

Climate Crisis 2019, Hurricanes Dorian and Michael, Winter Outlook, Proof CO2 isn't important, 536 AD



Bob Endlich

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Cruces Atmospheric Sciences Forum

16 Nov 2019

Topics

Inside Climate News Report on CNN Dem Party “Climate Crisis” Town Hall

“Holding the Fossil Fuel Industry Accountable”

Google Engineers’ Report in IEEE Spectrum

100 per cent renewables in Georgetown — Reports from Texas

Arithmetic confronts Developed Countries w/ Developing Countries’ emissions

Guardian’s claims by Michael Mann and Andrew Dessler- Hurricane Dorian

2018’s Hurricane Michael: how to torture the data, by NOAA

Detection, Attribution, Energetics -- Figures of Merit

Topics 2

Despite the amounts of CO₂ and Methane in the air today, it was warmer, a lot warmer in the past when <CO₂> was less than at present.

Last year's winter outlook:

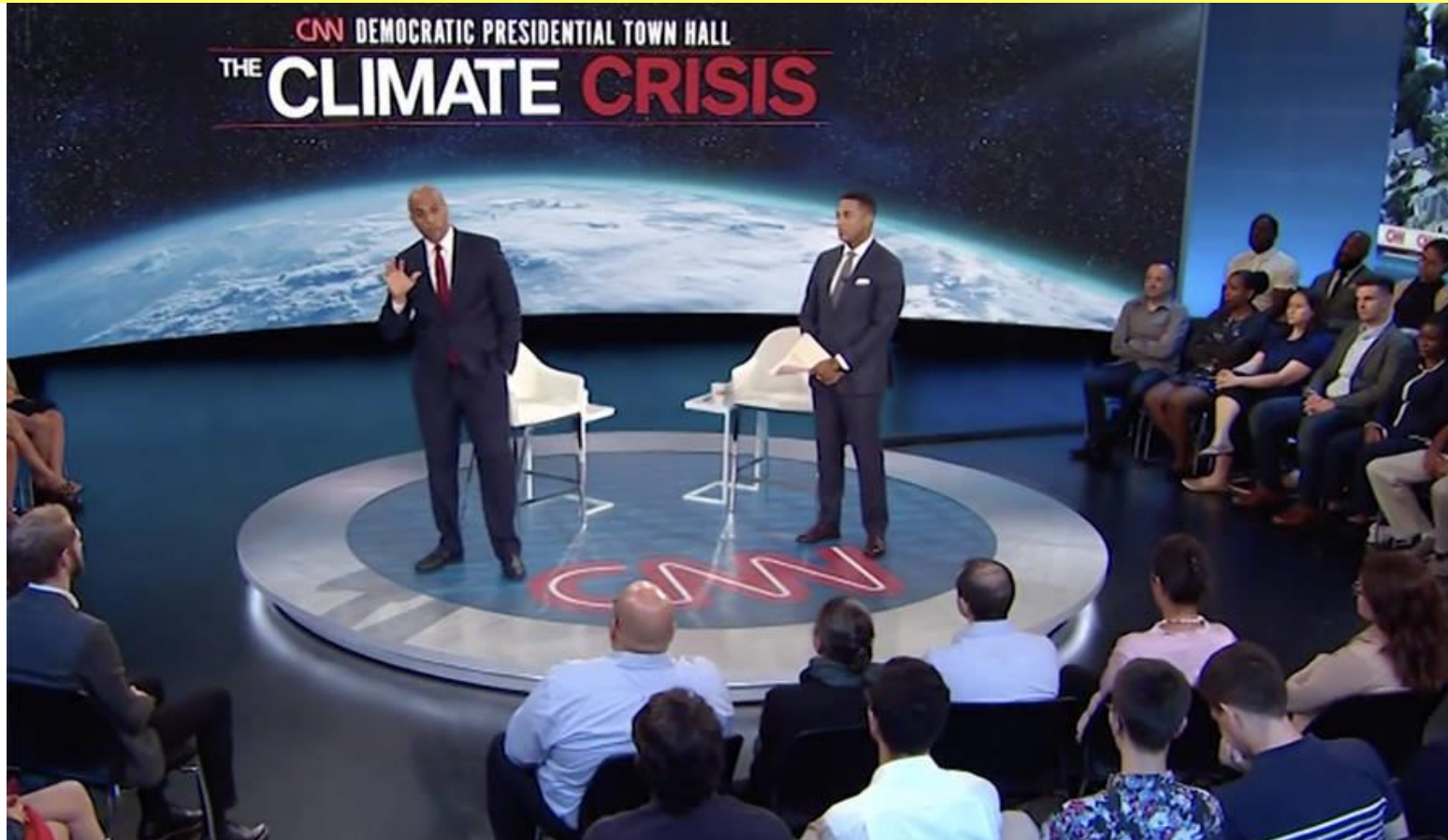
Validation

What explains the results?

Is warming a problem?

536 AD as a case study

<https://insideclimatenews.org/news/05092019/climate-change-2020-presidential-candidates-town-hall-analysis-cnn-hurricane-dorian-carbon-price-fracking>



There was none of the debate over science that has dominated U.S. political discussions and strangled action in recent years. Instead, candidates focused on how they would navigate a transition to what all agreed should be 100 percent clean energy by mid-century. Most of the sparring was over what would they do to hold the fossil fuel industry accountable, how far they would go to change American lifestyles, and how would they marshal the money and political support.

“There was none of the debate over science that has dominated U.S. political discussions and strangled action in recent years.”

Bob’s Question: Did I miss it?

Who were the people in the debate, where was it held, and what facts, data and stories came from it?

I think this is a made-up notion, or worse.

“Instead, candidates focused on how they would navigate a transition to what all agreed should be 100 percent clean energy by mid-century.”

***Impossible: see notes on Google Project RE<C, next.
<OBTW, there is no human ability to change climate>***

“Most of the sparring was over what would they do to hold the fossil fuel industry accountable, how far they would go to change American lifestyles, and how would they marshal the money and political support.”

“Holding the Fossil Fuel Industry Accountable?”

Does anyone remember the gasoline crises of the 1970s? The Gas Lines?



Hemmings Classic Car Gas pains, 1973-1974





“Holding the Fossil Fuel Industry Accountable?”

Does anyone remember the gasoline shortages from Hurricane Sandy?

Hurricane Sandy: New Jersey residents waiting for gas, charging stations



Long gas lines across N.J. after Hurricane Sandy

Posted on October 30, 2012 2:59 PM | Updated October 30, 2012 2:59 PM



Long gas lines across N.J. after Hurricane Sandy

Posted on October 30, 2012 2:59 PM | Updated October 30, 2012 2:59 PM



Editorial Comment:

For publishing such junk “*Inside Climate News*”
is part of the Fake News Network.

IMHO...

What It Would Really Take to Reverse Climate Change

Today's renewable energy technologies won't save us. So what will?

By Ross Koningstein and David Fork

Starting in 2007, Google committed significant resources to tackle the world's climate and energy problems....

Google's boldest energy move was an effort known as RE<C, which aimed to develop renewable energy sources that would generate electricity more cheaply than coal-fired power plants do.

In 2011, the company decided that RE<C was not on track to meet its target and shut down the initiative.

RE<C invested in large-scale renewable energy projects and investigated a wide range of innovative technologies, such as **self-assembling wind turbine towers, drilling systems for geothermal energy, and solar thermal power systems, which capture the sun's energy as heat.**

For us, designing and building novel energy systems was hard but rewarding work.

What It Would Really Take to Reverse Climate Change

Today's renewable energy technologies won't save us. So what will?

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While a large emissions cut sure sounded good, this scenario still showed substantial use of natural gas in the electricity sector. That's because today's renewable energy sources are limited by suitable geography and their own intermittent power production.

Wind farms, for example, make economic sense only in parts of the country with strong and steady winds.

The study also showed continued fossil fuel use in transportation, agriculture, and construction.

In the marketplace, utility companies pay different prices for electricity, depending on how easily it can be supplied to reliably meet local demand.

“Dispatchable” power, which can be ramped up and down quickly, fetches the highest market price.

Unfortunately, most of today's clean generation sources can't provide power that is both distributed and dispatchable.

Solar panels, for example, can be put on every rooftop but can't provide power if the sun isn't shining

What It Would Really Take to Reverse Climate Change

Today's renewable energy technologies won't save us. So what will?

By Ross Koningstein and David Fork

By 2011, however, it was clear that RE<C would not be able to deliver a technology that could compete economically with coal, and Google officially ended the initiative and shut down the related internal R&D.

So, what to conclude about *Inside Climate News'* report on the Climate Crisis Town Hall? *“fatuous?” definition: silly and pointless*

Georgetown Utility Systems

GEORGETOWN UTILITY SYSTEMS

[Water](#)[Electric](#)[Streets & Transportation](#)[Conservation Programs](#)[Garbage & Recycling](#)[Utility Maps](#)[Rates](#)[Contact Us](#)

[Georgetown Utility Systems](#) > [Georgetown Powered by 100% Renewable Energy](#)

Georgetown Powered by 100% Renewable Energy

A 154-megawatt solar power agreement finalized in 2015, in addition to a 144 megawatt wind power agreement in 2014, makes the City of Georgetown one of the largest municipally-owned utilities in the U.S. to supply its customers with 100 percent solar and wind energy. The long-term agreements also allow Georgetown to provide competitive electric rates and hedge against price volatility for energy produced by fossil-fuels.

A 25-year power purchase agreement with Clearway Energy for 150-megawatts of solar power started in 2018. The new renewable power contracts signed by Georgetown provide electricity at a lower overall cost than its previous wholesale power contracts....To read the entire press release click [here](#).

As for Georgetown's claim of 100% renewable electricity, Charles McConnell, executive director of the Energy and Environment Initiative at Rice University, told the Austin American-Statesman in 2017, *"It's not kind of misleading, it's very misleading, and it is for political gain."*

"...what Georgetown did to make the 100% renewable claim "...was (to buy) more electricity than they could use almost any day of the year." The city's policymakers had to buy far more wind and solar energy because those sources are so unreliable.

The flip side of 100% renewable claim is that on low demand days with plenty of wind, Georgetown's contracted wind and solar energy suppliers generate a surplus, selling that power at very low cost into the larger Texas market.

...on days with high electric demand with little wind generation, the city may fall short of power, but, because it's hooked up to the larger Texas grid, reliable power produced by natural gas, coal or even nuclear plants fill the gap and keep the lights on.

As of today, residents of Georgetown.... aren't pleased with paying more for their electricity for the privilege of making the dubious claim to 100% renewable power..."

Texas City Leaders Face Wrath of Residents Over Green Energy Deal

The city's mayor said renewable energy made good business sense, but now rates – and anger – are on the rise.

By Sharon Jayson Contributor March 28, 2019, at 5:01 p.m.



Clean energy goal in Las Cruces calls for 100 percent dependence by 2050

, Las Cruces Sun-News Published 10:00 a.m. MT April 3, 2018

LAS CRUCES - Las Cruces city councilors on Monday OK'd a goal to reach 100 percent clean-energy dependence by the year 2050.

The goal also calls for city government to derive 25 percent of its power needs from renewable energy by 2022 and 50 percent by 2030.

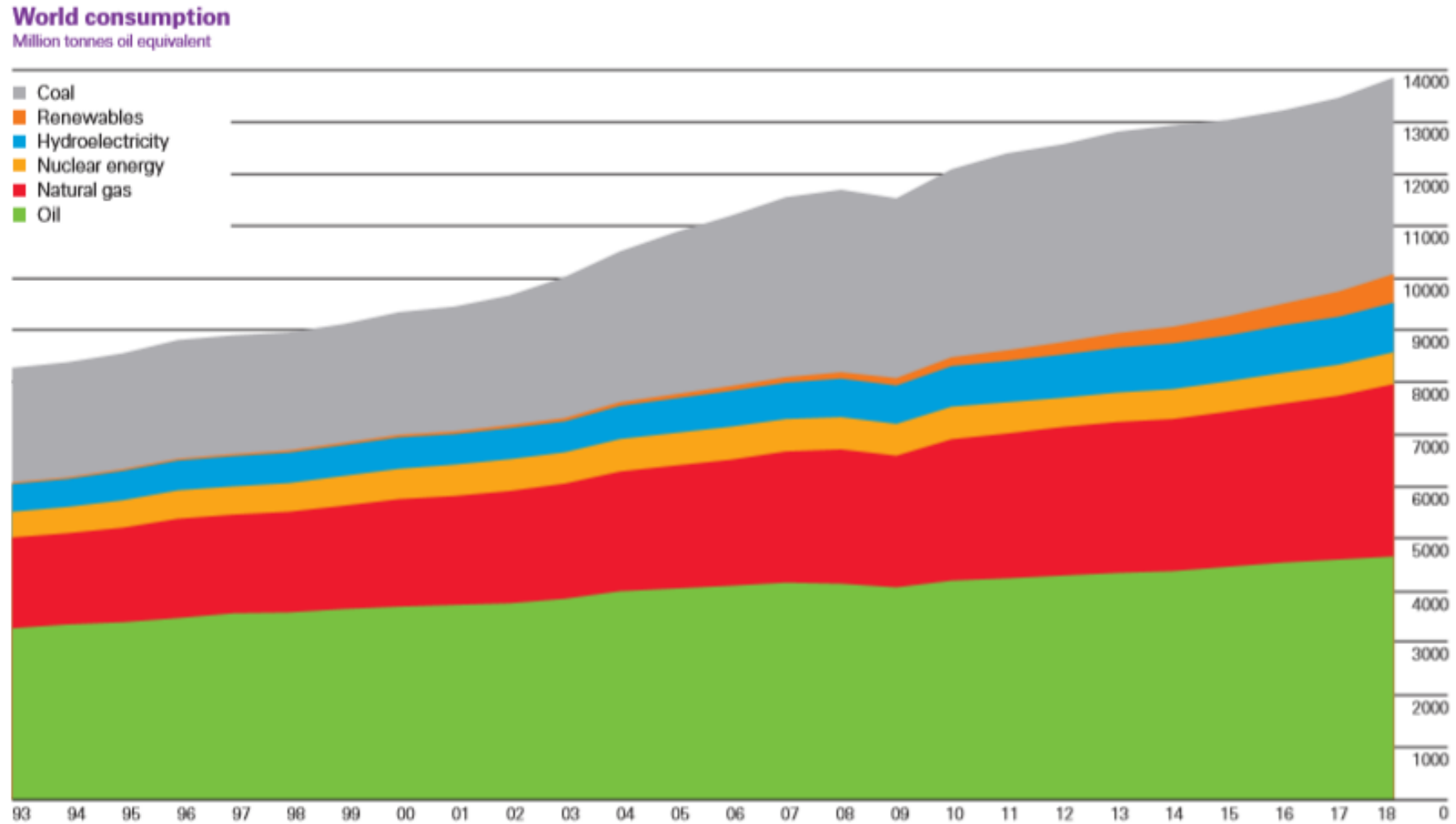
Now, city government pays for much of its electricity from the privately owned El Paso Electric Co. and gets some power from city-owned facilities that have had solar panels installed in recent years.

CLIMATE

The New York Times

As Beijing Joins Climate Fight, Chinese Companies Build Coal Plants





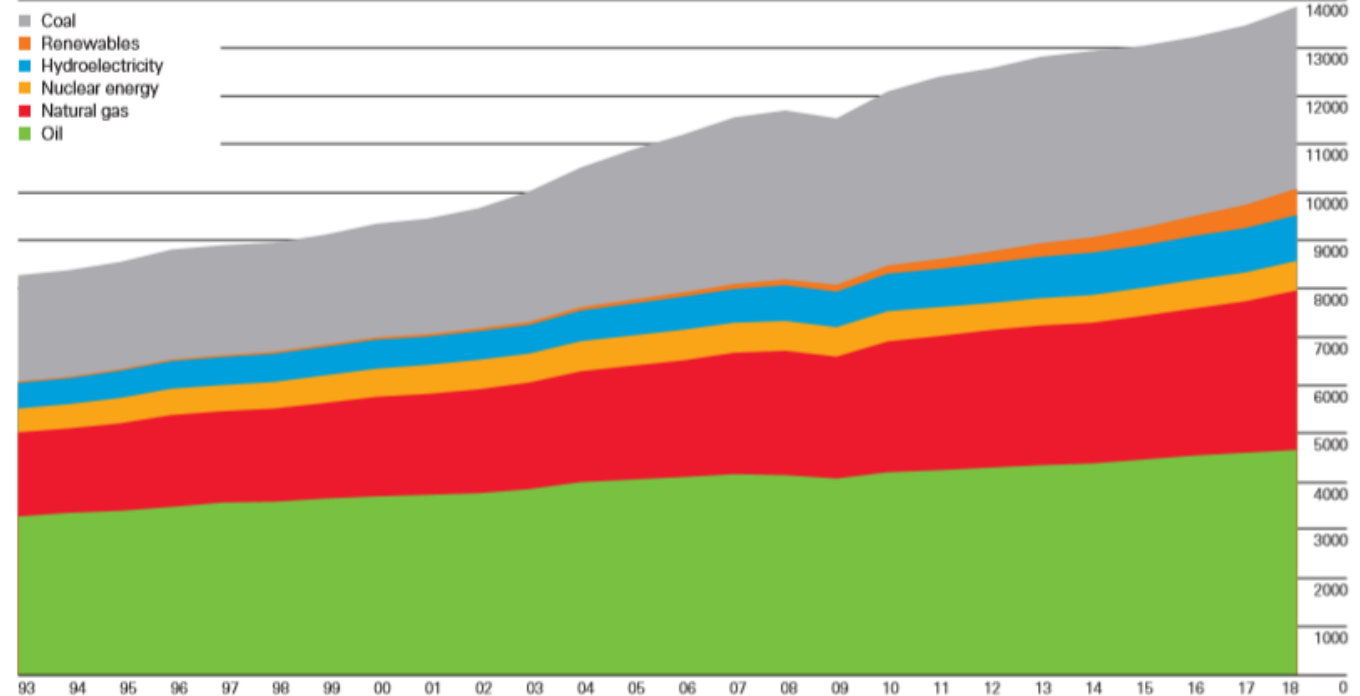
Global Energy Use rose by 18.5% in the decade 2008-2018.
About 98.5% of that decade long energy growth occurred in the developing nations
with about 78.5% of that growth obtained from increased fossil fuel use.

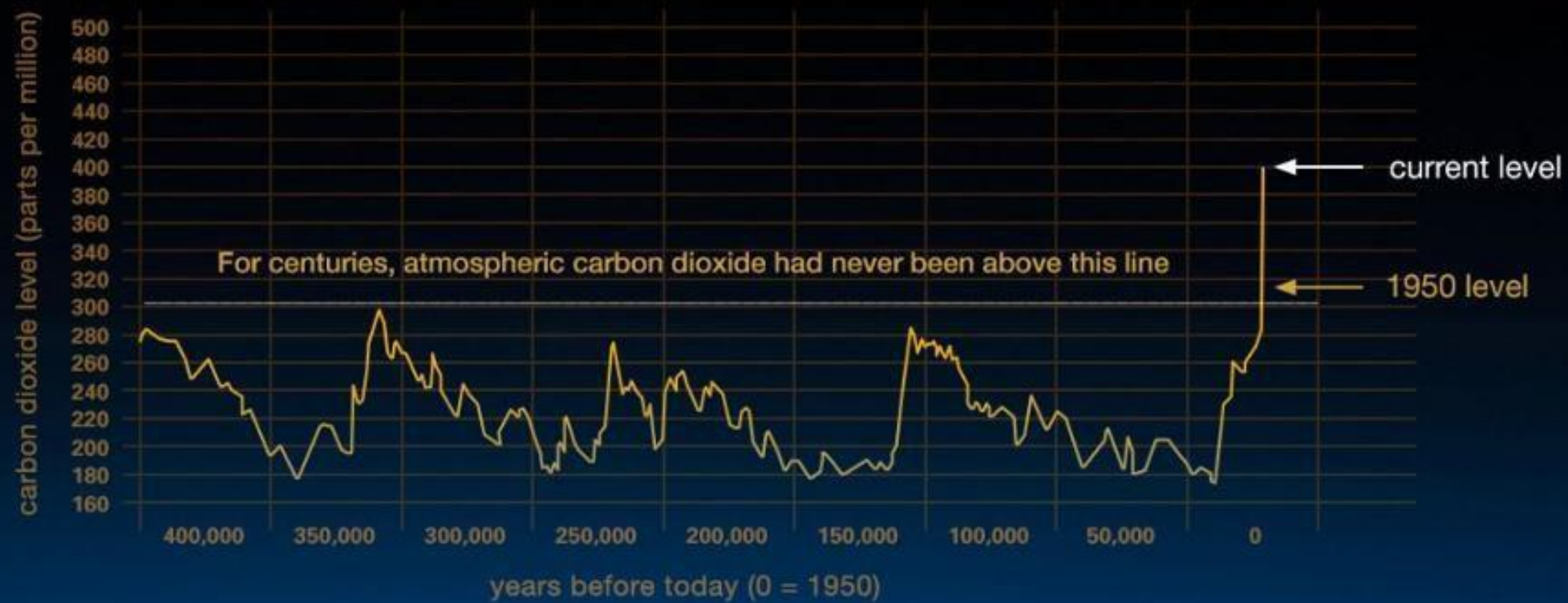
In the decade leading to 2018 the developing nations **increased** CO2 emissions by about 4.5 billion metric tons, completely overwhelming the developed nations that **decreased** CO2 emissions by about 1 billion metric tons led by the U.S.

How does New Mexico's conversion to 100% renewables stack up?

World consumption

Million tonnes oil equivalent





[Culture](#)[Lifestyle](#)[More](#)

Opinion

Climate change

Michael Mann and Andrew E Dessler

Wed 4 Sep 2019 02:00 EDT

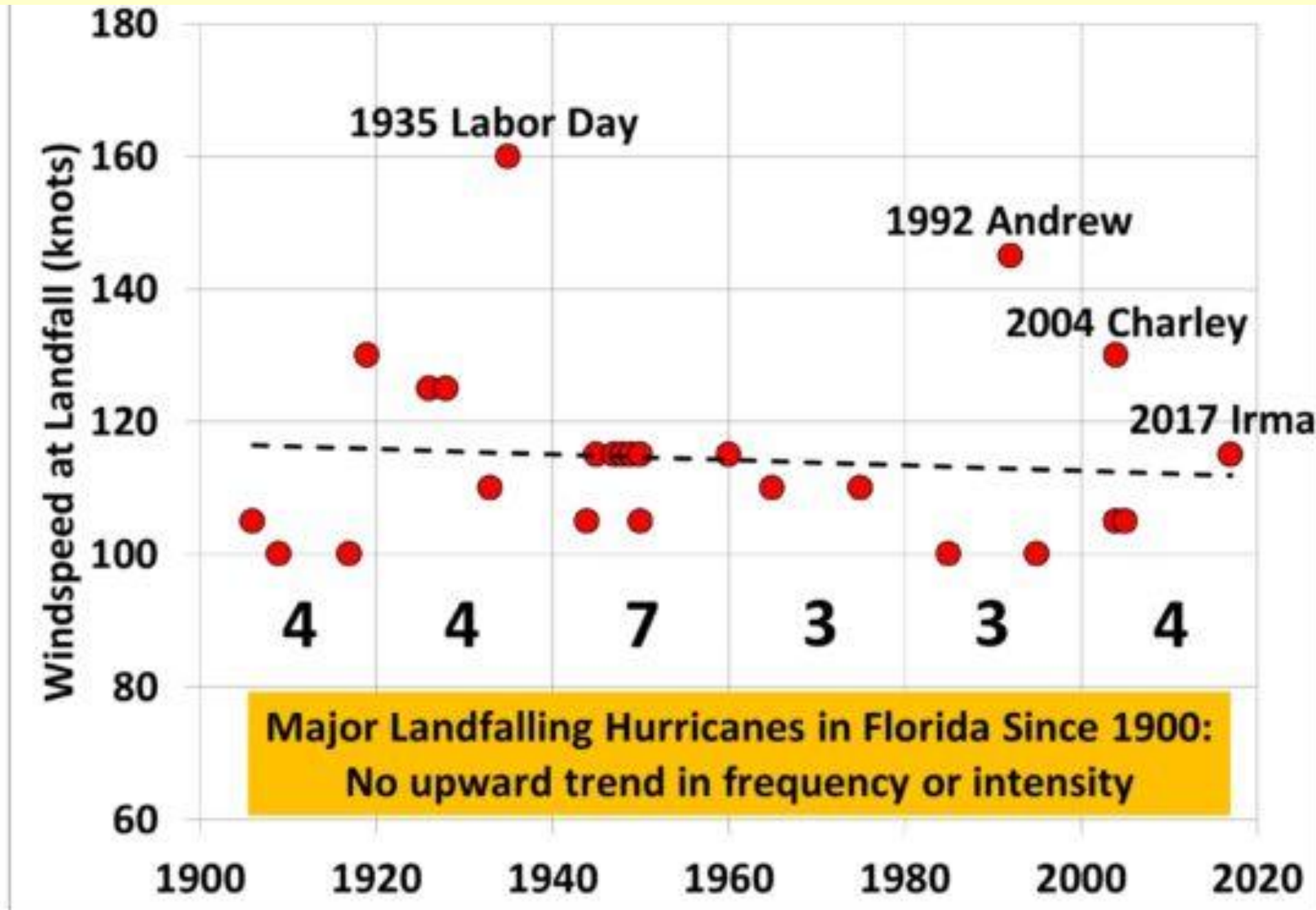
...Because unless we confront the climate crisis, warming will turn more and more of our fantastic landscapes, cities we call paradise and other dream destinations into nightmarish hellscapes.

