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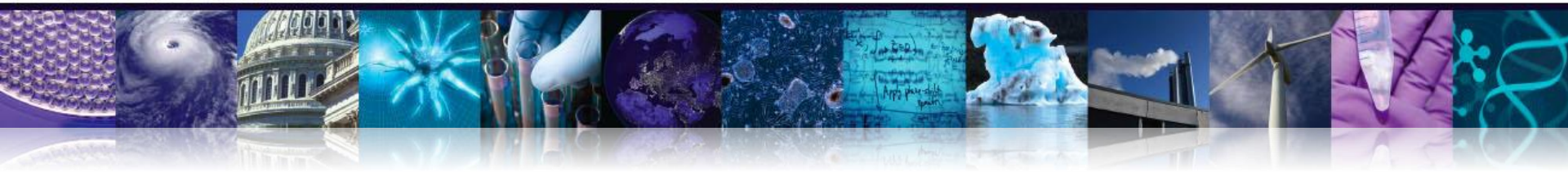
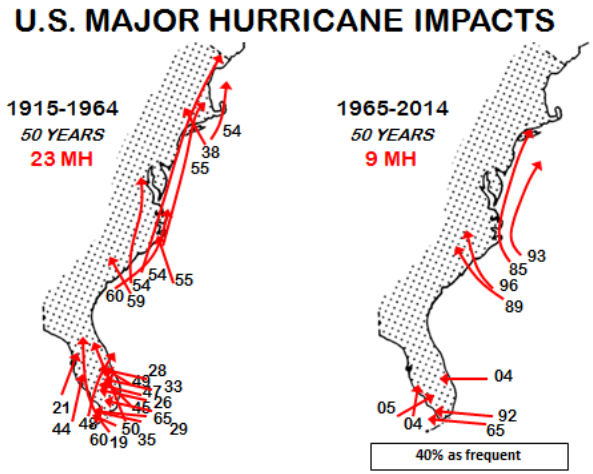


Extreme Weather and Climate Change: Science and Politics

Roger A. Pielke, Jr.
University of Colorado

31 May 2018
Canon Institute for Global Studies
Tokyo, Japan



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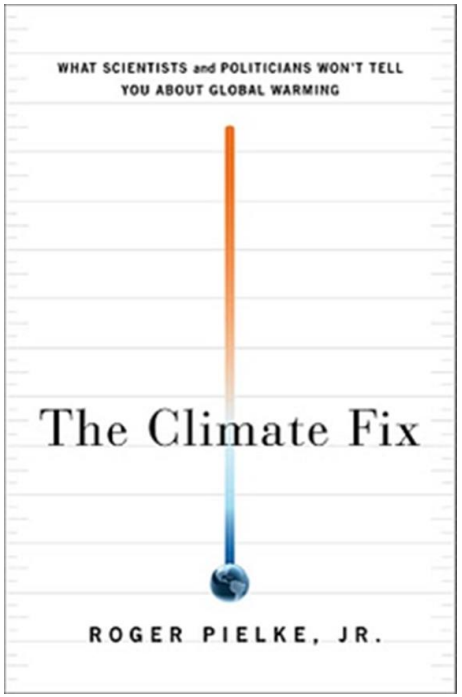
http://sciencepolicy.colorado.edu

Questions NOT addressed in this talk

- **Is human-caused climate change real and/or significant?**
  - **Me: Yes it is**
- **What policies makes sense in response?**
  - **Me: Read my book!**



I have studied extreme events & climate since 1993

The Apex of my Career – March 15, 2006

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

ROGER REVELLE LECTURE SERIES
PRESENTED BY THE OCEAN STUDIES BOARD

2006–Roger Pielke, Jr.

Roger Pielke, Jr. is a professor in the Environmental Studies Program and a fellow of the Cooperative Institute for Research in the Environmental Sciences (CIRES) at the University of Colorado. At CIRES, Dr. Pielke directed the Center for Science and Technology Policy Research from 2001-2007. From 1993-2001 he was a scientist at the Environmental and Societal Impacts Group at the National Center for Atmospheric Research in Boulder, Colorado, where he studied societal responses to extreme weather events, policy responses to climate change, and U.S. science policy. Dr. Pielke's research focuses on the relation of scientific information and public and private sector decision-making. His current areas of interest include the politicization of science, decision making under uncertainty, and policy education for scientists. Dr. Pielke chaired the American Meteorological Society's Committee on Societal Impacts 1999-2002, and has served on the Science Steering Committee of the World Meteorological Organization's World Weather Research Programme and the Board on Atmospheric Sciences and Climate of the National Research Council, among other advisory committees. Dr. Pielke received his B.A. in mathematics, M.A. in public policy and Ph.D. in political science from the University of Colorado.

Disasters, Death and Destruction: Accounting for Recent Calamities

The recent devastation caused by Hurricane Katrina, the Indian Ocean tsunami, and South Asian earthquake has kept natural disasters at the focus of our attention. The past decades have seen a spectacular series of catastrophes around the world with ever increasing economic losses and horrific loss of life. The recent spate of disasters has created two common perceptions among decision makers and the general public. First, there is a sense that the economic impacts associated with extreme events have increased in recent years. Second, given that a human influence on the climate system has been well established, a perception exists that the recent increase in weather-related disasters like floods and hurricanes is in some way related to changes in climate. These perceptions beg two questions:

- Have loss of life and damages associated with extreme weather events actually increased in recent years?
- What factors account for observed trends in the impacts of weather on society?

WELCOME

In 1999, the Ocean Studies Board (OSB) launched the Roger Revelle Commemorative Lecture to highlight the important links between ocean science and public policy. The series was named in honor of the late Roger Revelle, a leader in the field of oceanography for over 50 years who spearheaded efforts to investigate the mechanisms and consequences of climate change. In recognition of the critical importance of education in linking science and public policy, the OSB has partnered with the National Science Resources Center and the Smithsonian's National Museum of Natural History to bring the Revelle Lecture to a broader audience. The lecture is held annually in conjunction with the OSB meeting in Washington, DC.

About Roger Revelle

SPONSORS

- National Science Foundation (NSF)
- The Office of Naval Research (ONR)
- The U.S. Geological Survey (USGS)
- The National Aeronautics and Space Administration (NASA)
- The National Oceanic and Atmospheric Administration (NOAA)
- The Smithsonian Science Education Center
- The Smithsonian Institution
- The Gordon and Betty Moore Foundation

CONTACT INFORMATION

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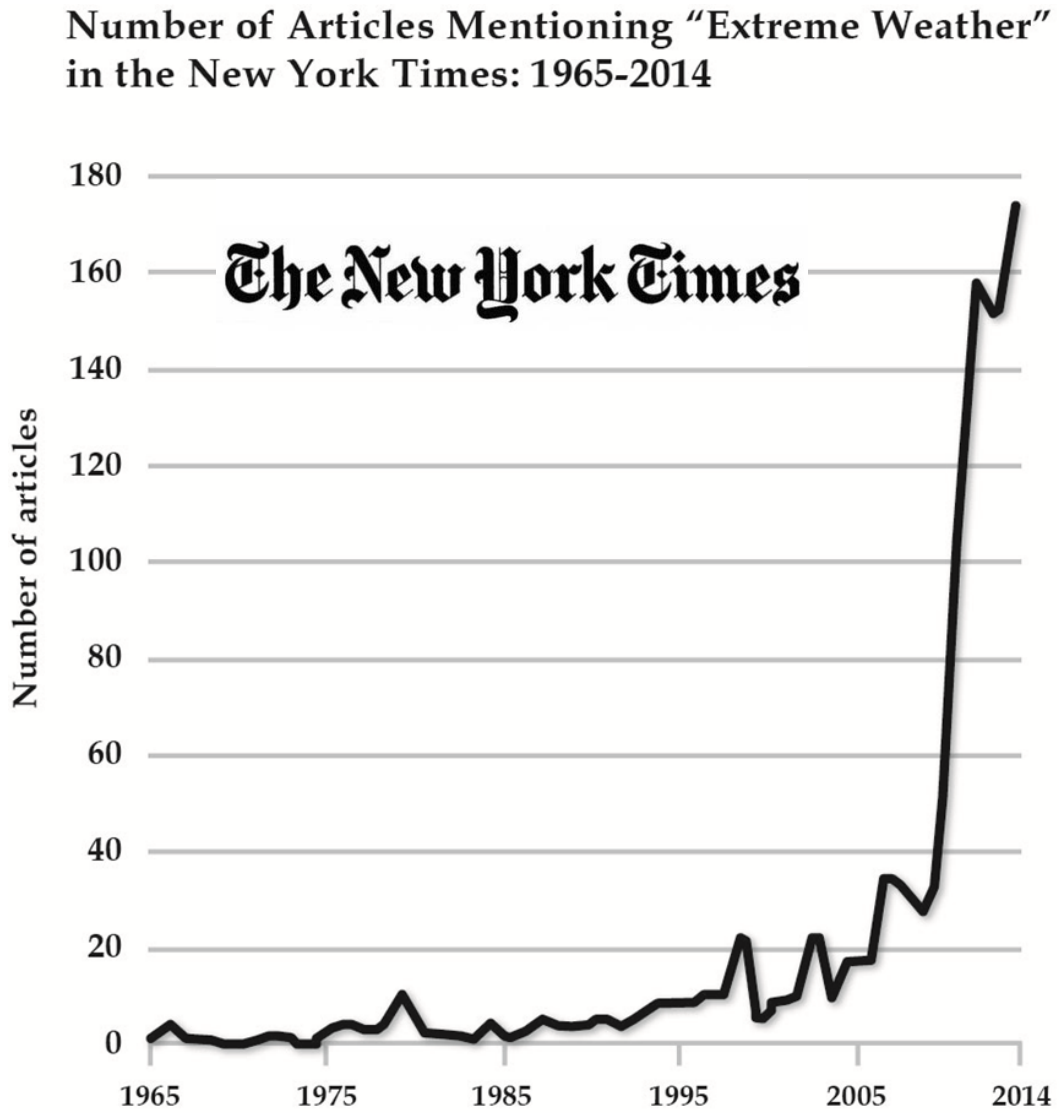
Two months later, May 2006 ...

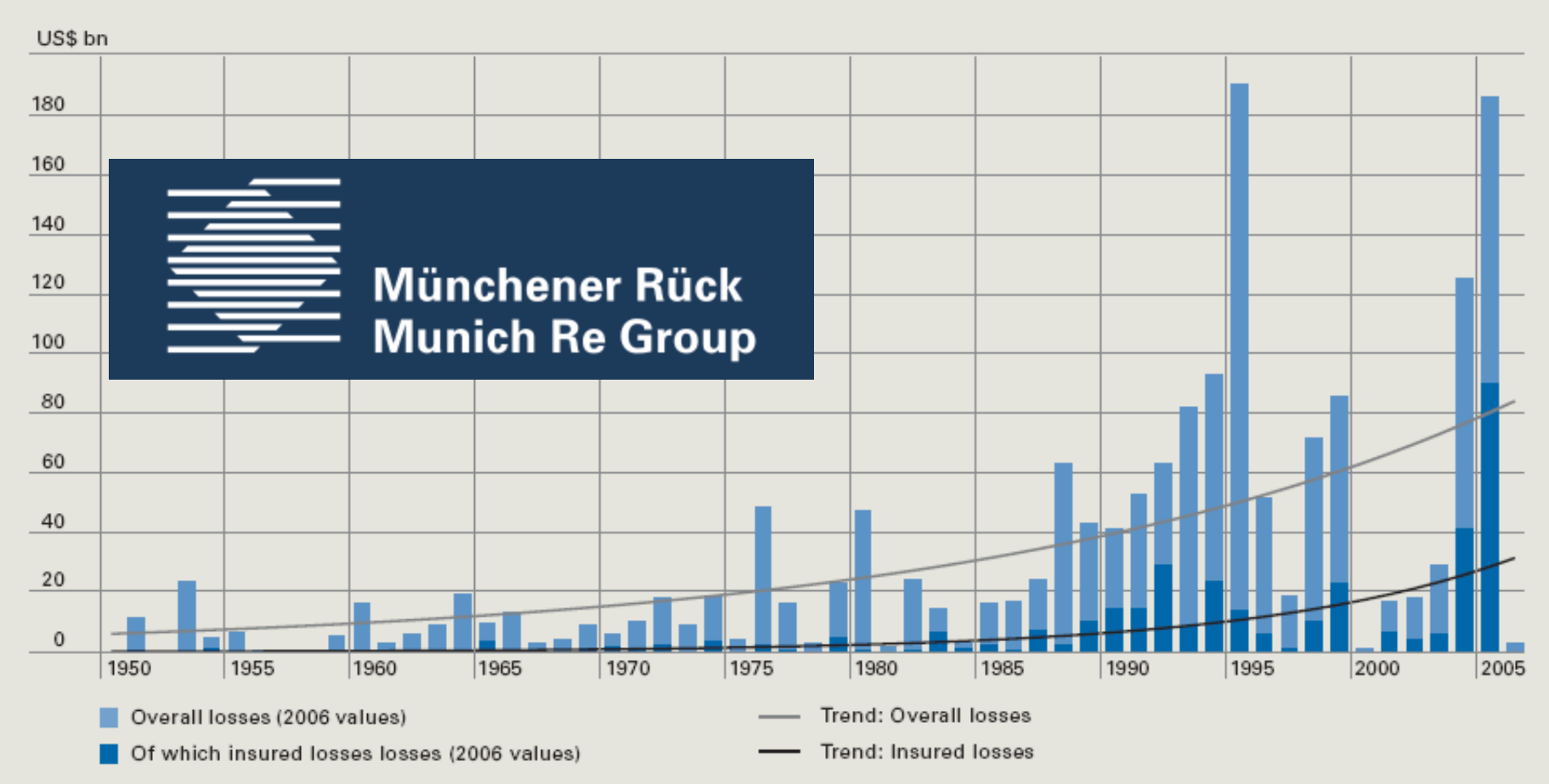
“extreme weather” in the NY times 1860-2014



Hohenkammer workshop in May, 2006

Münchener Rück
Munich Re Group

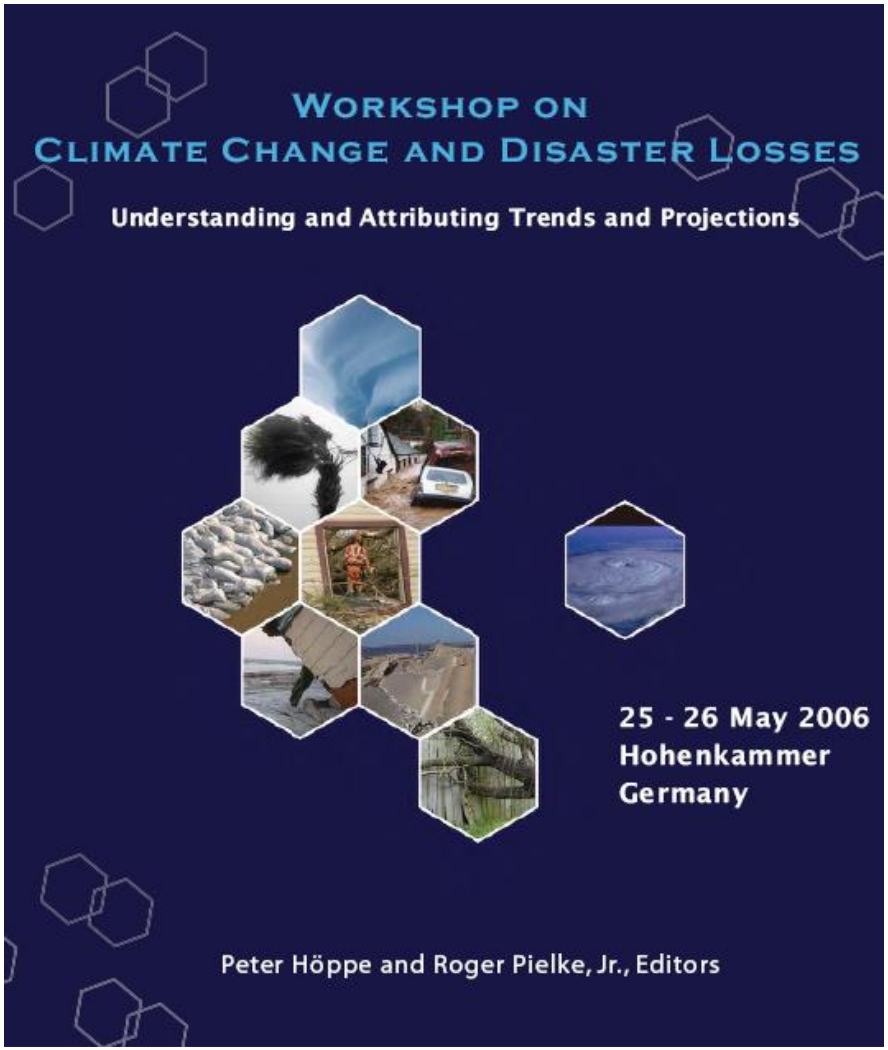
Increasing global losses



Source: Munich Re 2007

Hohenkammer Workshop May, 2006

- Co-sponsors: US NSF, Munich Re, GKSS Institute for Coastal Research, Tyndall Centre for Climate Change Research
- 32 participants from 16 countries
- 24 background "white papers"
- Summary consensus report
- Consistent with IPCC WGI



