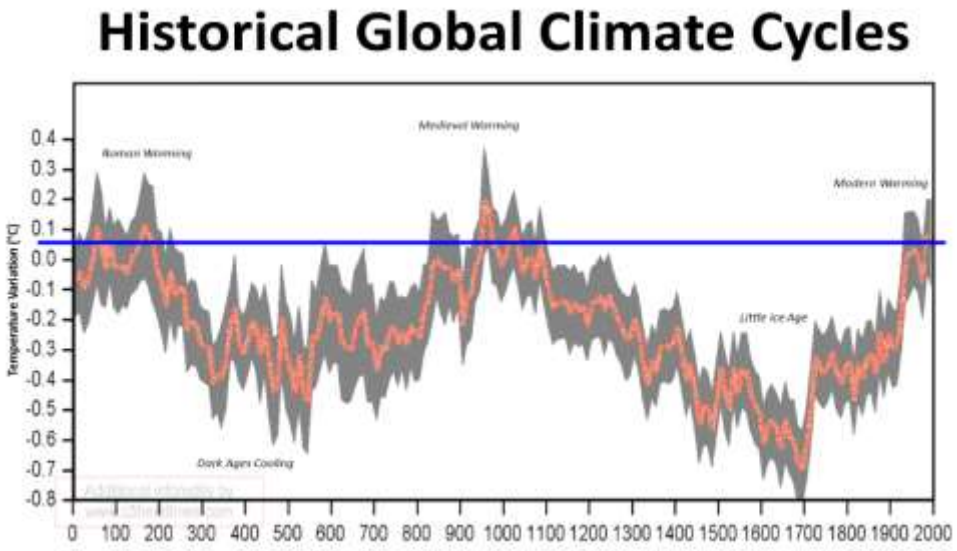
CLIMATE CYCLES



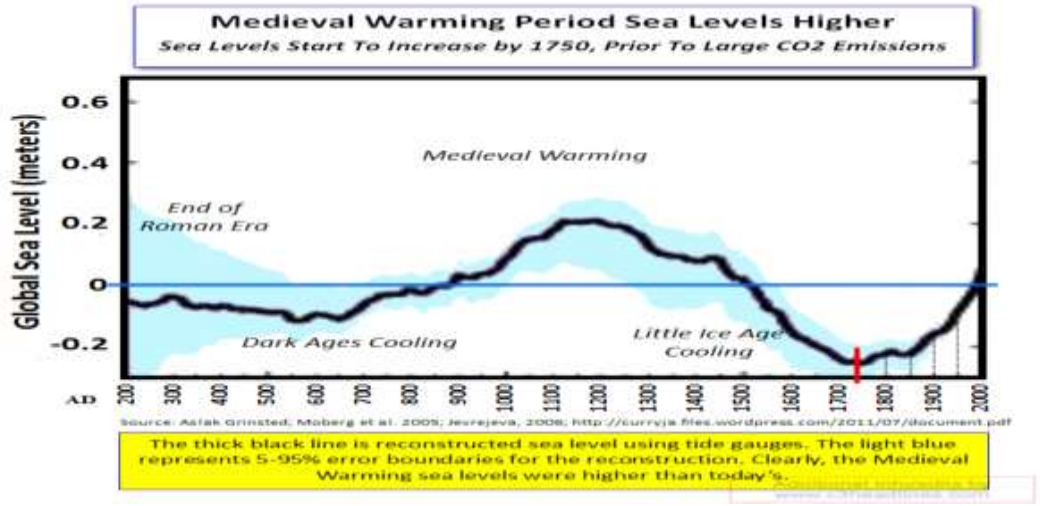
Source: Andy May using data from Yair Rosenthal, et al, "Pacific Ocean Heat Content During the Past 10,000 Years" Science 342, (2013)



Source: Moberg, A., et al, Nature, 433 613-617 (2005).



Geografiska Annaler:F.C. Ljunqivist, Series A, Physical Geography Volume 92, Issue 3, pages 339–351, September 2010



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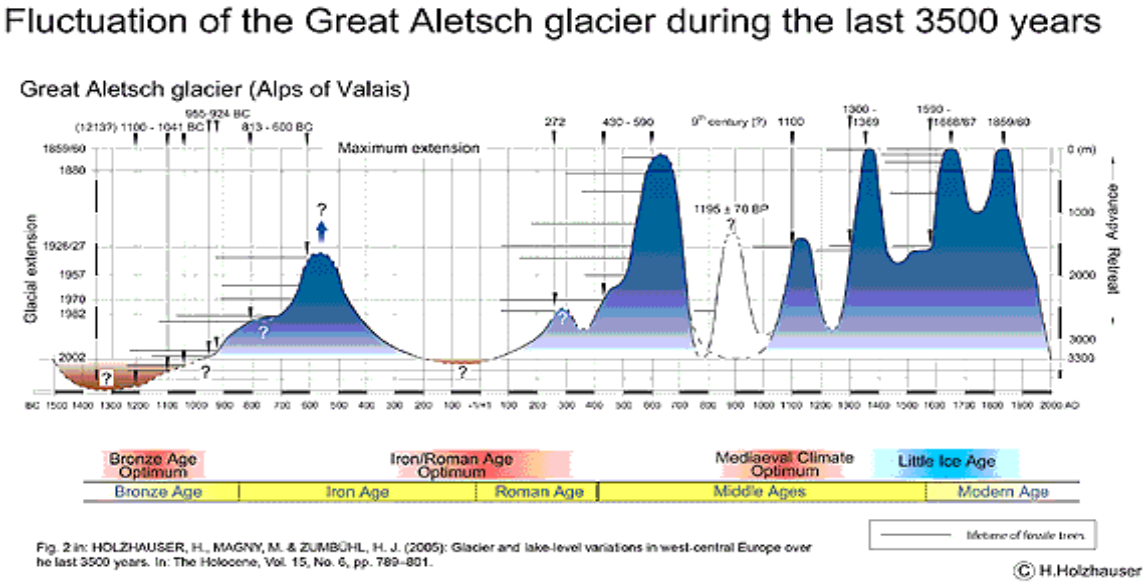


Fig. 2 in: HOLZHAUSER, H., MAGNY, M. & ZUMBÜHL, H. J. (2005): Glacier and lake-level variations in west-central Europe over he last 3500 years. In: The Holocene, Vol. 15, No. 6, pp. 789–801.

Source: Hanspeter Holzhauser, The Holocene, Vol 15, No.6 pgs. 789-801

WARM PERIODS

- **Minoan** – Millet grown in Scandinavia, glaciers in the Alps smaller than today.

- **Roman** – Mines in Alps under permafrost today, citrus grown in England, grapes grown in Northern England, glaciers retreated.

- **Medieval** – China cultivates citrus several hundred kilometers north than today, Germany grew grapes 200 meters higher altitude than today, cherry blossoms bloom early in Japan, barley grown in Greenland, wheat grown in Trondheim, Norway, Baltic grapes 500 kilometers further north than today, Vikings graveyards now permafrost, Ontario tree line 130 kilometer further north than today, warm loving *heterofaster urticae* nettle ground bug in York, England, sea level rise, glaciers in Alps recede.

COLD PERIODS

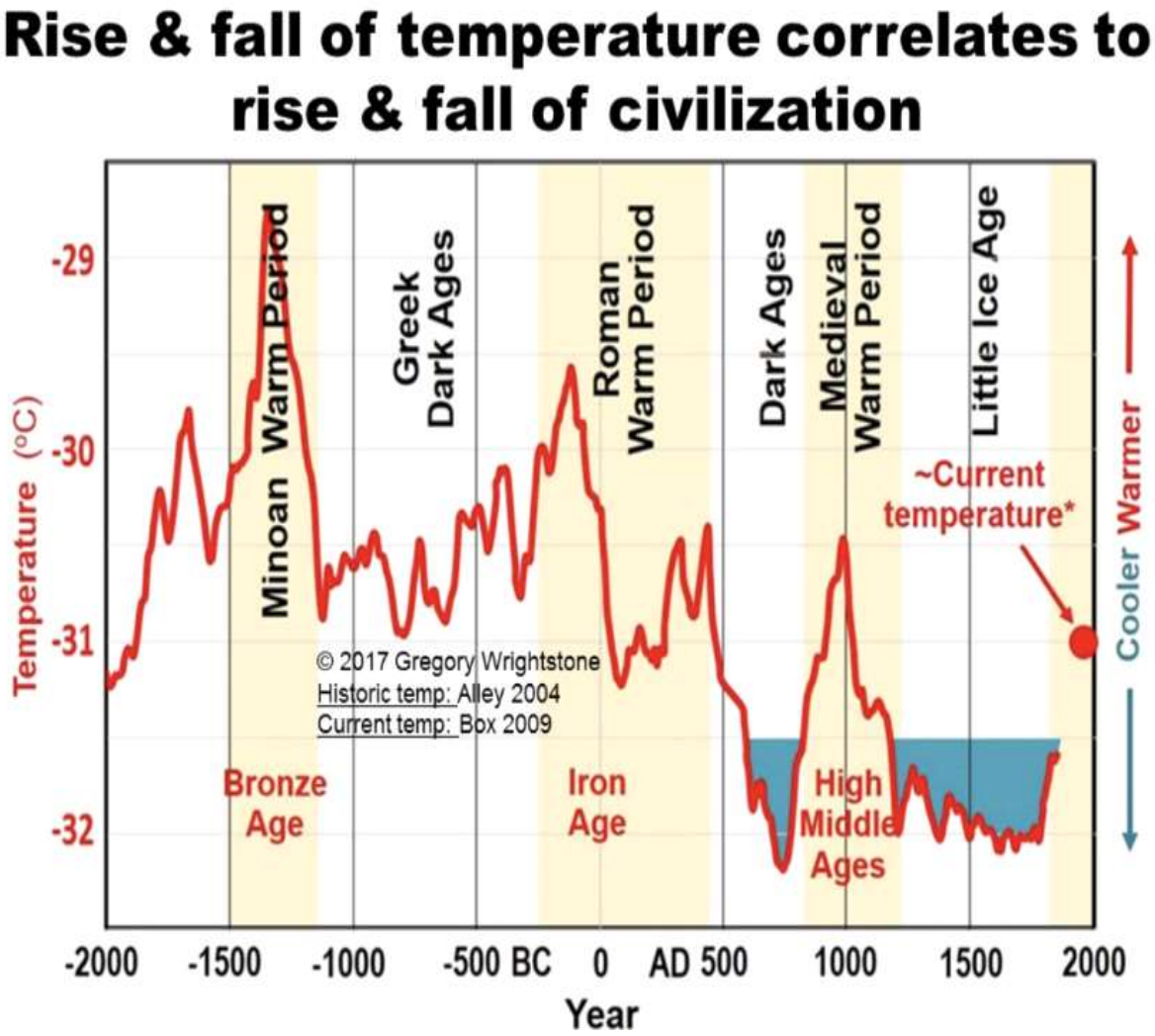
Source: *The Frost Fairs of River Thames | Amusing Planet*

- **Greek Dark Ages** – Cold and arid conditions caused a collapse in agriculture. Tree lines moved 300 to 400 meters lower in the Alps.

- **Dark Ages** – Yangzi and Danube rivers froze over, Roman passes through the Alps closed with glacier growth, tree lines fell by 200 meters in Central Europe.

- **Little Ice Age** – De Bois glacier swallowed two villages, Delaware River and Boston Harbor froze over, winter markets were held on the Thames River, canals in Amsterdam and Venice froze over, Egyptians wore fur coats for the first time in recorded history. The Vikings had to abandon Greenland.

"endless days when dark clouds obscure the sunlight"
Bishop Robert Burton (1577-1640)



Source: Gregory Wrightstone using data from Alley, R.B. (2004) Ice Core Temperature and Accumulation Data, Paleoclimatology Program Boulder, CO.