Global heating made Hurricane Dorian bigger, wetter – and more deadly

We know that warm waters fuel hurricanes, and Dorian was strengthened by waters well above average temperatures



While the science has yet to come in on the specifics of just how much worse climate change made Dorian, we already know enough to say that warming worsened the damage. Because it's not a coincidence that Dorian was one of the strongest landfalling storms ever recorded in the Atlantic, with the strongest sustained peak winds east of Florida, and the strongest ever to hit the Bahamas. This comes less than a year after Florida withstood the first landfalling category 5 hurricane in decades, on 5 October – the latest ever in the season for a storm that strong.



The Great Hurricane of 1780

The Great Hurricane of 1780, also known as Huracán San Calixto, the Great Hurricane of the Antilles, and the 1780 Disaster, is the deadliest Atlantic hurricane on record.

Between 22,000 and 27,501 people died throughout the Lesser Antilles when the storm passed through them from October 10–16..

Specifics on the hurricane's track and strength are unknown because the official Atlantic hurricane database goes back only to 1851





French troops are still stationed at Fort Saint-Louis in Fort-de-France, Martinique. This 17th-century fort survived the Great Hurricane of 1780.

The United States as we know it was just a gleam in George Washington's eye when the Great Hurricane of 1780 blasted its way through the Caribbean, killing approximately 22,000 people. Among the dead were British and American soldiers who had been skirmishing in warships scattered throughout the region as part of the Revolutionary War

The hurricane stripped the bark off trees and left none standing on Barbados.

Cuban meteorologist [José Carlos Millás](#) has estimated that this damage could be caused only by winds exceeding 200 miles per hour (320 km/h). Every house and fort on Barbados was destroyed.

According to British Admiral [George Brydges Rodney](#), the winds carried their heavy cannons aloft 100 feet (30 m).

Great Hurricane of 1780



Warehouses on the beach of St. Eustatius were damaged by the hurricane.

2018's Hurricane Michael: How to Torture the Data,
by NOAA.....

About the notion that 2018's Hurricane Michael was a
Category 5 Hurricane when it hit.....

Tyndall AFB and Mexico Beach, Florida

... these data

https://en.wikipedia.org/wiki/Saffir–Simpson_scale

Saffir–Simpson scale

Category	Wind speeds			
	(for 1-minute maximum sustained winds)			
	m/s	knots (kn)	mph	km/h
Five	≥ 70 m/s	≥ 137 kn	≥ 157 mph	≥ 252 km/h
Four	58–70 m/s	113–136 kn	130–156 mph	209–251 km/h
Three	50–58 m/s	96–112 kn	111–129 mph	178–208 km/h
Two	43–49 m/s	83–95 kn	96–110 mph	154–177 km/h
One	33–42 m/s	64–82 kn	74–95 mph	119–153 km/h



Hurricane Michael Was A Category 5, NOAA Finds — The First Since Andrew In 1992

Hurricane Michael had been classified as a Category 4, at 155 mph. The last hurricane of such intensity at landfall was Hurricane Andrew, which struck South Florida and Louisiana in 1992.

Debris from Hurricane Michael rests along a canal on Oct. 18, 2018, in Mexico Beach, Fla. NOAA upgraded the storm to a Category 5 after completing its analysis.



“...And then they directly contradicted themselves in the same article, with the image below. There weren't any category four wind speed gusts, much less sustained winds. I don't see any evidence from wind reports or damage reports that Michael was a category four storm at landfall.”





Hurricane Michael had been classified as a Category 4, at 155 mph. The last hurricane of such intensity at landfall was [Hurricane Andrew](#), which struck South Florida and Louisiana in 1992.



NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

HURRICANE MICHAEL

(AL142018)

7–11 October 2018

John L. Beven II, Robbie Berg, and Andrew Hagen
National Hurricane Center
17 May 2019¹



GOES-16 PSEUDO-NATURAL COLOR IMAGE OF HURRICANE MICHAEL AT 1730 UTC 10 OCTOBER 2018. IMAGE COURTESY OF NOAA/NESDIS.



GOES-16 PSEUDO-NATURAL COLOR IMAGE OF HURRICANE MICHAEL AT 1730 UTC 10 OCTOBER 2018. IMAGE COURTESY OF NOAA/NESDIS.

Michael was a category 5 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that made a catastrophic landfall near Mexico Beach and Tyndall Air Force Base, Florida, producing devastating winds and storm surge near the coast, and rain and wind inland. It was directly responsible for 16 deaths and about \$25 billion in damage in the United States. Before hitting the United States, the cyclone brought hurricane-force winds to the western tip of Cuba when it was a category 2 hurricane.

¹ Original report dated 19 April 2019. This version corrects the discussion of fatalities in Virginia, includes an updated version of Figure 12, and corrects various minor typos.



Table 3. Selected surface observations for Hurricane Michael, 7–11 October 2018.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft) ^o	Storm tide (ft) ^d	Estimated Inundation (ft) ^e	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC) ^a	Sustained (kt) ^b	Gust (kt)				
Cuba									
Cuba-Francia (78309) (21.94N 82.97W)	08/2100	1005.2	8/1630	23	39				5.48
Cabo de San Antonio (78310) (21.87N 84.95W)	08/2020	974.7	08/2001	84	92				8.78
Santa Lucia (78312) (22.67N 83.97W)	08/2300	998.2	08/1700	27	50				6.82
Isabel Rubio (78313) (22.17N 84.10W)	08/2300	998.2	08/1400	38	65				10.88
San Juan y Martinez (78314) (22.28N 83.83W)	08/2240	1001.1	08/1628	37	55				10.40
Pinar del Rio (78315) (22.42N 83.68W)	08/2100	1001.6	08/2200	36	42				11.45

Florida Coastal Monitoring Program (FCMP)

FCMP T2 Beacon Hill (29.91N 85.38W)			10/1732	94 (15 m, 5-min)	110				
FCMP T3 Tyndall AFB (30.02N 85.53W)	10/1713	920.2	10/1657	92 ^l (15 m, 1-min)	112 ^l				

Florida Automated Weather Network (FAWN)

Carrabelle (29.84N 84.70W)	10/1745	990.0	10/1900	30 (10 m)	46				
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Saffir–Simpson scale

Wind speeds				
Category	(for 1-minute maximum sustained winds)			
	m/s	knots (kn)	mph	km/h
Five	≥ 70 m/s	≥ 137 kn	≥ 157 mph	≥ 252 km/h
Four	58–70 m/s	113–136 kn	130–156 mph	209–251 km/h

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**Measured winds at Tyndall AFB's FCMP T3 site at 1657L were 112 knots.
That is the top end of Category THREE**

Florida

International Civil Aviation Organization (ICAO) Sites

Tyndall AFB (KPAM) (30.07N 85.59W)	10/1720	922.4 ⁱ	10/1712	75 ^l	121 ^l				
St. Petersburg (KPIE) (27.91N 82.69W)	10/0853	1007.2	10/1529	24	34				1.12

Saffir–Simpson scale

Category	Wind speeds (for 1-minute maximum sustained winds)			
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Measured winds at Tyndall AFB's ICAO site, the Base Weather station, at 1720L, were 121 knots. That is the middle of Category FOUR.

Winds and Pressure

The Florida landfall intensity

“We hope you don’t find these Mathematical Gymnastics”
NOAA made “flight level to surface adjustments...”
hunting for highest wind at 8000 ft, then adjusting THAT down to
the surface... KPAM’s surface measurements weren’t good enough

Michael’s **estimated** intensity at landfall in Florida is 140 kt. While the real-time operational estimate was 135 kt, the final best track intensity estimate was determined by a detailed post-storm analysis review of the available aircraft winds, surface winds, surface pressures, satellite intensity estimates, and Doppler radar velocities – including data and analyses that were not available in real time. It should be noted that the NHC best track intensities typically have an uncertainty of around $\pm 10\%$.

1) The maximum flight-level wind measured in Michael near the time of landfall was 152 kt by a USAFR aircraft at 700 mb (approximately 8,000 ft) in the southeast eyewall at 1723 UTC 10 October. This flight-level wind would yield an estimated surface wind of 137 kt using the standard NHC flight-level to surface adjustments, which account for the possibility that the aircraft did not sample the maximum flight-level wind. The maximum real-time surface wind estimate from the SFMR was 138 kt in the south eyewall at 1706 UTC that day. However, there were missing SFMR data in the real-time transmission during that penetration of the eyewall. Re-construction of the instrument’s raw brightness temperatures during the dropout period by the NOAA AOC indicates that the maximum 10-second SFMR wind estimate was 152 kt near 1707

<https://notalotofpeopleknowthat.wordpress.com/2019/09/11/are-category-5-hurricanes-such-as-dorian-the-new-normal-asks-michael-mann/#more-41316>

“On the Classification of Extreme Atlantic Hurricanes Utilizing Mid-Twentieth-Century Monitoring Capabilities”

Abstract

Next slide has the important conclusion

An investigation is conducted to determine how improvements in observing capabilities and technology may have affected scientists' ability to detect and monitor Saffir–Simpson Hurricane Wind Scale Category 5 hurricanes in the Atlantic Ocean basin during the mid-twentieth century. Previous studies state that there has been an increase in the number of intense hurricanes and attribute this increase to anthropogenic global warming. Other studies claim that the apparent increased hurricane activity is an artifact of better observational capabilities and improved technology for detecting these intense hurricanes. The present study focuses on the 10 most recent Category 5 hurricanes recorded in the Atlantic, from Hurricane Andrew (1992) through Hurricane Felix (2007). These 10 hurricanes are placed into the context of the technology available in the period of 1944–53, the first decade of aircraft reconnaissance. A methodology is created to determine how many of these 10 recent Category 5 hurricanes likely would have been recorded as Category 5 if they had occurred during this period using only the observations that likely would have been available with existing technology and observational networks. Late-1940s and early-1950s best-track intensities are determined for the entire lifetime of these 10 recent Category 5 hurricanes. It is found that likely only 2 of these 10—both Category 5 landfalling hurricanes—would have been recorded as Category 5 hurricanes if they had occurred during the late-1940s period. The results suggest that intensity estimates for extreme tropical cyclones prior to the satellite era are unreliable for trend and variability analysis.

<https://notalotofpeopleknowthat.wordpress.com/2019/09/11/are-category-5-hurricanes-such-as-dorian-the-new-normal-asks-michael-mann/#more-41316>

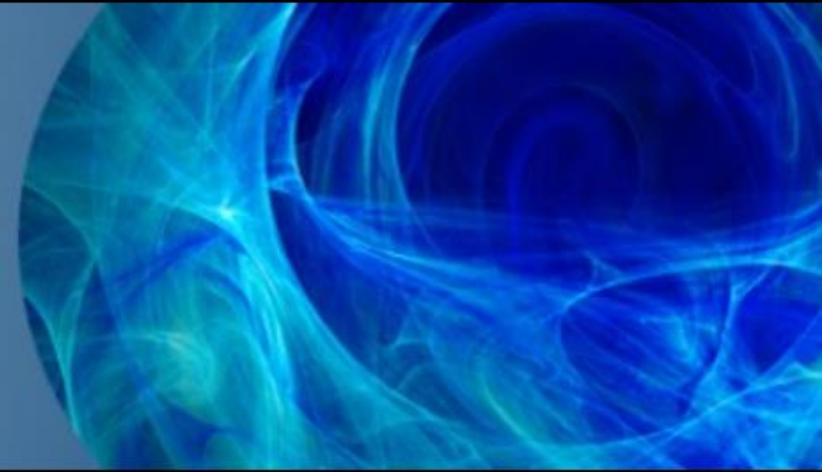
“On the Classification of Extreme Atlantic Hurricanes Utilizing Mid-Twentieth-Century Monitoring Capabilities”:

<https://journals.ametsoc.org/doi/full/10.1175/JCLI-D-11-00420.1>

“It is found that likely only 2 of these 10—both Category 5 landfalling hurricanes—would have been recorded as Category 5 hurricanes if they had occurred during the late-1940s period.”

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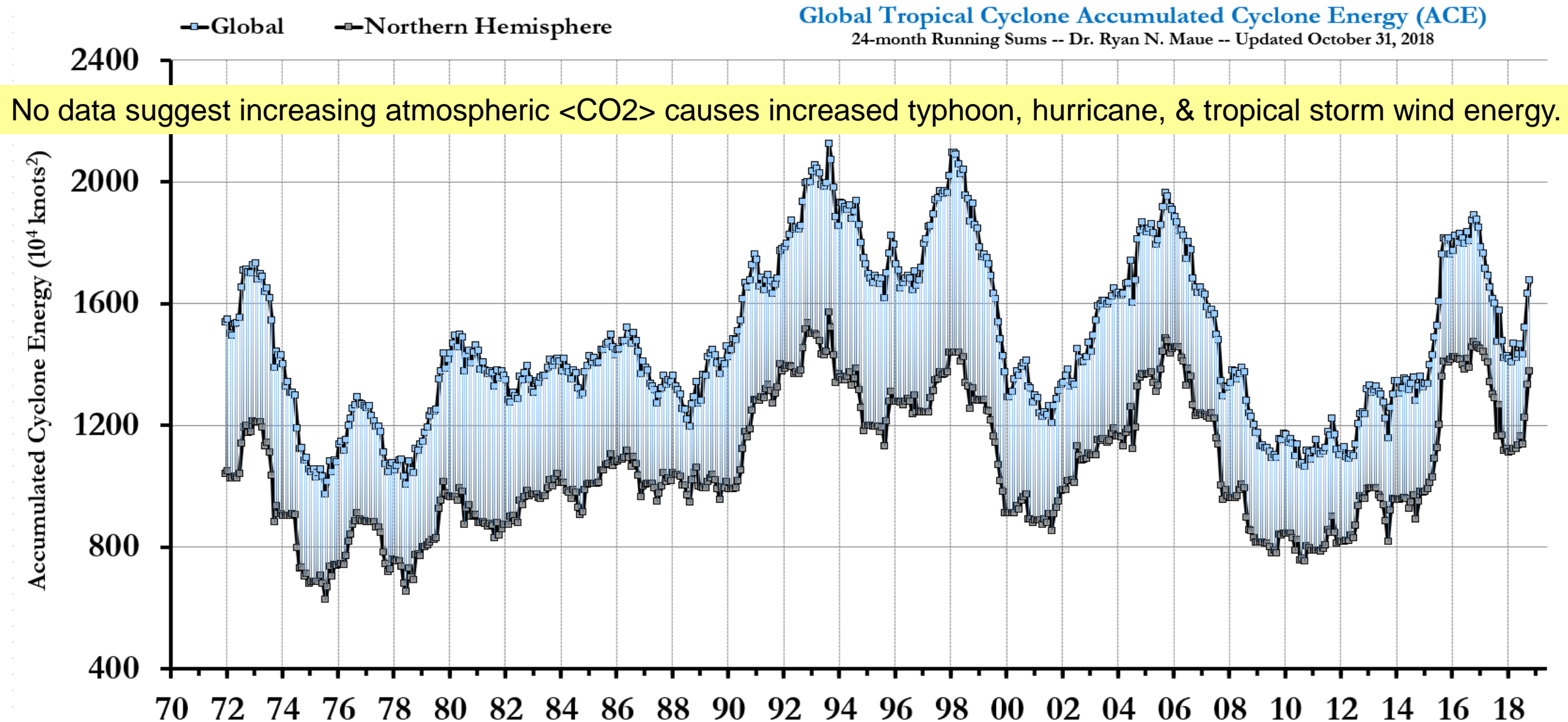
Climate Etc.



“...In summary, the trend signal in hurricane activity has not yet had time to rise above the background variability of natural processes. Manmade climate change may have caused changes in hurricane activity that are not yet detectable due to the small magnitude of these changes compared to estimated natural variability, or due to observational limitations. But at this point, there is no convincing evidence that manmade global warming has caused a change in hurricane activity.”

http://policlimate.com/tropical/global_running_ace.png

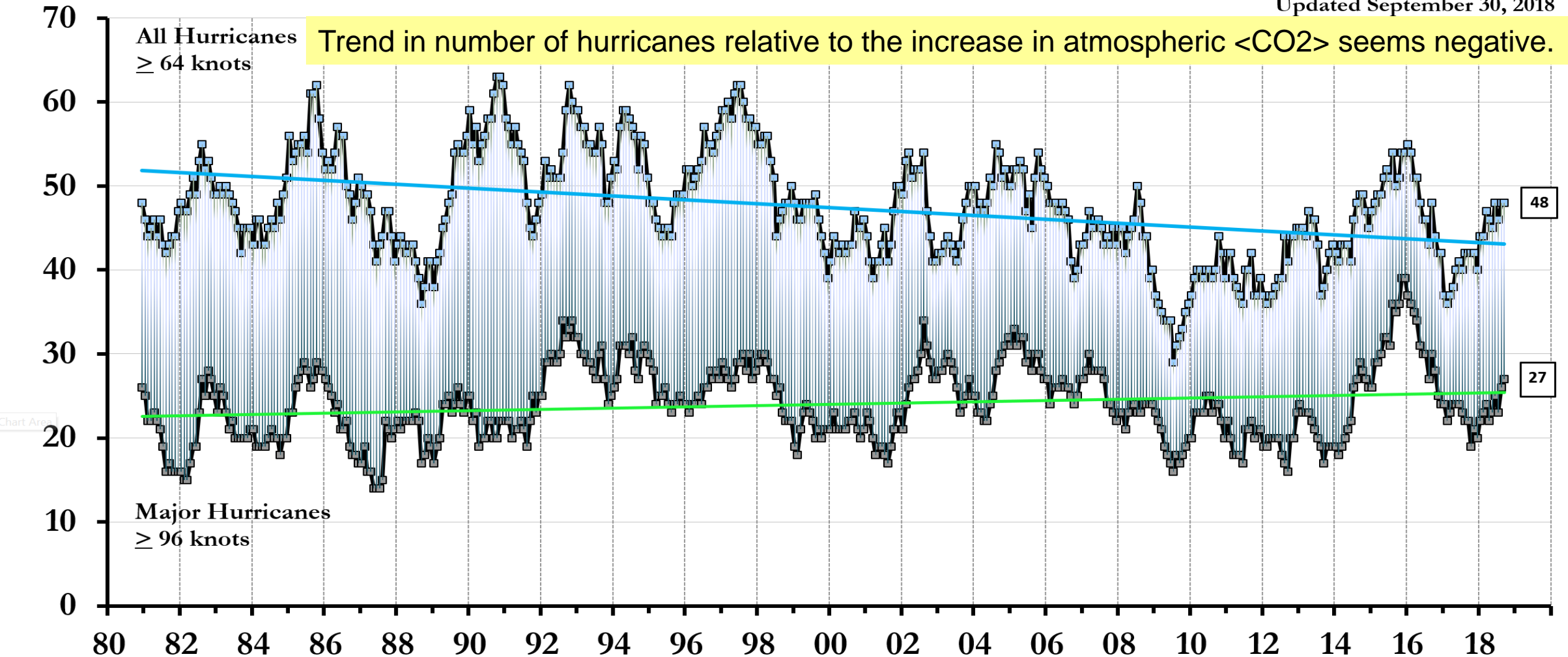
Accumulated Cyclone Energy, a measure similar to kinetic energy, of all tropical storms, hurricanes, and typhoons



Global Major Hurricane Frequency -- 12 month running sums

Dr. Ryan N. Maue

Updated September 30, 2018



Climate History data show
previous warm periods,
Medieval Warm Period,
Warmer than Today

Snow and ice retreat in progress

Isolated glaciers and snowfields
are melting away



Gutzler (2000)
photo of Athabasca Glacier
courtesy P. Fawcett

... Page 9 of Dr. David Gutzler's old presentation on the NM EIB Web Site.

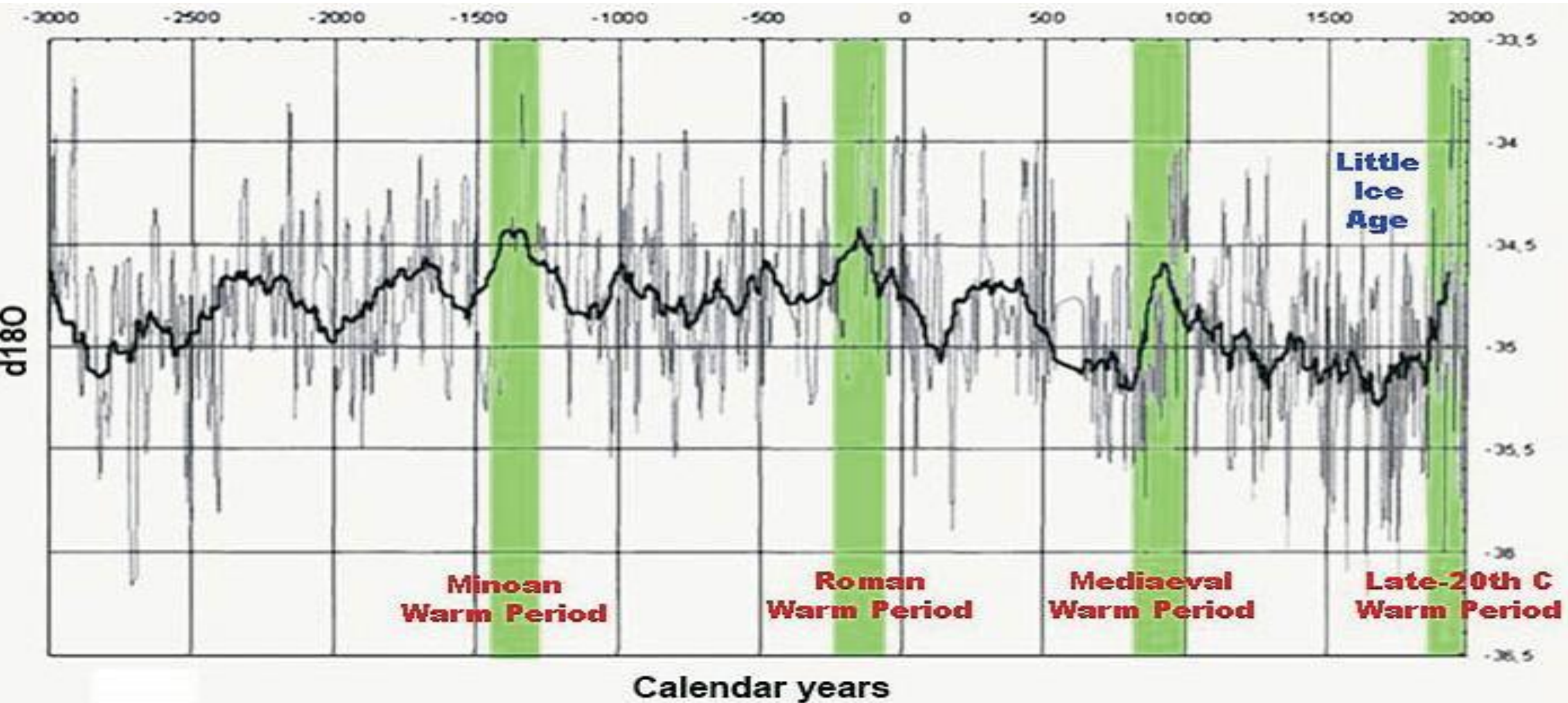
From this, you might think that melting back never happened before.

But it has happened many times before.

Also, Glaciers such as Grindelwald, Switzerland, Engabreen, Norway, and Franz-Josef Glacier, New Zealand are getting longer at the present, throwing cold water on Gutzler's claims.

Climate, the Counter Consensus,
by Robert M. Carter, pg 141

http://www.greenworldtrust.org.uk/Science/Images/Main/Warm_periods.jpg



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RESEARCH ARTICLE



A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates

Gerard Bond^{*}, William Showers, Maziet Cheseby, Rusty Lotti, Peter Almasi, Peter deMenocal, Paul Priore, Heidi Cullen, Irka ...

+ See all authors and affiliations

Science 14 Nov 1997:

Vol. 278, Issue 5341, pp. 1257-1266

DOI: 10.1126/science.278.5341.1257

Article

Figures & Data

Info & Metrics

eLetters

 PDF

Abstract

Evidence from North Atlantic deep sea cores reveals that abrupt shifts punctuated what is conventionally thought to have been a relatively stable Holocene climate. During each of these episodes, cool, ice-bearing waters from north of Iceland were advected as far south as the latitude of Britain. At about the same times, the atmospheric circulation above Greenland changed abruptly. Pacing of the Holocene events and of abrupt climate shifts during the last glaciation are statistically the same; together, they make up a series of climate shifts with a cyclicity close to 1470 ± 500 years. The Holocene events, therefore, appear to be the most recent manifestation of a pervasive millennial-scale climate cycle operating independently of the glacial-interglacial climate state. Amplification of the cycle during the last glaciation may have been linked to the North Atlantic's thermohaline circulation.

