

Weather, Climate, and Climate Change...

What the Data Say

California Wine Country Fires; Climate History



Bob Endlich

bendlich@msn.com

21 October 2017

Cruces Atmospheric Sciences Forum

<http://casf.diskstation.wordpress>

Twenty-Five Years Ago...

Meteorological Team Chief, High Energy Laser Systems Test Facility, WSMR 10 yrs



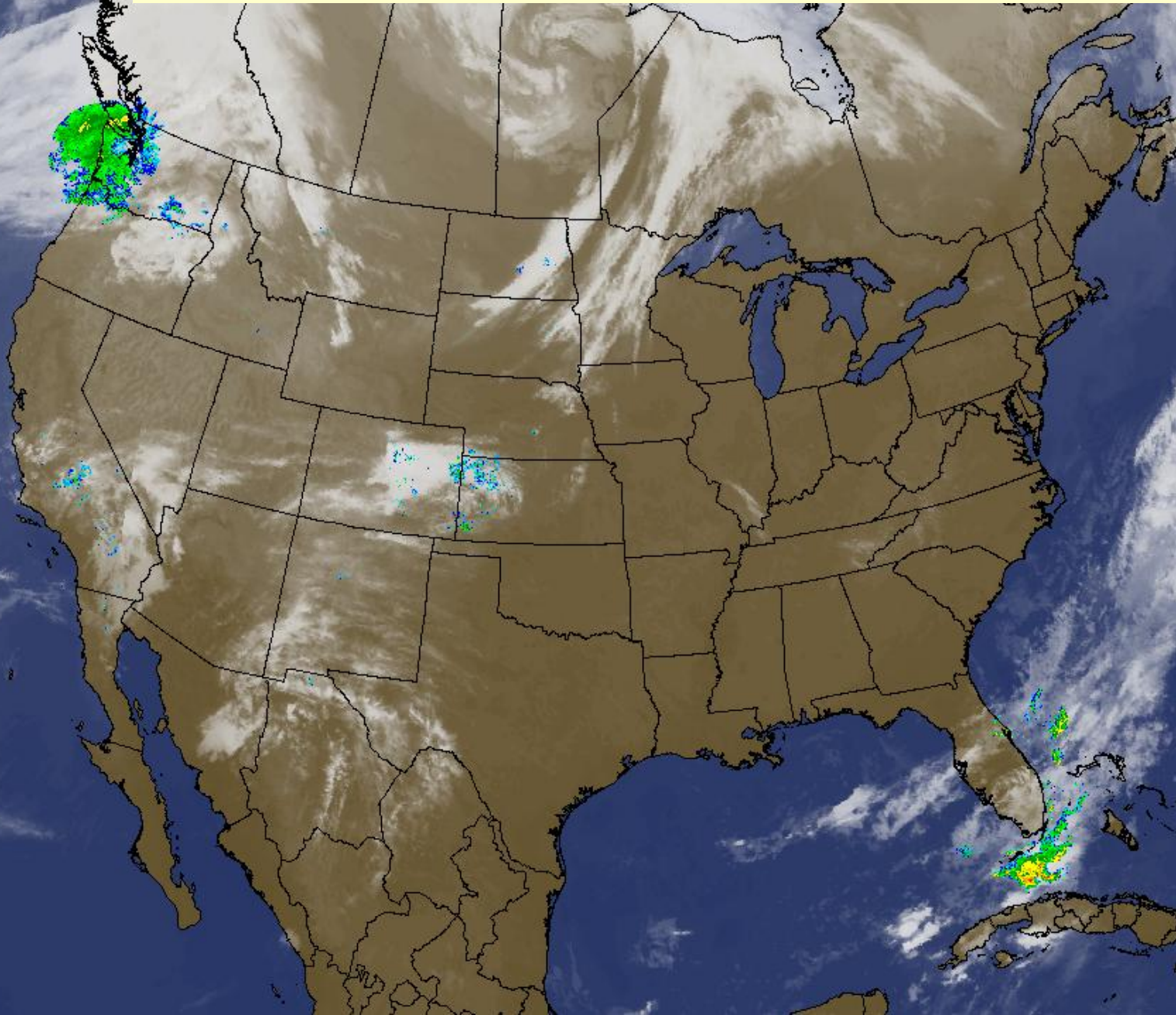
**MIRACL Device, Sea Light
Beam Director, Meteorological
Team and Equipment**



Present Weather Briefing

First Wednesday, 18 October 2017

Next, Saturday, 21 October, 2017



“Zonal” flow.
Short Wave
LK Winnipeg

Major Storm
WA...OR

Cold Air Cu
Gulf Alaska

Mountain
wave
“Standing
Wave” clouds

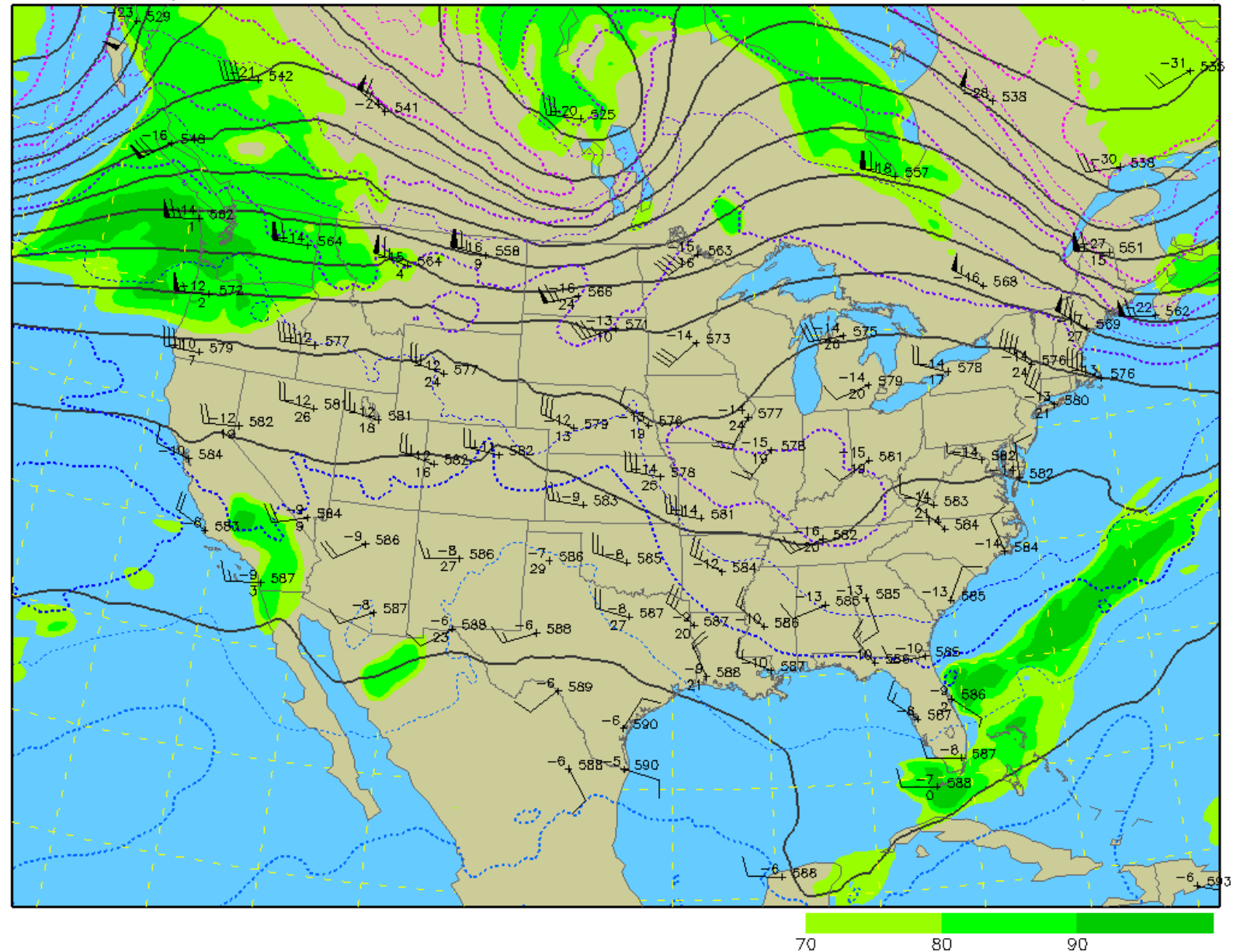
MT, OR, CO

Minor Trofs
CA, AZ-NM

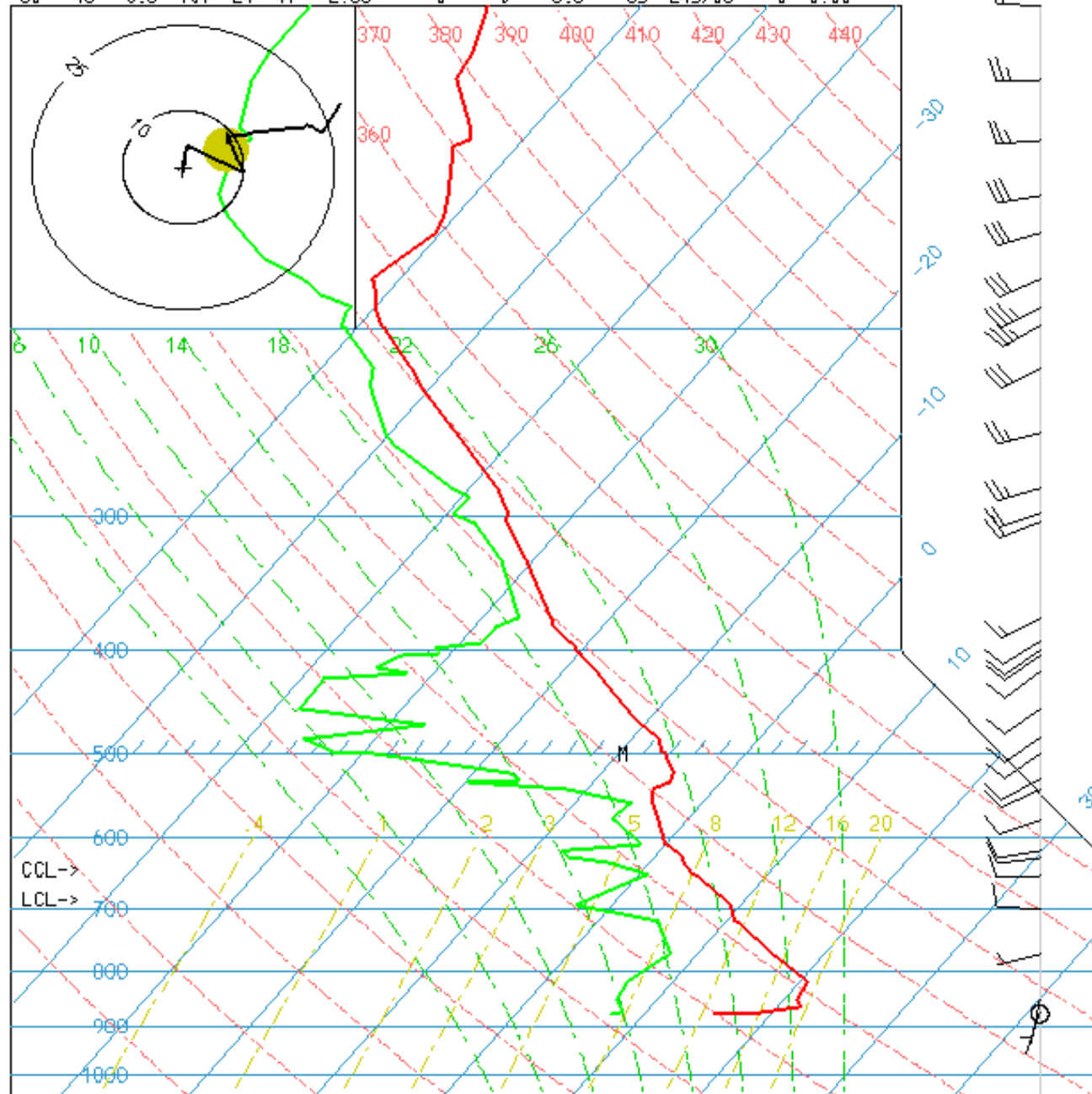
500 mb Heights (dm) / Temperature ($^{\circ}\text{C}$) / Humidity (%)

0-hour analysis valid 1200 UTC Wed 18 Oct 2017

RAP (12z 18 Oct)



T(F) Td LI SWT K TT Pw(cm) CAPE CIN Bmin Tc CELL SREH VGP
60 46 3.3 101 24 41 2.38 0 0 -3.8 85 245/08 0 0.00



SKEW-T/LOG-P VALID 1200 UTC 10/18/2017 KEPZ

Lat = 31.87 , Lon = -106.70

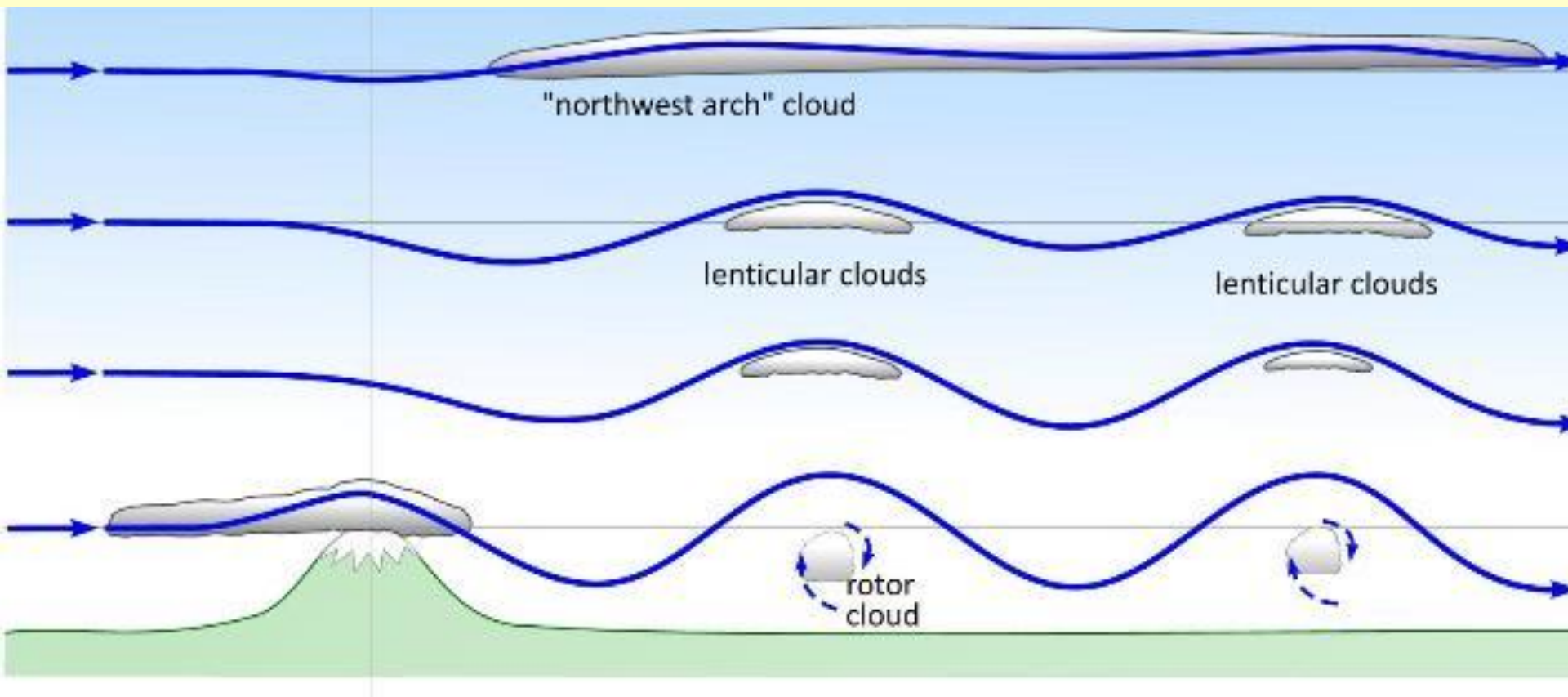
KEPZ Sounding
18 OCT 1200Z
0600L

PW = 23.8 mm
PW = .94 Inches

Right on the
edge of
thunderstorms.

Winds not strong
enough for
Mountain Waves
here:

Need 25 knots
perpendicular
to mountains
wind speeds
increasing with ht
Stable Atmosphere.

