First presentation of NMSU's Climate "Education" Series: my analysis of Dave DuBois' presentation of 17 April 2018

Why are we concerned about a changing climate?

Bob Endlich <u>bendlich@msn.com</u> Cruces Atmospheric Sciences Forum 21 Nov 2020 Cover Slide, url, from Dave DuBois' presentation. I put the NMSU logo on DuBois' graphics.





https://nmsu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=e2a2af60-a7e8-437a-8199-a8c40146fee9

Conventions and notes for this presentation:





I got Dave DuBois' slides originally from <u>https://nmsu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=e2a2af60-a7e8-437a-8199-a8c40146fee9</u>

This location is on some of my graphics; NMSU has since changed the location to:

https://sustainability.nmsu.edu/nmsuccess/ scroll to the bottom to find his presentation.

I distinguish between Dave DuBois' slides and my graphics

by putting the NMSU logo on DuBois' slides.

Right, how I present information taking issue with DuBois' statements:

When, after challenge from other workers in this specialty, the principal author has to issue a statement that the main feature of the graphic "is not statistically robust"...it means that the data are not trustworthy.

That DuBois misses this confession speaks to poor scholarship on DuBois' part.

Editorial:

NMSU, other Universities and Land Grant Universities, scientists, professional societies, and <deep state> government agencies are making a crisis out of the normal ebb and flow of natural climate cycles, in order to secure special funding channels and prestige, and attach **crisis** and **emergency** to the climate we have and have had for the past 10,000 years or so. In many ways the climate we have now is very beneficial.

Dave DuBois follows this very path; his is

"A Case Study in Dishonesty, Deceit, and Deception."

The following introductory graphics show my bias, based on the references

http://www.drroyspencer.com/2018/07/summer-causes-climate-change-hysteria/



2,000 years of Northern Hemisphere temperature variations from an average of a number of temperature proxies.

The period of substantial human-caused warming is generally agreed to be only since 1950 (IPCC AR5).

https://www.drroyspencer.com/2014/05/ill-see-your-97-percent-and-raise-you-3-percent/ 1690 was the depths of Little Ice Age. Just after 1690, NH temperatures jumped 0.3C. Why? Thermometer record starts in the late 1800s.



Year AD

*Ljungqvist, F.C. 2010. A new reconstruction of temperature variability in the extra-tropical Northern Hemisphere during the last two millennia. Geografiska Annaler: Physical Geography, Vol. 92 A(3), pp. 339-351, September 2010. DOI: 10.1111/j.1468-0459.2010.00399.x https://www.drroyspencer.com/2014/ 05/ill-see-your-97-percent-and-raiseyou-3-percent/

Nearly Every Century Experiences Global Warming or Cooling

Temperature Reconstruction* for N. Hemisphere, 1 - 2000 AD Shows Modern Warm Period Not Exceptional



Year AD

*Ljungqvist, F.C. 2010. A new reconstruction of temperature variability in the extra-tropical Northern Hemisphere during the last two millennia. Geografiska Annaler: Physical Geography, Vol. 92 A(3), pp. 339-351, September 2010. DOI: 10.1111/j.1468-0459.2010.00399.x

Maybe thirteen warm periods in the past 11,000 years, based on Alpine Tree Ring Data



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

Glaciers as Climate Witness.

http://notrickszone.com/2019/01/13/sun-as-main-driver-japanese-scientist-cites-7-major-examples-how-real

-climatic-data-contradict-agw-claims-sun/



THE WASHINGTON TIMES

http://notrickszone.com/2019/03/25/satelliteevidence-affirms-solar-activity-drove-a-significant -percentage-of-recent-warming/



Graph Source: Soon et al., 2015

Non-Adjusted Temperature Data Appear To Correlate With 20th Century Solar Forcing

<u>Yndestad and Solheim (2017)</u> have released a reconstruction of solar activity (Total Solar Irradiance, or TSI) for 1700-2013.



Fig. 3. TSI-HS total solar irradiance from 1700 to 2013 A.D. (Scafetta and Willson, 2014).



<u>http://ruby.fgcu.edu/courses/twimberley/EnviroPhilo/BondPap.pdf</u> A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates Gerard Bond, et al, SCIENCE; 14 Nov 1997; 278, 5341; Research Library

"Thousand year" cycles have been known for over 20 years... published in SCIENCE.

Frequently calledBond Cycles

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.

Greenland GISP2 Ice Core - Temperature Last 10,000 Years

https://wattsupwiththat.com/2011/01/24/easterbrook-on-the-magnitude-of-greenland-gisp2-ice-core-data/

In 2000, Penn State's Richard Alley published on the Younger Dryas, using the GISP2 data from Greenland.

Please note the presence of the Bond Cycles



End of Bob's Editorial and Introduction



Why am I concerned about a changing climate?

My kid's future and opportunities (for example, what will current national parks look like)

My heritage and their traditional lifestyles

My social and moral responsibility

Most of us in this room are in the top 0.1% rich





-

Has the climate changed in the past?

Going back 11,000 years





Marcott

From figure 1 of Marcott et al. "A Reconstruction of Regional and Global Temperature for the Past 11,300 Years" Science 339, 1198 (2013) https://wattsupwiththat.com/2013/03/31/marcott-issues-a-faq-on-thei-paper/

20th century portion of our paleotemperature stack is not statistically robust, cannot be considered representative of global temperature changes, and therefore is not the basis of any of our conclusions

Going back 11,000 years



From figure 1 of Marcott et al. "A Reconstruction of Regional and Global Temperature for the Past 11,300 Years" Science 339, 1198 (2013) During the lecture about these proxies, DuBois' words, about 10:20 in the video are, "...temperatures were falling, and all of a sudden, 'Boom!' the temperatures went up!"

There was not the slightest indication by DuBois that the last 100 years of this 12,000year temperature reconstruction were NOT STATISTICALLY ROBUST, as Marcott's later words described this feature. https://wattsupwiththat.com/2013/03/31/marcott-issues-a-faq-on-thei-paper/

20th century portion of our paleotemperature stack is not statistically robust, cannot be considered representative of global temperature changes, and therefore is not the basis of any of our conclusions.