A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates

Gerard Bond; William Showers; Maziet Cheseby; Rusty Lotti; et al **Science**; Nov 14, 1997; 278, 5341; Research Library

RESEARCH ARTICLE

A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates

Gerard Bond,* William Showers, Maziet Cheseby, Rusty Lotti,
Peter Almasi, Peter deMenocal, Paul Priore, Heidi Cullen,
Irka Hajdas, Georges Bonani

Evidence from North Atlantic deep sea cores reveals that abrupt shifts punctuated what is conventionally thought to have been a relatively stable Holocene climate. During each of these episodes, cool, ice-bearing waters from north of Iceland were advected as far south as the latitude of Britain. At about the same times, the atmospheric circulation above Greenland changed abruptly. Pacing of the Holocene events and of abrupt climate shifts during the last glaciation are statistically the same; together, they make up a series of climate shifts with a cyclicity close to 1470 ± 500 years. The Holocene events, therefore, appear to be the most recent manifestation of a pervasive millennial-scale climate cycle operating independently of the glacial-interglacial climate state. Amplification of the cycle during the last glaciation may have been linked to the North Atlantic's thermohaline circulation.



Persistent Solar Influence on North Atlantic Climate During the Holocene

Gerard Bond^{1,*}, Bernd Kromer², Juerg Beer³, Raimund Muscheler³, Michael N. Evans⁴, William Showers⁵, Sharon Hoffmann¹,...

[+ See all authors and affiliations](#)

Science 07 Dec 2001:

Vol. 294, Issue 5549, pp. 2130-2136

DOI: 10.1126/science.1065680

Article

Figures & Data

Info & Metrics

eLetters

PDF

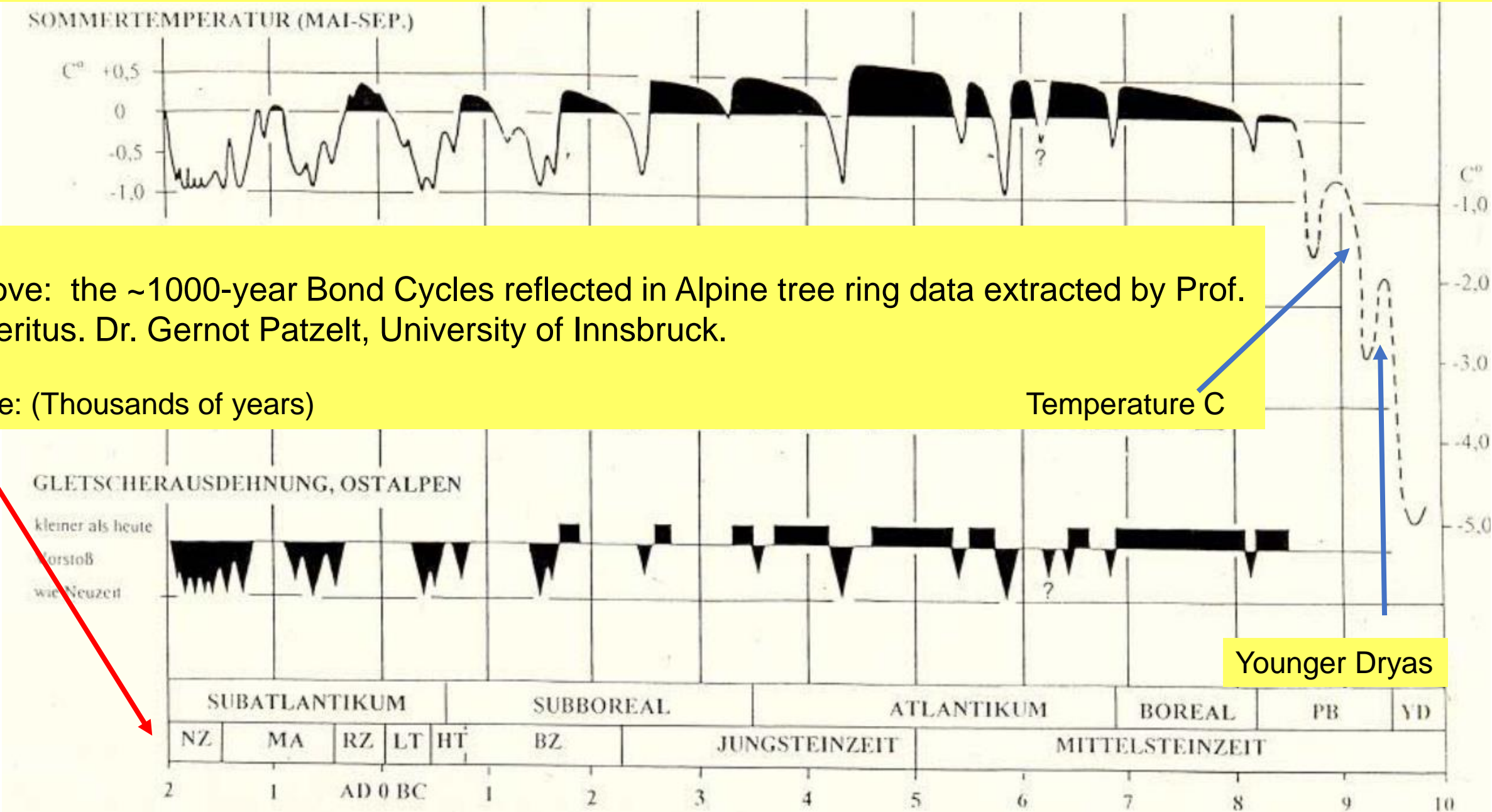
Abstract

Surface winds and surface ocean hydrography in the subpolar North Atlantic appear to have been influenced by variations in solar output through the entire Holocene. The evidence comes from a close correlation between inferred changes in production rates of the cosmogenic nuclides carbon-14 and beryllium-10 and centennial to millennial time scale changes in proxies of drift ice measured in deep-sea sediment cores. A solar forcing mechanism therefore may underlie at least the Holocene segment of the North Atlantic's "1500-year" cycle. The surface hydrographic changes may have affected production of North Atlantic Deep Water, potentially providing an additional mechanism for amplifying the solar signals and transmitting them globally.

Persistent Solar Influence on North Atlantic Climate During the Holocene

**Gerard Bond,^{1*} Bernd Kromer,² Juerg Beer,³
Raimund Muscheler,³ Michael N. Evans,⁴ William Showers,⁵
Sharon Hoffmann,¹ Rusty Lotti-Bond,¹ Irka Hajdas,⁶ Georges Bonani⁶**

Surface winds and surface ocean hydrography in the subpolar North Atlantic appear to have been influenced by variations in solar output through the entire Holocene. The evidence comes from a close correlation between inferred changes in production rates of the cosmogenic nuclides carbon-14 and beryllium-10 and centennial to millennial time scale changes in proxies of drift ice measured in deep-sea sediment cores. A solar forcing mechanism therefore may underlie at least the Holocene segment of the North Atlantic's "1500-year" cycle. The surface hydrographic changes may have affected production of North Atlantic Deep Water, potentially providing an additional mechanism for amplifying the solar signals and transmitting them globally.

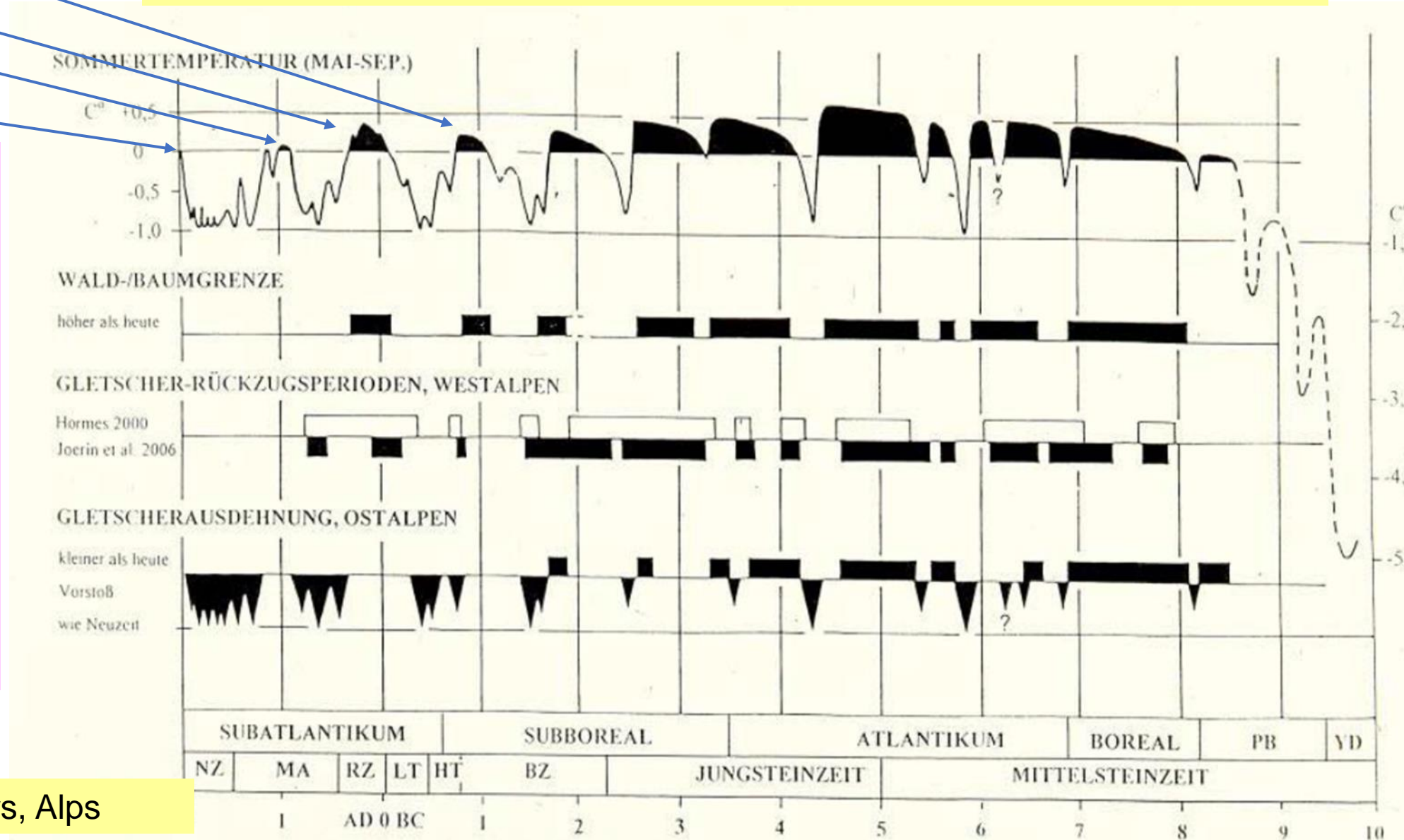


These are tree-ring-derived “proxy” temperatures from the Alps.

Minoan
Roman
Medieval
Present

http://www.iuf-berlin.org/wm_files/wm_pdf/prof._patzelt_berlin_4.12.2009.pdf

Top line of the graph below is the May to September temperature time series



Top line shows ~thirteen separate warm periods since the last glacial maximum.

Present Warm period (...with more CO2..) appears weaker than almost all previous Holocene Warm Periods

Timeline, last 12,000 years, Alps

At least two web resources show numerous references show in many respects the Medieval Warm Period was warmer than today

The resources are <http://www.co2science.org/data/mwp/mwpp.php>



and <http://pages.science-skeptical.de/MWP/MedievalWarmPeriod.htmx>

Medieval Warm Period Project

ScienceSkepticalBlog
www.science-skeptical.de

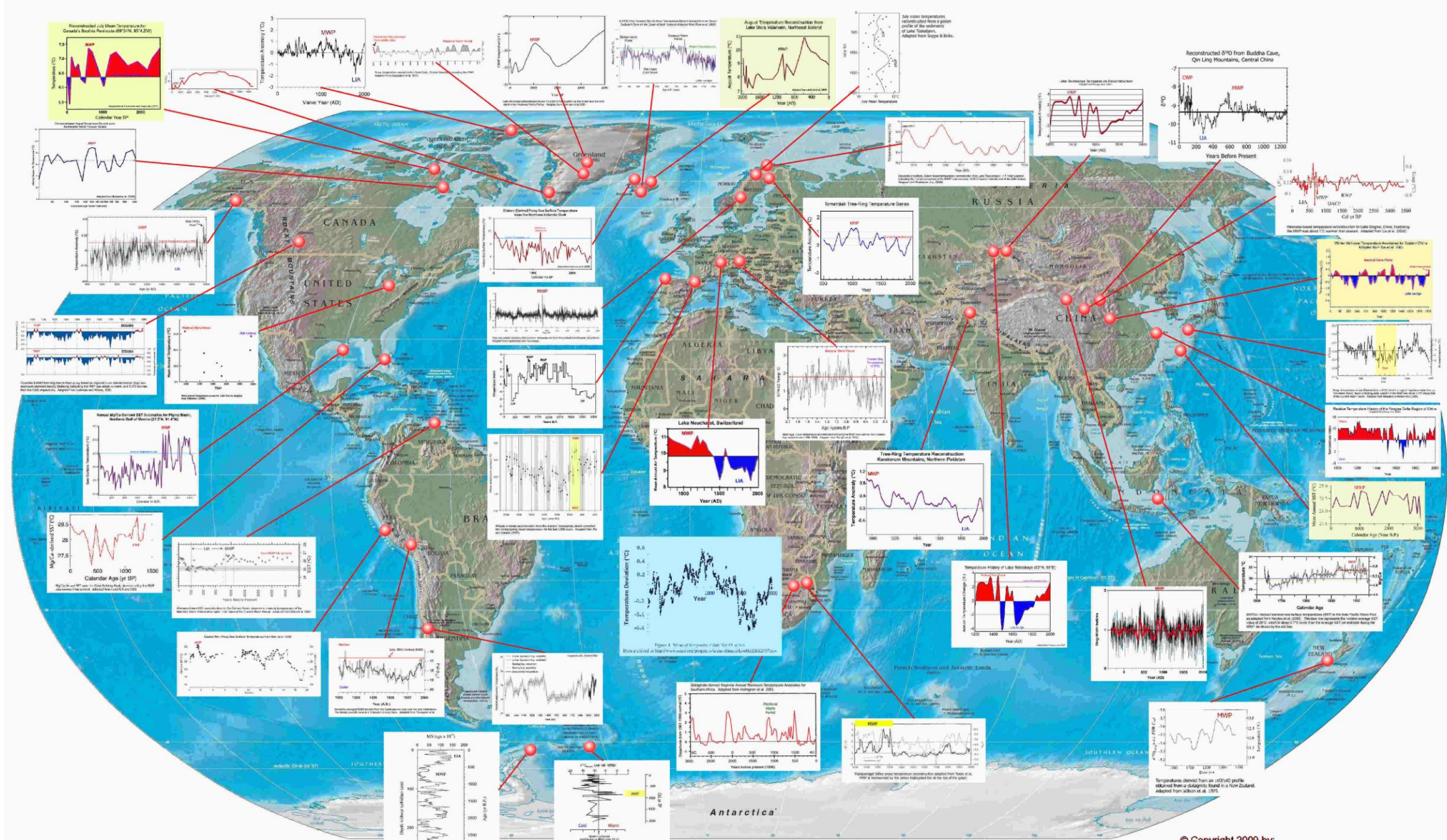


Figure 1: A world map showing the locations of paleotemperature reconstructions. Red dots indicate the locations of the reconstructions, and red lines connect them to the corresponding graphs. The graphs show temperature anomalies over time, with some showing a clear Medieval Warm Period (MWP) and Little Ice Age (LIA) pattern. The locations include Canada, United States, Mexico, Central America, Caribbean, South America, Africa, Europe, Asia, Australia, and Antarctica. The graphs show various temperature reconstructions, including annual, seasonal, and decadal, with some showing a clear Medieval Warm Period (MWP) and Little Ice Age (LIA) pattern.

Data collected at <http://www.skepticalscience.com/medievalwarmperiod.htm>

The following are data from the Northern Hemisphere

Perhaps it's understandable that there might be more data from the Northern than from the Southern Hemisphere.

We will examine Southern Hemisphere data later, principally from the Vostok Ice Cores

Falling heights of the tree line
White Mountains of California
since 2500 BC.

This shows that since
~2,500 BC temperatures
in California and adjacent
regions have been falling...

So...it was warmer from
2,500 BC until the present.

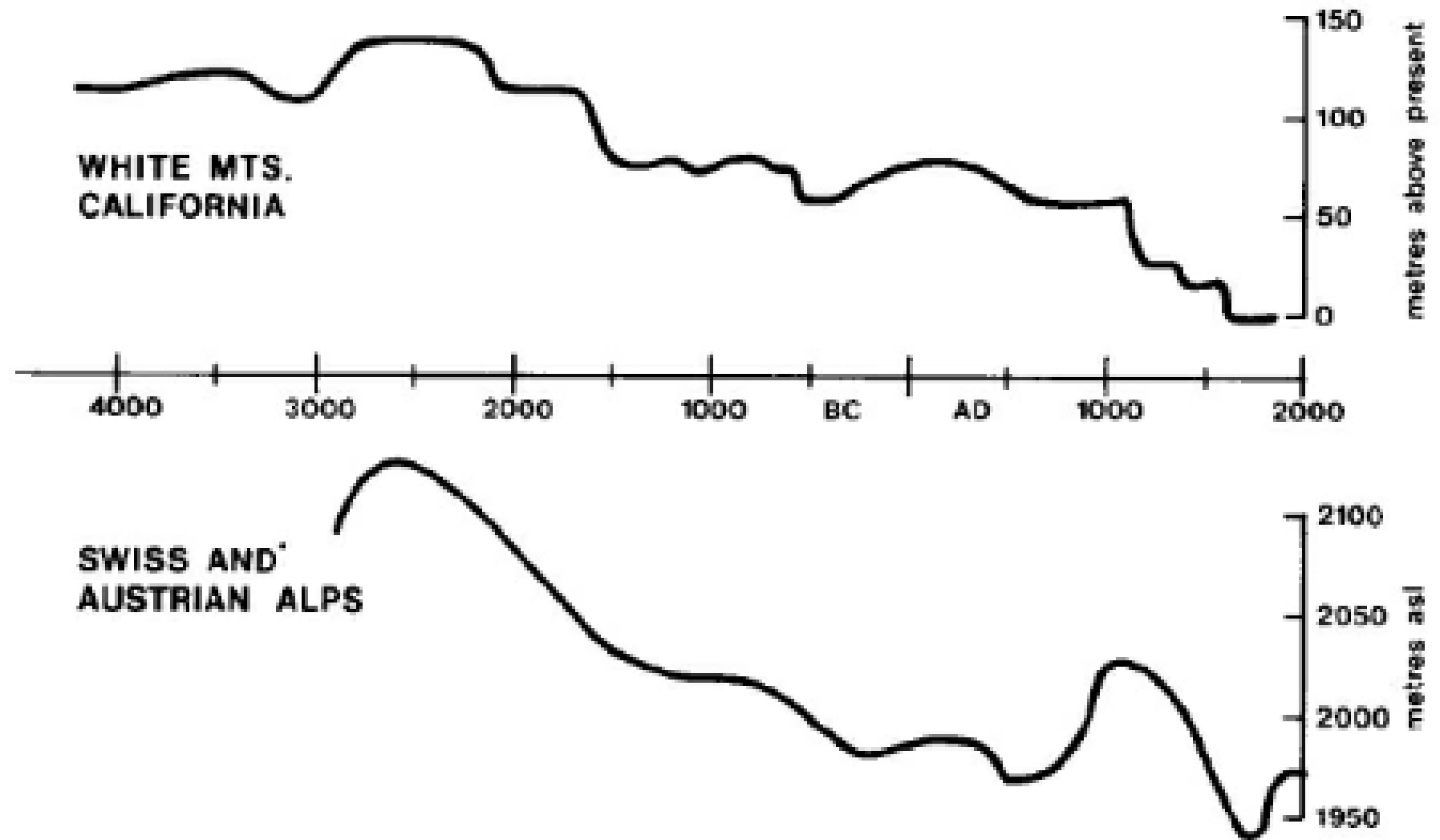
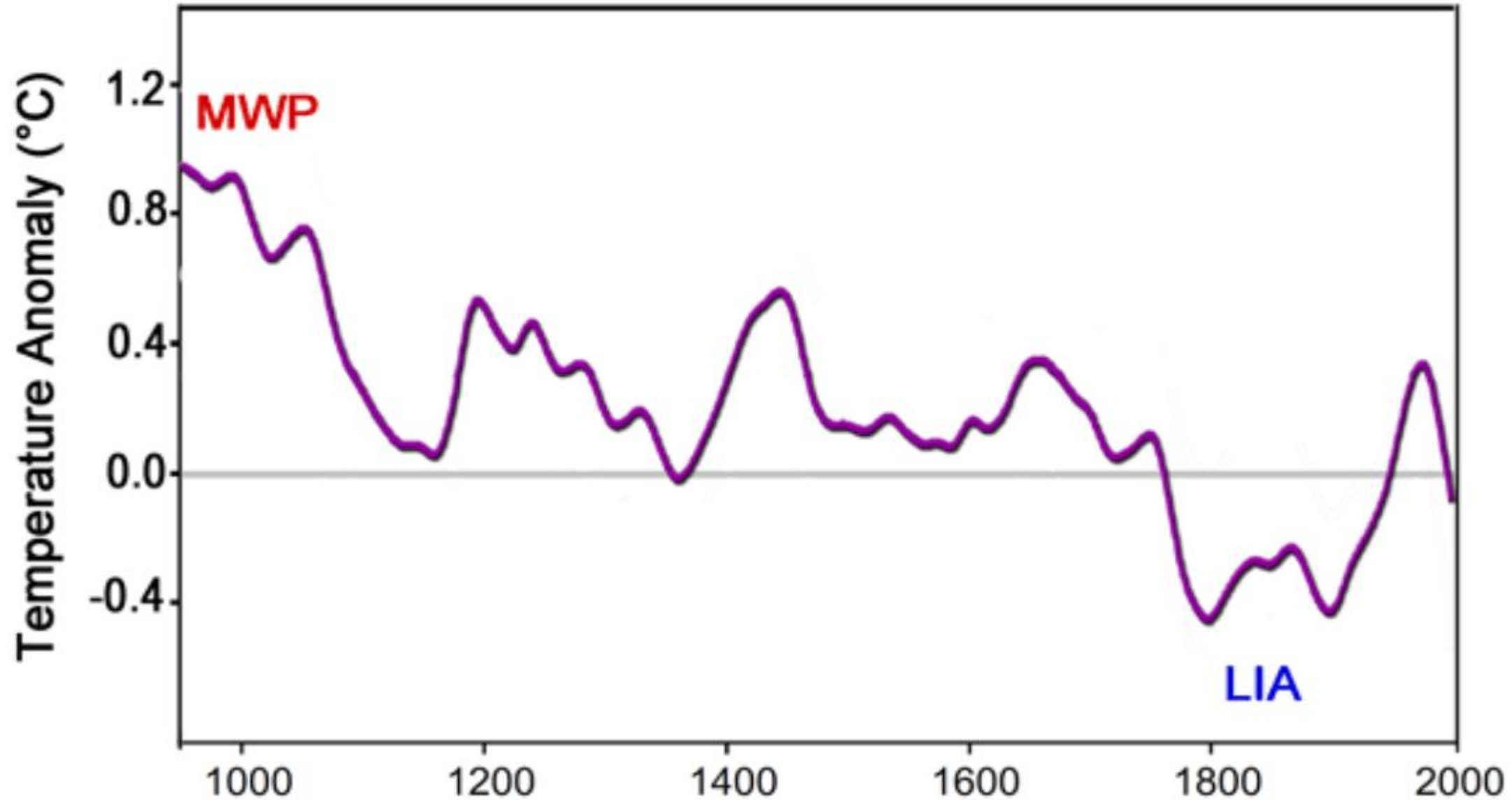


Fig. 53 Changes in the height of the upper tree line in two areas in the White Mountains, California and in the Alps in Switzerland and Austria. (From work by V.C. La Marche and V. Markgraf.)

Lamb, Hubert H.. Climate, History and the Modern World (Kindle Location 2207). Taylor and Francis, Kindle Edition

Tree-Ring Temperature Reconstruction Karakorum Mountains, Northern Pakistan



Proxy temperature time series

Climate in the Holocene is always changing, no stasis.

~1000 year "Bond Cycles" dominate.

Add 0.8-0.9C since the depth of the Little Ice Age (Red line, Red arrow, at right)

Most of the Holocene has been warmer than at present.