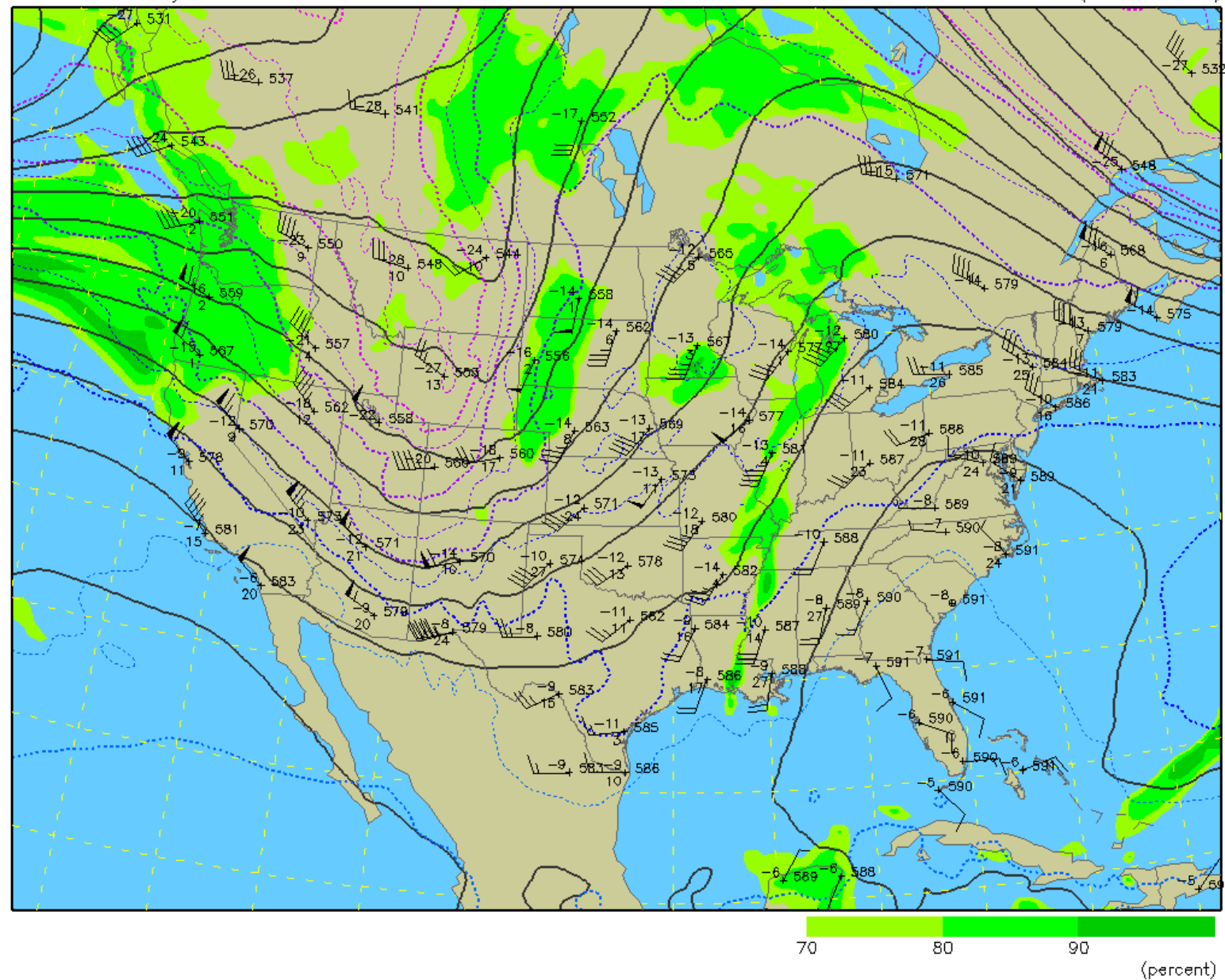


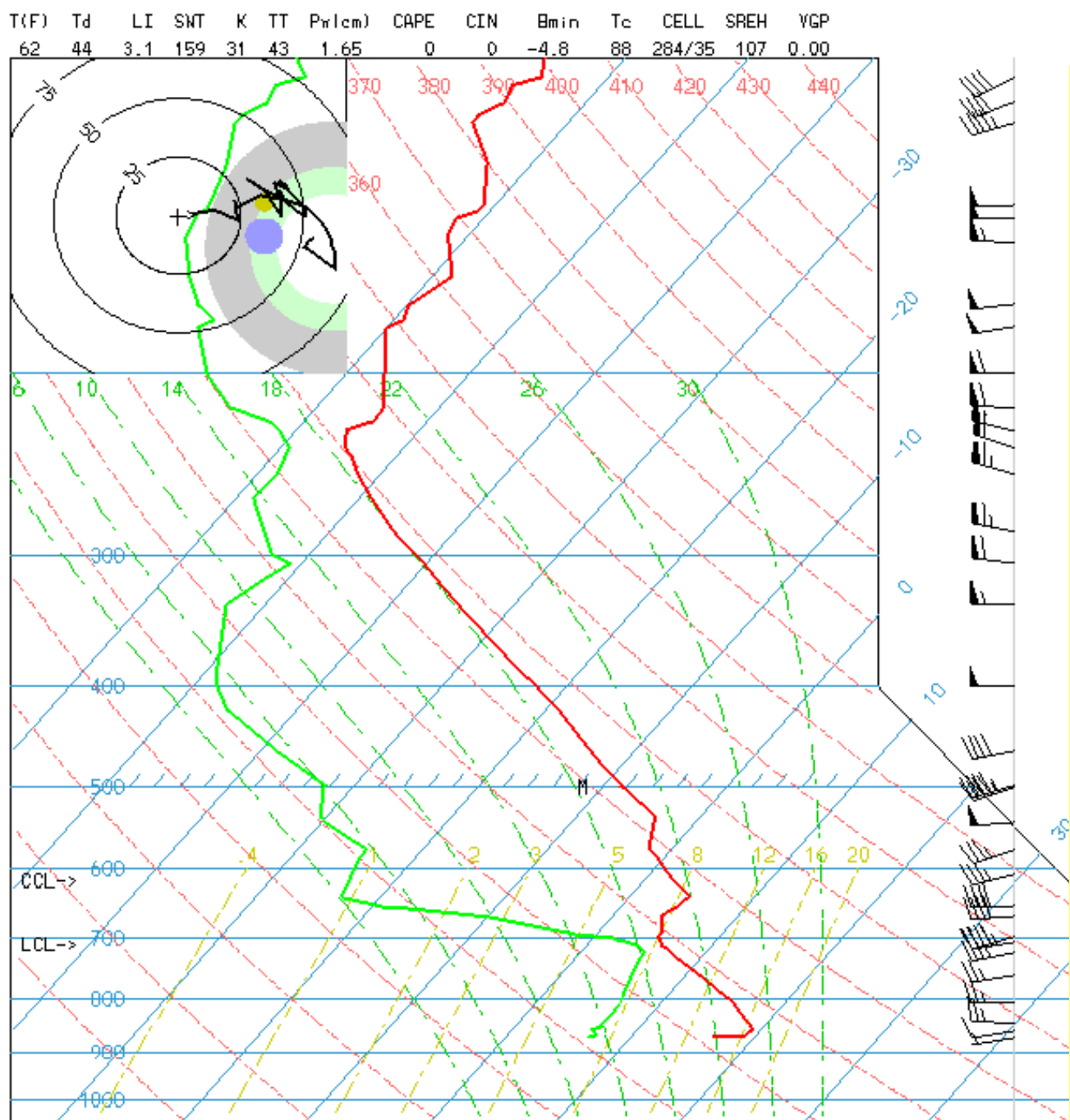


500 mb Heights (dm) / Temperature ($^{\circ}\text{C}$) / Humidity (%)

0-hour analysis valid 1200 UTC Sat 21 Oct 2017

RAP (12z 21 Oct)

500 millibar
ChartSaturday 21
Oct 2017/12ZProminent
Ridge
Carolinas-
Hudson BayLee side
Trough
short waveCooler next
couple of days



Saturday Morning

21 Oct 2017/1200Z

EPZ sounding.

Complex Air Mass

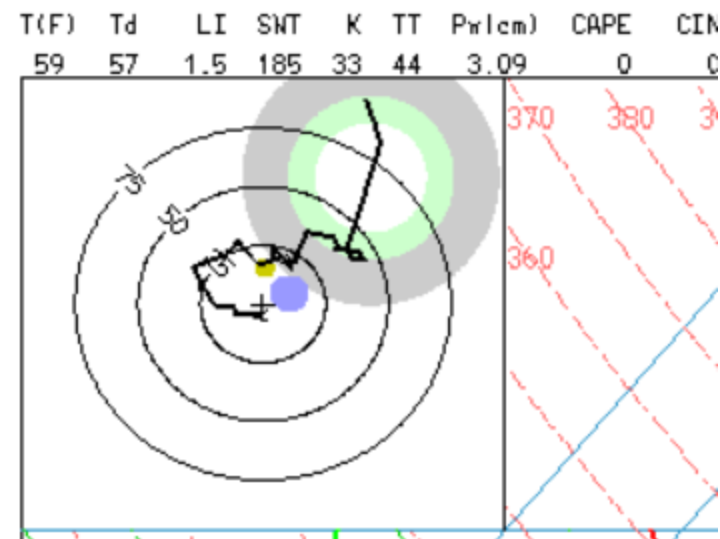
Sharp Tropopause

Potentially Warm Air Aloft

Frontal Inversion of Temperature

Cold, somewhat damp Air below

Today's Severe Weather Threat:



Colored gray and green rings and blue dot represent work of Rasmusse and Blanchard (see References) attempt to predict the **motion** and **type** of supercell thunderstorms based on a climatology study of supercells.

Blue dot is the estimated supercell storm motion... taking 60% of the magnitude and 8 m/s to the right of the boundary-layer to 4 km shear vector.

Blue circle represents a 4 m/s error estimate and is also indicated by the heading "CELL" along the top and is only valid for developing to mature supercell thunderstorms not necessarily all general thunderstorms.

When the blue dot lies within the green ring, then no supercells are anticipated.

When the blue dot lies on the green ring, "High-Precipitation" supercells are expected.

When the blue dot lies on the gray ring, then "Classic" supercells are expected

When the blue dot lies outside the gray ring, "Low-Precipitation" supercells are expected.



Saturday Morning 21 Oct 2017/ 0900L Las Cruces NM Mountain Waves Developing right at 10,000 FT MSL. Organ Mountains peaks are ~8900 Ft MSL.



Saturday Morning 21 Oct 2017/ 1000L Las Cruces NM Mountain Waves Continue Developing. Rotor Clouds with flat cumulus bases also developing downstream as Planetary Boundary Layer becomes thicker.

Rather than examine in detail the present weather for the borderland, we'll examine another weather-related disaster:

Last Week's/California's Wine Country Fire Disaster

and

The weather conditions which enabled it: The Diablo Winds

We include **last week's** present weather graphics: excellent diagnostics for this episode...



A destroyed car sits in the remains of a home in Santa Rosa, California



<http://www.mercurynews.com/2017/10/11/wine-country-fires-gov-brown-vetoed-2016-bill-aimed-at-power-line-wildfire-safety/>

News California News

Wine Country fires: Gov. Brown vetoed 2016 bill aimed at power line, wildfire safety



Fallen electrical lines on Parker Hill Road in Santa Rosa on Tuesday. (Nhat V. Meyer/Bay Area News Group)

<http://www.mercurynews.com/2017/10/11/wine-country-fires-gov-brown-vetoed-2016-bill-aimed-at-power-line-wildfire-safety/>

A year ago, a bipartisan bill aimed at reducing the risk of wildfires from overhead electrical lines went to Gov. Jerry Brown's desk. It was vetoed.

The author of the measure — passed unanimously by both houses of the Legislature — now says the governor missed out on a chance to tackle one of his state's longstanding vulnerabilities: massive wildfires endangering residential communities.

But the governor's office and the California Public Utilities Commission say the bill duplicated efforts already underway among the CPUC, Cal Fire and utilities like PG&E.

<http://www.mercurynews.com/2017/10/11/wine-country-fires-gov-brown-vetoed-2016-bill-aimed-at-power-line-wildfire-safety/>

Now, as a series of deadly fires rages in Wine Country, serious questions are once again being asked about the safety of overhead electrical wires in a state prone to drought and fierce winds.

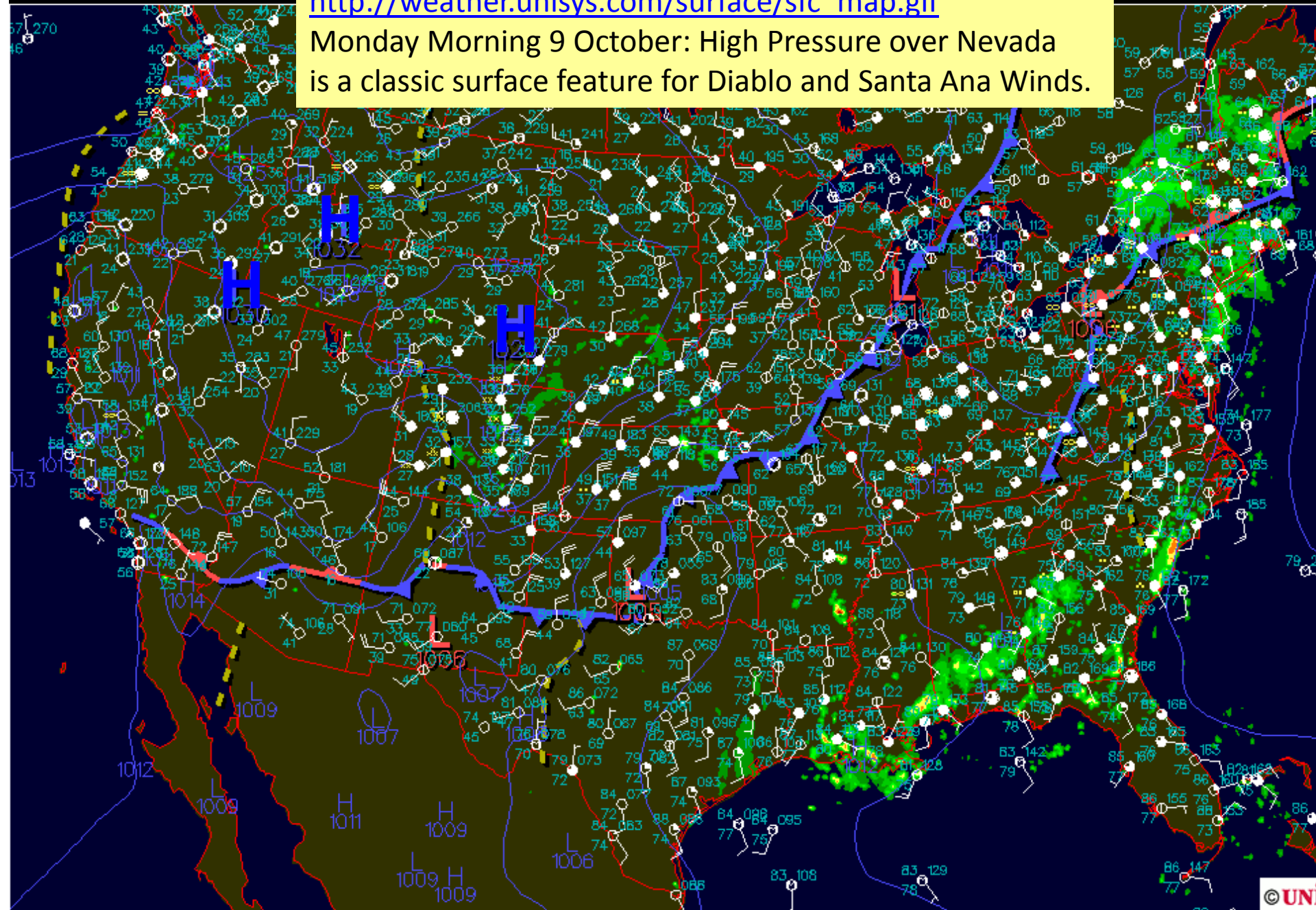
On Wednesday, Cal Fire said that investigators have started looking into whether toppled power wires and exploding transformers Sunday night may have ignited the simultaneous string of blazes.

<https://wattsupwiththat.com/2017/10/12/qotw-climatologist-hillary-clinton-shot-down-by-reality/>

PG&E power lines may be linked to Wine Country fires



Monday Morning 9 October: High Pressure over Nevada
is a classic surface feature for Diablo and Santa Ana Winds.

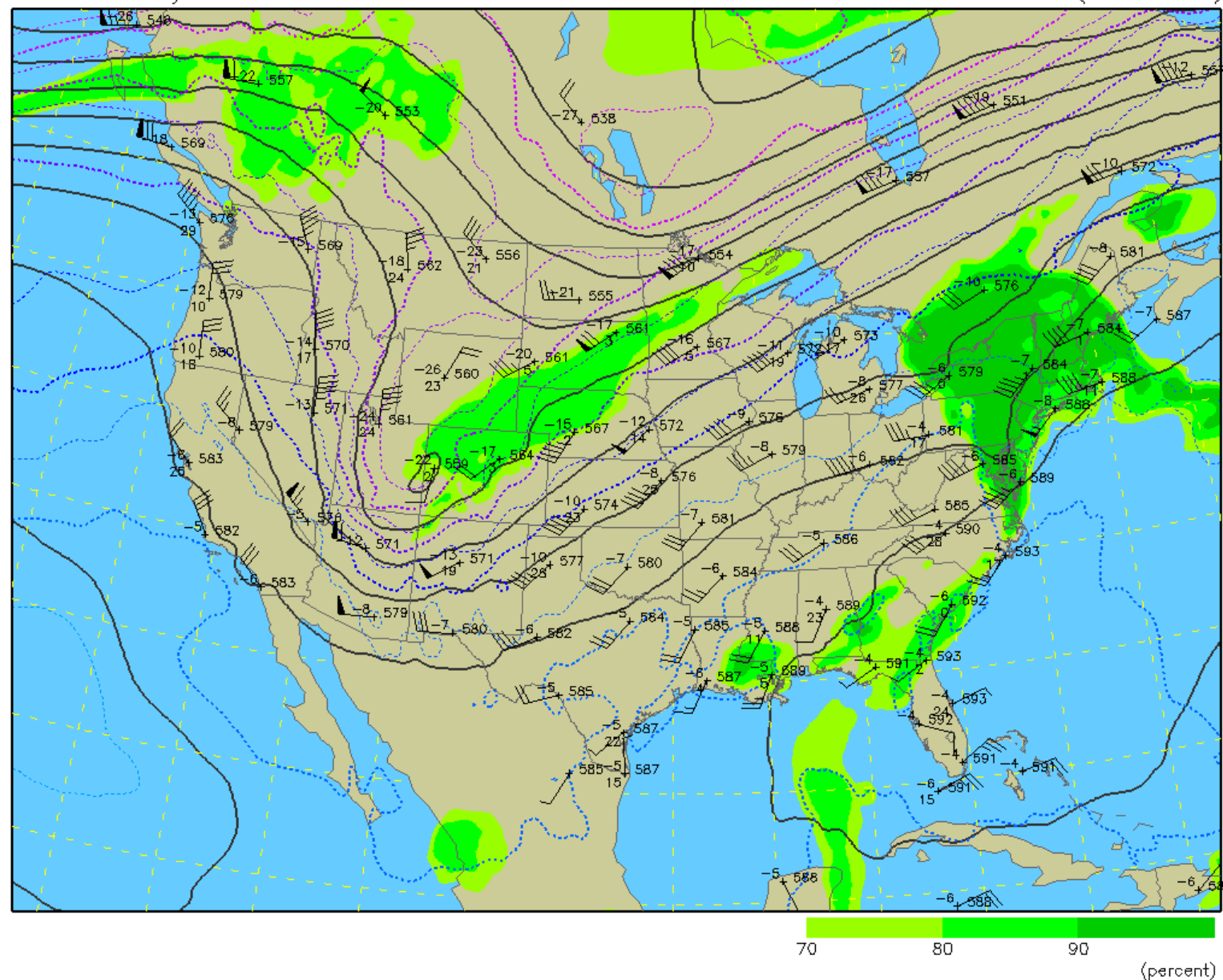


500 mb Heights (dm) / Temperature (°C) / Humidity (%)