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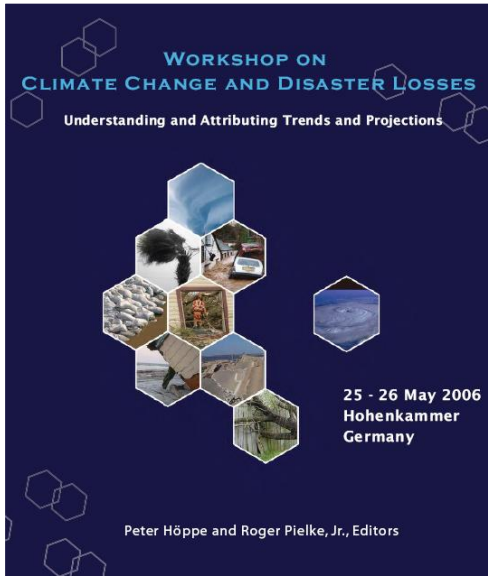
Hohenkammer Workshop May, 2006

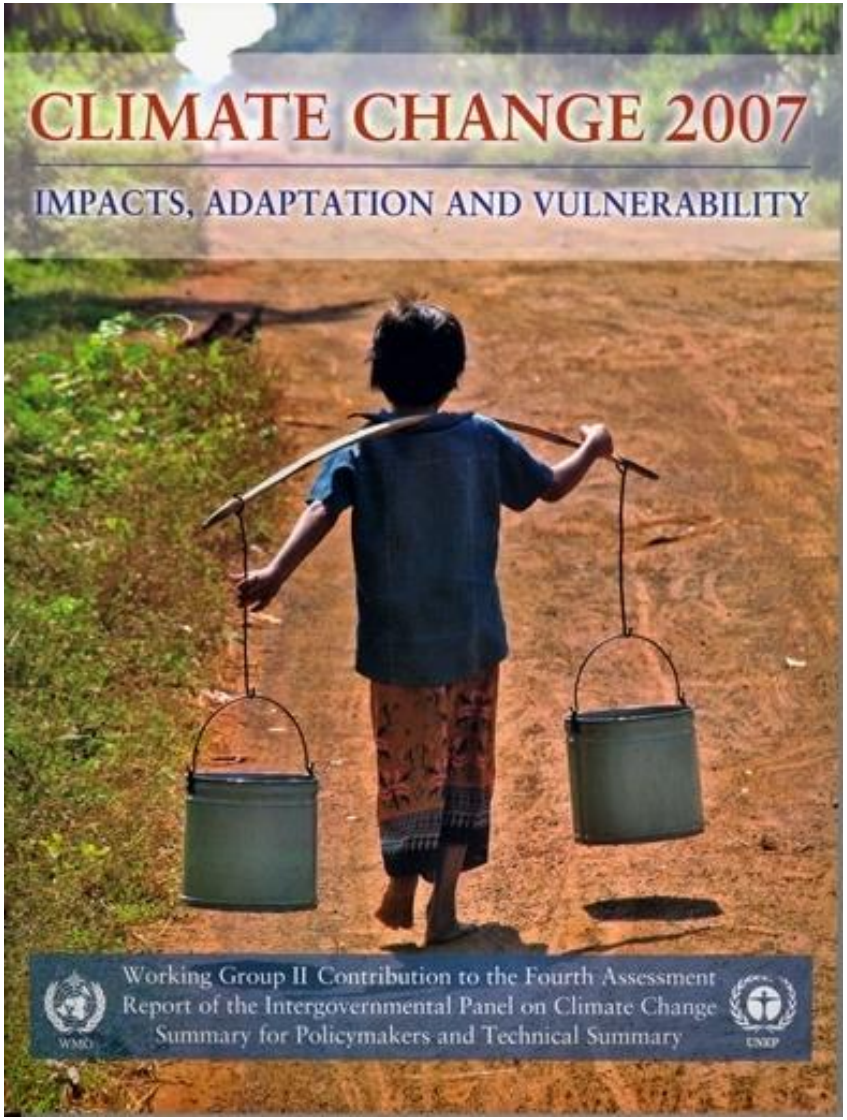
- Analyses of long-term records of disaster losses indicate that societal change and economic development are the principal factors responsible for the documented increasing losses to date.

- Because of issues related to data quality, the stochastic nature of extreme event impacts, length of time series, and various societal factors present in the disaster loss record, **it is still not possible to determine the portion of the increase in damages that might be attributed to climate change due to GHG emissions**



- In the near future the quantitative link (attribution) of trends in storm and flood losses to climate changes related to GHG emissions is unlikely to be answered unequivocally.

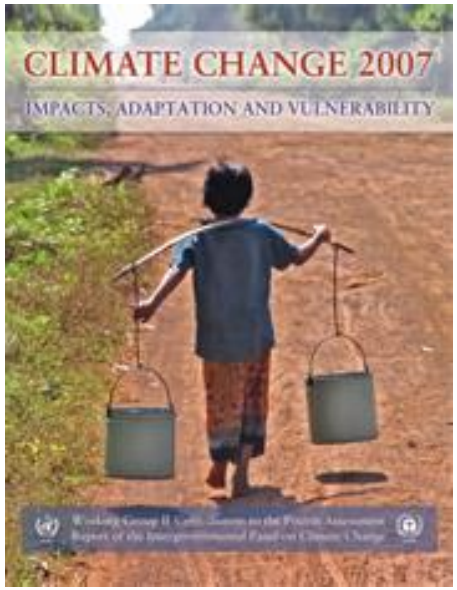
IPCC AR4 2007



IPCC 2007: Reliance on "one study"

1.3.8.5 Summary of disasters and hazards

Global losses reveal rapidly rising costs due to extreme weather-related events since the 1970s. One study has found that while the dominant signal remains that of the significant increases in the values of exposure at risk, once losses are normalised for exposure, there still remains an underlying rising trend.



Relies on "one study" -- What is that "one study"?

(Muir Wood et al., 2006).

1.3.8 Disasters and hazards

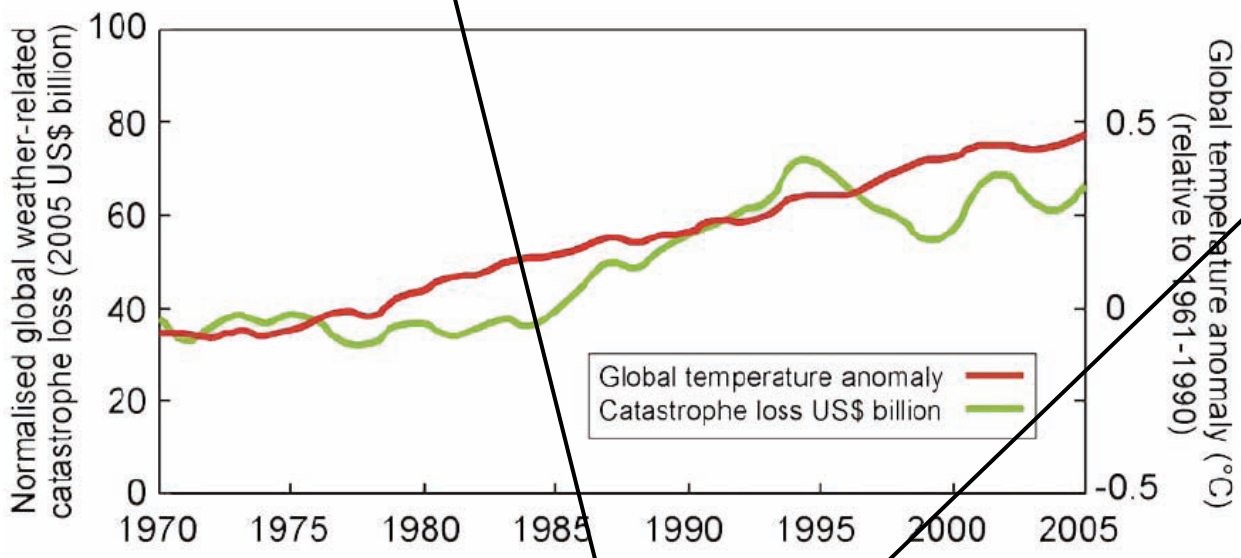
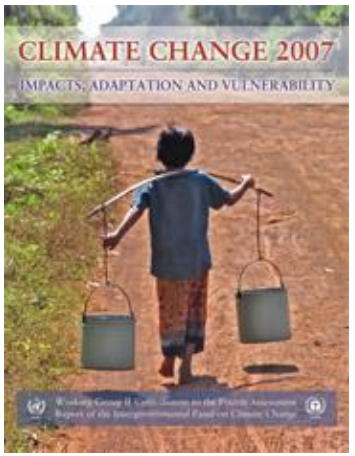


Figure SM-1.1. *An example from the literature of one study analysing rising costs of normalised weather-related catastrophes compared with global temperatures. Data smoothed over ±4 years = 9 years until 2001 (Muir Wood et al., 2006).*

SM.1-4



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The "one study" was a 2006 workshop paper

Systems in the Hindu Kush-Himalayan Region. ICIMOD, Bhutan, Kathmandu, 227 pp.

Moonen, A.C., L. Ercoli, M. Mariotti and A. Masoni, 2002: Climate change in Italy indicated by agrometeorological indices over 122 years. *Agr. Forest Meteorol.*, **111**, 13-27.

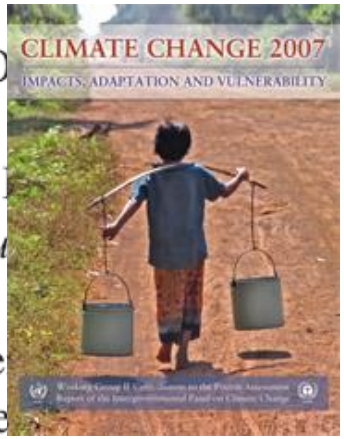
Mueller, D.R., W.F. Vincent and M.O. Jeffries, 2003: Break-up of the largest Arctic ice shelf and associated loss of an epishelf lake. *Geophys. Res. Lett.*, **30**, 2031, doi:10.1029/2003GL017931.

Muir Wood, R., S. Miller and A. Boissonnade, 2006: The search for trends in a global catalogue of normalized weather-related catastrophe losses. *Workshop on Climate Change and Disaster Losses: Understanding and Attributing Trends and Projections*. Hohenkammer, Munich, 188-194.

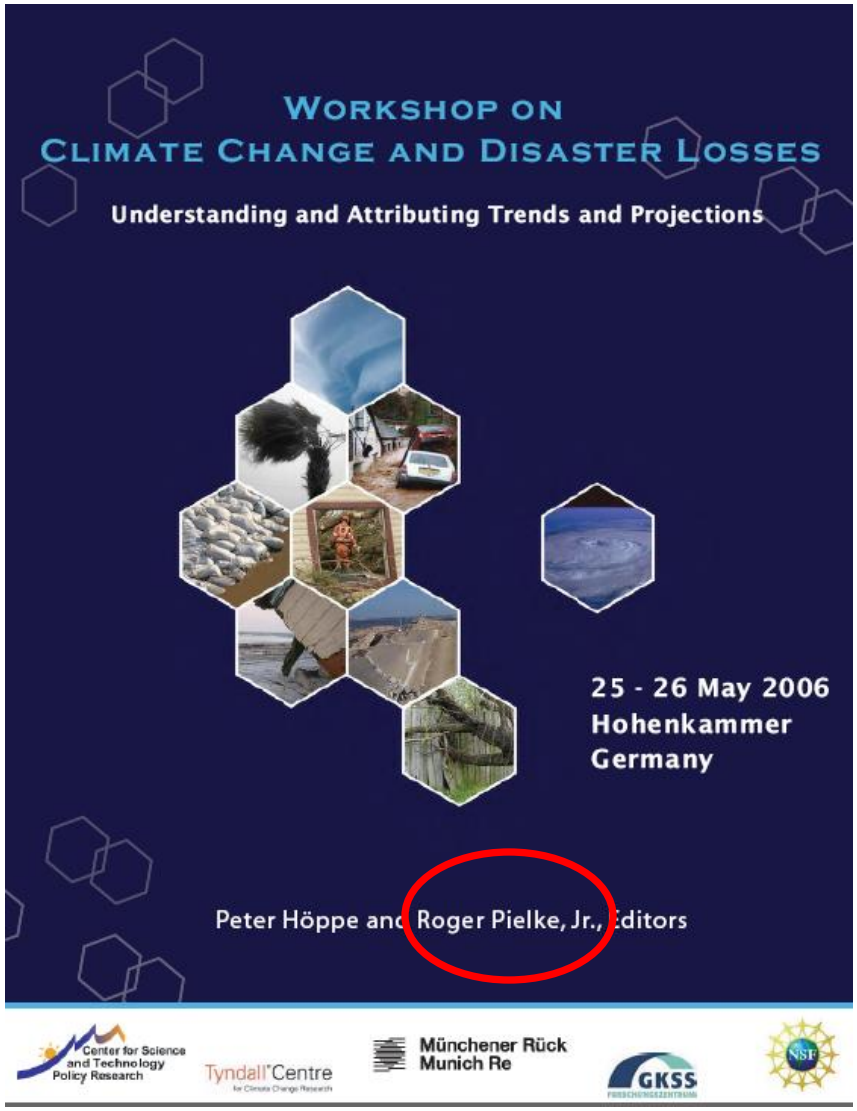
Munich Re Group, 2005: Annual Review: *Natural Catastrophes 2004*. WKD O
setdruck GmbH, Munich, 60 pp.

Myneni, R.B., C.D. Keeling, C.J. Tucker, G. Asrar and R.R. Nemani, 1997:
creased plant growth in the northern high latitudes from 1981 to 1991. *Natu*
386, 698-702.

Nabuurs, G.J., A. Pussinen, T. Karjalainen, M. Erhard and K. Kramer, 2002: Ste
wood volume increment changes in European forests due to climate change



Hey look! I co-organized that workshop!



Guess what?

•The graph from the IPCC does not appear in Muir-Wood 2006, nor does the underlying data!

•In February 2010 during a public debate at the Royal Institution in London, Robert Muir-Wood revealed that he had created the graph, included it in the IPCC and then ***intentionally miscited it*** in order to circumvent the IPCC deadline for inclusion of published material.

•IPCC Lead Author Muir-Wood (and RMS) said that the graph should never have been included in the report

•In 2006 Risk Management Solutions (the company that employs RM-W) predicted that the risk of US hurricane damages had increased by 40%, necessitating much higher insurance and reinsurance premiums ($82 billion according to Sarasota Herald Tribune)

What the mis-cited source for the IPCC graph actually said when finally published in 2008

"We find insufficient evidence to claim a statistical relationship between global temperature increase and normalized catastrophe losses."

Miller et al. 2008
(RM-W was a co-author)

26 February 2010

FROM THE ARTICLE:

"Chief beef: Hurricanes and the bottom line

Telling quote: "We cannot make a causal link between increase in greenhouse gases and the costs of damage associated with hurricanes, floods, and extreme weather phenomena." —interview with FP

. . . For his work questioning certain graphs presented in IPCC reports, Pielke has been accused by some of being a climate change "denier.""