Going back 11,000 years



From figure 1 of Marcott et al. "A Reconstruction of Regional and Global Temperature for the Past 11,300 Years" Science 339, 1198 (2013)

When, after challenge from other workers in this specialty, the principal author has to issue a statement that the significant feature of the graphic "is not statistically robust,"...

it means that the data are suspect, probably wrong.

That DuBois misses this confession speaks to poor scholarship on DuBois' part.

⁶



Temperature from the past 1000 Years

Northern Hemisphere temperature reconstructions



Mann et al. 2008. Proceedings of the National Academy of Sciences, Vol. 105, No. 36, pp. 13252-13257

This is the Mann Hockey Stick.

DuBois' description of this was, paraphrased, "Some people had problems with it but a later version had 96 co-authors and they all came up with the same result!"

He implies that number of co-authors represents a figure of merit for scientific validity.

Based on DuBois' presentation, the collegeage students present in the audience would have never guessed the Mann Hockey Stick was met with great consternation...

that there were Congressional Hearings on this in 2005 and 2006, when 20-year-old students were in first and second grade.

This controversy continues to the present day.

Temperature from the past 1000 Years

Northern Hemisphere temperature reconstructions



Mann et al. 2008. Proceedings of the National Academy of Sciences, Vol. 105, No. 36, pp. 13252-13257

Subject is very important, and is described in the following slides



Sidebar discussion of the Mann Hockey Stick

Acknowledgement: Steve McIntyre of Climate Audit

Much of what I draw on here is from his research and publications WRT the Mann Hockey Stick

https://climateaudit.files.wordpress.com/2005/09/ohioshort.pdf

How do we "know" that 1998 was the warmest year of the millennium?

Stephen McIntyre

Presentation at Ohio State University May 16, 2008

Thank you for the invitation to speak here. I've spent most of my life in business, mostly on the stock market side of mining exploration deals - not the most obvious introduction to climate science, but one which is perhaps more relevant than people may think. Much of the material in this sidebar comes from Steve McIntyre and his blog Climate Audit





Global Warring In Climate Debate, The 'Hockey Stick' Leads to a Face-Off



Figure 5. Wall Street Journal, Feb. 2005; Top right – at a hearing of the Investigations Subcommittee of the House Energy and Commerce Committee, July 2005. Left to right – Mann, Ralph Cicerone, President of the National Academy of Sciences, me, Jay Gulledge, Pew Center, Edward Wegman.



https://climateaudit.org/2005/06/25/ipcc-1990-an-extended-excerpt/

Original Caption: Figure 7.1. Schematic diagrams of global temperature variations since the Pleistocene on three time-scales:

(a) the last million years; < Bob Comment: Present Warm Period is the COOLEST (!) of the past five warm periods>

(b) the last ten thousand years, and

(c) the last thousand years.

The dotted line nominally represents conditions near the beginning of the twentieth century.

https://climateaudit.org/2005/06/25/ipcc-1990-an-extended-excerpt/

Virtually all our information about modern climate has been derived from measurements which were designed to monitor weather rather than climate change. Even greater difficulties arise with the proxy data...which must be used to deduce the characteristics of climate before the modern instrumental period began. So special attention is given to a critical discussion of the quality of the data on climate change and variability and our confidence in making deductions from these data.





Note that we have not made much use of several kinds of proxy data, for example tree ring data, that can provide information on climate change over the last millennium. [my bold] We recognise that these data have an increasing potential; however their indications are not yet sufficiently easy to assess nor sufficiently integrated with indications from other data to be used in this report. Climate varies naturally on all time scales from hundreds of millions of years to a few years.. Since the beginning of the current interglacial epoch about 10,000 years BP, global temperatures have fluctuated within a much smaller range, Some fluctuations have nevertheless lasted several centuries, including the Little Ice Age which ended in the nineteenth century and which was global in extent. ...

I show this in the next graphic

https://wattsupwiththat.com/2011 /01/24/easterbrook-on-themagnitude-of-greenland-gisp2ice-core-data/



https://climateaudit.org/2005/06/25/ipcc-1990-an-extended-excerpt/

There is evidence that rapid changes in climate have occurred on time scales of about a century which cannot be directly related to

orbital forcing or to changes in atmospheric composition.



Greenland GISP2 Ice Core - Temperature Last 10,000 Years

https://wattsupwiththat.com/2011/01/24/easterbrook -on-the-magnitude-of-greenland-gisp2-ice-core-data/ We conclude that despite great limitations in the quantity and quality of the available historical temperature data, the evidence points consistently to a real but irregular warming over the last century. A global warming of larger size has almost certainly occurred at least once since the end of the last glaciation without any appreciable increase in greenhouse gases. **Because we do not understand the reasons for these past warming events, it is not yet possible to attribute a specific proportion of the recent, smaller warming to an increase of greenhouse gases.**



https://wattsupwiththat.com/2011/01/24/easterbrook -on-the-magnitude-of-greenland-gisp2-ice-core-data/

So why was the Hockey Stick so influential?

First, it appeared to provide a much more sophisticated statistical analysis than earlier efforts.

It claimed to have "statistical skill," reporting highly significant verification RE and r2 statistics.

It claimed to be robust to the presence or absence of tree ring proxies, about which there was then considerable specialist caution.

It used seemingly sophisticated "principal components" methods to handle a much larger data set than had been considered in prior studies. **O** Skill: "significant skill in independent cross-validation tests"

- **O** *Robustness to tree ring problems:* "possible low-frequency bias due to non-climatic influences on tree-ring indicators is not problematic ... Whether we use all data, exclude tree rings, or base a reconstruction only on tree rings, has no significant effect on the form of the reconstruction..."
- **O** Size of network: Unprecedentedly large (415 proxies), some of which summarized by principal components
- **O** Geographical Balance
- Qualified Proxies: all had been "analysed by palaeoclimate researchers"

But we (Climate Audit) were unable to replicate these claims.

Our calculations showed that the verification r2 statistic in the AD1400 step, the first step in MBH98, was only 0.02 –completely insignificant.