9 OCT 2017/ 12Z 500 mb

0-hour analysis valid 1200 UTC Mon 09 Oct 2017

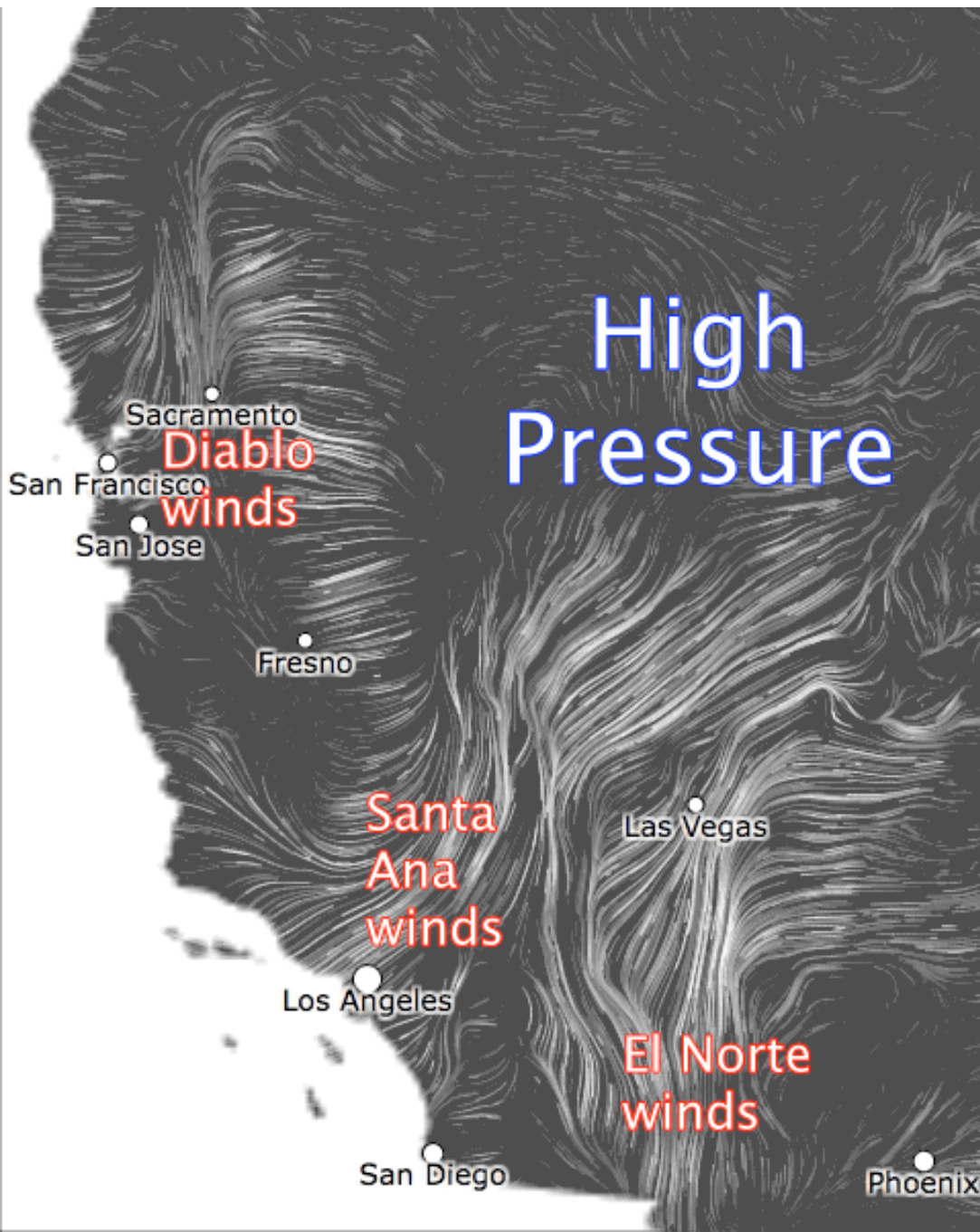
RAP (12z 09 Oct)

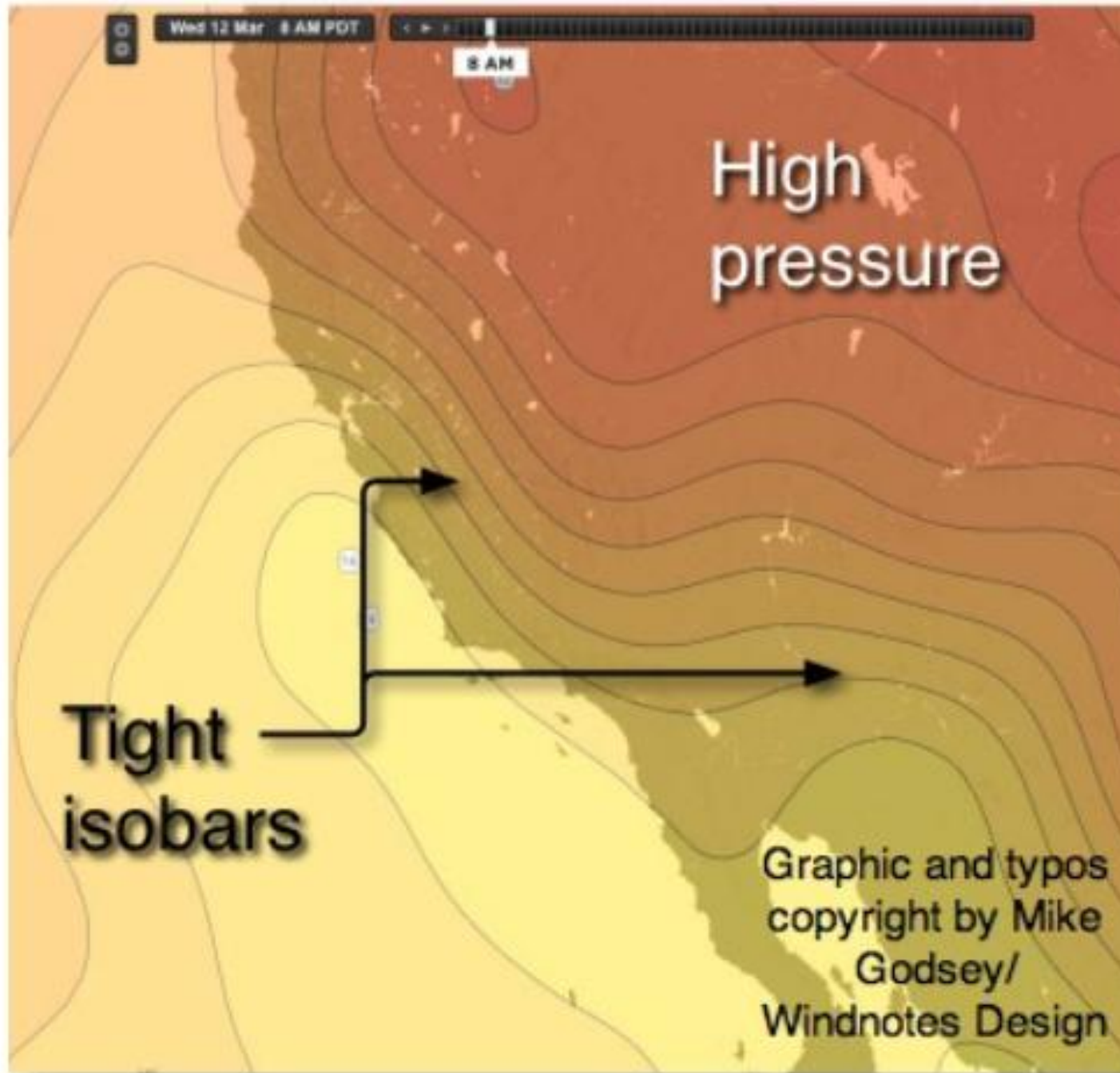


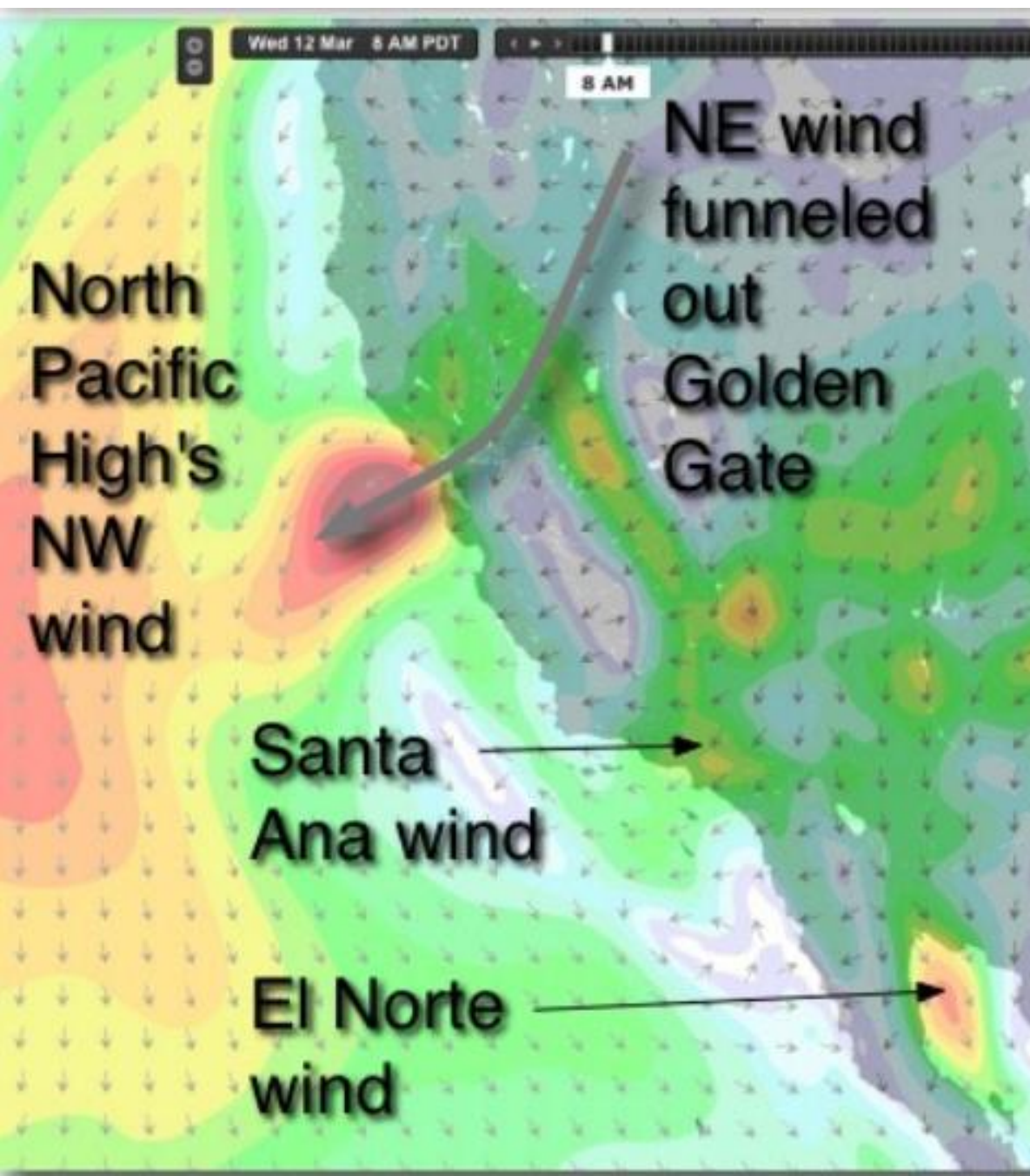
High Pressure building in at the surface and aloft in early fall over the Pacific Northwest is the key ingredient for Diablo Wind events.



Offshore Winds
Downslope Winds
Adiabatic
Compression
Dry Conditions
up to 16,500 ft
or 550 mb

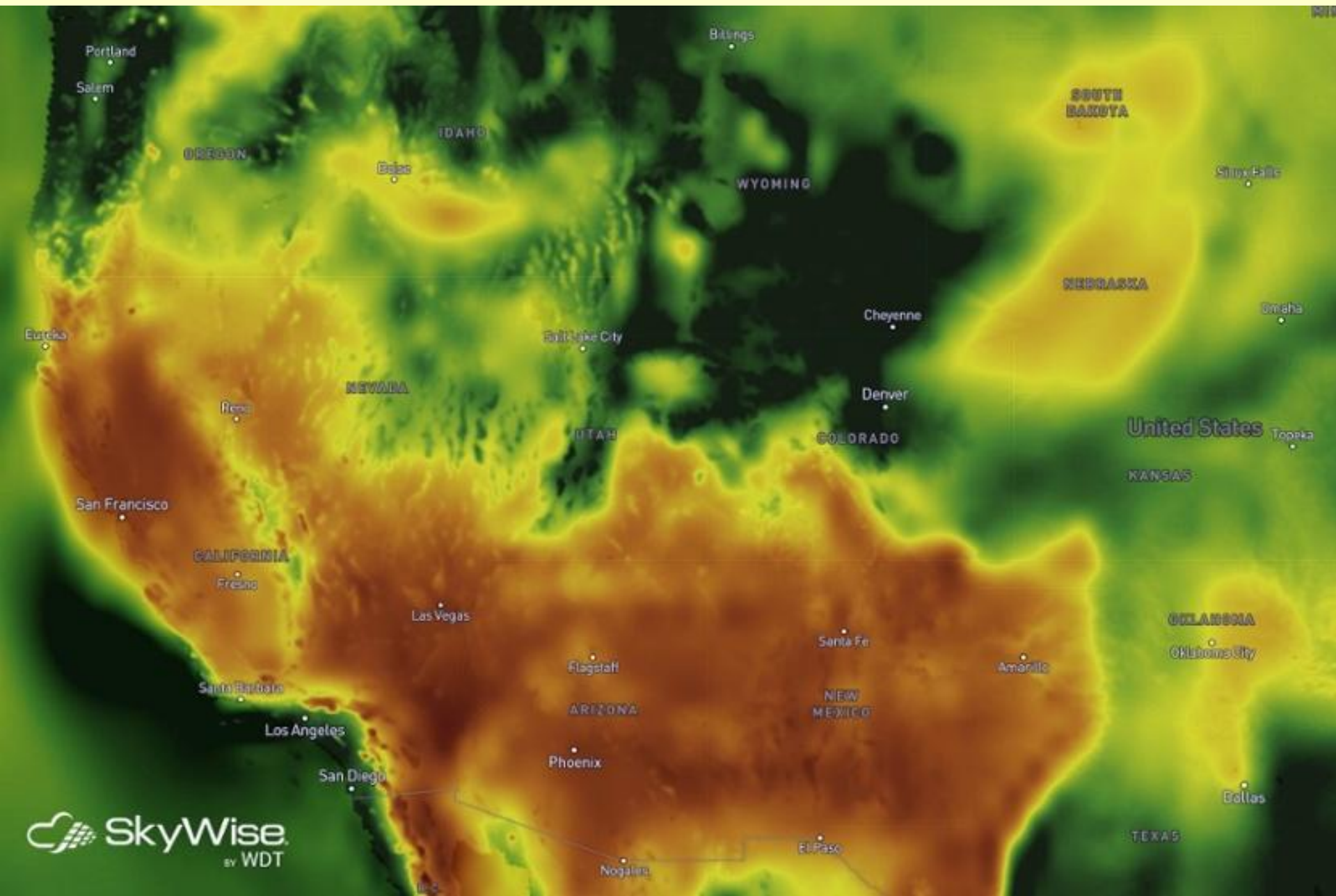








Relative Humidity Chart



<https://www.marketslant.com/article/15-stark-videos-expose-reality-california-wildfires-0>

WINDS WHIP UP FIERCE CALIFORNIA FIRES

Hot, dry winds (known as **Santa Anas** in southern California and **Diablos** in northern California) often whip up roaring fires across the state. It usually begins due to winds circulating around a high-pressure area over Nevada or Utah.

1 HIGH WINDS

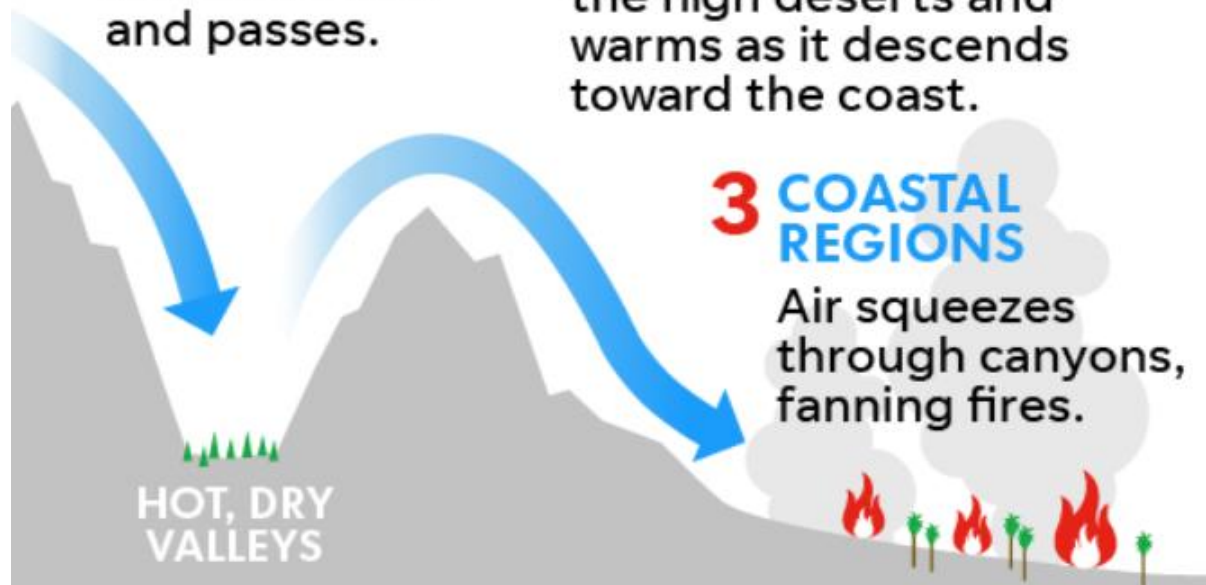
Winds can gust to **80 mph** in the mountains and passes.

2 COMPRESSED AIR

Cool air descends from the high deserts and warms as it descends toward the coast.

