CO_2 - Man's Essential Friend

21 August 2023

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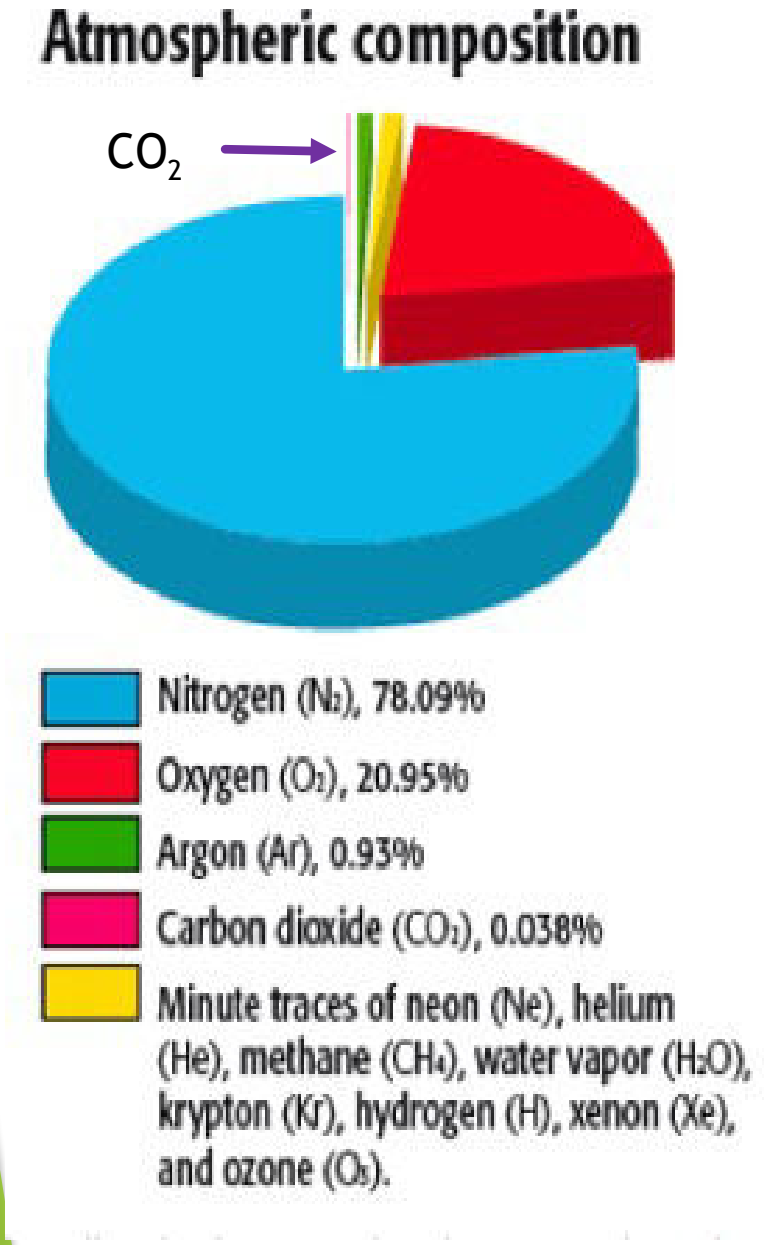
(Hons))



The pink portion is CO_2

It currently forms 0.0417% of our atmosphere on a volume basis.

That is the same as 417 ppm

When first measured in Mauna Loa in Hawaii in 1958 it was 313 ppm.

Despite being such a small volume it helps to keep us warm.

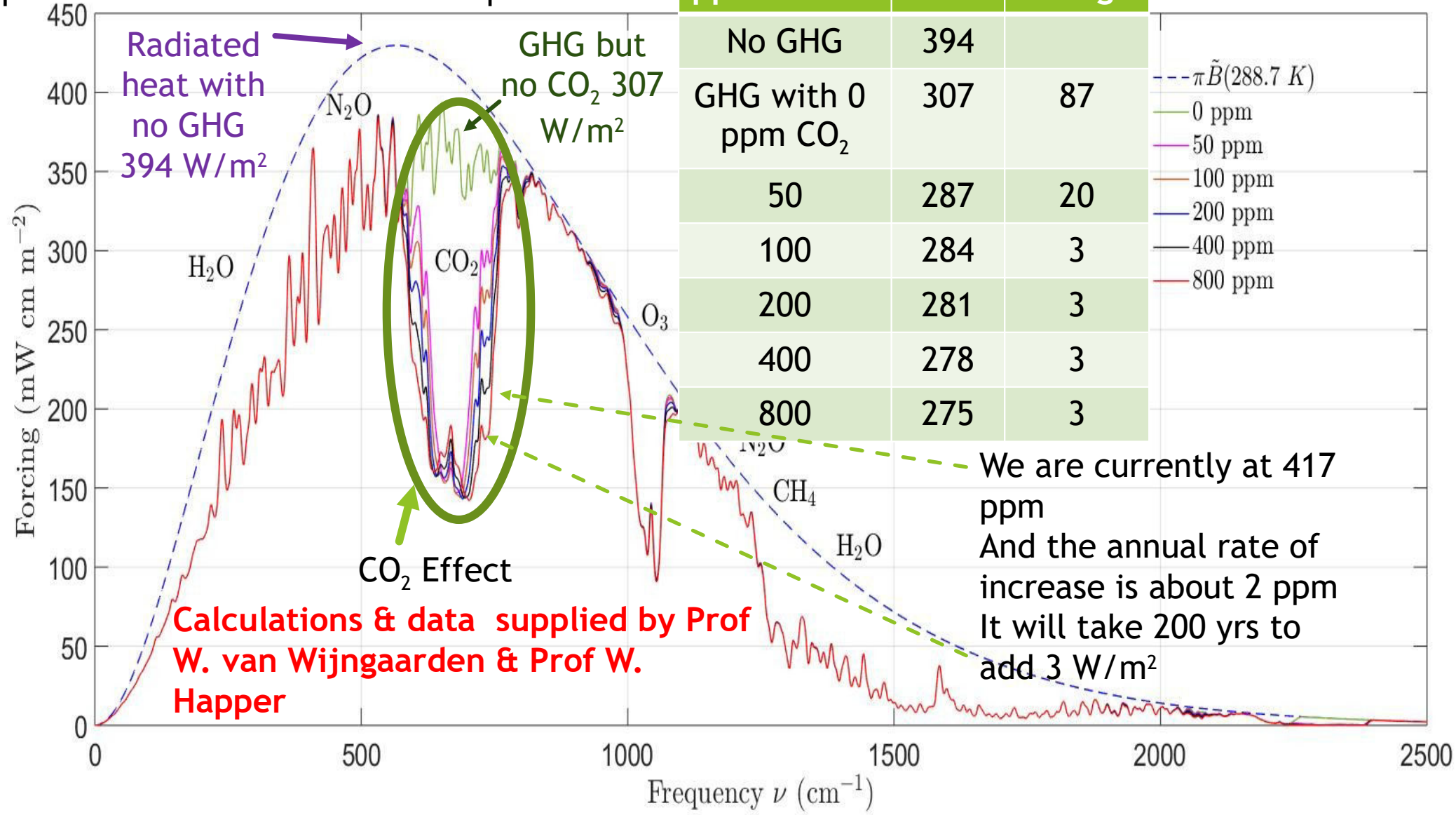
Without it & the other greenhouse gases (GHG's) the earth would average -9oC instead of 15.5oC

Water vapour is the biggest GHG

But It Is The First 50 ppm Of CO_2 That Does The Majority Of Warming.

Graph relates to a cloud free atmosphere

ppm	W/m²	Change
No GHG	394	
GHG with 0 ppm CO_2	307	87
50	287	20
100	284	3
200	281	3
400	278	3
800	275	3



Calculations & data supplied by Prof W. van Wijngaarden & Prof W. Happer

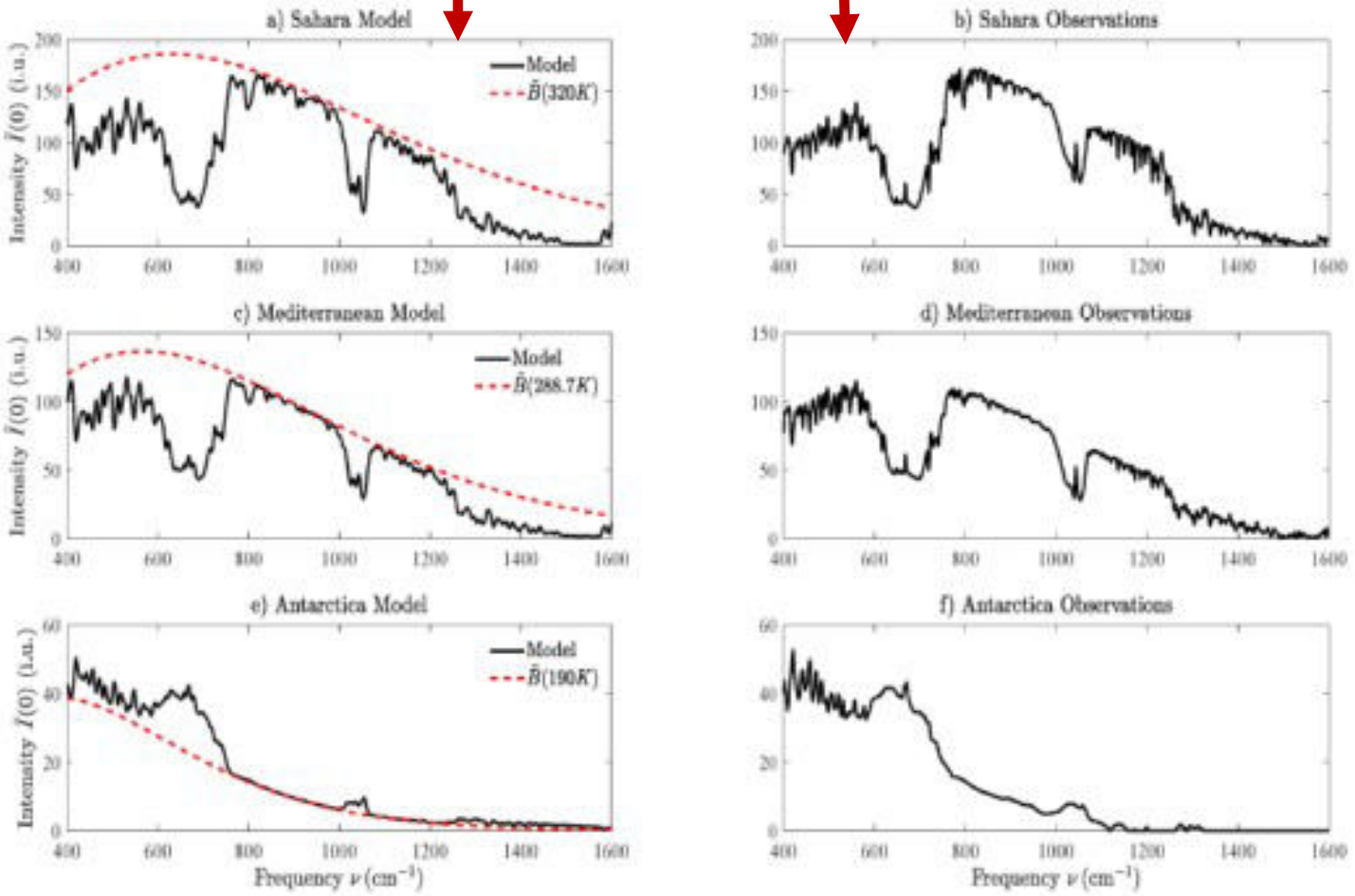
We are currently at 417 ppm
And the annual rate of increase is about 2 ppm
It will take 200 yrs to add 3 W/m²

How Good Are Prof van Wijngaarden & Prof Happer At Calculating The Greenhouse Effect?

Thermal radiation to space. One can hardly distinguish modeled spectra of from those observed from satellites.

Modelled

Measured (With Satellites)



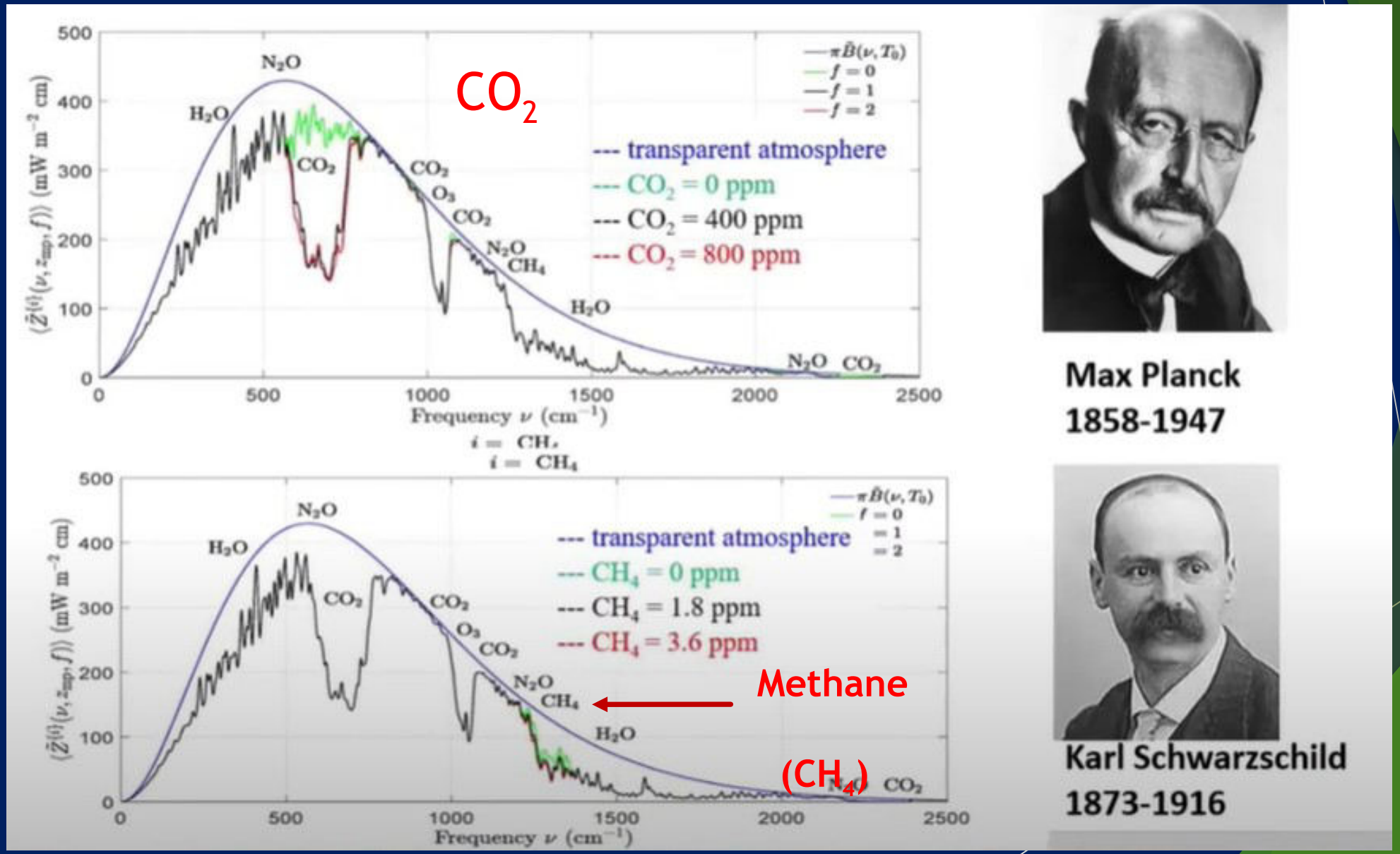
Over the Sahara @ 47oC

Over the Mediterranean @ 15oC

Over Antarctica @ -83oC

Their predictions match reality. Their scientific method passes the truth test.

So What About Methane (CH_4) From Our Cows, The Other Gas Being Demonised



Max Planck
1858-1947

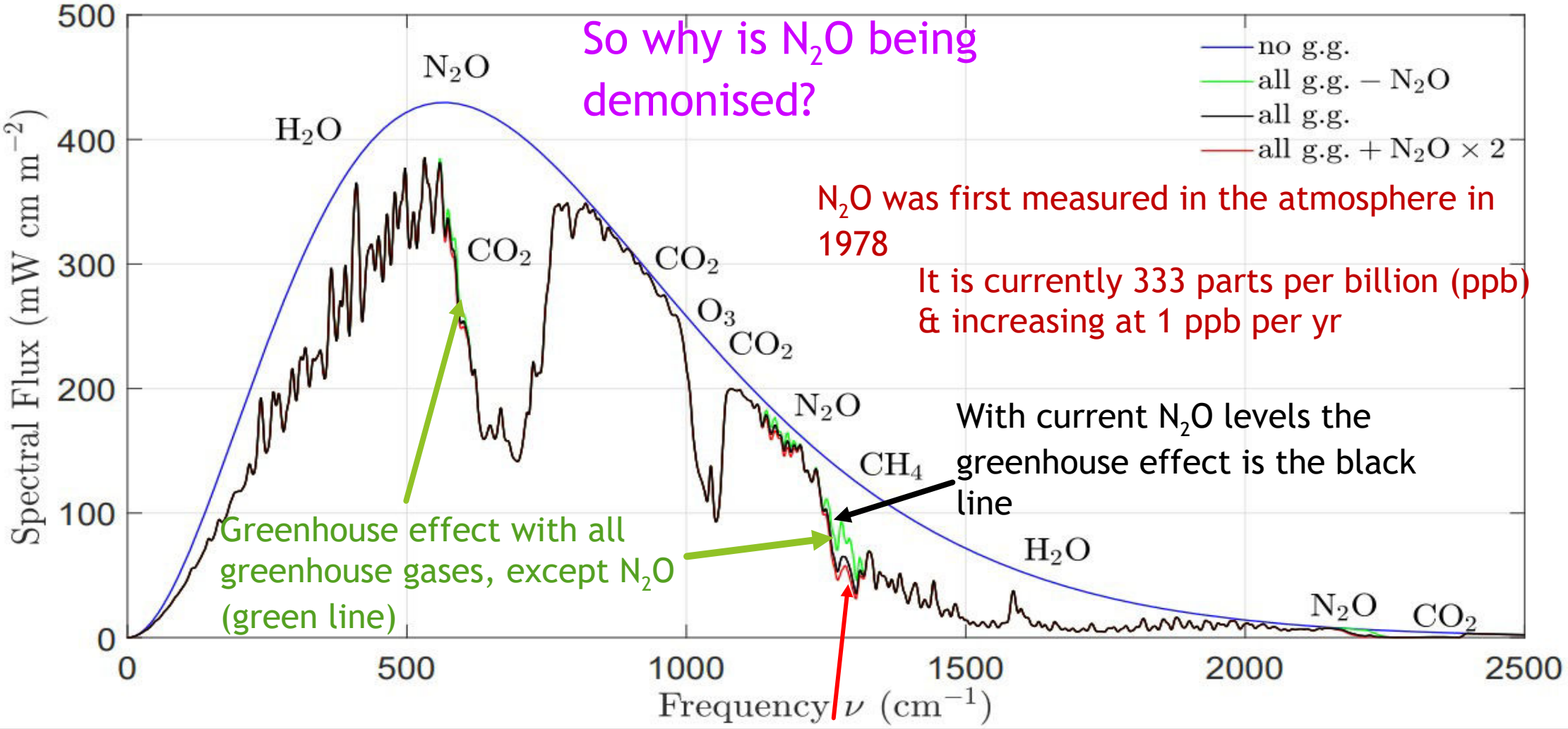
Karl Schwarzschild
1873-1916

Methane (CH_4) was first measured at 1.6 ppm in 1983 & is now 1.9 ppm. See if you can see the influence of doubling it from 1.8 ppm to 3.6 ppm (black line to red line)

At the current rate of increase it will take 240 yrs to reach 3.6 ppm.

Why are we penalising ruminant milk & meat production? Without them we can't meet the protein needs of the world.

And N_2O, nitrous oxide, the new demon being canvassed as a reason to restrict agriculture



Not Only Does CO_2 Help To Keep Us Warm But Without It We Would Starve & Suffocate

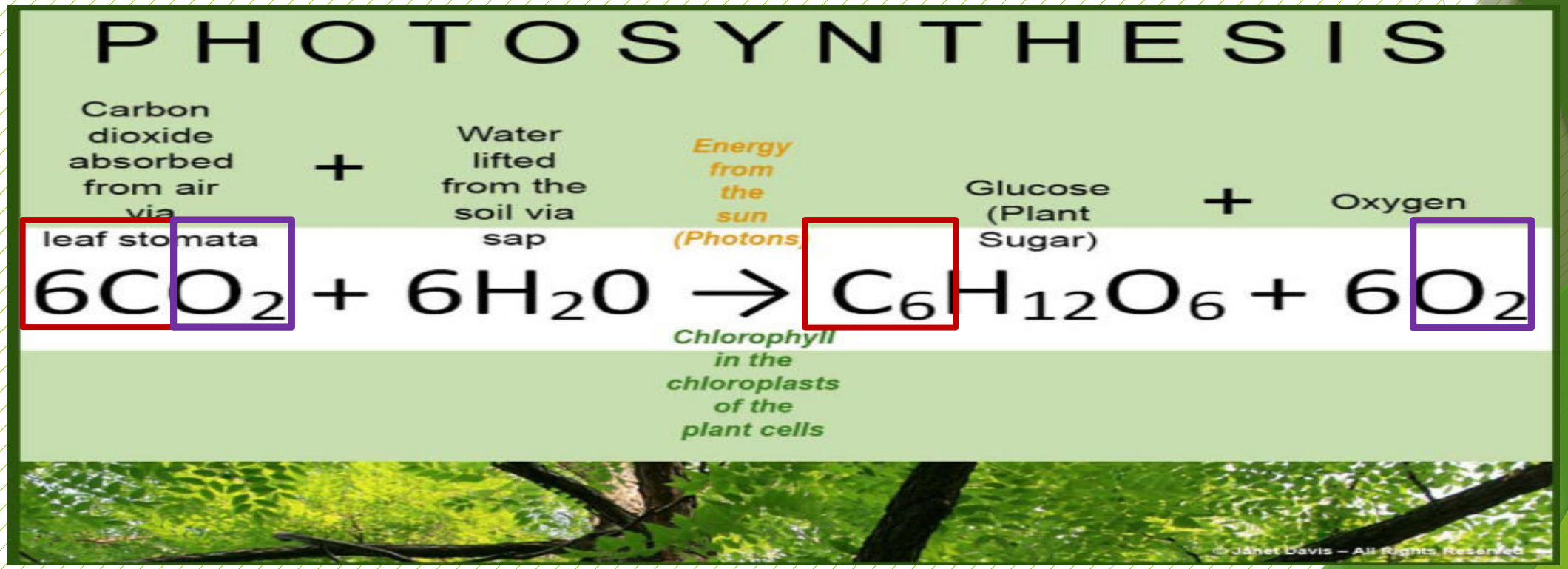
That is why it is our essential friend.

Via Photosynthesis Plants Convert:

264 gms of CO_2 into 180 gms of Glucose & 192 gms of Oxygen.

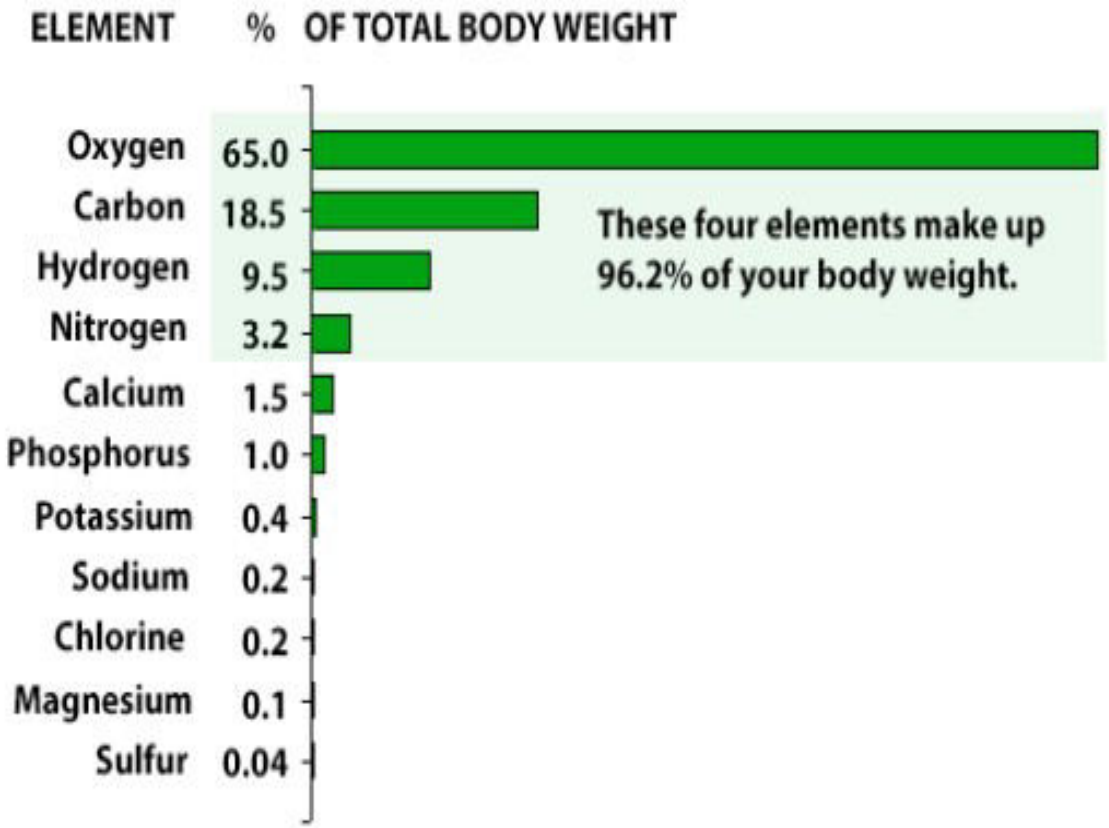
2.87 MJ Of Energy From The Sun Drives The Equation

This is the start of our food supply chain & our source of oxygen.



The Carbon In Glucose Is Used As The Foundational Element To Make All The Other Molecules Of Life. (See the display.)

- Building blocks of protein (amino acids) that make our muscles & enzymes
- Fats & Lipids
- Hormones
- Complex sugars like starch & fibres
- Blood cells
- Keratin, a protein that makes our skin, nails & hair
- The list is huge
- That's why it makes up 18.5% of our body mass



CO_2 Is Plant Food. Increasing It Increases Plant Production. This Is Research From Arizona State University

Ambient = 380 ppm

+450 = 830 ppm

Explains why tomato farmers pump up to 1,200 ppm CO_2 into their greenhouses to increase yield.