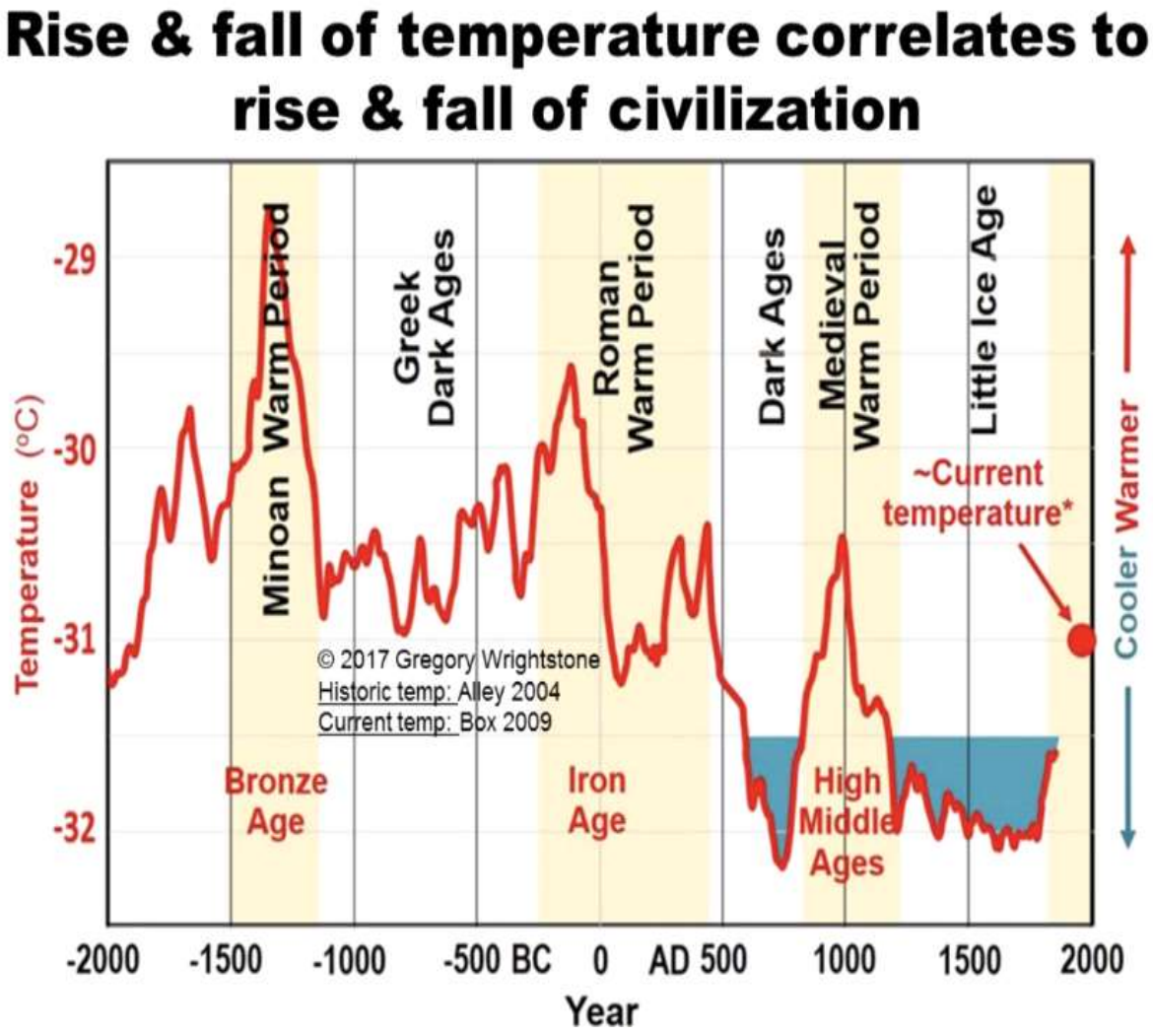
WARM IS GOOD

- **Minoan** – Plentiful harvests, emergence of the Bronze Age civilizations of Egypt, Mesopotamia, and China.

- **Roman** – Bountiful harvests, growing populations in the Roman Empire and Hun Dynasty, cultural advancements, architectural and engineering feats.

- **Medieval** – Increased food supplies, more cultivational land, population explosion, town formation expands, cathedrals built, emergence of Nordic nations in Scandinavian, Iceland and Greenland settlements established.

"Those who do not learn history are doomed to repeat it."
Winston Churchill



Source: Gregory Wrightstone using data from Alley, R.B. (2004) Ice Core Temperature and Accumulation Data, Paleoclimatology Program Boulder, CO.

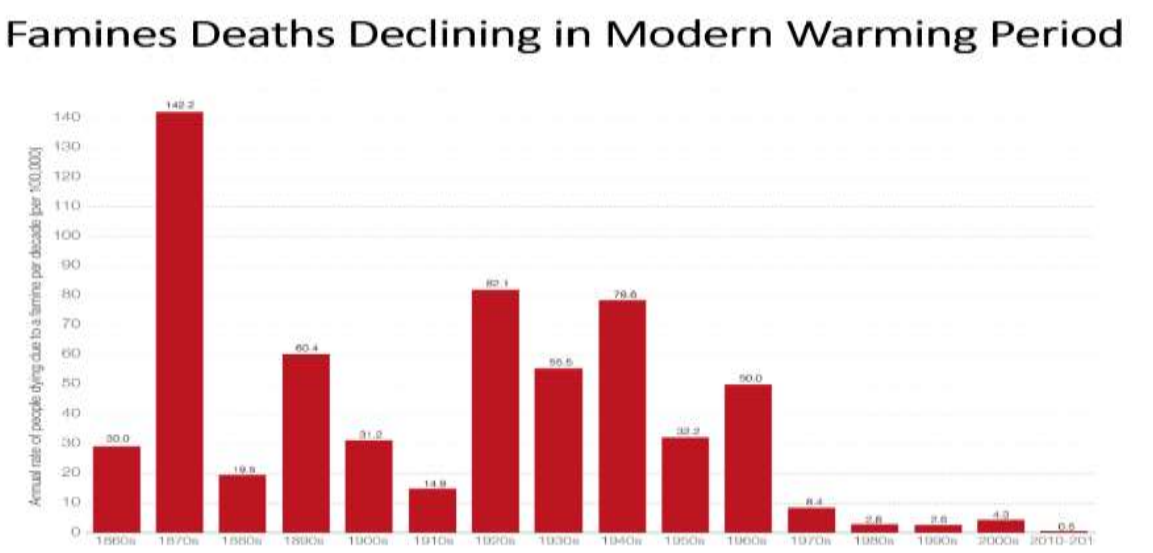
COLD IS BAD, VERY BAD

- **Greek Dark Ages** – Poor harvests, migrations and wars with the Seas People, collapse of Bronze Age civilizations, writing and palace building went dormant.

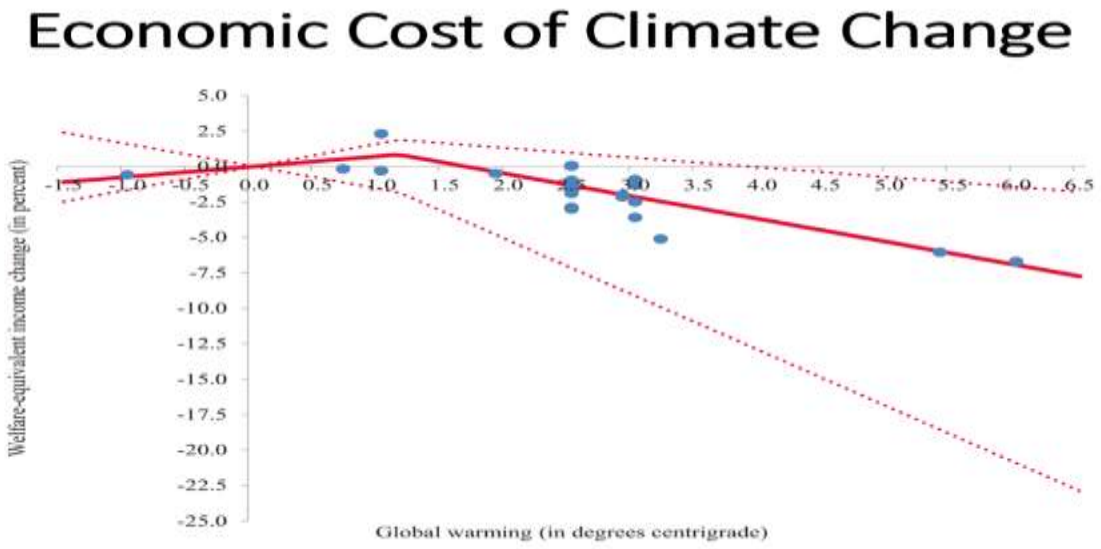
- **Dark Ages** – Cold, frosts, crop failures and epidemics, Roman Empire population fell from 30 to 15 million, cities including Ephesus, Antioch, Palmyra fell into decline, settlements north of the Alps were abandoned, climate migrations south of Huns and Goths, Roman and Classic Mayan civilizations collapsed.

- **Little Ice Age** – Crops failed, agrarian societies collapsed, malnutrition, plagues and disease, rebellion, riots, or wars in the Ming Dynasty, Aztec, and European nations, populations in Germany, Bohemia, and Finland declined by half or more and by one third in Asia and Europe, Greenland abandoned.

"Those who do not learn history are doomed to repeat it."
Winston Churchill



Source: OurWorldinData.org/famines.

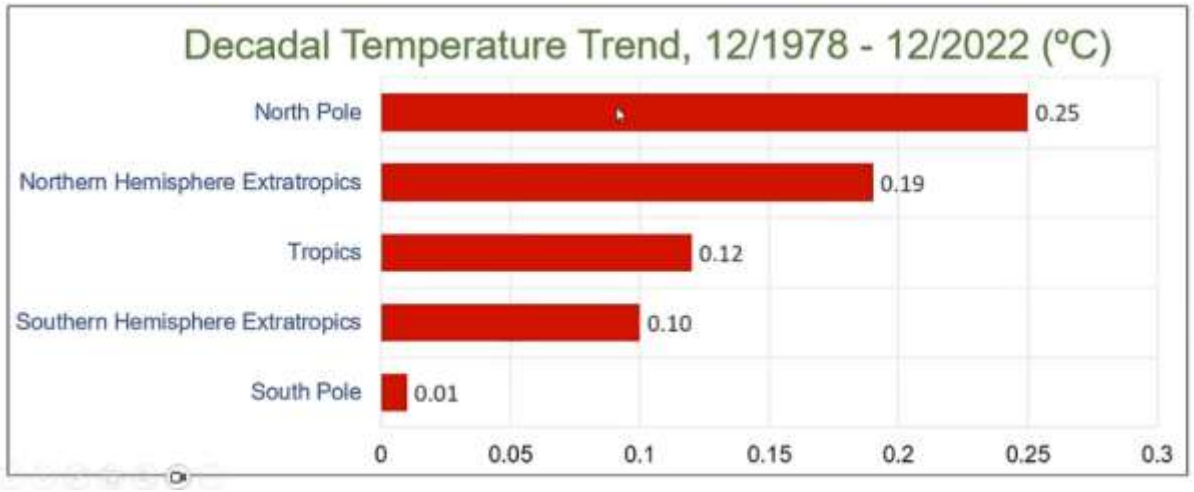


Source: Source: Richard S. J. Tol, The Economic Impacts of Climate Change," Review of Environmental Economics and Policy, 2018, 12 (1) pgs. 4-25.

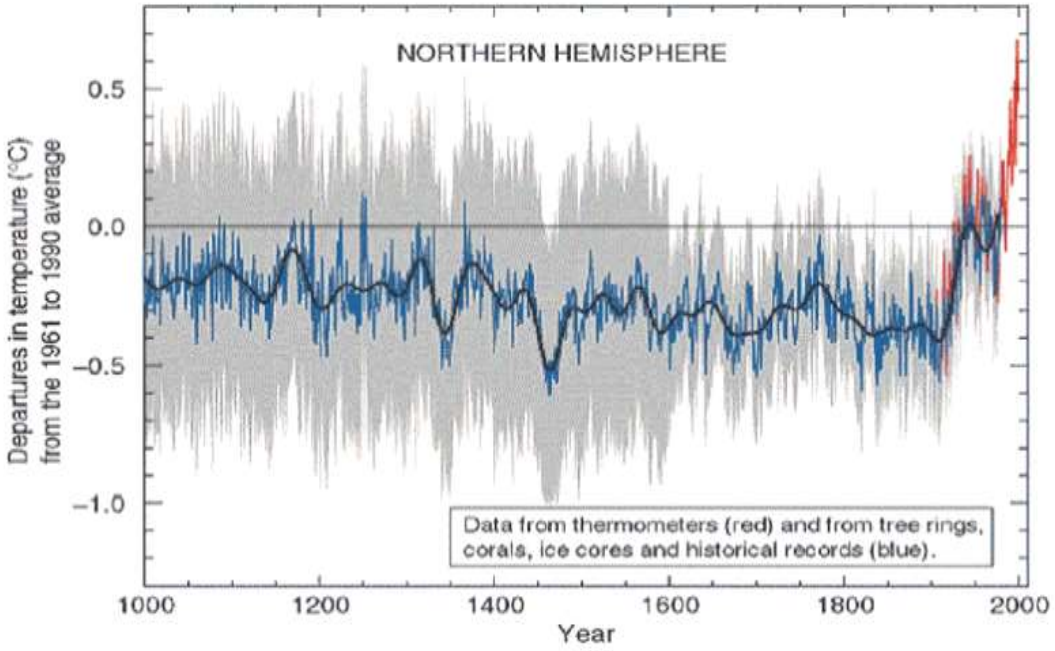
MODERN PROSPERITY

- **Modern Warm Period** – Modern warmth has provided abundant food and famines have dramatically declined. We have unprecedented prosperity.

- **Economic Cost of Climate**– Economist and IPCC author Richard Tol reviewed 22 economic papers on climate change. The mean of forecasts are:
  - The impact has been net-positive and will continue to be net-positive until an increase of 1.7C since 1850 is reached.
  - "…the impact of climate change does not significantly deviate from zero until 3.5C warming."



Source: Dr. Roy Spencer, University of Alabama Huntsville as presented by Arthur Viterito, Tom Nelson Podcast, November 28, 2023.