X-Axis, Time

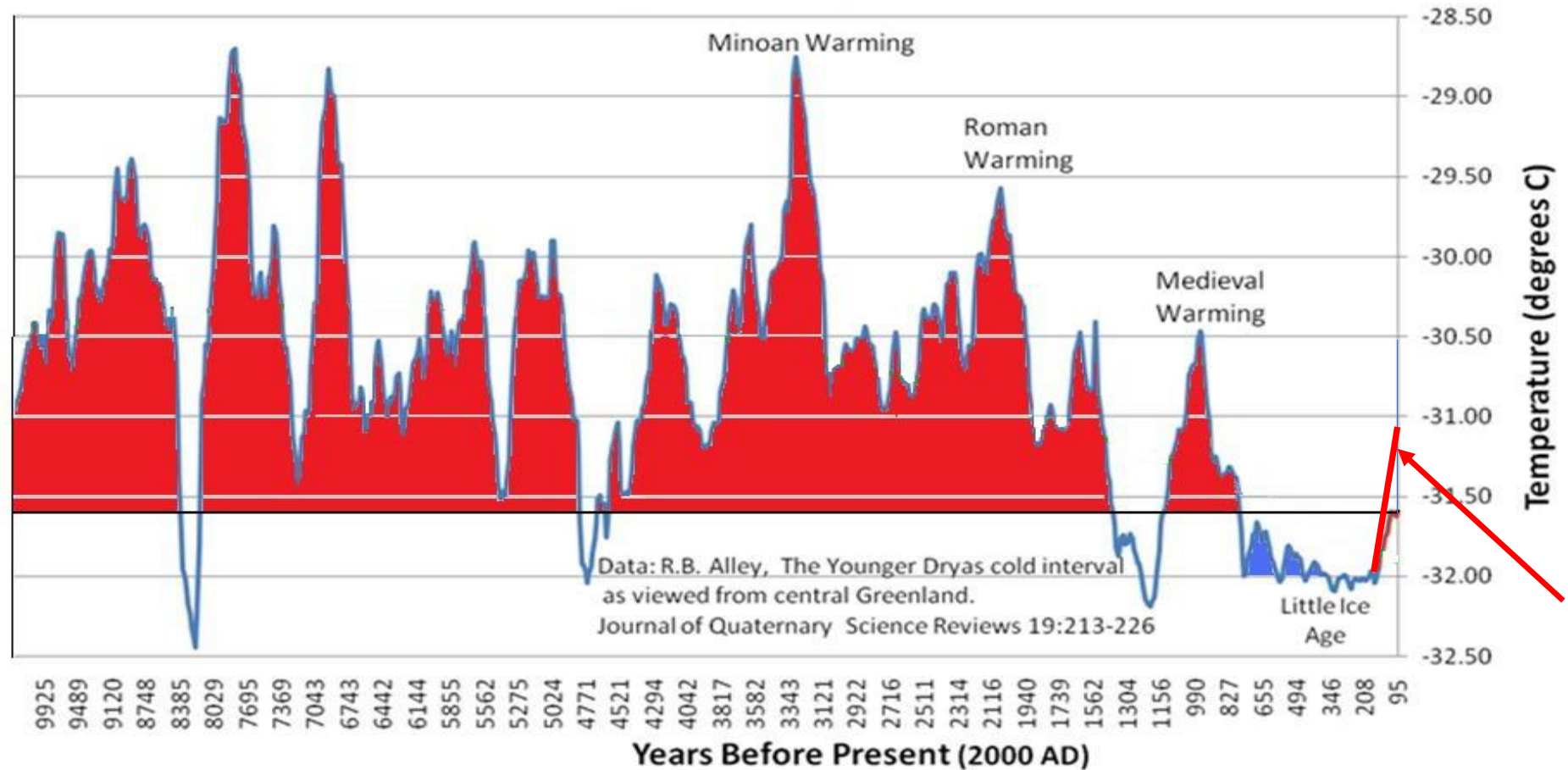
Y-Axis, Temperature

Oldest on Left,

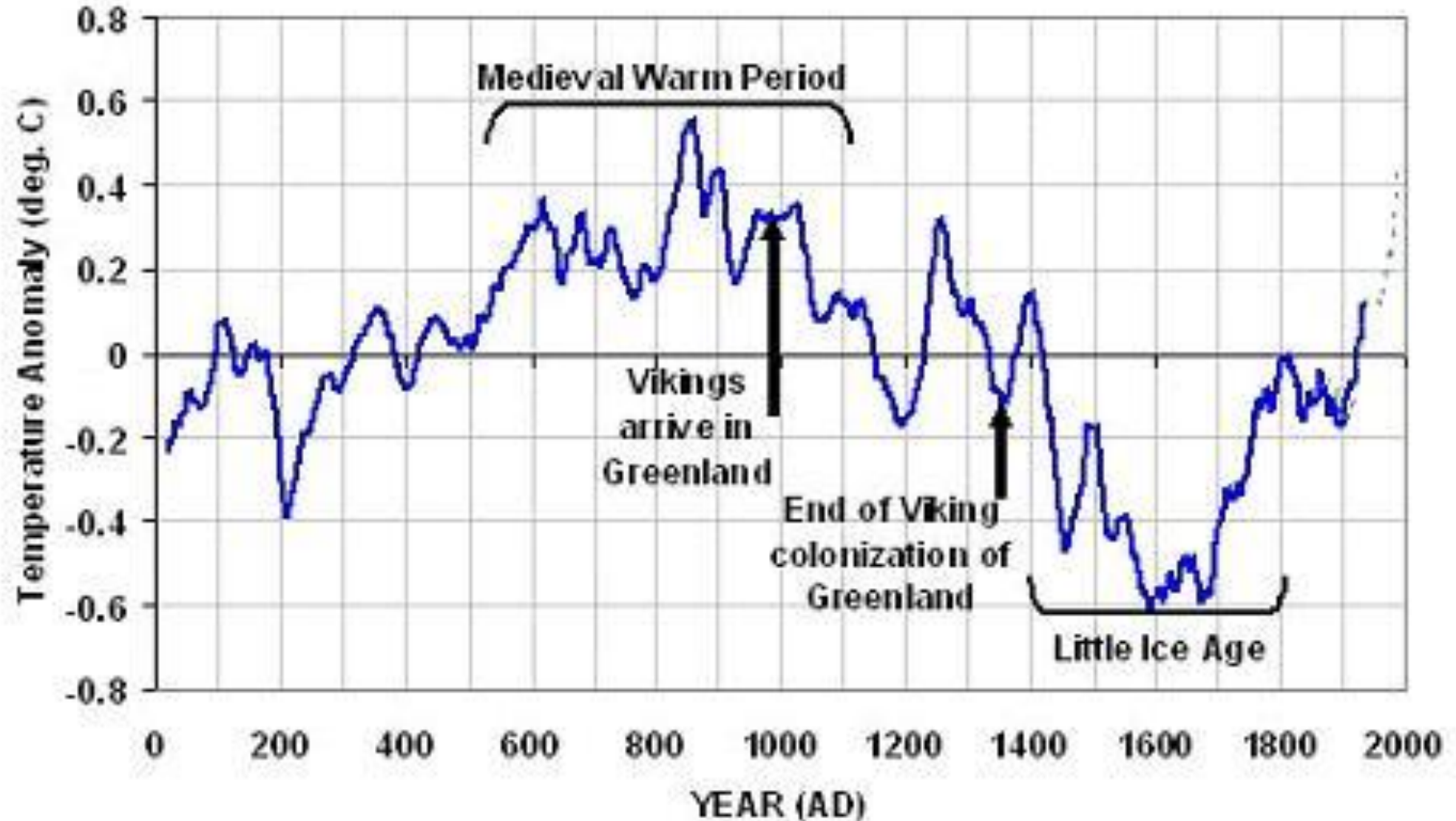
from the O16/O18 ratio , Greenland GISP2 Ice Core, Coldest Down, Warmer Up.

Present on Right

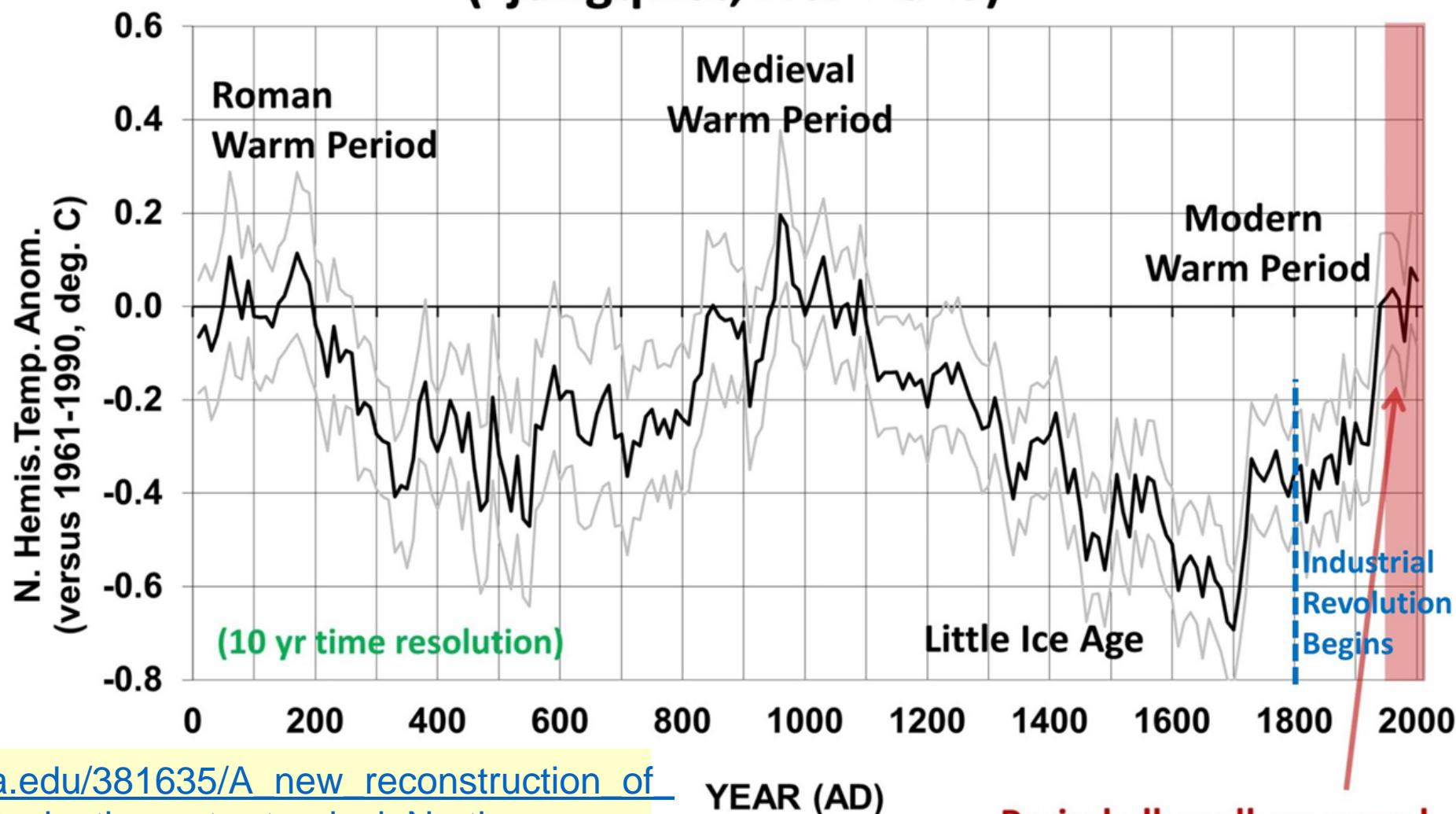
Greenland GISP2 Ice Core - Temperature Last 10,000 Years



Loehle, 2007. A 2,000-year global temperature reconstruction on non-treering proxy data. *Energy & Environment*, 18, 1049-1058.



N. Hemisphere Temperature proxies (Ljungqvist, F.C. 2010)



https://www.academia.edu/381635/A_new_reconstruction_of_temperature_variability_in_the_extra-tropical_Northern_Hemisphere_during_the_last_two_millennia

This grainy image is
a Foxtail Pine.

1000 years old; it is found
well above the present
Tree Line.

If this was warmest in the Holocene,
the trees would be higher now.

Location:
Bighorn Plateau,
Sequoia National Park,
California.

Photo from
A Primer on CO₂ and Climate
Howard C Hayden,
Vales Lake Publishing,
Pueblo, CO, pg 18.





Figure 21. Left- Whitewing Mt (C Millar); right – Boreal Plateau (Andrew Bunn)

Recent studies in California (Millar et al. 2006) analyzed ecological combinations of trees growing at high altitudes in the MWP, where subfossil trees can be found above the present treeline. Their conclusion was that the MWP was 3.2 deg C warmer than present in California.

Deadwood tree stems scattered above treeline on tephra-covered slopes of Whitewing Mtn (3051 m) and San Joaquin Ridge (3122 m) show evidence of being killed in an eruption from adjacent Glass Creek Vent, Inyo Craters.

We dated deadwood to 815-1350 CE... Using contemporary distributions of the species, we modeled paleoclimate during [the MWP] to *be significantly warmer (+3.2C annual minimum temperature)* and slightly drier (-24 mm annual precipitation) than present.



Figure 21. Left- Whitewing Mt (C Millar); right – Boreal Plateau (Andrew Bunn)

The 12th and 13th centuries were most favorable for Larch growth ... the timberline was the highest, stand density the biggest, longevity of trees the longest, size of trees the largest, increment in diameter and height the most intensive

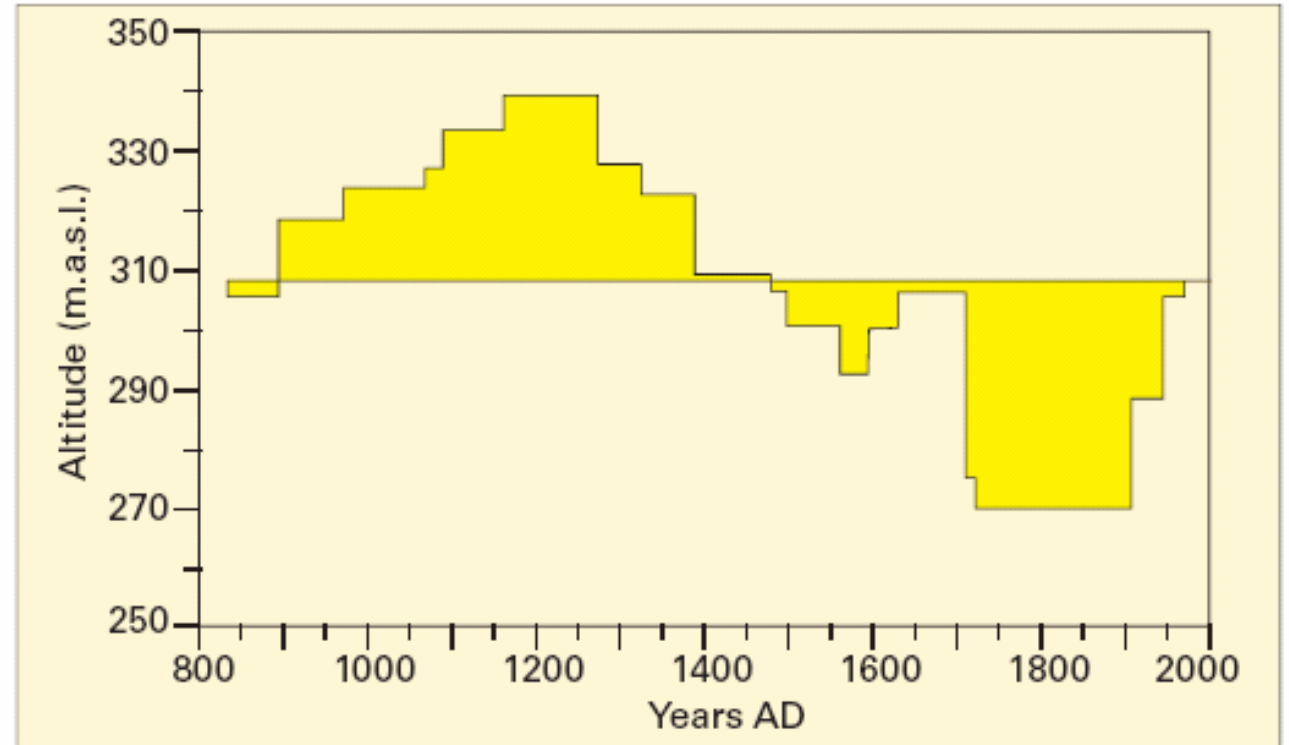
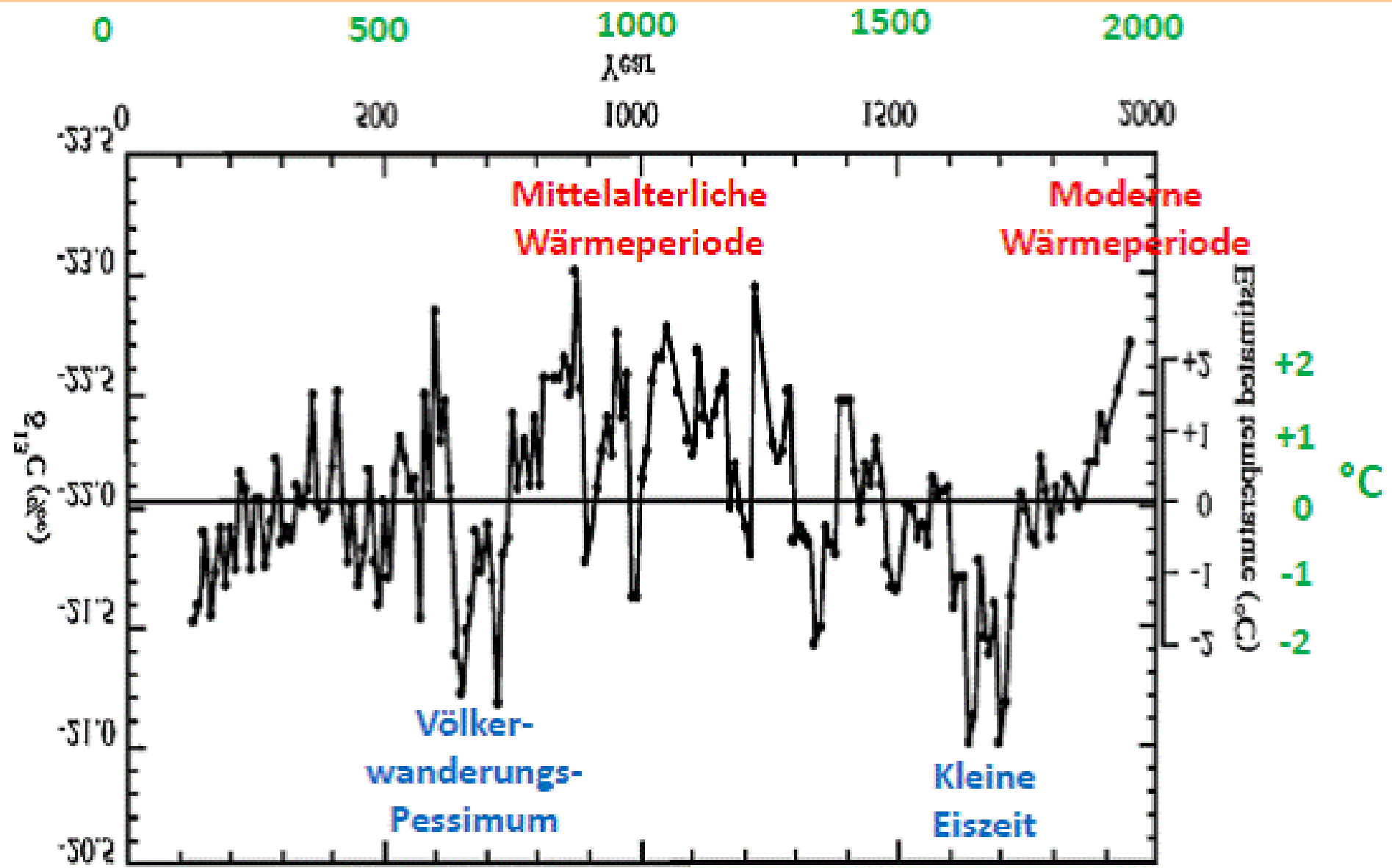


Fig.1. Altitudinal displacement of the upper treeline in the Polar Ural Mountains during the last 1150 years.

Figure 24. Left – Photograph of **Polar Urals treeline**, advancing modern treeline in background, medieval treeline in foreground (Jan Esper); right – Shiyatov 1995 figure showing treeline elevation at Polar Urals with high medieval treeline

Medieval Warm Period and the Little Ice Age as a local, North Atlantic phenomenon: Since when is Japan located in the North Atlantic? (Tree ring study from Japan) by Sebastian Lüning & Fritz Vahrenholt (Authors of The Cold Sun)



In recent decades, North American glaciers have advanced by many kilometers and buried forests in ice in the same regions where glaciers have receded and uncovered Medieval-era forests.



Glacier-buried forests from ~1000 years ago uncover a warm Medieval period

Figure 2. Students learn how scientists combine living and dead trees to create millennial-length records of temperature, such as the buried forests emerging here from the wasting margin of Mendenhall Glacier (Credit: Jesse Wiles).

WWW.THIS IS CLIMATE CHANGE.ORG



THEN
(1894)



NOW
(2008)

MENDENHALL GLACIER - ALASKA

<https://www.youtube.com/watch?v=mtHreJbr2WM>

Steve Goreham Video:

Fossil tree and roots are radiocarbon dated 1000 YBP Therefore, MWP warmer than today!

Under the Mendenhall Glacier—A Forest!



9:28 / 45:15





Quaking aspen

Plants

Populus tremuloides is a deciduous tree native to cooler areas of North America, one of several species referred to by the common name aspen. It is commonly called quaking aspen, trembling aspen, American aspen, Quakies, mountain or golden aspen, trembling poplar, white poplar, popple, as well as others. [Wikipedia](#)

Scientific name: *Populus tremuloides*

1020 years ago thick stands of Aspen grew on Greenland.



<https://www.quora.com/Are-there-any-university-Physics-educated-climate-change-skeptics-who-can-definitively-refute-the-120-year-old-basis-for-Anthropogenic-Global-warming/answer/Paul-Noel-5>

”... there is no convincing evidence for natural cycles in the observational record that could explain the observed changes in climate”

Quote from Executive Summary, 2017 version of the National Climate Assessment

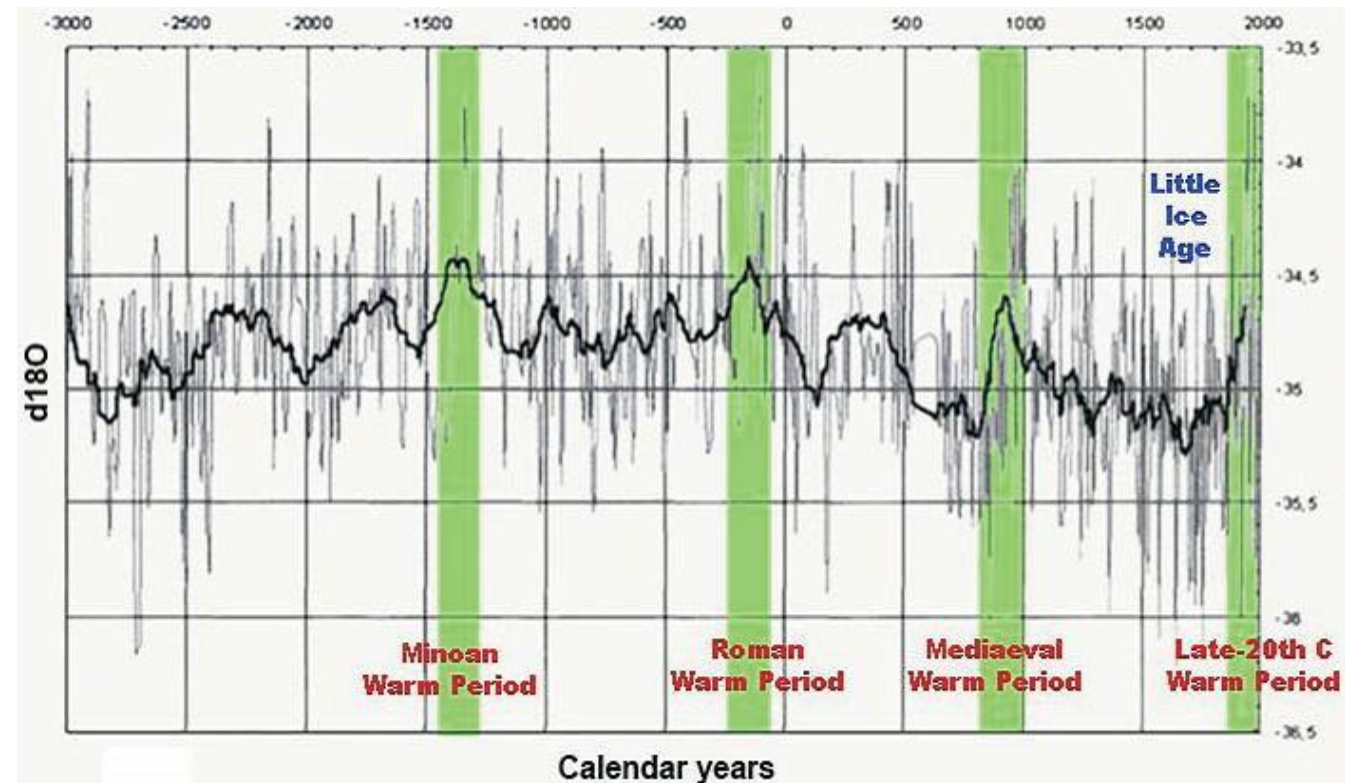
The stunning ignorance or attempted outright deception by Government “experts” in this statement, take your choice, are a marvel to behold.