New Phytologist (2010) 188: 674–695 (University of Kansas Research)

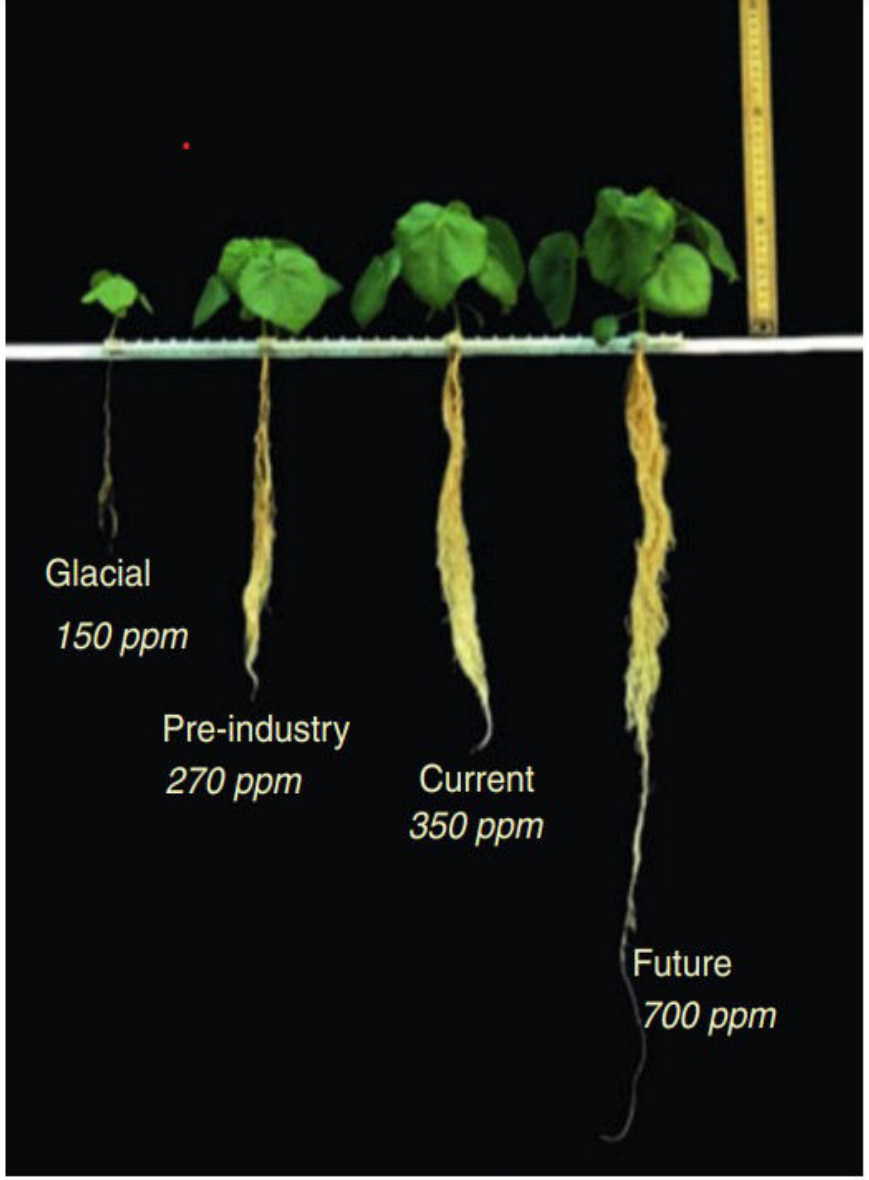
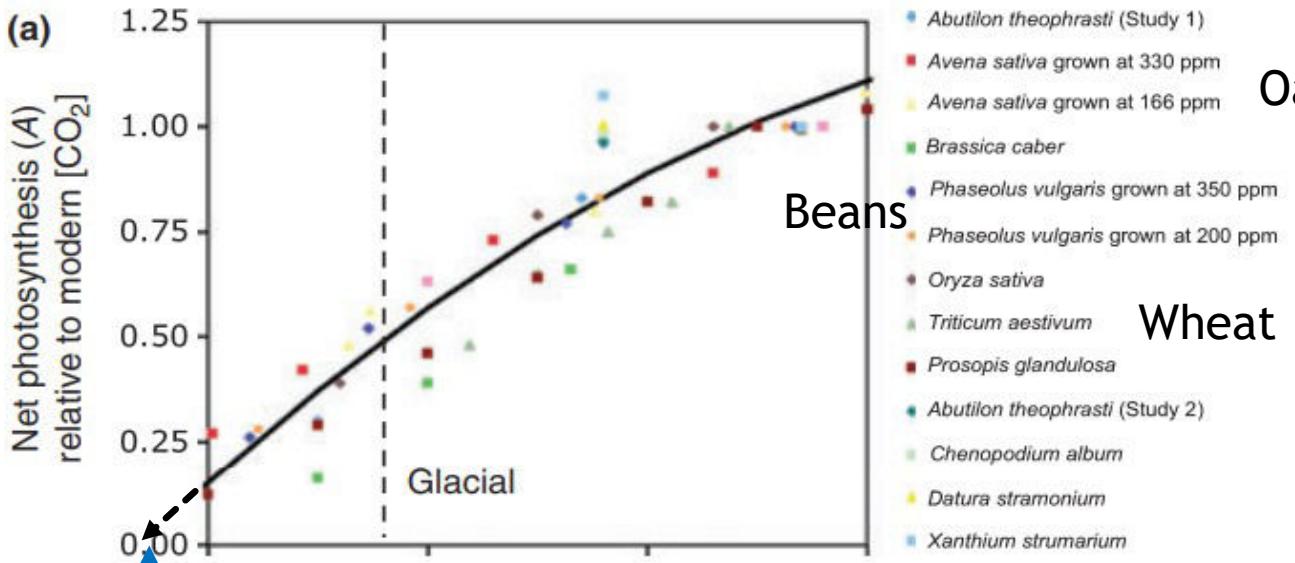


Fig. 2 Representative plants of *Abutilon theophrasti* (C_3) grown at glacial through future [CO_2]. All plants were 14 d of age and were grown under similar water, light, and nutrient conditions. These plants were photographed during a study by Dippery *et al.* (1995). (Photograph is courtesy of Anne Hartley, Florida Gulf Coast University.)

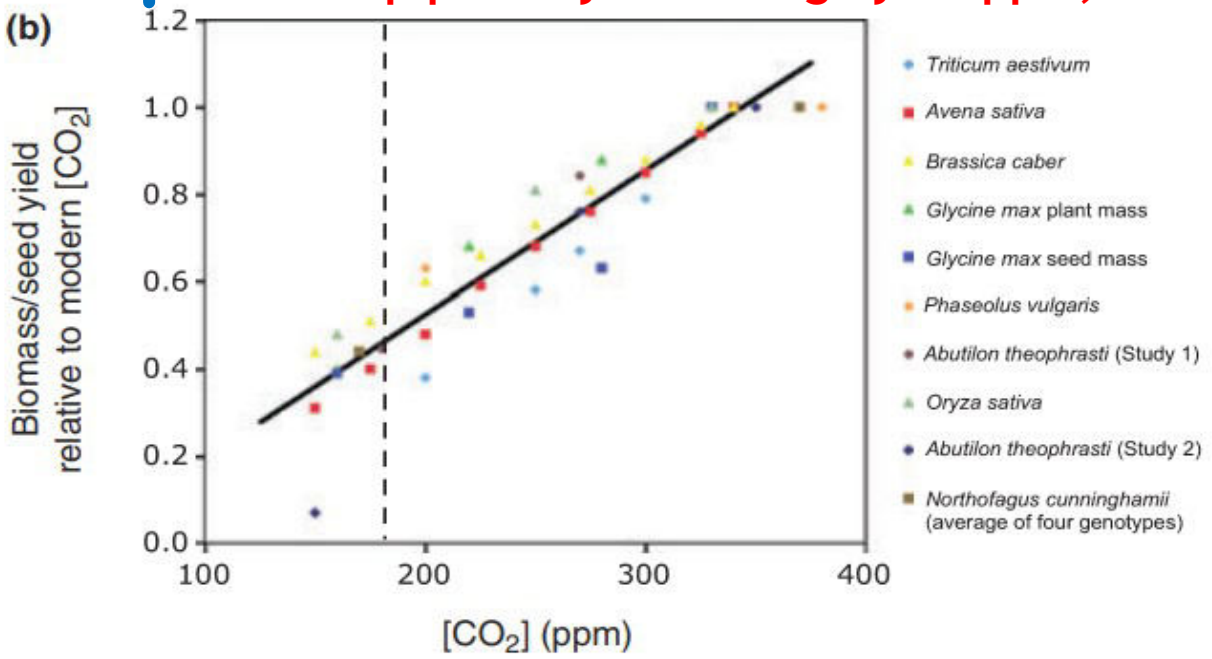


Oats

Beans

Wheat

Plants stop photosynthesising by 50 ppm, so die



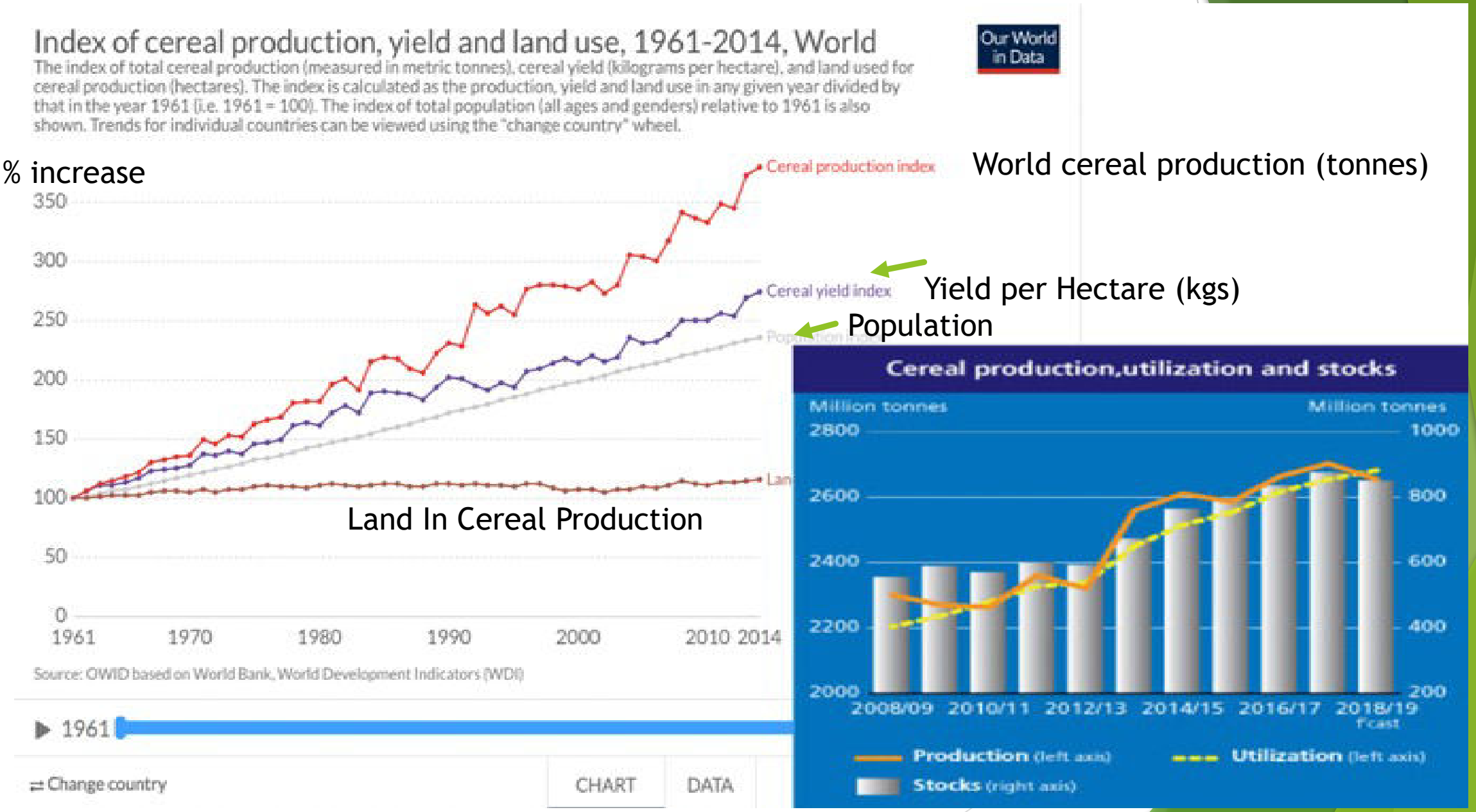
The More CO_2 In The Atmosphere The More Plant Material (Biomass) That Is Produced

US Department of Agriculture, (FAO 1996)

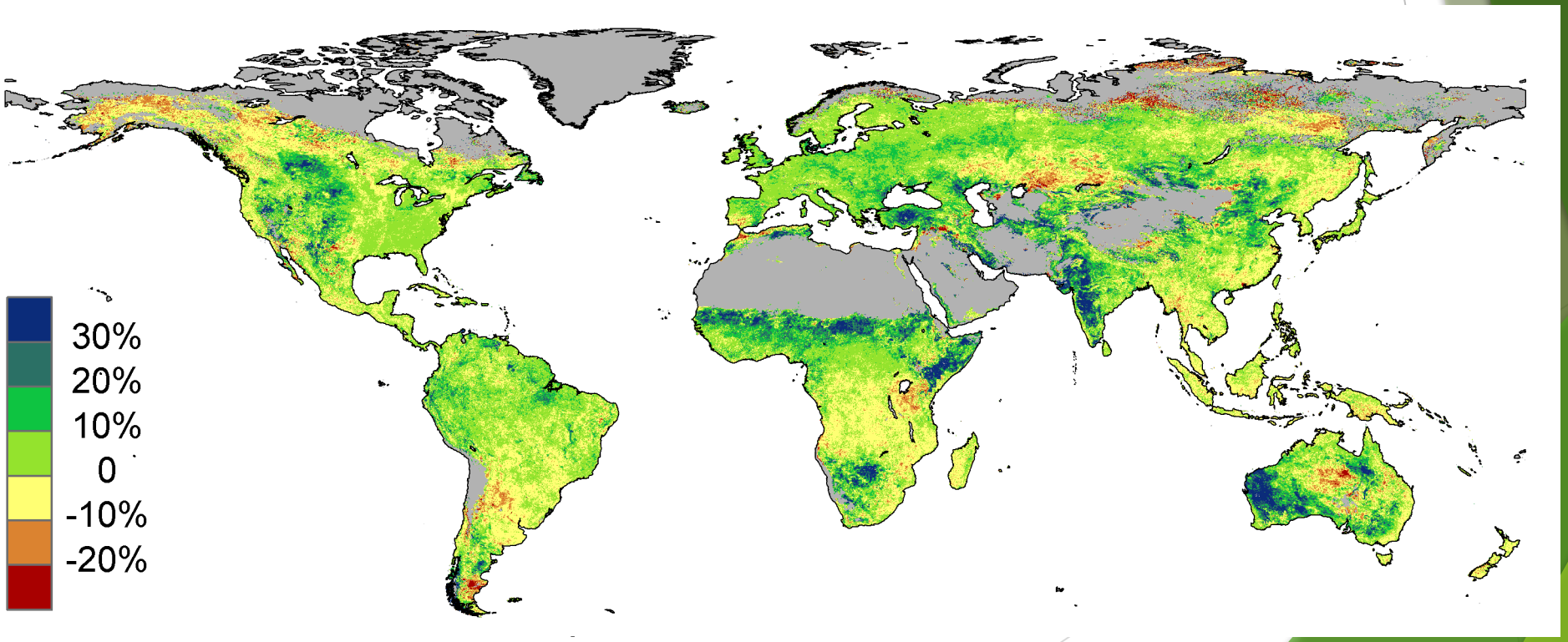
- Several recent symposia proceedings and reviews leave little doubt that crop plants can respond well to elevated CO_2 (Rozema *et al.*, 1993; Woodwell and Mackenzie, 1995; Wittwer, 1995).

  Poorter (1993) compiled information from 156 plant species and found that doubling CO_2 provided an average growth increase of 37%.
- Crudely speaking, with doubling CO_2 from 280 ppm before the industrial revolution to 560 ppm, we could feed the same number of people with 37% less land

Not Surprising That Increasing CO_2 Is Helping To Increase World Food Production



Increased levels of CO_2 have helped boost green foliage across the world's arid regions over the past 30 years through a process called CO_2 fertilisation, according to CSIRO research. https://www.youtube.com/watch?v=S-nsU_DaIZE&ab_channel=ReasonTV

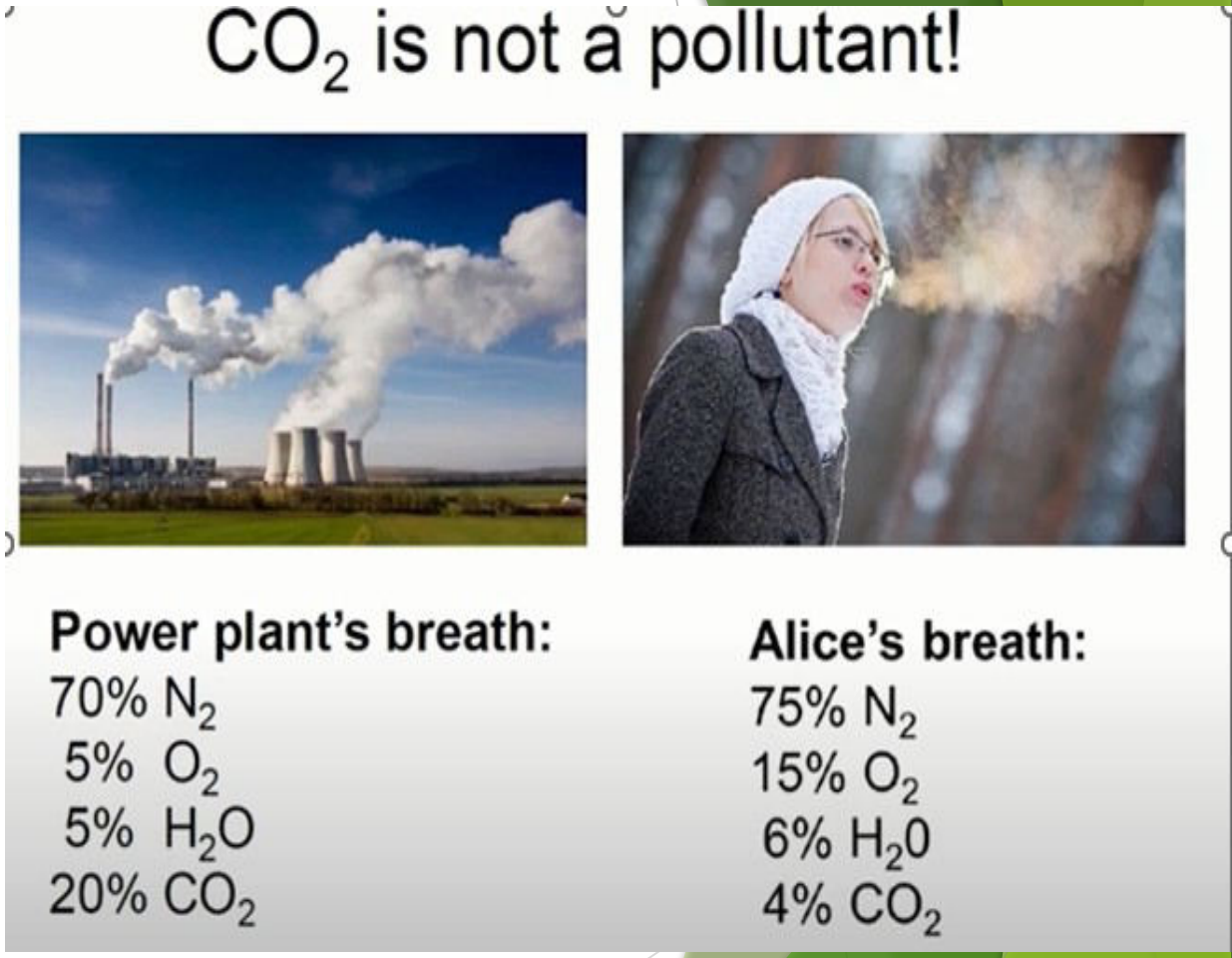


To Understand The Debate We Need To Understand Some Basic Truths

NPR weighs in on climate change policy ...

- If you can see it, it isn't CO_2.
- We breath out about 40,000 ppm of CO_2. That is 4% of our breath.
- Can you see it?
- So why do people use photos like this to malign CO_2?
- This photo shows steam being discharged from chimneys & has nothing to do with CO_2.

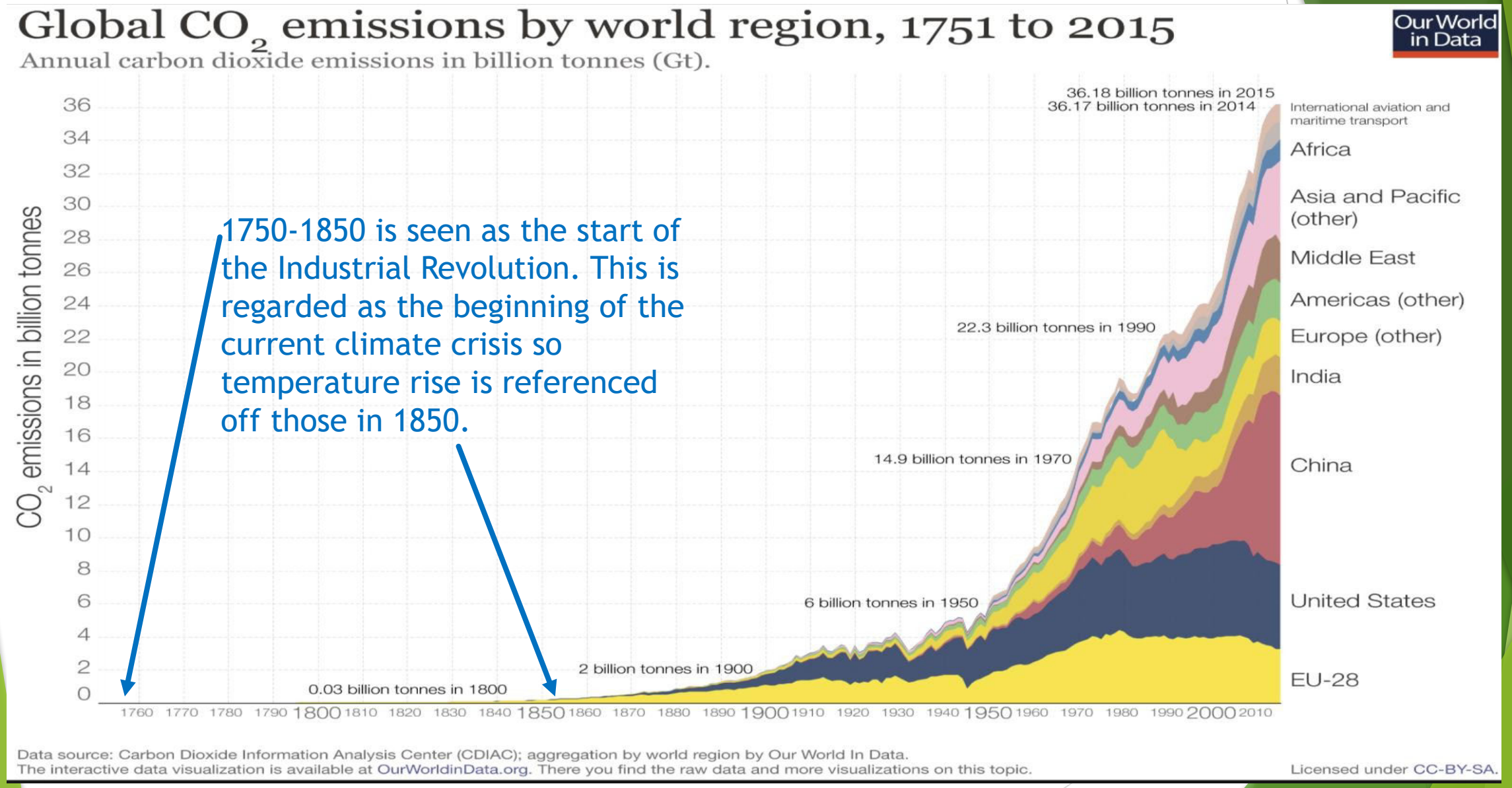
- Humans Breath Out Just Under 1 kg Of CO_2 Per Day.
- So 8.0 Billion People Add Nearly 8 Million Tonnes To The Atmosphere/Day
- The same happens to the CO_2 from industry
- The CO_2 becomes food for plants
- <u>It is not a pollutant</u>



However We Are Told That Man Is Causing Global Warming By:

- Burning fossil fuel that produces carbon dioxide (CO_2)
- Farming ruminants which produces methane (CH_4)
- Using nitrogenous fertilizer that produces nitrous oxide (N_2O)

From 1800 until 2015, Man Has Increased Carbon Emissions From About 30 Million Tonnes To 36.2 Billion By Burning Fossil Fuel (= x1200 increase)

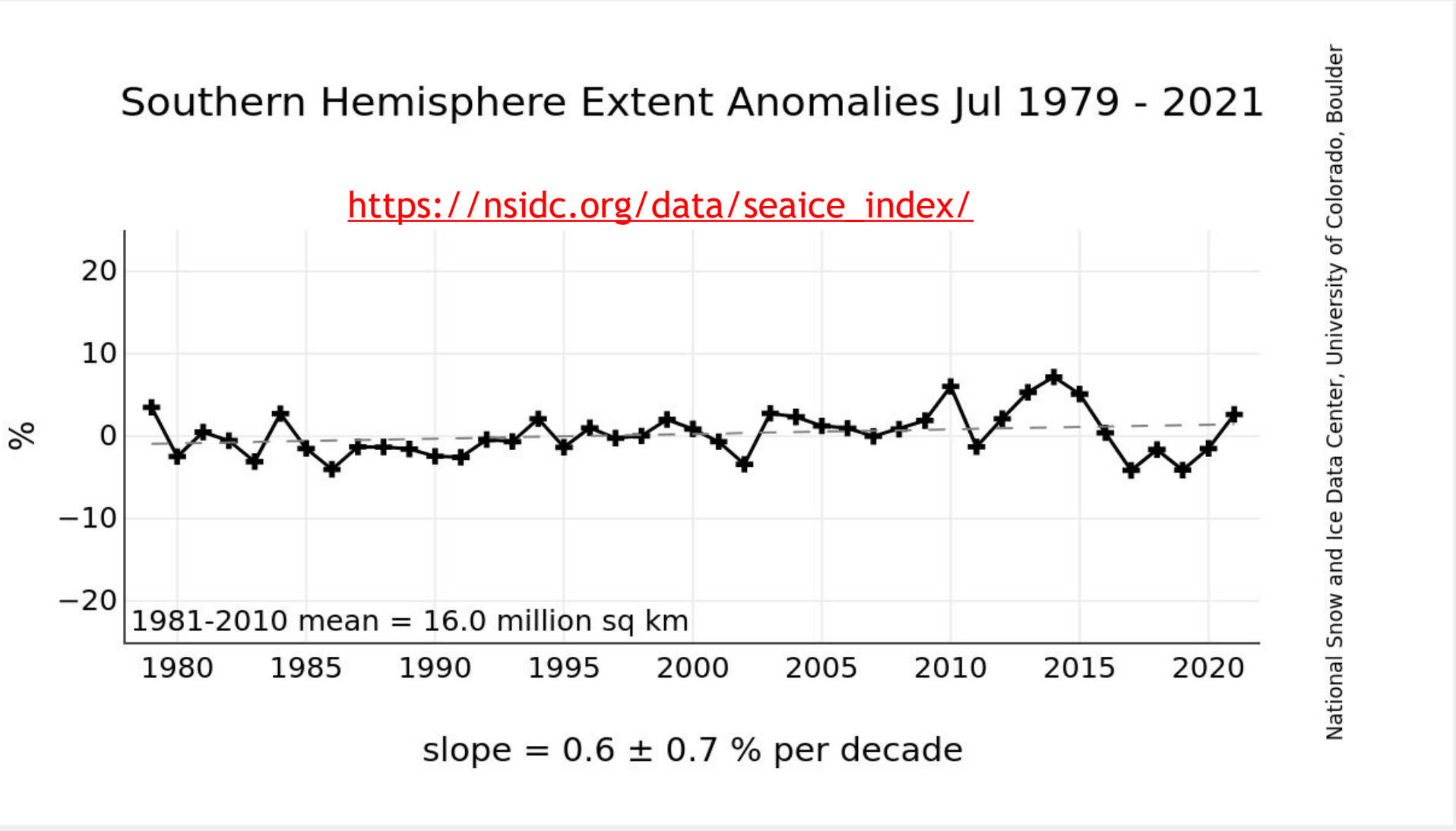


With Such A Large Increase in Carbon Emissions Is It True That We Are Negatively Impacting The Planet?