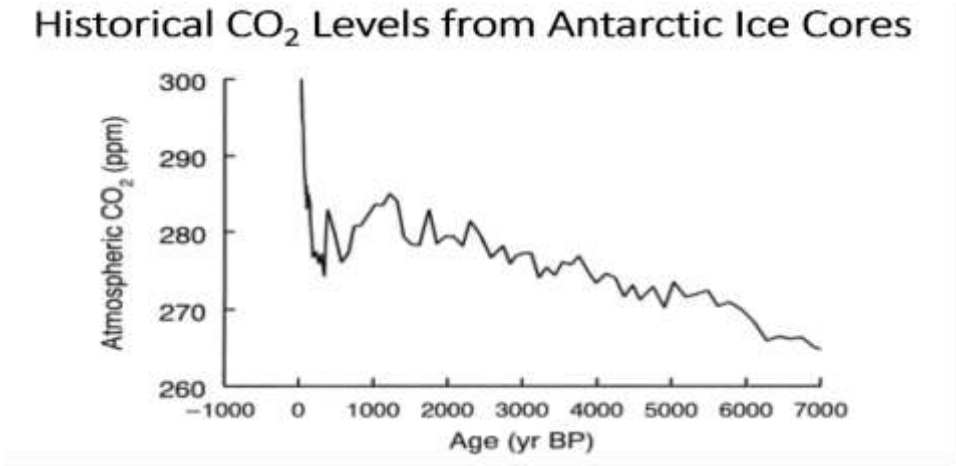
Mann Hockey Stick, Source: IPCC AR3 Report

GET RID OF THE MWP

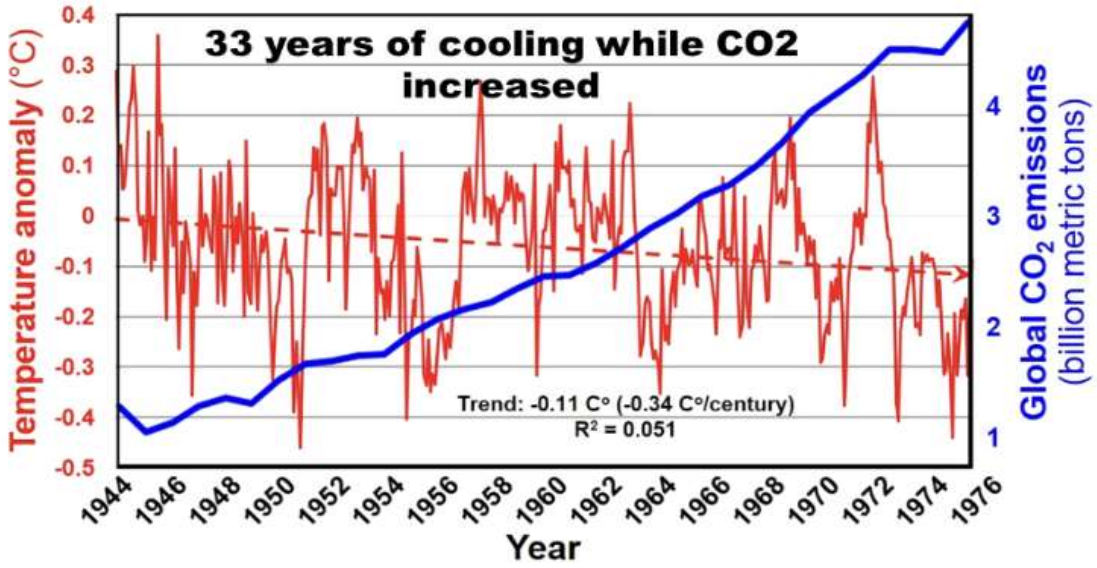
- **Mann Hockey Stick** - IPCC climate researcher wrote, **"We have to get rid of the Medieval Warm Period."** Michael Mann did just that with his Hockey Stick graph. Published in AR3, despite objections from University of Hamburg meteorologist Hans Von Storch.

- **Mann Hockey Stick Criticism** – Statistics, proxies, and mixing proxy and thermometer data has been criticized in four published papers (Soon, McIntyre, McShane). AR6 has new hockey stick from PAGES 2k group. IPCC ignores paper from PAGES 2k members who did not support the AR6 hockey stick. Similar criticism raised about AR6 graph from McIntyre and CLINTEL scientists (Crok, et al)

- **Regional Climate Change?** – **Mann argues the Medieval Warm Period was a regional event** in the Northern Hemisphere, especially in Greenland and Europe. **Current global warming is also a regional event** in the Northern Hemisphere, especially in Greenland and Europe.



Source: CO_2 record derived from the Taylor Dome Antarctic ice core study (Indermühle et al., 1999)



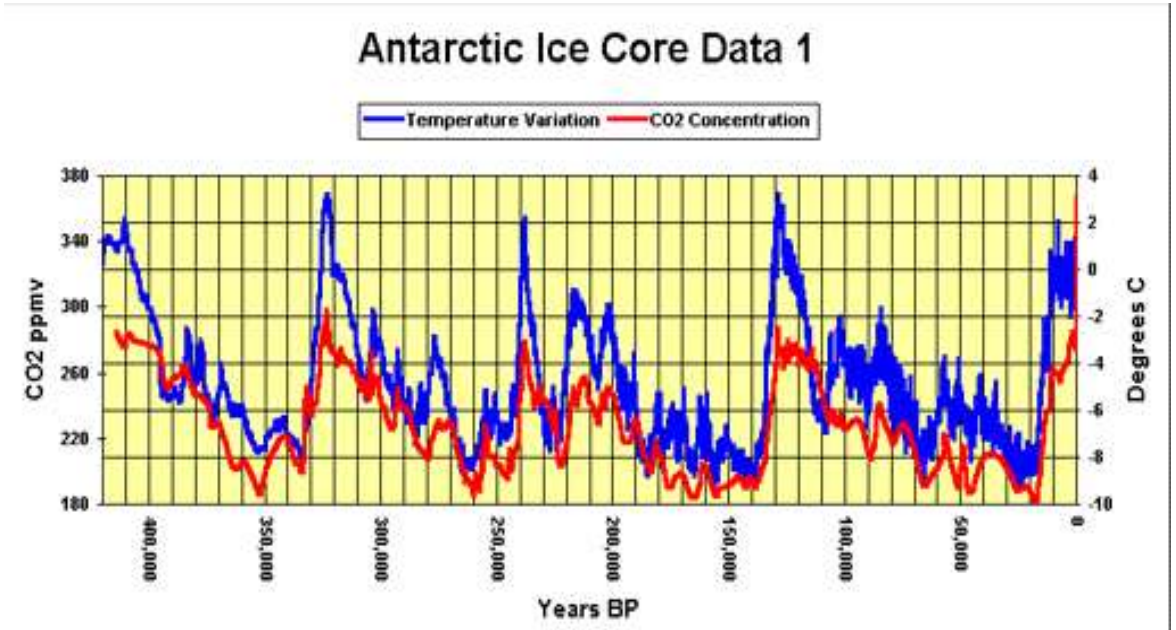
Source: Chart by Gregory Wrightstone, temperatures from HardCRUT4.

CO_2: NOT THE ONLY DRIVER

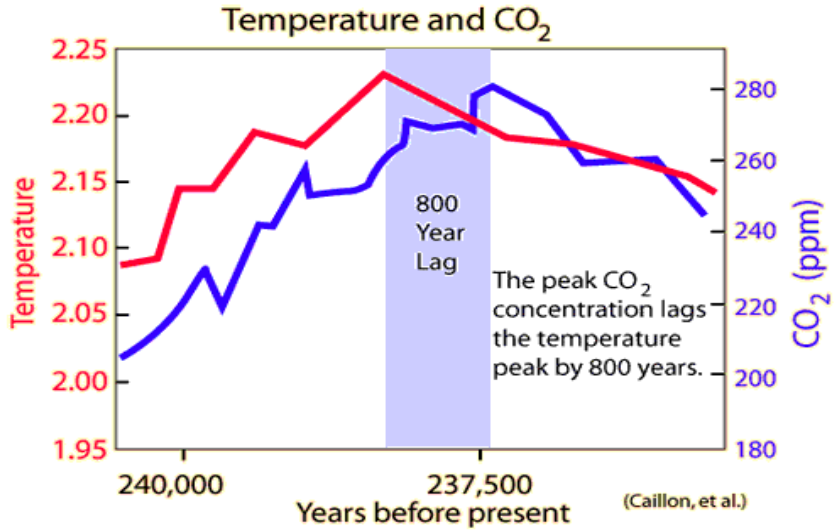
- **Holocene Climate Optimum** – 7,000 years ago, temperatures were 2C higher in Greenland and the Pacific Ocean than today, but CO_2 levels were lower.

- **Minoan, Roman, and Medieval Warm Periods** – These periods were as warm or warmer than today, but CO_2 levels were lower than today.

- **"Big Freeze" of the 1970s** – The temperature decline from the mid 1940s through the 1970s was during a time when CO_2 emissions increased by 5-fold.



Source: Pettit et al, (1999) Antarctica ice core data from Vostok, Nature 3 June 1999



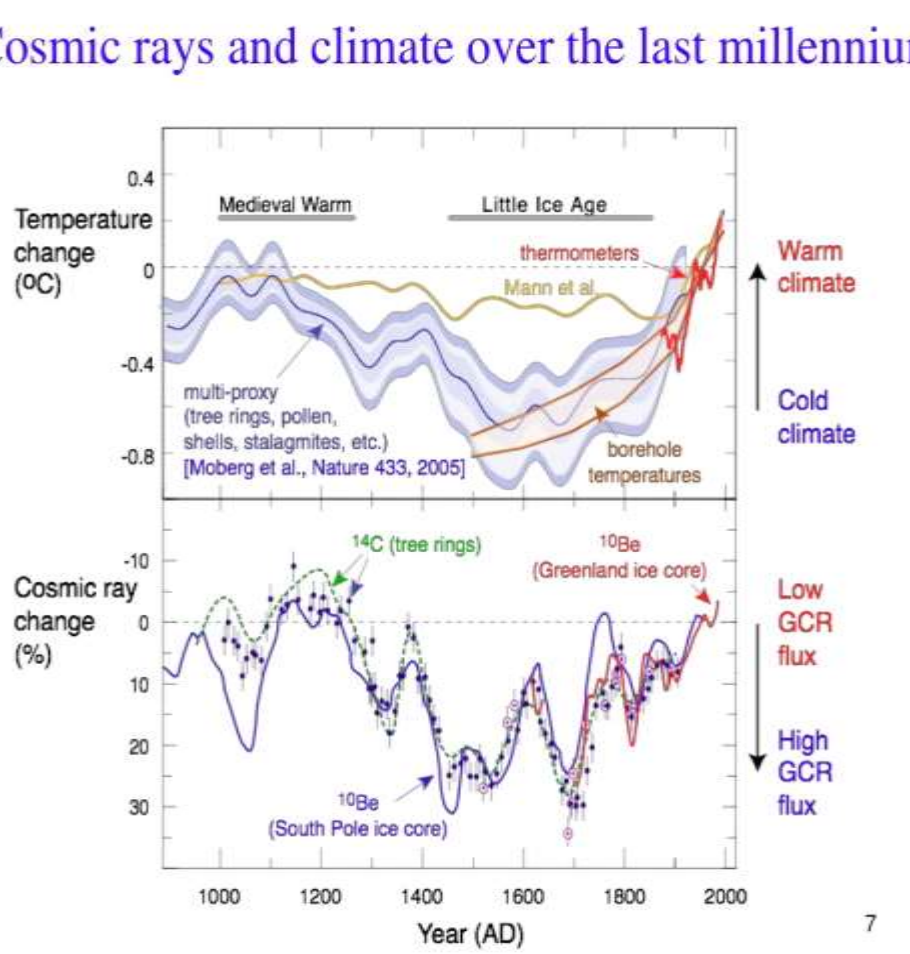
Source: Ian Clark, University of Ottawa, Antarctica ice core data from Vostok.

TEMPERATURE LEADS CO_2

- **Al Gore's "An Inconvenient Truth"** – 400,000 years of history show CO_2 levels correlate to temperature. In this case, correlation is not causation.

- **A Ridiculous Argument**
  - These 100,000-year Ice Age temperature swings are due to the **Milankovitch cycles** of eccentricity.
  - Temperature increases by 11C but CO_2 only changes from 180 ppm to 300 ppm. This 120 ppm increase has a radiative forcing of 2.2 W/m^2, or **0.6C**.
  - **Temperature leads CO_2** due to the absorption and release of CO_2 (like a warm or cold Coca-Cola). Pursuant to Henry's Law, the release of CO_2 of 120 ppm is in line with a 11 C change in temperature.

SOLAR AND CLIMATE CYCLES

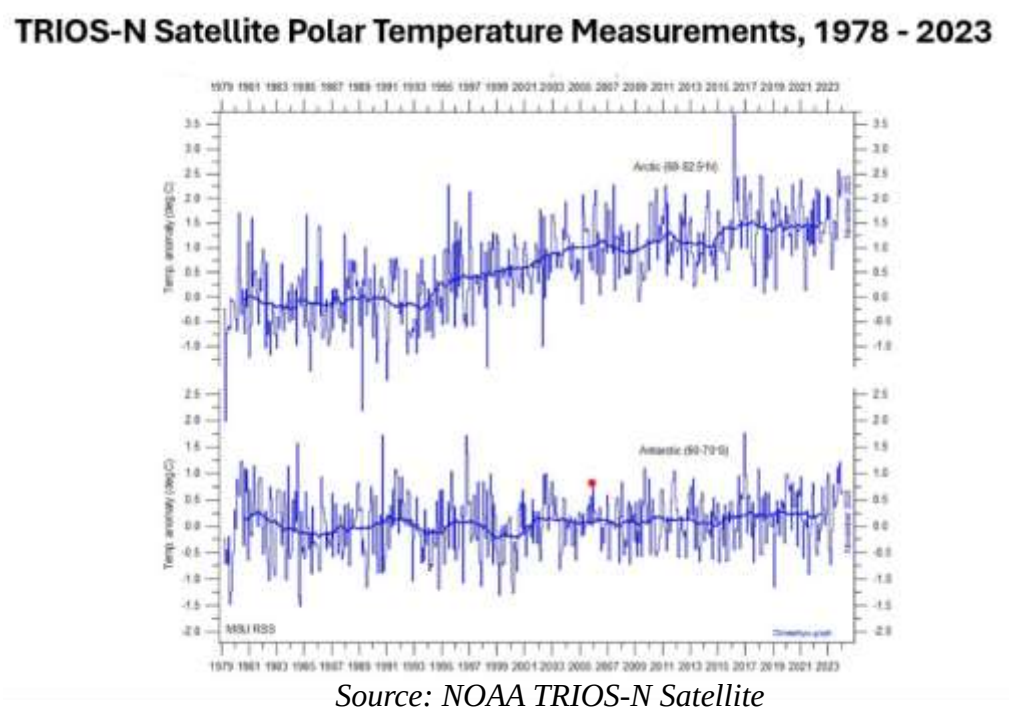


Source: Henrik Svensmark (2007), Danish National Space Center.