FP Foreign Policy
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APRIL 8, 2012 | DIRECTORY | BLOGS | CHANNELS | NEWS BRIEFS

The FP Guide to Climate Skeptics

Can't tell the legitimate concerns from the nonsense? FP is here to help.

BY CHRISTINA LARSON, JOSHUA KEATING | FEBRUARY 26, 2010

ROGER PIELKE, JR.*

Who is he? Environmental studies professor at the University of Colorado-Boulder and a fellow of the university's **Cooperative Institute for Research in Environmental Sciences**; author of ***The Honest Broker: Making Sense of Science in Policy and Politics***

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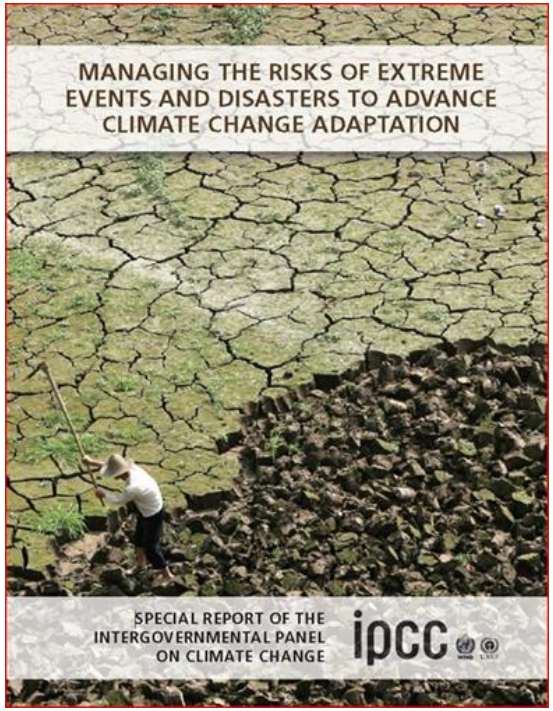
Science continues: IPCC 2012 SREX on disaster losses

"Long-term trends in economic disaster losses adjusted for wealth and population increases have not been attributed to climate change, but a role for climate change has not been excluded (medium evidence, high agreement)."

IPCC SREX 2012



My 2013 Senate Hearing testimony

2014 Holdren Testimony Before Same Committee

John Holdren: A Response to Roger Pielke

Drought and Global Climate Change: An Analysis of Statements by Roger Pielke Jr
John P. Holdren, 28 February 2014

Introduction

In the question and answer period following my February 25 testimony on the Administration's Climate Action Plan before the Oversight Subcommittee of the U.S. Senate's Committee on Environment and Public Works, Senator Jeff Sessions (R-AL) suggested that I had misled the American people with comments I made to reporters on February 13, linking recent severe droughts in the American West to global climate change. To support this proposition, Senator Sessions quoted from testimony before the Environment and Public Works Committee the previous July by Dr. Roger Pielke, Jr., a University of Colorado political scientist. Specifically, the Senator read the following passages from Dr. Pielke's written testimony:

> *It is misleading, and just plain incorrect, to claim that disasters associated with hurricanes, tornadoes, floods or droughts have increased on climate timescales either in the United States or globally.*
>
> *Drought has "for the most part, become shorter, less, frequent, and cover a smaller portion of the U.S. over the last century". Globally, "there has been little change in drought over the past 60 years."*

Footnotes in the testimony attribute the two statements in quotation marks within the second passage to the US Climate Change Science Program's 2008 report on extremes in North America and a 2012 paper by Sheffield *et al.* in the journal Nature, respectively.

I replied that the indicated comments by Dr. Pielke, and similar ones attributed by Senator Sessions to Dr. Roy Spencer of the University of Alabama, were not representative of mainstream views on this topic in the climate-science community; and I promised to provide for the record a more complete response with relevant scientific references.

Dr. Pielke also commented directly, in a number of tweets on February 14 and thereafter, on my February 13 statements to reporters about the California drought, and he elaborated on the tweets for a blog post on The Daily Caller site (also on February 14). In what follows, I will address the relevant statements in those venues, as well. He argued there, specifically, that my statements on drought "directly contradicted scientific reports", and in support of that assertion, he offered the same statements from his July testimony that were quoted by Senator Sessions (see above). He also added this:

> *The United Nations Intergovernmental Panel on Climate Change found that there is "not enough evidence at present to suggest more than low confidence in a global-scale observed trend in drought."*

In the rest of this response, I will show, first, that the indicated quote from the US Climate Change Science Program (CCSP) about U.S. droughts is missing a crucial adjacent sentence in the CCSP report, which supports my position about drought in the American West. I will also show that Dr. Pielke's statements about global drought trends, while irrelevant to my comments about drought in California and the Colorado River Basin, are seriously misleading, as well, concerning what is actually in the UN Panel's latest report and what is in the current scientific literature.

1

John Holdren wrote 6 pages, supposedly in response to me, and posted it on the White House website

The entirety of my 2013 Senate Testimony on Drought

Drought

What the IPCC SREX (2012) says:

- "There is medium confidence that since the 1950s some regions of the world have experienced a trend to more intense and longer droughts, in particular in southern Europe and West Africa, but in some regions droughts have become less frequent, less intense, or shorter, for example, in central North America and northwestern Australia."
- For the US the CCSP (2008)[20] says: "droughts have, for the most part, become shorter, less frequent, and cover a smaller portion of the U. S. over the last century."[21]

What the data says:

8. **Drought has "for the most part, become shorter, less frequent, and cover a smaller portion of the U. S. over the last century."[22]**

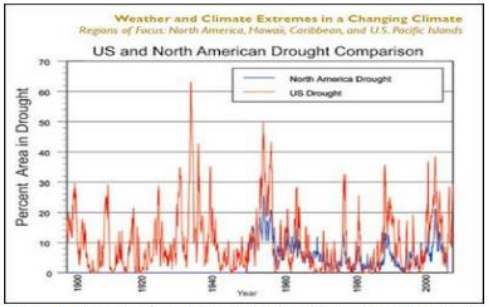


Figure 8. Figure 2.6 from CCSP (2008) has this caption: "The area (in percent) of area in severe to extreme drought as measured by the Palmer Drought Severity Index for the United States (red) from 1900 to present and for North America (blue) from 1950 to present."

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John Holdren's essay posted on the White House website led to a congressional "investigation" of me in 2015

The New York Times

SCIENCE

Lawmakers Seek Information on Funding for Climate Change Critics

By JOHN SCHWARTZ FEB. 25, 2015

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Democratic lawmakers in Washington are demanding information about funding for scientists who publicly dispute widely held views on the causes and risks of climate change.

Prominent members of the United States House of Representatives and the Senate have sent letters to universities, companies and trade groups asking for information about funding to the scientists.

The letters came after evidence emerged over the weekend that Wei-Hock Soon, known as Willie, a scientist at the Harvard-Smithsonian Center for Astrophysics, had failed to disclose the industry funding for his academic work. The documents also included correspondence between Dr. Soon and the companies who funded his work in which he referred to his papers and testimony as "deliverables."

In letters sent to seven universities on Tuesday, Representative Raúl M. Grijalva, an Arizona Democrat who is the ranking member of the House committee on natural resources, sent detailed requests to the academic

I was accused (falsely) of taking Exxon money

Daily Camera

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SWEETHEART DANCE • NORTH BOULDER RECREATION CENTER

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CU-Boulder's Roger Pielke Jr. targeted by congressman over research funding

Prof calls probe a politically motivated 'witch hunt'

By Gloria Dickie
For the Camera

POSTED: 02/25/2015 09:52:52 AM MST | UPDATED: ABOUT A YEAR AGO

A University of Colorado professor who's been a polarizing figure in the climate change debate is being investigated by a Democratic congressman from Arizona over whether he's received research funding from fossil fuel companies.

Both professor Roger Pielke Jr. — who denies claims that he's a climate change skeptic — and the CU administration on Wednesday said that's absolutely not the case.

"Professor Pielke is a highly regarded faculty member who is clearly operating under the principles of academic freedom, which we strongly defend," CU Provost Russell Moore said. "We stand behind him. His research has been funded by the National Science Foundation, National Oceanic and Atmospheric Administration and other credible organizations.

"None of his research has been funded by oil companies or fossil

Roger Pielke Jr., a University of Colorado professor, says he's under investigation by a U.S. congressman for potential conflicts of interest in his

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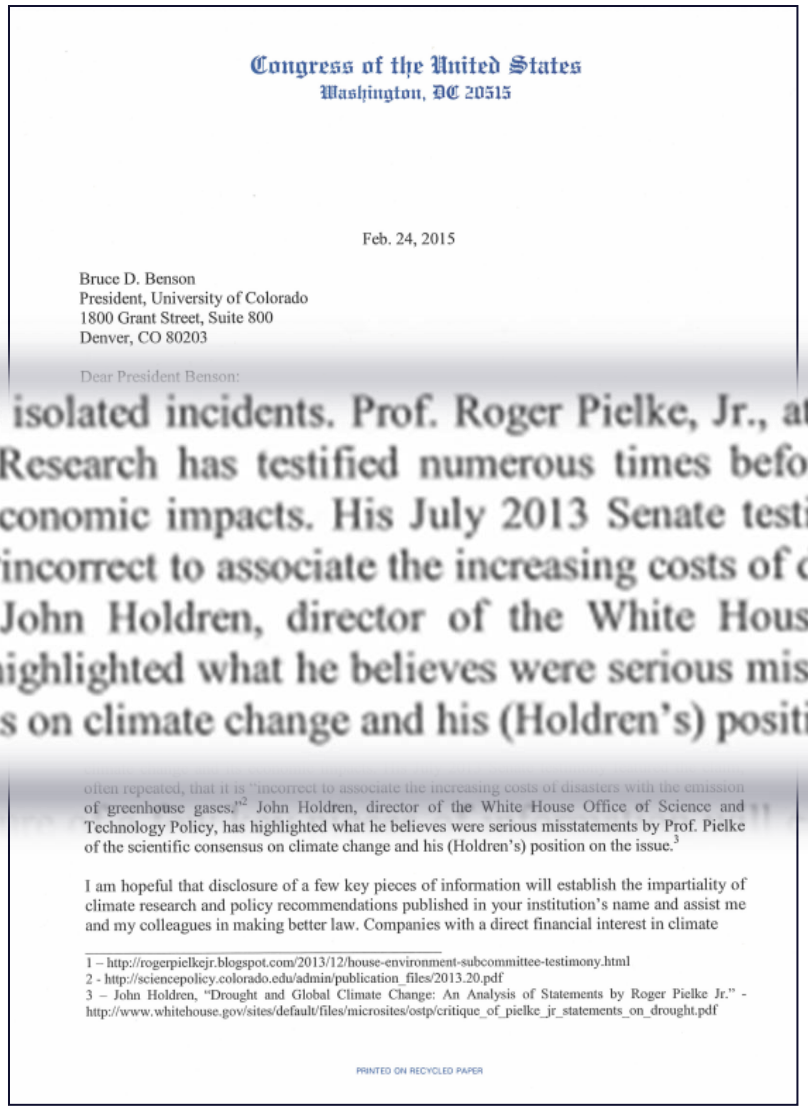
Representative Raul Grijalva's letter to my university president



Congress of the United States
Washington, DC 20515

Feb. 24, 2015

Bruce D. Benson
President, University of Colorado
1800 Grant Street, Suite 800
Denver, CO 80203

Dear President Benson:

If true, these may not be isolated incidents. Prof. Roger Pielke, Jr., at CU's Center for Science and Technology Policy Research has testified numerous times before the U.S. Congress[1] on climate change and its economic impacts. His July 2013 Senate testimony featured the claim, often repeated, that it is "incorrect to associate the increasing costs of disasters with the emission of greenhouse gases."[2] John Holdren, director of the White House Office of Science and Technology Policy, has highlighted what he believes were serious misstatements by Prof. Pielke of the scientific consensus on climate change and his (Holdren's) position on the issue.[3]

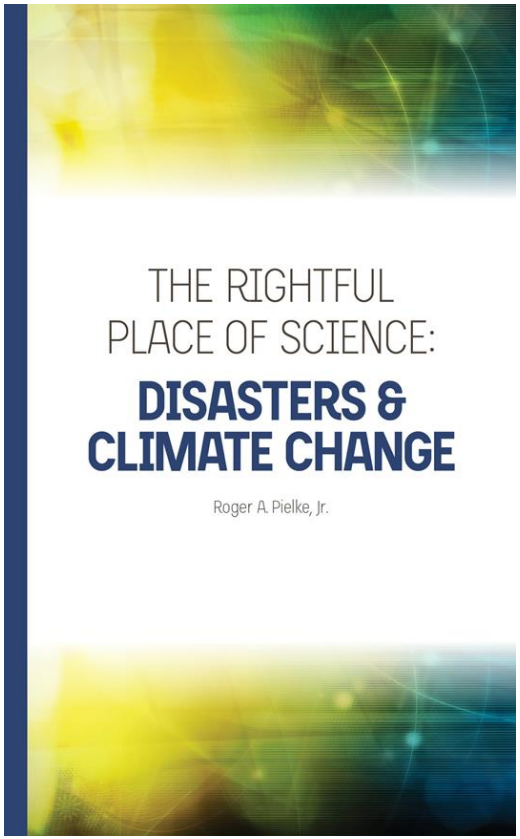
I am hopeful that disclosure of a few key pieces of information will establish the impartiality of climate research and policy recommendations published in your institution's name and assist me and my colleagues in making better law. Companies with a direct financial interest in climate

1 – http://rogerpielkejr.blogspot.com/2013/12/house-environment-subcommittee-testimony.html
2 - http://sciencepolicy.colorado.edu/admin/publication_files/2013.20.pdf
3 – John Holdren, "Drought and Global Climate Change: An Analysis of Statements by Roger Pielke Jr." - http://www.whitehouse.gov/sites/default/files/microsites/ostp/critique_of_pielke_jr_statements_on_drought.pdf

PRINTED ON RECYCLED PAPER

Let's look at some data

- **The latest science on trends in extreme events**
  - **Hurricanes (tropical cyclones)**
  - **Tornadoes**
  - **Floods**
  - **Drought**
  - **Temperature**
  - **Precipitation**



My initial motivation for writing the short book: Listening to Pres Obama's June 29, 2013 Radio Address

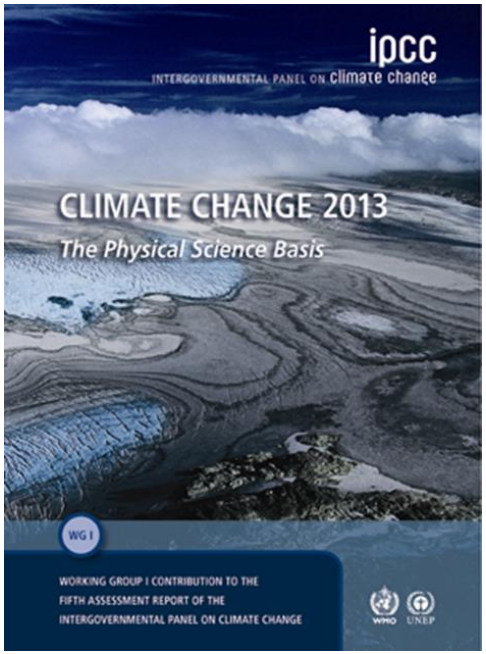
"[W]hile we know no single weather event is caused solely by climate change, we also know that in a world that's getting warmer than it used to be, all weather events are affected by it – more extreme droughts, floods, wildfires, and hurricanes. . .

And Americans across the country are already paying the price of inaction in higher food costs, insurance premiums, and the tab for rebuilding."