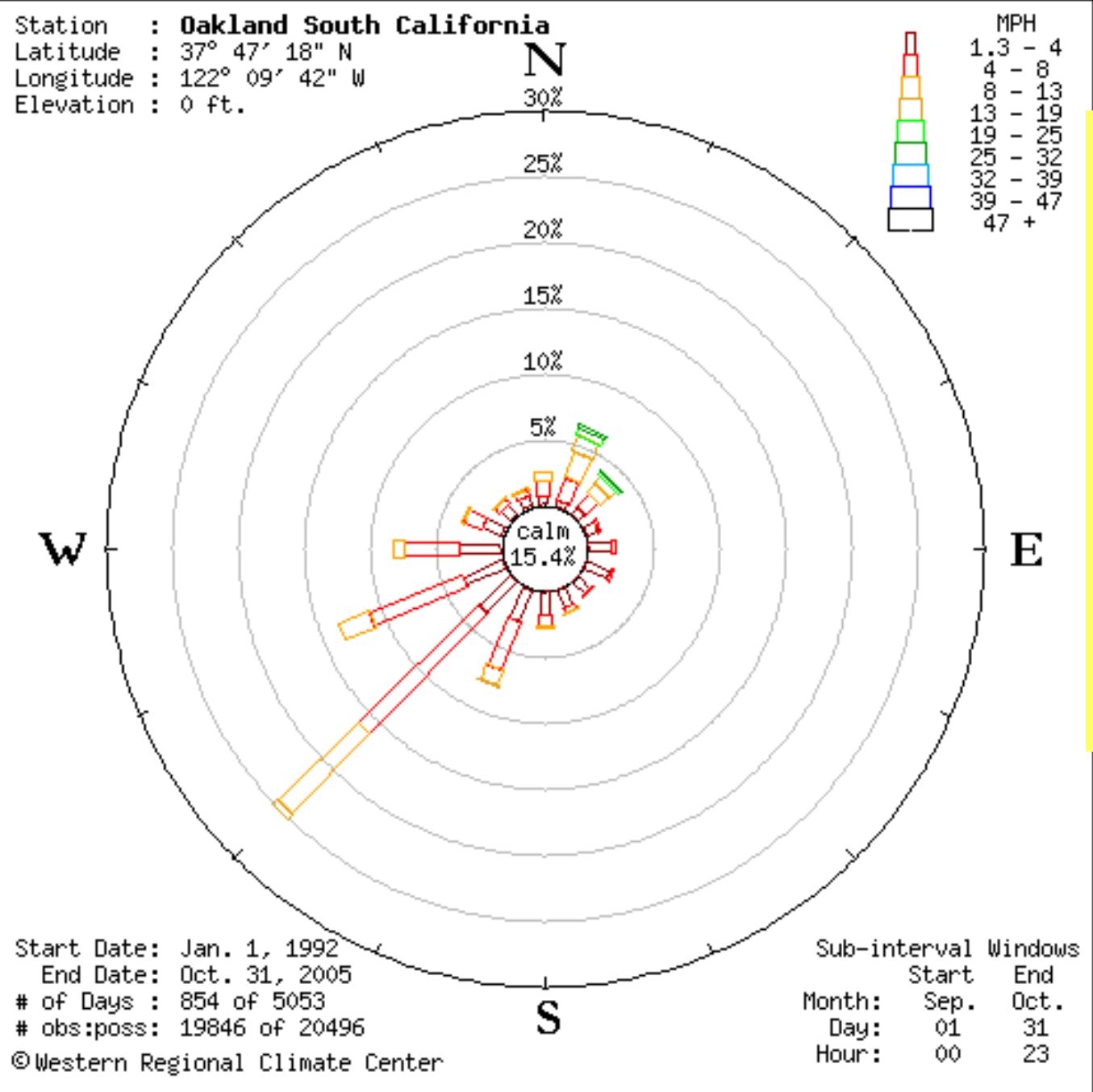
3 COASTAL REGIONS

Air squeezes through canyons, fanning fires.



SOURCE National Weather Service;
Storm Prediction Center

USA TODAY



Wind Rose for
Oakland South,
California.

The strongest winds
(Greens)

are strong winds from
the Northeast.

“Diablo Winds”

CALIFORNIA

Here's Why October Is California's Most Dangerous Month for Wildfires

“....October ...most dangerous month for California wildfires as dry vegetation and seasonal winds fuel speedy flames.

"By the time you get to this season, right when you're starting to anticipate... rain, it's actually the most fire prone part of the year," said Max Moritz, a wildfire specialist at the University of California Cooperative Extension.

...most destructive and largest fires in California...have occurred in...October.

...1991 Oakland hills fire that [destroyed 3,500 homes and killed 25 people](#) in Alameda County near San Francisco... the state's most destructive fire.

...the October 2003 Cedar fire in San Diego county [scorched 273,246 acres of land](#) — the most of any fire in the state's history.

Climate History 2

Several sources for paleoclimate or climate history are available. Among my favorites:

<https://wattsupwiththat.com/paleoclimate/>

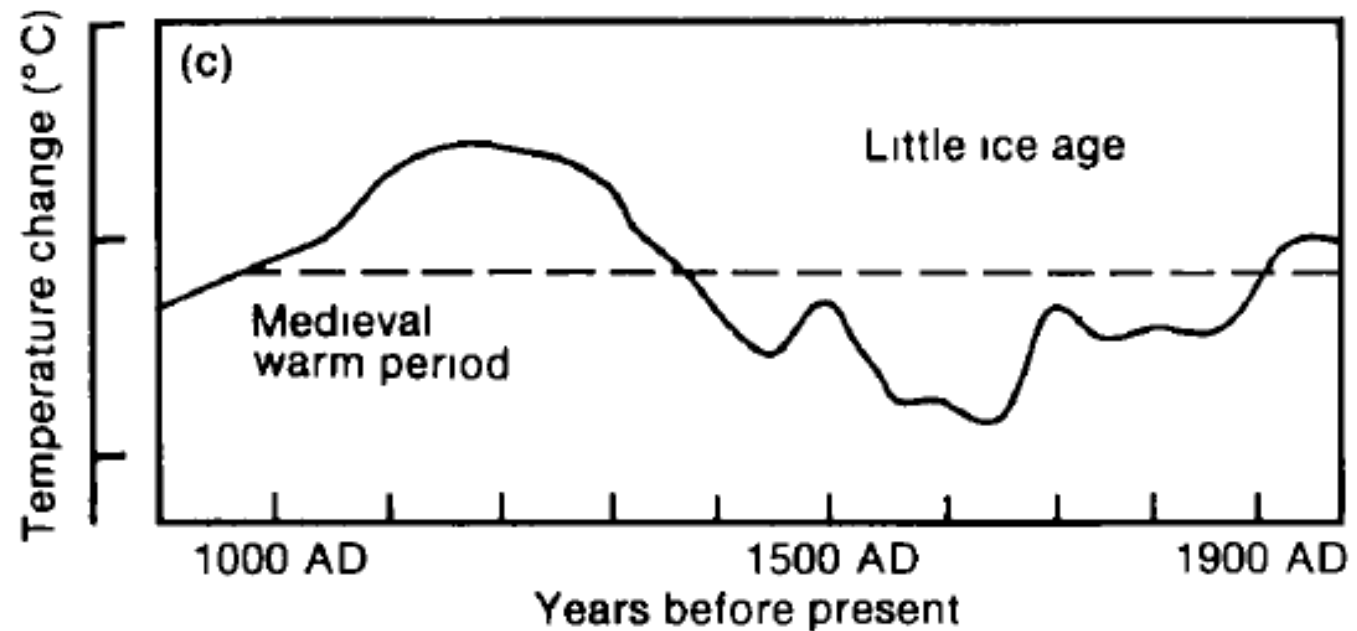
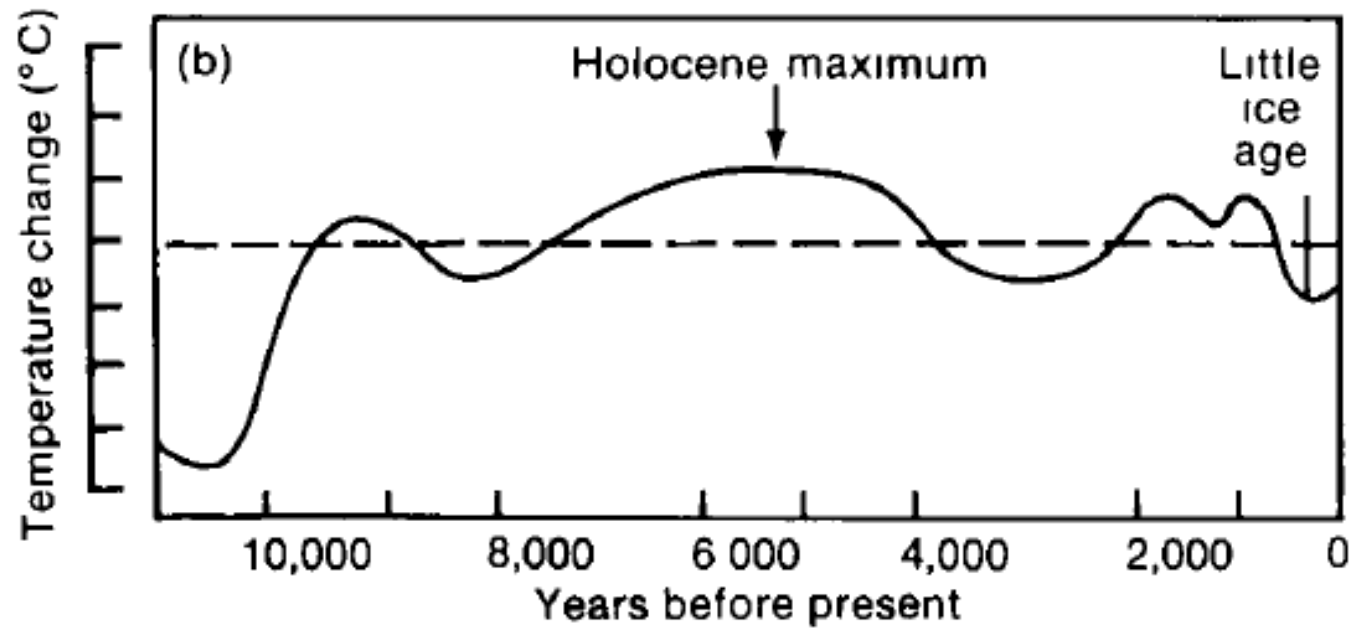
<http://notrickszone.com/2017/05/29/80-graphs-from-58-new-2017-papers-invalidate-claims-of-unprecedented-global-scale-modern-warming/>

<http://notrickszone.com/2017/09/28/update-the-2017-explosion-of-non-hockey-stick-graphs-continues/>

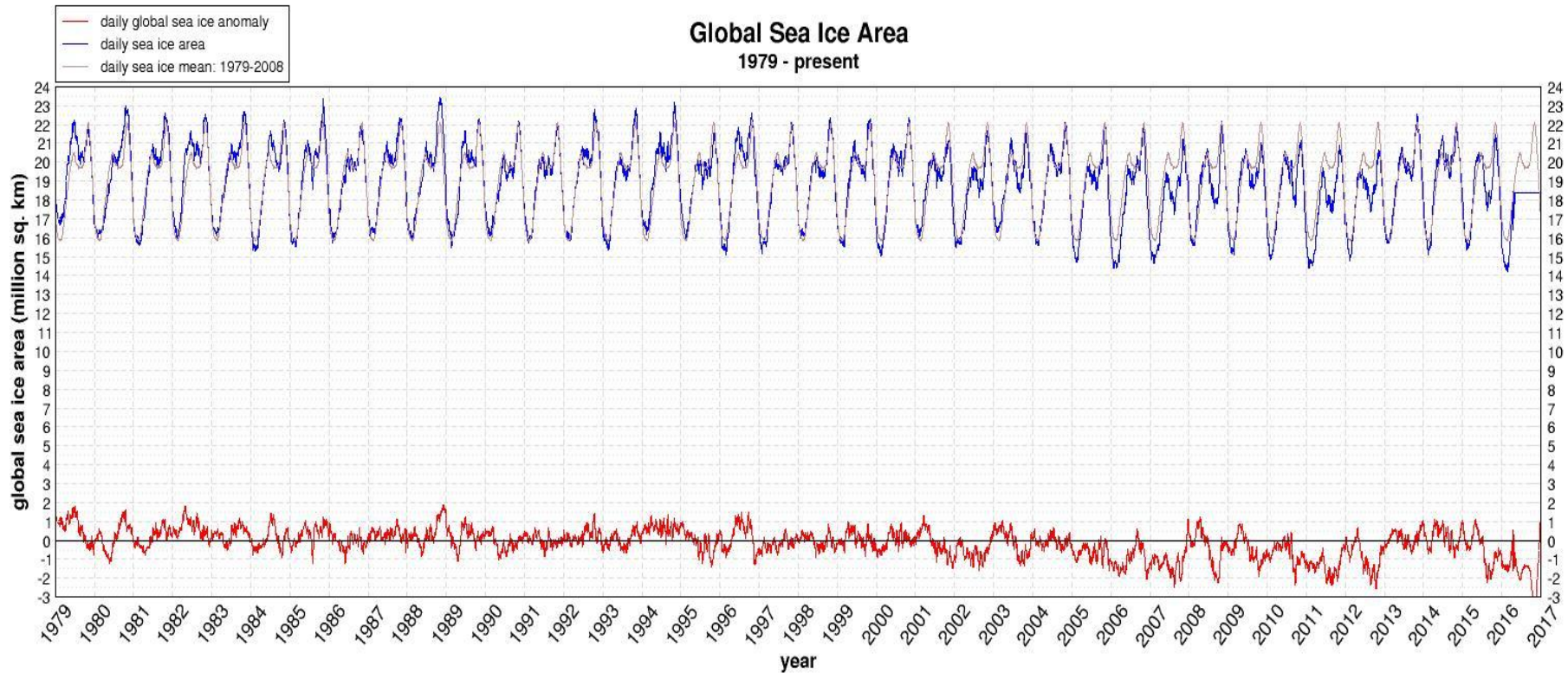
<http://notrickszone.com/global-warming-disputed-300-graphs/>

Scores of histories; most depend on various “proxy” determinations.

I chose for this class those which are most exemplary or representative.

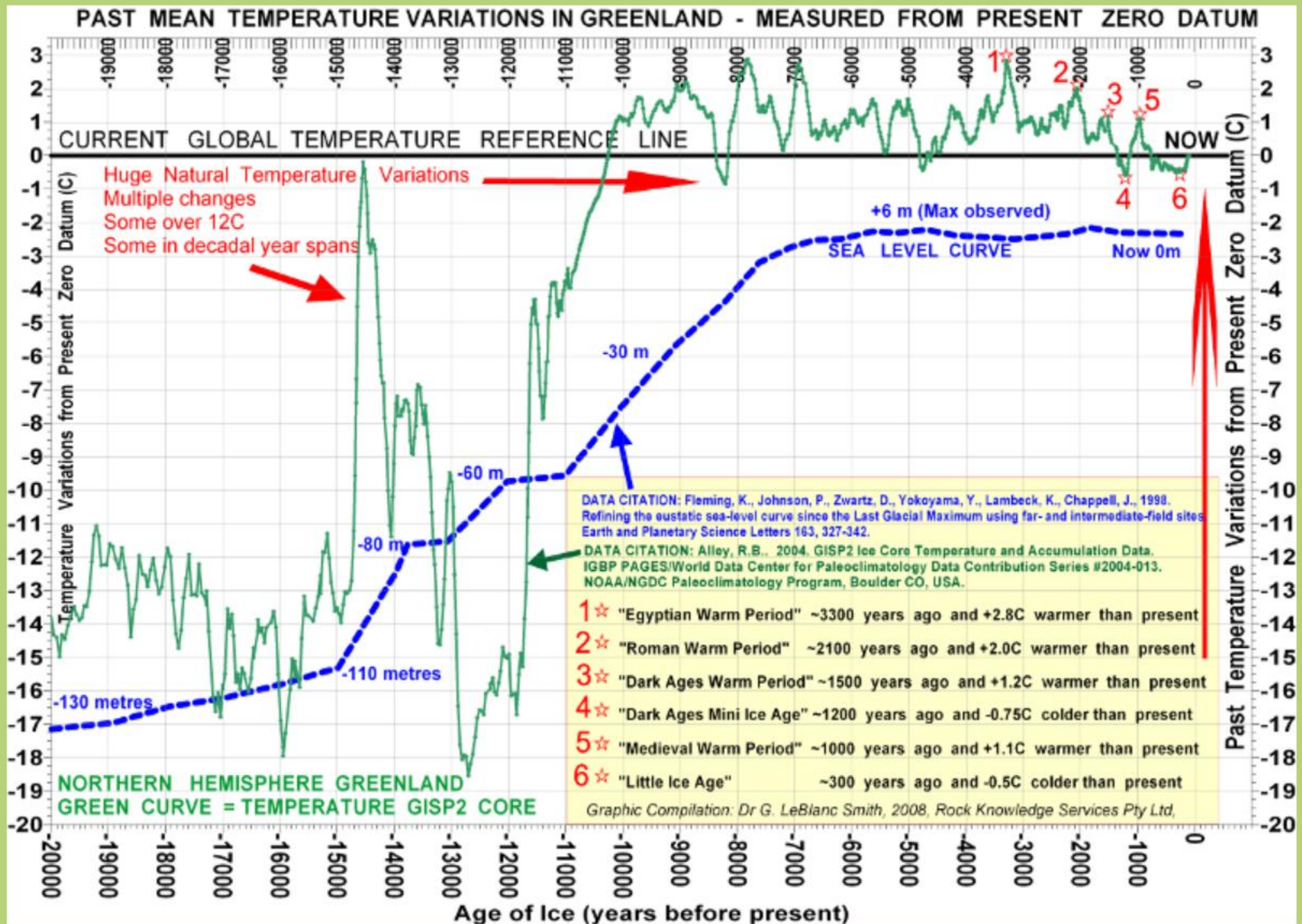


<http://arctic.atmos.uiuc.edu/cryosphere/IMAGES/global.daily.ice.area.withtrend.jpg>