RESEARCH ARTICLE

A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates

Gerard Bond,* William Showers, Maziet Cheseby, Rusty Lotti, Peter Almasi, Peter deMenocal, Paul Priore, Heidi Cullen, Irka Hajdas, Georges Bonani

Evidence from North Atlantic deep sea cores reveals that abrupt shifts punctuated what is conventionally thought to have been a relatively stable Holocene climate. During each of these episodes, cool, ice-bearing waters from north of Iceland were advected as far south as the latitude of Britain. At about the same times, the atmospheric circulation above Greenland changed abruptly. Pacings of the Holocene events and of abrupt climate shifts during the last glaciation are statistically the same; together, they make up a series of climate shifts with a cyclicity close to 1470 ± 500 years. The Holocene events, therefore, appear to be the most recent manifestation of a pervasive millennial-scale climate cycle operating independently of the glacial-interglacial climate state. Amplification of the cycle during the last glaciation may have been linked to the North Atlantic's thermohaline circulation.



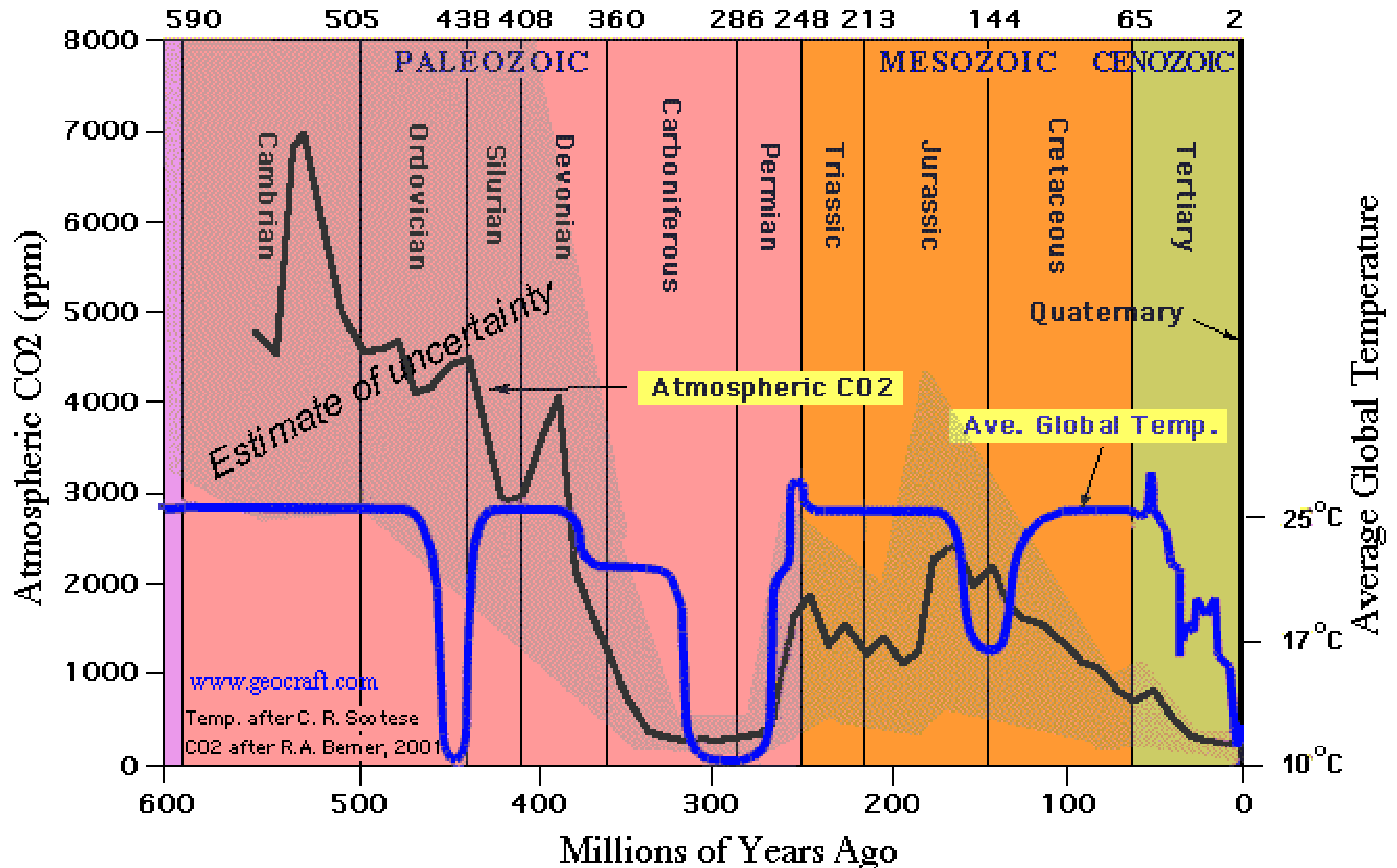
Warming In the Arctic is Revealing Evidence of Natural Climate Change

Tree stumps (dated to be 1,000-2,000 years old) at the terminus of receding Mendenhall Glacier (Alaska) reveal that glaciers change naturally on long time scales, and that there have been periods of Arctic warmth before.



We will gradually zoom in on the Southern Hemisphere's
Data

But first, the Global Data Set



At ~7000 Parts per Million CO₂ in the Cambrian, there was ~18X the present amount of CO₂ at 415 PPM.

The lowest <CO₂> was at the depth of the Wisconsin Ice Age.

Joy Ward reports 180-220 PPM CO₂ low enough to carbon-starve Junipers from La Brea Tar Pits

For the members:

Where did the CO₂ go?

Geologic History of <CO₂> and Temperature as published in Hayden's Primer on CO₂ And Climate.

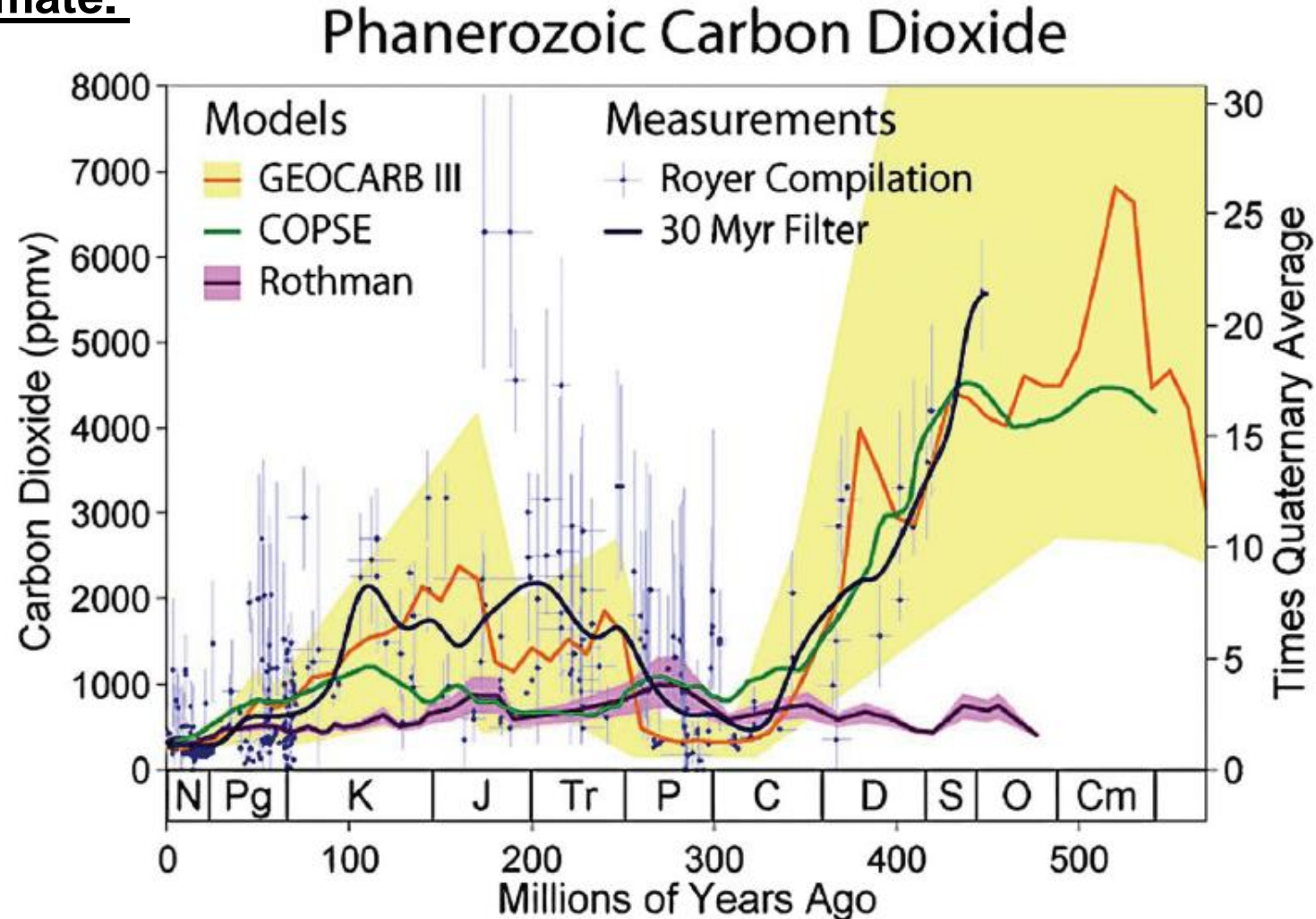


Figure 24: Phanerozoic CO₂: CO₂ concentrations for the past 600 million years, in parts per million (left) and as multiples (up to a factor ~20) of current concentration (right). The past 400,000-year period is squeezed into a thin sliver on the left. Dots represent data, and lines represent various models [Hayden 2007]. Note the significant downward trend in CO₂ levels in the past 200 million years.

At ~7000 Parts per Million CO₂ in the Cambrian, there was ~18X the present amount of CO₂ at 415 PPM.

The lowest <CO₂> was at the depth of the Wisconsin Ice Age
Joy Ward reports 180-220 PPM CO₂ low enough to carbon-starve Junipers from La Brea Tar Pits

Where did the CO₂ go?

Hint: $\text{CaO} + \text{CO}_2 \Rightarrow \text{CaCO}_3$

ANSWER: to CaCO₃ in Limestone, Dolomite, Coral Reefs, Oolite, Marble

Examples:



Redwall Limestone

The Grand Canyon of Arizona



Gibraltar

The Rock of Gibraltar

into marble, used in monuments....

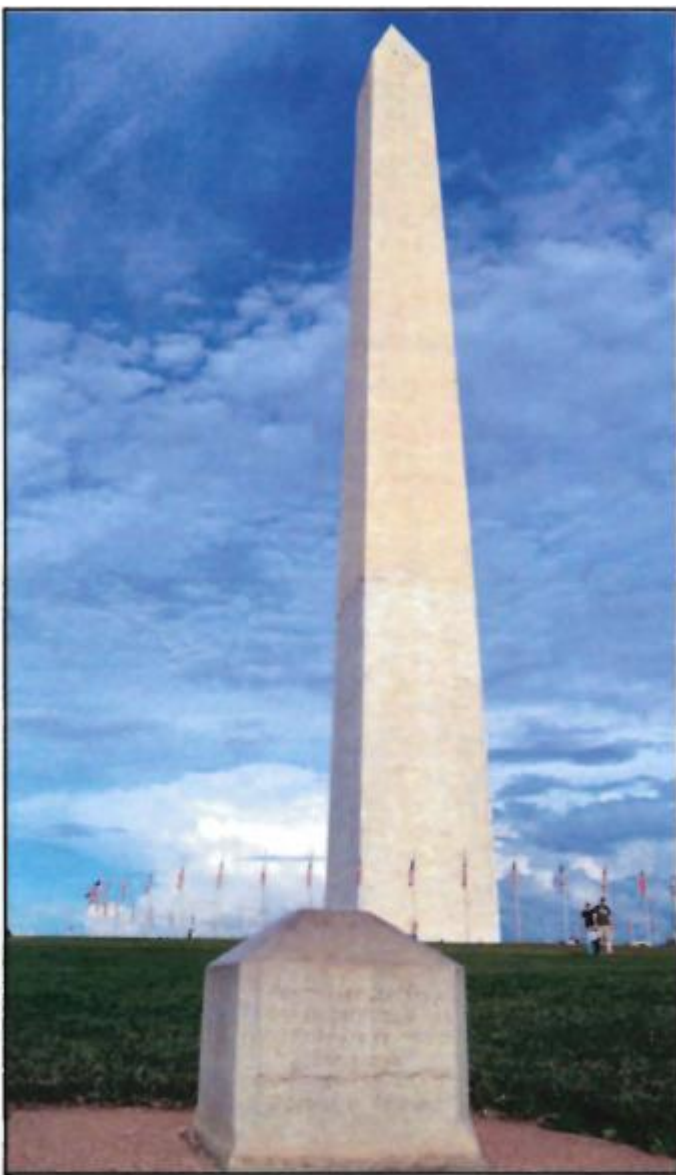


Figure 14. Washington Monument, showing *Texas marble* on the bottom third and *Cockeysville marble* on the upper two thirds. The Jefferson stone is in the foreground. Compare with the 1851 view in Figure 2.



Figure 34. National Gallery of Art West Building, *Tennessee marble*. Note stronger banding on outermost columns.



Bedford Limestone, also called the Bedford Oolitic Limestone is favored in many construction projects.

Left, the Empire State Building

Below, the Jefferson Memorial (the dome)

Next, the Pentagon.









El Capitan, Guadalupe Mountains National Park consists of Permian-age limestone, part of the reef complex of Carlsbad Caverns National Park.

Here are some data with emphasis on
the Southern Hemisphere

Pleistocene Climate Cycles

~100,000-year cycles

Temperatures in Blue show Interglacials (in yellows), Glacials (in Blue)

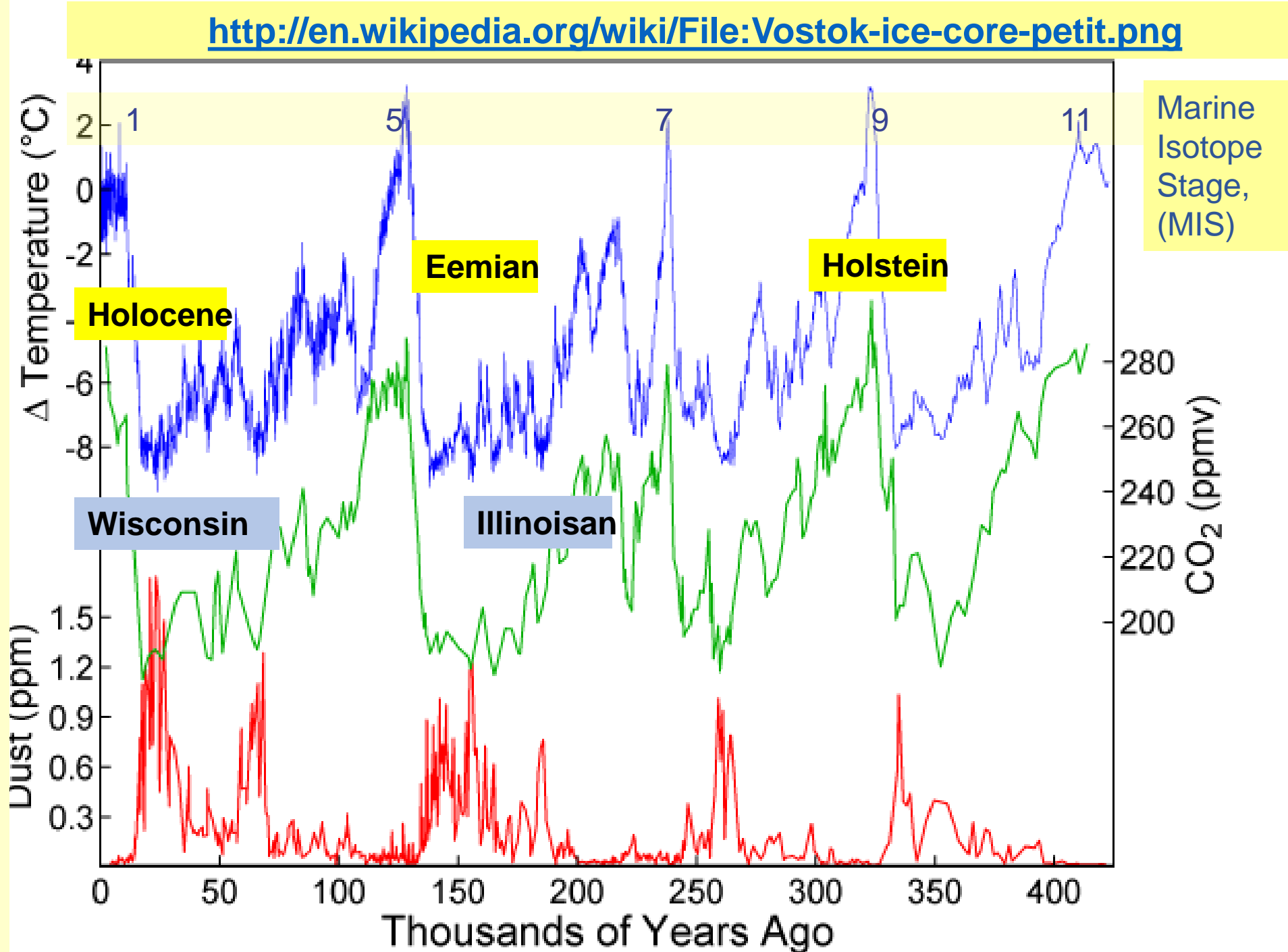
Zero, current mean Temp

<CO2> in Green

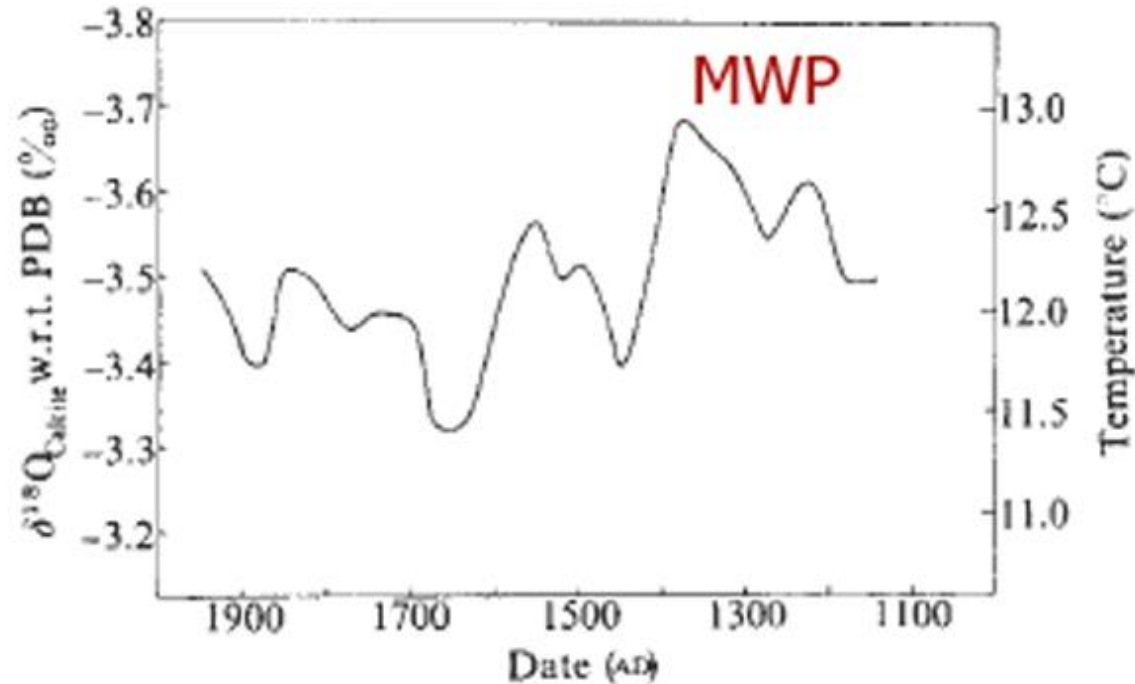
MIS 1 Holocene is the coolest of the five interglacials.

Present <CO2> is now 415 PPM, off scale high.

Shows that CO2 does not control temperature, but responds to temperature.



The Medieval Warm period occurred in New Zealand.



Temperatures derived from an $^{18}\text{O}/^{16}\text{O}$ profile obtained from a stalagmite found in a New Zealand. Adapted from Wilson et al. 1979.

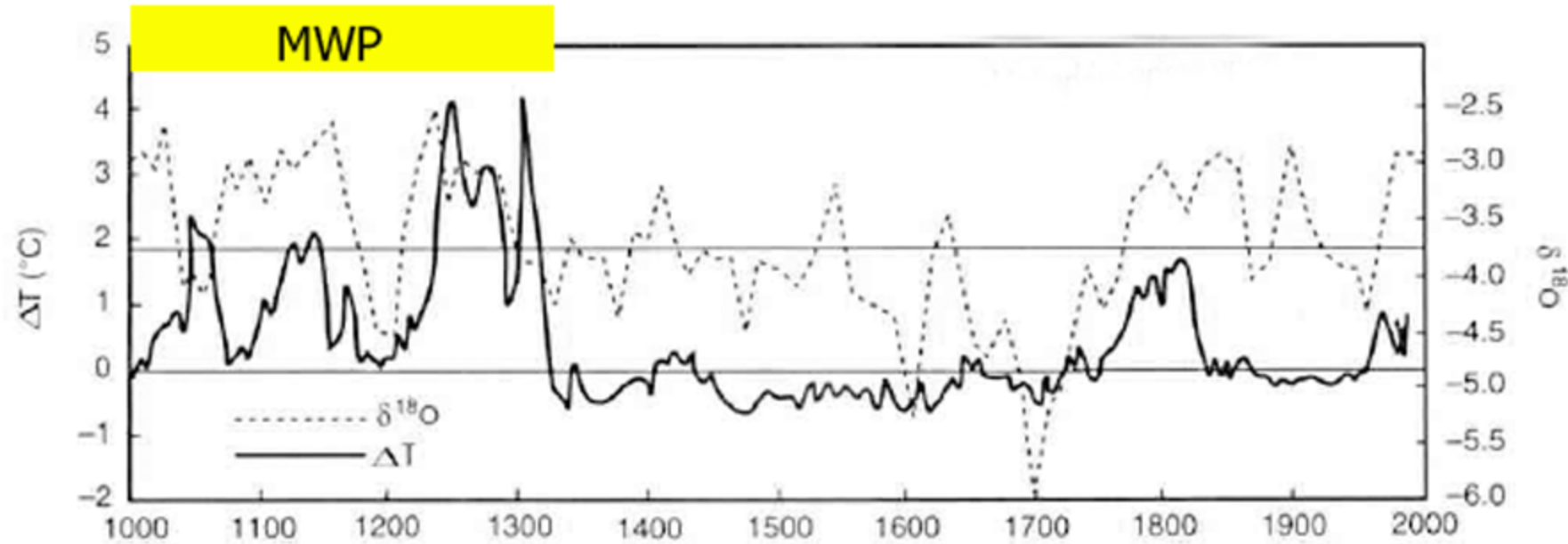
Reference

Wilson, A.T., Hendy, C.H. and Reynolds, C.P. 1979. Short-term climate change and New Zealand temperatures during the last millennium. *Nature* **279**: 315-317.

Description

Temperatures derived from an $^{18}\text{O}/^{16}\text{O}$ profile through a stalagmite found in a New Zealand cave (40.67°S, 172.43°E) revealed the Medieval Warm Period to have occurred between AD 1050 and 1400 and to have been 0.75°C warmer than the Current Warm Period.

The Medieval Warm Period occurred in South Africa.