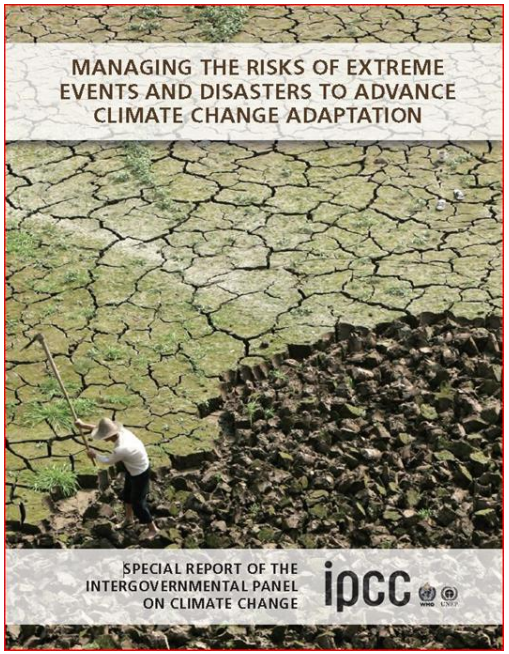
Of course, both US parties play politics with the weather

A note on references

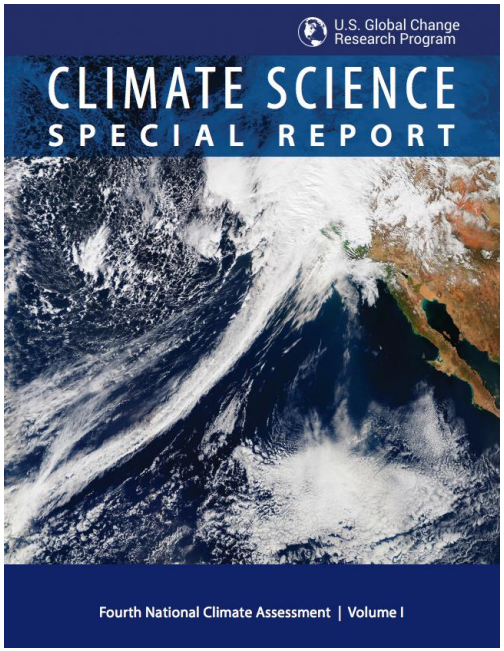
- IPCC = Intergovernmental Panel on Climate Change
- IPCC AR5 = 5th assessment report in 2013/14
- IPCC SREX = Special Report on Extreme Events in 2012
- US NCA = US National Climate Assessment 2017



IPCC AR5



IPCC SREX



US NCA

IPCC AR5 – Extreme temperatures

"[T]here is medium confidence that globally the length and frequency of warm spells, including heat waves, has increased since the middle of the 20th century although it is likely that heatwave frequency has increased during this period in large parts of Europe, Asia and Australia."

"Medium confidence: increases in more regions than decreases but 1930s dominates longer term trends in the USA."

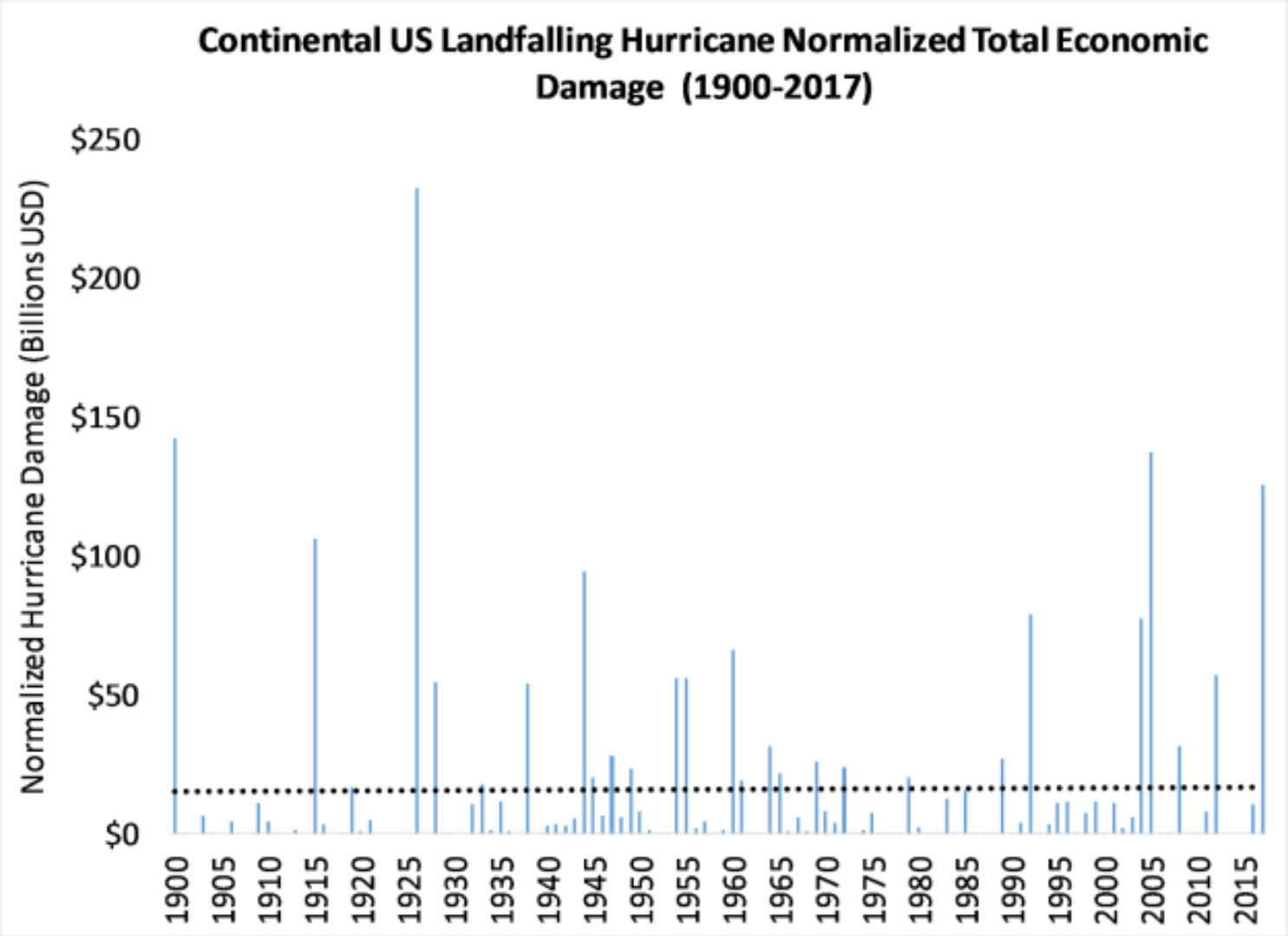
IPCC AR5 – Extreme precipitation

"[I]t is likely that since 1951 there have been statistically significant increases in the number of heavy precipitation events (e.g., above the 95th percentile) in more regions than there have been statistically significant decreases, but there are strong regional and subregional variations in the trends."

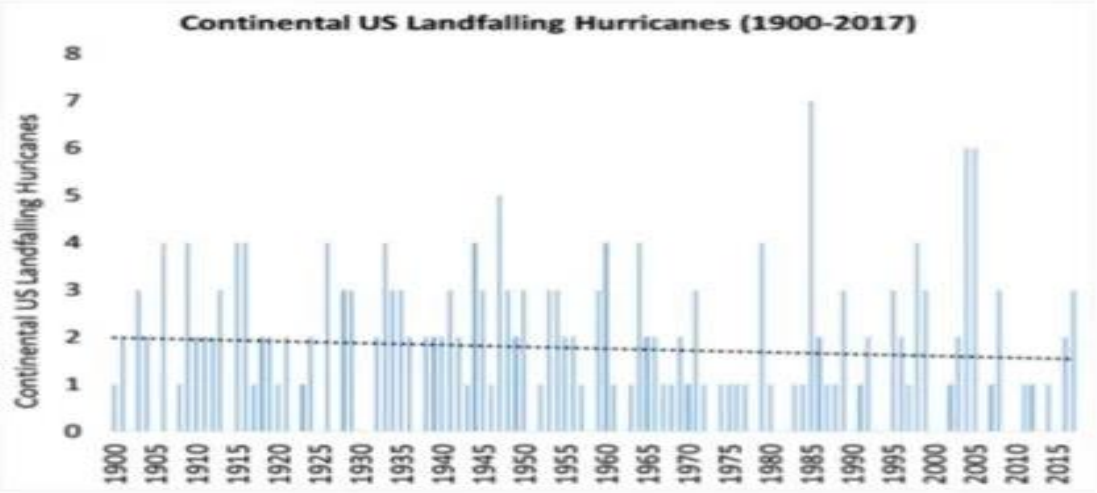
"[T]here is medium confidence that anthropogenic forcing has contributed to a global scale intensification of heavy precipitation over the second half of the 20th century in land regions where observational coverage is sufficient for assessment."

Note: "Likely" = >66%

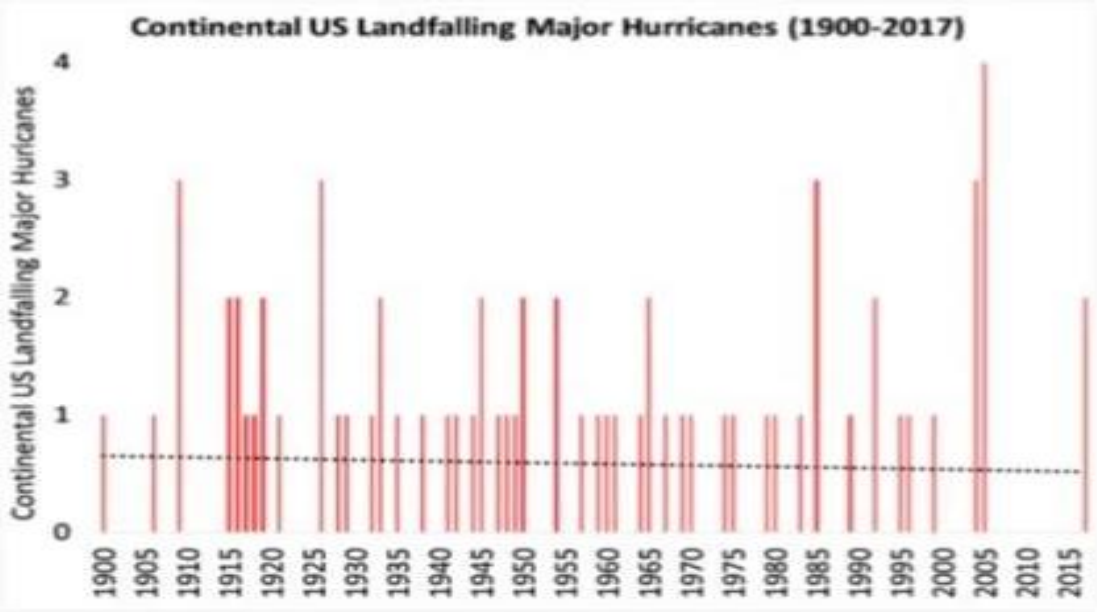
Normalized hurricane losses 1900-2017



Use climate data as a check on normalization results



With no upwards trends in hurricane landfall frequency or intensity, there is simply no reason to expect to see an upwards trend in normalized losses.



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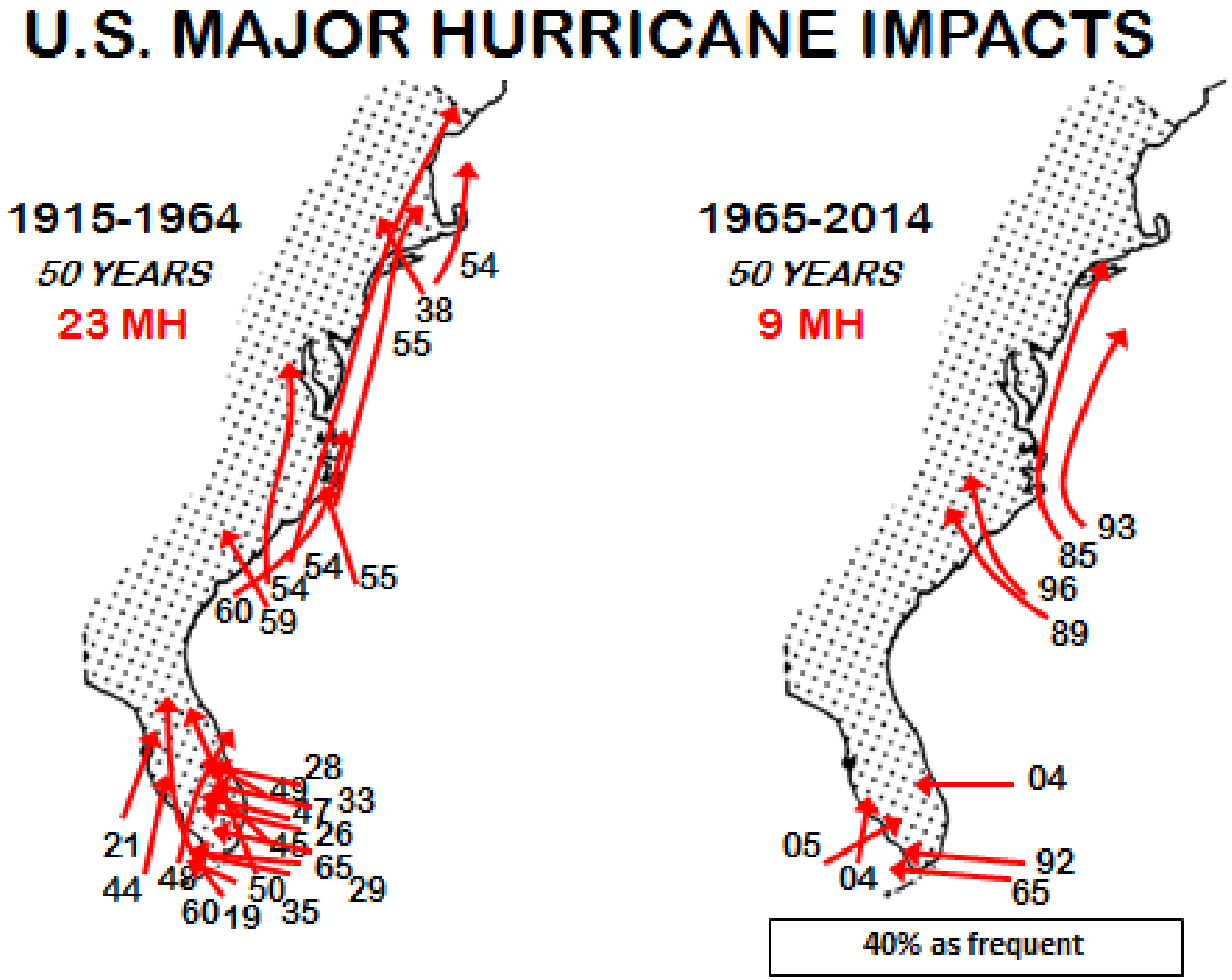
Where did the major hurricanes go?