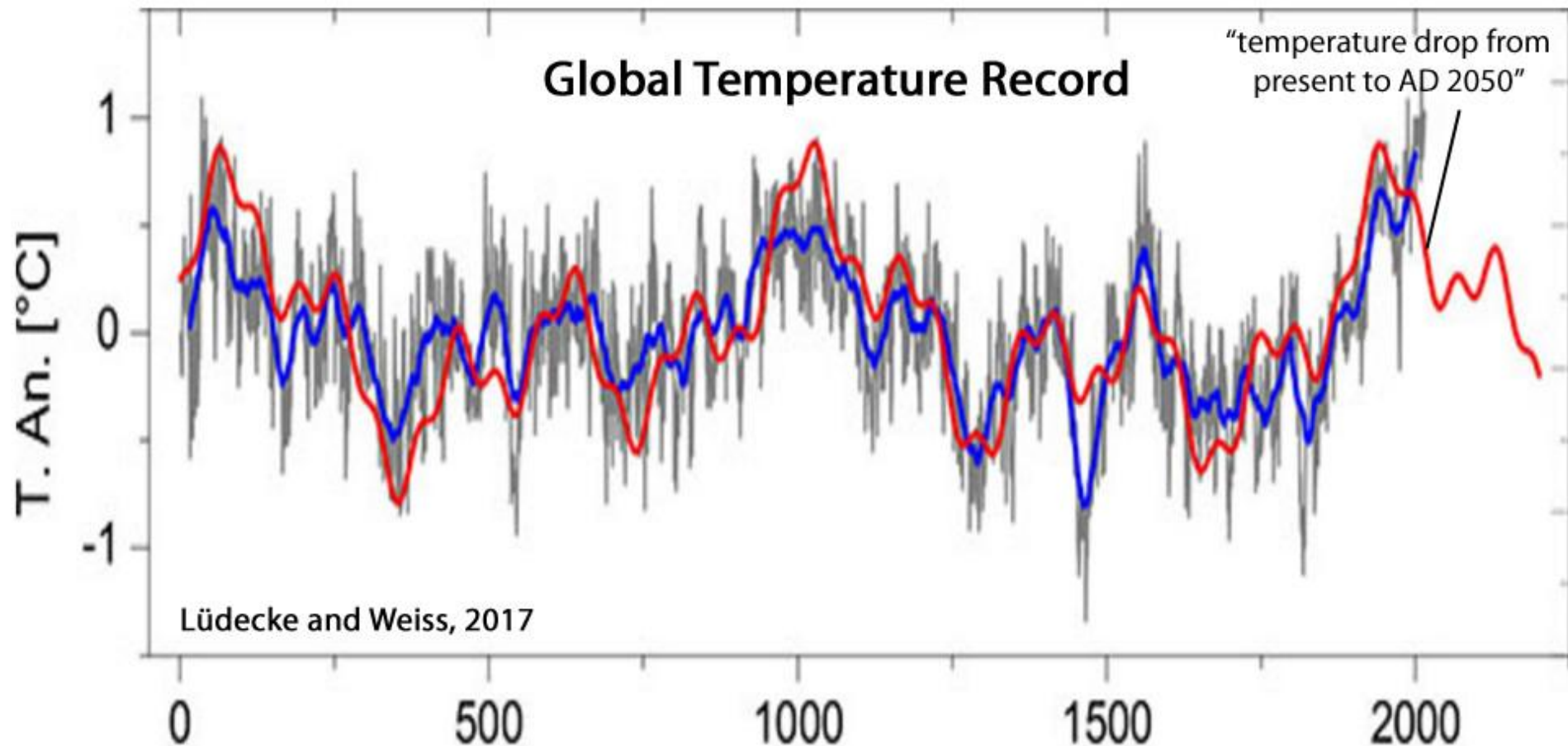
With so-called human-caused CO₂-fueled Global Warming ongoing, why has the global sea ice cover changed so little in the time 1979-2015 since the NASA satellites were launched?

“Cryosphere Today” from UIUC used to be a reliable source, but after an equipment failure on Air Force DMSP satellite, data collection became problematic, so did some of the data.



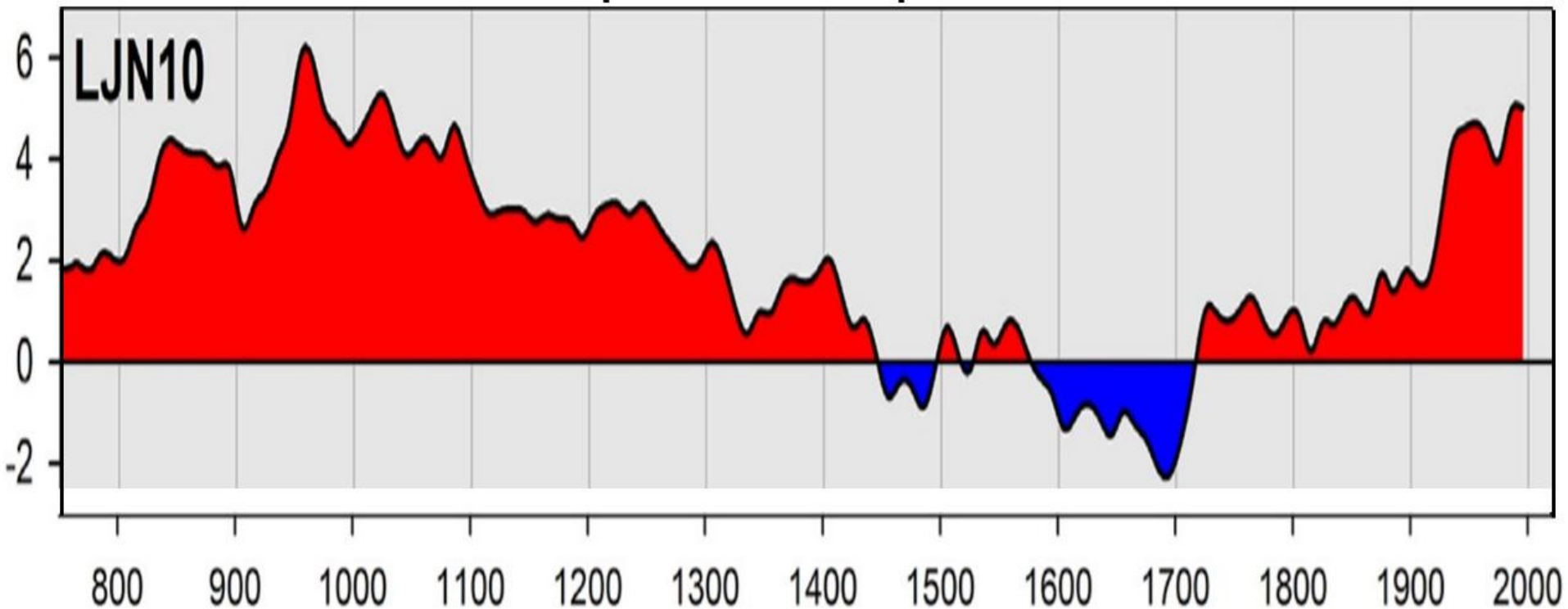
This journal article finds significant power in the 1000-1450 year “Bond Cycles” and attempts to project that analysis into the future.

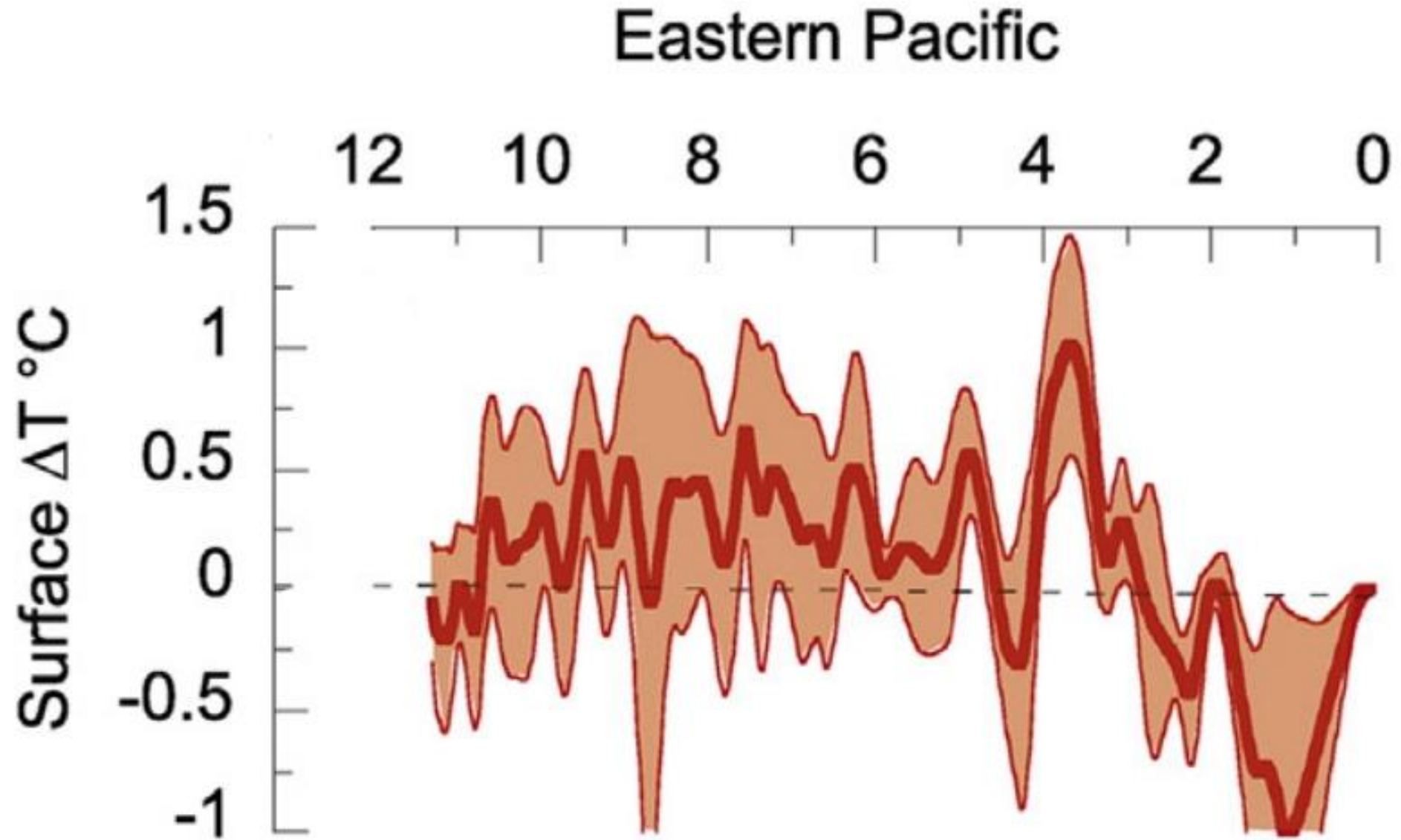
Harmonic Analysis of Worldwide Temperature Proxies for 2000 Years



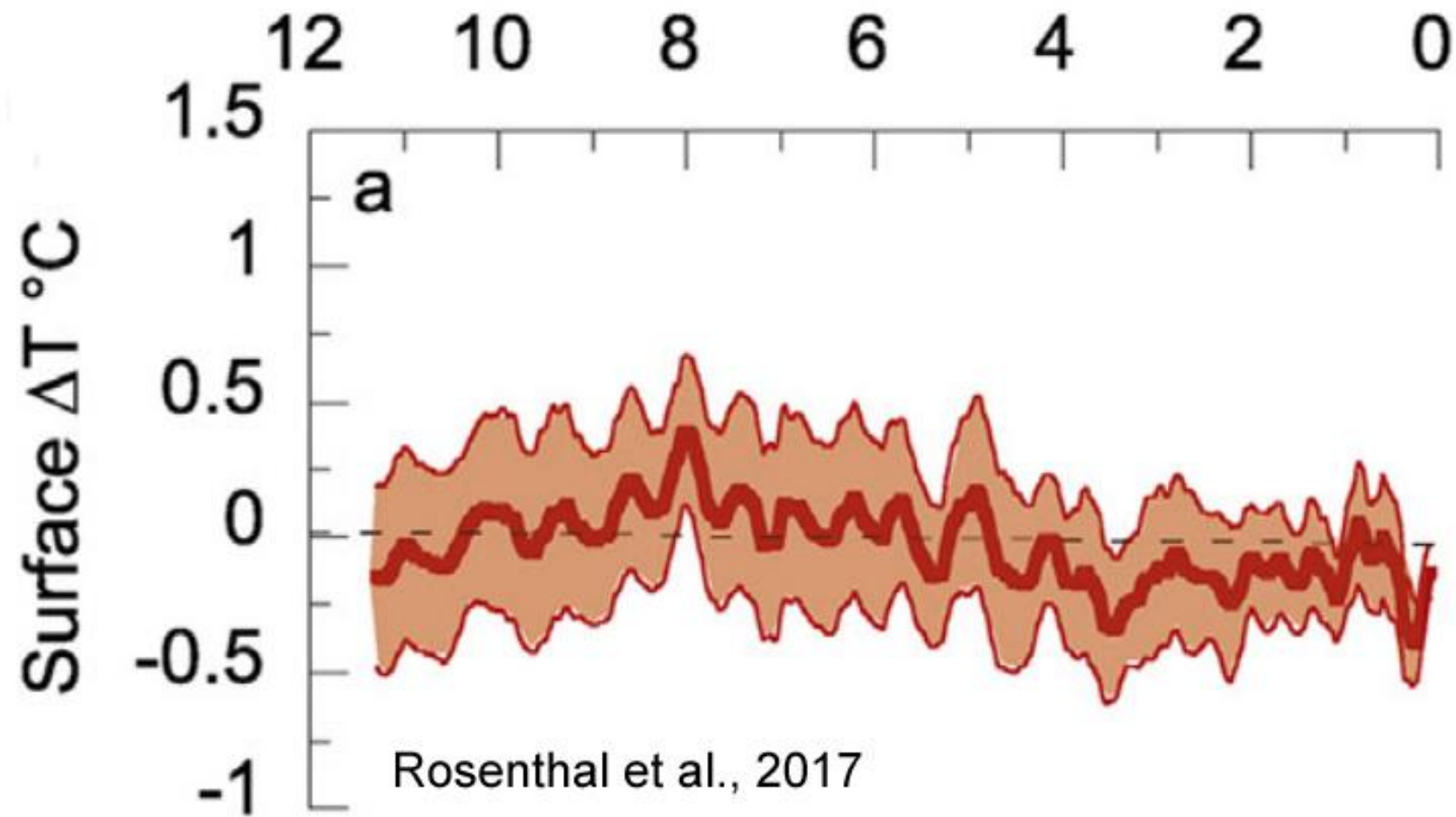
Last millennium northern hemisphere summer temperatures from tree rings: Part I: The long term context

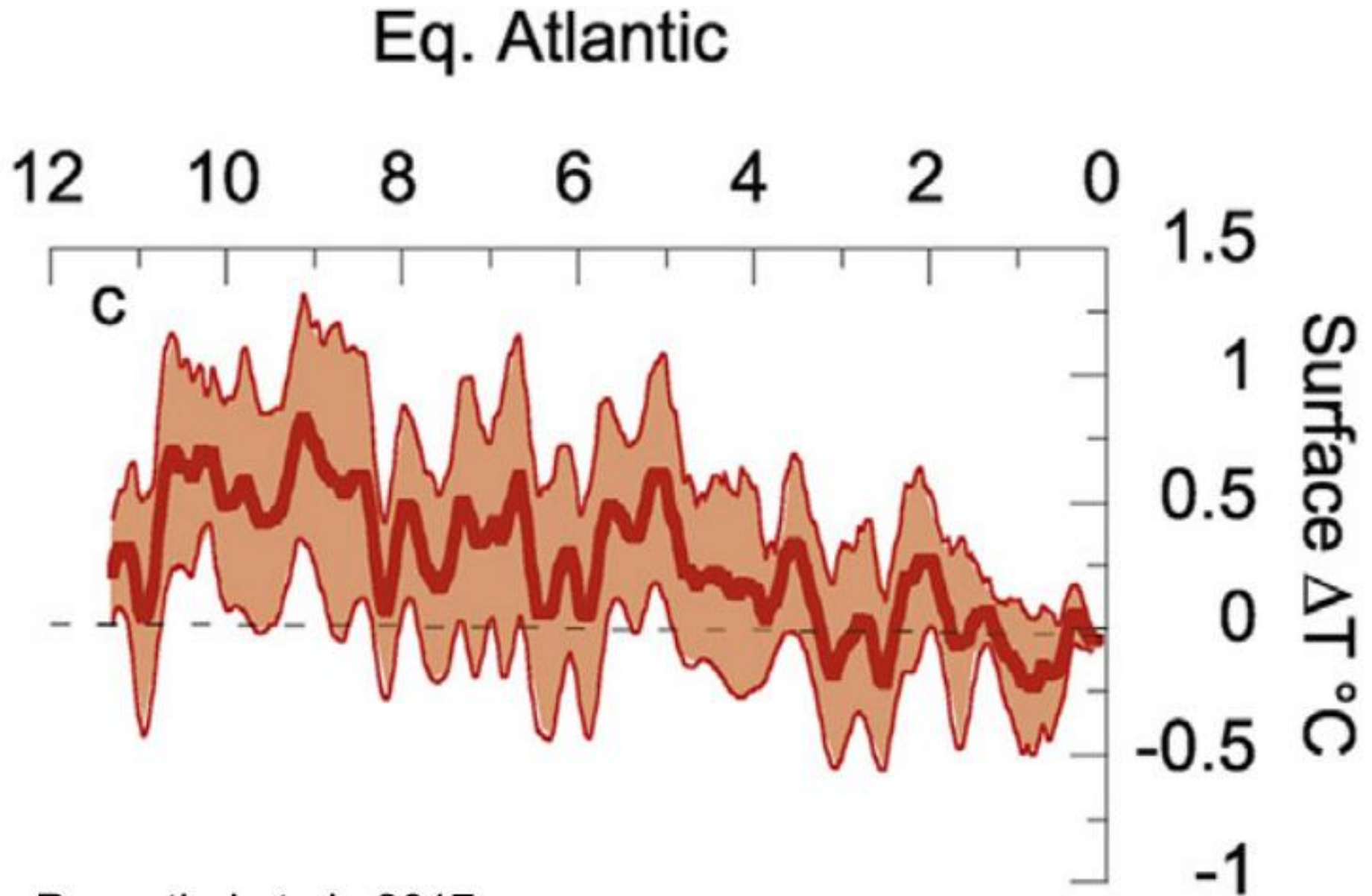
Northern Hemisphere Temperatures 750 - 1999 C.E.