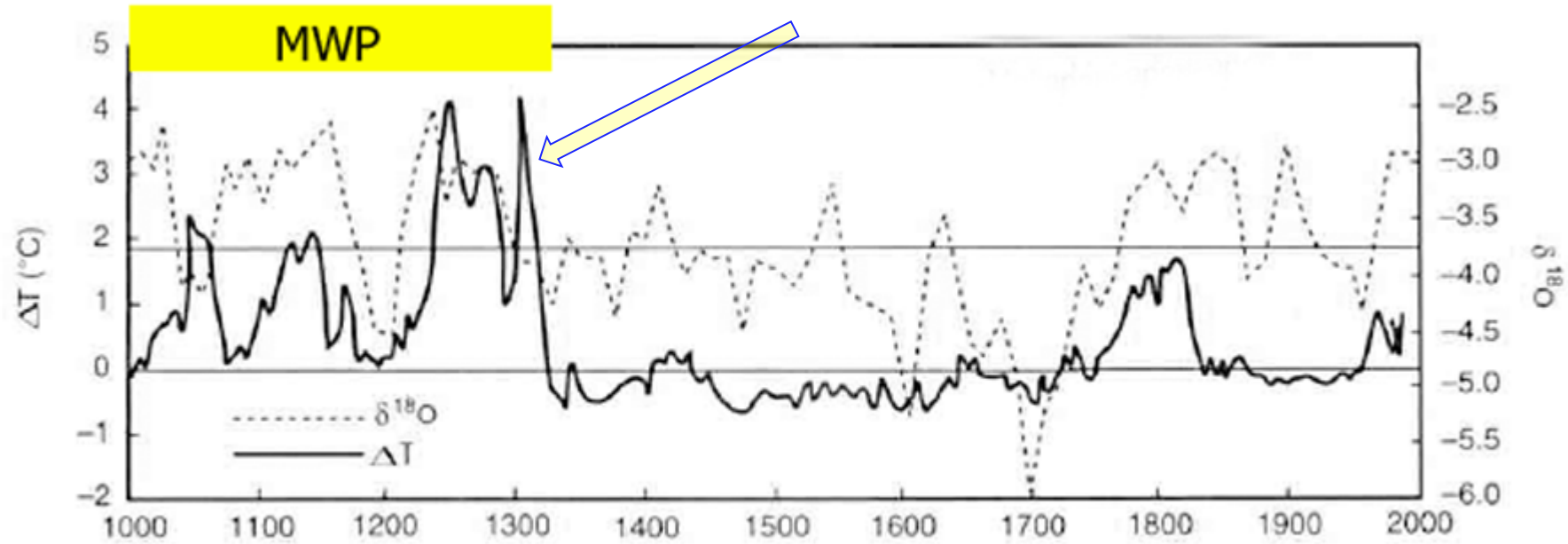


Makapansgat Valley proxy temperature reconstruction adapted from Tyson et al.
MWP is represented by the yellow highlighted bar at the top of the graph.

Description

Maximum annual air temperatures in the vicinity of Cold Air Cave (24°1'S, 29°11'E) in the Makapansgat Valley of South Africa were inferred from a relationship between color variations in banded growth-layer laminations of a well-dated stalagmite and the air temperature of a surrounding 49-station climatological network...

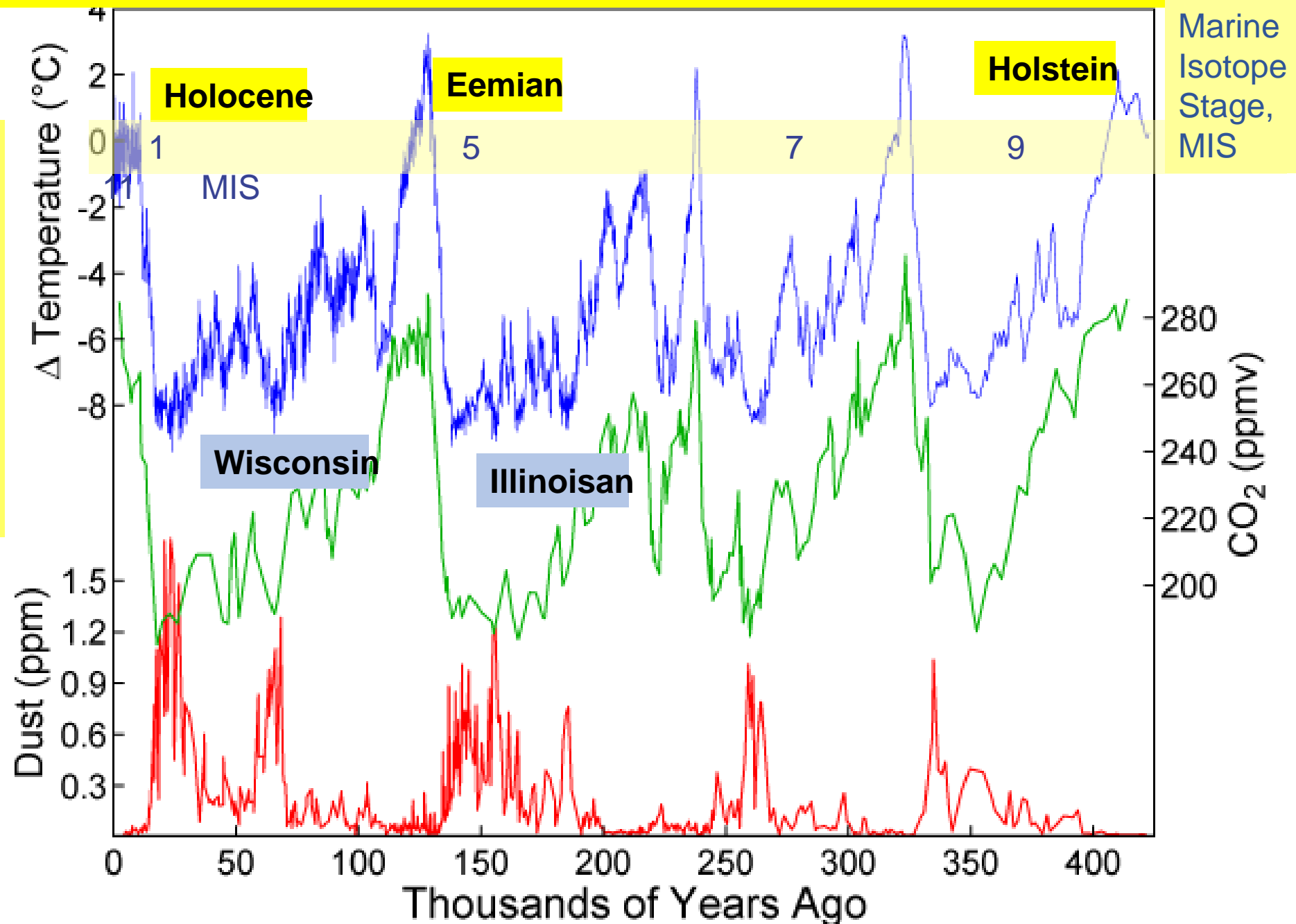
The Medieval Warm Period (AD 1000-1325) was as much as 3-4°C warmer than the Current Warm Period (AD 1961-1990 mean).



Makapansgat Valley proxy temperature reconstruction adapted from Tyson et al.
MWP is represented by the yellow highlighted bar at the top of the graph.

The rapid collapse in temperatures noted in the South Africa proxy is the same time that the Tyrrhenian Sea Level fell precipitously and ships of Pisa could no longer reach their Home Port on the Arno River.

Hubert Lamb is clear that he thought the MWP ended abruptly in around 1300 AD:
“The change which broke the medieval warm regime must have been devastatingly sudden.” (P177. [Climate, History and the Modern World](#)).



Note especially
the Blue data
(temperature, C)

and

Green data
<CO₂> PPM.

Next Slide.

During depths of the Wisconsin, Junipers from La Brea Tar Pits were CO₂-starved @180-220 PPM.

"Carbon starvation in glacial trees recovered from the La Brea tar pits, southern California"

<https://www.fs.usda.gov/treearch/pubs/22081>

Humans, animals, depend on plants for carbohydrates to sustain themselves. If plants die, we and animals die.

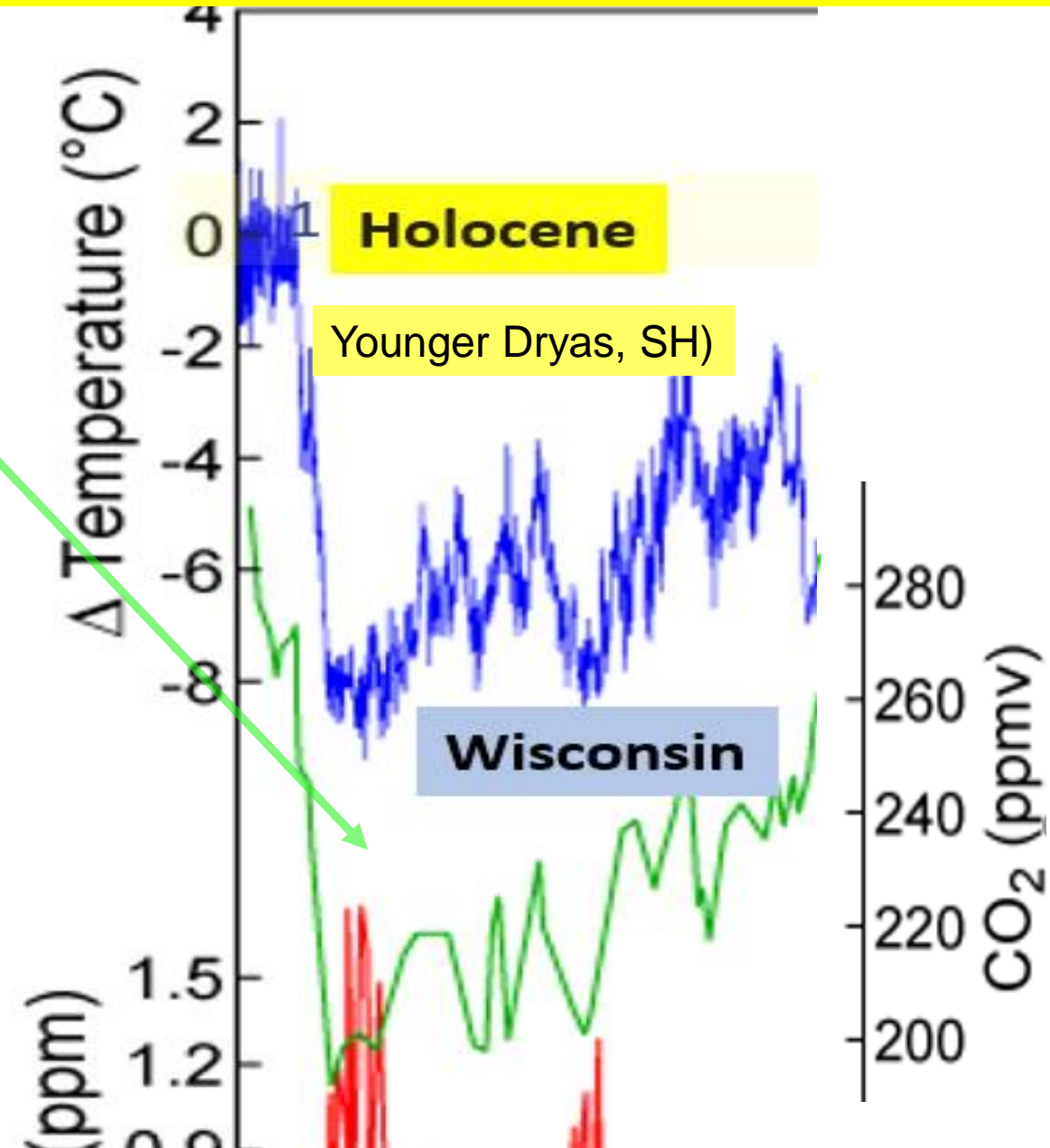
Natural variations of +/- 2C occurred in the Holocene.

In Antarctica, temperature change +/-1.5 C commonly occurs; was 2C warmer than today earlier in the Holocene.

Today, we're not today nearly as warm as we were in earlier Holocene.

Peak <CO₂> in the Holocene was ~280 PPM.

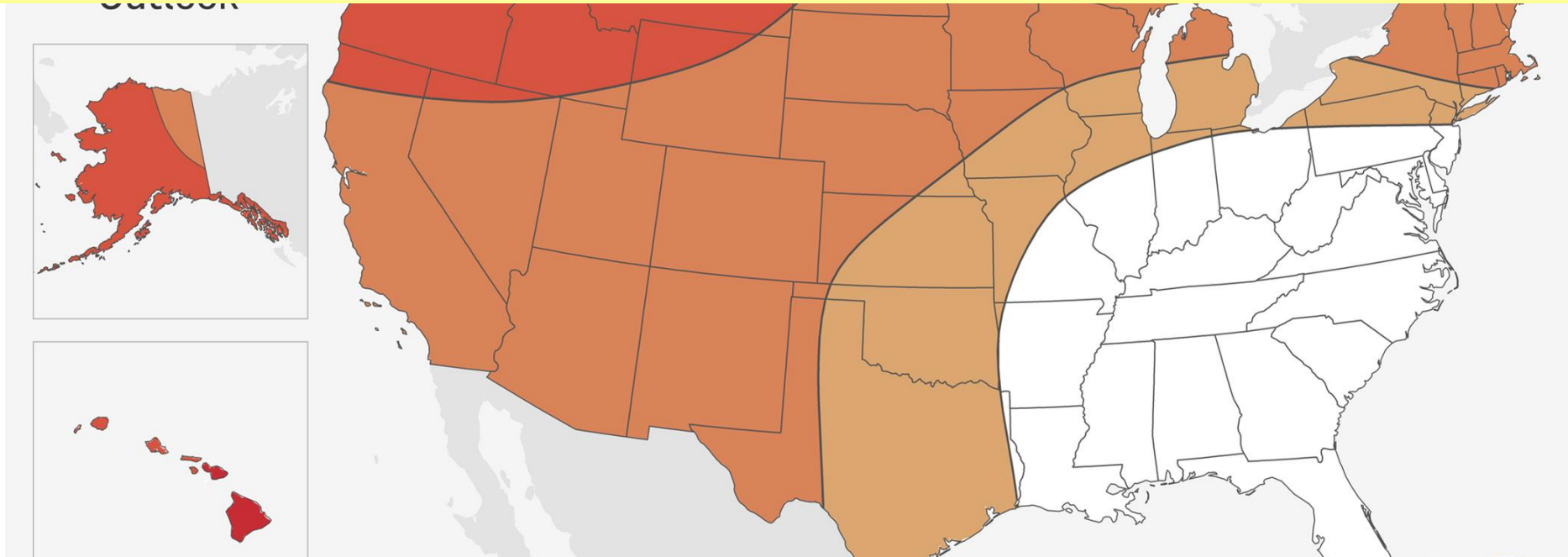
At 412 PPM CO₂ today, temps are far from the warmest of the Holocene.



We're way colder today than the four earlier Interglacial peaks in MIS 5, 7, 9 and 11. **CO₂ Theory fails.**

A recent climate forecast has failed

Winter 2018-2019 Climate Forecast and Validation



Bob Endlich

bendlich@msn.com

Weather, Climate and Climate Change—What the Data Tell Us

21 May 2019 updated 15 Nov 2019



National Oceanic and Atmospheric
Administration
U.S. Department of Commerce

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Winter Outlook favors warmer temperatures for much of U.S.

Wet southern states to contrast drought in West

[Weather](#) | [forecasts winter](#)

SHARE



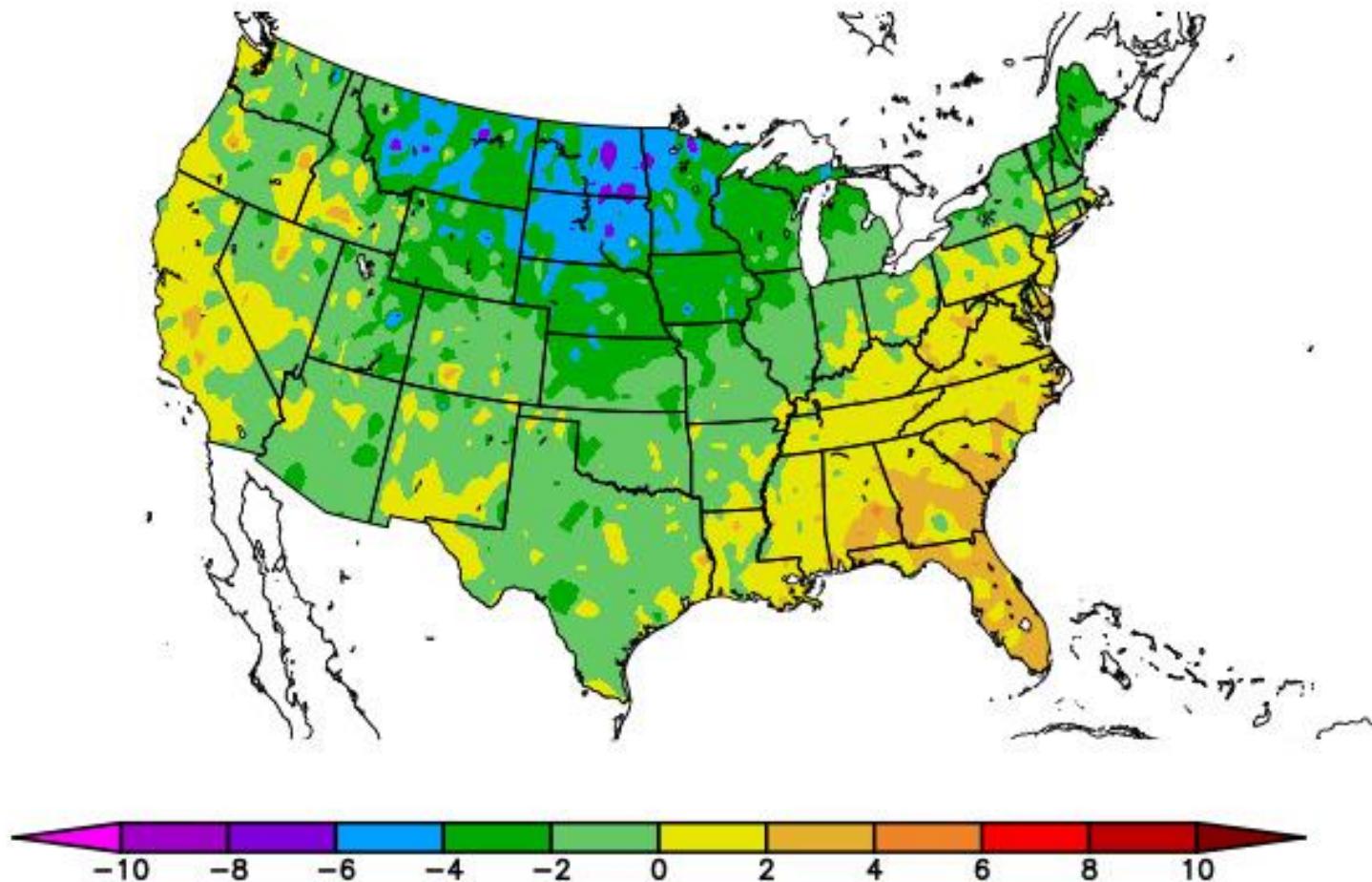
October 18, 2018 —

October 18, 2018 —

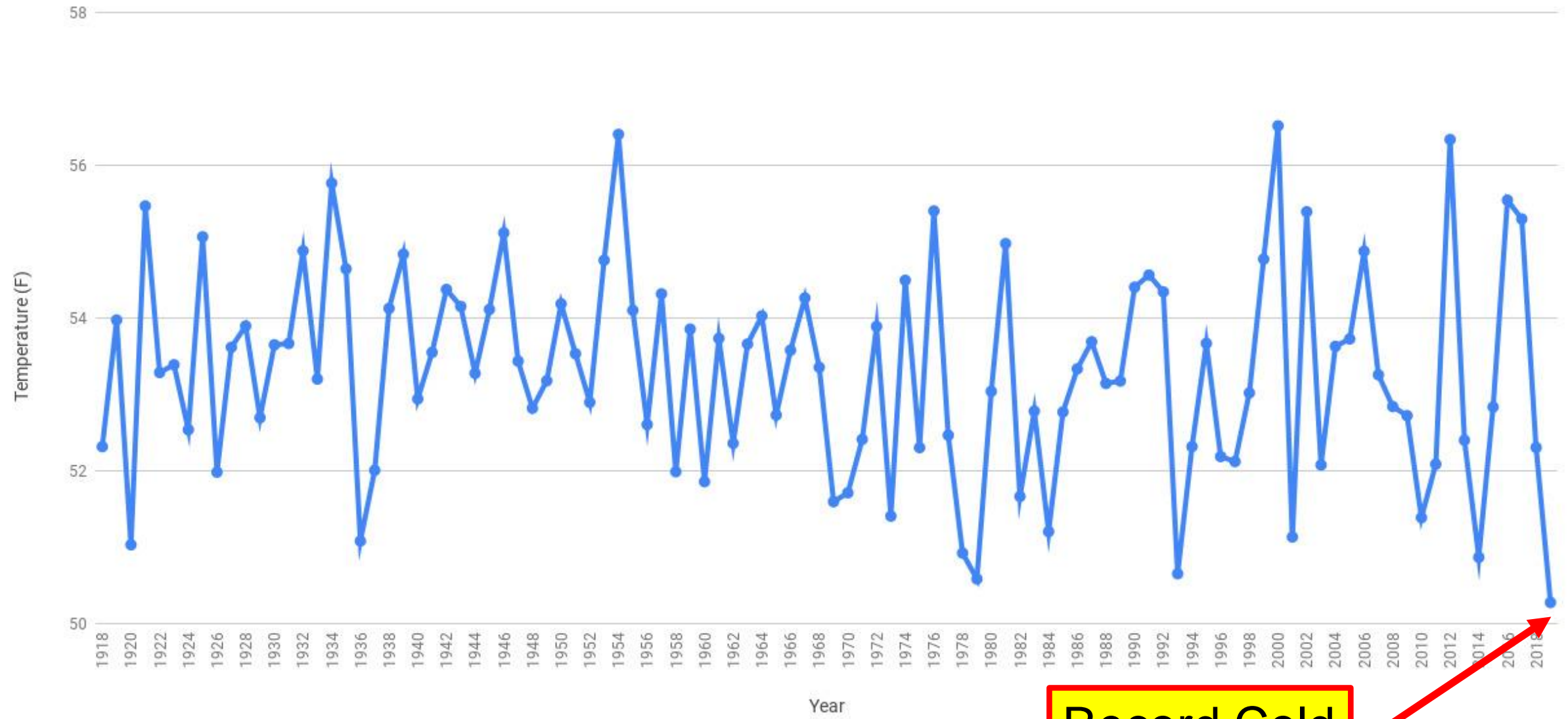
A mild winter could be in store for much of the United States this winter according to NOAA's Climate Prediction Center. In the U.S. Winter Outlook for December through February, above-average temperatures are most likely across the northern and western U.S., Alaska and Hawaii.