Other standard statistics failed as well

<u>realclimate</u>: False Claims by McIntyre and McKitrick regarding the Mann et al. (1998) reconstruction; Myth vs. Fact Regarding the "Hockey Stick"; On Yet Another False Claim by McIntyre and McKitrick; Dummies guide to the latest "Hockey Stick" controversy.

Mann This claim by MM is just another in a series of disingenuous (off the record: plainly dishonest) allegations by them about our work. Our reconstruction passes both RE and R^2 verification statistics if calculated correctly. ... I hope you are not fooled by any of the "myths" about the hockey stick that are perpetuated by contrarians, right-wing think tanks, and fossil fuel industry disinformation. (Michael Mann 2005)

<u>UCAR</u> "the highly publicized criticisms of the MBH graph are unfounded" (UCAR 2005)

Houghton at Senate, July 2005: "the assertions by McIntyre and McKitrick have been shown to be largely false in the context of the actual data used by Mann and co-workers." (Houghton 2005)


From McIntyre's **Climate Audit**:

One of the main difficulties with the Mann Hockey Stick was Mann's use of Keith Briffa's 12 cores of data from the Yamal Peninsula of Northern Russia.

http://bishophill.squarespace.com/blog/2009/9/29/the-yamal-implosion.html

There is a long story at this 2009 (!) Bishop Hill post, which I recommend reading. A Cliff's Notes summary follows:

"...This could be done by performing a simple sensitivity test, replacing the twelve cores that Briffa had used for the modern sections of Yamal with some of the other available data. Sure enough, there was a suitable Schweingruber series called Khadyta River close by to Yamal, and with 34 cores, it represented a much more reliable basis for reconstructing temperatures."

https://climateaudit.files.wordpress.com/2009/11/google_labeled1.jpg



http://bishophill.squarespace.com/blog/2009/9/29/the-yamal-implosion.html

McIntyre therefore prepared a revised dataset, replacing Briffa's selected 12 cores with the 34 from Khadyta River.

- The revised chronology was simply staggering. The sharp uptick in the series at the end of the twentieth century had vanished, leaving a twentieth century apparently without a significant trend.
- The blade of the Yamal hockey stick, used in so many of those temperature reconstructions that the IPCC said validated Michael Mann's work, was gone. (bold, paragraphing added)



Proof that Michael Mann's Hockey Stick was based on 12 anomalous Yamal Peninsula tree rings!

Michael Mann cherry picked these rings to show the "Hockey Stick."

Michael Mann still clings to this charade.

Dave DuBois has not had the curiosity to find or ask about this finding.



Steve McIntyre

Posted May 24, 2013 at 11:15 PM | Permalink

Briffa's exclusion of Khadyta data reminds me of Esper's wonderful dictum:

However as we mentioned earlier on the subject of biological growth populations, this does not mean that one could not improve a chronology by reducing the number of series used if the purpose of removing samples is to enhance a desired signal. The ability to pick and choose which samples to use is an advantage unique to dendroclimatology.

Yup.

DuBois, quoting Michael Mann



Mann et al. 2008. Proceedings of the National Academy of Sciences, Vol. 105, No. 36, pp. 13252-13257



Mann Hockey Stick did not find a Medieval Warm Period.

Hockey Stick published in the IPCC Third Assessment Report aka TAR



See Next, from the Polar Urals

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.

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

This looks like more cheating to me, by Mann and the IPCC.

The Briffa reconstruction is the solid black in the plot on the left and the solid green on the right.

Notice how the green plot is truncated in the IPCC report, right. This is "Mike's NATURE trick to Hide the Decline."

Below Left, Mann's chart used by DuBois. Right, from IPCC Third Assessment chart, then McIntyre Temperature from the past 1000 Years Northern Hemisphere temperature reconstructions



Mann et al. 2008. Proceedings of the National Academy of Sciences, Vol. 105, No. 36, pp. 13252-13257

How do we "know" that 1998 was the warmest year of the millennium?

Stephen McIntyre Presentation at Ohio State University May 16, 2008



Figure 28. Left - IPCC TAR Spaghetti Graph. Right- blow-up of right hand portion. The divergent portion (after 1960) of the Briffa reconstruction (green) was deleted in IPCC TAR (green) 1960 and thus no visible "divergence". Similar truncation in AR4.

http://jonova.s3.amazonaws.com/graphs/mwp-lia/hiding-the-decline-hockeystick-mann-600.jpg

What the tree rings show:

After "Mike's trick" to hide the decline





Changes already happening



- State-wide temperatures of last decade were warmest of this century
- Morning lows getting warmer on top of urban heat island (not all locations)
- Longer growing season
- Mountain freezing level higher in elevation
- Dust storms not only affecting human health but slowly changing snowmelt timing

Changes already happening



- State-wide temperatures of last decade were warmest of this century
- Morning lows getting warmer on top of urban heat island (not all locations)
- Longer growing season
- Mountain freezing level higher in elevation
- Dust storms not only affecting human health but slowly changing snowmelt timing

DuBois reports this as a news flash. Really?

Is there a period of stasis in the data? Never. DuBois is disingenuous.

We are emerging from the Little Ice Age, part of the Bond Cycles

This is deliberate distortion of the record.



Changes already happening



- State-wide temperatures of last decade were warmest of this century
- Morning lows getting warmer on top of urban heat island (not all locations)
- Longer growing season
- Mountain freezing level higher in elevation
- Dust storms not only affecting human health but slowly changing snowmelt timing

DuBois reports this as a news flash.

Really?

- Is there a period of stasis in the data? Never.
- DuBois is disingenuous.
- We are emerging from the Little Ice Age
- This is deliberate distortion of the record.





There's no doubt that we're warming

Already in a warming trend & to continue into

the future

Trend per decade in summer (JJA) temperatures since 1970 by climate division



Statewide +0.7°F per decade

Data source: https://www.ncdc.noaa.gov/cag/

Right away, DuBois conveys the notion that the post-1970 warming associated with the Atlantic Multidecadal Oscillation continues forever.