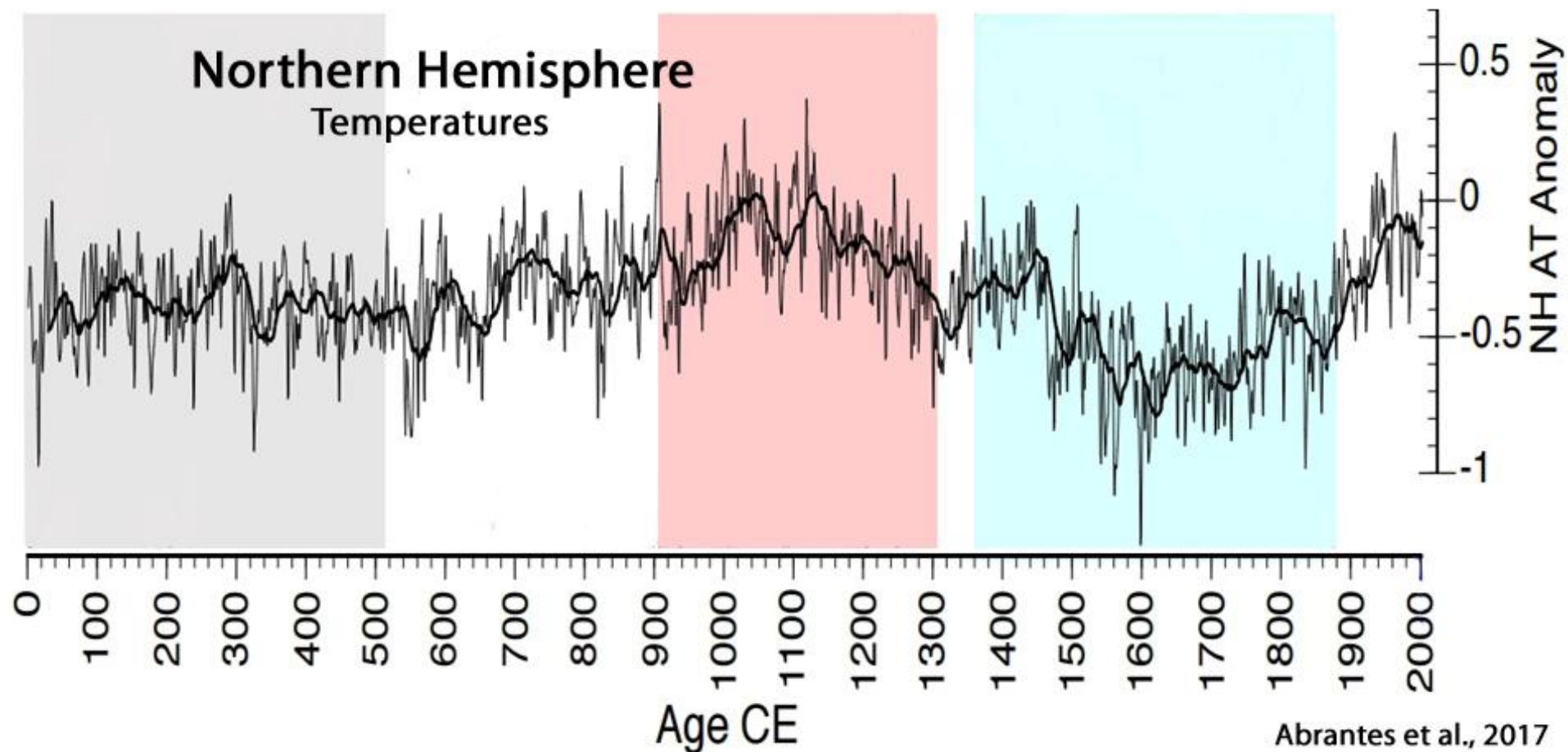
Western Pacific Warm Pool Sea Surface Temperatures WPWP



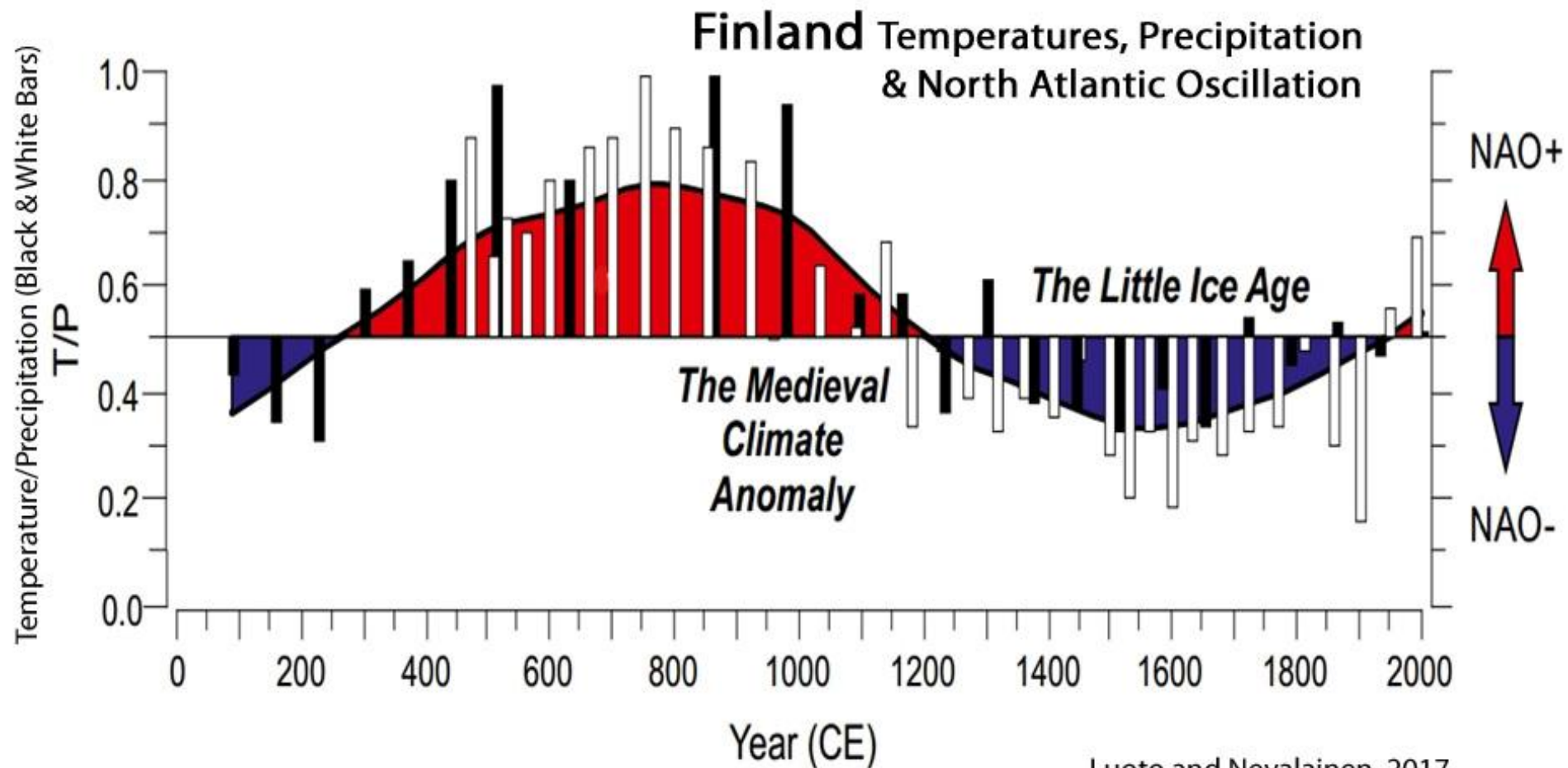


Historical Climate off the Atlantic Iberian Peninsula

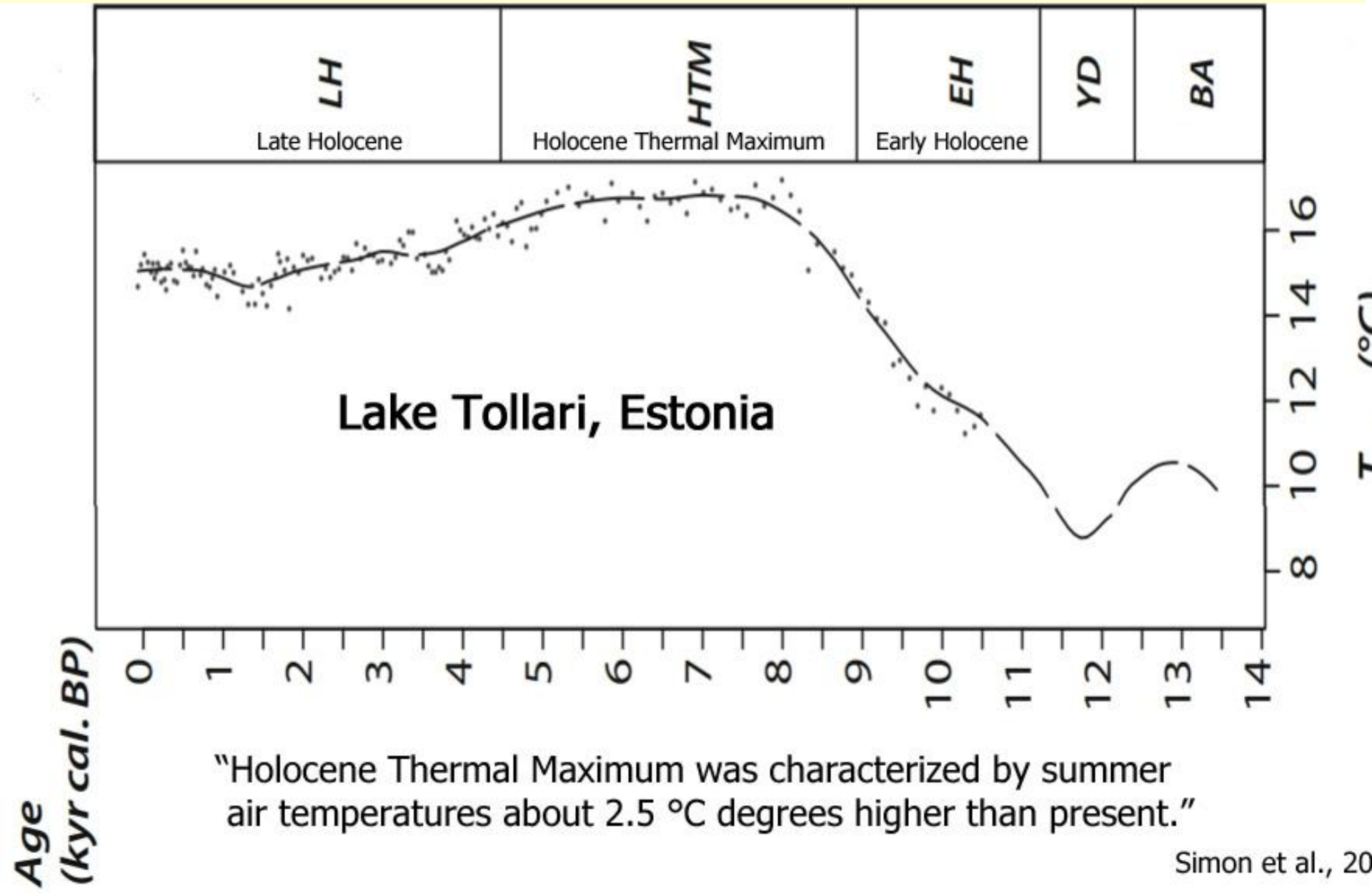
Abrantes^{1,2}, Fátima; Teresa Rodrigues^{1,2}, Marta Rufino^{2,3}; Emília Salgueiro^{1,2}; Dulce Oliveira^{1,2,4};



Temperature-precipitation relationship of the Common Era in northern Europe



.... 14,000 years of climate-induced changes in carbon resources sustaining benthic consumers in a small boreal lake (Lake Tollari, Estonia)



THE MYTH OF THE 1970s GLOBAL COOLING SCIENTIFIC CONSENSUS

BY THOMAS C. PETERSON, WILLIAM M. CONNOLLEY, AND JOHN FLECK

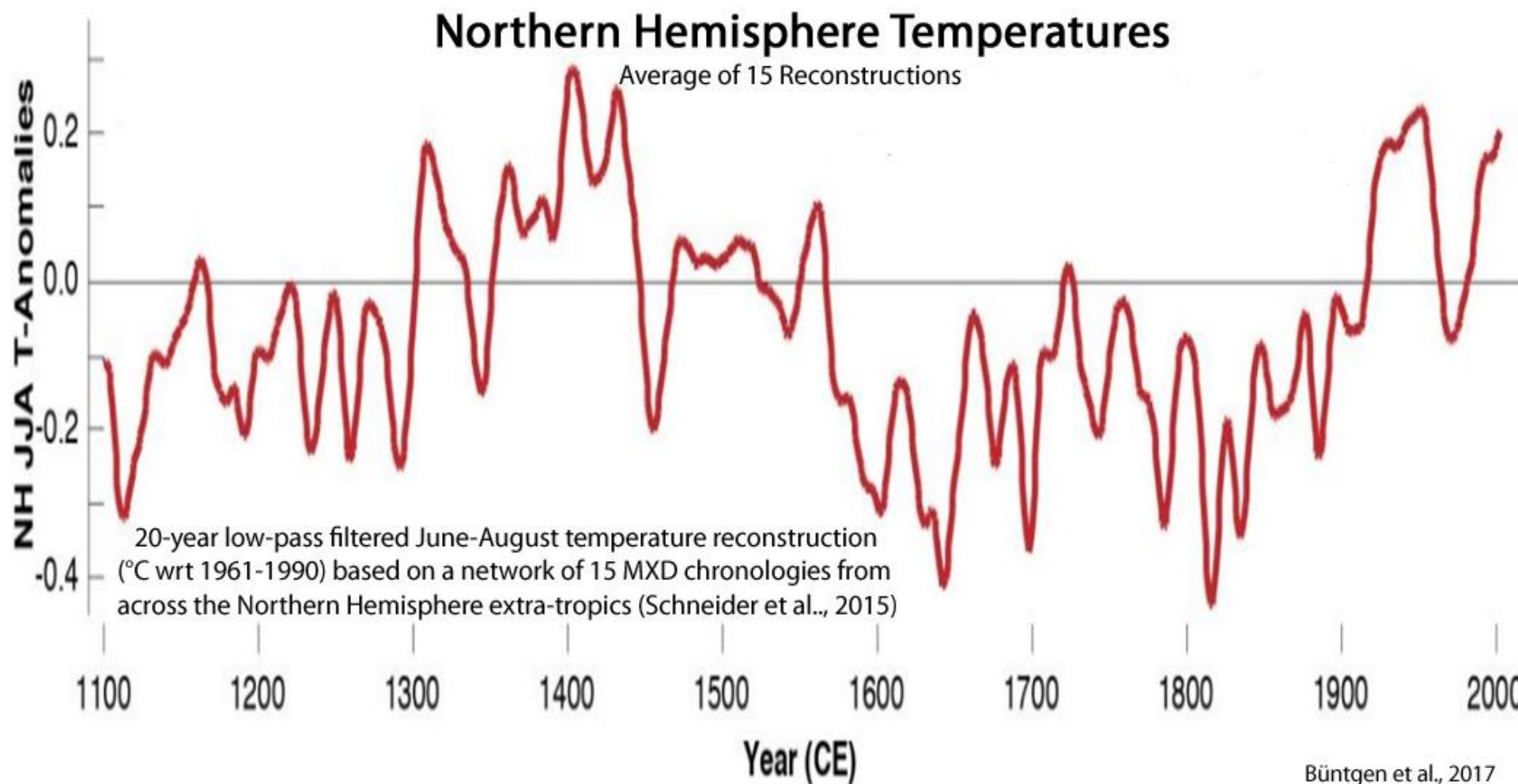
There was no scientific consensus in the 1970s that the Earth was headed into an imminent ice age. Indeed, the possibility of anthropogenic warming dominated the peer-reviewed literature even then.