Temperature Validation on 19 May 2019

Departure from Normal Temperature (F)
10/1/2018 – 5/18/2019

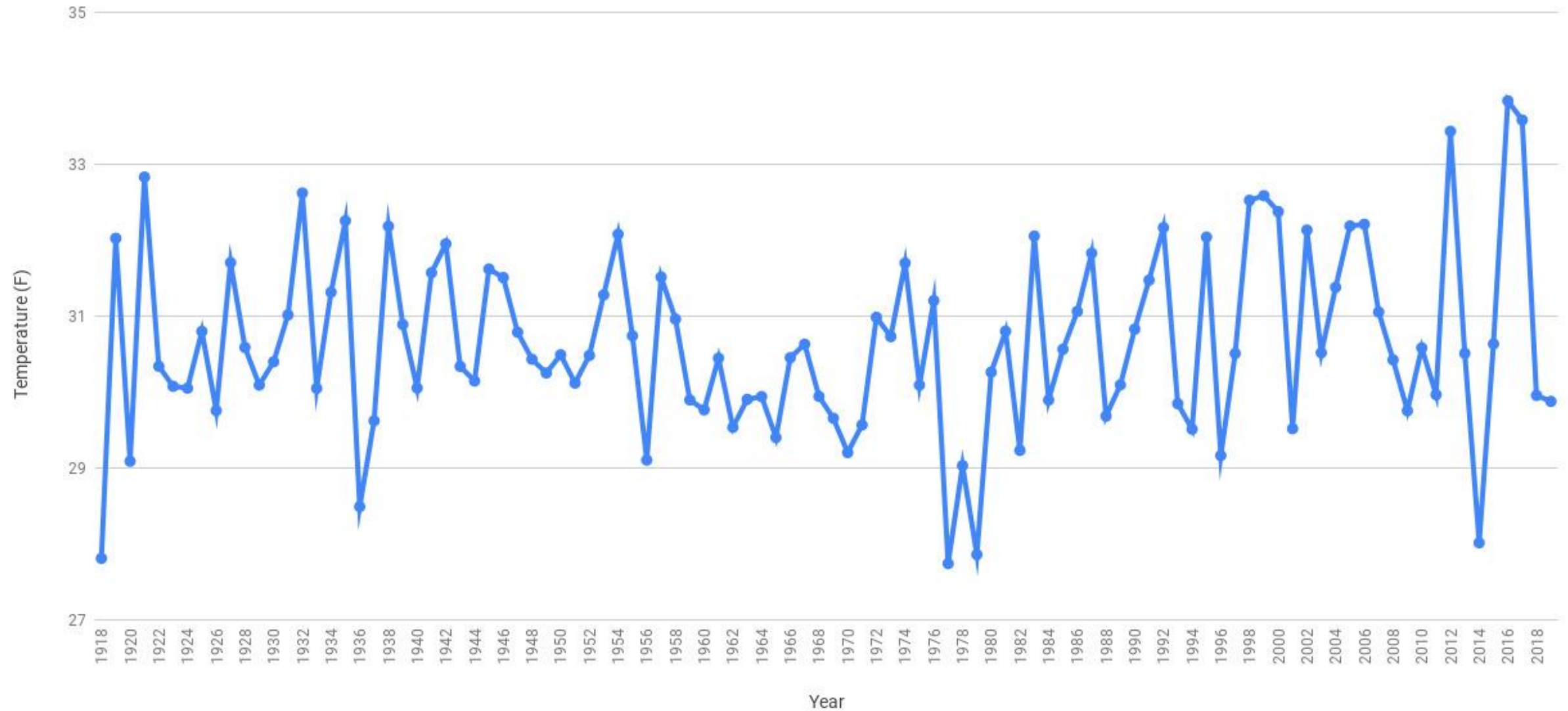


October Through April Average Daily Maximum Temperature At All 1,218 United States Historical Climatology Network Stations



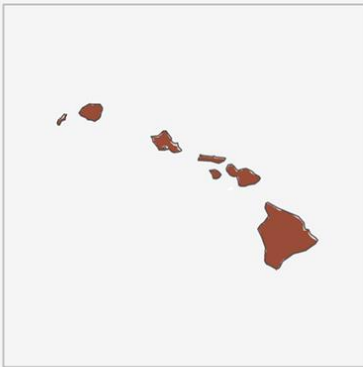
Record Cold

October Through April Average Daily Minimum Temperature At All 1,218 United States Historical Climatology Network Stations

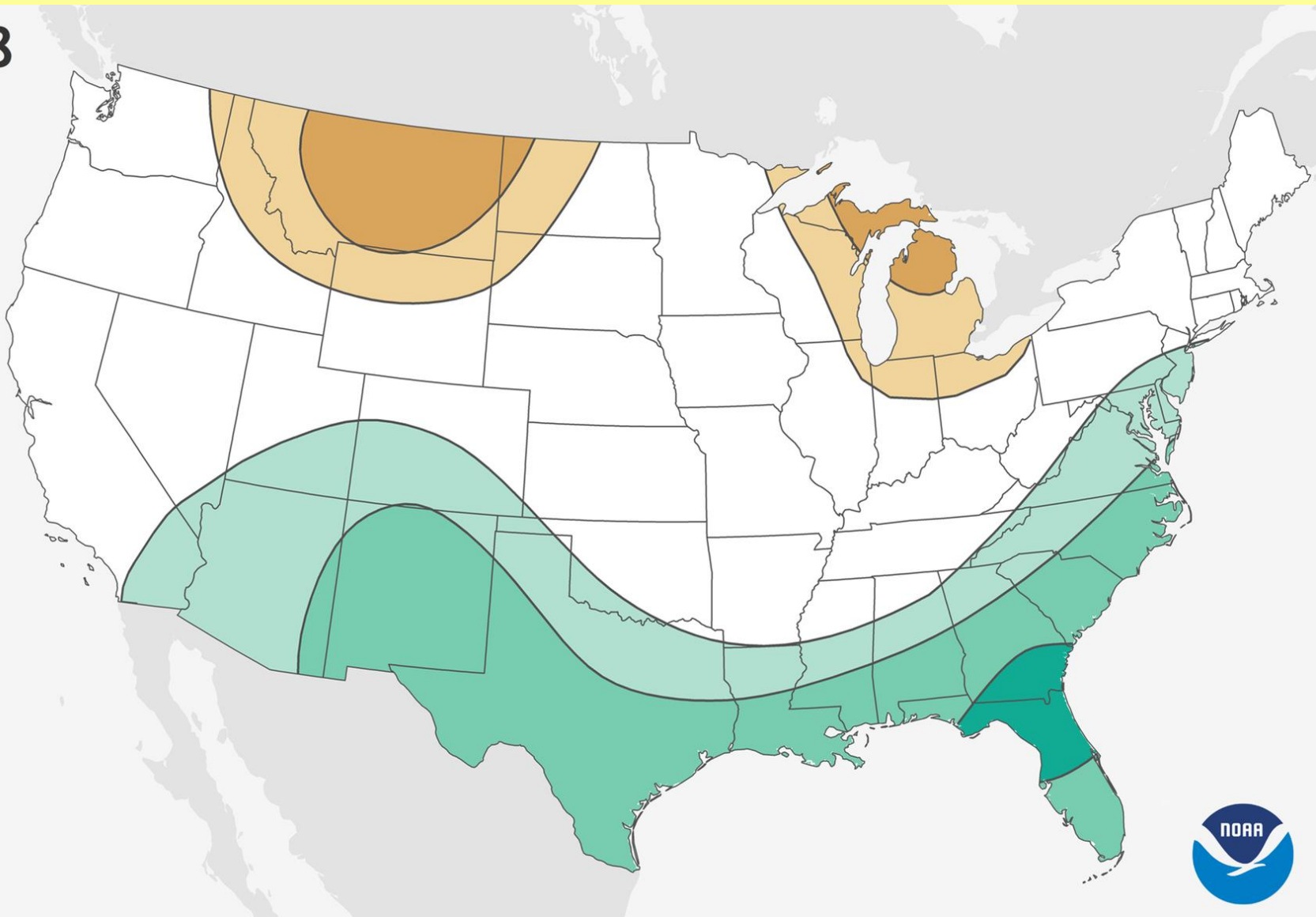


Winter 2018

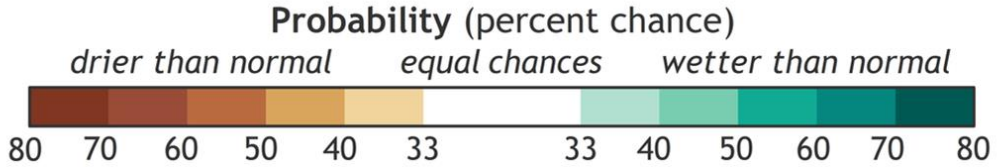
U.S. Precipitation Outlook



AK and HI not to scale

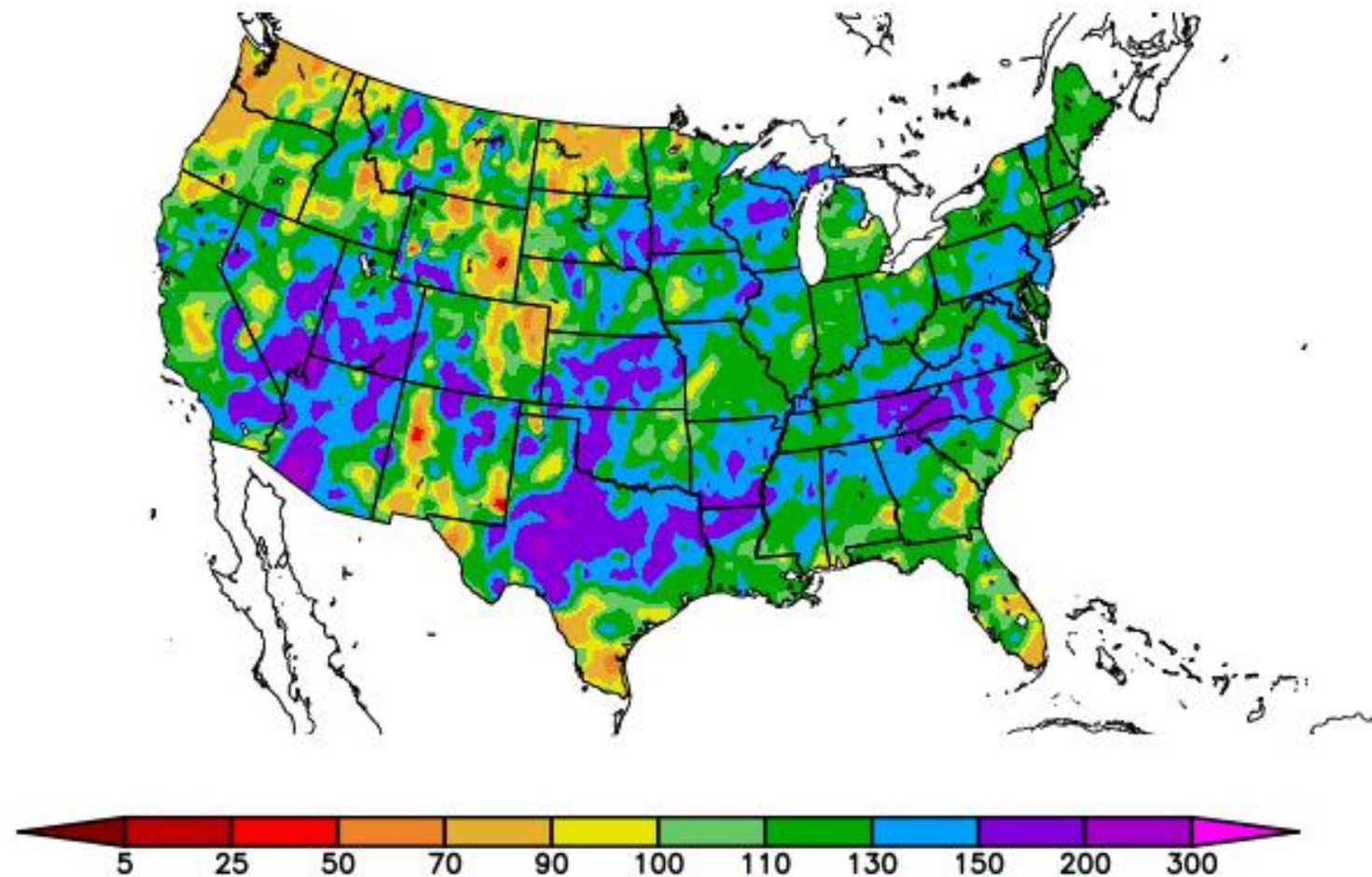


Precipitation Outlook
for Dec 2018 – Feb 2019
Issued 18 October 2018

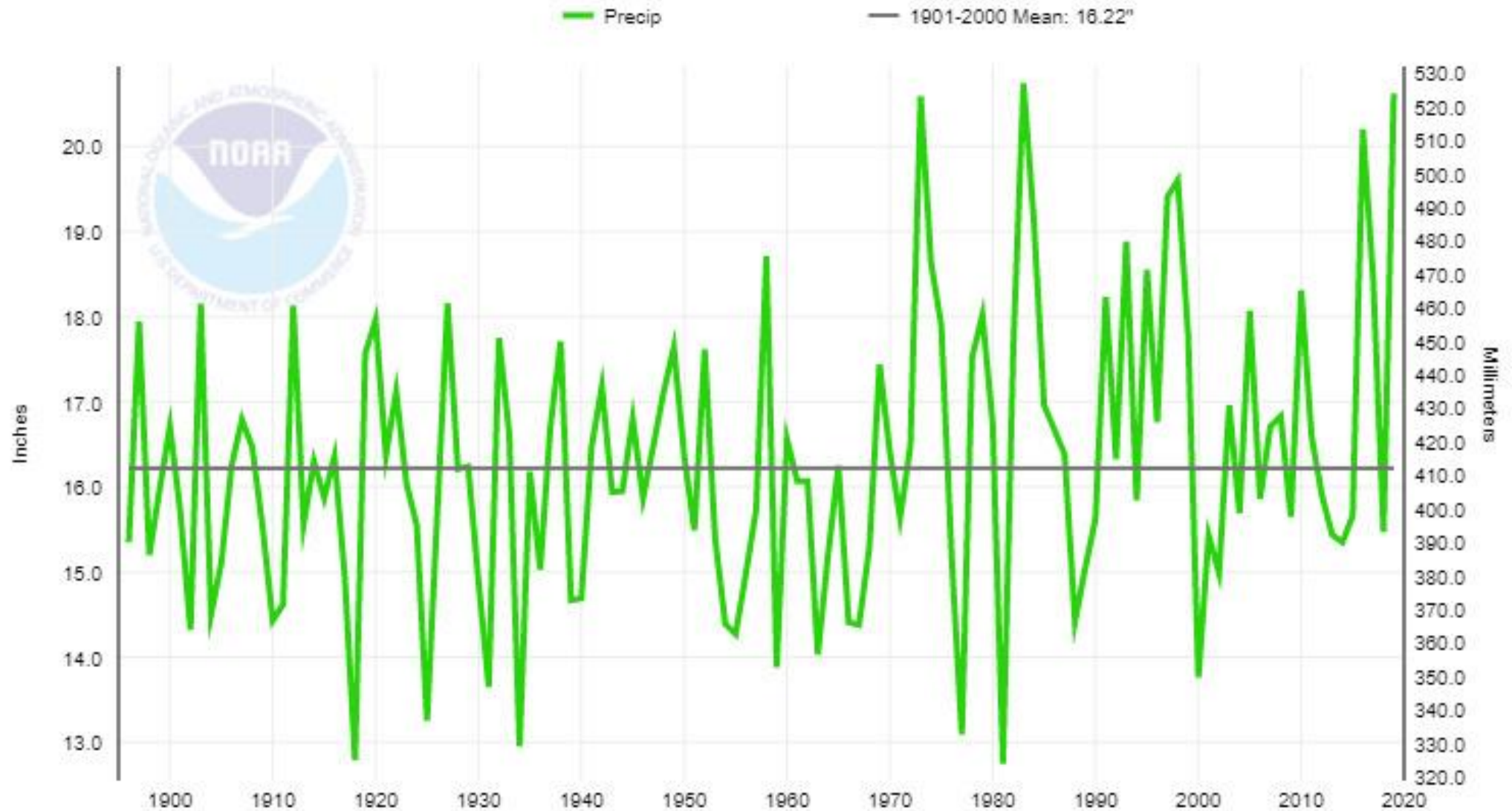


NWS Climate Prediction Center
Map by NOAA Climate.gov

Percent of Normal Precipitation (%) 10/1/2018 – 5/18/2019

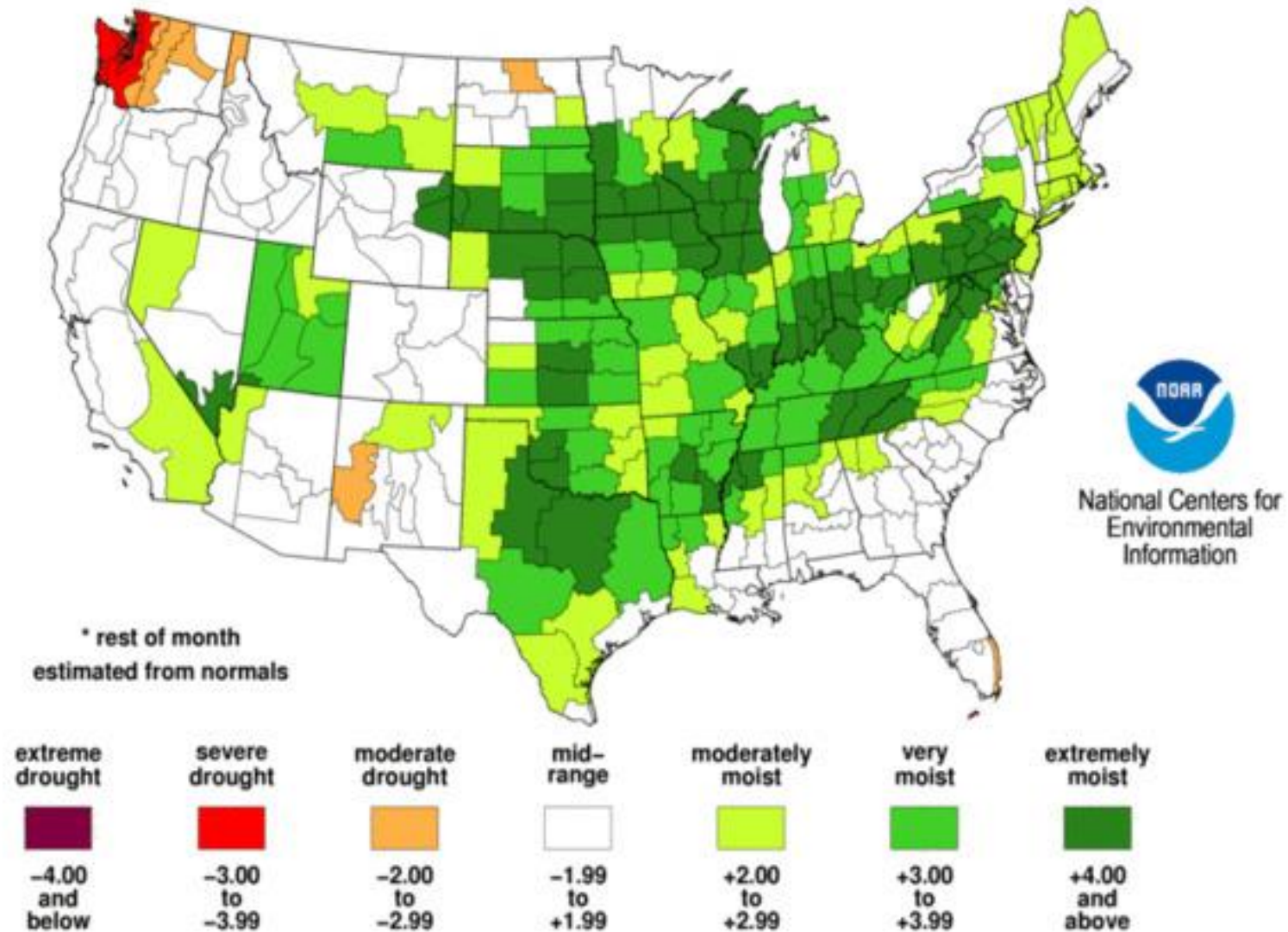


Contiguous U.S., Precipitation, October-April



Palmer Drought Index Long-Term (Meteorological) Conditions

May 2019: through May 11 2019*



What explains such poor results?

This might show that climate forecasting is impossible at this time....

...that we have reached the limits of predictability....

More in the following, added 1 Nov 2019

<https://wattsupwiththat.com/2019/10/31/extended-forecasts-are-not-reliable/>

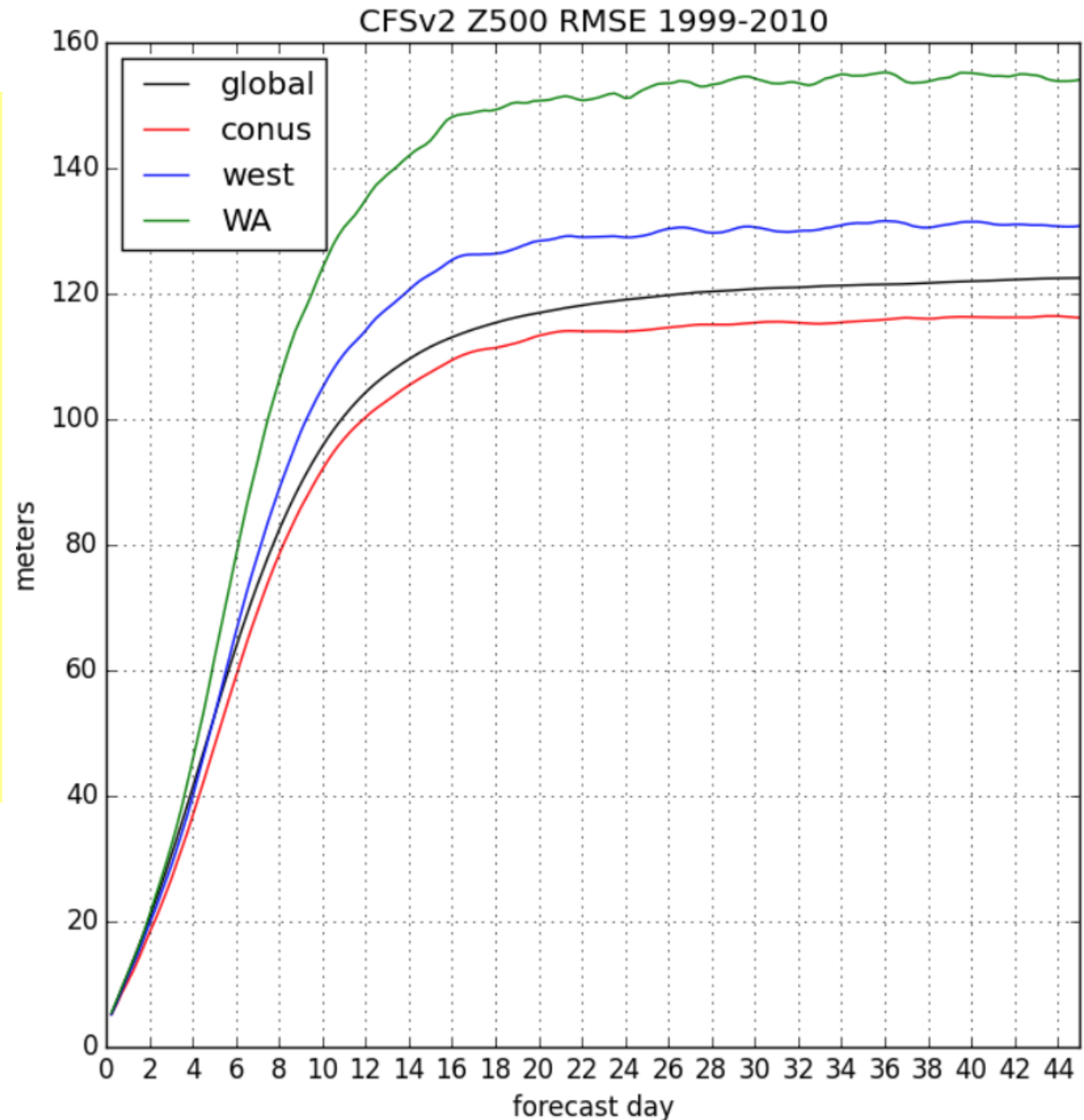
...why is our skill improving rapidly for the shorter periods, but not the longer ones?

Because the forecasting problem is very different at the different temporal scales.

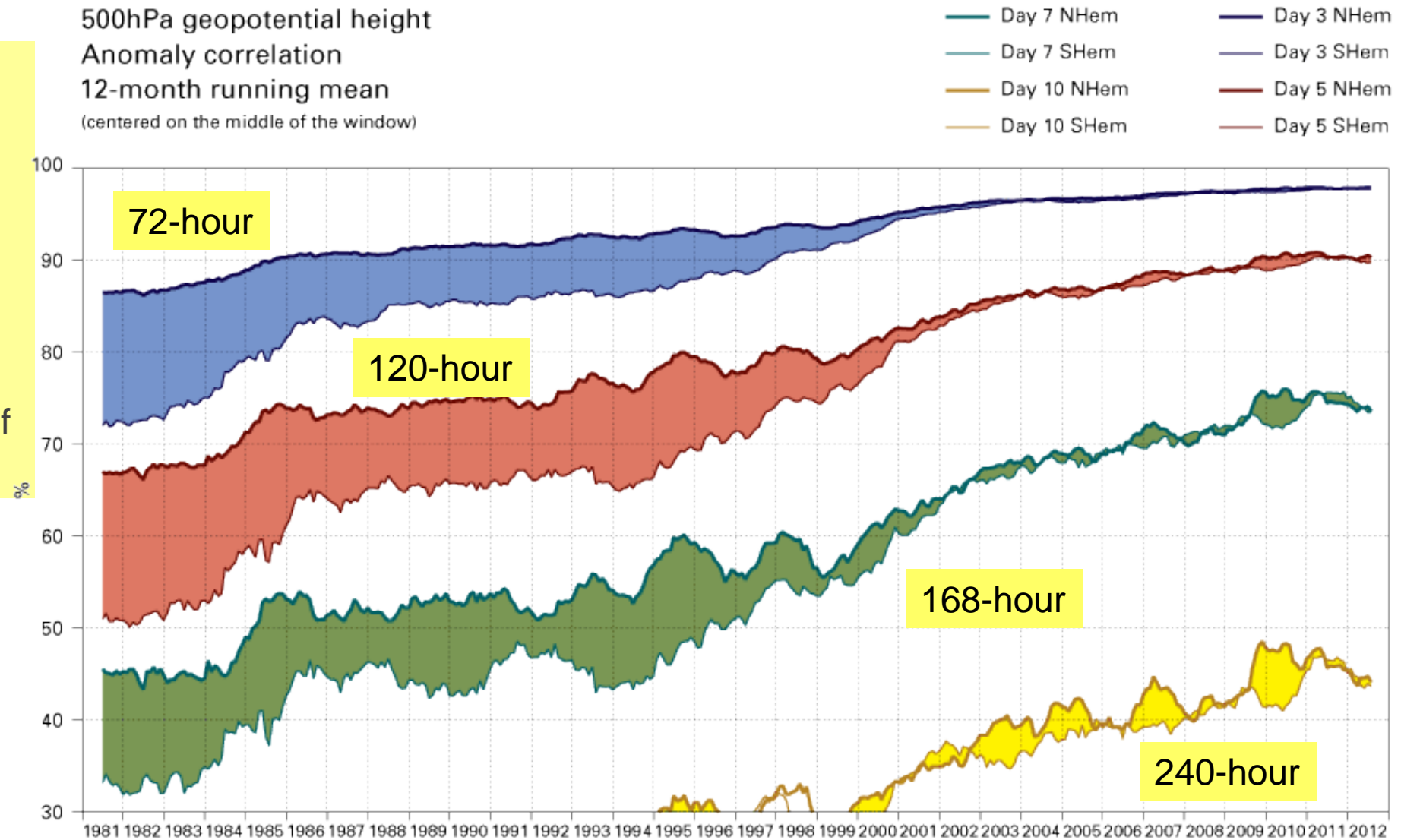
For the short periods, forecasting is an initial value problem.