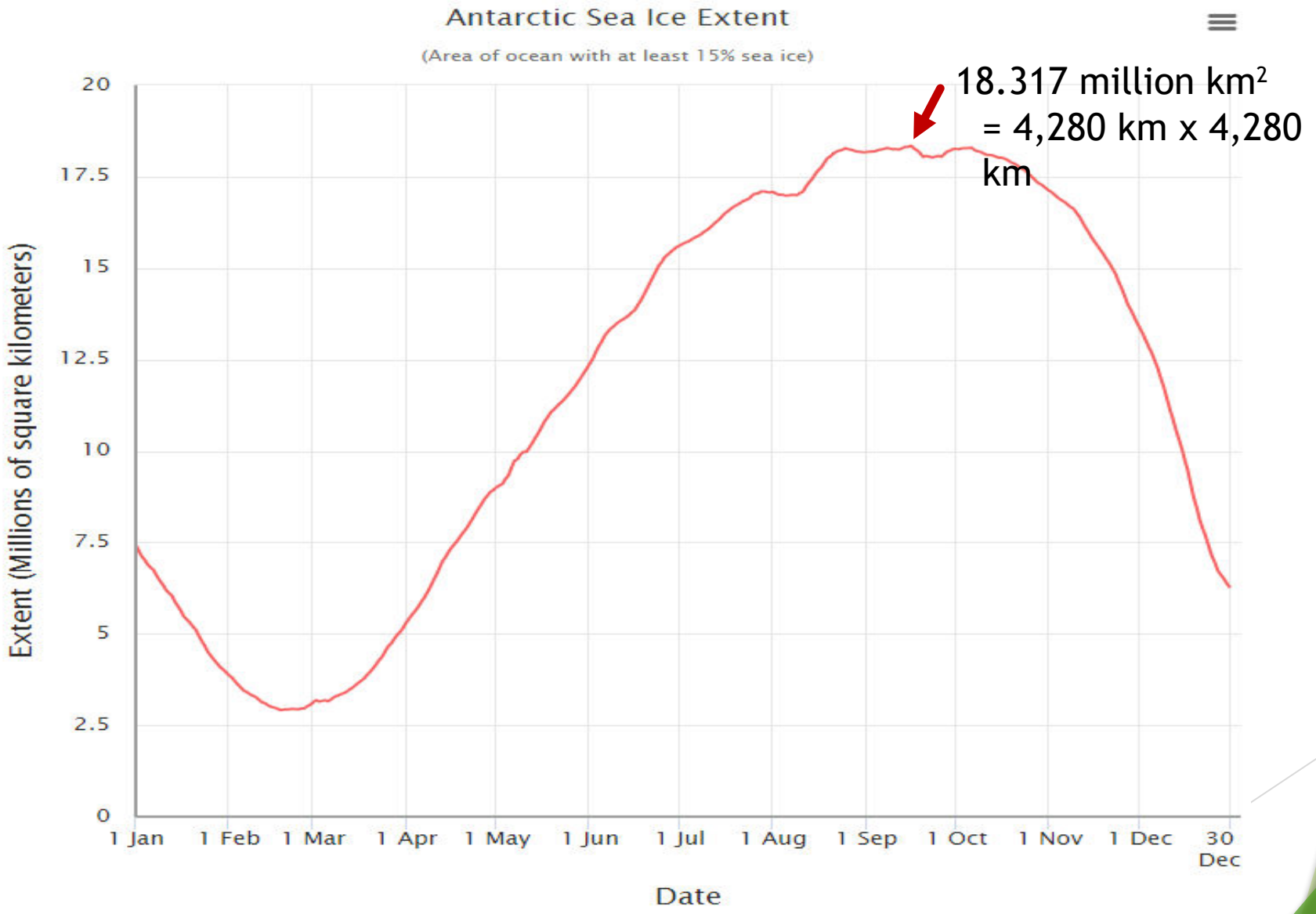
- Ice melting at the poles
- Sea level rise
- Rising temperature
- Floods
- Droughts
- Cyclones
- Tornados

Let's Look At The Evidence

Antarctica with 90% of the earth's ice, has shown an INCREASE in ice since satellite photos began in 1979

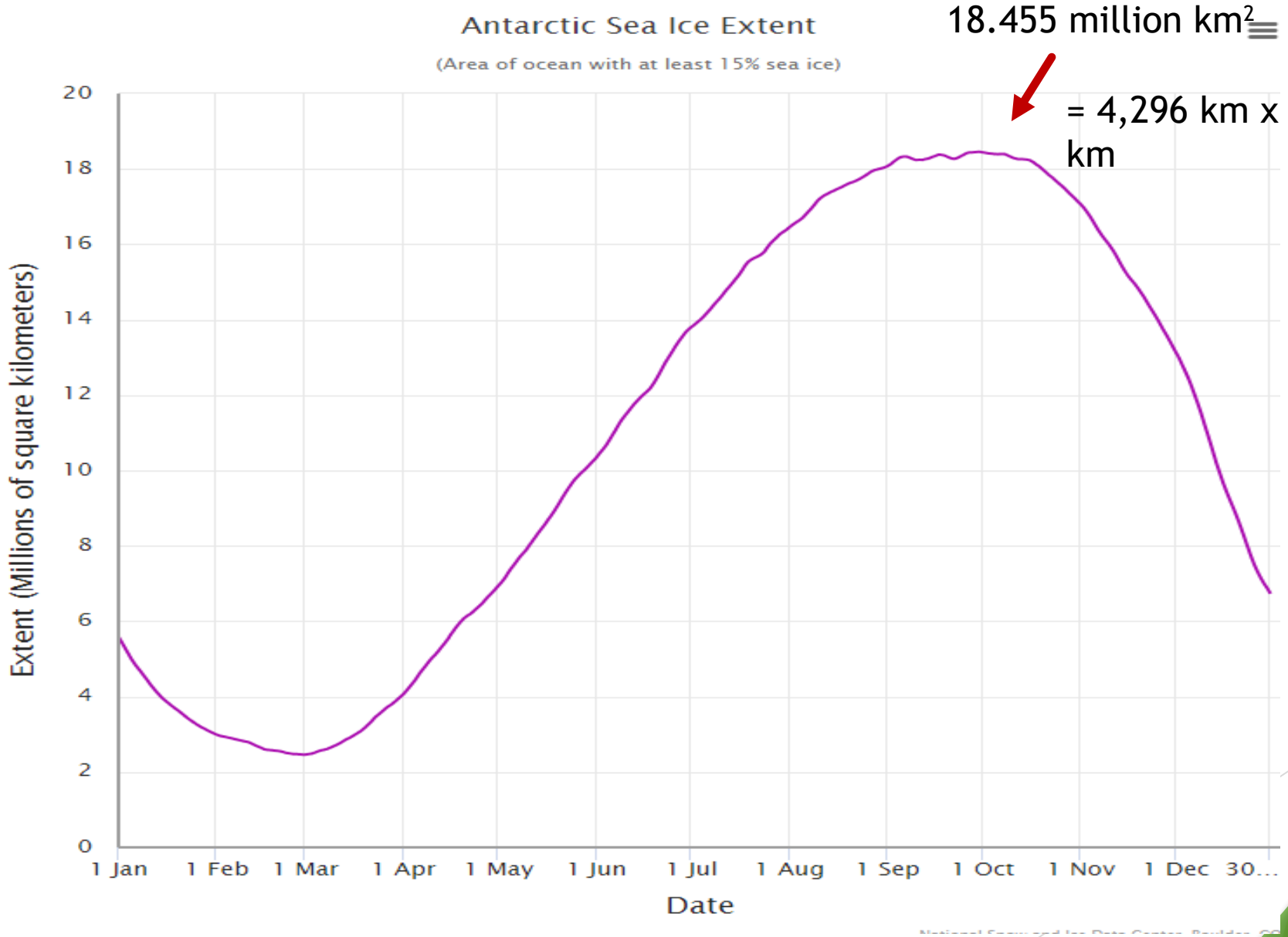


Antarctic Sea Ice Extent In 1979



https://nsidc.org/arcticseaicenews/category/daily-image/

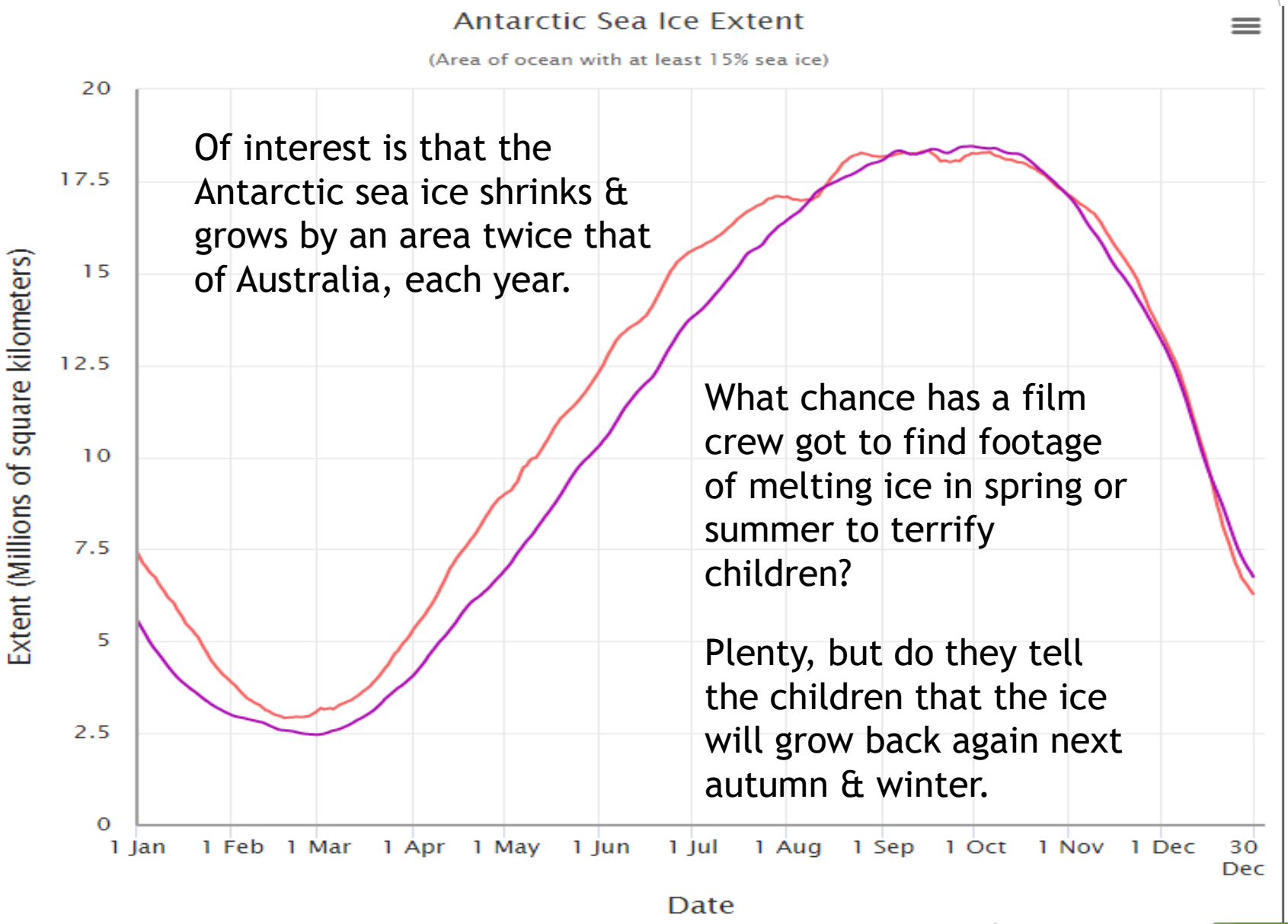
Antarctic Sea Ice Extent In 2019



18.455 million km^2

= 4,296 km x 4,296 km

Antarctic Sea Ice Extent In 1979 verses 2019 (40 yrs)

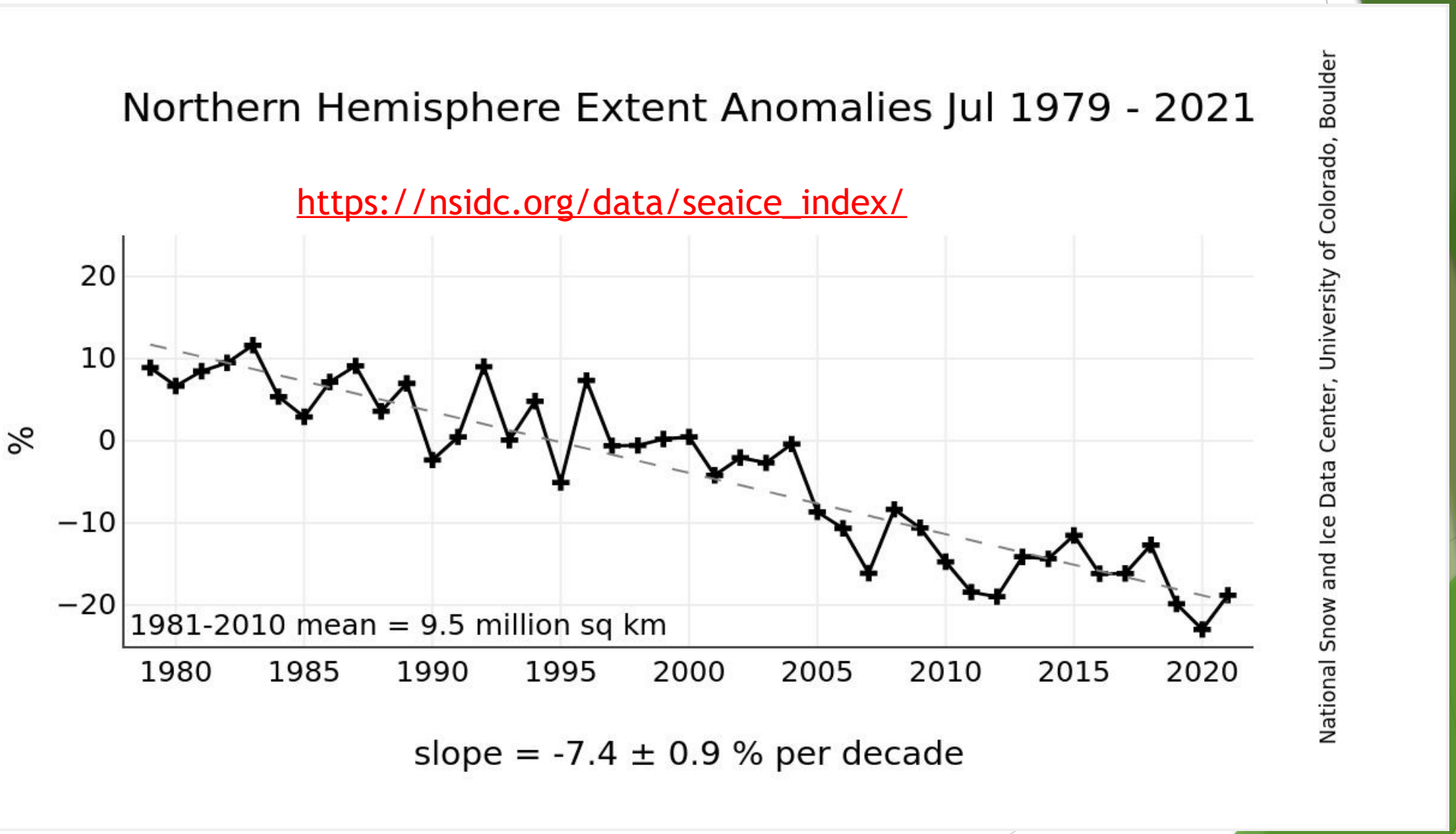


Of interest is that the Antarctic sea ice shrinks & grows by an area twice that of Australia, each year.

What chance has a film crew got to find footage of melting ice in spring or summer to terrify children?

Plenty, but do they tell the children that the ice will grow back again next autumn & winter.

But Satellite photos show Arctic sea ice HAS receded



But Ice Has Been Melting Nearby At Glacier Bay In Alaska Since At Least 1750, So Why Not The Arctic?

Glacier Bay, Alaska

North Pole

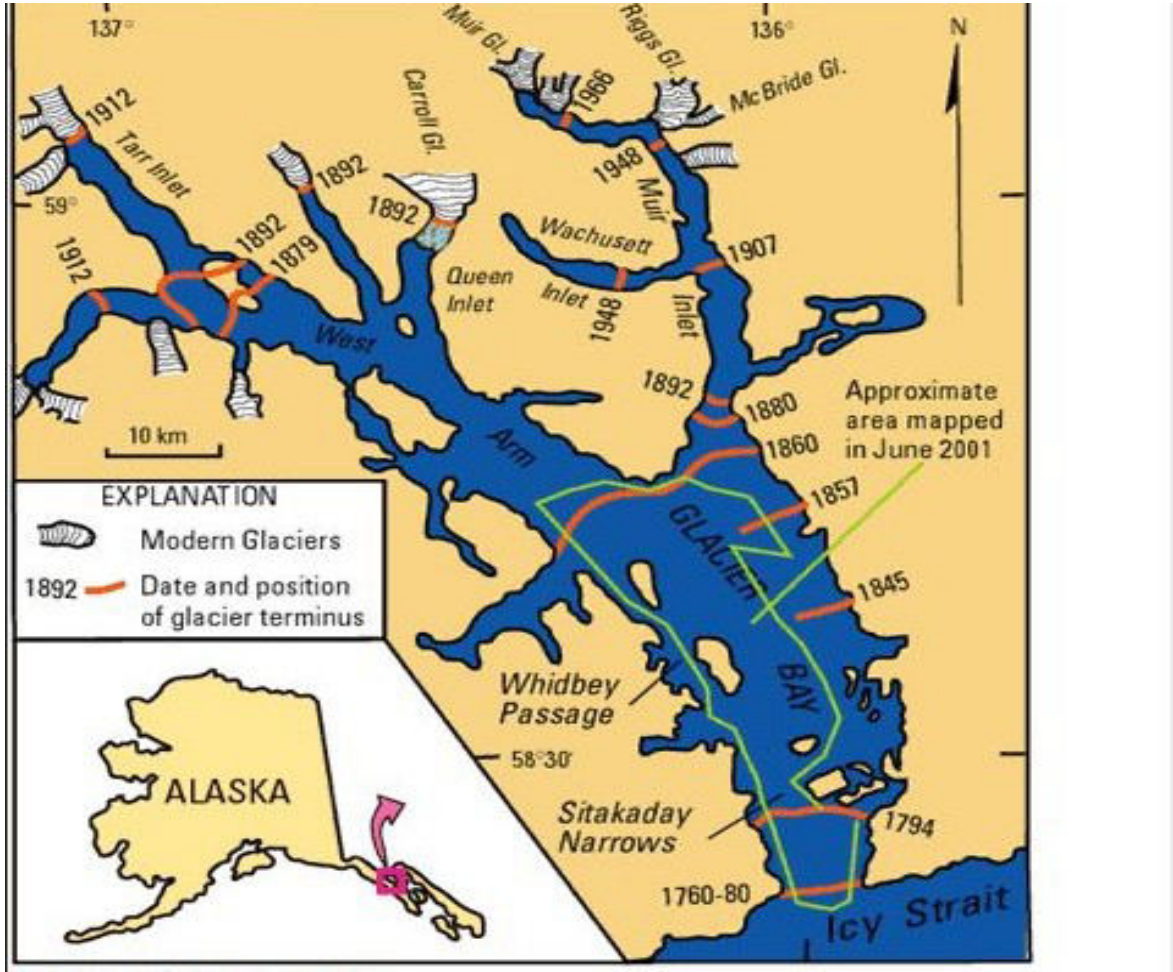
Glacier Bay Has Eye Witness Records Extending Back To 1750 & Most Of The Ice Had Melted By 1880

The Little Ice Age came and went quickly in geologic terms. By 1750 the glacier reached its maximum, jutting into Icy Strait, but 45 years later, when Capt. George Vancouver sailed here, the glacier had melted back five miles into Glacier Bay, which it had gouged out.

When conservationist John Muir came here in 1879 the glacier had retreated 40 more miles up the bay since Vancouver's visit. A renowned author, Muir captured the public's imagination about Alaska, attracting tourists to Glacier Bay. Like most people today, they came by ship.

Today you must travel 65 miles up the bay to view tidewater glaciers—a far cry from the glacier's 1750 maximum shown at left. Northern regions respond to changes in climate at faster rates than southern regions do. How will Glacier Bay change in your lifetime?

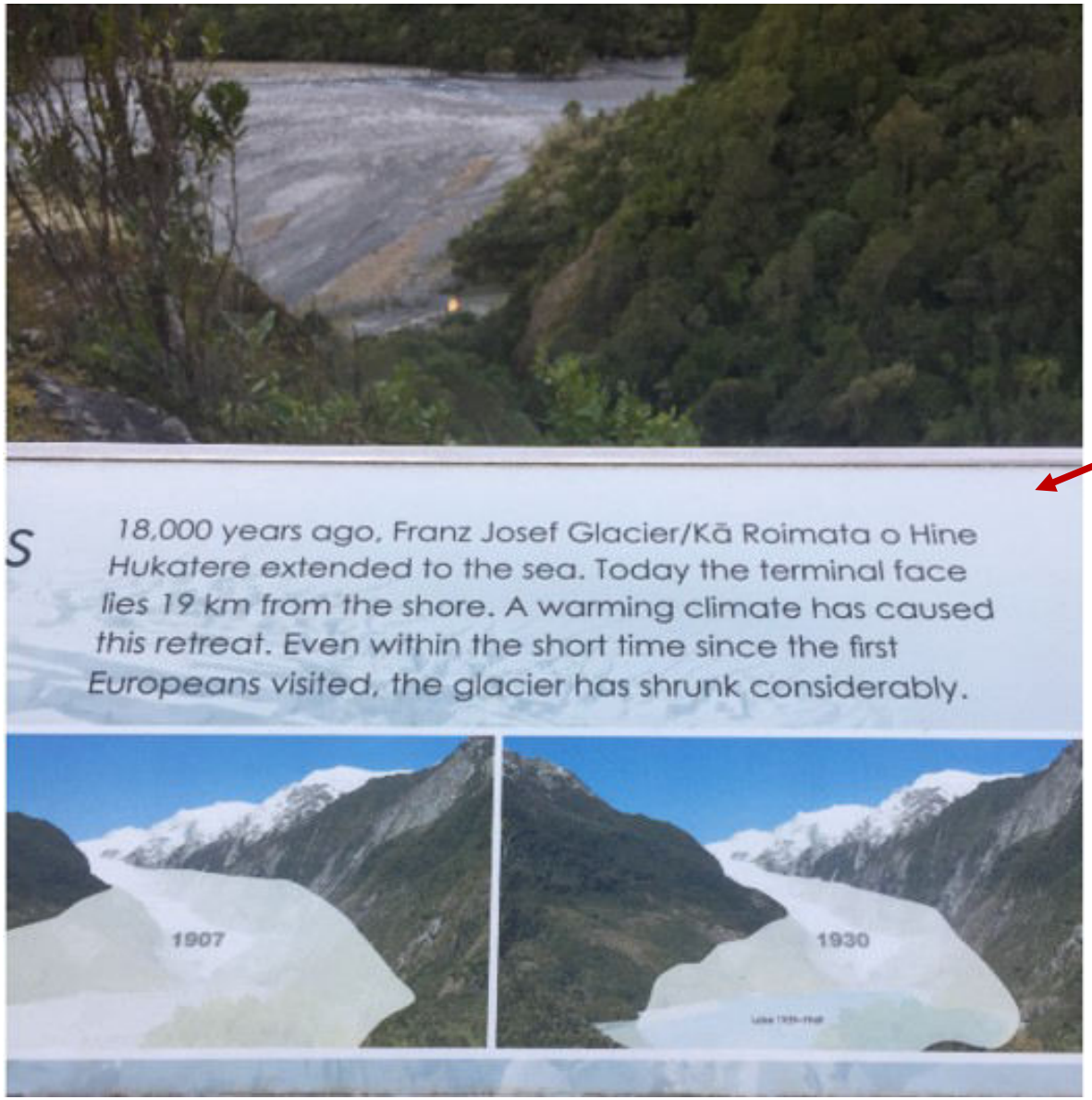
The extent of ice at Glacier Bay has been well recorded and the melt began before the industrial revolution



No higher resolution available.

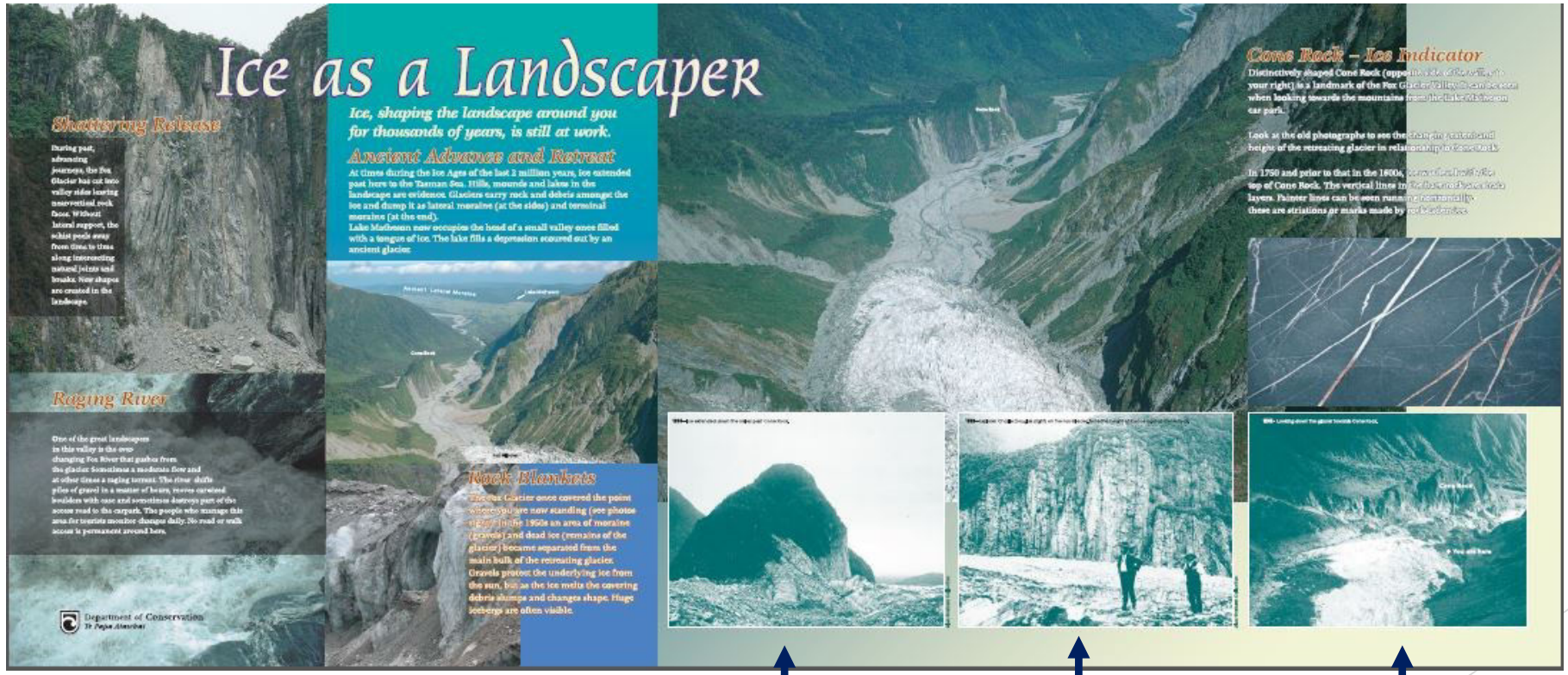
Glacierbaymap.gif (420 × 458 pixels, file size: 29 KB, MIME type: image/gif)

Franz Joseph Showed a similar history. See 1907 vs 1930



18,000 years ago, Franz Josef Glacier/Kā Roimata o Hine Hukatere extended to the sea. Today the terminal face lies 19 km from the shore. A warming climate has caused this retreat. Even within the short time since the first Europeans visited, the glacier has shrunk considerably.