Source: P. Klotzbach

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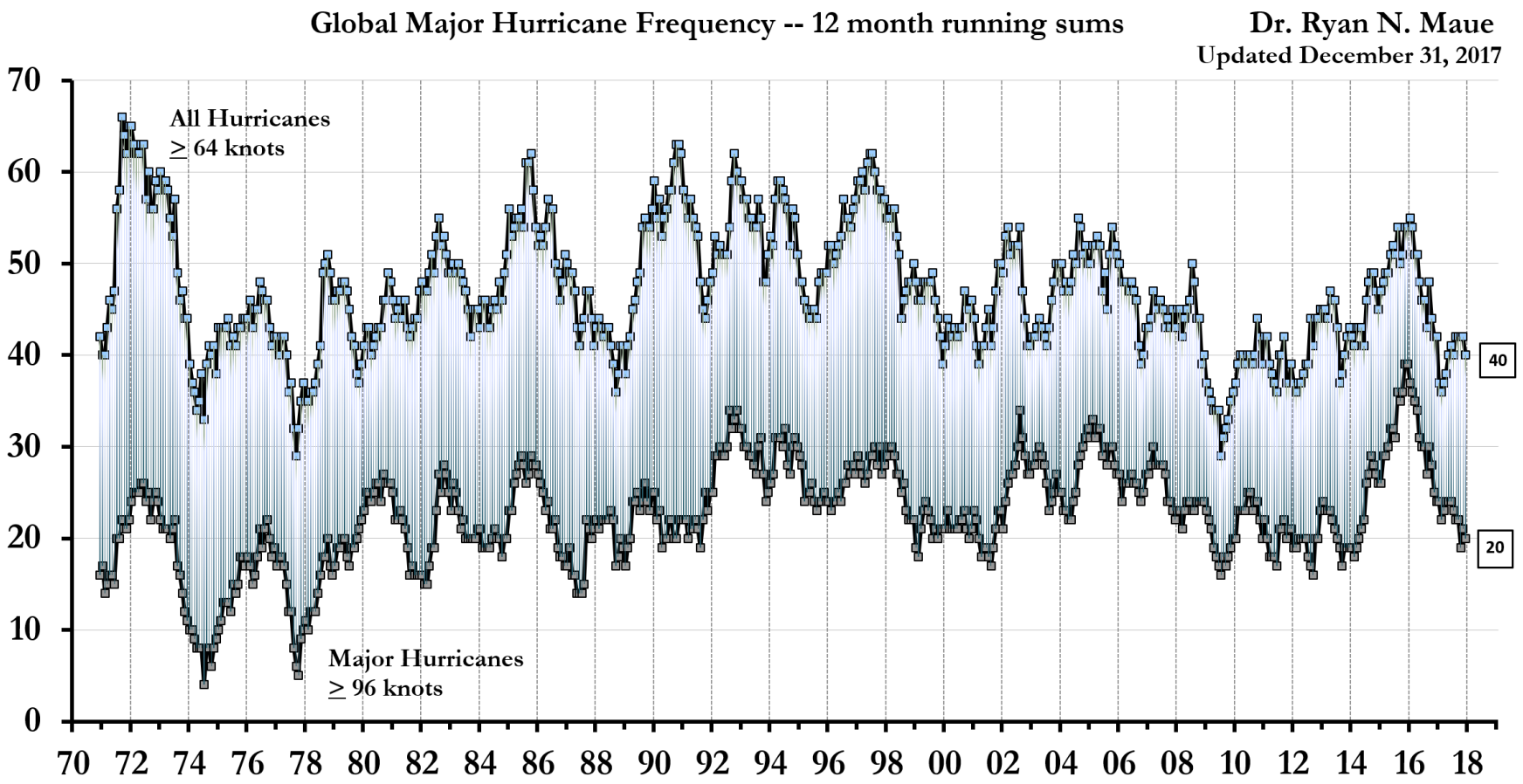
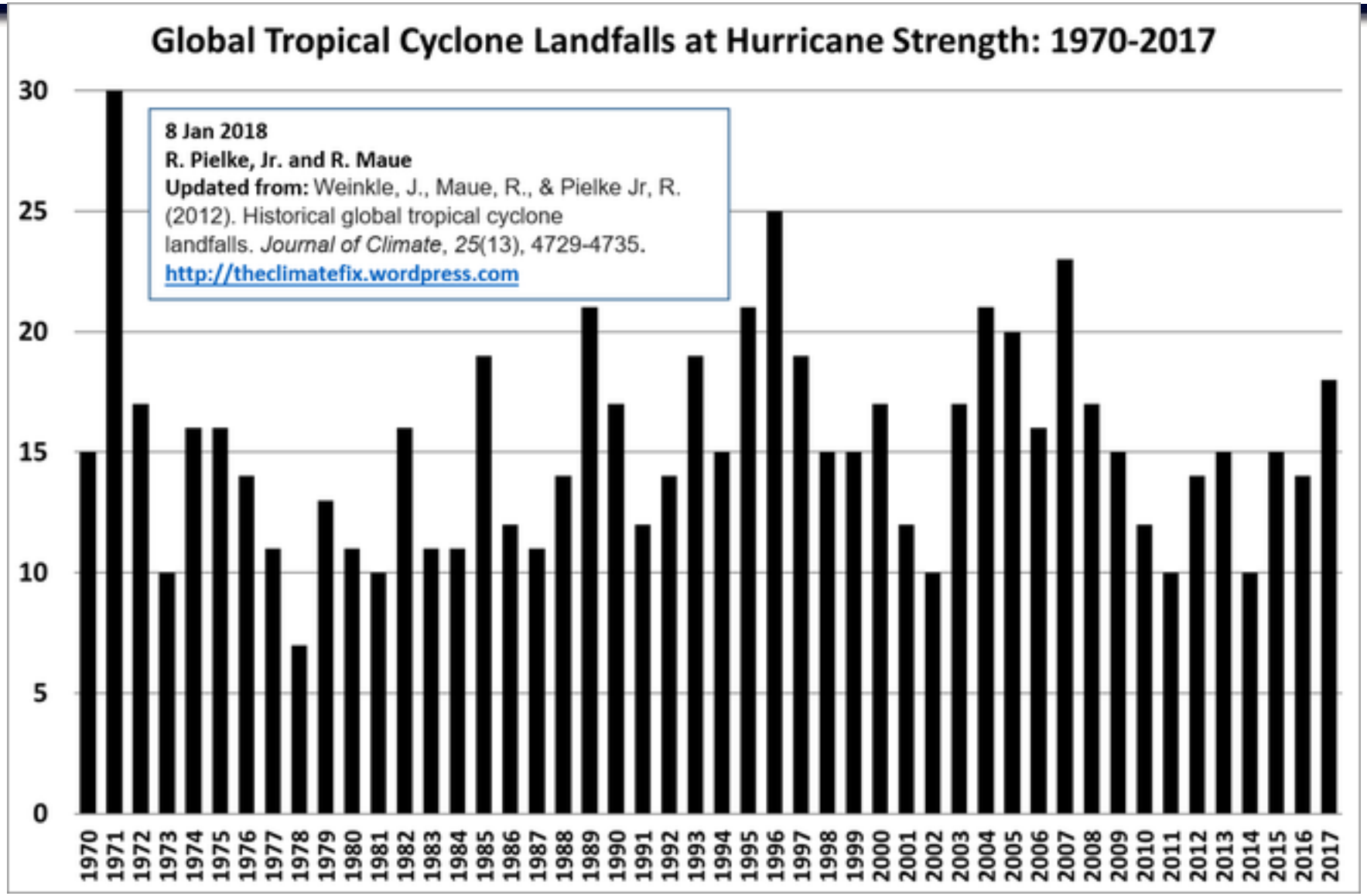
A global view of tropical cyclone trends

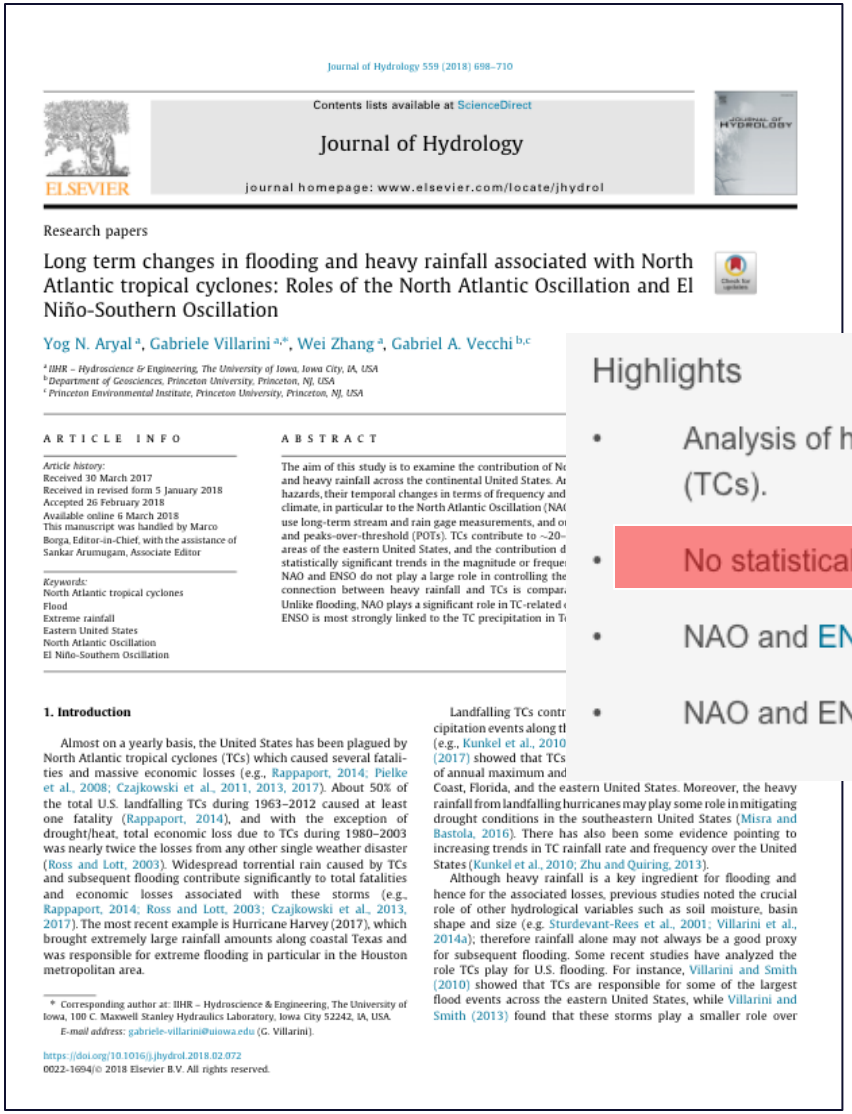


Source: Ryan Maue, after Maue (2011)
http://models.weatherbell.com/global_major_freq.png

Global landfalls updated through 2017 . . .



Hurricane-related flooding? No Trends



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Research papers

Long term changes in flooding and heavy rainfall associated with North Atlantic tropical cyclones: Roles of the North Atlantic Oscillation and El Niño-Southern Oscillation

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North Atlantic Oscillation
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ABSTRACT

The aim of this study is to examine the contribution of Nc
and heavy rainfall across the continental United States. An
hazards, their temporal changes in terms of frequency and
climate, in particular to the North Atlantic Oscillation (NAO
use long-term stream and rain gage measurements, and ot
and peaks-over-threshold (POTs). TCs contribute to ~20–
areas of the eastern United States, and the contribution d
statistically significant trends in the magnitude or freque
NAO and ENSO do not play a large role in controlling the
connection between heavy rainfall and TCs is compara
Unlike flooding, NAO plays a significant role in TC-related
ENSO is most strongly linked to the TC precipitation in T

1. Introduction

Almost on a yearly basis, the United States has been plagued by North Atlantic tropical cyclones (TCs) which caused several fatalities and massive economic losses (e.g., Rappaport, 2014; Pielke et al., 2008; Czajkowski et al., 2011, 2013, 2017). About 50% of the total U.S. landfalling TCs during 1963–2012 caused at least one fatality (Rappaport, 2014), and with the exception of drought/heat, total economic loss due to TCs during 1980–2003 was nearly twice the losses from any other single weather disaster (Ross and Lott, 2003). Widespread torrential rain caused by TCs and subsequent flooding contribute significantly to total fatalities and economic losses associated with these storms (e.g., Rappaport, 2014; Ross and Lott, 2003; Czajkowski et al., 2013, 2017). The most recent example is Hurricane Harvey (2017), which brought extremely large rainfall amounts along coastal Texas and was responsible for extreme flooding in particular in the Houston metropolitan area.

Landfalling TCs contr
cipitation events along t
(e.g., Kunkel et al., 2010
(2017) showed that TCs
of annual maximum and
Coast, Florida, and the eastern United States. Moreover, the heavy rainfall from landfalling hurricanes may play some role in mitigating drought conditions in the southeastern United States (Misra and Bastola, 2016). There has also been some evidence pointing to increasing trends in TC rainfall rate and frequency over the United States (Kunkel et al., 2010; Zhu and Quiring, 2013).

Although heavy rainfall is a key ingredient for flooding and hence for the associated losses, previous studies noted the crucial role of other hydrological variables such as soil moisture, basin shape and size (e.g. Sturdevant-Rees et al., 2001; Villarini et al., 2014a); therefore rainfall alone may not always be a good proxy for subsequent flooding. Some recent studies have analyzed the role TCs play for U.S. flooding. For instance, Villarini and Smith (2010) showed that TCs are responsible for some of the largest flood events across the eastern United States, while Villarini and Smith (2013) found that these storms play a smaller role over

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https://doi.org/10.1016/j.jhydrol.2018.02.072
0022-1694/

Highlights

- Analysis of heavy rainfall and flooding from North Atlantic tropical cyclones (TCs).
- No statistically significant trends in the magnitude or frequency of TC floods.
- NAO and ENSO do not drive the frequency and magnitude of TC flooding.
- NAO and ENSO play a large role in TC-related heavy precipitation.

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IPCC AR5 – Tropical cyclones

"Current datasets indicate no significant observed trends in global tropical cyclone frequency over the past century ."

"No robust trends in annual numbers of tropical storms, hurricanes and major hurricanes counts have been identified over the past 100 years in the North Atlantic basin."

IPCC AR5 – Floods

"In summary, there continues to be a lack of evidence and thus low confidence regarding the sign of trend in the magnitude and/or frequency of floods on a global scale."

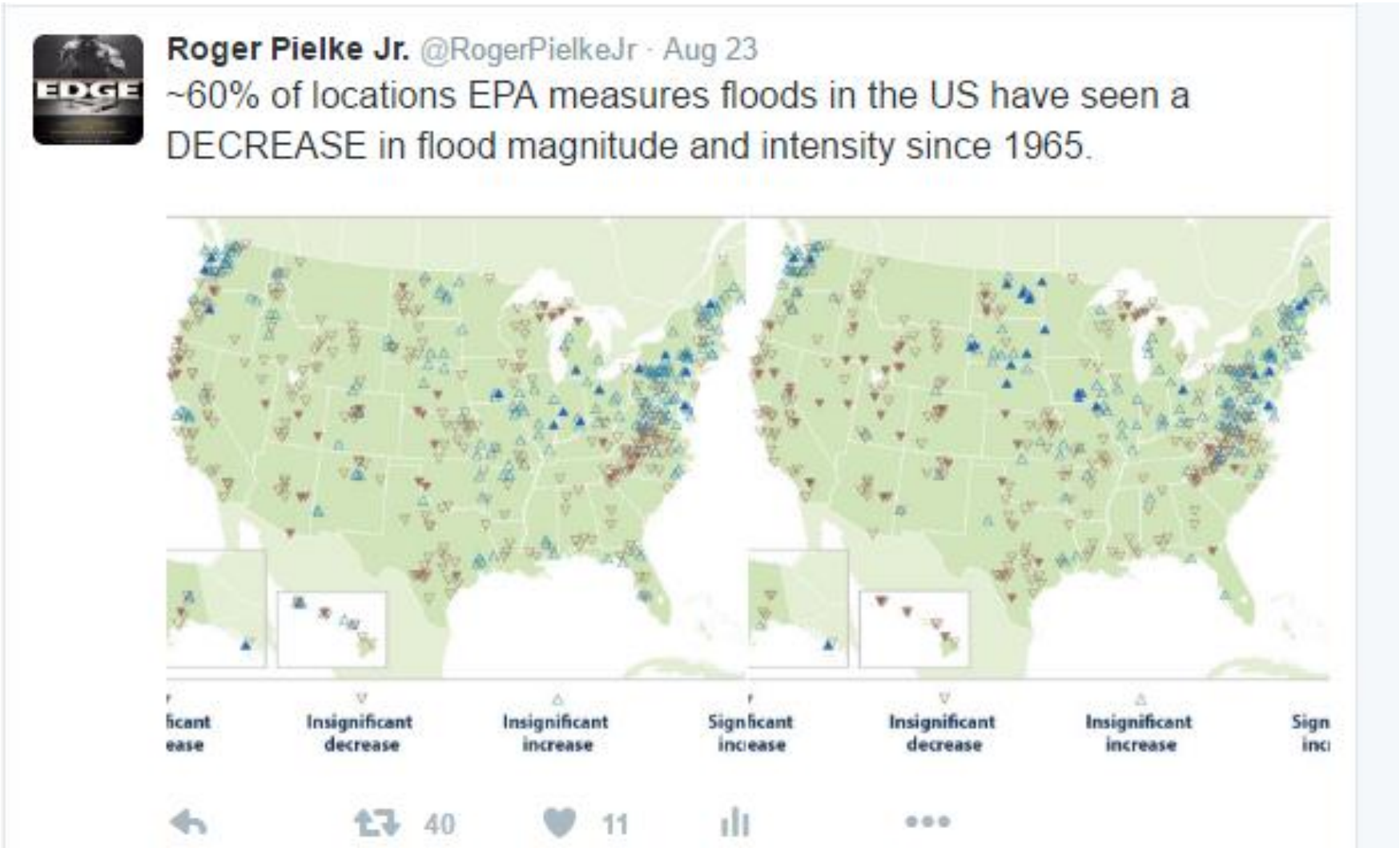
IPCC SREX co-authors – Floods

"a direct statistical link between anthropogenic climate change and trends in the magnitude/frequency of floods has not been established…