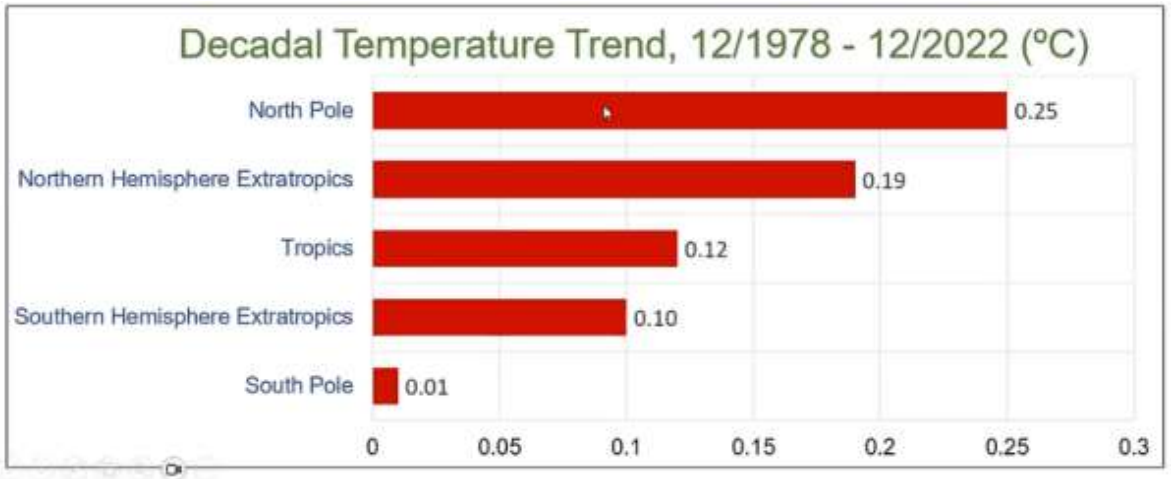
- **Cosmic Rays** – Cosmic rays create isotopes Carbon 14 and Beryllium 10. Paleoclimate samples are measured by mass spectrometry to determine the levels of C14 and Be10 in the sample layers.

- **Solar Cycles** – The magnetic field of the sun varies with solar cycles. A stronger magnetic field shields the earth from cosmic rays; **a weak magnetic field allows up to 20% more cosmic rays** to enter the earth's atmosphere. The millennium-scale Eddy Solar Cycle is confirmed by sun-spot records and C14 and Be10 paleoclimate measurements.

- **Climate Cycles** – The climate cycles of the Holocene Climatic Optimum, Minoan Warm Period, Greek Dark Ages, Roman Optimum, Dark Ages, Medieval Optimum, Little Ice Age, and Modern Warming are synchronous with cosmic ray flux and millennial Eddy Solar Cycles. **The Modern Maximum is the strongest grand solar cycle in 10,000 years.**



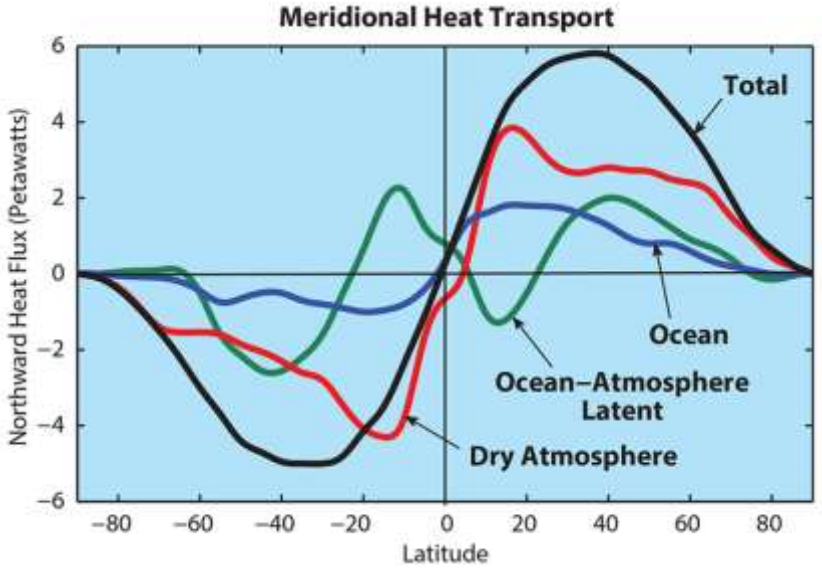
Source: NOAA TRIOS-N Satellite



Source: Dr. Roy Spencer, University of Alabama Huntsville as presented by Arthur Viterito, Tom Nelson Podcast, November 28, 2023.

ARCTIC AMPLIFICATION

- The Arctic is warming faster than Antarctica and the rest of the globe.
- CO_2 is relatively uniform around the globe so it cannot explain Arctic Amplification.
- Polar vortex, ice melt, and permafrost methane cannot explain Arctic Amplification since such factors would be similar in Antarctica
- **Ocean currents transporting solar heat to the atmosphere near the Arctic can explain Arctic Amplification.**



Source: Chart by Andy May from Rui Xin Huang, "Ocean, Energy Flows," Encyclopedia of Energy, Volume 4, 2004.

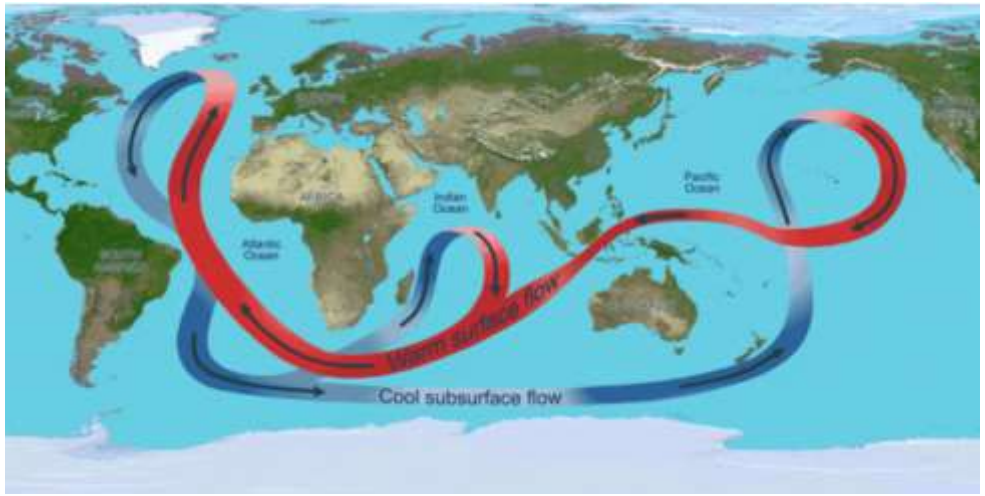


Diagram of MOC: NASA

HEAT TRANSPORT

- The oceans and atmosphere transport heat to the poles. Essential to maintaining the Earth's Energy Budget

- Initially more heat is transported from the Tropics to the south, but ocean heat puts more heat in the north

- The Meridial Overturning Circulation (MOC) carries more heat to the north; amplified by the Gulf Stream Circulation in the North Atlantic and Kurshio Circulation in the North Pacific

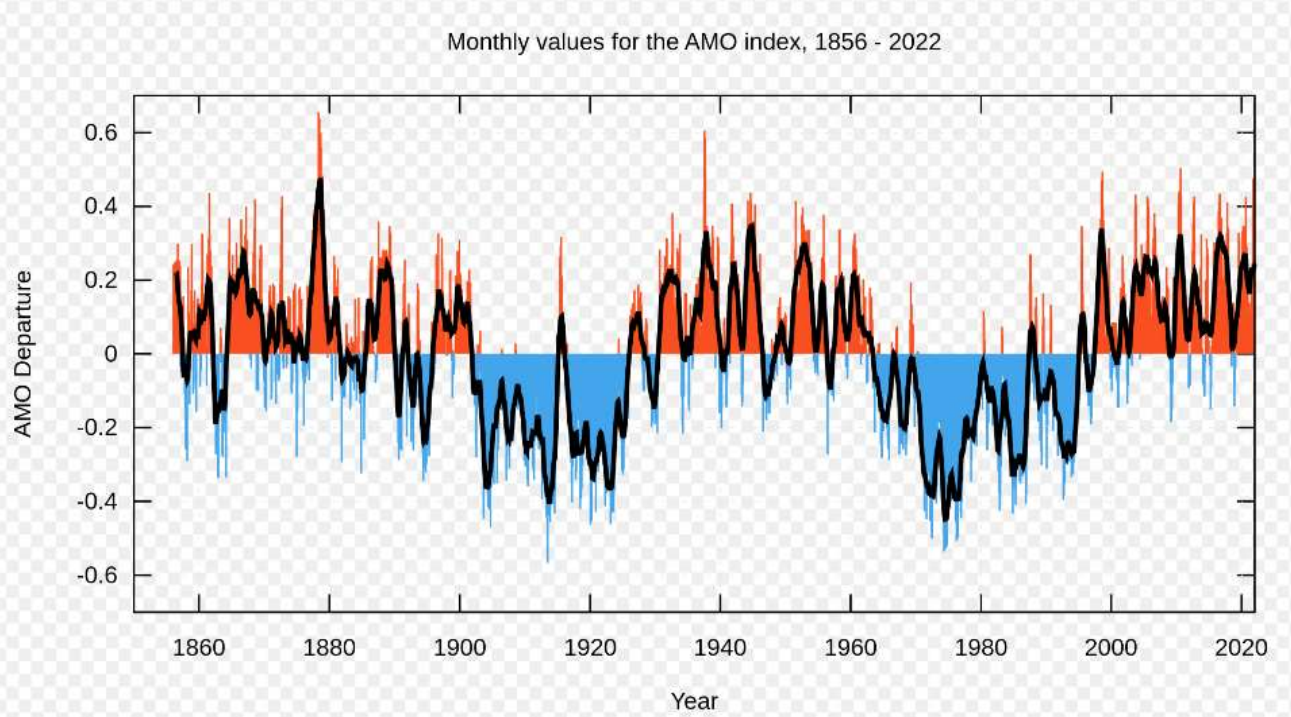
- **More heat is transferred to the atmosphere near Greenland, Europe**, and the West Coast of North America.

- London (50F), Moscow (39F), Winnipeg (28F), and Krasnoyarsk (21F) are on about the same latitude.

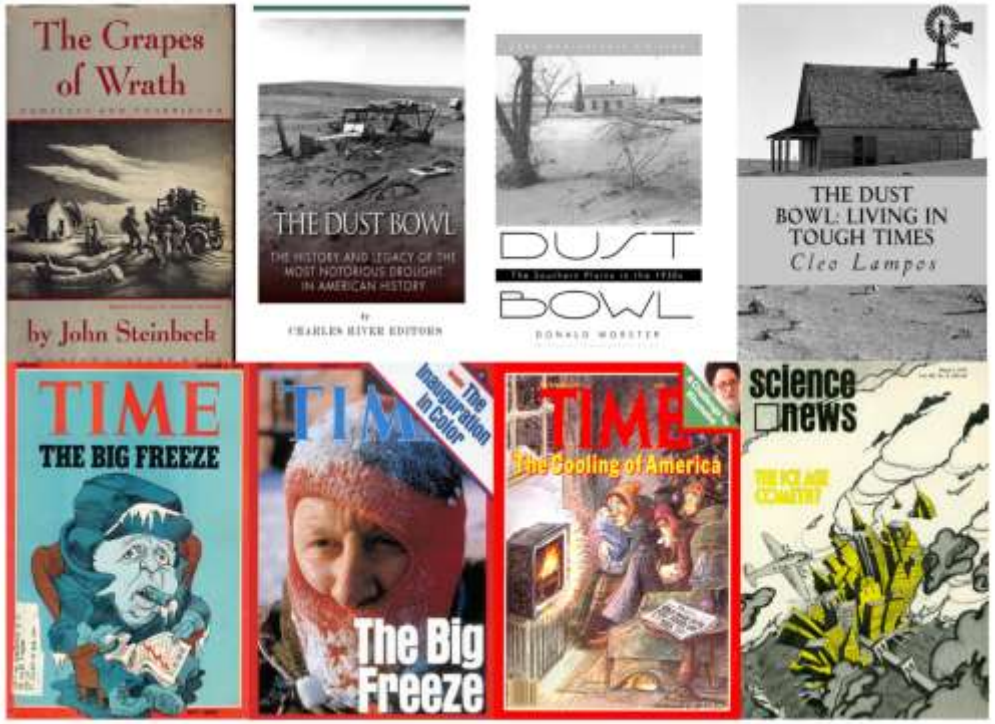
OCEAN OSCILLATIONS

Record 1930s Temperatures that have not been exceeded

- Europe: Italy 119.3F, Greece 118.4F, Spain 116.6F, Sweden 101.8F
- USA: 23 of 48 continental states, North Dakoda 121F, Wisconsin 114F
- Canada: 7 of 13 providences: Saskatchewan 113F, Alberta 110F