Fox Glacier plaque also recorded a similar trend before the 2020 flood destroyed the plaque



Note These Photos

Photo 1 - In 1894 Fox Glacier extended well beyond Cone Rock, a perfect reference for glacial activity

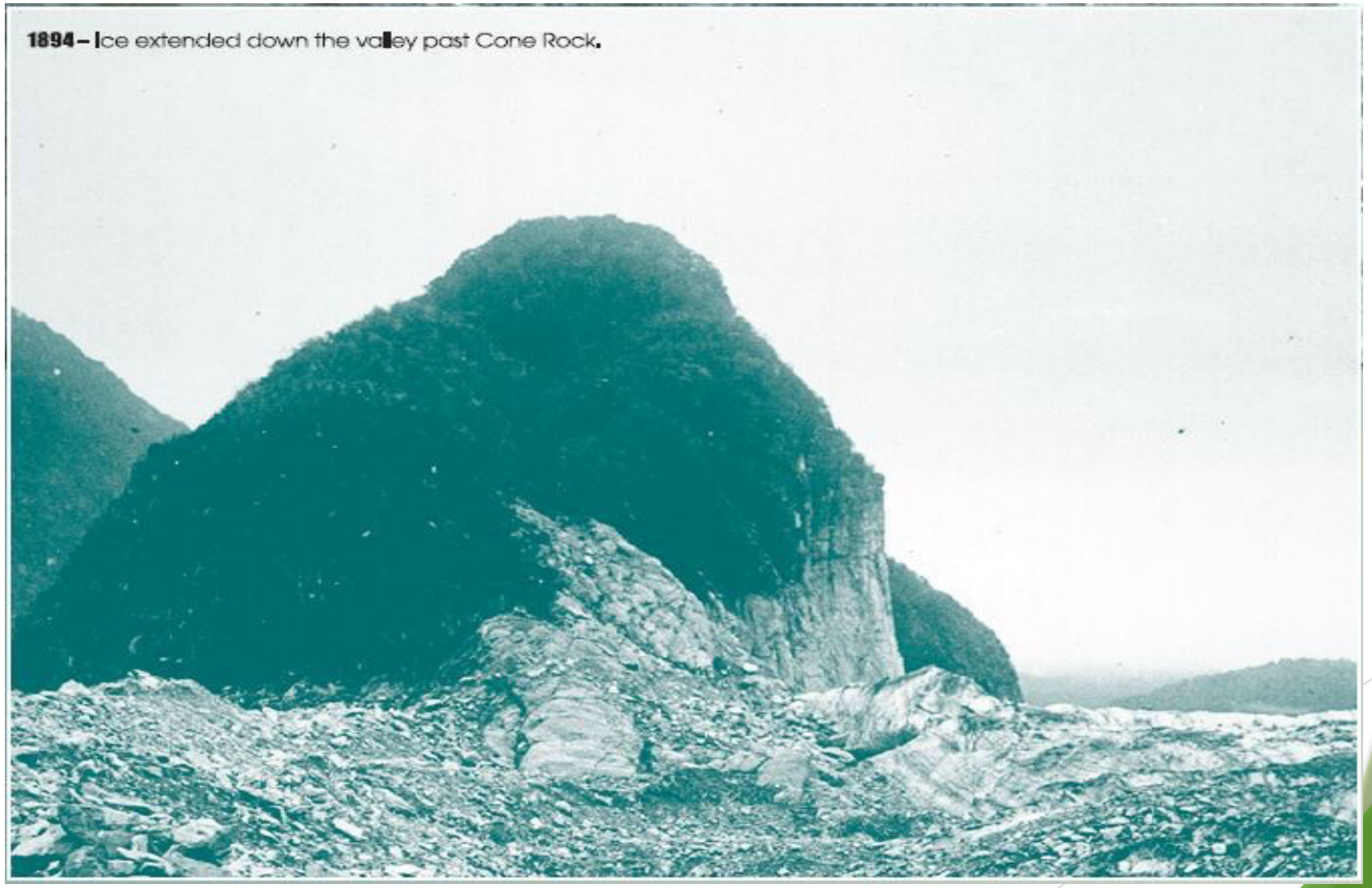


Photo 2 - In 1900 the glacier depth was easily measured against Cone Rock

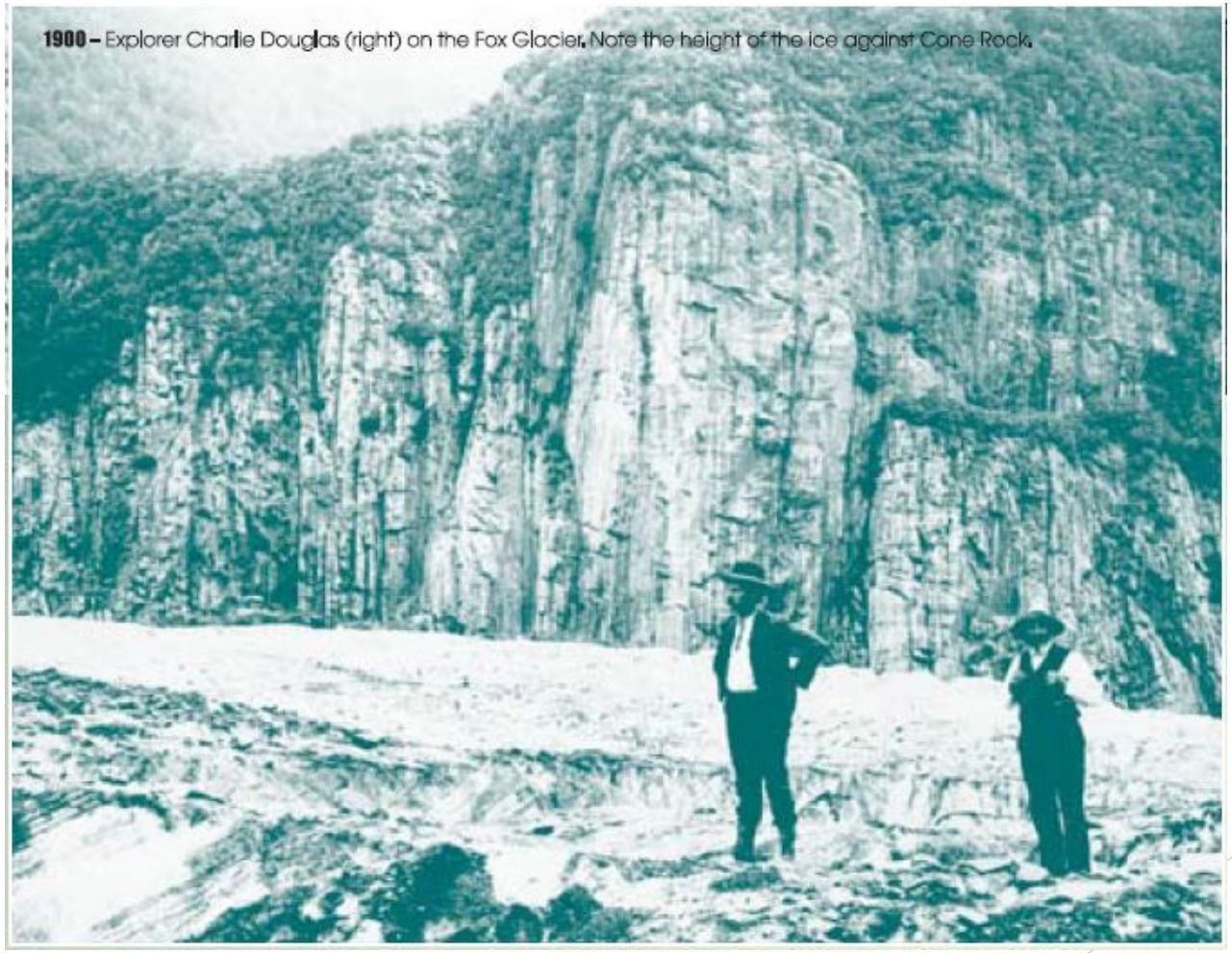
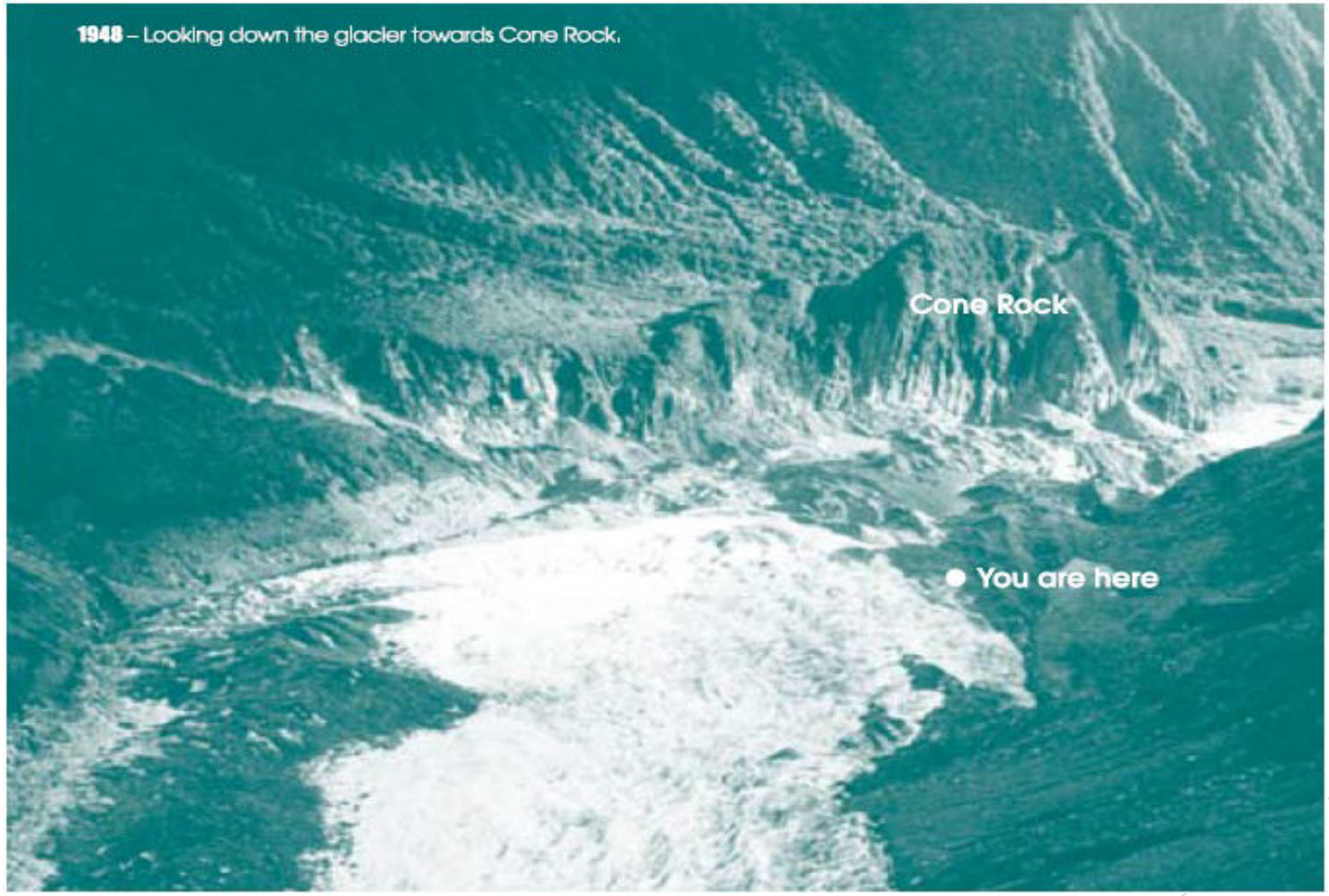


Photo 3 - By 1948 the glacier had receded to be upstream of Cone Rock, highlighting that the ice was melting before significant carbon emissions began



UK Records Show That The Thames Froze Regularly Between 1607-1815.

This Painting from 1677, shows the frozen Thames

During the Great Winter of 1683 / 84, **where even the seas of southern Britain were frozen solid for up to two miles from shore**, the most famous Frost Fair was held.

https://www.historic-uk.com/HistoryUK/HistoryofEngland/The-Thames-Frost-Fairs/

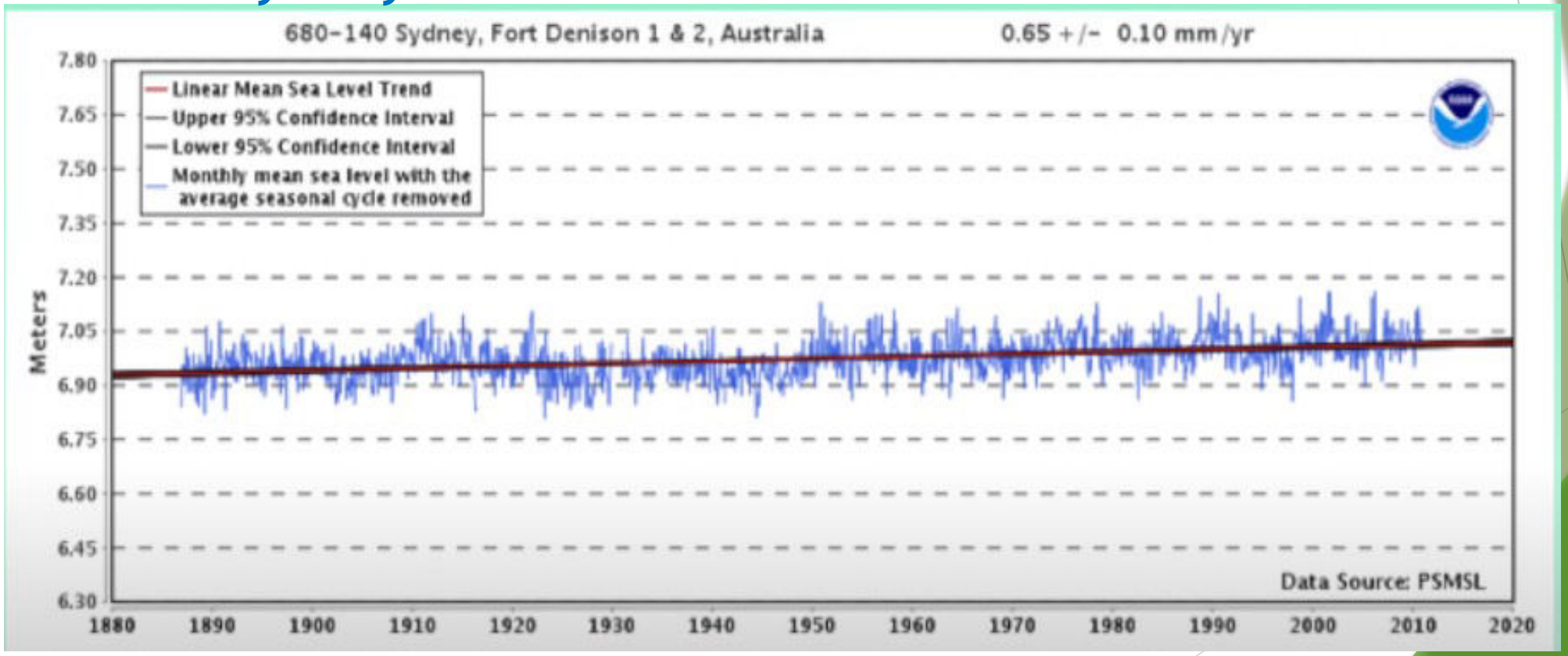
The last ever Frost Fair held in 1814 / 15

By the 1800's the climate had started to warm, the severity of the winters had waned and the last ever London Frost Fair took place in the January of 1814.

https://www.historic-uk.com/HistoryUK/HistoryofEngland/The-Thames-Frost-Fairs/

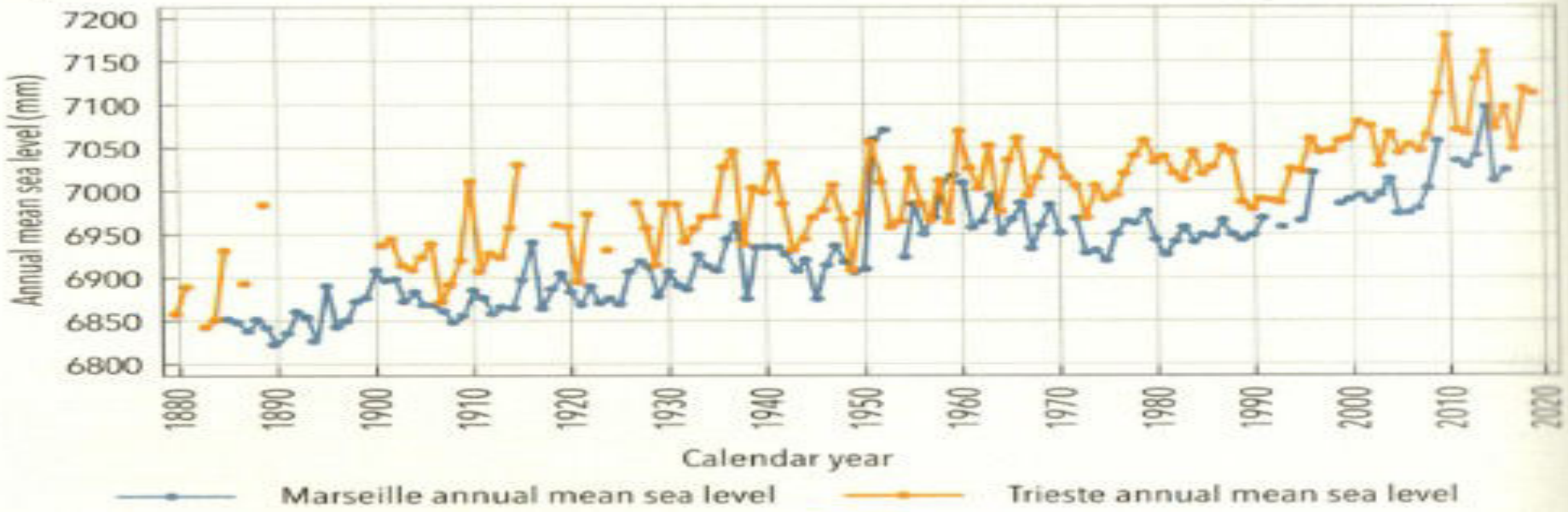
With Alaskan Ice Melting Since 1750 & A Similar Trend In The UK & NZ, Would We Expect Sea Levels to Be Rising?

This is Sydney's Sea Level Record Since 1887.



The same linear trend has occurred in France and Italy from 1880 - 2016

Figure 17.6 Annual mean sea level at Marseille (France) and Trieste (Italy), 1880 to 2016

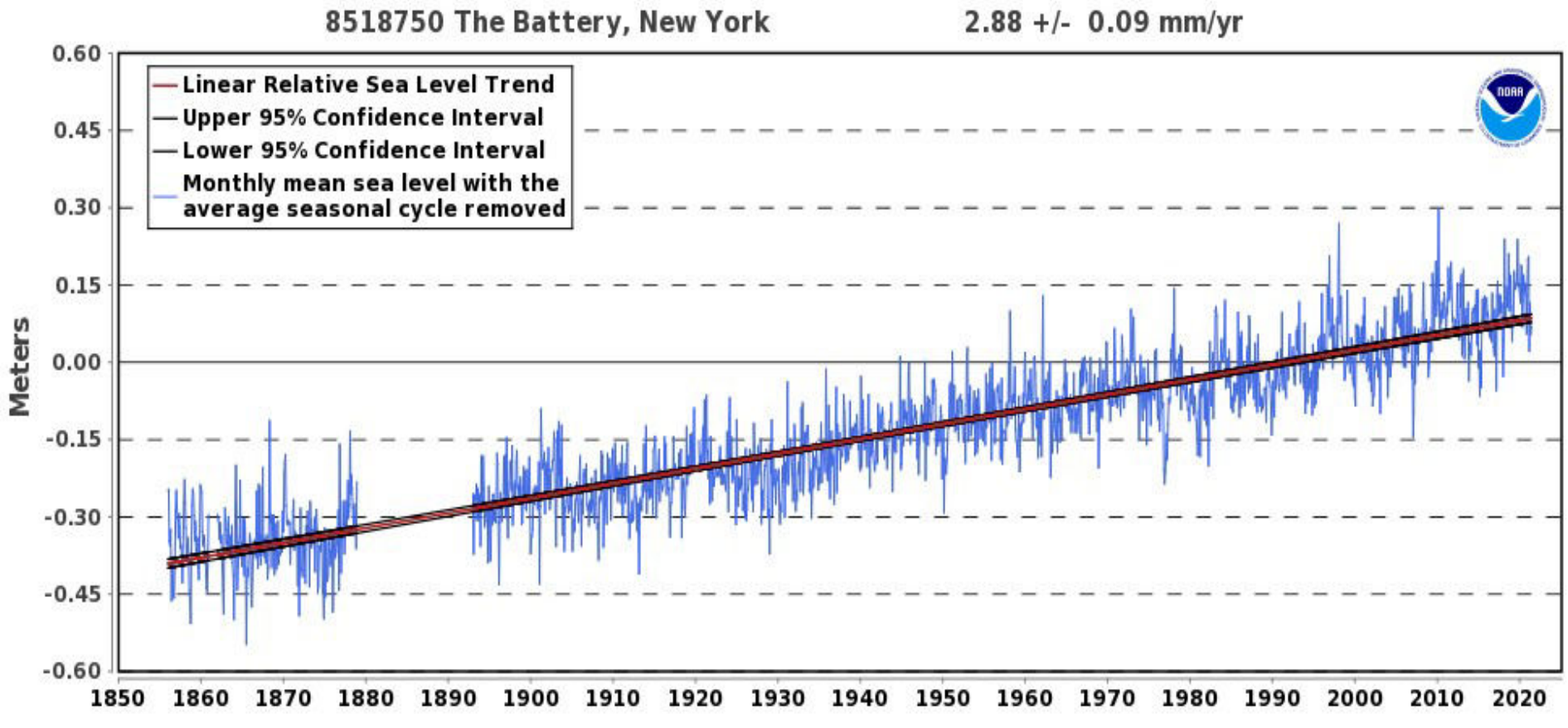


Tide gauge data from the Permanent Service for Mean Sea Level (PSMSL 2020).

Sources: Permanent Service for Mean Sea Level: https://www.psmsl.org/data/obtaining/stations/61.php, https://www.psmsl.org/data/obtaining/stations/154.php.

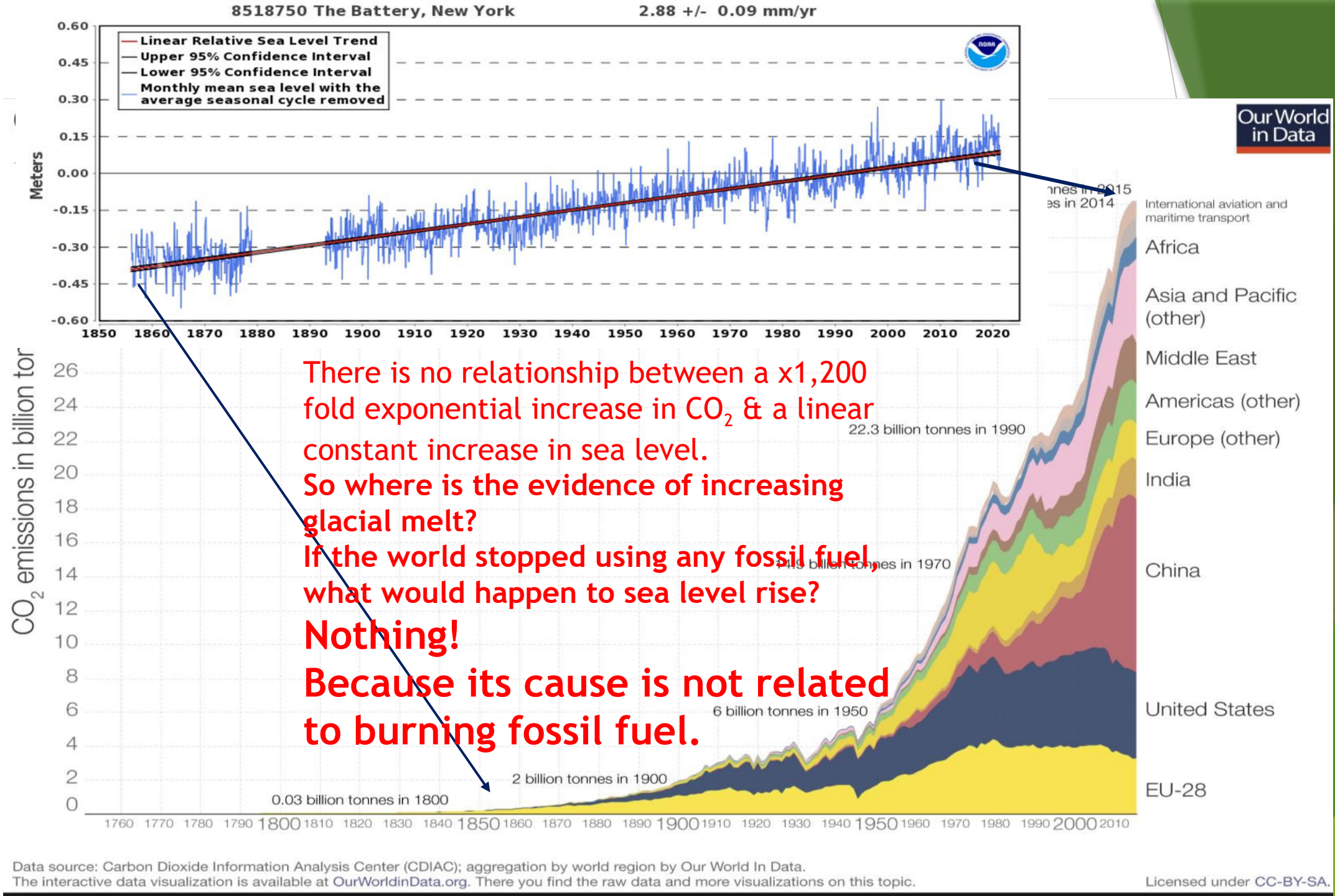
The Record In New York Is Even Older But It Still Shows A Consistent Yearly Increase Since 1855.