We start with a good description of the 3D atmosphere and our models simulate how things evolve. Because of weather satellites and other new data sources, our initial description of the atmosphere has gotten MUCH better. And our models are much better:

But small errors in the initial description of the atmosphere and deficiencies in our models inevitably lead to growing errors, and by 2 weeks such errors swamp the forecast. The forecasts are not much better than simply using the average conditions (or climatology).



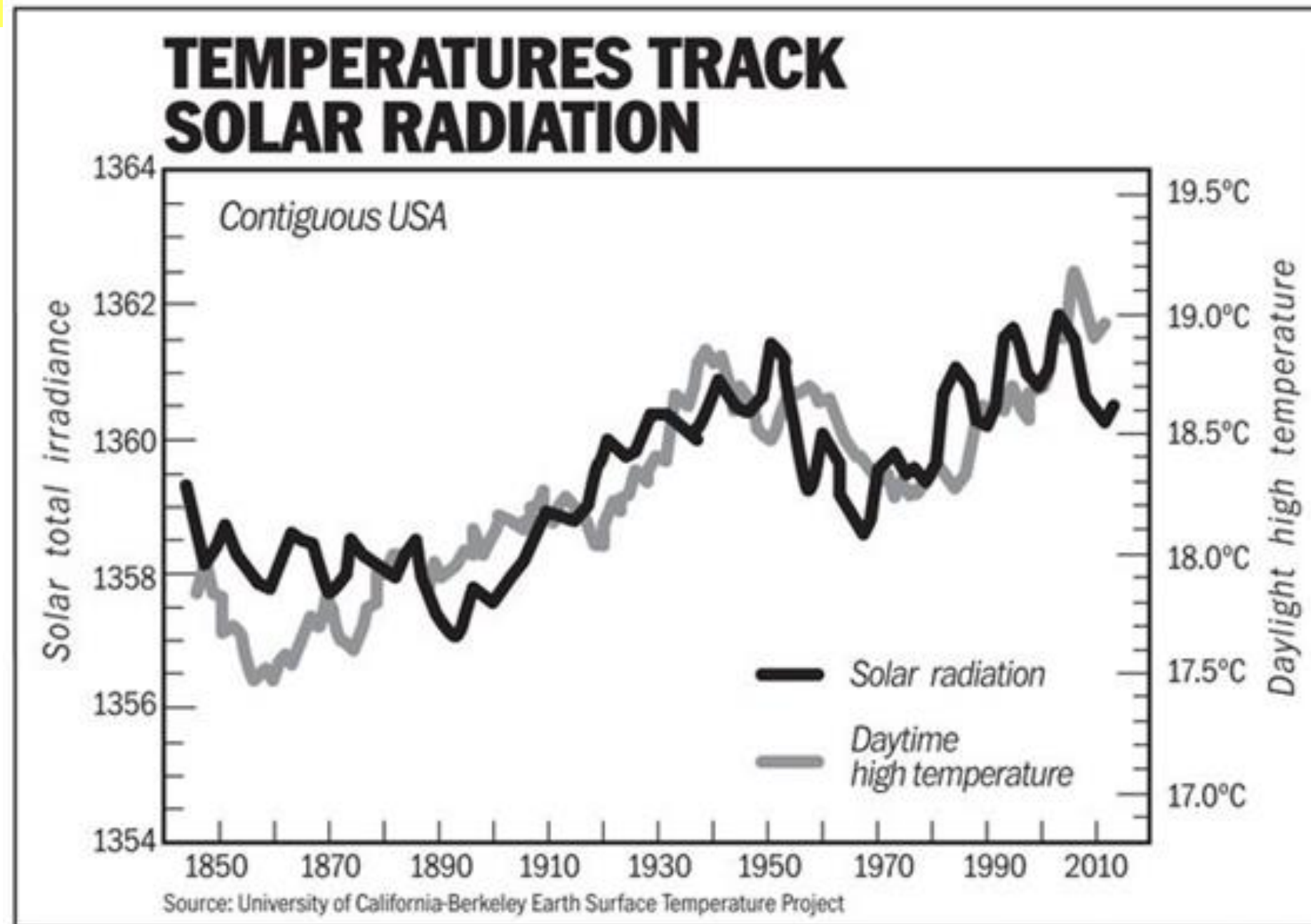
For the short periods, forecasting is an initial value problem. We start with a good description of the 3D atmosphere and our models simulate how things evolve. Because of weather satellites and other new data sources, our initial description of the atmospheric has gotten MUCH better.



And our models are much better: higher resolution, much better description of key physical processes, and more. That is why a plot of the skill of skill of the 1-10 day forecasts of the European Center has improved greatly over the past decades

Why 536 AD was the Worst Year to be alive in the Northern Hemisphere





<https://www.dailymail.co.uk/sciencetech/article-6397621/Why-536-AD-worst-year-alive.html>

Why 536 AD was the worst year to be alive:

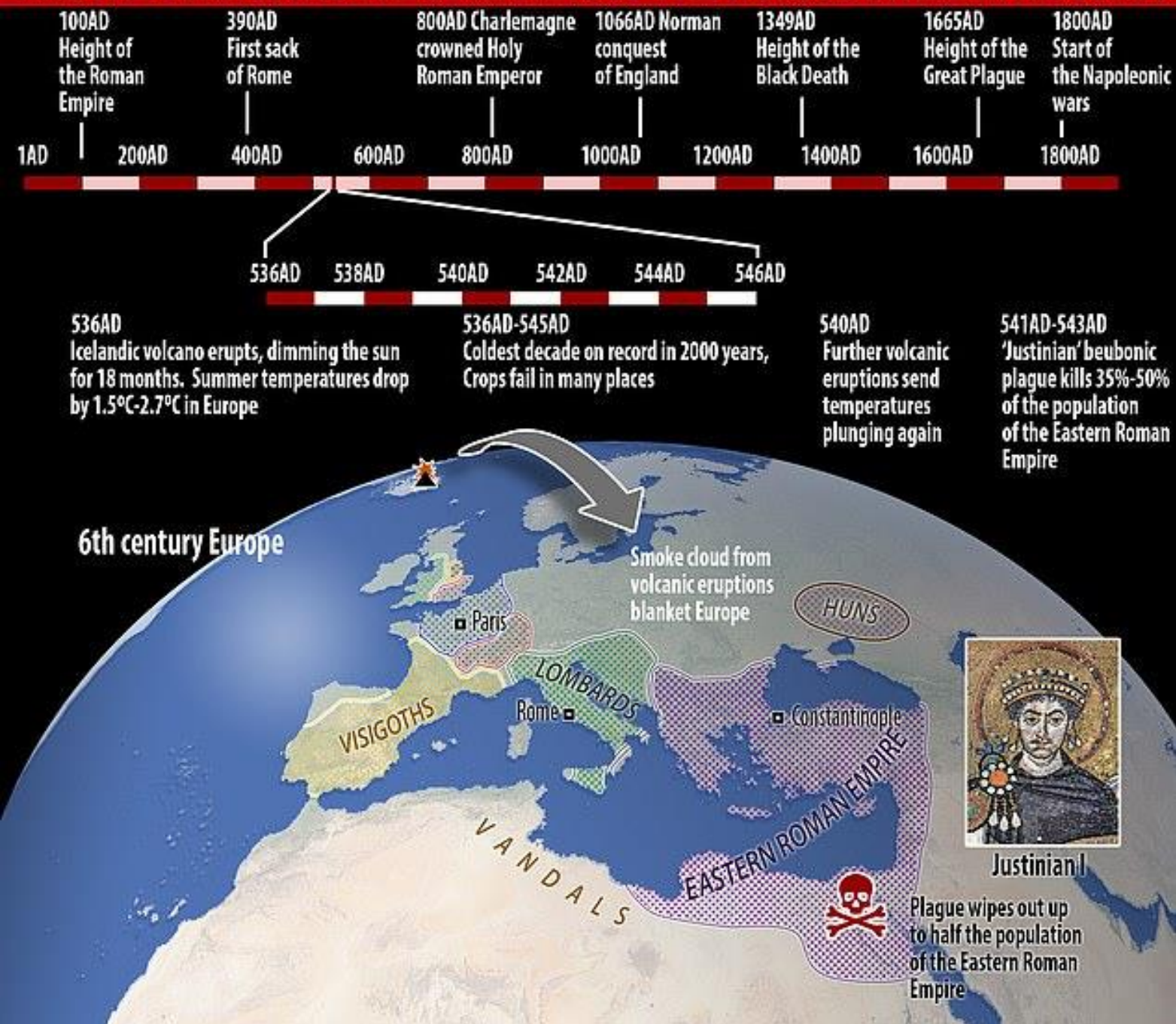
Scientists say a mysterious fog that blocked out the sun causing crop failures and widespread famine was the worst global disaster in history

According to research from a Harvard professor, the year 536AD is a prime candidate for the unfortunate accolade as the worst year in the entirety of human history.

The bleak year kick-started the coldest decade for more than two millennia



WAS THE YEAR 536AD THE BEGINNING OF THE WORST DECADE IN HISTORY?



Incessant volcanic activity is believed to have produced millions of tons of ash which spread over vast swaths of the world. It caused snowfall in China, continental-scale crop failure and extreme drought and famine throughout most of the northern hemisphere



Bob comment

Depth of the post-

Roman Warm Period

the “Dark Ages”

WHAT HAPPENED IN THE YEAR 536AD?

A cataclysmic volcanic eruption in Iceland created a huge cloud that resided over most of the northern hemisphere for 18 months.

The eerie fog caused an unrelenting dusk persevering throughout day and night.

Effects on the climate were so severe that the Irish chronicles tell of 'a failure of bread from the years 536–539'.

Temperatures in the summer of 536 fell 1.5°C to 2.5°C, initiating the coldest decade in the past 2,300 years.

This introduced a period of economic ruin which would steadfastly remain in place until a century later.



The placid Lake Ilopango is the caldera of the Ilopango volcanic complex, which in 539 or 540 A.D. produced one of the largest volcanic eruptions in the last 7,000 years. The lake was also present then; as lava boiled the water into steam, the eruption became even more explosive.

The ices of Greenland and Antarctica bear the fingerprints of a monster: a gigantic volcanic eruption in 539 or 540 A.D. that killed tens of thousands and helped trigger one of the worst periods of global cooling in the last 2,000 years. Now, after years of searching, a team of scientists has finally tracked down the source of the eruption.

Historical accounts that date to 536 describe a dark fog that dimmed the sun and ushered in a wave of crop deaths. Until recently, scholars were open to the idea that these clouds were the remains of an asteroid or comet. But modern data confirms that the event was volcanic—and that it was two volcanoes up to four years apart, not just one.

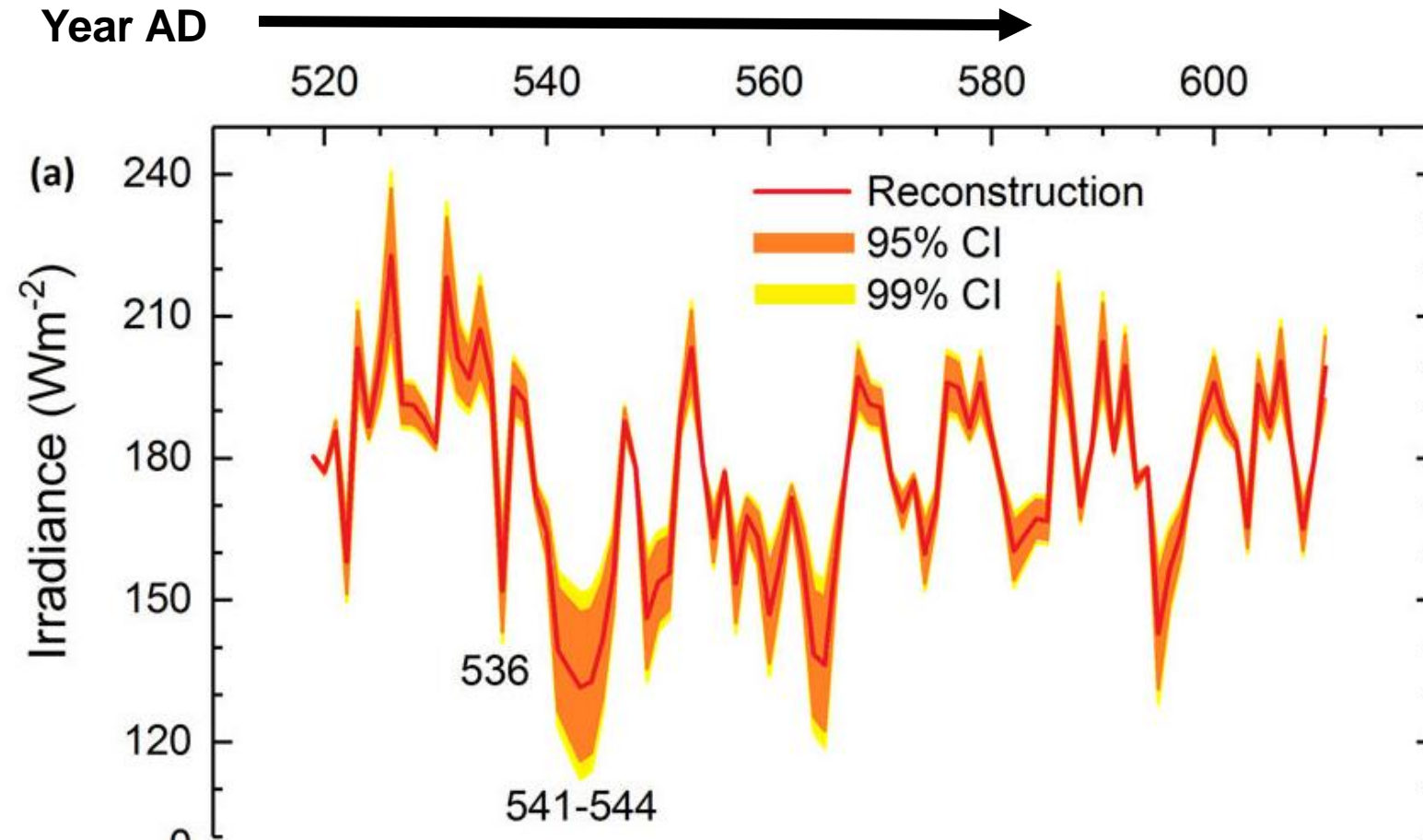


To pinpoint the eruption, researchers relied on radiocarbon dating, which takes advantage of the fact that living plants (and whatever eats them) absorb traces of radioactive carbon-14. Dead plants and animals no longer absorb carbon-14, and the trapped carbon starts to decay like clockwork. By counting up the products of this decay, scientists can see when the plant or animal died, a proxy for the age of objects found nearby.



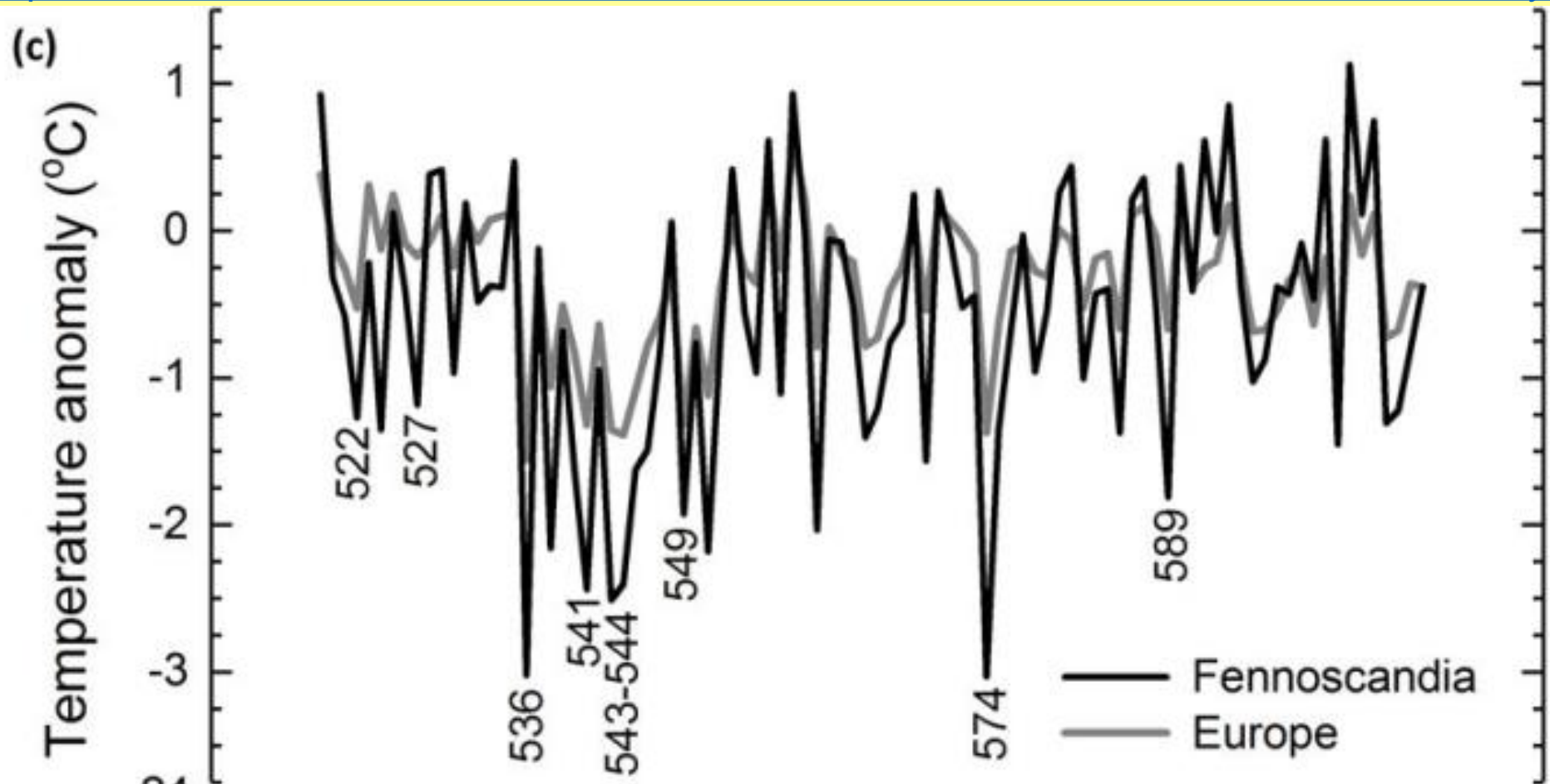
Location of
Lake Ilopango, El Salvador

Solar Irradiance



Palaeoclimate reconstructions. Tree-ring $\delta^{13}\text{C}$ based reconstruction of irradiance (global radiation) (red line) with Monte Carlo68 based estimates of 95% (orange area) and 99% confidence (yellow area) intervals showing the reduction in irradiance in AD 536 and 541–546

Negative first difference of the reconstructed irradiance recording change in irradiance from previous to concurrent yr. European & northern Fennoscandian summer (June–August) temperature reconstructions relative to the AD 1961–1990 baseline



Palaeoclimate reconstructions. Tree-ring $\delta^{13}\text{C}$ based reconstruction of irradiance (global radiation) (red line) with Monte Carlo68 based estimates of 95% (orange area) and 99% confidence (yellow area) intervals showing the reduction in irradiance in AD 536 and 541–546

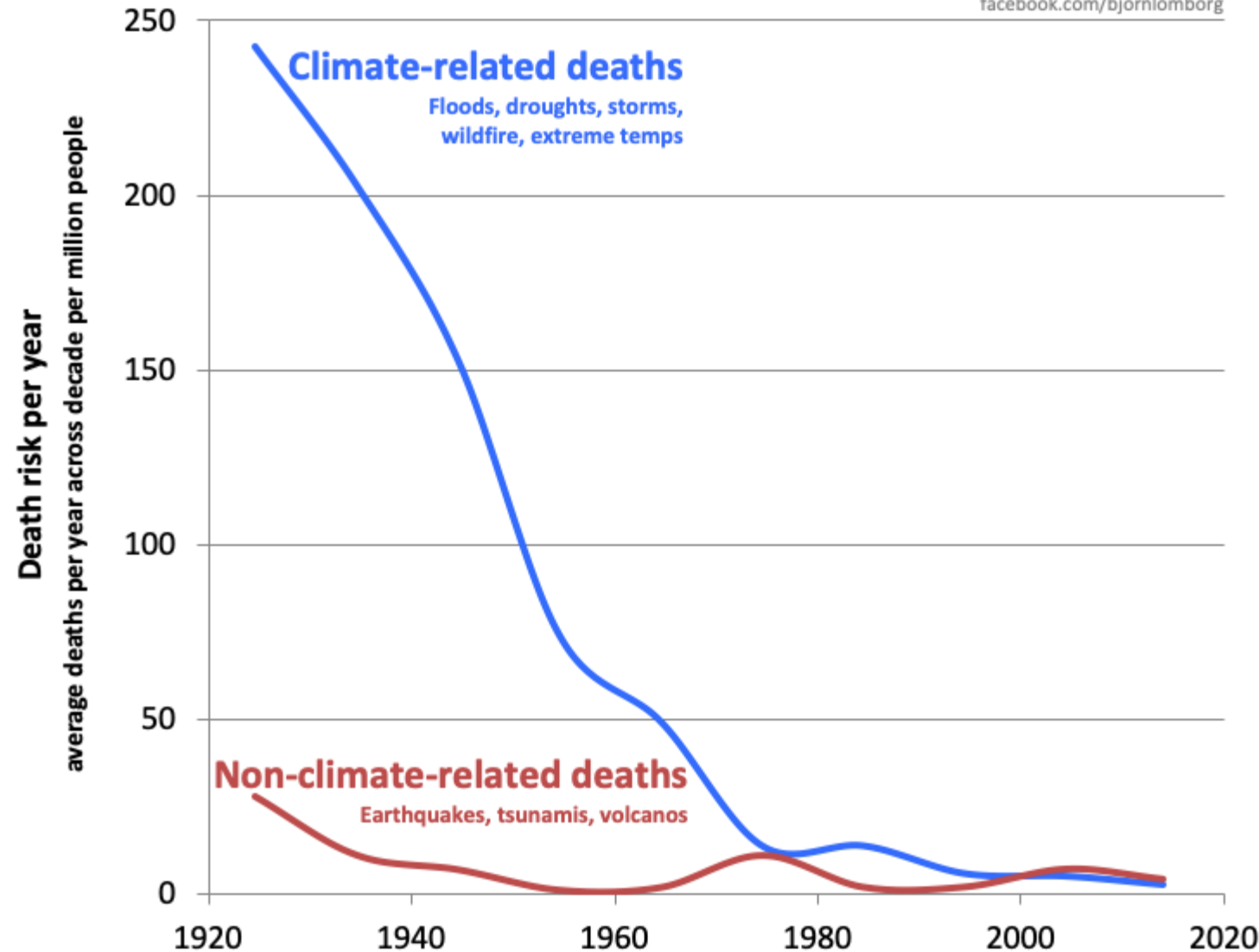
Negative first difference of the reconstructed irradiance recording change in irradiance from previous to concurrent yr. European & northern Fennoscandian summer (June–August) temperature reconstructions relative to the AD 1961–1990 baseline

<https://wattsupwiththat.com/2019/01/27/inverse-hockey-stick-climate-related-death-risk-for-an-individuals-down-99-since-1920/>

“There is some uncertainty about complete reporting from early decades, which is why this graph starts in 1920, and if anything this uncertainty means the graph *underestimates* the reduction in deaths.”

Global Death Risk from Climate and non-Climate Catastrophes, 1920-2018

facebook.com/bjornlomborg



Affordable Energy vs. Prosperity: Does anyone notice a connection?