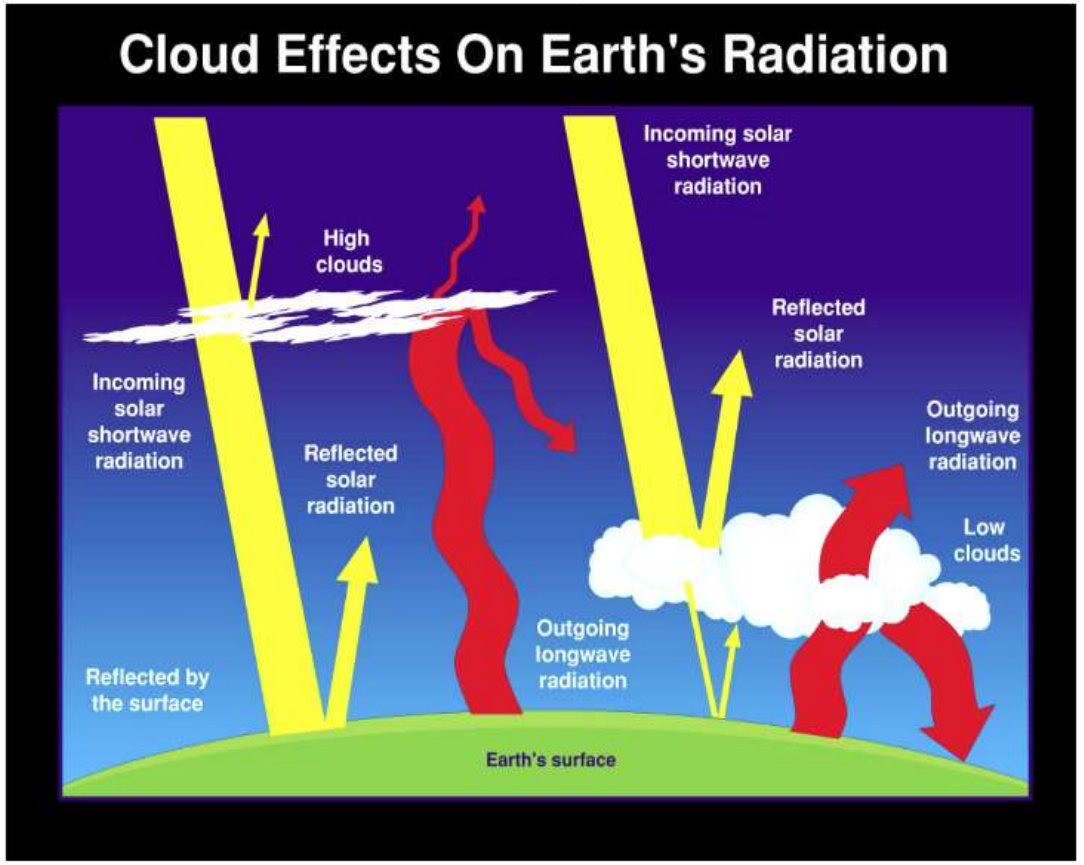
Source: Wikipedia



OCEAN WARMING

Oceans are warmed by the Sun

- Incoming solar radiation is estimated at 173,000 TW, which constitutes over 99.9 % of the energy input to the earth's climate system.
- Oceans are 70% of the area of the globe but absorb **90% of the world's solar heat**, due to their low albedo.
- Low clouds, which shade the earth, have the greatest impact on ocean warming.
  - 240 watts/m^2 of solar energy makes it to the surface
  - Low clouds reflect 70% to 90% of this heat
  - 240 x 90% = **216 watts/m^2** is 72 times 3 watts/m^2 of radiative forcing by doubling CO_2 over the next 150 years
  - There is 10% to 15% more cloud cover over the oceans



OCEAN WARMING

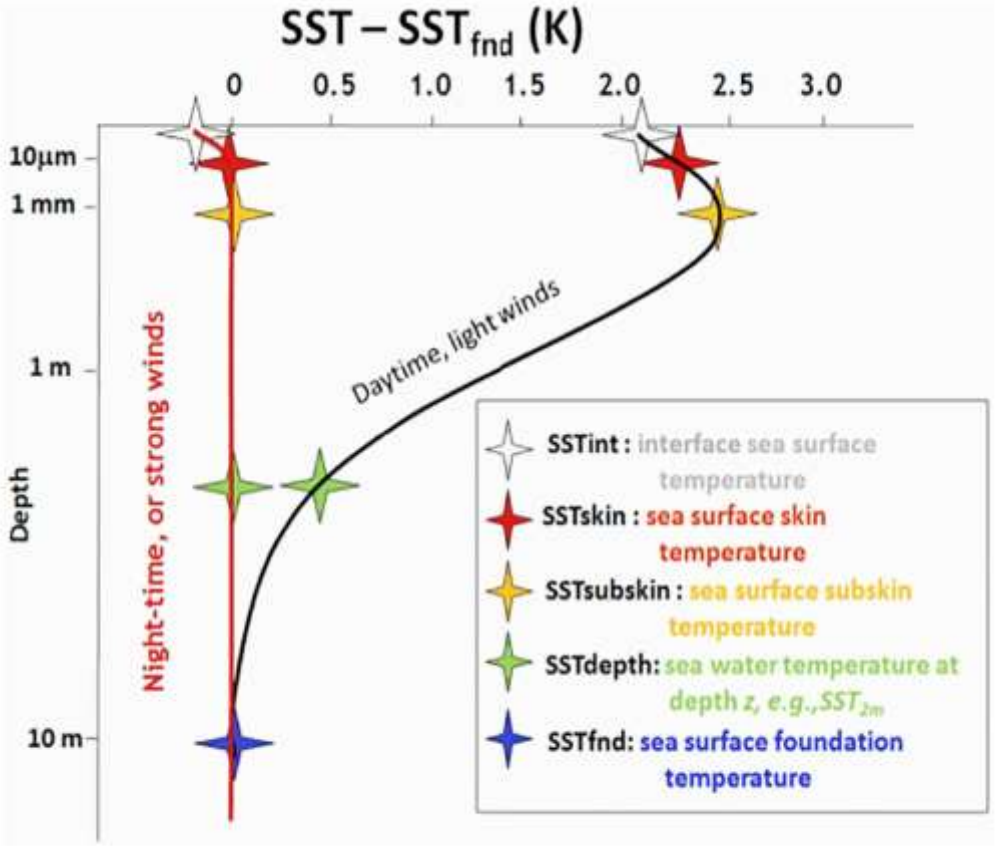


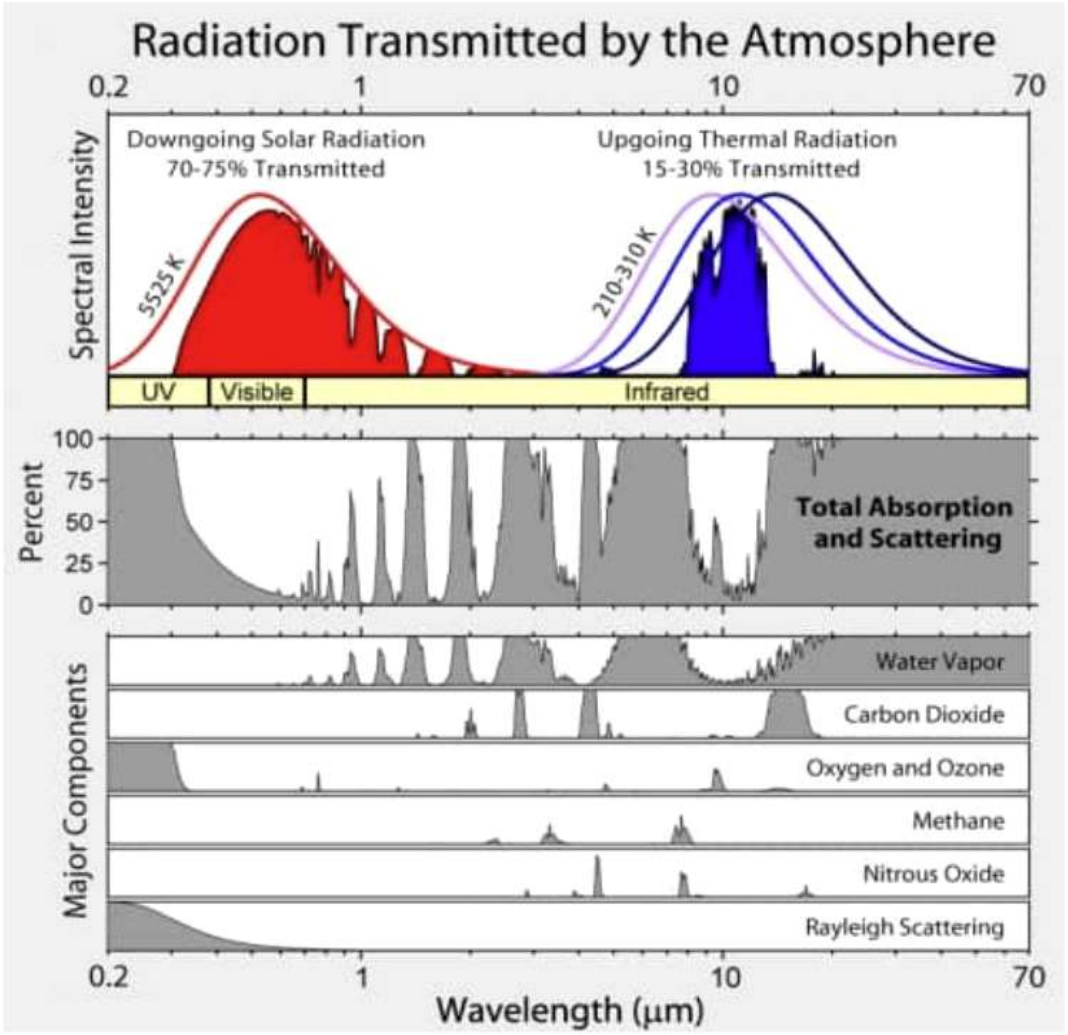
Fig. 2. Near-surface oceanic temperature gradients. From Minnett and Kaiser-Weiss (2012).

CO_2 has No Effect on Ocean Warming

- **Oceans are 2 degrees C warmer than the atmosphere** at sea level (17C vs. 15C); Atmosphere cools the oceans
- **Radiation, conduction, and convection heating from the atmosphere only heats the surface; leads to cooling from evaporation.**
  - Evaporation absorbs 2,260 joules per gram of water
  - 127 watts/m^2 of heat is removed from oceans by evaporation
- **CO_2 warms in the 13 to 17µ infrared spectrum; 90% of the heat is absorbed in water in the first 100 µ. (width of human hair)**
- A warmer atmosphere does not slow transfer of heat from the ocean to the atmosphere since wind (convection) and warmth aids evaporation and warmth also aids radiation. **Atmospheric CO_2 warming only heats the surface of the ocean** and such heat is lost to evaporation.
- **Sea Skin (20 µ to 1 mm) is colder than the sea just below the skin**. This proves atmospheric warming of the ocean surface is more than offset by evaporative cooling. This is true in the Tropics where the atmosphere is warmer than the ocean.

GREENHOUSE GASES

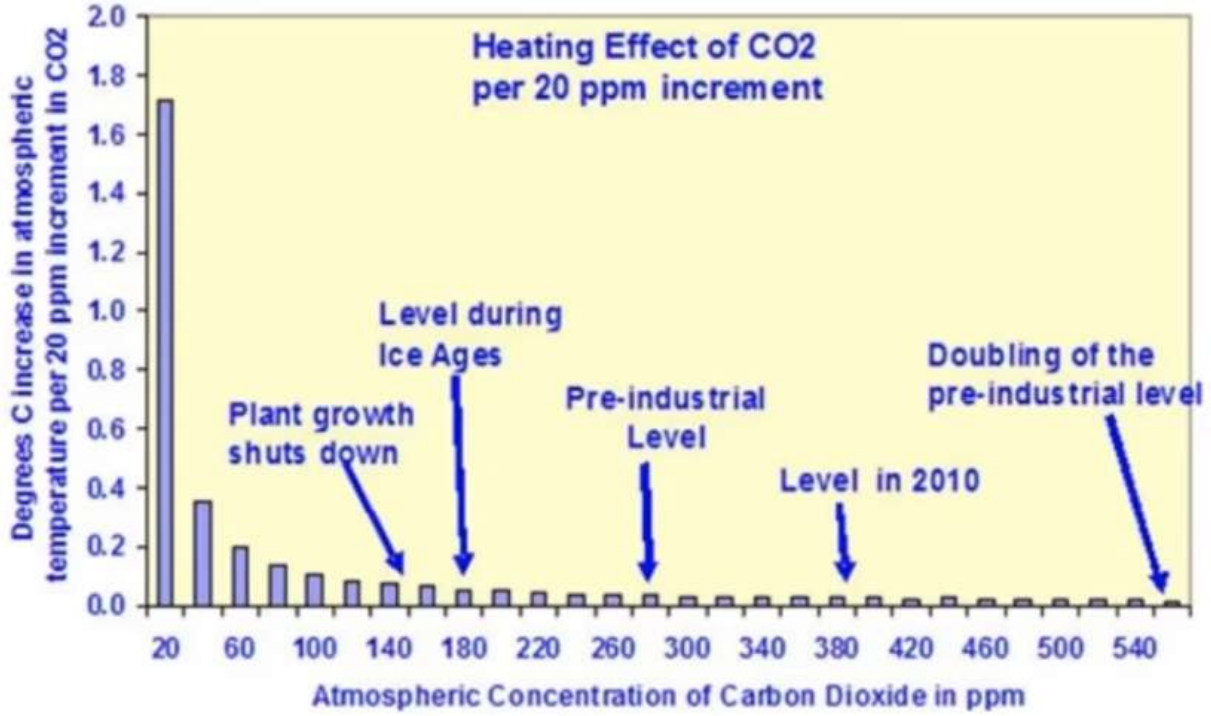
- Greenhouse gases slow the release to space of infrared radiation in spectrums specific to the quantum physics of each molecule. This raises the temperature of Earth.
- **Water is the dominant greenhouse gas both in concentration 4,000 ppm and the wide absorption spectrum**.
- CO_2 is the next important greenhouse gas at 420 ppm, but is **effectively limited to the 13µ to 17µ spectrum**. **99.4% saturation occurs in first 10 meters from ground.**
- Methane and Nitrous Oxide and Methane, measured in ppb have minimal impact (*see William van Wijngaarden, Tom Nelson Podcast #56*). CFCs and HFCs, measured in ppt have even less impact. One million times less concentration than $CO_{2)}$.
- CFCs and HFCs, measured in ppt have even less impact. One million times less concentration than CO_2



Source: Wikipedia

EXPONENTIAL DECLINE

- The power of CO_2 to warm (known as radiative forcing) declines exponentially as concentration is increased.
  - Radiative forcing equation: K x ln(C/Co)
  - ln(**2**) = (**1** x 0.693), ln(**4**) = 1.386 (**2** x 0.693), ln(**8**) = 2.079 (**3** x 0.693), ln(**16**) = 2.772 (**4** x 0.693)
  - You need to double concentrations successively to achieve a corresponding one unit of increase of heating.
  - For example, **an increase of 400 ppm of CO_2 raises temperature by about 0.8C. It would take another 800 ppm increase for another 0.8C, so to raise temperature by 1.6C requires increasing CO_2 by 1200 ppm**.