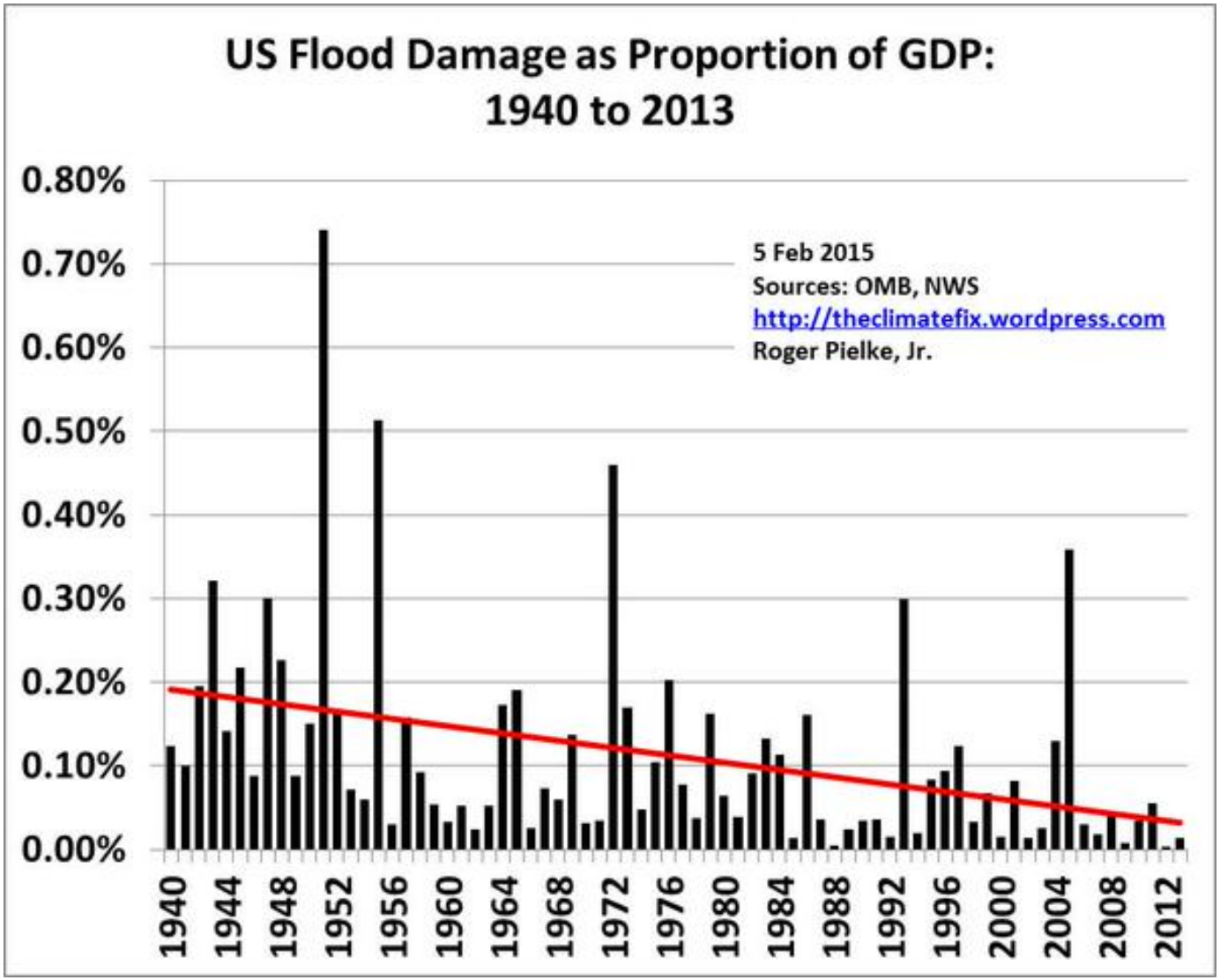
There is such a furore of concern about the linkage between greenhouse forcing and floods that it causes society to lose focus on the things we already know for certain about floods and how to mitigate and adapt to them."

Zbigniew et al. 2014
Hydrological Sciences Journal

US EPA: More US flood decreases than increases



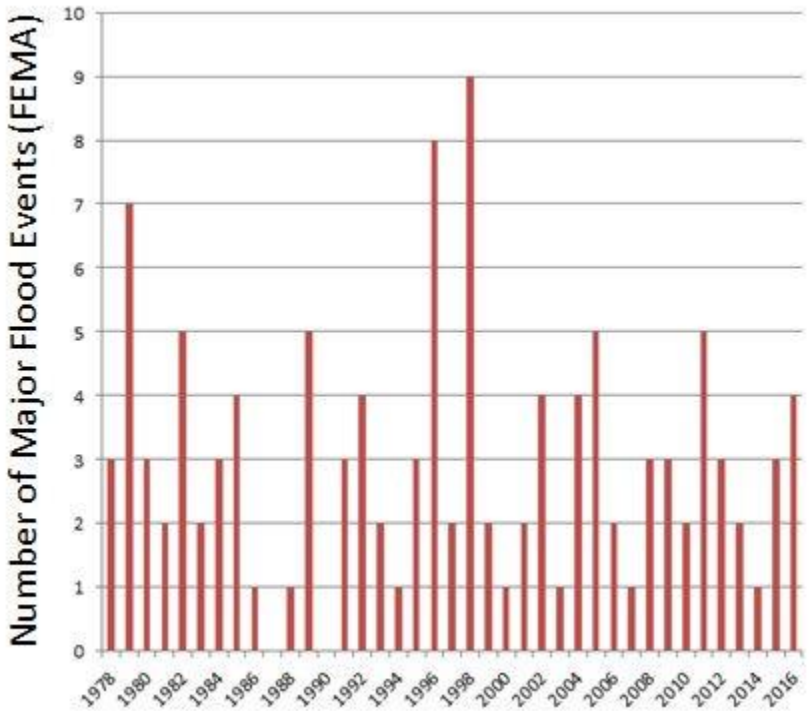
Flood damage in the US, decreasing as % GDP



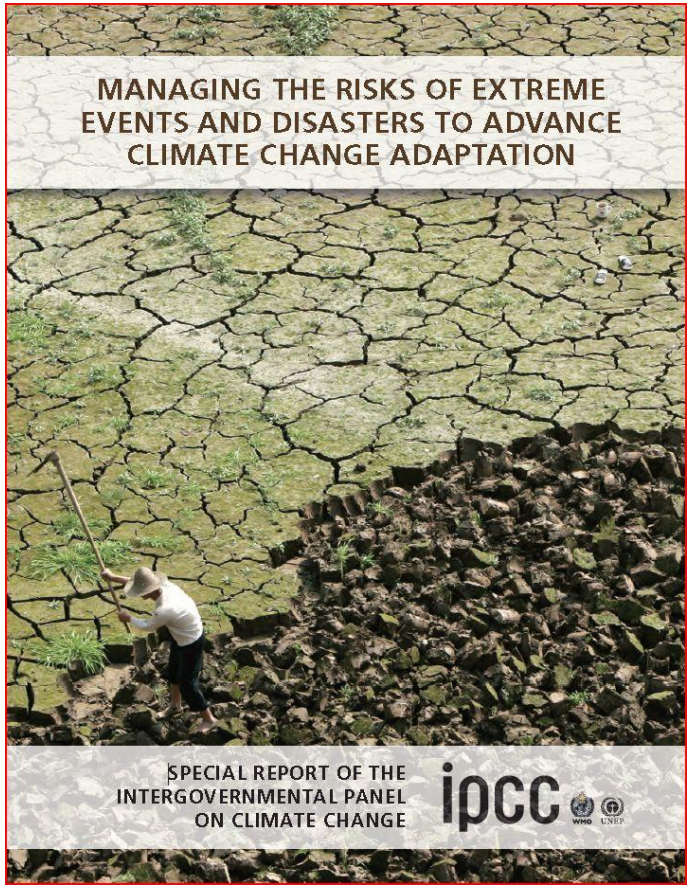
FEMA also sees no trend (since 1978)

- Major U.S flood events continue be a major loss focus.
- 2016 had 4 major flooding event.
  - Late Winter Severe Storms – March
  - Torrential Rains – Texas - April
  - Louisiana Flooding - Aug
  - Hurricane Matthew – Oct (Pending Official Data)
- However, no real trend in flood event since 1978

*Major Flood Event = Flooding events with 1,500 FEMA claims.

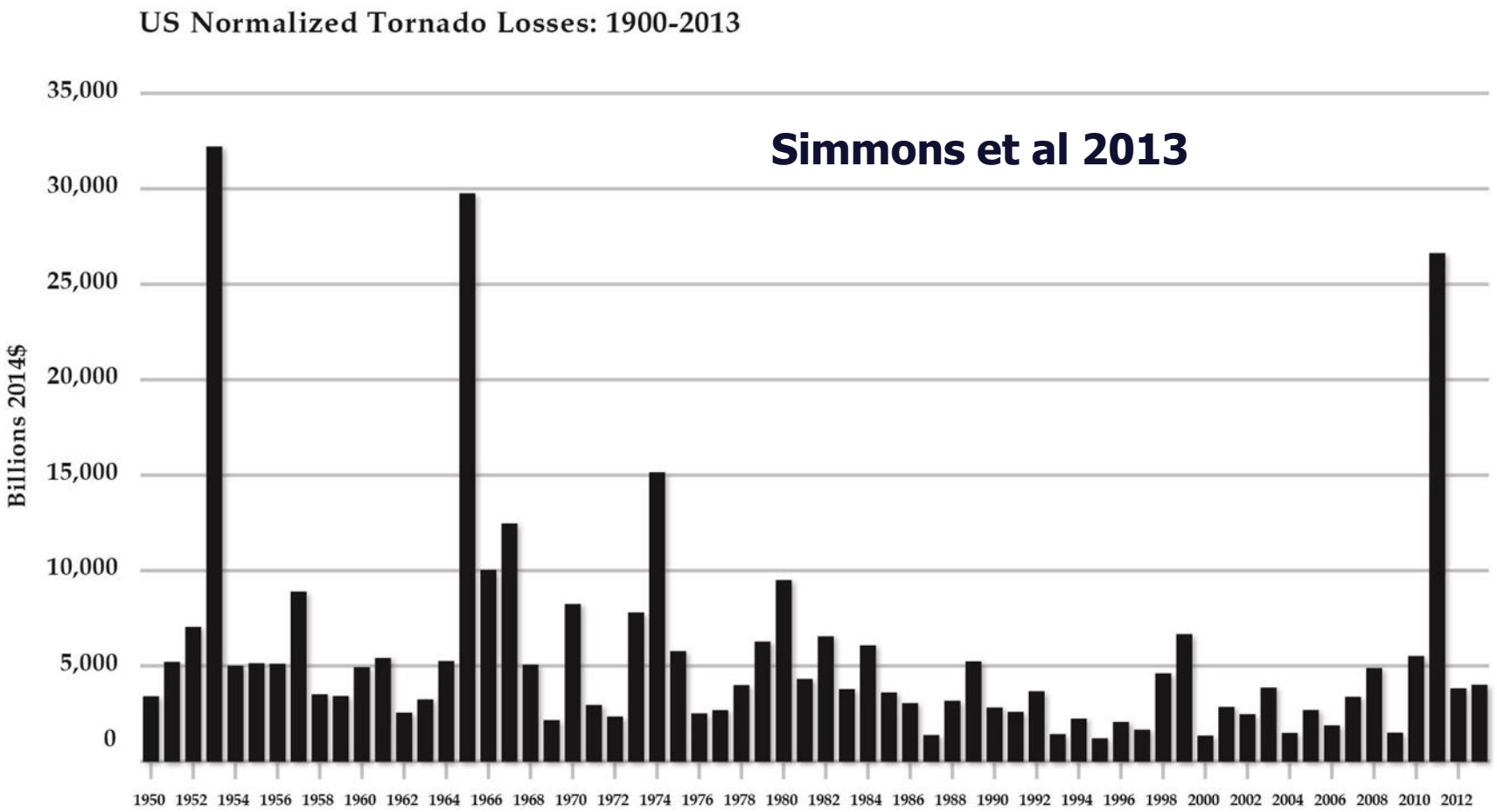


IPCC SREX – Tornadoes

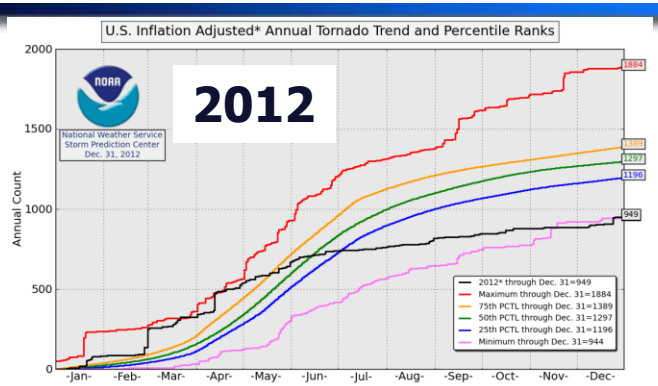


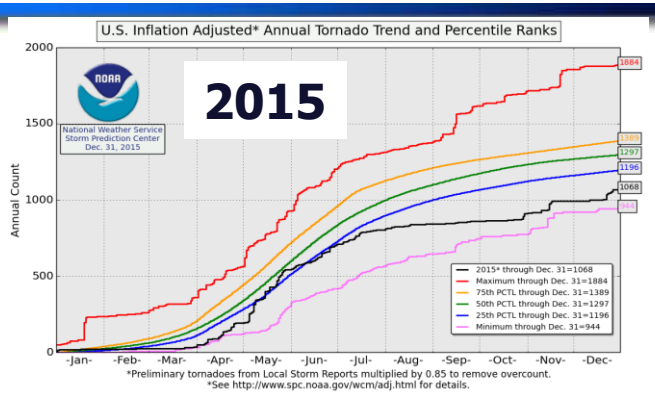
"There is low confidence in observed trends in small spatial-scale phenomena such as tornadoes and hail."