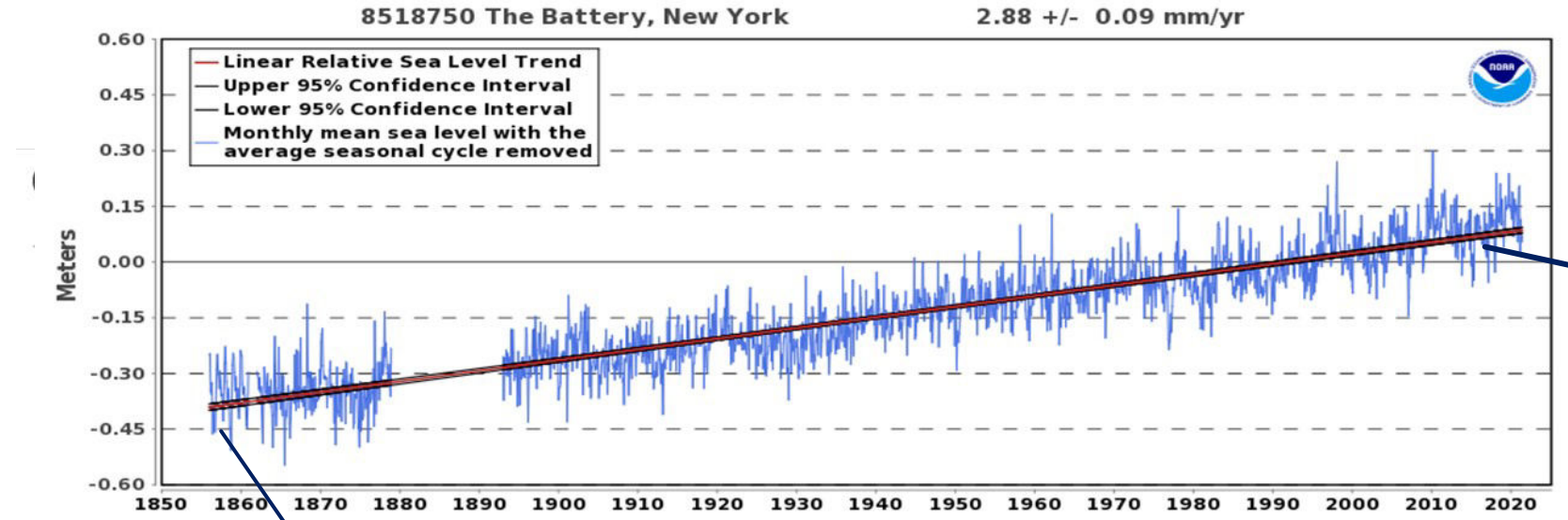
https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8518750

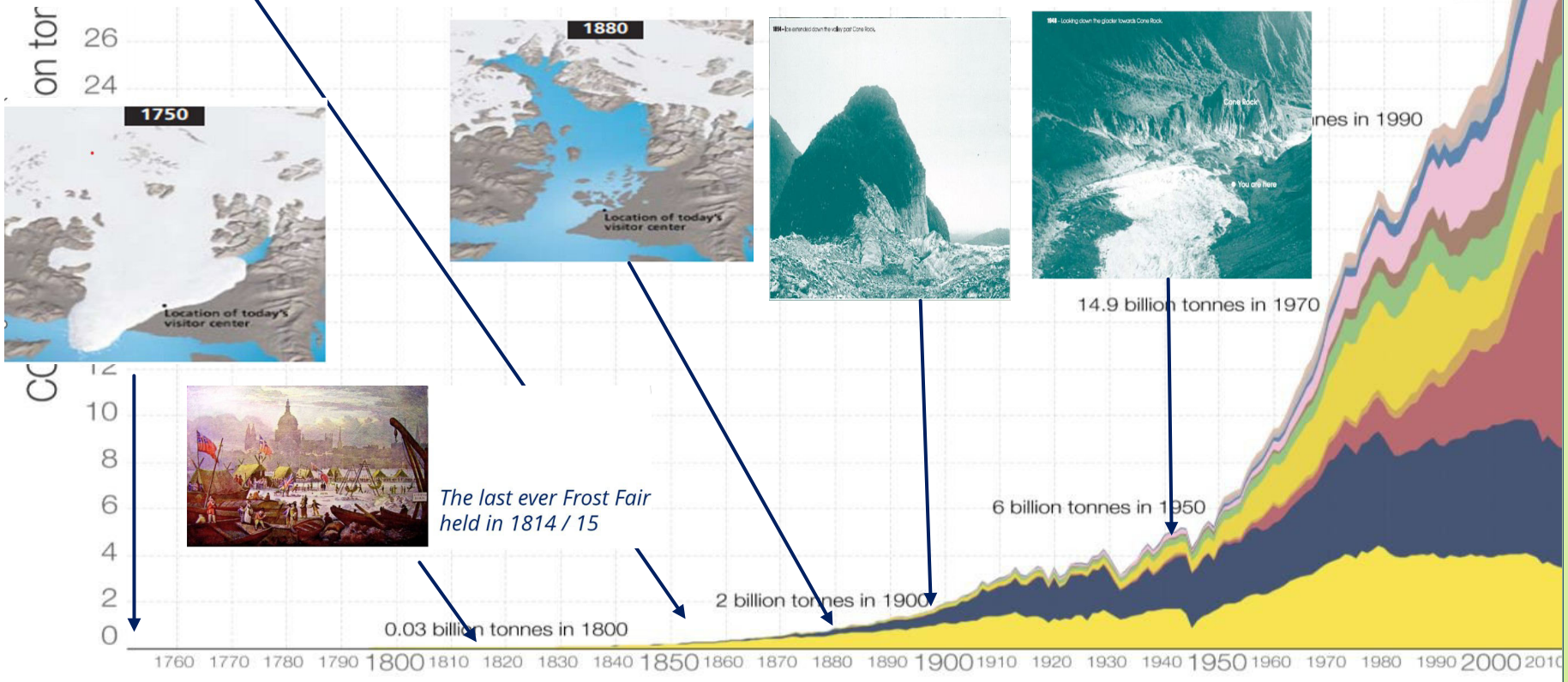


As well, even the United Nation's IPCC, the body whose task it is to find evidence for climate change, stated

- "No significant acceleration in the rate of sea-level rise during the 20th century has been detected" (Church et al 2001 – Changes in Sea Level In: Climate Change 2001: The Scientific Basis. Contribution of Working Group 1 to the Third Assessment Report of the Intergovernmental Panel on Climate Change pp 639-693.)


8518750 The Battery, New York
2.88 +/- 0.09 mm/yr
Linear Relative Sea Level Trend
Upper 95% Confidence Interval
Lower 95% Confidence Interval
Monthly mean sea level with the average seasonal cycle removed
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1850 1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020
There is no relationship between a x1,200 fold exponential increase in CO_2 & a linear constant increase in sea level.
So where is the evidence of increasing glacial melt?
If the world stopped using any fossil fuel, what would happen to sea level rise?
Nothing!
Because its cause is not related to burning fossil fuel.
Our World in Data
CO_2 emissions in billion tor
26
24
22
20
18
16
14
12
10
8
6
4
2
0
22.3 billion tonnes in 1990
6 billion tonnes in 1950
2 billion tonnes in 1900
0.03 billion tonnes in 1800
1760 1770 1780 1790 1800 1810 1820 1830 1840 1850 1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010
International aviation and maritime transport
Africa
Asia and Pacific (other)
Middle East
Americas (other)
Europe (other)
India
China
United States
EU-28
Data source: Carbon Dioxide Information Analysis Center (CDIAC); aggregation by world region by Our World In Data.
The interactive data visualization is available at OurWorldinData.org. There you find the raw data and more visualizations on this topic.
Licensed under CC-BY-SA.





Data source: Carbon Dioxide Information Analysis Center (CDIAC); aggregation by world region by Our World In Data.
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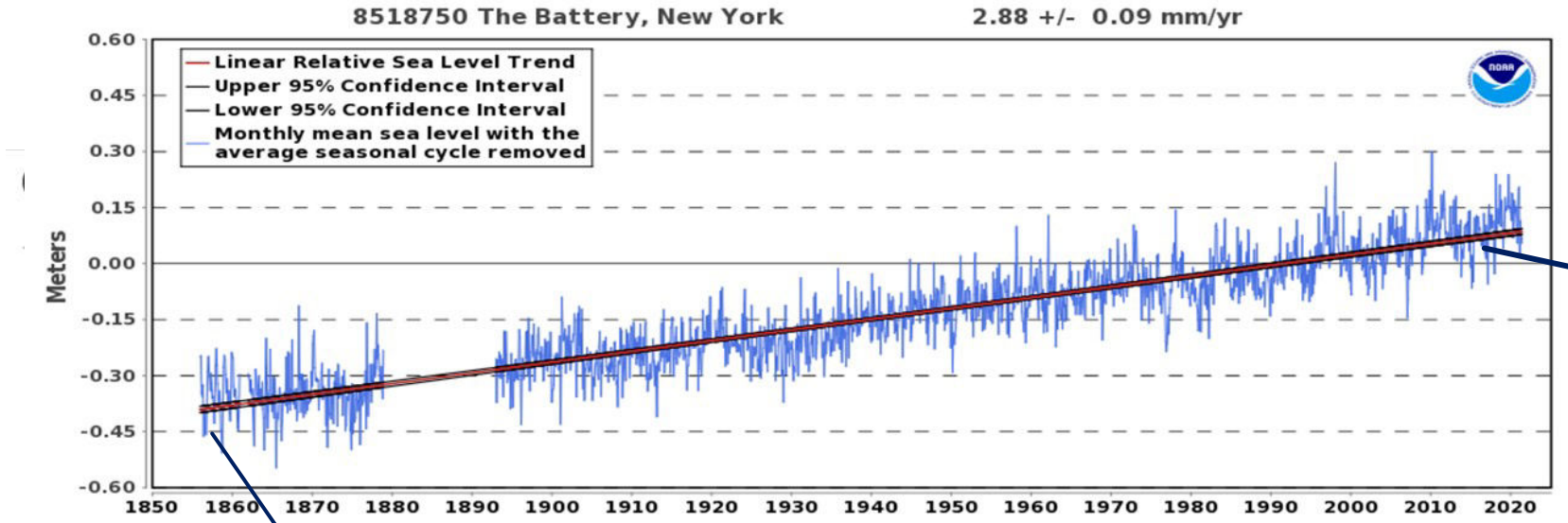
How come we are blaming the burning of fossil fuels for:

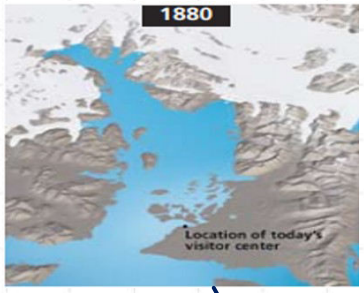
- melting glaciers & the corresponding sea level rise when,

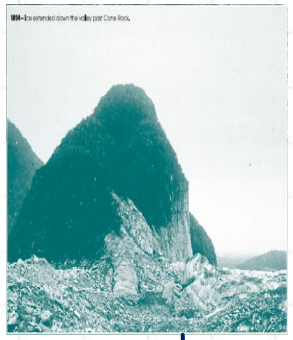
- we know from eye witness accounts from before the industrial revolution (1760-1850),

- that the ice was already melting &

- has done so at a constant rate since at least 1855.







The last ever Frost Fair held in 1814 / 15

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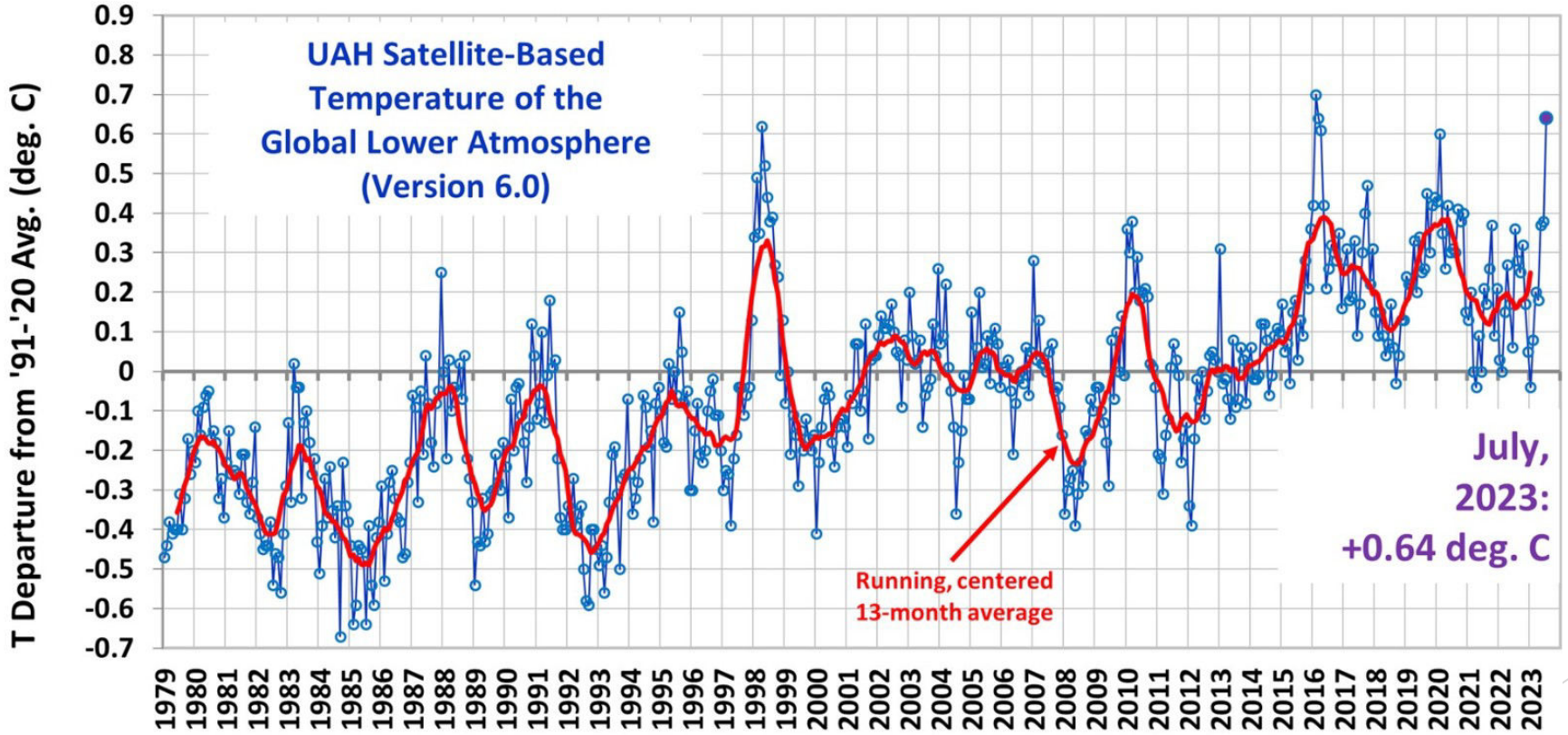
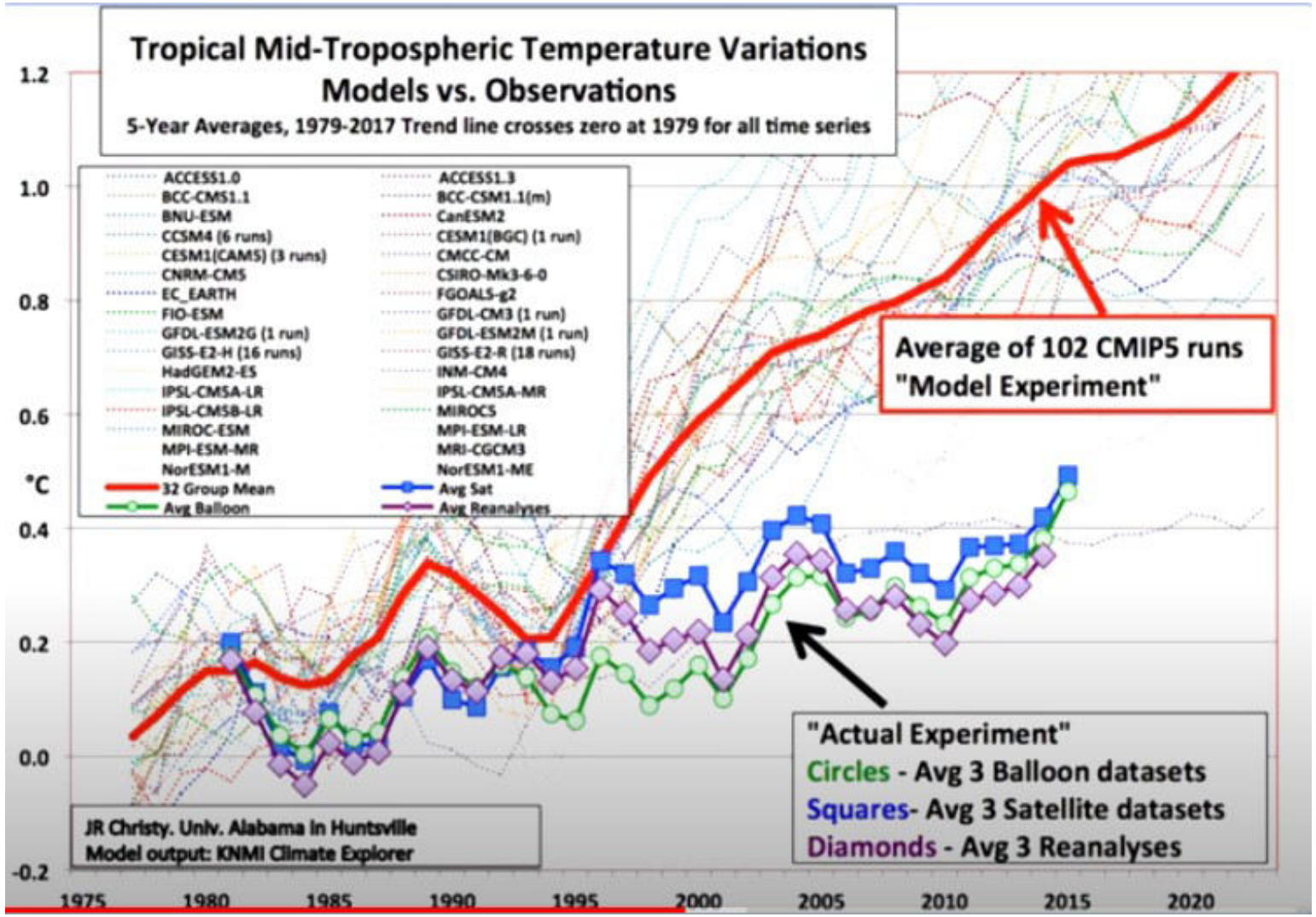
So why has the NZ Gov't stopped oil and gas exploration ?????????????

Like Sea Level Rise, The Commencement Of Satellite Monitoring of Global Temperature In 1979 Shows A Small Gradual Increase



But Climate Models With > 200% Error In Predicting Temperature Are Being Used To Make Gov't Policy

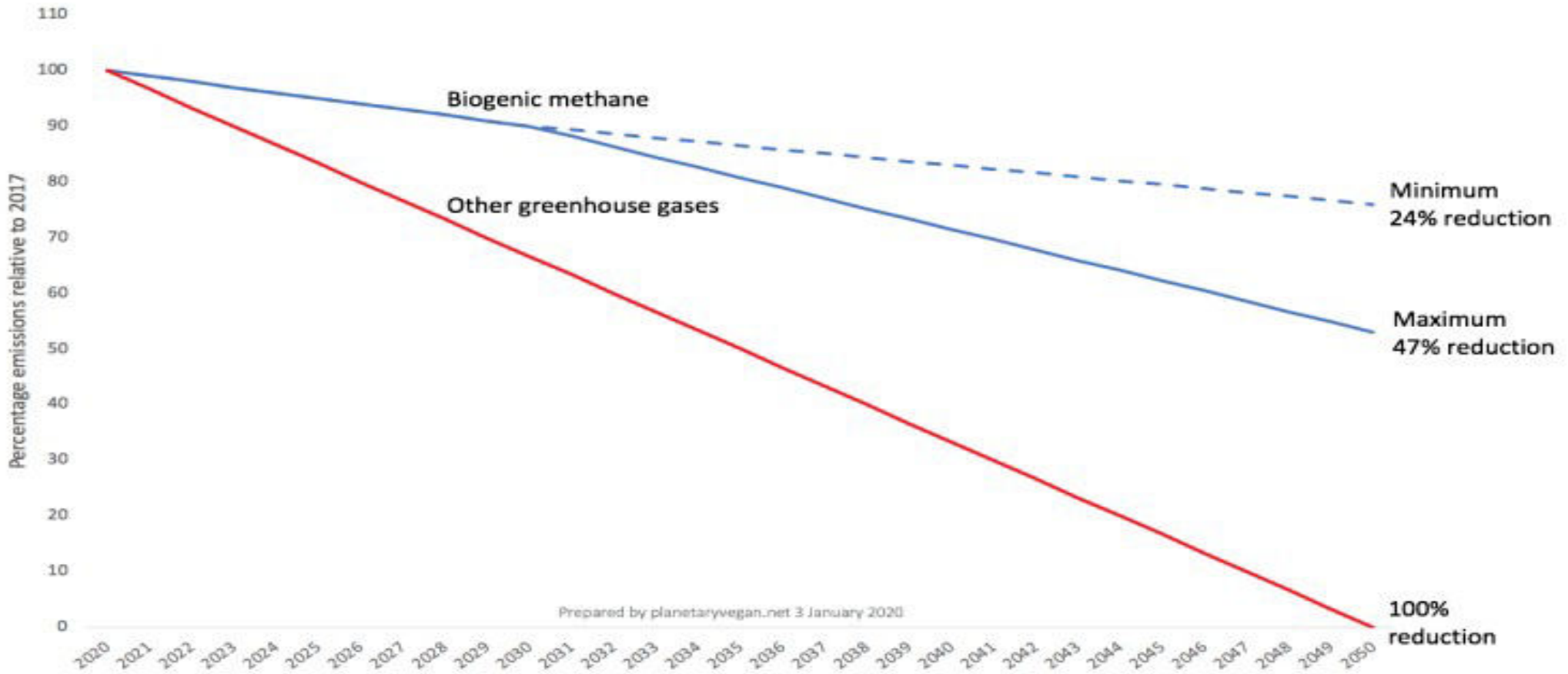


The models have an error of 200% compared to actual records from weather balloons & satellites

https://www.youtube.com/watch?v=I8hdE3eZ6vs&feature=youtu.be

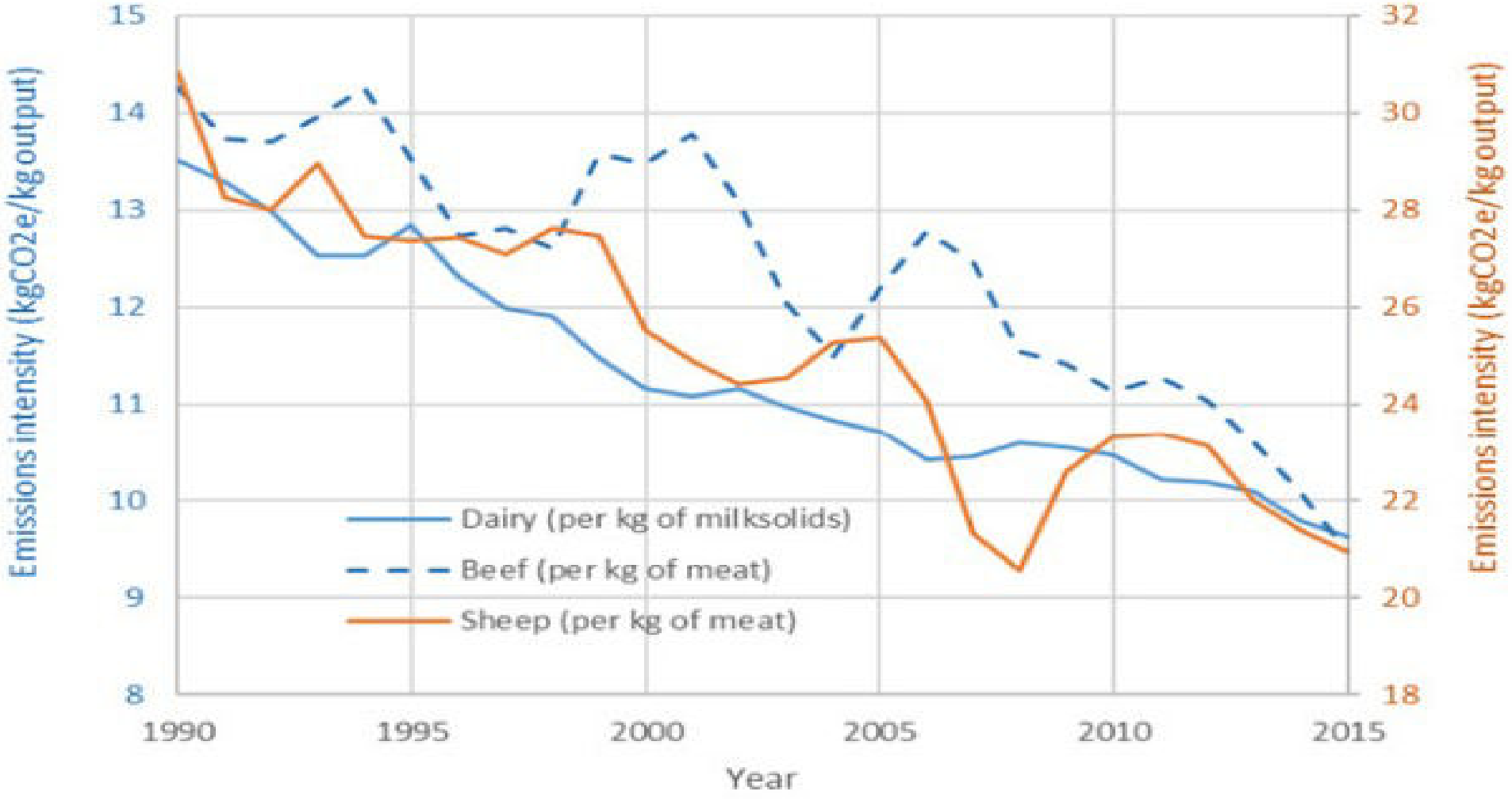
Here Is What The Models Are Persuading Our Gov't To Do. The Goal Of The Zero Carbon Amendment Act - Nov 2019