Source: Jeremy Nieboer, Tom Nelson Podcast #151

"Facts are stubborn things."
John Adams

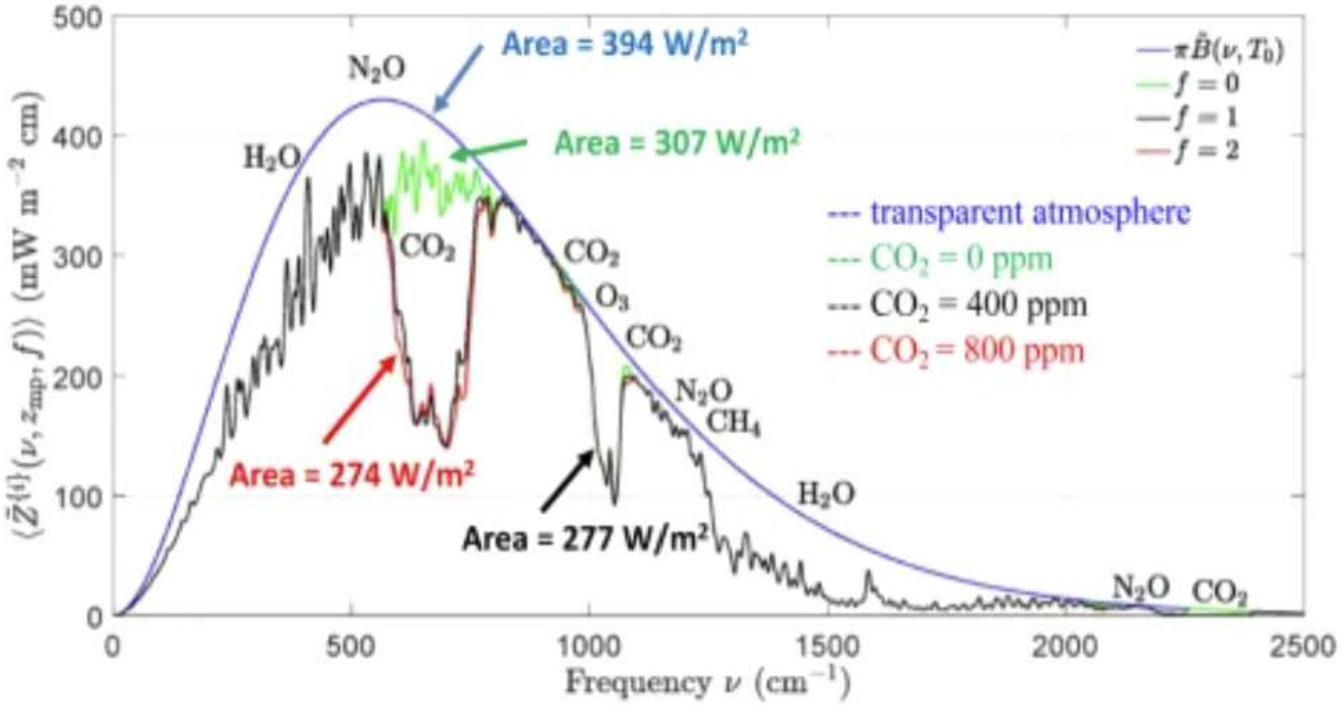
DOUBLING CO_2

- Doubling CO_2 from 400 ppm to 800 ppm decreases radiation to space from 277 W/m^2 to 274 W/m^2 or by 3 W/m^2

- Using the Stephan-Boltzmann Law, **3 W/m^2 = 0.8C**. William Happer and Brad Marston agree. It is about 1C including all greenhouse gases. **1C of warming is not a climate crisis.**

- At today's use of fossil fuel emissions, 2.4 ppm per year, it would take 159 years to increase CO_2 from 420 ppm today to 800 ppm.

Earth's surface temperature, T = 60 F → 16 F without greenhouse gases



Source: William Happer

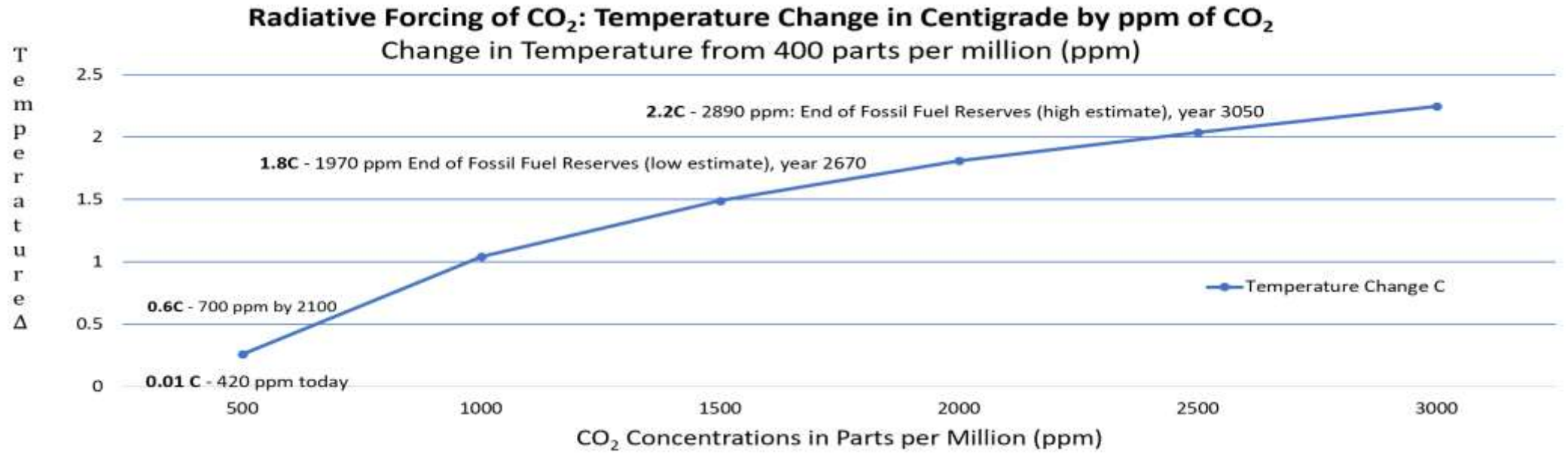
END OF FOSSIL FUELS

Estimated Fossil Fuel Reserves

- The Global Carbon Project estimates remaining fossil fuel reserves to be around 2,795 gigatons.

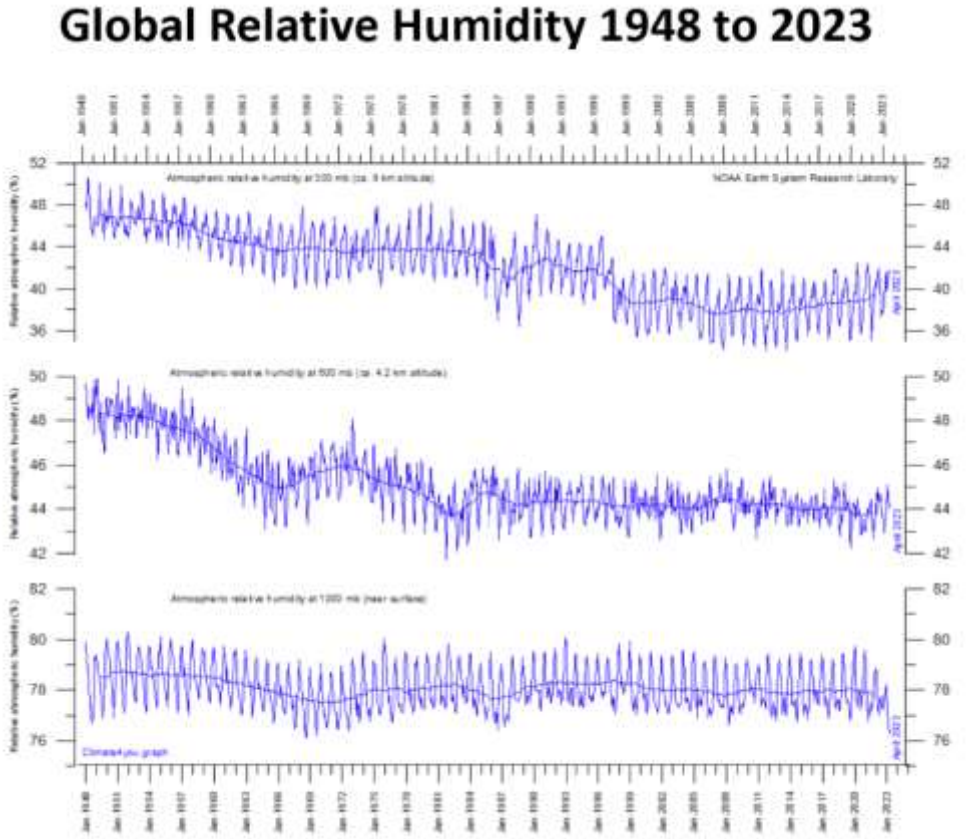
Burning All Reserves

- **If all were burned, CO_2 would be at 2,890 ppm, an increase of 8.5 W/m^2 or 2.2C**



WATER VAPOR FEEDBACK

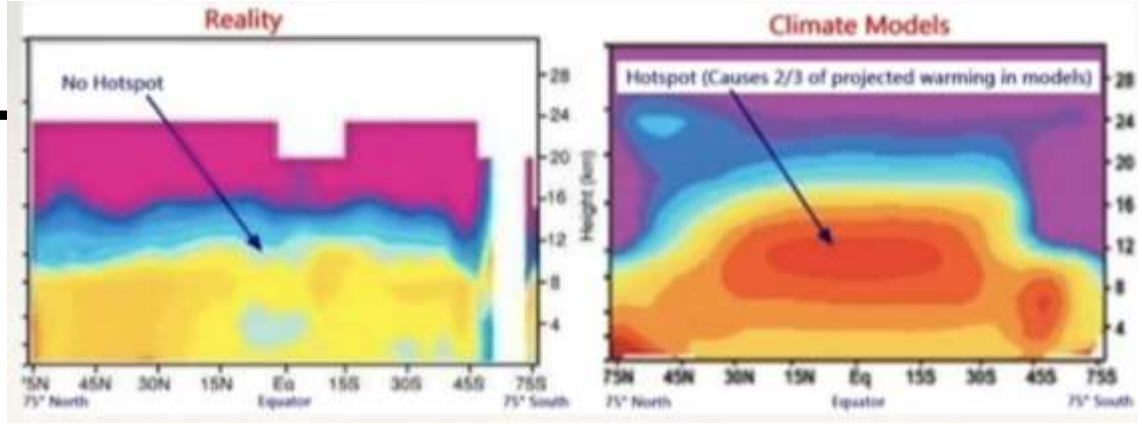
- **The basis of climate alarmism** - IPCC models assume a water vapor feedback will **amplify CO_2 warming by 3x.**
- IPCC models assumes relative humidity and the Clausis-Clapeyron principle (1C = 7% humidity increase) are both held constant.
- Physicist William van Wijngarden calculates water vapor feedback at constant relative humidity at 1x (see Tom Nelson Podcast #56)
- Relative humidity has declined.
- Soden, et al study in Journal of Climate finds water vapor feedback of 1.8W/m^2 for each 1C. This results in a **feedback of 1/2x**. The **net impact of clouds is negative 1/2x**, so clouds offset water vapor feedback.