His presentation dismisses "climate cycles," despite AMO data showing ~60-year cycles in the 20th into the 21st Century, some indicated in graphics below.

illustrate these climatic trends.



There's no doubt that we're warming



• Already in a warming trend & to continue into







https://climatedataguide.ucar.edu/climate-data/atlantic-multi-decadal-oscillation-amo

Starting to count temperatures about 1970 is deliberately deceptive. There is a prominent 60-year cycle in North American Temperatures—the Atlantic Multi-decadal Oscillation. https://climatedataguide.ucar.edu/climate-data/atlantic-multi-decadal-

oscillation-amo





Why is the climate changing?



Could it be the sun?



Light Energy From the Sun

Long wave energy (heat) returned to space

SUSPECT 1: The Sun



Changes in energy from the sun reduce or increase the energy received by the earth over years to millennia



https://www.pmodwrc.ch/forschung-entwicklung/solarphysik/tsi-composite/

Solar Variations



- Sun spots follow an 11-year cycle, also called a Schwabe cycle
- Each sunspot is a cool region but overall the sun shines brighter during more spots
- Variations in sunspots alter intensity by about 0.08%
- Averaged over the Earth, corrected for Earth's albedo, results in forcing of 0.2 W/m²

Non-Adjusted Temperature Data Appear To Correlate With 20th Century Solar Forcing

<u>Yndestad and Solheim (2017)</u> have released a reconstruction of solar activity (Total Solar Irradiance, or TSI) for 1700-2013.



Fig. 3. TSI-HS total solar irradiance from 1700 to 2013 A.D. (Scafetta and Willson, 2014).



Data

by James Hansen, et. al, an increasingly hard to find paper published by Science in 1981 (Sci. 28 Aug 1981, Vol. 213, No. 4511.

https://casf.me/pdf-files-climate-related-reports -studies-and-data/

SUSPECT 2: Natural cycles



Internal cycles exchange heat between the ocean and atmosphere, altering weather patterns around the world on timescales from 30 days up to 120 years or more



The Northeasterly Trade Winds are very prevalent, stronger in La Nina years. Visitors to Hawaii usually encounter steady from the northeast Trade Winds

This is the first time I'll show ENSO, El Nino-Southern Oscillation, indeed an atmospheric-oceanic exchange, more detail when you see this graphic next time.



http://www.essc.psu.edu/essc_web/seminars/spring2006/Mar1/Bond%20et%20al%202001.pdf

Persistent solar influence on North Atlantic climate during the holocene Gerard Bond; Bernd Kromer; Juerg Beer; Raimund Muscheler; et al *Science;* Dec 7, 2001; 294, 5549; Research Library Core pg. 2130

Paper on Bond Cycles

Hayhoe and DuBois are ignorant of the Bond Cycles.

Here is the oceanatmosphere exchange doubted by DuBois

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. <u>http://ruby.fgcu.edu/courses/twimberley/EnviroPhilo/BondPap.pdf</u> A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates Gerard Bond, et al, SCIENCE; 14 Nov 1997; 278, 5341; Research Library

"Thousand year" cycles have been known for over 20 years... published in SCIENCE.

Frequently calledBond Cycles

Why is David DuBois ignorant of the Bond Cycles?

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.

Orbital cycles



Orbital cycles alter amount of energy received



And we were cooling ... until the 1700s 1 °F industrialization temperature 0 °F -1 °F 400 no major natural cycles





Deceptive Dubois graphic from Katharine Hayhoe, similar at https://casf.me/evening-lecturealarmist-katharine-hayhoe/

How are Hayhoe and Dubois so ignorant of the Bond Cycles?

Greenland GISP2 Ice Core - Temperature Last 10,000 Years



Glaciers as Climate Witness, Gletcher als Klimazeugen



http://www.drroyspencer.com/wp-content/uploads/2000-years-of-global-temperatures-industrial-revolution-start.jpg

Northern Hemisphere. Journal Article showing present warming is what we'd expect coming out of the Little Ice Age

Robert Fulton's steamboat's first steam propulsion trips started in 1807.



https://www.academia.edu/381635/A_new_reconstruction_of_temperature_variability_in_the_extra-tropical_ Northern_Hemisphere_during_the_last_two_millennia

... but the next natural cycle is an ice age



LETTERS PURCHARD CHURCH ANNUARY 2010 | DOI 10.0016/10180100

nature geoscience

Determining the natural length of the current interglacial

P. C. Tzedakis1+, J. E. T. Channell², D. A. Hodell³, H. F. Kleiven^{4,3} and L. C. Skinner³

No glodal inception is projected to occur at the current atmospheric CO, concentrations of 390 ppow (rel. 1). Indeed, model experiments suggest that in the corner orbital configuration-which is characterized by a weak minimum in summer insolution-glacial inception would require CO, concontrations below proindustrial levels of 280 parcy (refs 2-6). However, the precise CO, threshold"" as well as the timing of the hypothetical next glaciation' remain undeas. Past intorgledials can be used to draw analogies with the present provided their duration is known. Here we propose that the minimum age of a glacial inception is constrained by the second of hipplan we have climate variability, which requires its shoets large enough to produce imberg discharges that derupt the nonan circulation. We identify the bipolar seears in ice-comand North Atlantic marine records by the appearance of a distinct phasing of interhemispheric dimete and hydrographic changes and ice-milled debris. The glodal inception during Marine lastope sub-Stage 10c, a close analogue for the present interglacial, occurred near the summer insolution edulation, suggesting that the interglacial was not prolonged by subdued radiation fording". Assuming that ice growth mainty responds to inselution and CO, forcing, this analogy suggests that the and of the current interglacial would occur within the next 1500 years, if atmospharic CO, concentrations did not eacand 240 it Spperiv.