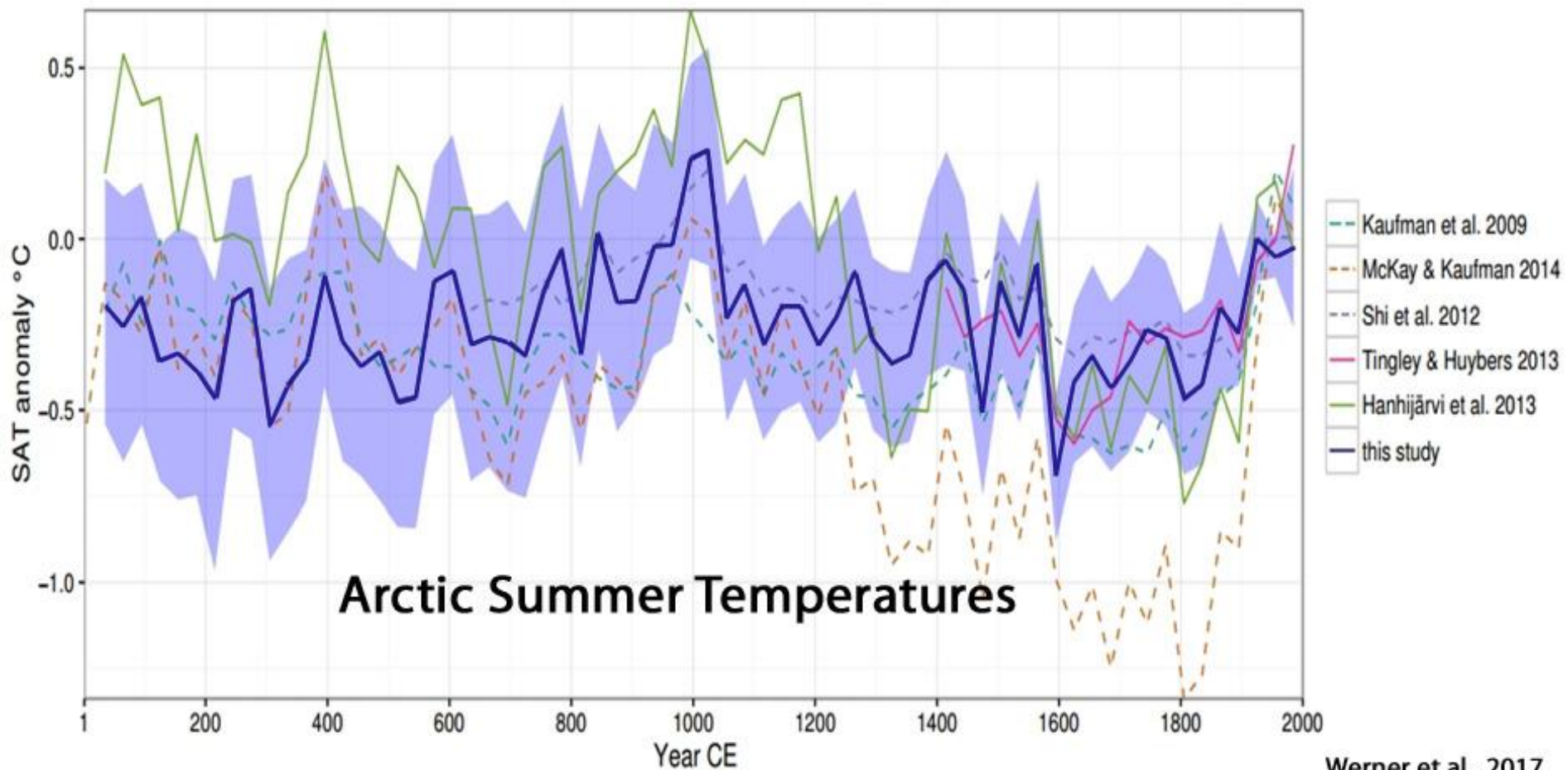
THE MYTH. When climate researcher Reid Bryson stood before the members of the American Association for the Advancement of Science in December 1972, his description of the state of scientists' understanding of climate change sounded very much like the old story about the group of blind men trying to describe an elephant. The integrated enterprise of climate science as we know it today was in its infancy, with different groups of scientists feeling blindly around their

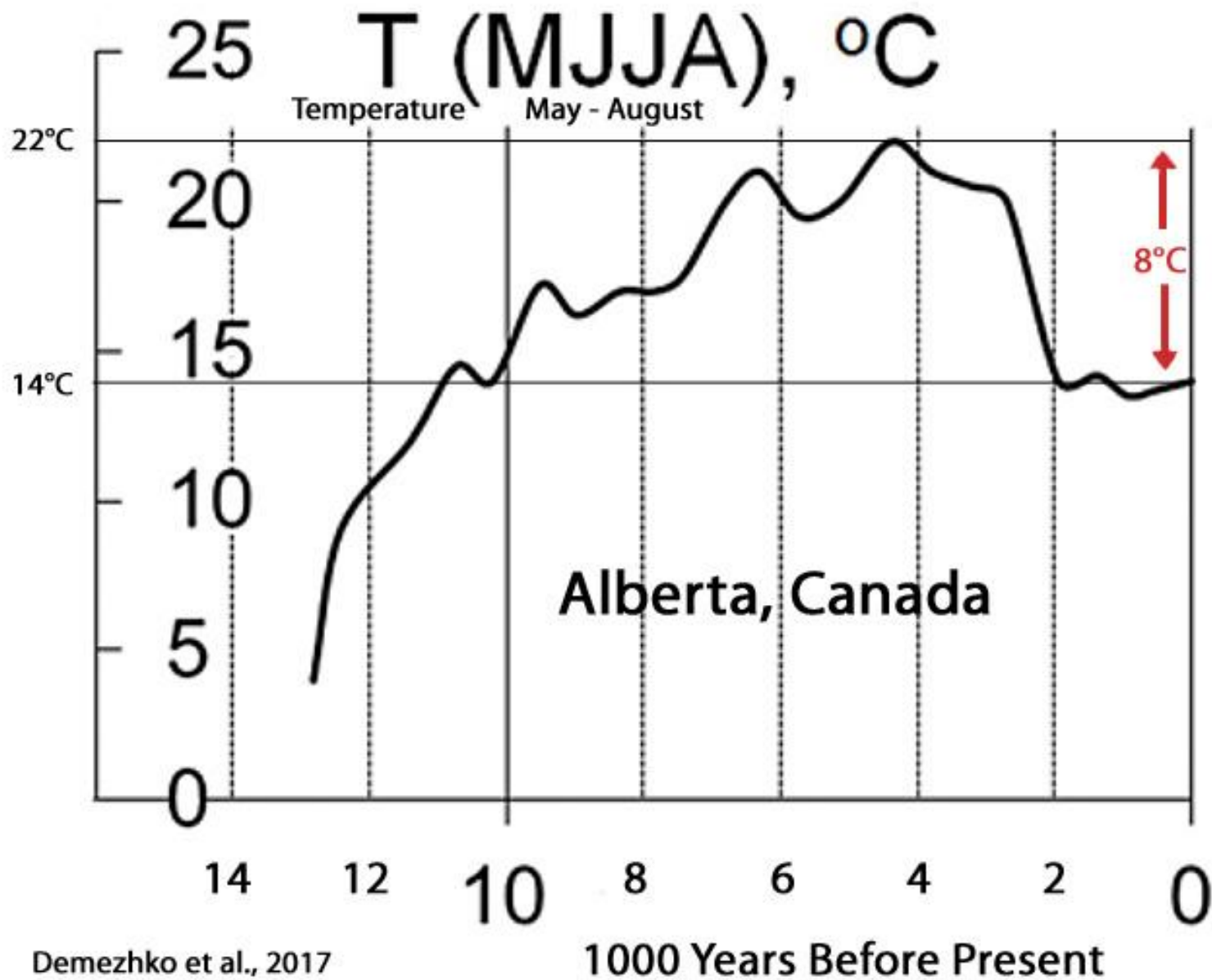
piece of the lumbering climate beast. Rigorous measurements of increasing atmospheric carbon dioxide were available for the first time, along with modeling results suggesting that global warming would be a clear consequence. Meanwhile, newly created global temperature series showed cooling since the 1940s, and other scientists were looking to aerosols to explain the change. The mystery of waxing and waning ice ages had long entranced geologists, and a cohesive explanation in terms of orbital solar forcing was beginning to emerge.

<http://notrickszone.com/2017/05/29/80-graphs-from-58-new-2017-papers-invalidate-claims-of-unprecedented-global-scale-modern-warming/>

<https://sci-hub.cc/http://journals.ametsoc.org/doi/abs/10.1175/JCLI-D-16-0526.1>







A 5000-year old Spruce in the Canadian Arctic. This tree grew during the Holocene Climatic Optimum. Trees no longer live there because the climate is colder now. This is now tundra.

**Holocene landscape development and climatic change in the low arctic,
Northwest Territories, Canada**

**[Palaeogeography, Palaeoclimatology, Palaeoecology](#)
[Volume 205, Issues 3-4](#), 30 March 2004, Pages 221-234**

**Professor Glen M. McDonald,
Director UCLA Institute for the Environment,
Full Professor, UCLA Dep't of Geography.
Chairman, Department of Geography
UCLA**

**Similar Photo also in
"A Primer on CO2 and Climate,"
Howard C Hayden,
Vales Lake Publishing,
Pueblo, CO, pg 18.**

**Photo is in Dr Hubert Lamb's book,
Climate, History, and the Modern World**





Tree Stump (*Picea glauca*) in the north Canadian tundra.

The stump, radiocarbon dated about 4940 (+/- 140) years BP is seen still standing on a steep bank on the Tuktoyaktuk Peninsula (69.7N 133.16W) which borders the Arctic Ocean (Beaufort Sea) east of the McKenzie Delta in extreme northwest Canada.

This tree, in what is now tundra, shows wider growth rings than the nearest present day spruce forest 80-100 km further south near Inuvik in the lowest part of the McKenzie River valley.

Photograph kindly supplied by Professor J. C. Ritchie of Scarborough College, Toronto University

PLATE IV Tree stump (*Picea glauca*) in the north Canadian tundra.
The stump, radiocarbon dated about 4940 years (± 140) B.P., is seen still standing on a steep



The Tuktoyaktuk Peninsula... location of the 5,000 year-old spruce which grew during the Holocene Climate Optimum.



Area around Tuktoyaktuk today:

<http://www.tuktoyaktuk.ca/index.php/visiting/getting-h>



What's happening to the climate is unprecedented

Published: April 9 2010 03:00 | Last updated: April 9 2010 03:00

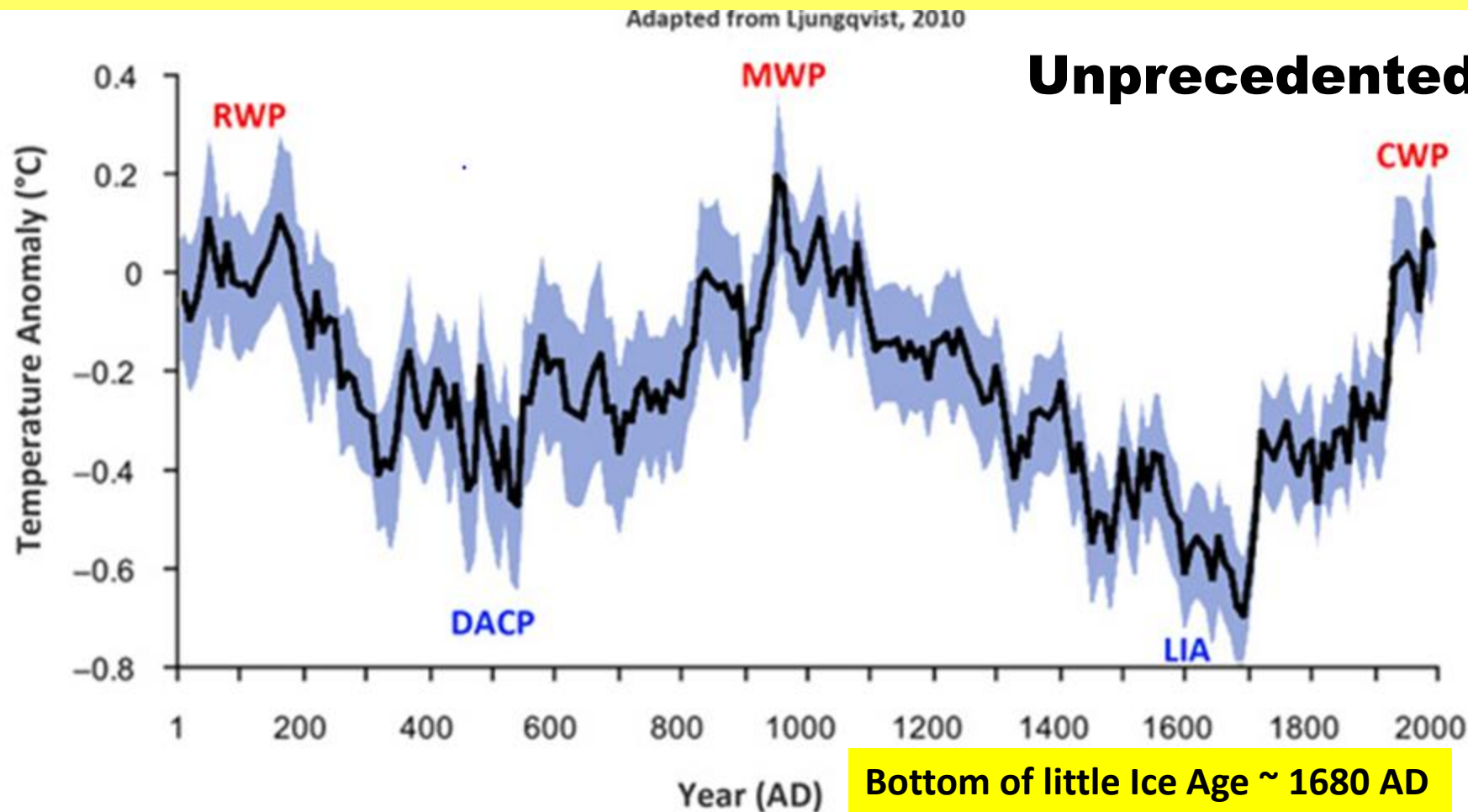
From Prof Martin Rees and Dr Ralph J. Cicerone.

Unprecedented?

Prof Rees is president of the Royal Society in the UK,

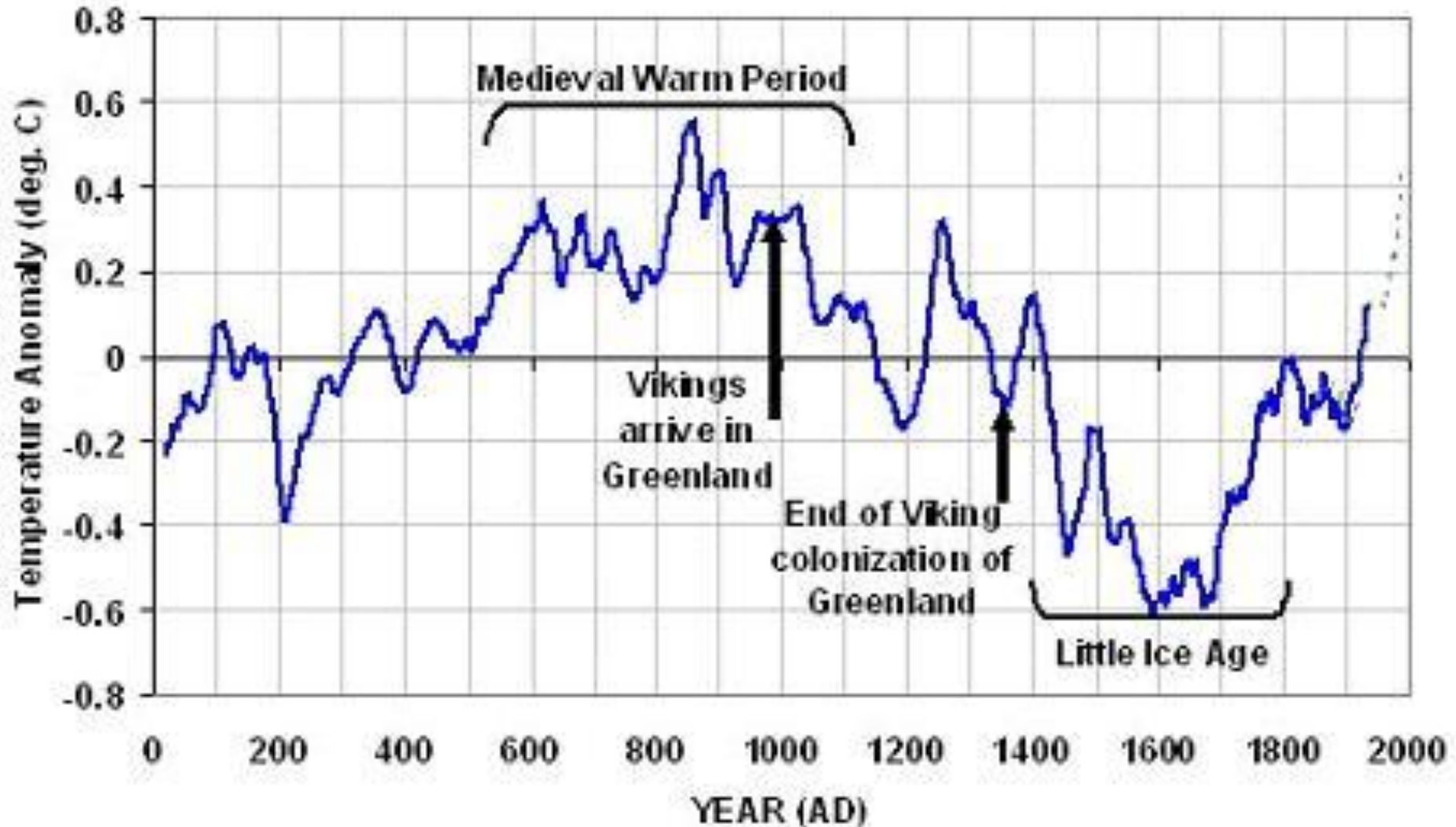
Dr Cicerone is the President of the US National Academy of Science

Ljungqvist, F.C. 2010. A new reconstruction of temperature variability in the extra-tropical Northern Hemisphere during the last two millennia. *Geografiska Annaler Series A* 92: 339-351.



Reconstructed extra-tropical (30-90°N) mean decadal temperature variations relative to 1961-1990 mean of the variance-adjusted 30-90°N CRUTEM3+HadSST2 instrumental temperature data of Brohan et al.(2006) and Rayner et al. (2006). Adapted from Ljungqvist (2010).

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



The Medieval Warm Period happened in the Western USA!

This grainy image is
a Foxtail Pine.