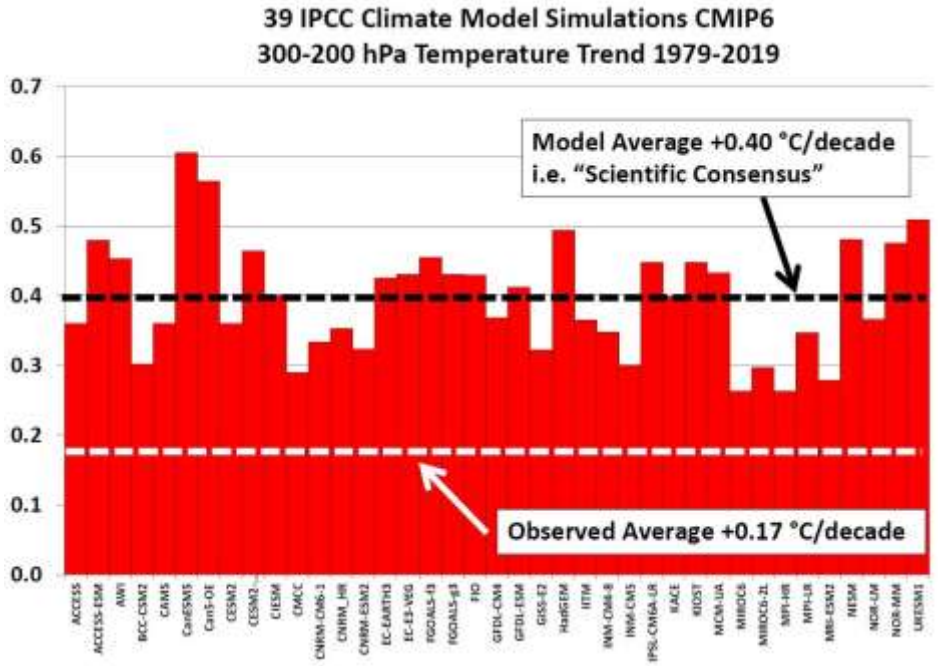
Source: NOAA Earth System Research Library, data graphed by Climate4you.com

WATER VAPOR FEEDBACK

- Water vapor feedback happens in the top of the troposphere. Water evaporates and cools the oceans, the **water condenses high in the troposphere and releases energy, forming a hot spot.**
- IPCC models predict a Tropical Hot Spot from water vapor feedback. However, the predicted **Tropical Hot Spot is not found in observations**.
- McKitrick and Christy 2020 paper shows IPCC **models have run too hot between 1979 to 2019 by 2.4x**
- The models have the water vapor feedback wrong.



Source: Presentation by Astrophysicist Nir Shaviv

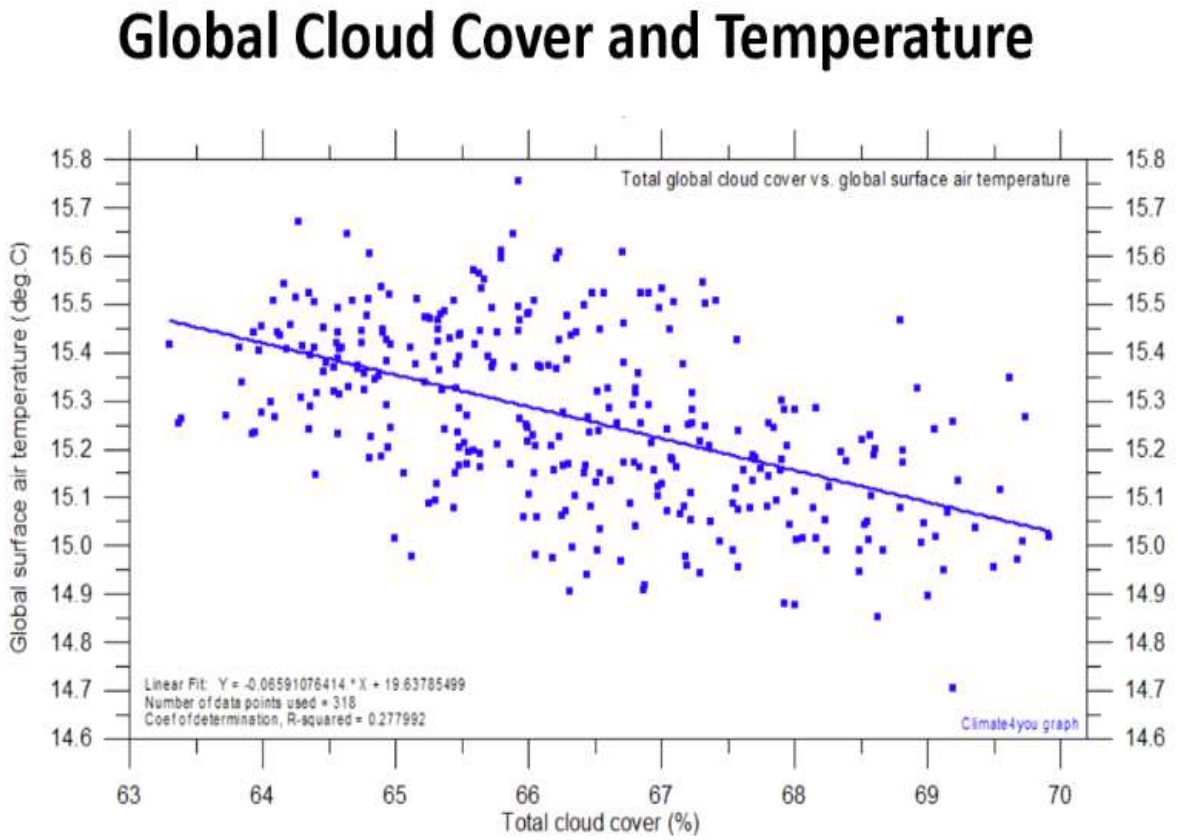


Source: R. McKitrick and J. Christy, "Pervasive Warming Bias in CMIP6 Tropospheric Layers," Earth and Space Science, September 2020, Volume 7, Issue 9, Christy J (2020).

Positive feedbacks in the climate models "are assumed - not derived or observed." - Richard Lindzen

CLOUD IMPACT

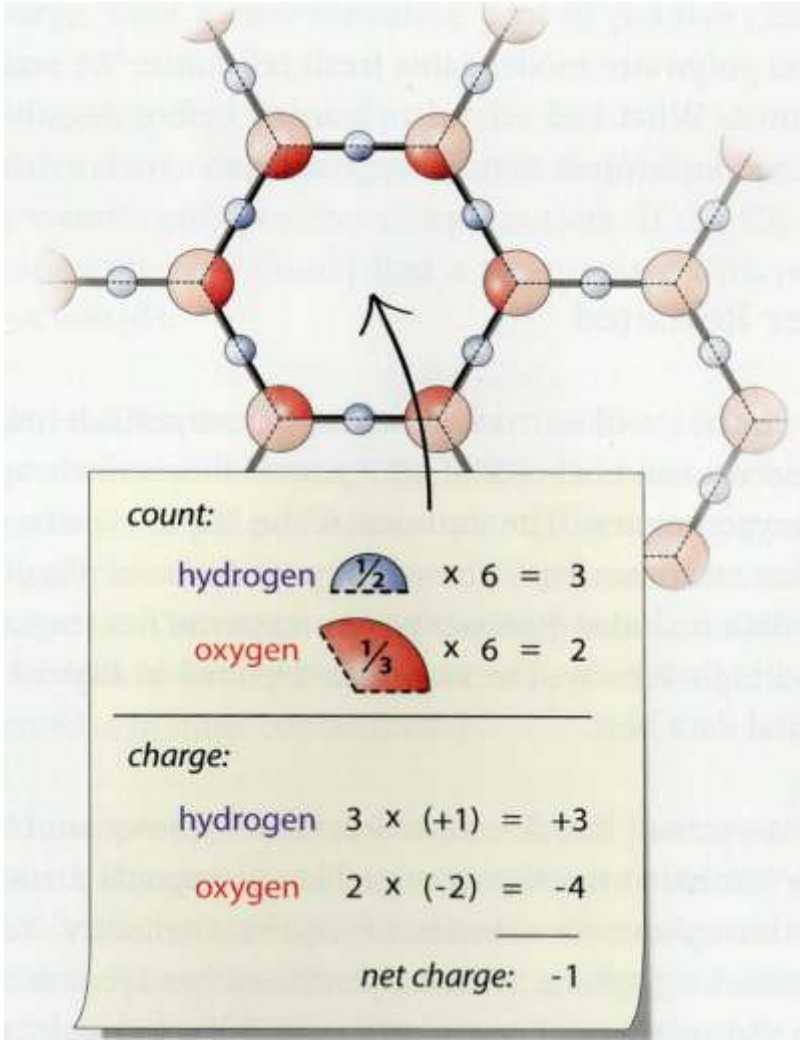
- **IPCC models assume 1.7 W/m^2 is radiated out to space for each 1C temperature increase. The observed number is 2.4W/m^2.**
- The albedo of low clouds is 0.7 to 0.9. They reflect 70% to 90% of solar energy back to space.
- **Observations show a 0.5C decline in temperature for each 7% increase in cloud cover, a negative 1/2x feedback that offsets the water vapor feedback**.
- On average, 240 W/m^2 makes it to the Earth's surface. Clouds block up to 90% or **216 W/m^2** from reaching the surface. Compare to **3W/m^2** to double CO_2.
- According to physicist and Nobel Laureate John Clausen, the radiative forcing from CO_2 is nearly two orders of magnitude (10^2 or 100-fold) smaller than the effective stabilization of the input-power provided by the low cloud-based thermostat.



Source: hardCRUT3 and The International Satellite Cloud Climatology ProjectEarth System Research Library, data graphed by Climate4you.com

CLOUD FORMATION

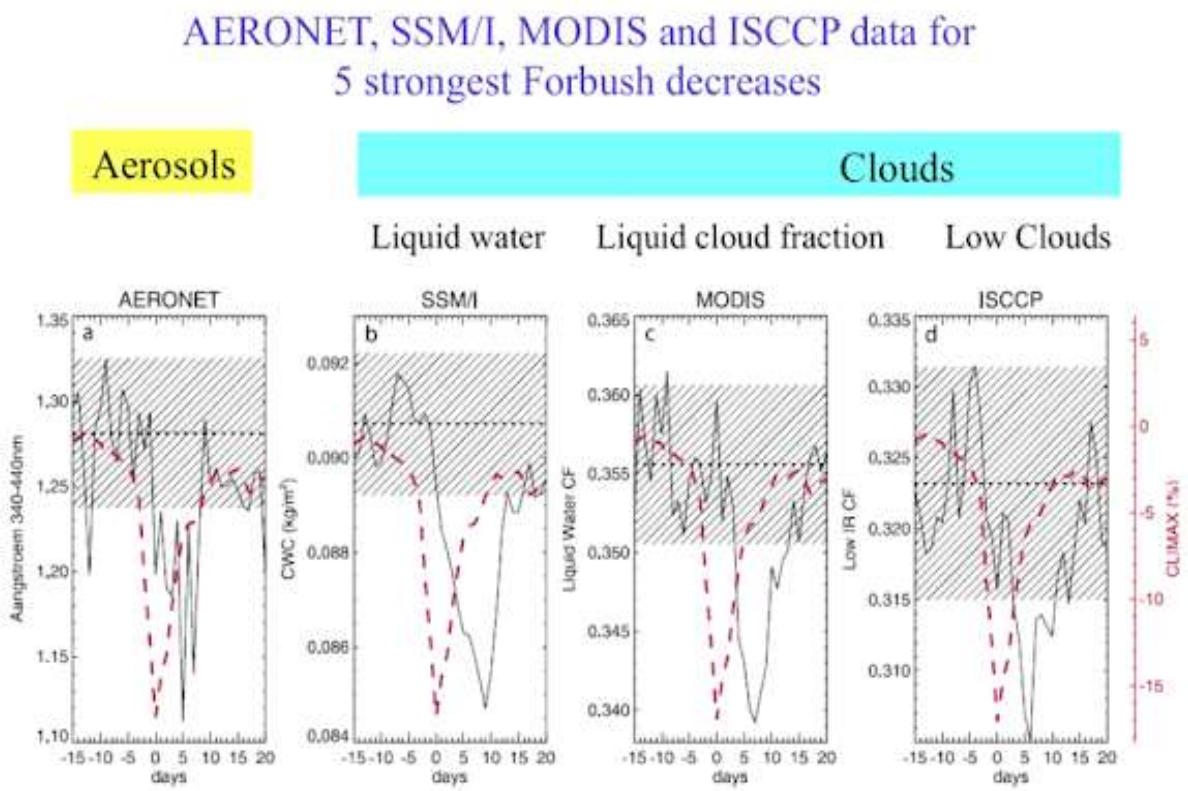
- Gerald Pollack shows through experiments that water forms **negatively charged H_3O_2** during evaporation. This conveys a negative charge to water vapor.
- The dominant cloud nucleating aerosols over the oceans are sulphates, nitrates, and dust. **These aerosols are all negatively charged**.
- Negatively charged sulfate aerosols are significant natural nuclei for the formation of low clouds. Observations over large algae blooms in the South China Sea contributed a substantial amount of sulfate aerosols into the atmosphere resulting in observed increased cloud formation. **Why the ocean smells like sulfur.**
- Using Richard Feynman's concept of like-likes-like, **positive charged protons act like glue to stick negatively charged ions together.**
- **Water Vapor + Aerosols + Protons = Clouds**