The notion that the Holocener low Marine incomposition (1.4) (3.4)

Clintatic modelling studies show that a reduction in boreal segments modelsion is the primary trajectory for glucid integration, with GO, playing a succedary midel. Lowering GO, shifts the inception induction bar principal and a studies of 200 perior would not be addressible low to laid to two growth given the subdual intudentia missionary.¹¹ However, the entries to which the

Tonisonnets Oranja Research Certin, Department of Securgaska, Lowensky Gillegi Lander, Lowien WCX 4387, XX.³Department of Destinguation of Lens Society of Landership, Candership CR221Q, UK.³Department of Lent Normal, University of Landership, Candership CR221Q, UK.³Department of Lent Normal, University of Lent Normal, Versity (Lent Normal), Versity (L

10 1011 Machine Publicary London. Bullette manual

Figure 11 Automassimal parameters (200 kpc after proceeds = 500 kpc at and parameters at a second or 500 kpc at a finite se

prunduatial COs Sevin ware 'turnati' has been shallenged⁴¹¹ In the suggestion that anthropogenic interfarence size the midbioloceus led to intervated proclimate gas (CIIC) concentrations, which construent the natural cooling trend and presented a glacial inception. The overthar glaciation hepethesis has been tuned by Climate structures using lower presidential GIIC concentrations,

safes interest of interest and the second se

"Based on these natural cycles, our current warming period should end within 1,500 years"

"And so we can be fairly sure that we have, whether we like it or not, delayed the possibility that we will revert from our present interglacial into a glacial state."



... but the ocean, atmosphere, land surface and cryosphere are <u>all</u> warming

Increased Heat Absorbed by the Earth (10²¹J)



Hey Dr DuBois!

Who says we are finished with the current Bond Cycle warming?

If a Bond Cycle is 1000 years long, and the bottom of the Little Ice Age was 1690, both of which we saw here...

then the peak might be 1690+500 or 2190. OR it might be 1690+725 or 2415... 400 years away.

... but the next natural cycle is an ice

age

Determining the natural length of the current interglacial

LETTERS



The form the current stability angle of interfactors in the stability of interfactors i

b) CO2 priority a socializer more "Lowering CO2, shifts the lifetime studies of the social social



geoscience

that all provide the second se



"Based on these natural cycles, our current warming period should end within 1 500 years"

"And so we can be fairly sure

that we have, whether we like it or not, delayed the possibility that we will revert from our present interglacial into a glacial state."



https://www.drroyspencer.com/2014/ 05/ill-see-your-97-percent-and-raiseyou-3-percent/

Nearly Every Century Experiences Global Warming or Cooling

Temperature Reconstruction* for N. Hemisphere, 1 - 2000 AD Shows Modern Warm Period Not Exceptional



Another Paper showing Bond Cycles

Hayhoe and DuBois are ignorant of the Bond Cycles.

This also points out what careful analysis of the data can reveal, those smaller cycles within the Bond Cycles.

> *Ljungqvist, F.C. 2010. A new reconstruction of temperature variability in the extra-tropical Northern Hemisphere during the last two millennia. Geografiska Annaler: Physical Geography, Vol. 92 A(3), pp. 339-351, September 2010. DOI: 10.1111/j.1468-0459.2010.00399.x

Year AD

What about oceanic cycles?



Energy is cycled from ocean to air and back over time. They don't create or store heat. Example of internal variability of the climate system. They do influence weather patterns.



The Northeasterly Trade Winds are very prevalent, stronger in La Nina years. Visitors to Hawaii usually encounter steady from the northeast Trade Winds


Nino 3.4 region: area bounded from 5N to 5S and from 120W to 160E





 Home
 Climate Information
 Data Access
 Customer Support
 Contact
 About
 Search
 Q

 Home > Climate Monitoring > Equatorial Pacific Sea Surface Temperatures
 July Global Release: Thu, 20 Aug 2015, 11:00 AM EDT

Equatorial Pacific Sea Surface Temperatures



ENSO | Zonal Winds | SSTs | Sea Temps | SST Anomalies | OLR | SOI

El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above (below) the threshold of +0.5°C (-0.5°C). This standard of measure is known as the Oceanic Niño Index (ONI).





The Oceanic Nino Index: (ONI) is one of the primary indices used to monitor the El Nino-Southern Oscillation (ENSO). The ONI is calculated by averaging sea surface temperature anomalies in an area of the east-central equatorial Pacific Ocean, which is called the Nino 3.4 region (5S to 5N; 170W to 120W).

http://ggweather.com/enso/oni.htm

Golden Gate Weather Services, Jan Null, used with permission

Red = Strong El Niño Blue = Strong La Niña Black = Moderate (either)

Oceanic Niño Index (ONI)

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml



Oceanic Niño Index (ONI)

Nino 3.4 Temperatures, Ocean SST

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml



Global Greenhouse Temps, TLT



Oceanic Niño Index (ONI) http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml Very 82-83 72-73 Strong 91-92 87-88 Strong 09-10 02-03 6-87 Moderate 68-69 94-95 Weak MЛ Weak 95-96 11-12 Moderate 70-71 -99-00 07-08 75-76 10-11 Strong 88-89 89 91 92 33 88 \$\$ \$\$ 5 an-67 22 181 8 Jan-95 Jan-96 1an-97 Jan-14 ai-15 an-17 an-18 an-19 Dates: Feb 1979 - Aug 2019 **Global Greenhouse Temps, TLT** 0.9 **UAH Satellite-Based** 0.8 0.7 **Temperature of the** G 0.6 Departure from '81-'10 Avg. (deg. **Global Lower Atmosphere** 0.5 (Version 6.0) 0.4 0.3 0.2 0.1 0 -0.1 -0.2 -0.3 August, 2019: -0.4 **Running**, centered +0.38 deg. C -0.5 13-month average -0.6 F -0.7

19

Nino 3.4 Temperatures, Ocean SST

 1993

 1993

 1994

 1995

 1995

 1996

 1997

 1998

 1999

 1996

 1997

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

 1998

What about oceanic cycles?

Energy is cycled from ocean to air and back over time. They don't create or store heat. Example of internal variability of the climate system. They do influence weather patterns.





DuBois is Bizarre! And Wrong!

Of course ENSO stores warm water in the Western Pacific near Indonesia!

Trade winds push water from offshore South America across the Pacific to Indonesia, all the way across the Pacific. The water is warmed by the equatorial sun along its journey.