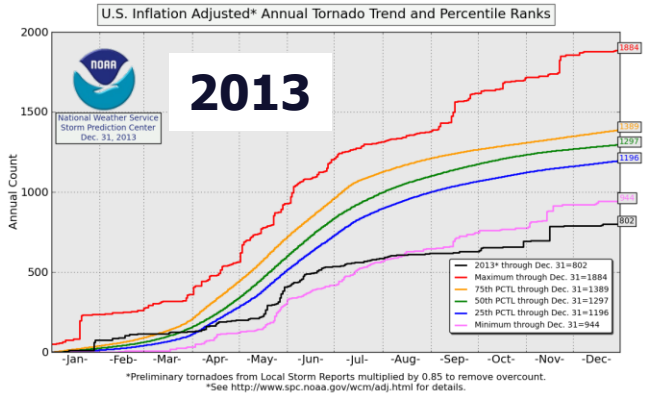
Normalized Tornado Losses in the US

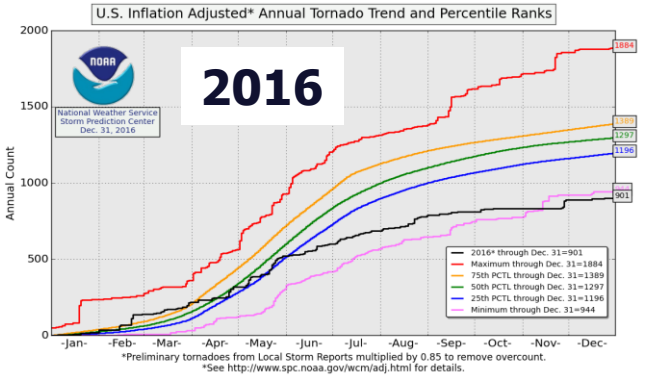


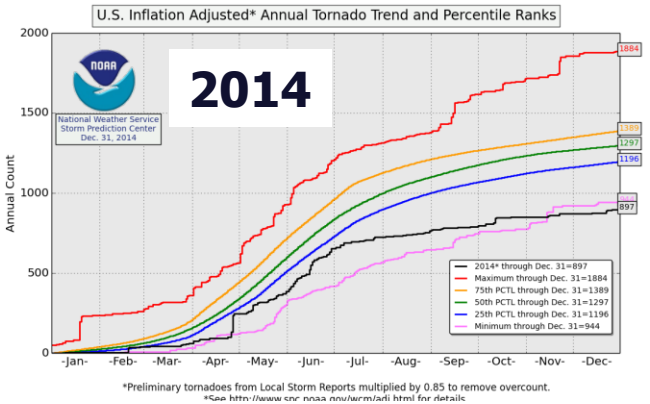
2012-2017+ US Tornadoes below median

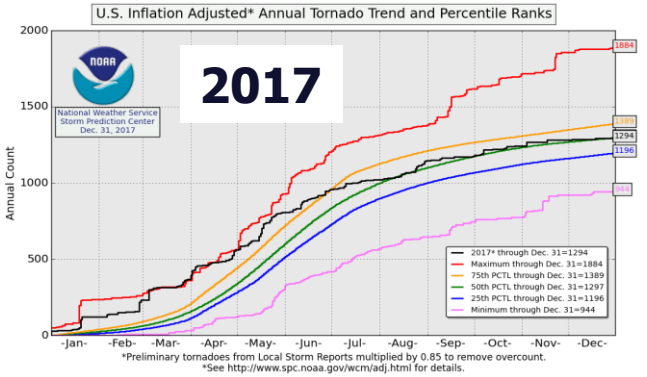












Source: NOAA SPC WCM Inflation adjusted data

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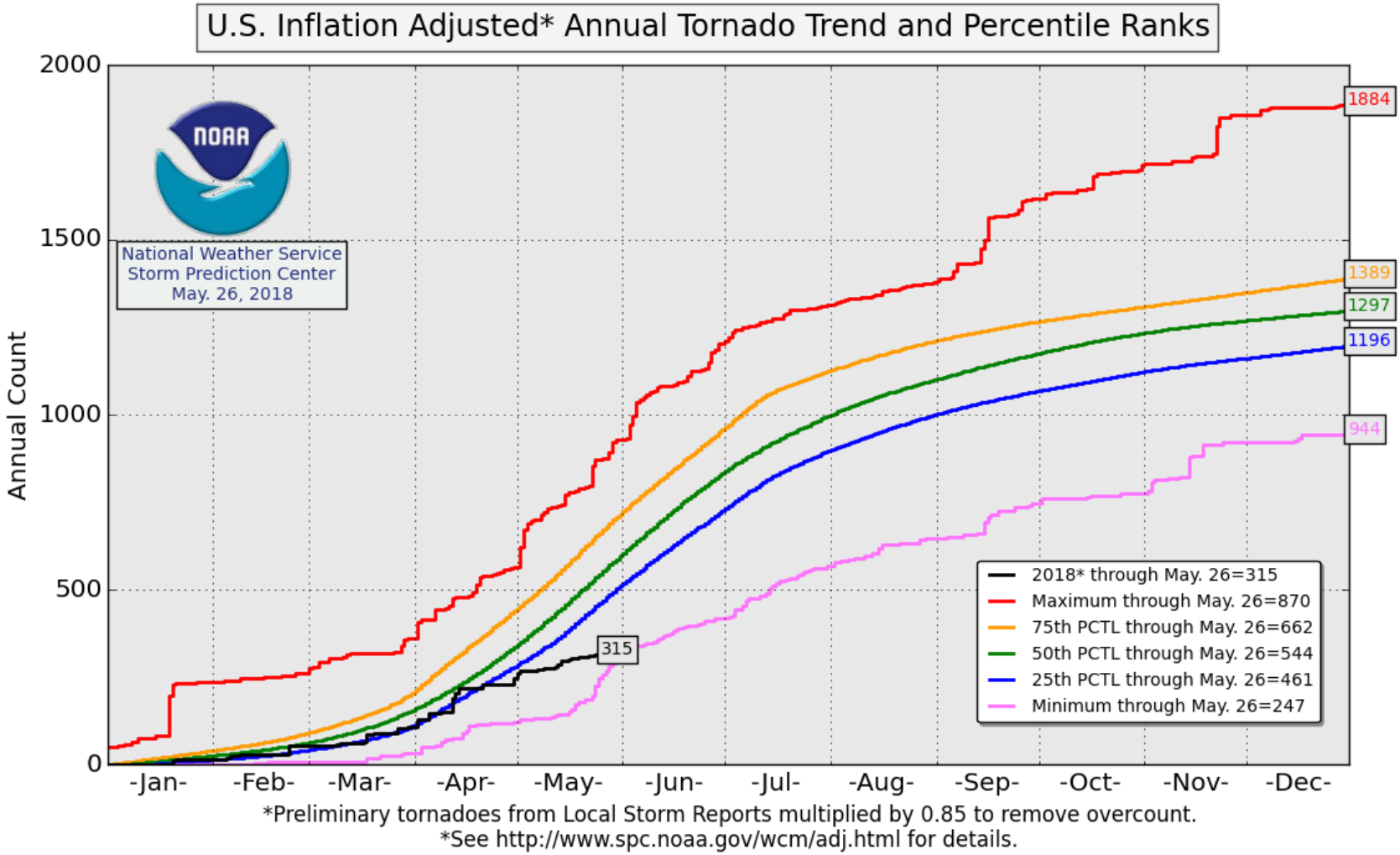
2018 (through May 26th, it's early still)

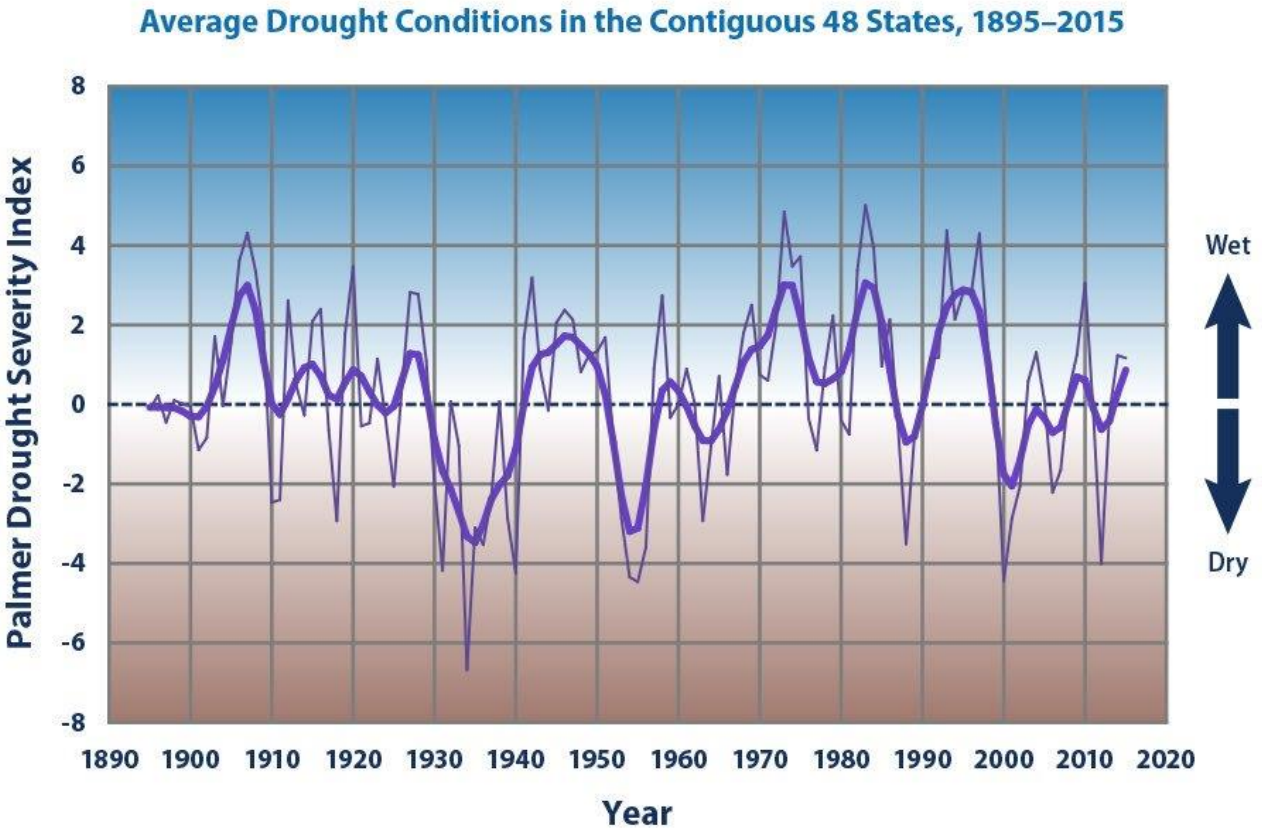


IPCC AR5 – Drought

"There is not enough evidence to support medium or high confidence of attribution of increasing trends to anthropogenic forcings as a result of observational uncertainties and variable results from region to region. . . we conclude consistent with SREX that there is low confidence in detection and attribution of changes in drought over global land areas since the mid-20th century."

"Recent long-term droughts in western North America cannot definitively be shown to lie outside the very large envelope of natural precipitation variability in this region"

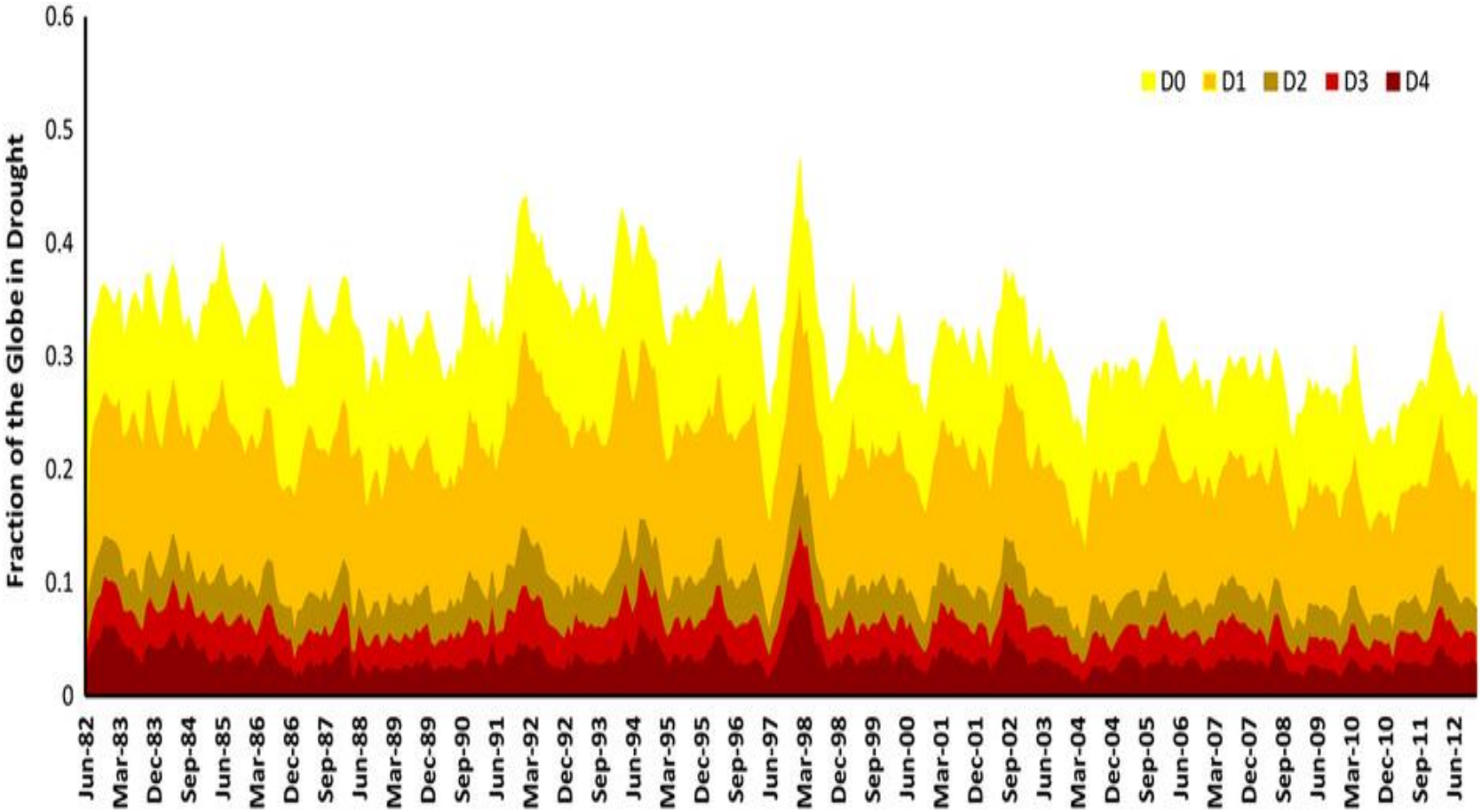
Via EPA, no long-terms trends in US drought



Data source: NOAA (National Oceanic and Atmospheric Administration). 2016. National Centers for Environmental Information. Accessed January 2016. www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.js.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

Fraction of the earth in drought: 1982-2012



Hao et al. 2014
Scientific Data
http://www.nature.com/articles/sdata20141

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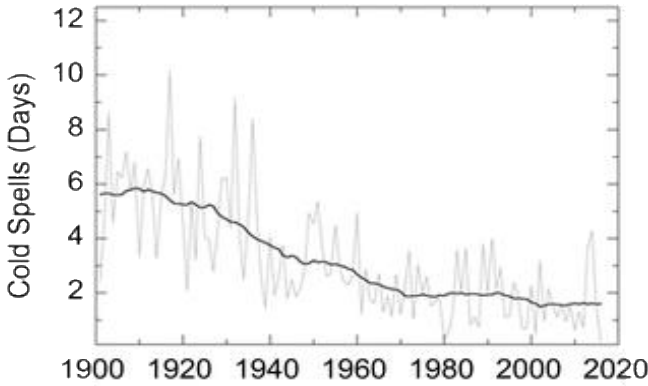
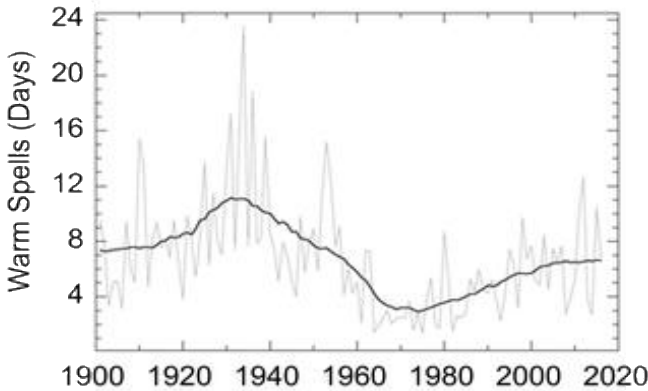
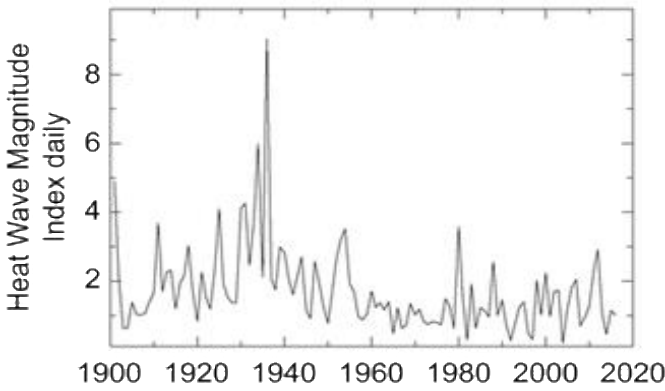
Most recent major US assessment, August 2017

US National Climate Assessment 2017

- "[IPCC AR5] concluded that it is very likely that human influence has contributed to the observed changes in frequency and intensity of **temperature extremes** on the global scale since the mid-20th century. . . In general, however, results for the contiguous United States are not as compelling as for global land areas . . ."
- **Hurricanes**: "there is still low confidence that any reported long-term (multidecadal to centennial) increases in TC activity are robust"
- **Tornadoes**: "A particular challenge in quantifying the existence and intensity of these events arises from the data source"
- **Winter storms**: "Analysis of storm tracks indicates that there has been an increase in winter storm frequency and inten 1950"







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US National Climate Assessment 2017

- **Drought**: "drought statistics over the entire CONUS have declined … no detectable change in meteorological drought at the global scale"
- **Drought**: "Western North America was noted as a region where determining if observed recent droughts were unusual compared to natural variability was particularly difficult"
- **Flooding**: "IPCC AR5 did not attribute changes in flooding to anthropogenic influence nor report detectable changes in flooding magnitude, duration, or frequency"
- **In the US**: "increasing & decreasing flooding magnitude but does not provide robust evidence that these trends are attributable to human influences… no formal attribution of observed flooding changes to anthropogenic forcing has been claimed"
- **Precipitation**: "a number of precipitation metrics over th continental United States has been examined; however trends identified for the U.S. regions have not b clearly attributed to anthropogenic forcing"

Summary of a robust scientific consensus

Have disasters become more costly because of human-caused climate change?