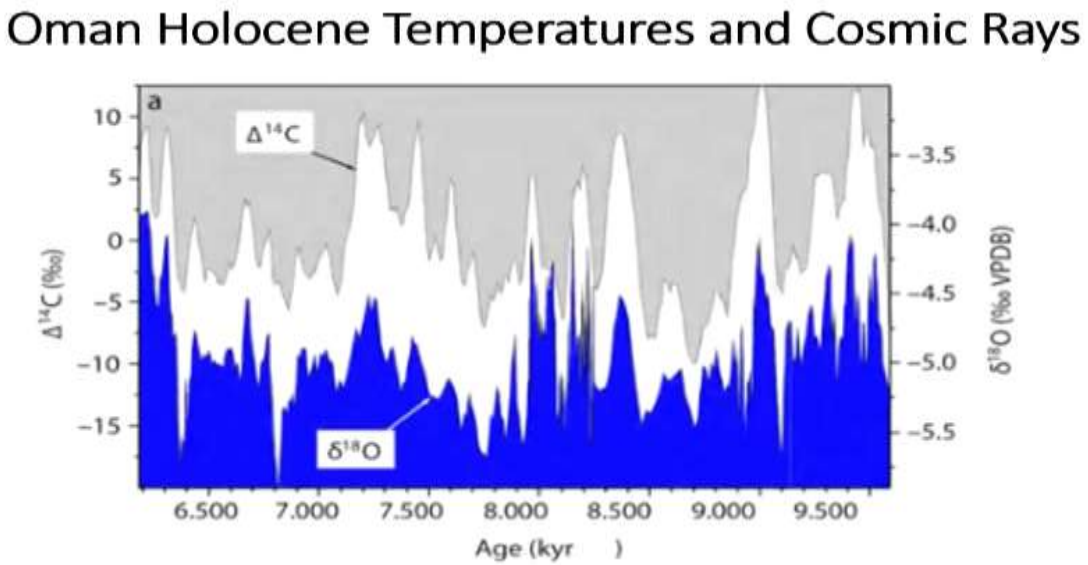
Source: Gerald H. Pollack, The Fourth Phase of Water, pg. 56

COSMIC RAYS

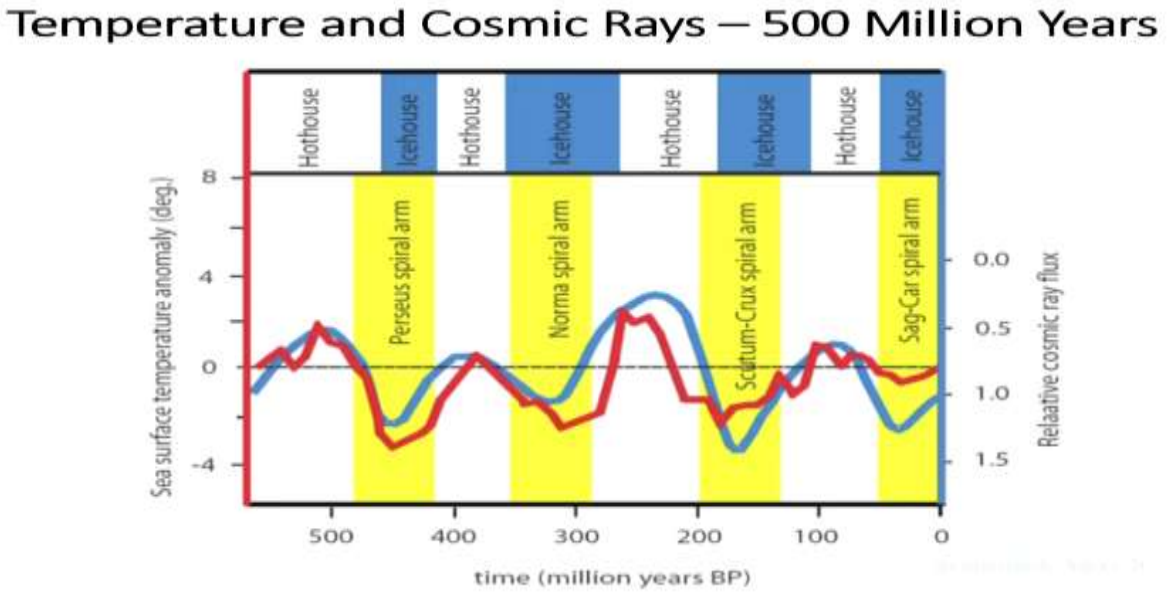
- **85% of cosmic rays are positively charged protons.**
- Astrophysicist Hendrick Svensmark proposed cosmic rays increase cloud cover by helping aerosols like sulfates form cloud nuclei.
- In a cloud chamber, Svensmark demonstrated sulfate aerosols growing in the presence of cosmic rays. **After 5 days** the aerosols grew to cloud nucleating size.
- Svensmark and astrophysicist Nir Shaviv looked at satellite data during solar flares (Forbush) and confirmed cloud nucleating aerosols and **clouds formation stopped 5 days** into the Forbush event.



Source: Svensmark, et al, "Cosmic Ray Decreases Effect Atmosphere Aerosols and Clouds," Geophysical Research Letters, 2009.



Source: Chart by Nir Shaviv with data from U. Neff, et al, Nature 41, 290-293 (2001).



Source: Nir Shaviv and Ján Veizer, "Celestial driver of Phanerozoic Climate?"

COSMIC RAYS IMPACTS

- Cosmic ray flux matches Eddy Solar Cycles and temperatures of the Minoan Warm Period, Greek Dark Ages, Roman Warm Period, Dark Ages, Medieval Warm Period, The Little Ice Age, and Modern Warming.

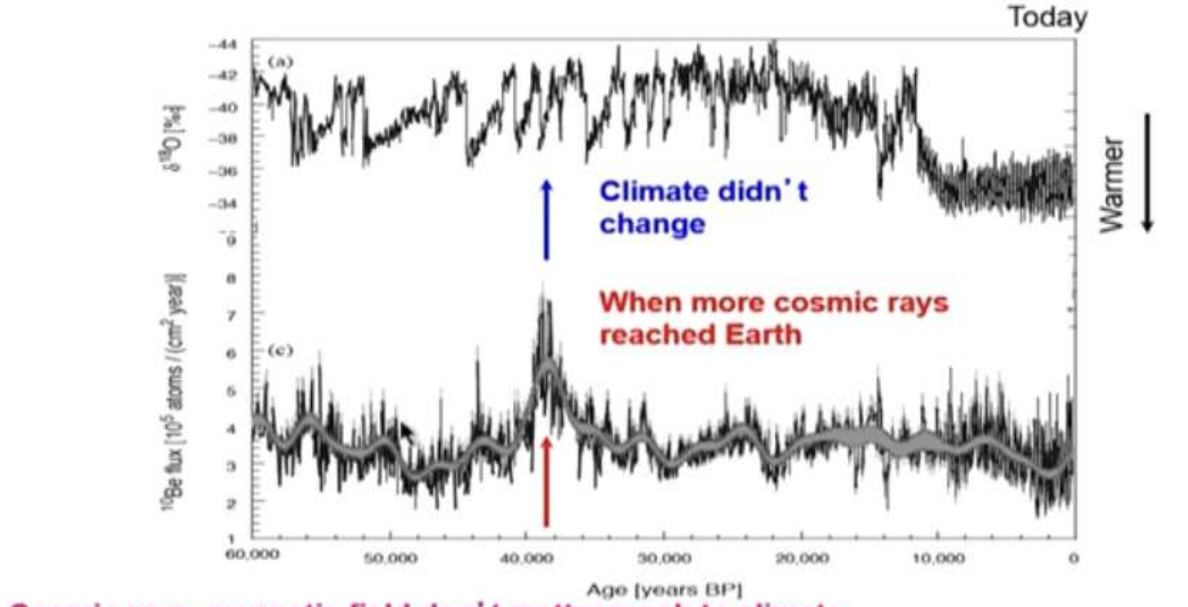
- **Cosmic ray flux matches the temperatures of the Holocene**.

- Isotope chemist Ján Veizer analyzed isotopes in 24,000 calcium carbonate fossil shells from various sediment levels to reconstruct temperatures of the earth over the past 500-million years. He found a strong cycle of **temperature swings of up to 10C every 140 million years**. CO_2 and other explanations could not explain the cause.

- Independently, astrophysicist Nir Shaviv studied meteorites to reconstruct historical cosmic ray flux and found **cosmic rays increased every 140 million years** as our solar system passed through the spiral arm of the Milky Way that had many Super Novas and the resulting elevated levels of cosmic rays.

CLIMATE APOLOGISTS

- Richard Alley argues the climate did not change much 40,000 years ago during the earth magnetic shift and high cosmic ray flux.
  - During the cold glaciation period when ice covered Northern Europe, Canada, and as far south as St. Louis, MO.
  - **Cold limited water vapor in the atmosphere for cloud formation**
  - **Cold limited sulfate aerosol production from algae blooms**
  - Cosmic rays would not form more clouds without water vapor and aerosols for the cosmic ray protons to stick together
  - **Great example of clouds as the Earth's thermostat**
- Agee, et al argue that although the correlation with cosmic rays and low cloud formation is excellent from 1982 to 2005, the correlation breaks down between 2008 to 2010.
  - A paper by Jenkins, et al in Journal of Climate in 2022 shows how **aerosols dropped dramatically in the early 2000s.**
  - Cosmic rays would not form more clouds if there were less aerosols



Source: Richard Alley

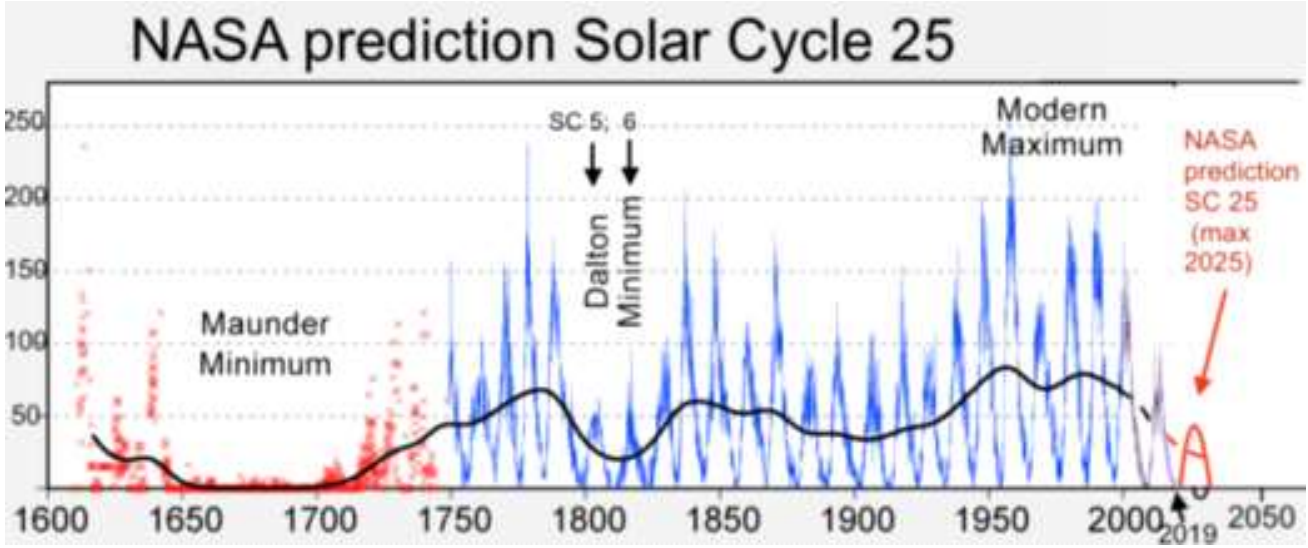
COLD IS COMING

- Solar physicist Valentina Zharkova has published several papers on the magnetic field of the sun. **The magnetic field is caused by two dynamo magnetic fields, the poloidal and toroidal fields.**

- **When the two fields are in resonance we have strong solar cycles, when in anti-phase, they cancel each other out.**

- Using principal component analysis, Zharkova has accurately reproduced historical grand solar minimums and maximums.

- Using these calculations, Zharkova predicts the current solar cycle 25 will be similar to cycle 24, but **cycle 26 will be similar to the Maunder Minimum**, which was during the Little Ice Age.



Source: weatherworkshops.com, "Solar-Cycle-23-NASA-Full

CONCLUSIONS BASED ON THE EVIDENCE

There is no Climate Crisis

- Climate is driven by many factors and the cooling impact of clouds on ocean heating is an ignored important factor.
- The basis of Climate Alarm, the water vapor feedback of 3x, is not supported by observational data.
- CO_2 warming will be about 2.2C by the time all carbon fossil fuels are used up. This will take hundreds of years.
- **Global Warming is a Reality** - We are in the warm periods of the AMO, PDO, just ending the Modern Solar Maximum, and have modest greenhouse gas warming
- **Cooling Expected after 2030** – The AMO, PDO will be in cold periods after 2034, Solar Cycle 26 in 2030 may be as low as the Maunder Minimum, increasing cosmic rays and clouds. Greenhouse gas warming will not fully offset the cooling.

Implications

- We should expect continued moderating temperatures and less severe weather until the mid-2030s
- Increased warming and CO_2 over this decade will be net beneficial with increased agriculture productivity to feed a growing population. The world will be greener.
- We have time to implement a rational energy transition focused on pollution controls and replacement of depleting fossil fuels.
- Preventing climate change is a boondoggle, we should focus investment on adaptation, protecting the environment, eliminating pollution, and fighting poverty.
- Climate Alarmism will fade and be discredited by the mid-2030s.

"Truth is incontrovertible. Malice may attack it, ignorance may deride it, but in the end, there it is." - Winston Churchill

THANK YOU

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