The warmed water is stored at the surface and below the surface when the trade winds stack up the warm water against Indonesia, until El Nino allows the flow back to the East

Videos which follow:

First shows El Nino releasing the heat stored in the western Pacific as it spreads East, across the Pacific Basin.

Second shows La Nina-strengthened trade winds push warm water back across the Pacific to the Western Pacific.

El Nino!



Here is La Nina



SUSPECT 4: Geologic Activity



Volcanoes produce dust, soot and ash



Geologic features (fissures, mud volcanoes, submarine volcanoes) also leak carbon dioxide and methane on an ongoing basis



Effects of from Volcanoes

- Volcanic CO₂ contributes to radiative forcing
 - Human sources contribute 150x that of volcanoes
 - Pinatubo emitted 4.2x10⁷ metric tons of CO₂
 - San Juan power plant emitted 1.1x10⁷ just in 2012





Image sources: http://pubs.usgs.gov/fs/1997/fs113-97/,

http://www.yaleclimateconnections.org/pics/0210_sanjuangensta.jpg

At 37:50 Dave Dubois says "Pinatubo is in the Southern Hemisphere"



CO₂ from Volcanoes

- <u>0.18 to 0.44</u> GT/yr CO₂ from volcanoes
- Anthropogenic sources account for <u>35</u> GT/yr in 2010
- Light duty vehicles 3 GT/yr

Plot to the right shows <u>ratio</u> of anthropogenic over volcanic CO₂ emissions over time

Graph from T. Gerlach (2011) EOS, 92(24)







... but volcanoes cool climate, not warm it. ... and geologic emissions <1/10 of human sources



Mt. Pinatubo erupted in 1990 in the Philippines

http://www.drroyspencer.com/latest-global-temperatures/



The natural suspects all have alibis!

- 1. The Sun: we should be getting cooler
- Natural cycles: the ocean should be getting cooler if the atmosphere is warming & The Orbit: too slow and next thing coming is another ice age
- 3. Geology: eruptions cool; slow leaks produce heat-trapping gases, but not nearly as much as humans



Minor point, the climactic eruption of Mt. Pinatubo was 15 Jun 1991, not 1990

... but volcanoes cool climate, not warm it. ... and geologic emissions <1/10 of human sources



Mt. Pinatubo erupted in 1990 in the Philippines



http://www.drroyspencer.com/latest-global-temperatures/

Mount Pinatubo



The eruption column of Mount Pinatubo on June 12, 1991, three days before the climactic eruption

What about atmospheric composition?





emits thermal radiation in infrared.



What could be driving current change?



- 1. Natural cycles 🖖
- 2. The Sun 🖖
- 3. The Orbit 🖖
- 4. Geology 🗸
- 5. Atmospheric Composition 🛧

https://wattsupwiththat.files.wordpress.com/2012/10/49ff5-6a010536b58035970c0134840e51fd970c-pi.png



What could be driving current change?



- 1. Natural cycles 🖖
- 2. The Sun 🕹
- 3. The Orbit 🗸
- 4. Geology 🗸

ALL OF THESE ARE IN BUSINESS RIGHT NOW. BUT MOST OF THEM ARE TRYING TO DRIVE OUR TEMPERATURE DOWN.

5. Atmospheric Composition 1

Atmospheric Composition is Driving it up Again, DuBois presents his graphic below in the form of a News Flash.

In 2000-year context, Ljungqvist shows that current temperatures are quite ordinary.

DuBois does not answer the question, "What is driving the Bond Cycles?" What caused that huge temperature increase around 1700?

What could be driving current change?

- 1. Natural cycles 🗸
- 2. The Sun 🕹
- 3. The Orbit 🗸
- 4. Geology ↓↑
- 5. Atmospheric Composition 🛧

Atmospheric Composition is Driving it up



ALL OF THESE ARE IN

BUSINESS RIGHT NOW. BUT MOST OF THEM ARE

TRYING TO DRIVE OUR

TEMPERATURE DOWN.



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.

Peak previously called the Holocene Climactic Optimum.



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.. <u>Climate, History and the Modern World (Kindle Location 2207)</u>. Taylor and Francis, Kindle Edition

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



Tree Ring temperature curve from Yakushima, Japan, mirrored (up hot, cold at bottom) and marked with the historically known warm and cold periods. This curve is one of many which show that the Medieval Warm Period was not locally confined to the north Atlantic and Europe, as is often claimed by climate alarmists.

http://www.drroyspencer.com/2009/06/epa-endangerment-finding-my-submitted-comments/



Increasing heat-trapping gases can artificially enhance the *natural* greenhouse effect



THE NATURAL GREENHOUSE EFFECT

naturally increases Earth's temperature by ~60°F



THE ENHANCED GREENHOUSE EFFECT has artificially increased Earth's temperature by 1.4°F



DuBois follows the polemic, but is wrong.

Graphics from Happer's latest work shows that CO2 effect is saturated.

Dependence of Earth's Thermal Radiation on Five Most Abundant Greenhouse Gases, W. A. van Wijngaarden and W. Happer_https://arxiv.org/pdf/2006.03098.pdf Fig 4.



This work examined the transmission of infrared radiation through a cloud-free atmosphere from the Earth's surface to outer space. A line-by line-calculation used over 1/3 million lines of the five most important naturally occurring greenhouse gases, H2O, CO2, O3, N2O and CH4.

The most striking fact about radiation transfer in Earth's atmosphere is summarized by Figs. 4 and 5.

Doubling the current concentrations of the greenhouse gases CO2, N2O and CH4 increases the forcings by a few percent for cloud-free parts of the atmosphere.

Dependence of Earth's Thermal Radiation on Five Most Abundant Greenhouse Gases, W. A. van Wijngaarden and W. Happer <u>https://arxiv.org/pdf/2006.03098.pdf</u> Fig 4.



Figure 4: Effects of doubling concentrations of carbon dioxide, CO2 on the filtered spectral flux at the mesopause altitude = 86 km. Present <CO2> of 400 PPM, black, Doubled to 800 PPM, red...