Only one answer to this question is strongly supported by the available data, the broad scientific literature and the assessments of the IPCC and US NCA:

No.**

There is exceedingly little evidence to support claims that disasters have become more costly because of human caused climate change.

(**But be careful saying that)

All's well that ends well, at my university at least …

Daily Camera

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SWEETHEART DANCE • NORTH BOULDER RECREATION CENTER

Home > CU News > Story

CU board shows support for faculty, students' academic freedom

By Sarah Kuta
Staff Writer

POSTED: 11/10/2016 08:13:01 PM MST | UPDATED: 3 MONTHS AGO

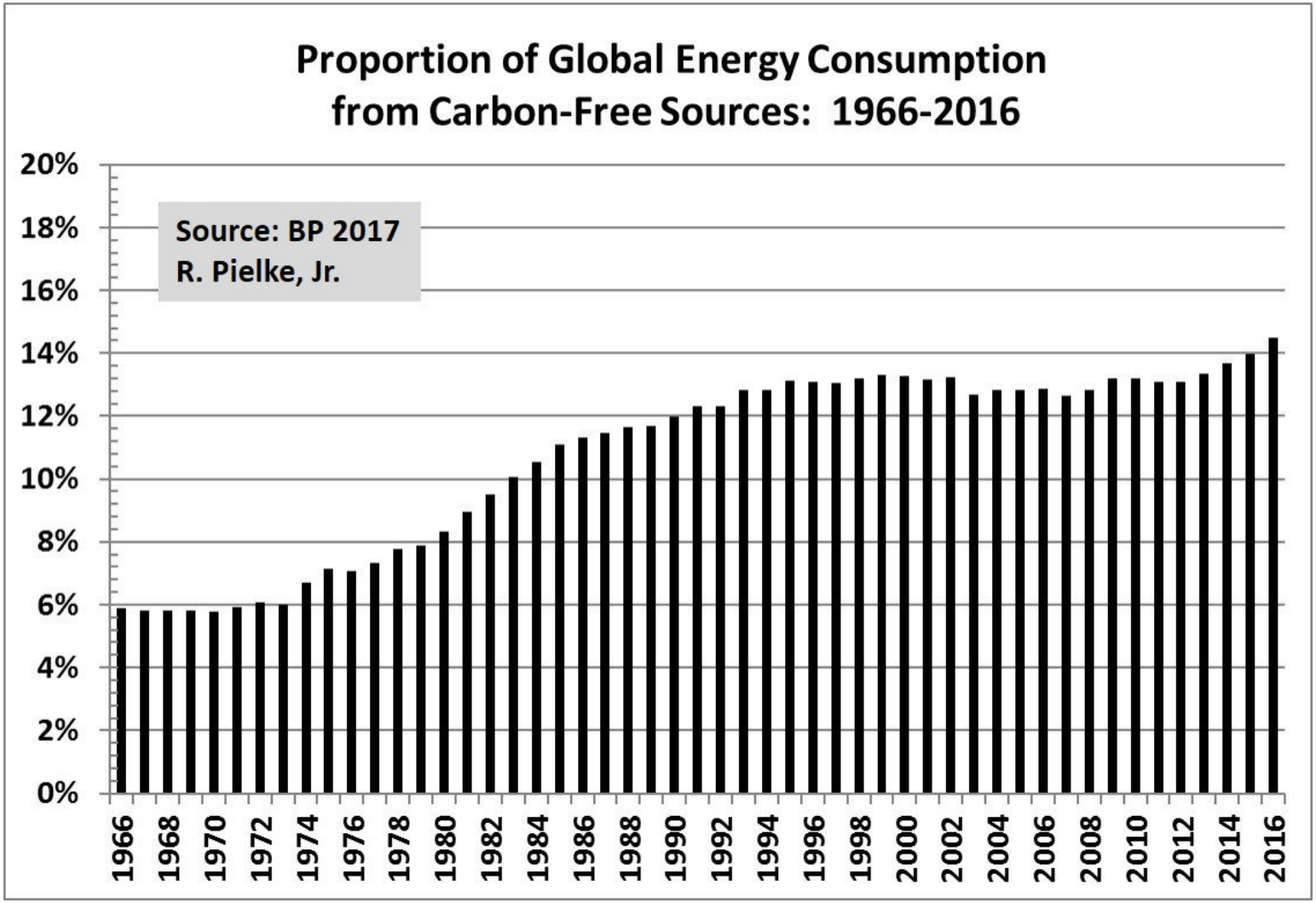
DENVER — The University of Colorado's Board of Regents reaffirmed its support for academic freedom on Thursday in light of recently released emails that showed that a liberal group targeted CU Boulder Professor Roger Pielke Jr. for his writings on climate change.

At a regular meeting in Denver, the regents passed a resolution 9-0 to send the message that "faculty and students must have complete freedom to study, to learn, to do research and to communicate the results of these pursuits to others."

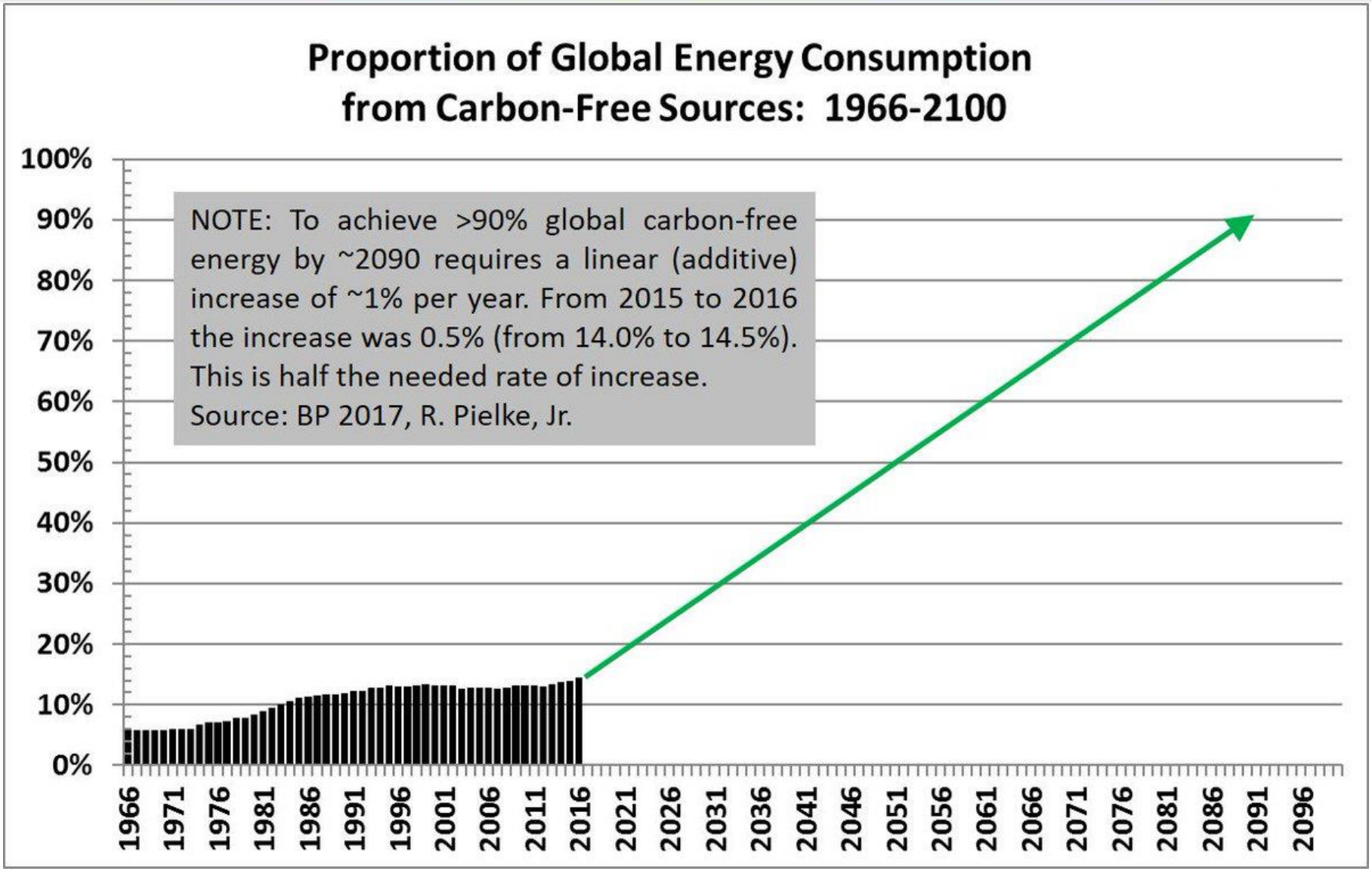
The principles of academic freedom are codified in regent laws, which govern the university. The board was restating its commitment to those principles on Thursday.

Roger Pielke Jr. (Courtesy photo)

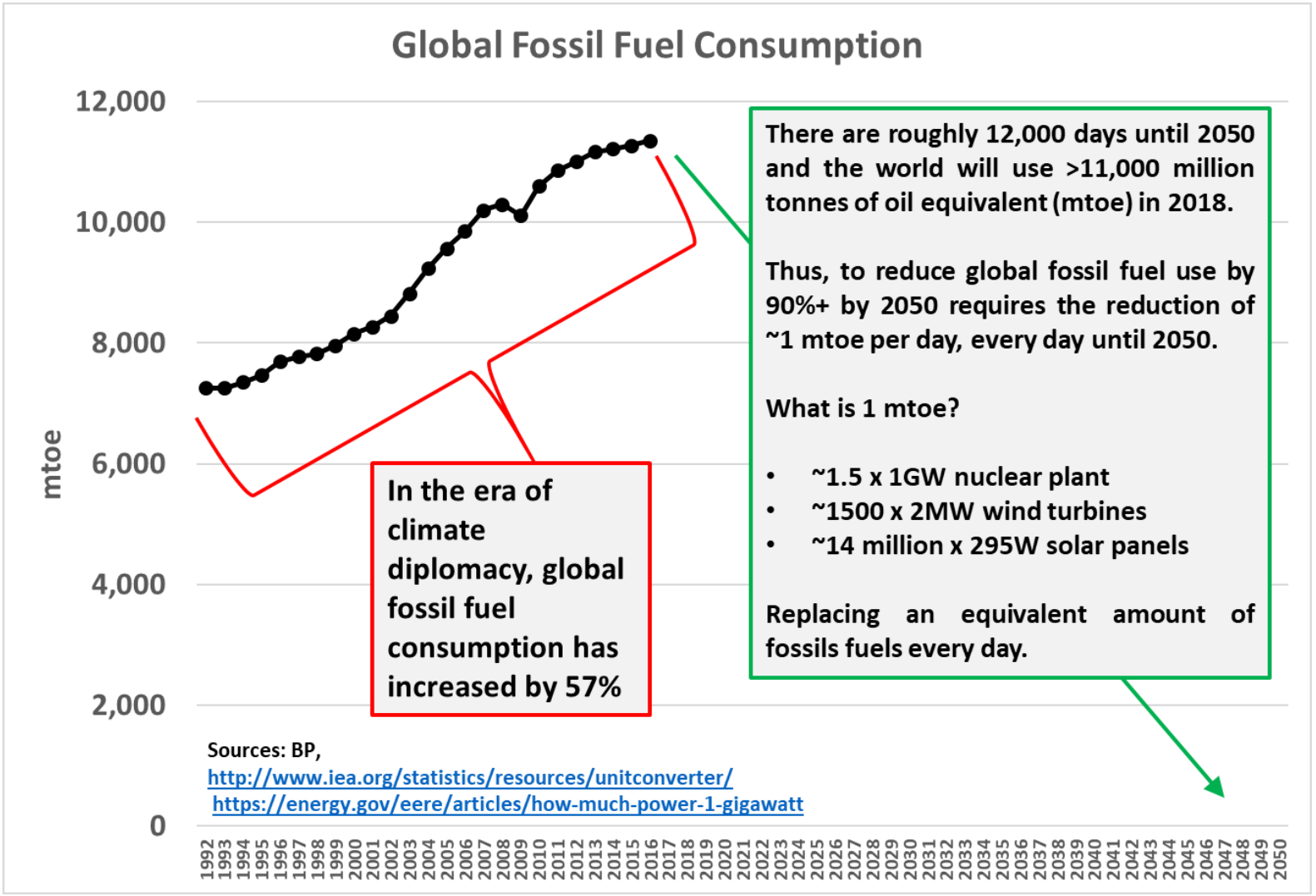
A final word on delegitimization: A proxy war



How do we go from here to there?

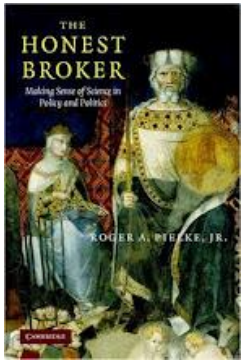


The scale of the challenge

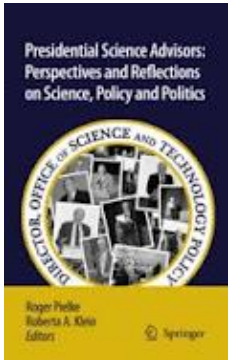


Thank you

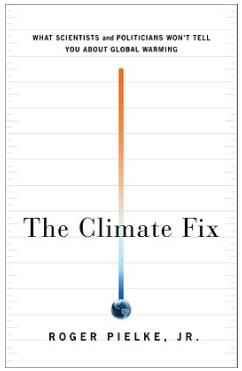
- pielke@colorado.edu
- Blog: http://leastthing.blogspot.com
- About me: http://rogerpielkejr.com/



2007

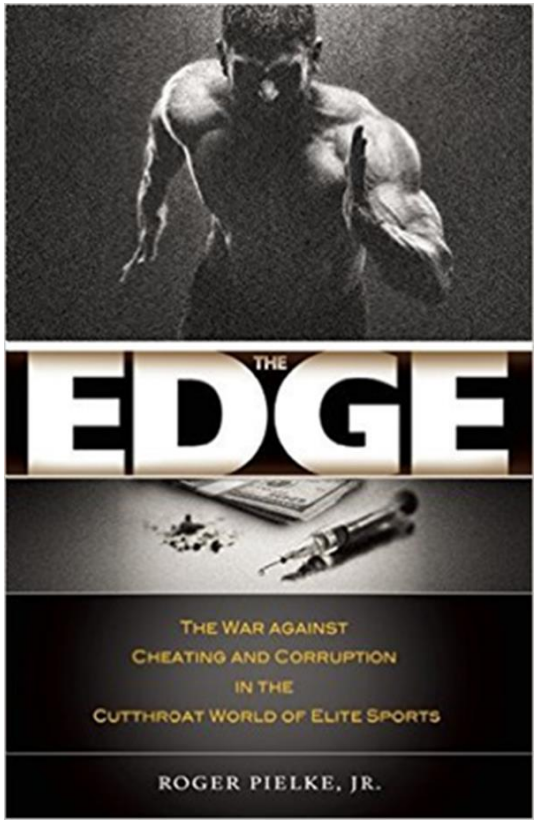


2010



2011

2014



2016