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

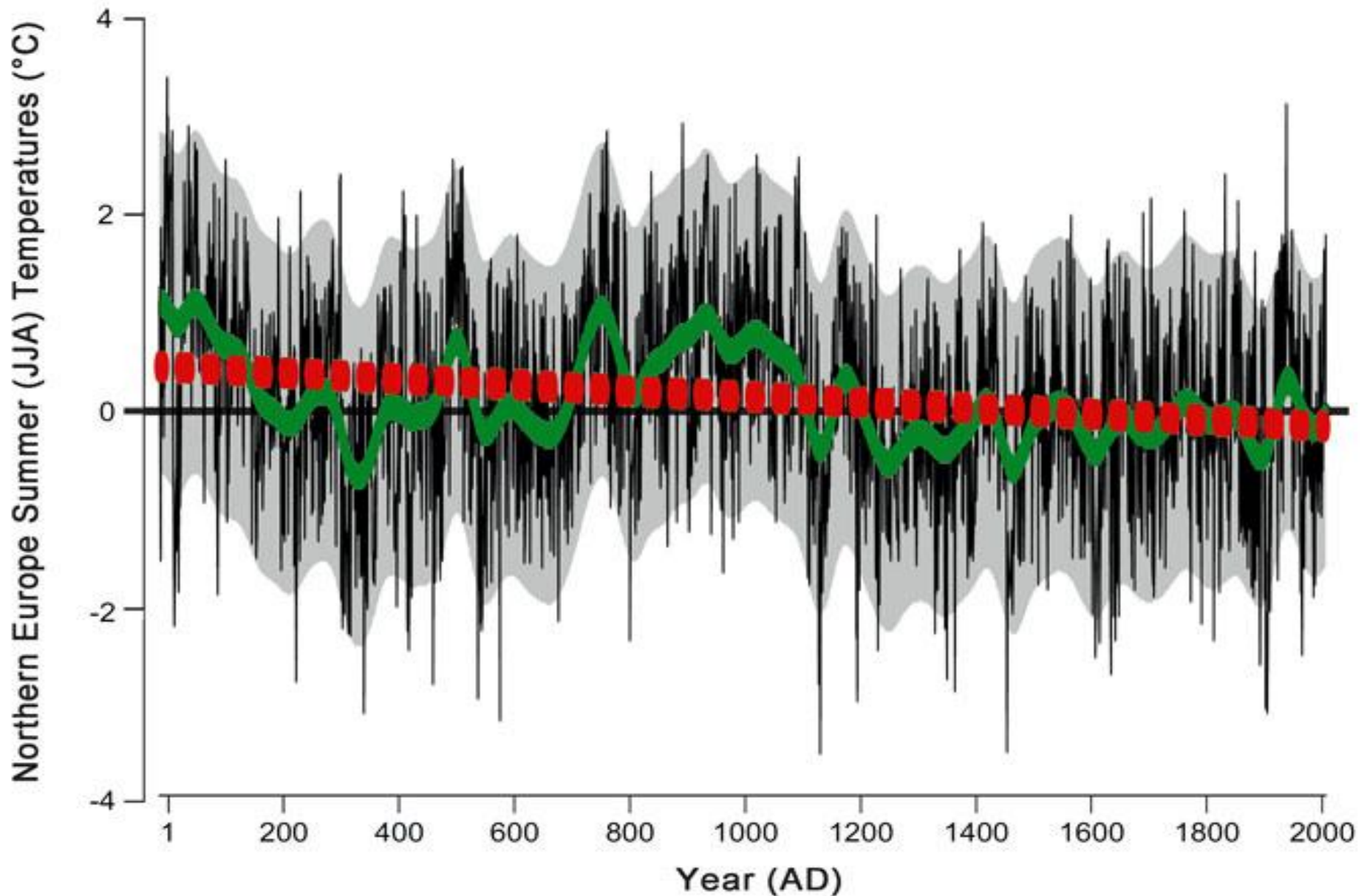
If this was warmest in the Holocene,
the trees would be higher now.

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.

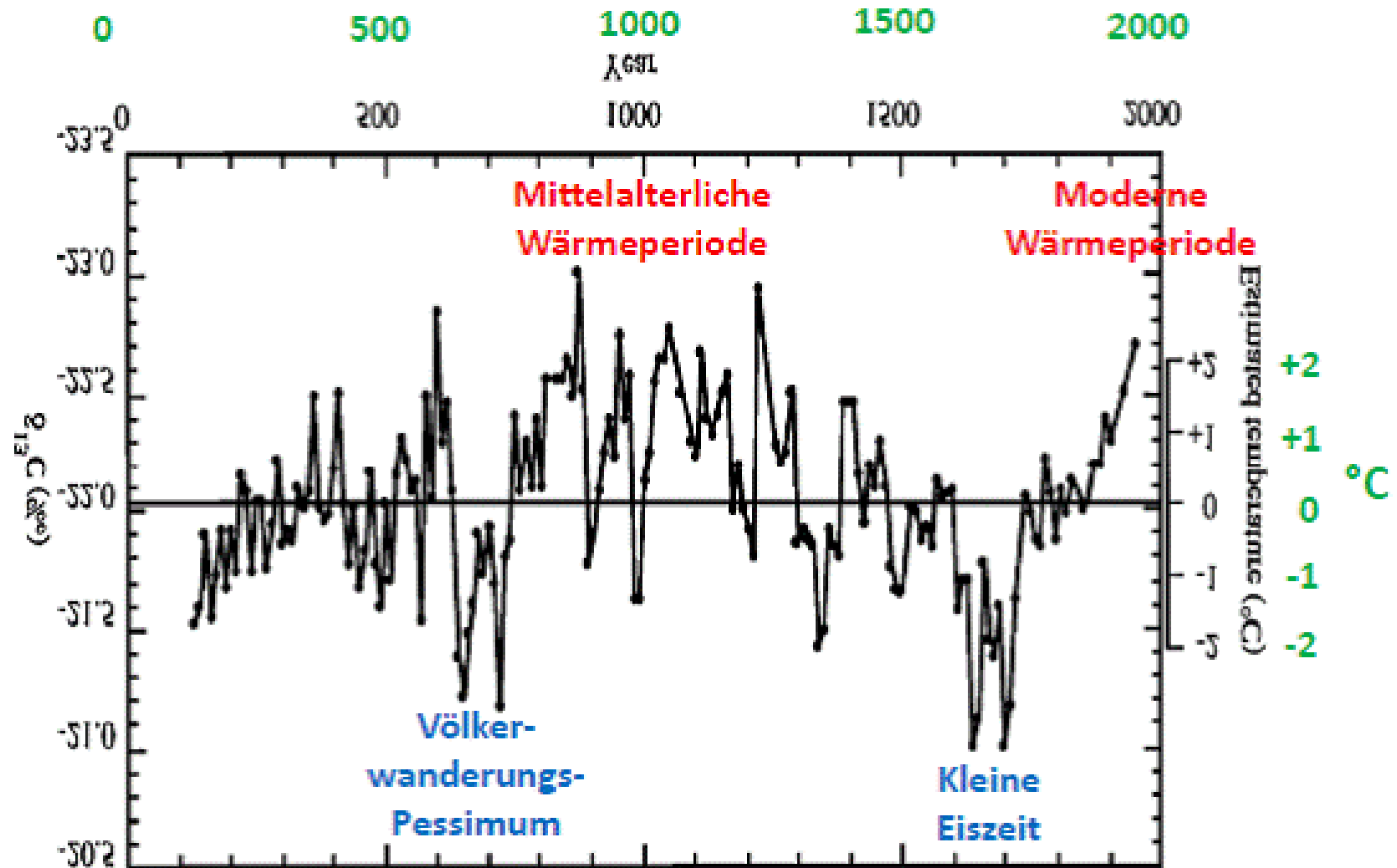


Northern Europe Summer (JJA) Temperature Time Series (Deg C)



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)



<http://wattsupwiththat.com/2012/06/17/manns-hockey-stick-refuted-10-years-before-it-was-published/>

A composite sea surface temperature record of the northern South China Sea for the past 2500 years: A unique look into seasonality and seasonal climate changes during warm and cold periods

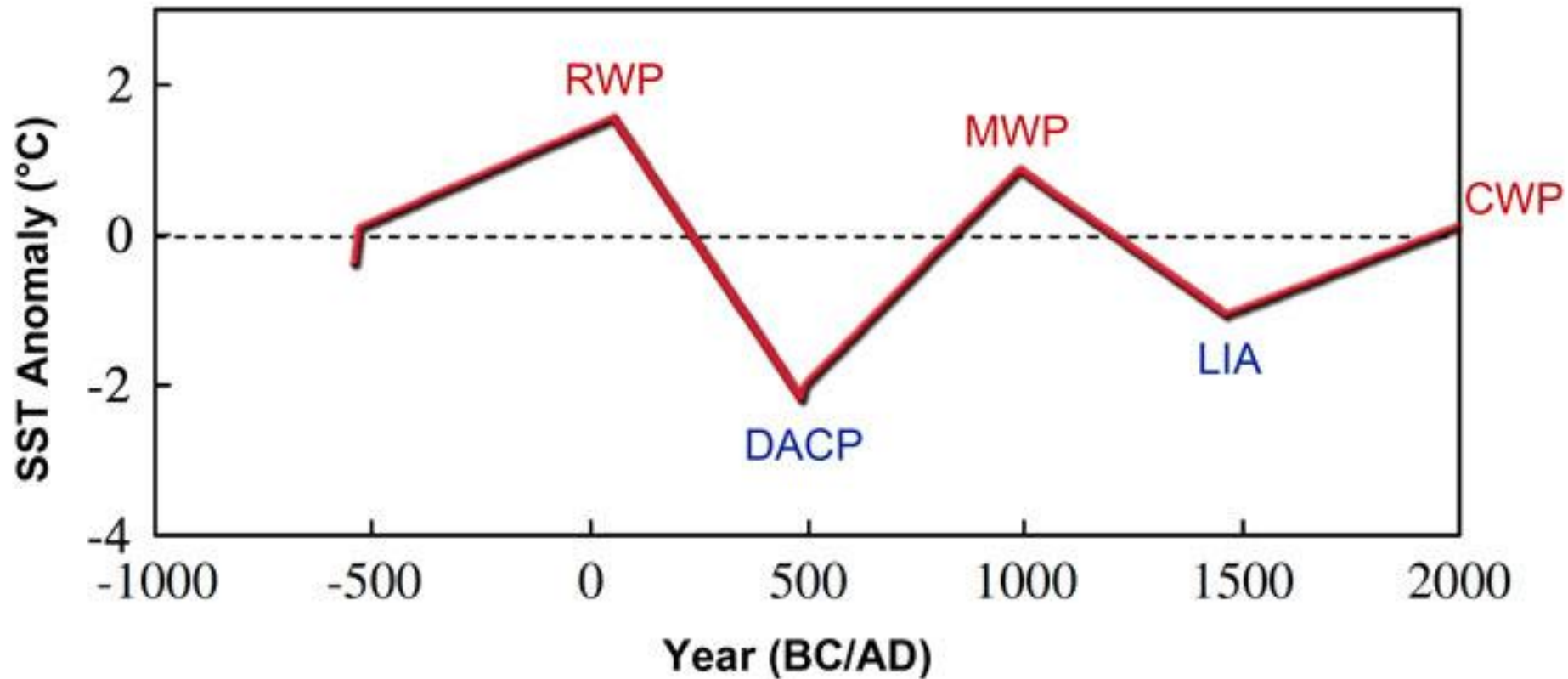
Earth-Science Reviews **141**: 122-135.

Review Article

Pages 122-135

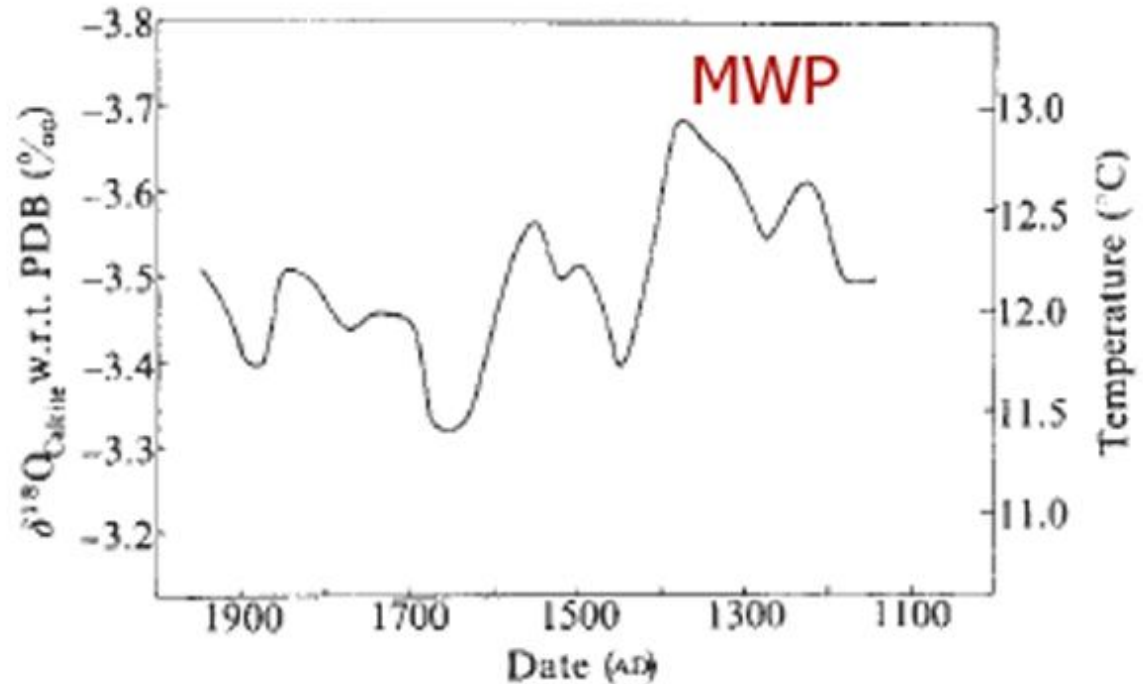
Hong Yan, Willie Soon, Yuhong Wang

SST Proxy for the Northern Region of the South China Sea



Proxy sea surface temperatures in the northern South China Sea revealing warmer temperatures than present during Medieval (MWP) and Roman (RWP) times, and cooler than present temperatures during the Dark Ages Cold Period (DACP) and Little Ice Age (LIA). Adapted from Yan et al. (2015).

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.

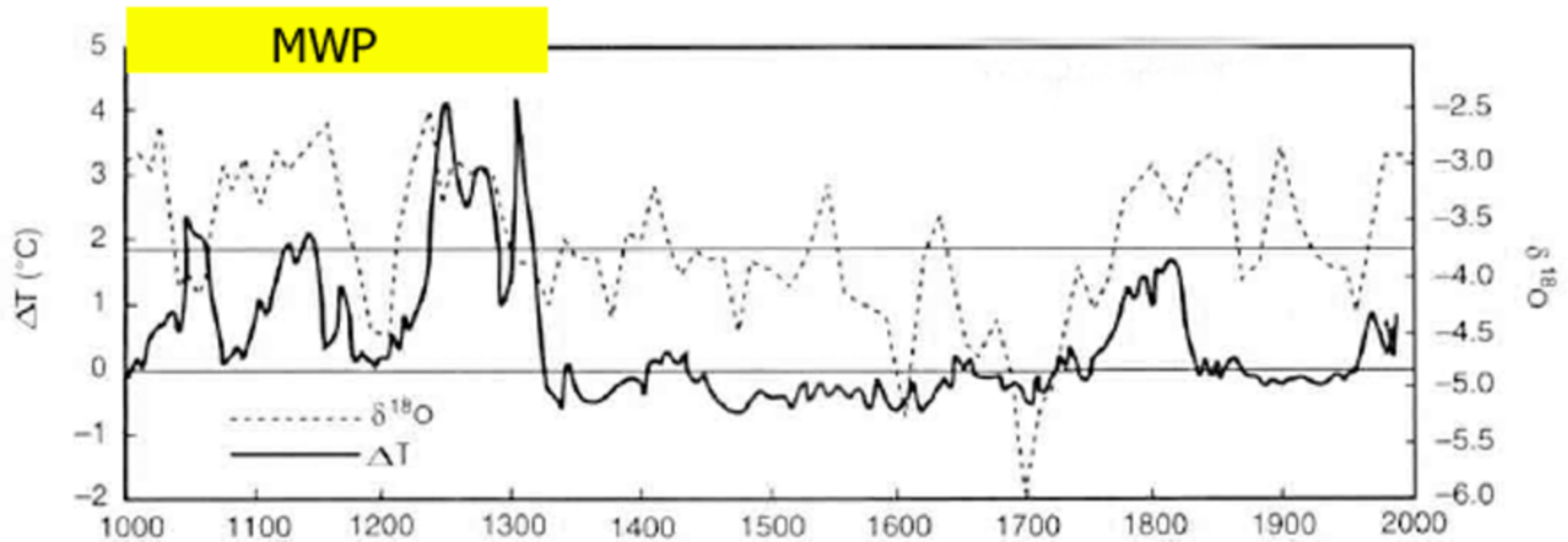
Reference

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.

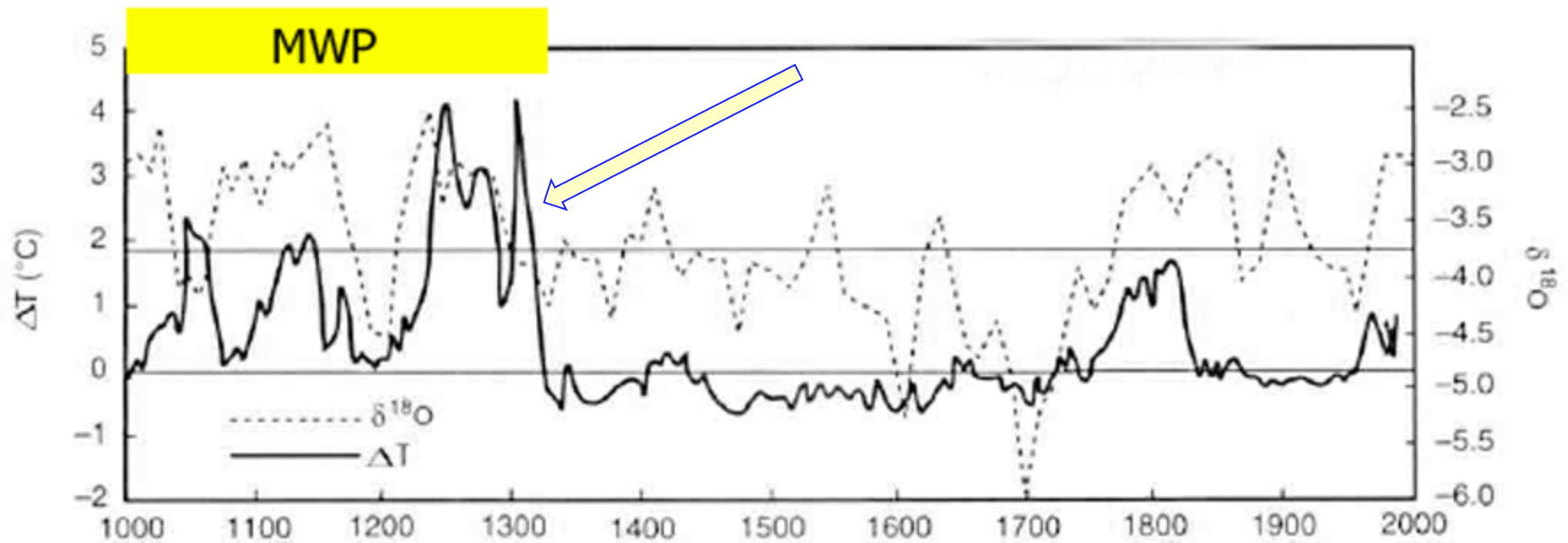


Makapansgat Valley proxy temperature reconstruction adapted from Tyson et al.
MWP is represented by the yellow highlighted bar at the top of the graph.

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](#)).