Figure 1: New Zealand emission reduction targets relative to 2017 base period



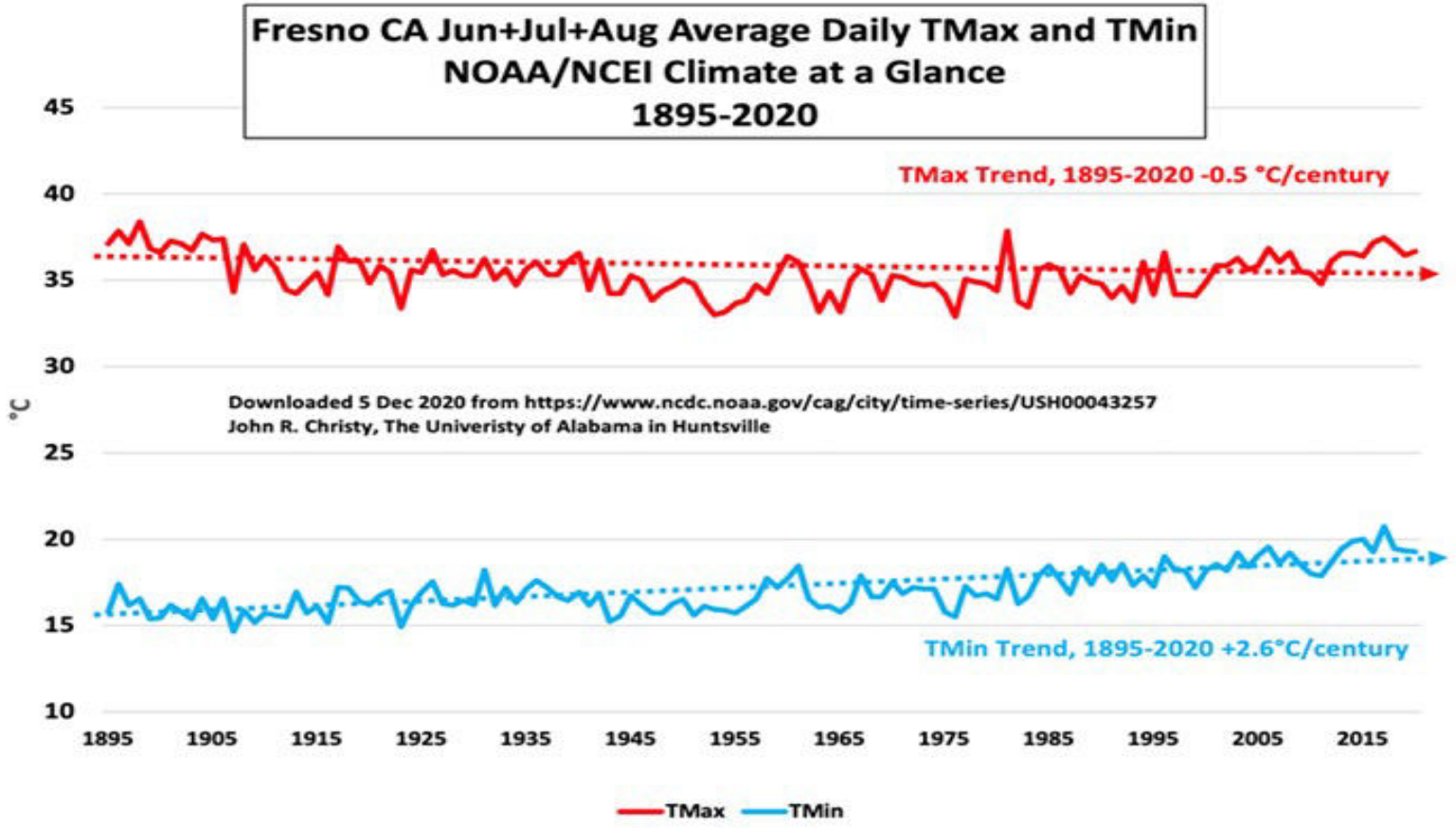
Trend lines from 2020 to 2050

30% Reduction In Methane & CO_2 Emissions From NZ Dairy, Beef & Sheep Farmers Between 1990-2015. And Without Gov't Intervention



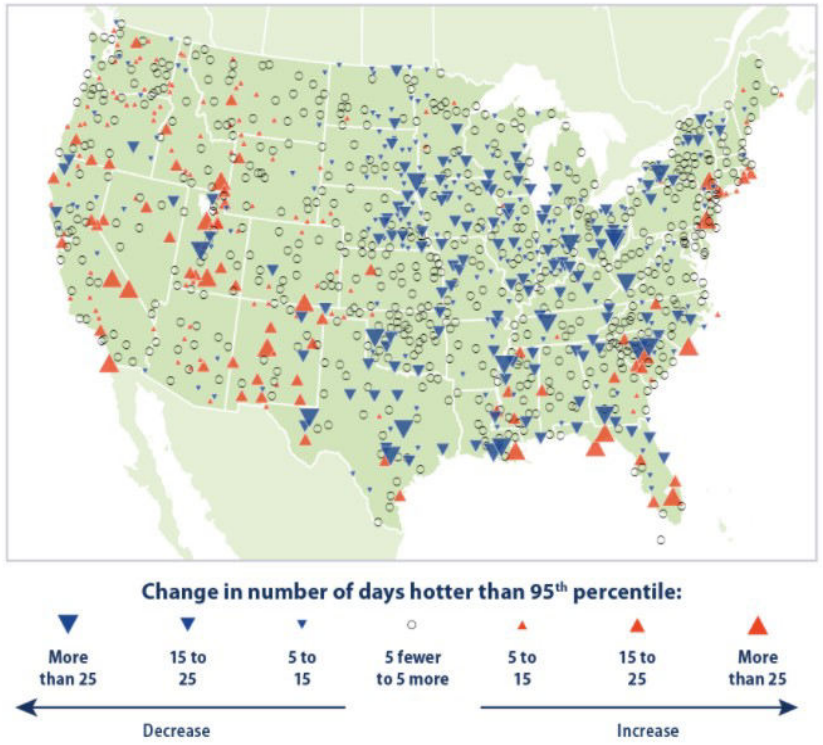
Source: NZ Govt 2018 "Zero-Carbon-Bill-Economic-Analysis-Report-FINAL"

The Average Temp Is Gradually Increasing, But It Is Not The Maximums, Rather It Is The Warming Minimums, As Shown Since 1895 In California.



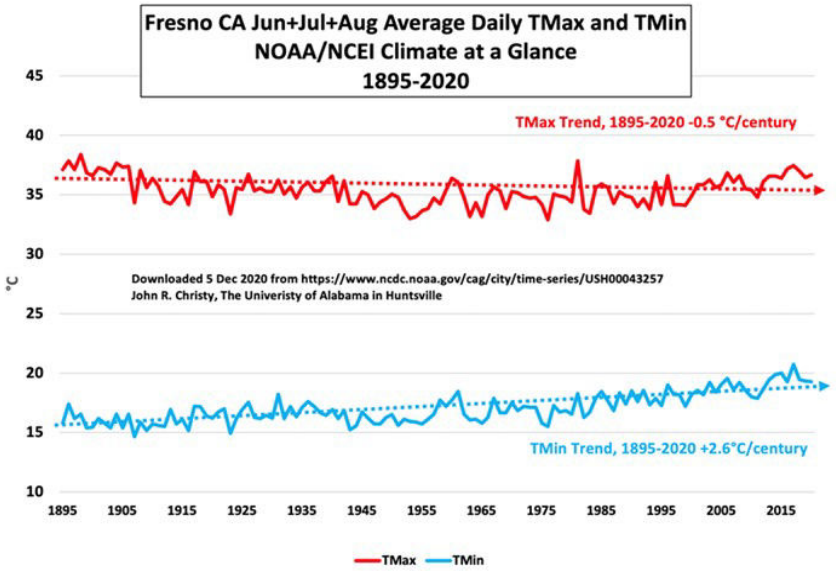
Same Trend Over Most Of The USA Where Unusually Hot Days Are Becoming Less Common From 1948-2015

Figure 4. Change in Unusually Hot Temperatures in the Contiguous 48 States, 1948–2015



This map shows trends in unusually hot temperatures at individual weather stations that have operated consistently since 1948. In this case, the term "unusually hot" refers to a daily maximum temperature that is hotter than the 95th percentile temperature during the 1948–2015 period. Thus, the maximum temperature on a particular day at a particular station would be considered "unusually hot" if it falls within the warmest 5 percent of measurements at that station during the 1948–2015 period. The map shows changes in the total number of days per year that were hotter than the 95th percentile. Red upward-pointing symbols show where these unusually hot days are becoming more common. Blue downward-pointing symbols show where unusually hot days are becoming less common.

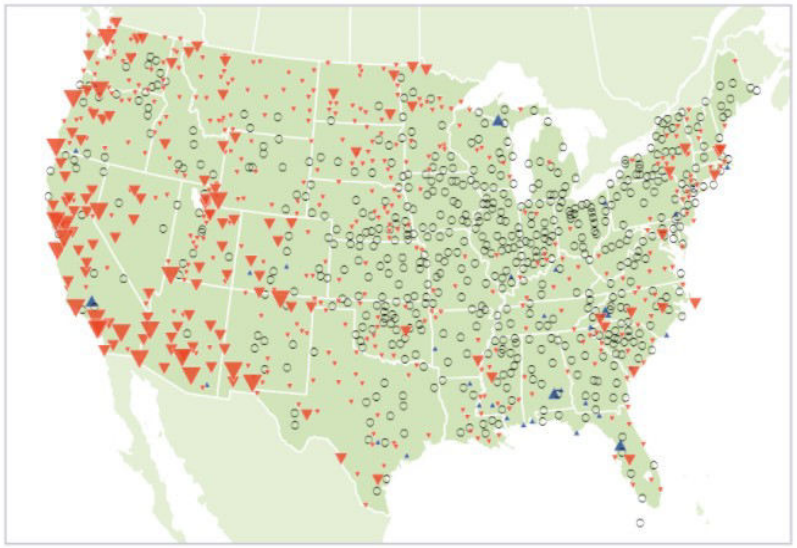
Data source: NOAA, 2016[8]



"Blue downward pointing symbols show where unusually hot days are becoming less common"

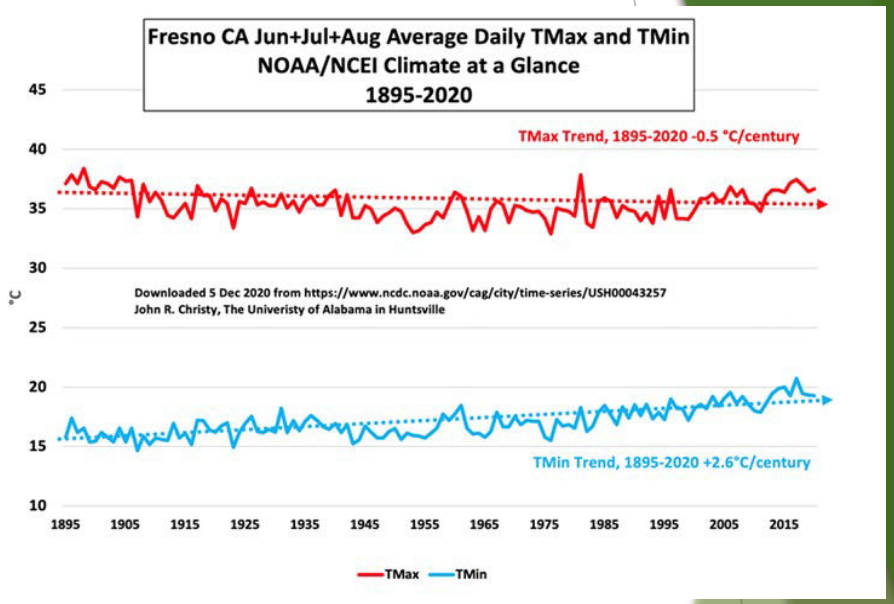
Same Trend Over Most Of The USA Where Unusually Cold Days Are Becoming Less Common From 1948-2015

Figure 5. Change in Unusually Cold Temperatures in the Contiguous 48 States, 1948–2015



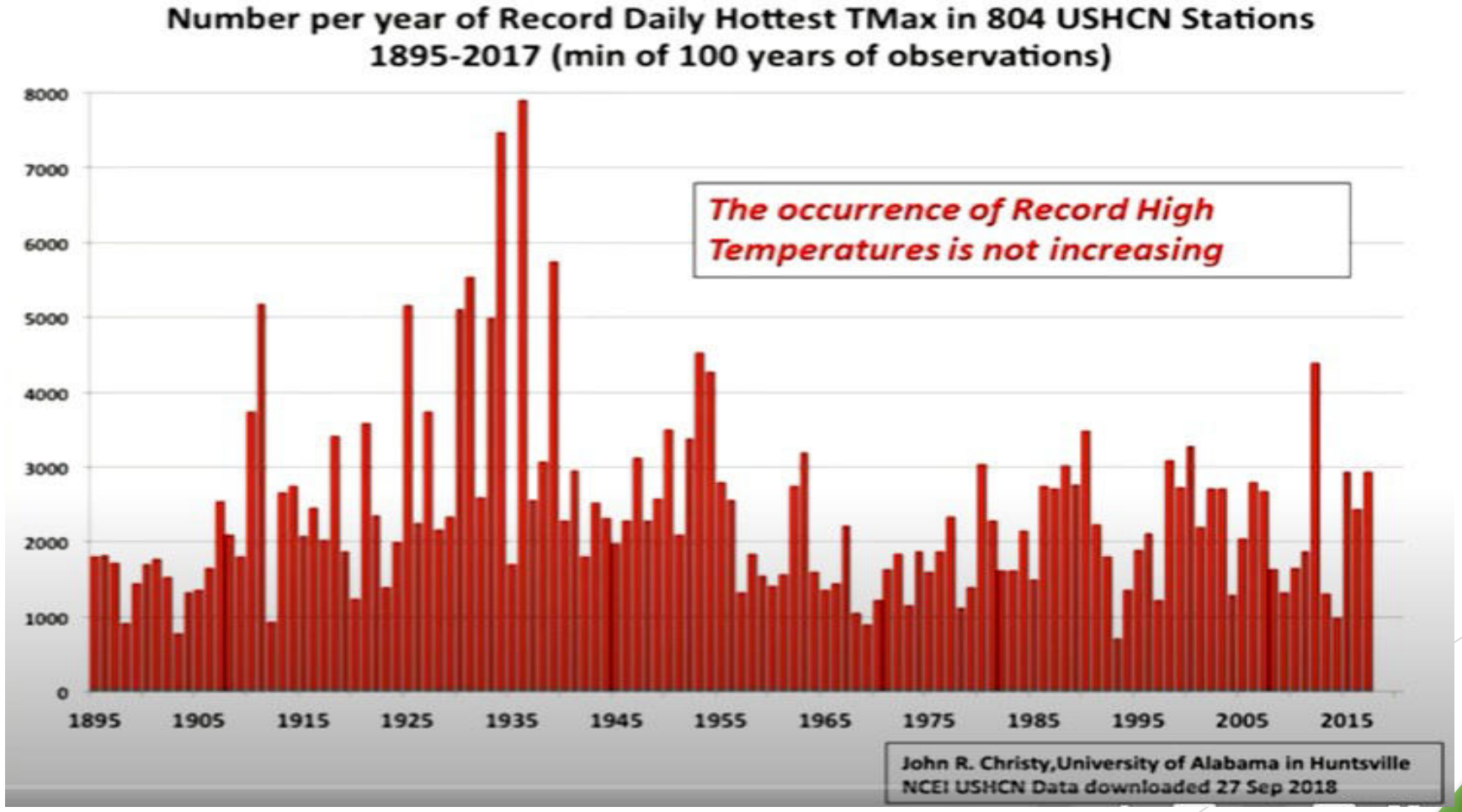
This map shows trends in unusually cold temperatures at individual weather stations that have operated consistently since 1948. In this case, the term "unusually cold" refers to a daily minimum temperature that is colder than the 5th percentile temperature during the 1948–2015 period. Thus, the minimum temperature on a particular day at a particular station would be considered "unusually cold" if it falls within the coldest 5 percent of measurements at that station during the 1948–2015 period. The map shows changes in the total number of days per year that were colder than the 5th percentile. Blue upward-pointing symbols show where these unusually cold days are becoming more common. Red downward-pointing symbols show where unusually cold days are becoming less common.

Data source: NOAA, 2016[10]

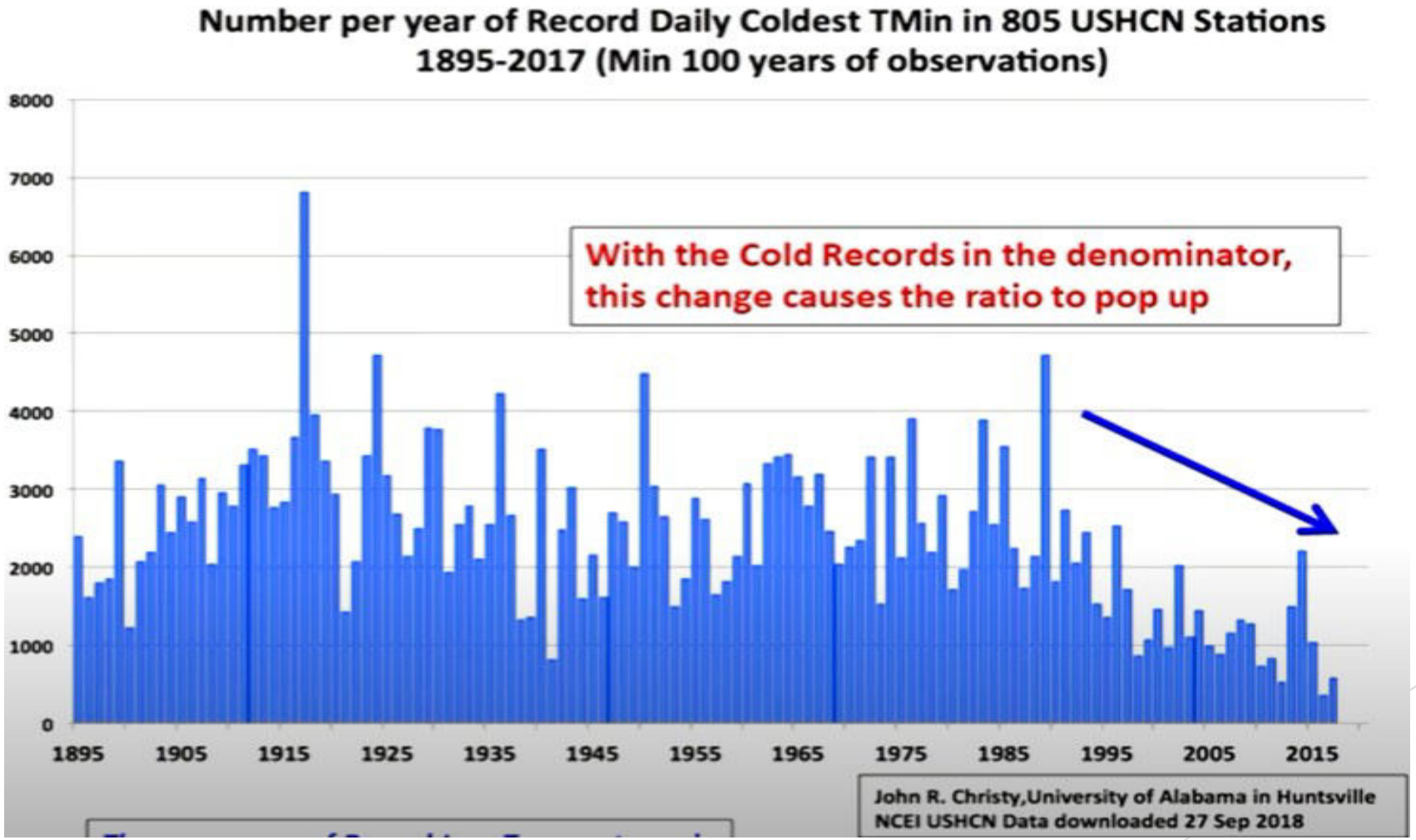


"Red downward pointing symbols show where unusually cold days are becoming less common."

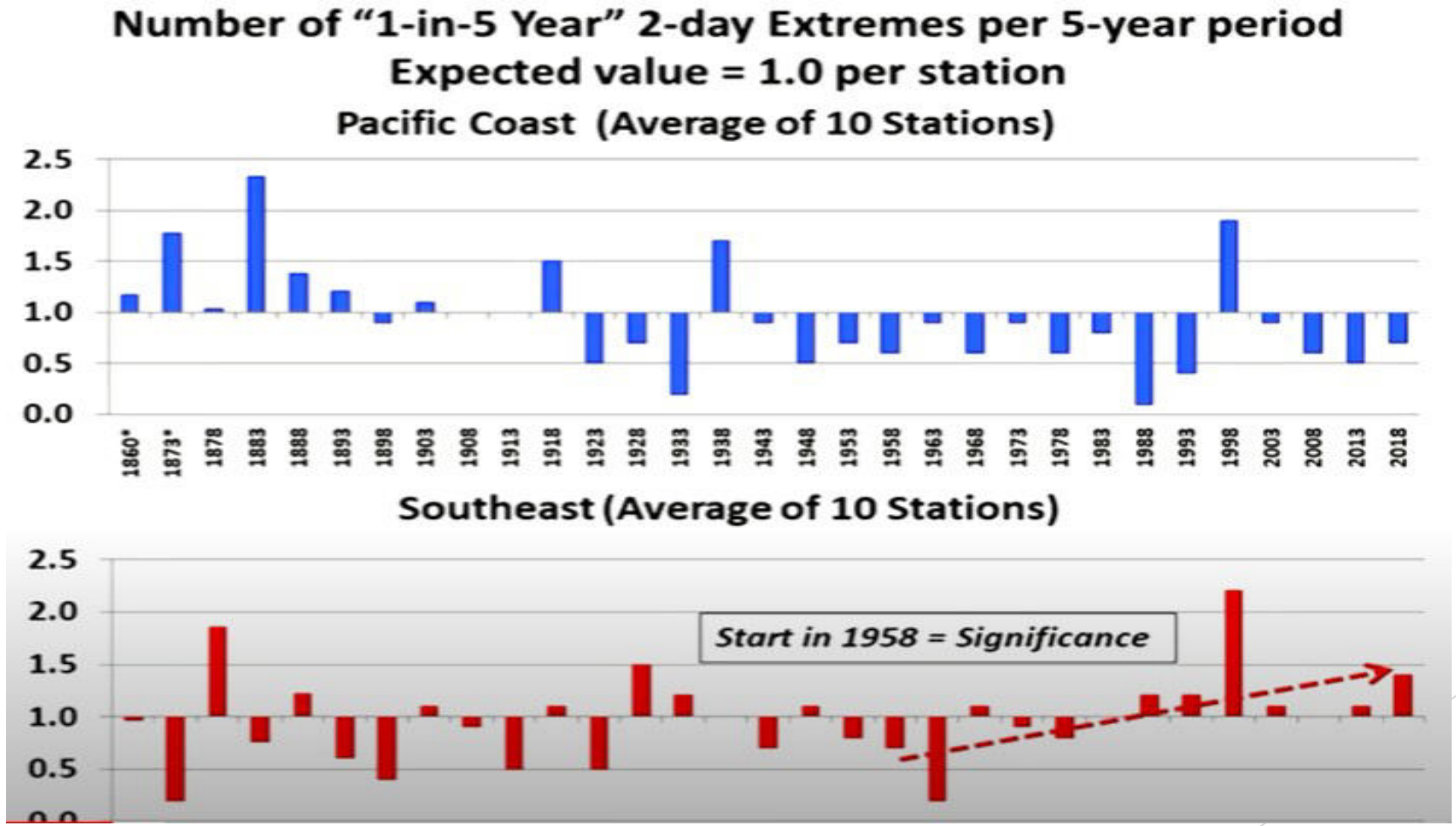
The USA Has Over 120 yrs of Temperature Records. The Number of Record Highs is Not Increasing, But In Fact Is Decreasing



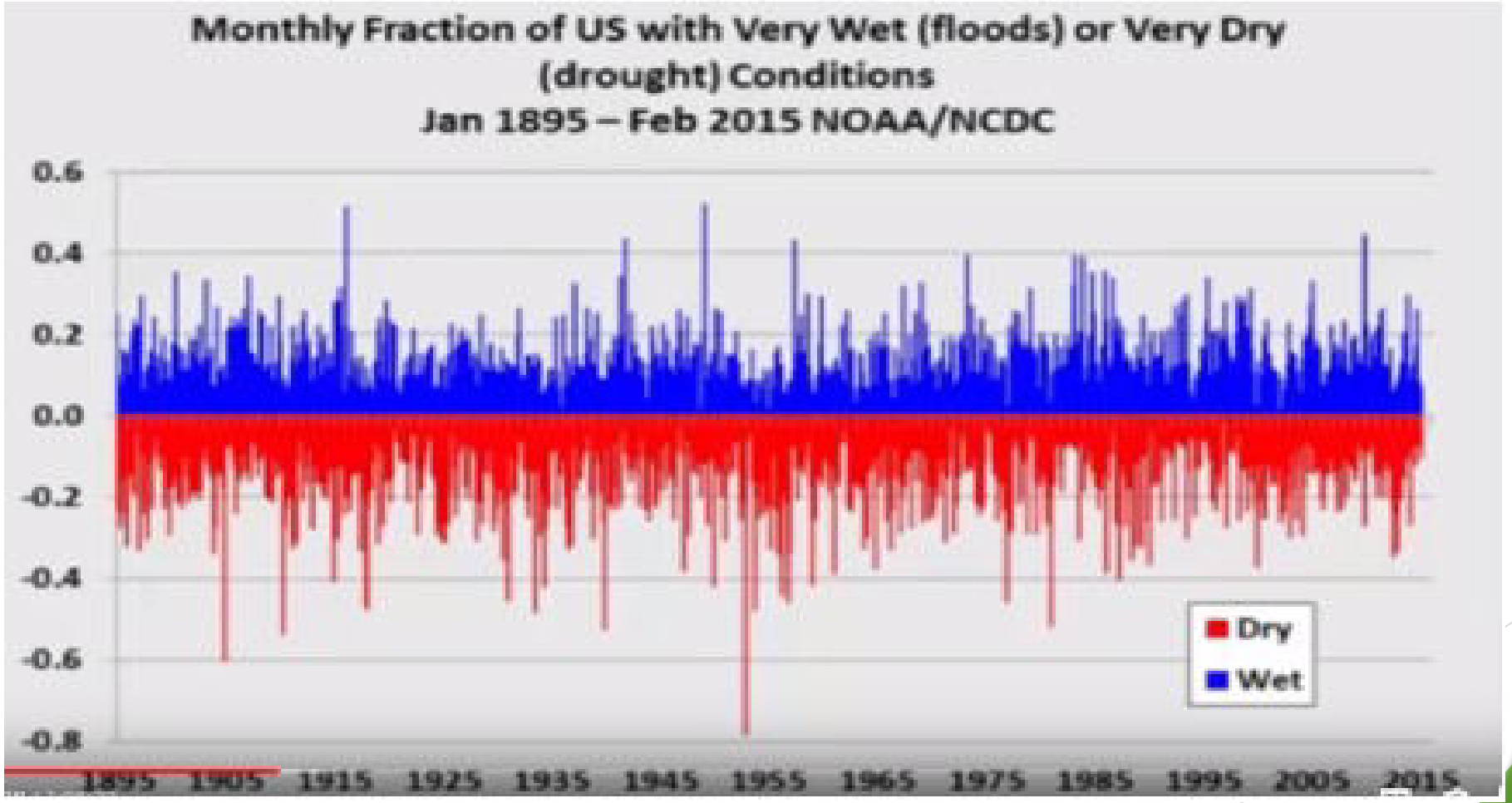
The Number of Record Lows Is Decreasing, So Warming Winters Creates The Average Temperature Trend To Increase



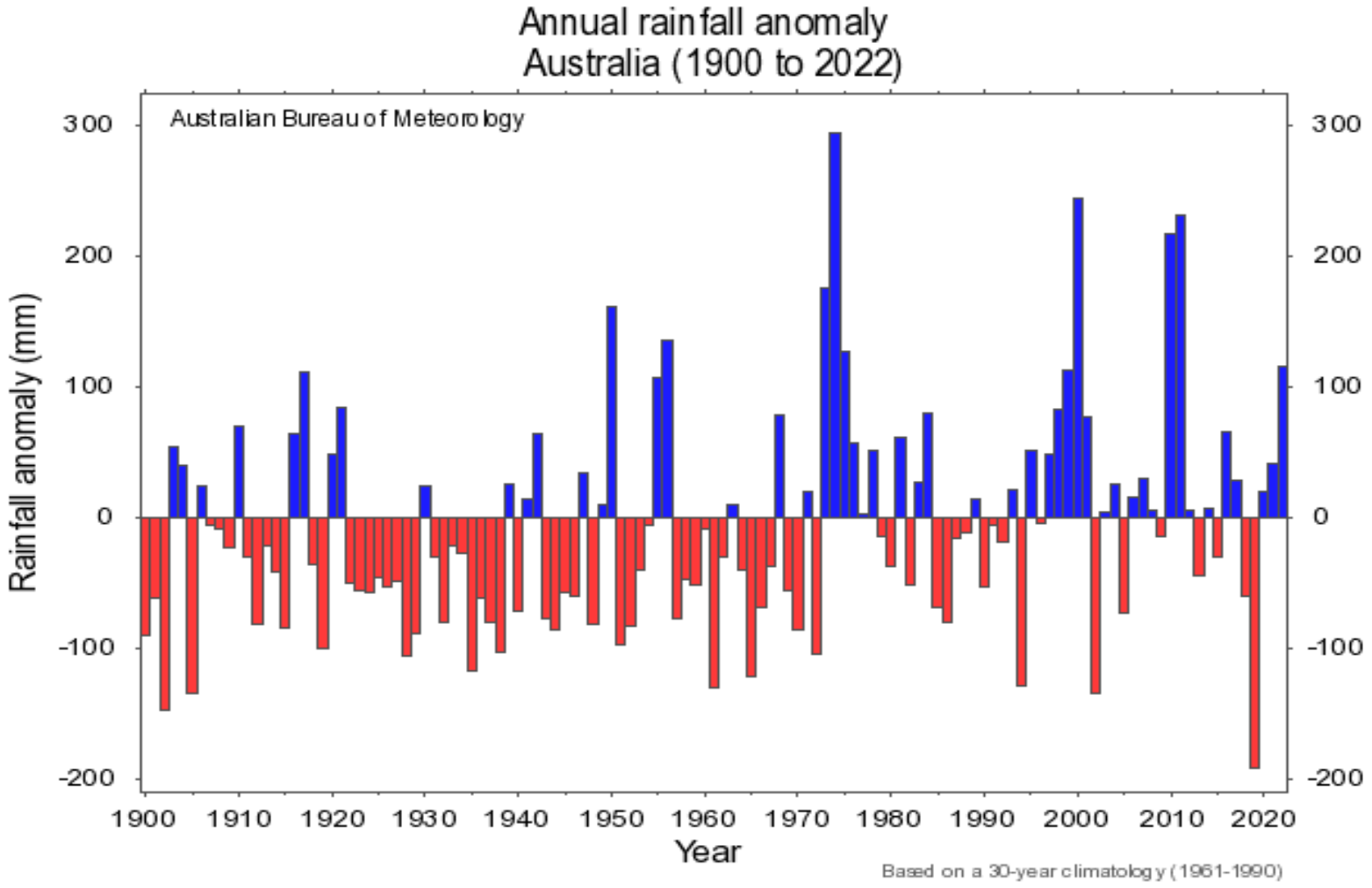
Rainfall Extremes in the USA Since 1860. Note That If You Start at an Appropriate Point It Can Be Made To Look Like Downpours Have Increased.