Dependence of Earth's Thermal Radiation on Five Most Abundant Greenhouse Gases, W. A. van Wijngaarden and W. Happer_https://arxiv.org/pdf/2006.03098.pdf Fig 4.



Doubling the CO2 concentration will cause a temperature decrease of the upper atmosphere of about 10 K... to restore hypothetical radiative-convective equilibrium...

For the case of fixed absolute humidity, the surface warms by 1.4 K which agrees very well with other work...

Keep in mind the Bond Cycles and temperature history as you glance at the next graphics

Greenland GISP2 Ice Core - Temperature Last 10,000 Years



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

Professor Glen M. McDonald, 221-234 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, <u>Climate, History, and the Modern World</u>



http://drtimball.com/2012/sensationalist-and-distorted-climate-stories-increase-as-climate-science-failures-exposed/



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 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 n the lowest part of the McKenzie River valley.

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



Arctic Village

Venetie

Prudhoe Bar

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





What about our future?


Days with maximum temperature > 105F



For Las Cruces Heat waves + high temperatures

- More frequent extreme heat days and warm night and many less cold nights
 - More days per year w/maximum temperatures above 95, 100 and 105°F and nights above 80°F (currently virtually non-existent) and a sharp decrease in nights below 32 and 28°F
- Greater risk of prolonged, multi-day heat events
 - The average and the longest multi-day heat wave based on both daytime maximum and nighttime minimum temperatures will get longer as well

Hayhoe et al. 2016

Plainly wrong. NMSU's thermometers do not meet the standards for surface temperatures because they are over bare dirt, not vegetation. Further, NMSU's thermometers are near the center of Las Cruces' urban heat island. Number of days over 100F (covering 120 years at NMSU)

Dubois and Hayhoe ASSUME that the increasing number of hot days goes as the increasing CO2, when it is related to the number of people in Las Cruces.

We characterize this as the Urban Heat island.



The effect is made even worse because the sensors DuBois oversees do not meet the standards of the World Meteorological Organization



Bottom Left contains computer projections from Intergovernmental Panel on Climate Change "scenarios."

The computer models are wildly off the mark, as the chart on the bottom right shows.

Red curve shows the average of 102 IPCC climate model runs which are running very hot compared with measurements from satellites and weather balloons.

Next iteration of the models, CMIP-6, run even hotter, according to early information. The NMSU Campus projections are "Garbage in, Garbage out." Fear Mongering.



Urban Heat Island Las Cruces, NM

Jon Kahler and I made several temperature runs. to characterize Las Cruces' Urban Heat Island. Our data are on-line at https://casf.me/94-2/

NMSU's thermometers are near the peak of this Urban Heat Island.



This is an October 2019 picture of the "Official" climate recording instruments near the NMSU Police Station.

The finned sensor in the middle is the Maximum Minimum Temperature System, MMTS, source of the temperatures for NMSU.

What's wrong with this picture?

MMTS is on bare soil.

It fails the world Meteorological Organization Standard.

Barefoot kids, Farmers and Meteorologists know <or should know> that bare ground gets a lot hotter than ground covered with grass onr vegetation.

Next slide



NMSU's Thermometer exposure fails the World Meteorological Organization's Class One Standard:

"Ground covered with natural and low vegetation (< 10 cm) representative of the region"

Farmers and Meteorologists know <or should know> that bare ground gets a lot hotter than ground covered with vegetation

The WMO standard is on-line here:

<u>https://www.wmo.int/pages/prog/www/IMOP/SitingClassif/CIMO_Guide_2014_en_I</u> <u>1-2_Annex_1B.pdf</u> Hayhoe and Dubois are projecting a Hellish future, based on the NMSU thermometer record.

This is just bad science, which is to say it is not science at all

Temperatures in this region outside the urban heat island are FALLING!

Rainfall in this region is rising.

Just look at the data from the Western Regional Climate Center for our area, next slides

Jornada Experimental Range NM, USHCN, Temperature



Socorro NM Temperature



Bosque Del Apache Temperature



Temperatures are <u>falling</u> in the agricultural regions.

They've been falling for over a century.



Bosque Del Apache Temperature . ш Temperarure 6 . Year



Further, rainfall in this area has been rising for about a century



https://jornada.nmsu.edu/content/usda-noaa-nws-monthly-summary-climatological-data

Jornada Range Precipitation



Bosque Del Apache Rainfall since 1921



Socorro Rainfall since 1942





Upper Rio Grande Max Temperatures



Multivariate Adaptive Constructed Analogs (Abatzoglou and Brown, 2012)

MACAv2-METDATA, Multi-Model Mean

RCP 8.5 is unrealistic. Climate modeling is unvalidated.

Roger Pielke's post on results of downscaling modeling to mesoscales shows futility of this approach.

Climate Science: Roger Pielke Sr.

HOME MAIN CONCLUSIONS MESSAGE FROM R.A. PIELKE SR.

Pielke Research Group: News and Commentary



Roger A. Pielke Sr.



- Born October 22, 1946 (age 70) United States
- Fields Meteorology, Climatology, Earth System Science

Institutions	University of Colorado Boulder,
	Colorado State University, Duke
	University, University of Virginia,
	NOAA Experimental Meteorology
	Lab
Alma mater	Towson State College (B.A.,
	1968), Pennsylvania State
	University (M.S., 1969; Ph.D.,
	1973)

Climate Science: Roger Pielke Sr.

HOME MAIN CONCLUSIONS MESSAGE FROM R.A. PIELKE SR.

Pielke Research Group: News and Commentary

BY RPIELKE | OCTOBER 9, 2012 · 7:00 AM

Quotes From Peer Reviewed Paper That Document That Skillful Multi-Decadal Regional Climate Predictions Do Not Yet Exist



The Huge Waste Of Research Money In Providing Multi-Decadal Climate Projections For The New IPCC Report

there is an enormous amount of money being spent to provide multidecadal regional climate forecasts to the impacts communities. In this post, I select just a few quotes from peer reviewed papers to document that the climate models do not have this skill. There are more detailed on this post also (e.g. <u>see</u>).

As the first example, from

Dawson A., T. N. Palmer and S. Corti: 2012: <u>Simulating Regime Structures</u> in Weather and Climate Prediction Models. Geophyscial Research Letters. doi:10.1029/2012GL053284 In press.

We have shown that a low resolution atmospheric model, with horizontal resolution typical of CMIP5 models, is not capable of simulating the statistically significant regimes seen in reanalysis,It is therefore likely that the embedded regional model may represent an unrealistic realization of regional climate and variability.



changes over Rio Grande Basin

- · Less snow, more rain during winter
 - Impacting lower elevation basins (e.g. Rio Chama)
- More frequent low flow periods
- Plant water consumption to increase
- Increased surface water evaporation
 - Elephant Butte evaporation increase by up to 10%
- Net irrigation water demand to increase by 19% by 2080

Reference: from US Bureau of Reclamation (2016), DOI (2013), EPA (2013) reports on the Rio Grande

Dave Dubois ascribes the fact that three modeling groups reach the same results as having more confidence in the results.

Remember, John Christy shows all the models running hot.

Around 1:05:30, Dubois throws his hands in the air and says, "we are already seeing this. (Snow) melted out a month early, snowfall down 30%," presented on 17 April 2018. DuBois had not stated the obvious from research into El Nino, PDO; he mentions them only in passing... But these changes have been happening in New Mexico for at least 2000 years, based on Tree Ring Analysis from the University of Arizona Tree Ring Laboratory.

https://archive.nytimes.com/www.nytimes.com/imagepages/2012/08/12/opinion/sunday/12drought-horizch.html



These changes happen because the temperature of the waters off the Americas determine the Rainfall/Drought Pattern. Remember El Nino and La Nina?



changes over Rio Grande Basin

- · Less snow, more rain during winter
 - Impacting lower elevation basins (e.g. Rio Chama)
- More frequent low flow periods
- · Plant water consumption to increase
- Increased surface water evaporation
 - Elephant Butte evaporation increase by up to 10%
- Net irrigation water demand to increase by 19% by 2080

Reference: from US Bureau of Reclamation (2016), DOI (2013), EPA (2013) reports on the Rio Grande

Around 1:05:45, Dubois extends the NMSU-UHI-contaminated data to plant growth in the Rio Grande Basin, "plants are going to get hotter and use more water"

Please see following graphics!



Rainfall has been increasing for a century, or more



Rainfall Los Lunas 3 SSW, NM



Rainfall, Bosque Del Apache NWR, NM





https://www.lcsun-news.com/story/news/local/2019/05/11/farmington-new-mexico-snowstorm-snow-rainsnowpack/1169798001/ Storm happened 4 weeks after Park Williams announced the second driest

La Nina in New Mexico history, on 3 April 2019 at the Rio Grande Theater.

Mother's Day weekend storm adds to New Mexico's already impressive snowpack

Michael Easterling, Farmington Daily Times Published 5:08 p.m. MT May 11, 2019



Snowpack figures high

STORY HIGHLIGHTS

Snowfall totals above 9,000 feet in the Farmington area ranged from 10 to 20 inches.

Parts of the Sangre de Cristo Mountains around Angel Fire and Taos had seen upward of 18 inches of snow.

The areas of the state that were too warm for snow got significant rainfall.

Concerns with Changing Climate



 Dust storms – increased aridity, intense spring storms; impacts transportation; snowmelt



Dave Dubois thinks we're entering a period of increasing dust storms.

Please see the following graphics

http://www.messynessychic.com/2015/04/03/the-ten-year-apocalypse-that-inspired-interstellar-and-nearly-destroyed-midwester-america/





https://realclimatescience.com/wp-content/uploads/2017/08/1280px-Dust_Bowl_-_Dallas __South_Dakota_1936_shadow.png https://www.denverpost.com/2011/05/12/when-deadly-dirt-devastated-the-southern-plains/



"Cattle went blind and suffocated. When farmers cut them open, they found stomachs stuffed with fine sand."

https://realclimatescience.com/2017/07/july-19-1934-everystate-over-90-degrees/







What can we do?

Adaptation - Prepare for a changing climate

Mitigation – Reduce carbon emissions, investing in a clean energy economy, rethink transportation...

Learn & act – what is your carbon footprint?

<u>Clean Energy</u> and <u>Carbon Footprint</u> are political terms, not scientific terms. DuBois' is engaging in political speech, not scientific discourse. More.. Bob's thoughts about clean energy and carbon footprint. Does this mean reducing or eliminating leisure and recreational travel?

Outlawing car racing? Eliminating college and university sports and sports teams? Cutting out travel to those away games? Eliminating the National Football League, National Basketball Association?

What about eliminating NASCAR, the Indy 500?

The Albuquerque Balloon Fiesta?

The COVID-19 restrictions have shown how easy it has been to restrict our First Amendment rights to assemble. Will the alleged "climate emergency" easily abridge those rights?





Too many people having fun!

Don't you people know there is a climate emergency?

DuBois closing slide, meant to engender fear, not impart knowledge. Next graphics show this is part of the PDO-Cold cycle, repeating past events on a 60 year basis.



Dr. Dave DuBois State Climatologist NMSU

dwdubois@nmsu.edu weather.nmsu.edu Twitter @nmclimate YouTube.com/nmclimate

Note: photo taken at close to lowest point of storage in recent years. Aug 29, 2013 90,634 acre-feet


https://en.wikipedia.org/wiki/Pacific_decadal _oscillation#/media/File:PDO.svg

Top graph, the Pacific Decadal Oscillation.

Middle graph, Jornada Range Precipitation.

Bottom graph, Elephant Butte Reservoir Storage time series.

Late 20th century PDO-Warm was the cause for the extended period of high-water storage at Elephant Butte Reservoir

> https://jornada.nmsu.edu/content/usda-noaanws-monthly-summary-climatological-data

> > 2,500

2,00

1,500

1,000

500

Reservoir Storage (thousand acre-feet)



https://waterdatafortexas.org/reservoirs/ individual/elephant-butte