Floods and Droughts In The USA From 1895-2015

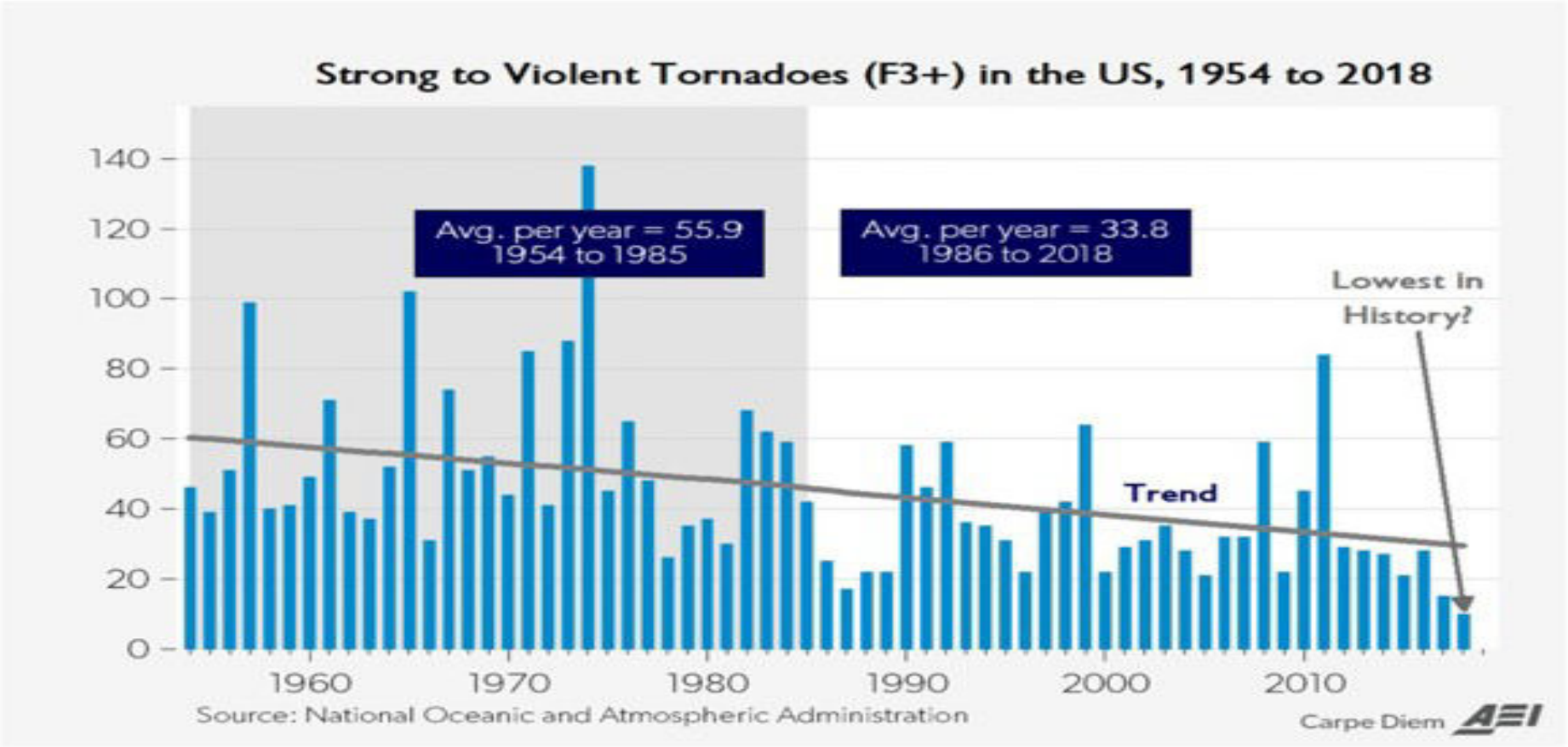


Australian Rainfall Anomaly 1900-2022 Doesn't Show Increased Droughts

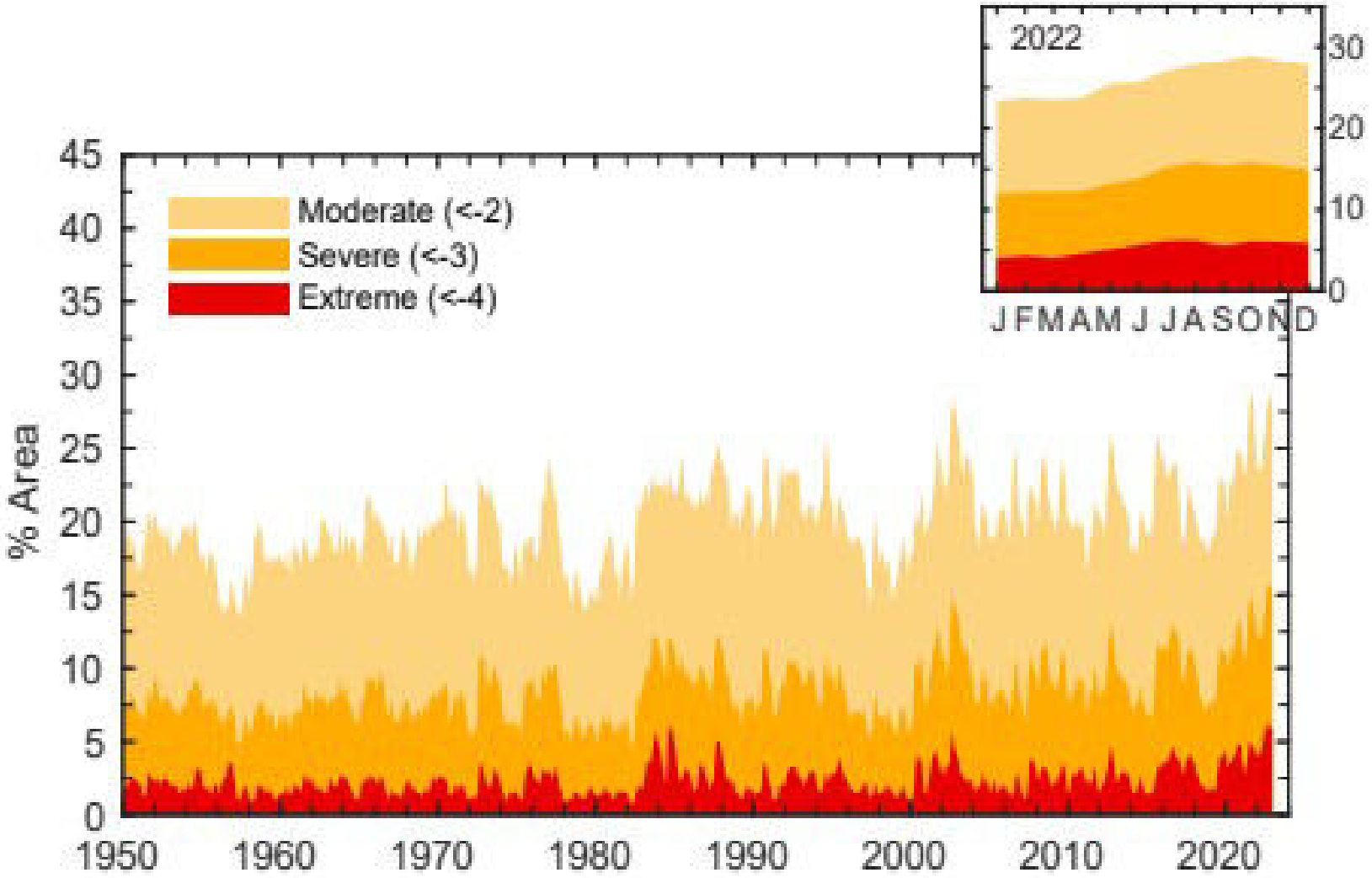


USA Strong to Violent Tornado History 1954-2018

2018 – Oklahoma record longest tornado drought ended 1 May

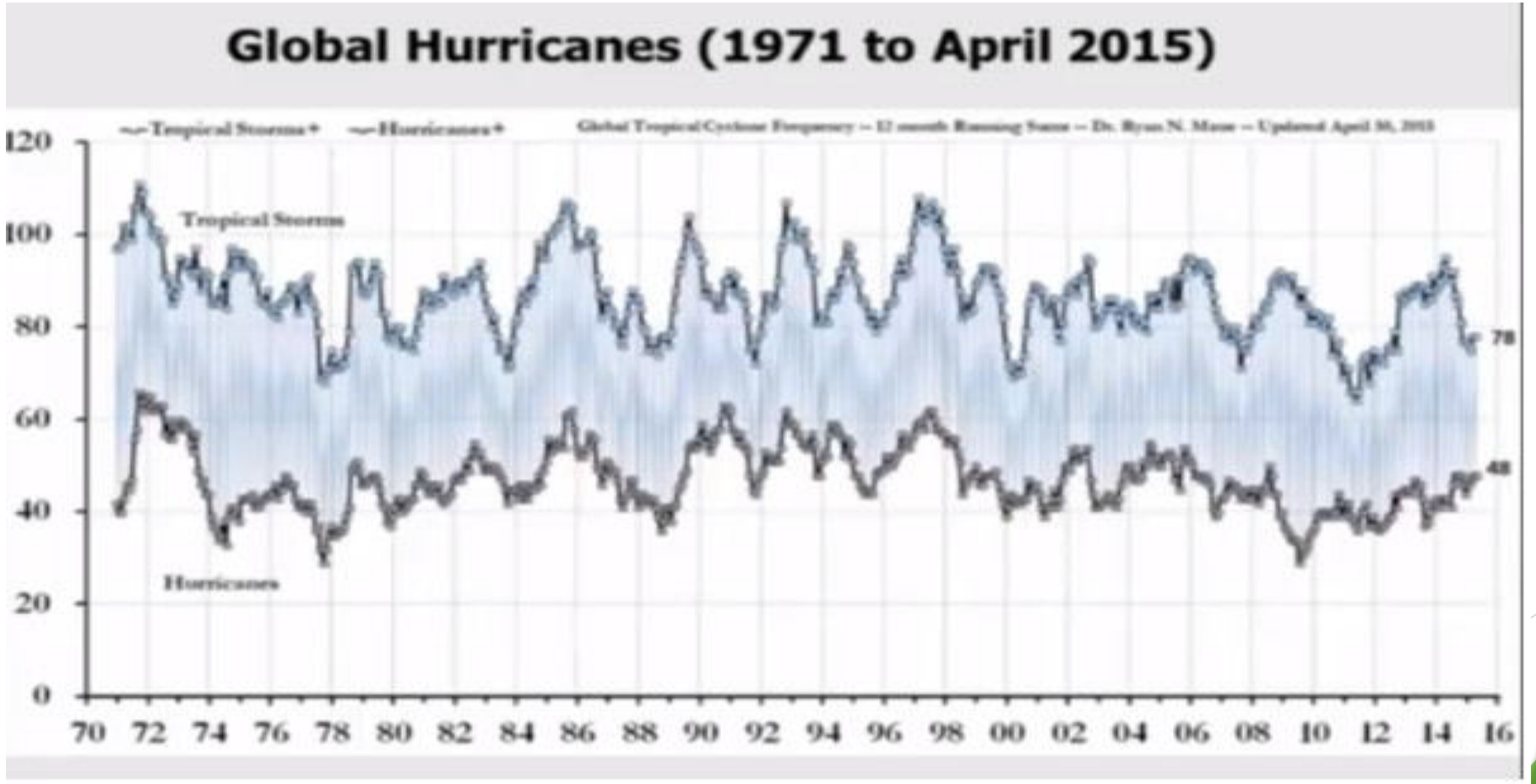


In Over 70 Yrs Global Drought Hasn't Increased

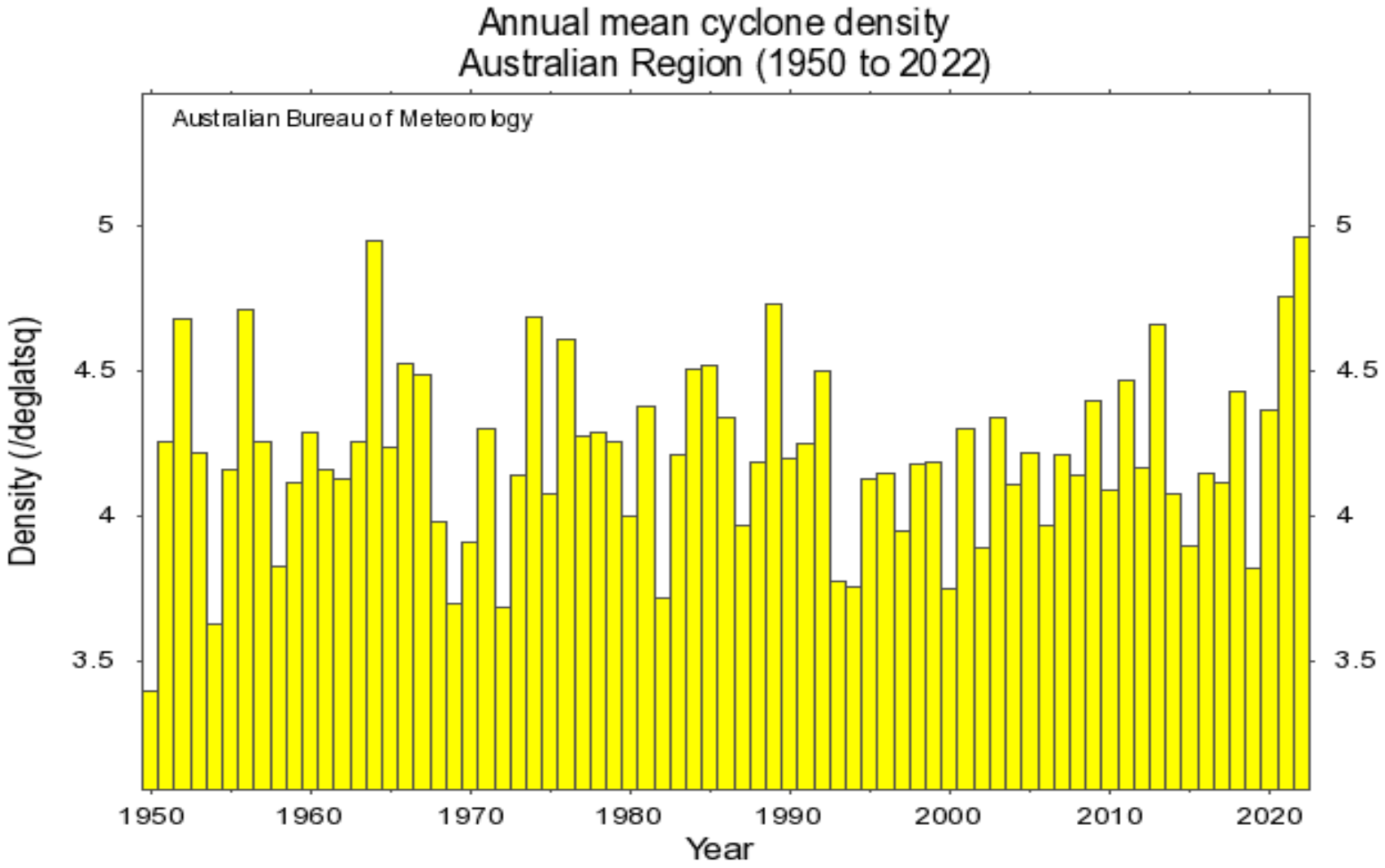


Percentage of global land area (excluding ice sheets and deserts) with scPDSI indicating moderate (<-2), severe (<-3) and extreme (<-4) drought for each month of 1950–2022. Inset: each month of 2022.

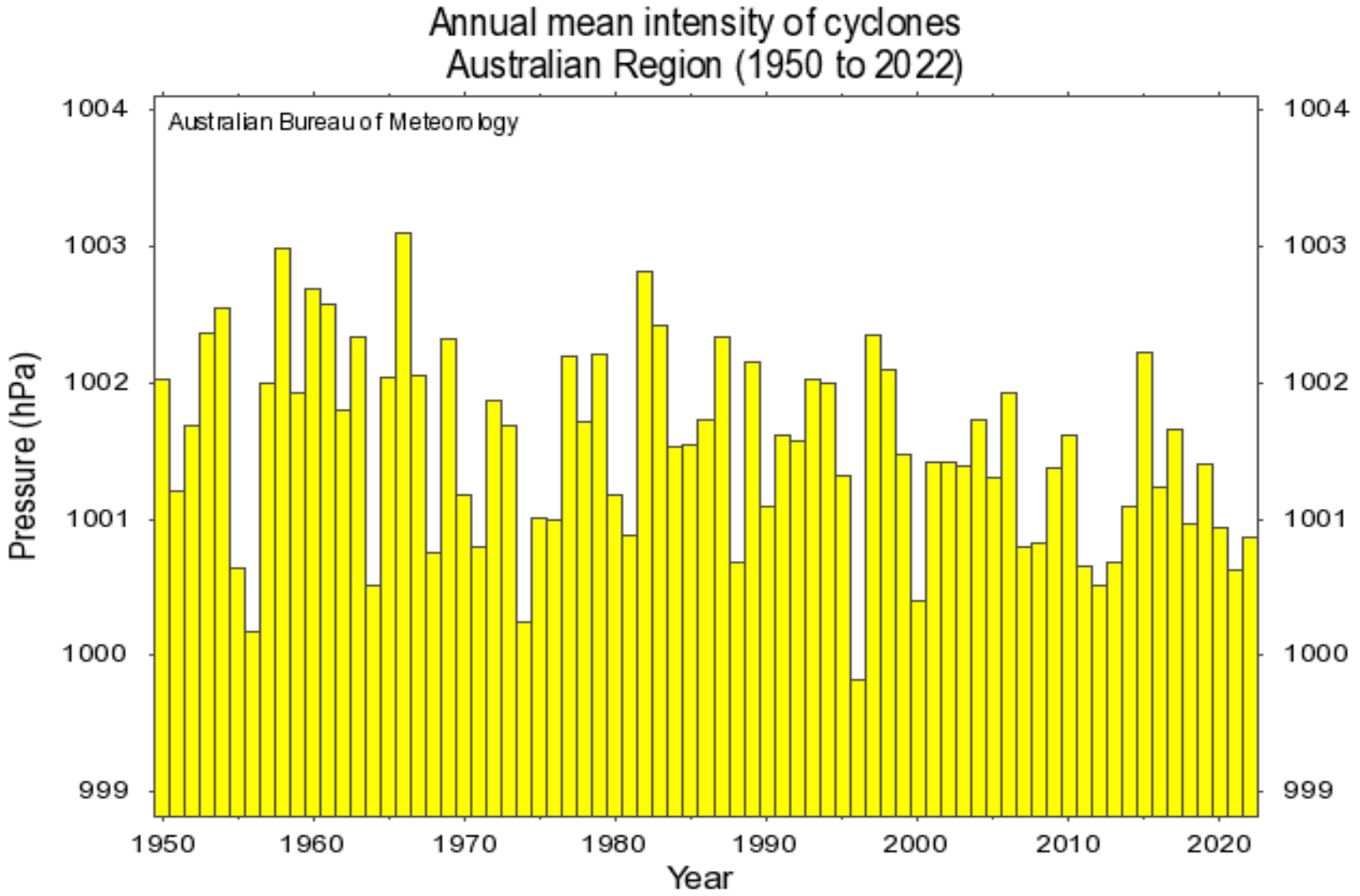
Tropical Storms and Hurricane/Cyclone Occurrence Is Easy To Measure And They Have Not Increased



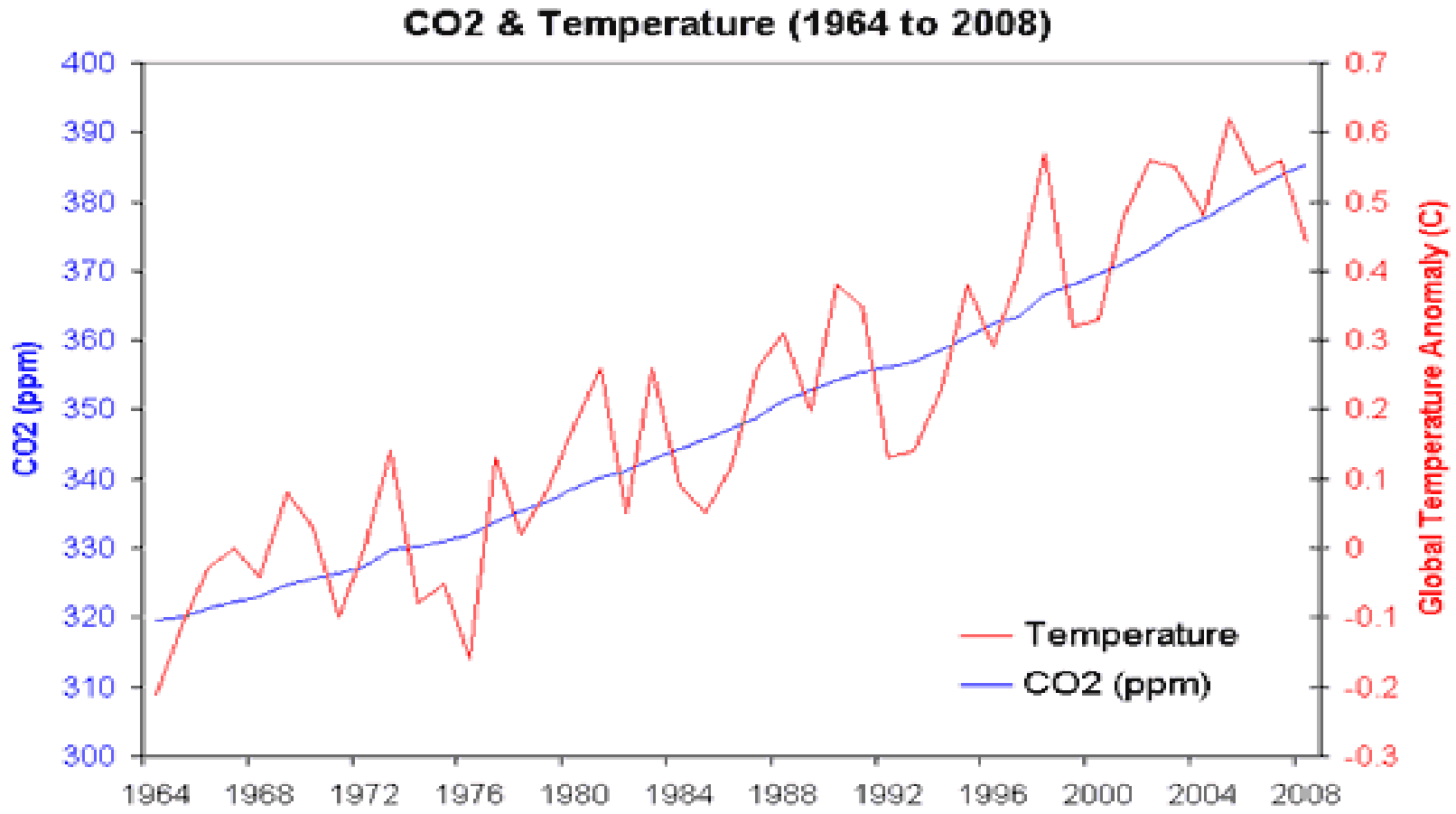
Australian Cyclone Incidence Shows No Worsening In The Last 70 Yrs



The Strength Of Australian Cyclones Hasn't Increased In The Last 70 Yrs



We Know CO_2 Is Certainly Slowly Increasing, As Is Average Temperature, But Which Is Causing The Other?



As Temperature Increases The Solubility Constant of CO_2 Decreases In A Polynomial Way

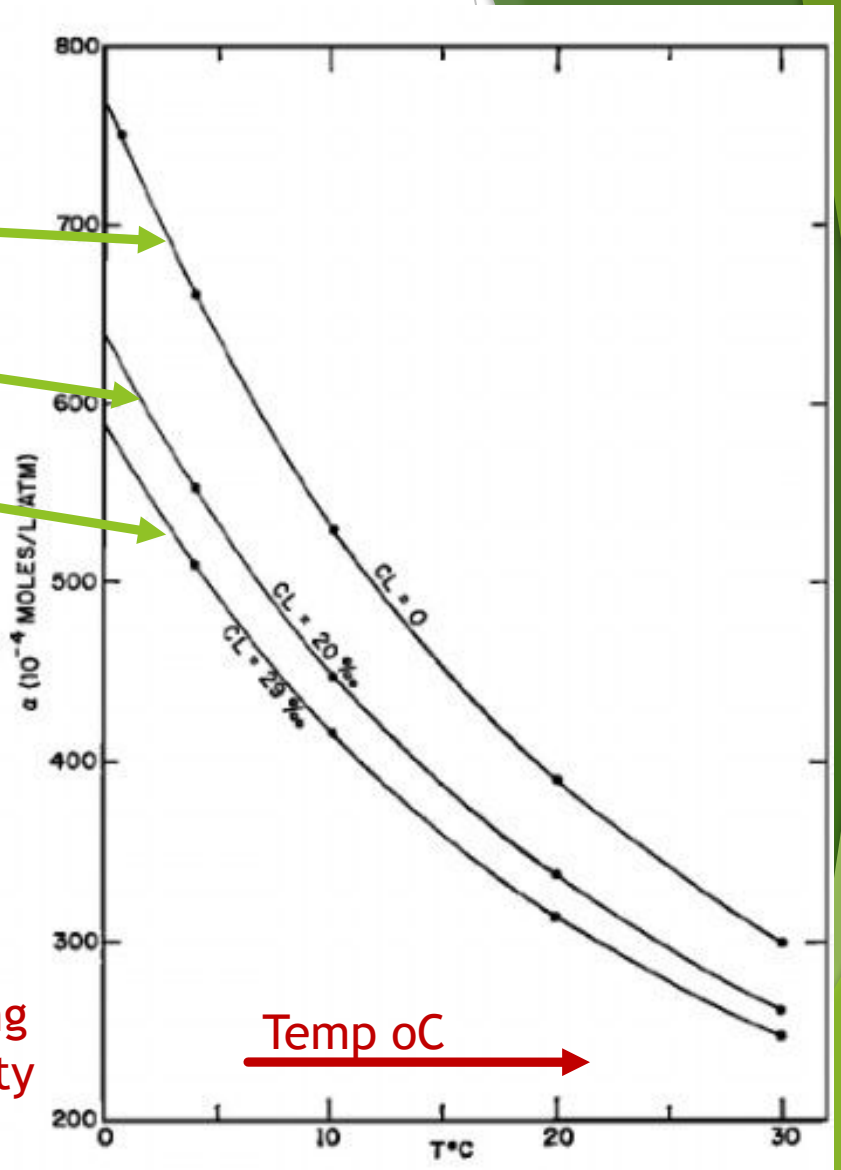
Water

Salt water (20 parts per thousand Cl)

NaCl solution (29 parts per thousand Cl)

So as the globe slowly warmed after The Little Ice Age, CO_2 began to come out of solution & be slowly released to the atmosphere

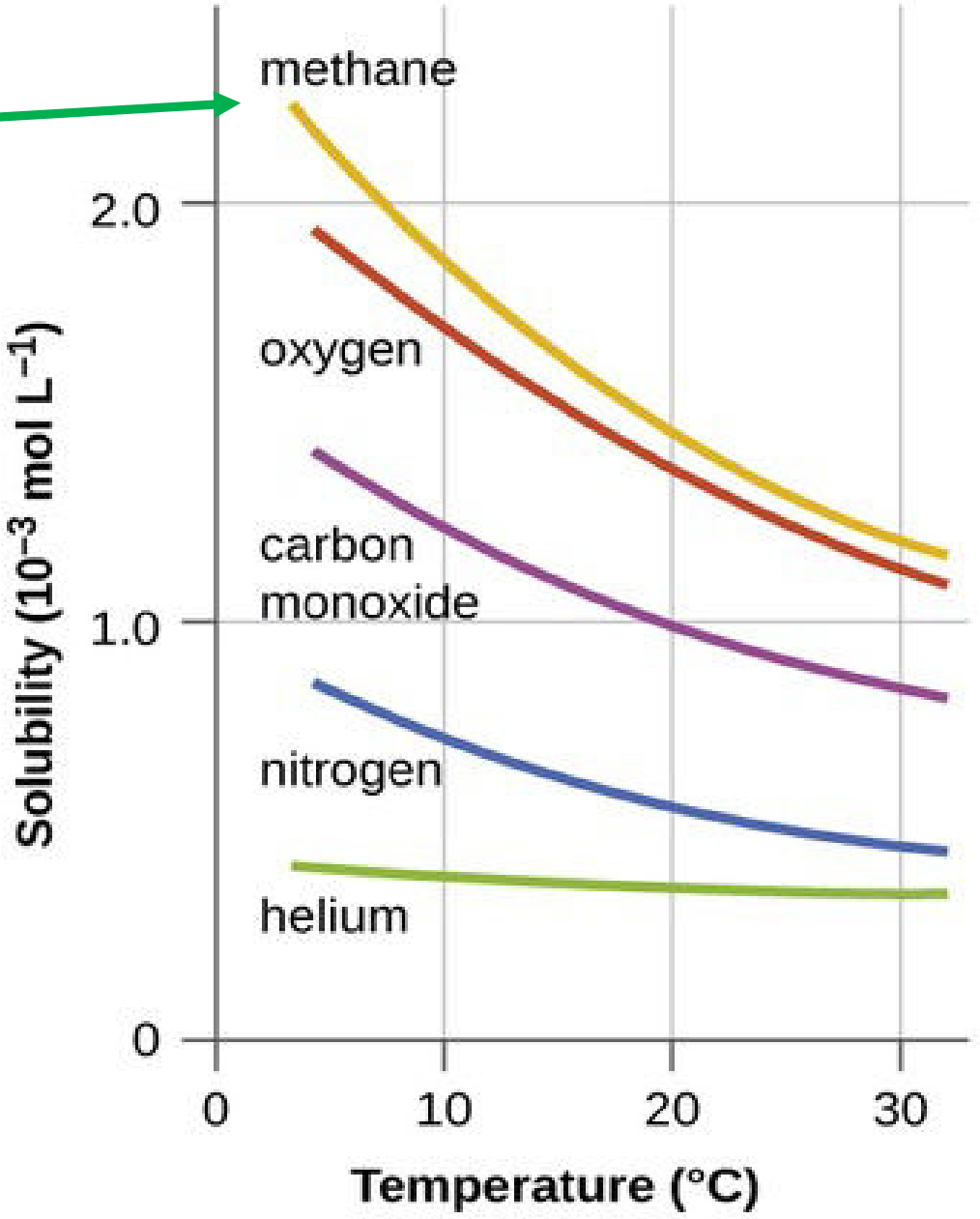
This explains why the atmospheric CO_2 levels are slowly increasing



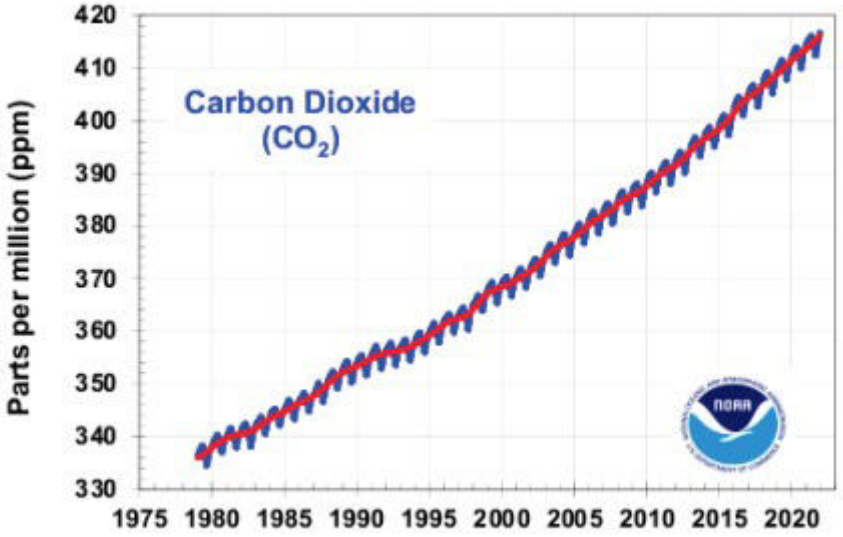
https://www.researchgate.net/publication/248784976_The_Solubility_of_CO_2_in_Water_and_Sea_Water

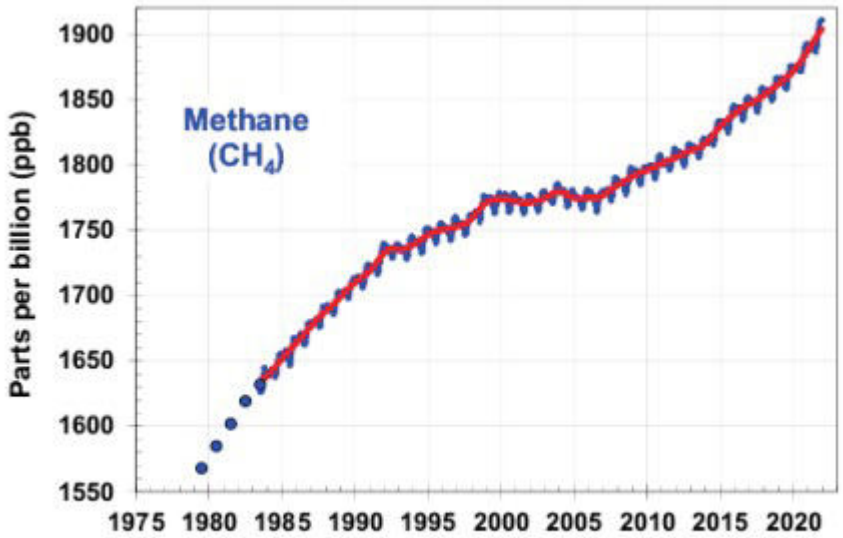
The solubility of methane is impacted in a similar way to CO_2

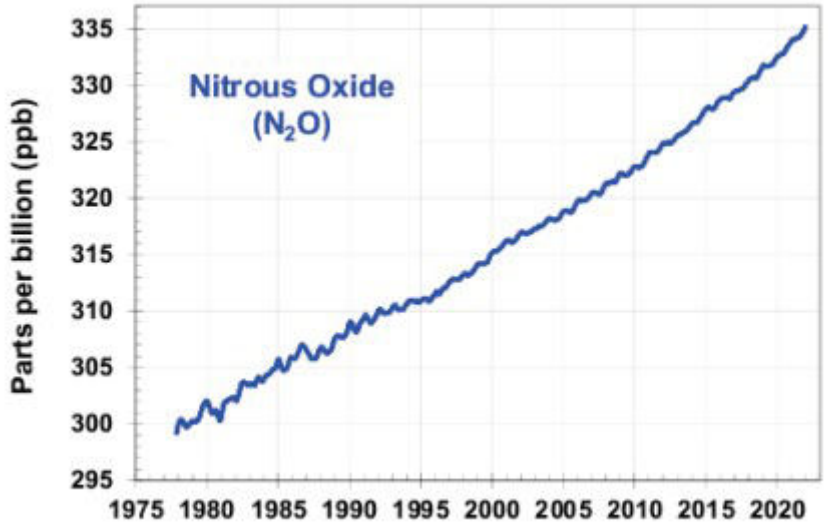
The slow increase in global temperature is not only driving the slow increase in CO_2, but also methane



All three demonised gases are slowly increasing



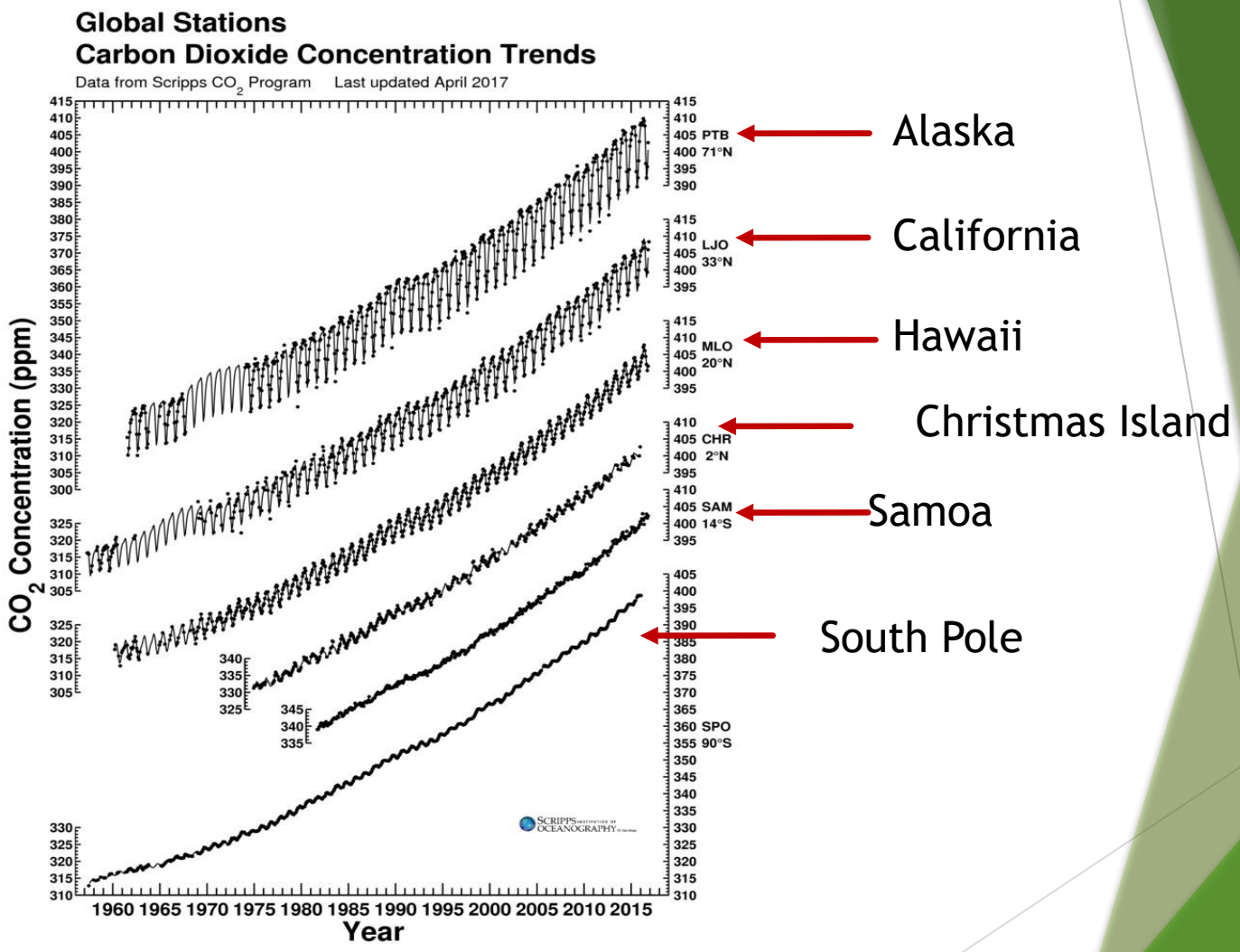




The graph portrays variations in CO_2 levels at Point Barrow Alaska (PTB), La Jolla California (LJO), Mauna Loa Observatory (MLO), Christmas Island (CHR), Samoa (SAM), and the South Pole (SPO) over the last 60 years.

In other words, the further a location is away from the coldest place on earth, Antarctica, the greater the variation in atmospheric CO_2, due to the variation in seasonal ocean temperature.

Remember, the oceans are very deep so the temperature of the ocean volume in a location will determine the CO_2 & methane solubility, not the surface.



Source: Scripps CO2CO2 Program, Global Stations CO2CO2 Concentration Trends

Latest Research Supports This Conclusion

Updated all day at Stuff

The Press Thursday, July 27, 2023

News 3

Melting sea ice fears dominate

Antarctic

Keiller MacDuff

As wildfires and heatwaves dominate th headlines in the Northern Hemisphere, Trans-Tasman gathering bringing hu dreds of Antarctic experts to a three-da conference in Christchurch has the focu squarely on the bottom of the Earth.

The New Zealand-Australia Antarct Science Conference Latitudes of Chang is the first gathering of its kind in arou a decade, and comes amid a rapidly inte sifying rash of extreme weather and so startling scientific discoveries.

Vastly reduced Antarctic sea ice — at th precise moment when it should be at i largest — has been recorded at its lowe levels since satellite measurement bega 45 years ago.

The ocean around Antarctica freez every winter, essentially doubling the si of the "white patch on the bottom of th world", Antarctic Research Centre eart sciences professor Tim Naish explained.

When it forms, the frozen sea water pushes a salty brine out, a huge sinking mass which drives global ocean circula- tion, pushing the ocean current up through the Pacific, into the Atlantic, and up to the North Pole. Essentially driving the trans- port of heat around the world.

A new paper, published yesterday in the

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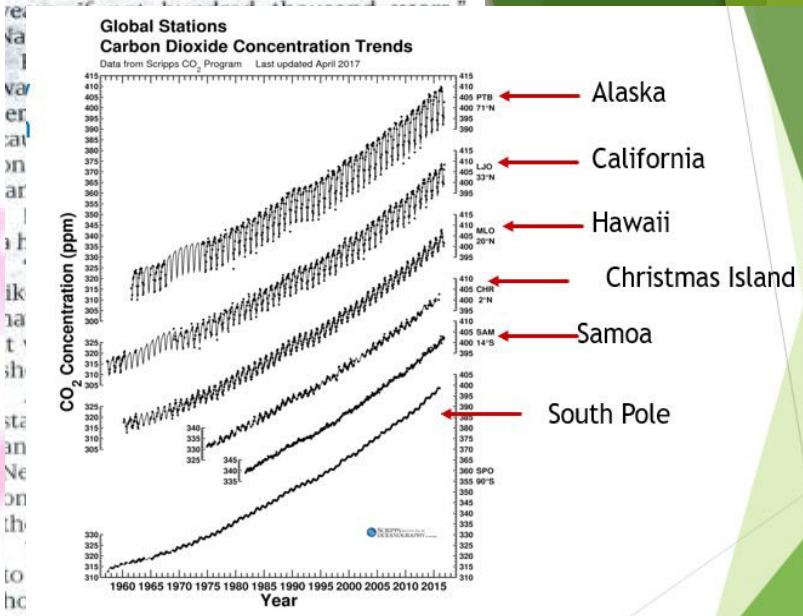


still going down last time I looked," she said.

"It's not a pretty picture."

She said sea ice reflects about 90% of sunlight, while the ocean absorbs about 90%, which will cause the ocean temperature to increase and make sea ice formation even less likely.

The reduction is so drastic it "doesn't even feature into the numbers that come — when the process becomes irreversible - as the trend could perhaps reverse or stop temporarily.

"But because of global warming and the heat we've put in the ocean and the atmosphere, it's not a case of if we hit a tipping point, it's just a case of when."

The rates of change were "completely unprecedented in the last few thousand

"We've known about how humans have been affecting the climate system for more than 30 years now, and all that's happened over that time is the evidence has just got more compelling and stronger."

The conference runs until tomorrow, with a variety of speakers presenting to the public at the Antarctica After Dark event tomorrow night.

Summary

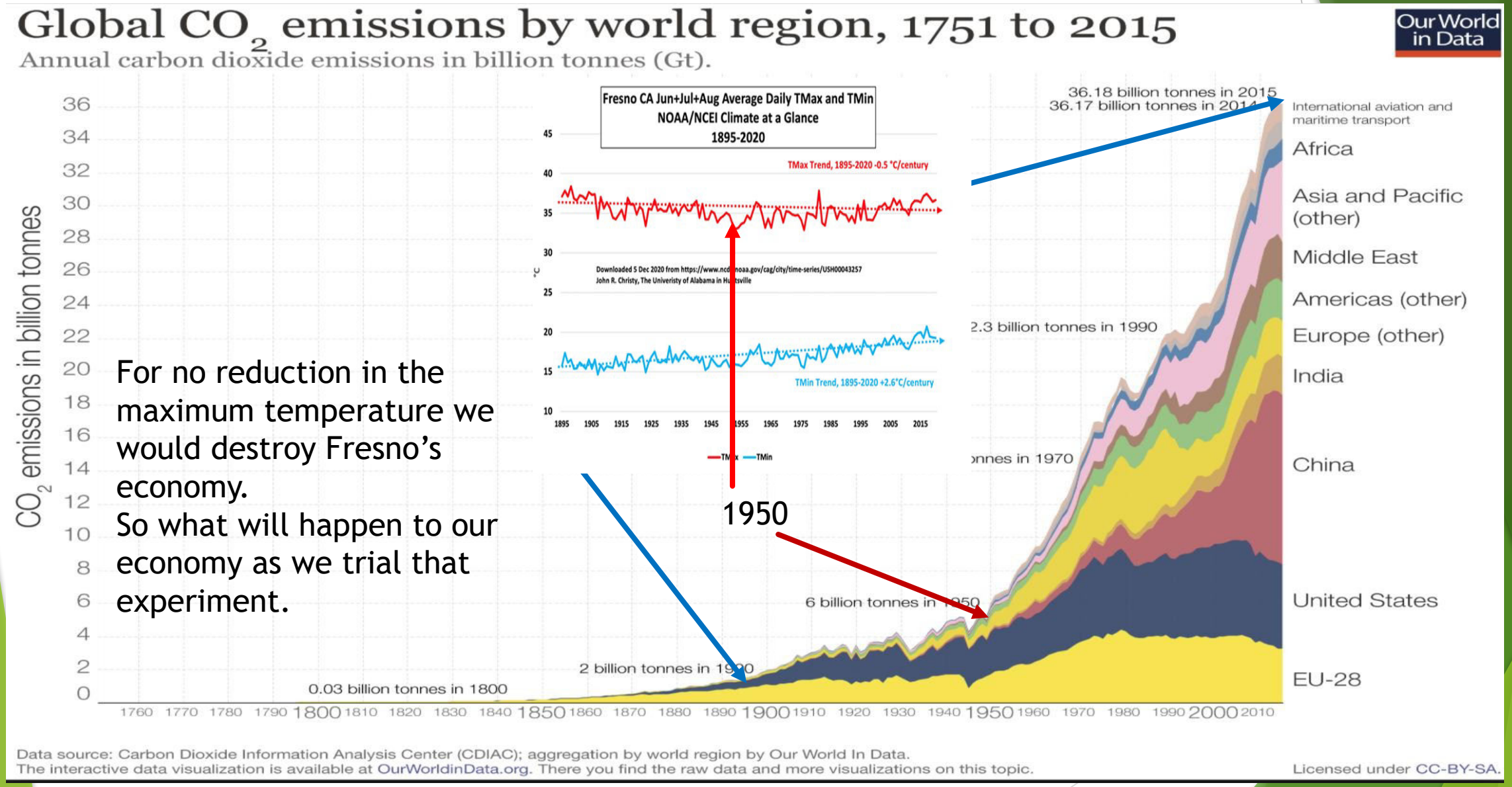
- The Little Ice Age around 1600-1800 established a period of significant temperature reduction, which in turn led to significant global glacial formation & therefore a reduction in sea level.
- Accordingly the world's oceans & fresh water stocks were frozen or cooled
- This caused atmospheric CO_2 levels to be reduced through increased absorption into water stocks.
- As the globe slowly warms until homeostasis is achieved, the oceans continue to slowly warm & the solubility of CO_2 and methane therefore decrease, thus increasing atmospheric concentrations.
- Man has little influence on the rate of increase of temperature, CO_2 & methane, so any attempts to do so through perceived mitigations will destroy the world's economies & population through the removal of reliable cheap energy.
- Increasing levels of CO_2 are helping to feed the planet
- The burning of plastic should be considered as a source of energy, providing ingredients in the plastics do not cause air pollution.
- This would be a solution to the very serious problem of plastic pollution, especially in the poor countries.

People Need Energy To Live So If They Don't Have Reliable Energy They Burn Trees. This Is The Border Of Two Countries With Different Policies On Using Fossil Fuel (Haiti (L) vs Dominican Republic (R))

www.youtube.com/watch?v=S-nsU_DaIZE

Which Living Standard Will We Leave Our Children & Grandchildren?

With Over 100 Yrs Of Temperature Data At Fresno (California) We Can See What Will Happen To Our Economy If We Reduced Carbon Emissions By 84% To 1950 Levels For Example.



For no reduction in the maximum temperature we would destroy Fresno's economy.
So what will happen to our economy as we trial that experiment.

Conclusions By World Class Scientists

- https://www.youtube.com/watch?v=imGGSObeGds&ab_channel=familyfirstnz

June 2021 - Prof Michael Kelly – former Professor of Technology at Cambridge University.

Regarding the wholesale shift to renewable energy "I think we are sleep walking into an awful future and its not one of climate change."

- https://www.youtube.com/watch?v=nor_0MKsmjc&ab_channel=SkyNewsAustralia

June 2021 - Former Chief Scientist to President Obama, Prof Steven Koonin, said humans have not had any detectable impact on climate metrics.

- https://www.youtube.com/watch?v=jePtwdjcU_g&ab_channel=RathnakumarS

Emeritus Prof William Happer, former Director of Energy Research for President Bush (Snr) and then President Clinton, says man-made climate change theory is a hoax. He was fired by Vice-President Al Gore because he kept correcting Gore's "grotesque" exaggeration of the climate facts.

Conclusions By World Class Scientists cont

- https://www.climatedepot.com/2019/06/24/watch-climatologist-epa-board-scientist-dr-john-christy-exposes-the-climate-scare/

Emeritus Professor John Christy won a prestigious science award when he worked for NASA, for measuring the earth's temperature with satellites.

He refutes the claims that man is the dominant cause of climate change & that we have climate emergencies

- https://www.youtube.com/watch?v=RCgEAmr42yI&ab_channel=TheUniversityofAlabamainHuntsvilleTheUniversityofAlabamainHuntsville

Retired MIT Professor of Atmospheric Physics, Richard Lindzen, does not support the theory of anthropogenic global warming.

And

- Michael Shellenberger is a *Time Magazine* "Hero of the Environment," and he wrote
  "Consider California. Between 2011–17 the cost of solar panels declined about 75 percent, and yet our electricity prices rose five times more than they did in the rest of the U.S.
  It's the same story in Germany, the world leader in solar and wind energy. Its electricity prices increased 50 percent between 2006–17, as it scaled up renewables."
- He was one of those involved in leading the expenditure of $US150 billion from 2009-2015 in the US to introduce mass renewables.
  He finished his TED Talk in November 2018 "I think it's also understandable that as the facts have come in, many of us have started to question our prior beliefs and change our minds. For me the question now is, now that we know that renewables can't save the planet, are we going to keep letting them destroy it?"

Other Resources

RCR – RealityCheck.Radio (online)

21 March - Ian Wishart with Paul Brennan

26 June 23 - Prof Geoff Duffy with Jaspreet & Don

29 June 23 - Barry Brill with Rodney Hide

https://www.youtube.com/watch?v=Moum_SZ5NNY

The earth's surface temperature data has been cherry picked by NOAA (Prof Richard Muller).

Questions For You

Are we being told the truth?

What does it mean for our children?

So what do we do about it?

Answer:

Share a piece of truth that you have learned today with others.

Truth will defend itself if enough of us share it.

Thank you