Bad Data: Are NASA, NOAA, EPA (and IPCC) Violating the Data Quality Act and Ignoring Science to Push Preferred Climate and Energy Policies?

A presentation for
The Federalist Society of the University of Houston Law School

by Willie Soon, willie@ceres-science.com
(in collaboration with Dr. Michael Connolly and Dr. Ronan Connolly)
Center for Environmental Research and Earth Sciences
(www.ceres-science.com)

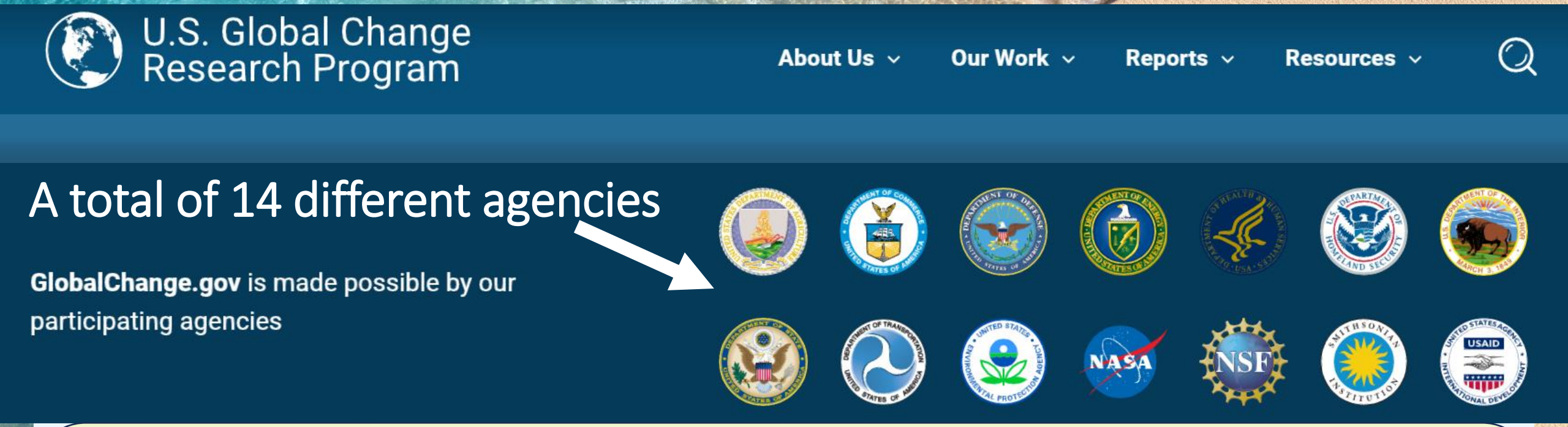
November 6th, 2023

The US Global Change Research Program (USGCRP)

About USGCRP

The U.S. Global Change Research Program (USGCRP) is a federal program mandated by Congress to coordinate federal research and investments in understanding the forces shaping the global environment, both human and natural, and their impacts on society. USGCRP facilitates collaboration and cooperation across its 14 federal member agencies to advance understanding of the changing Earth system. Research supported by USGCRP informs the Nation in navigating the challenges of a changing environment and identifying opportunities for a more resilient future.

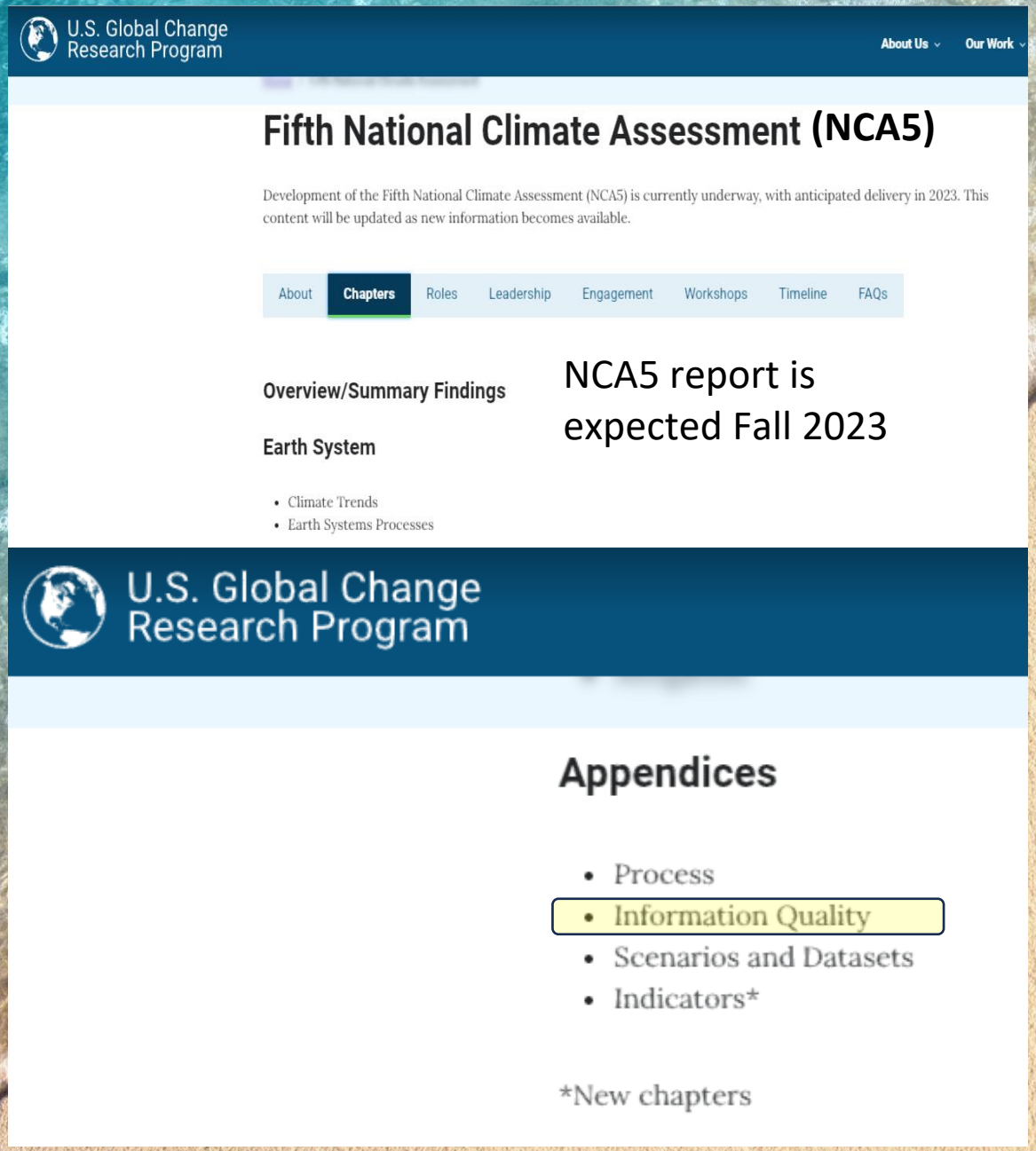
The US Global Change Research Program (USGCRP)



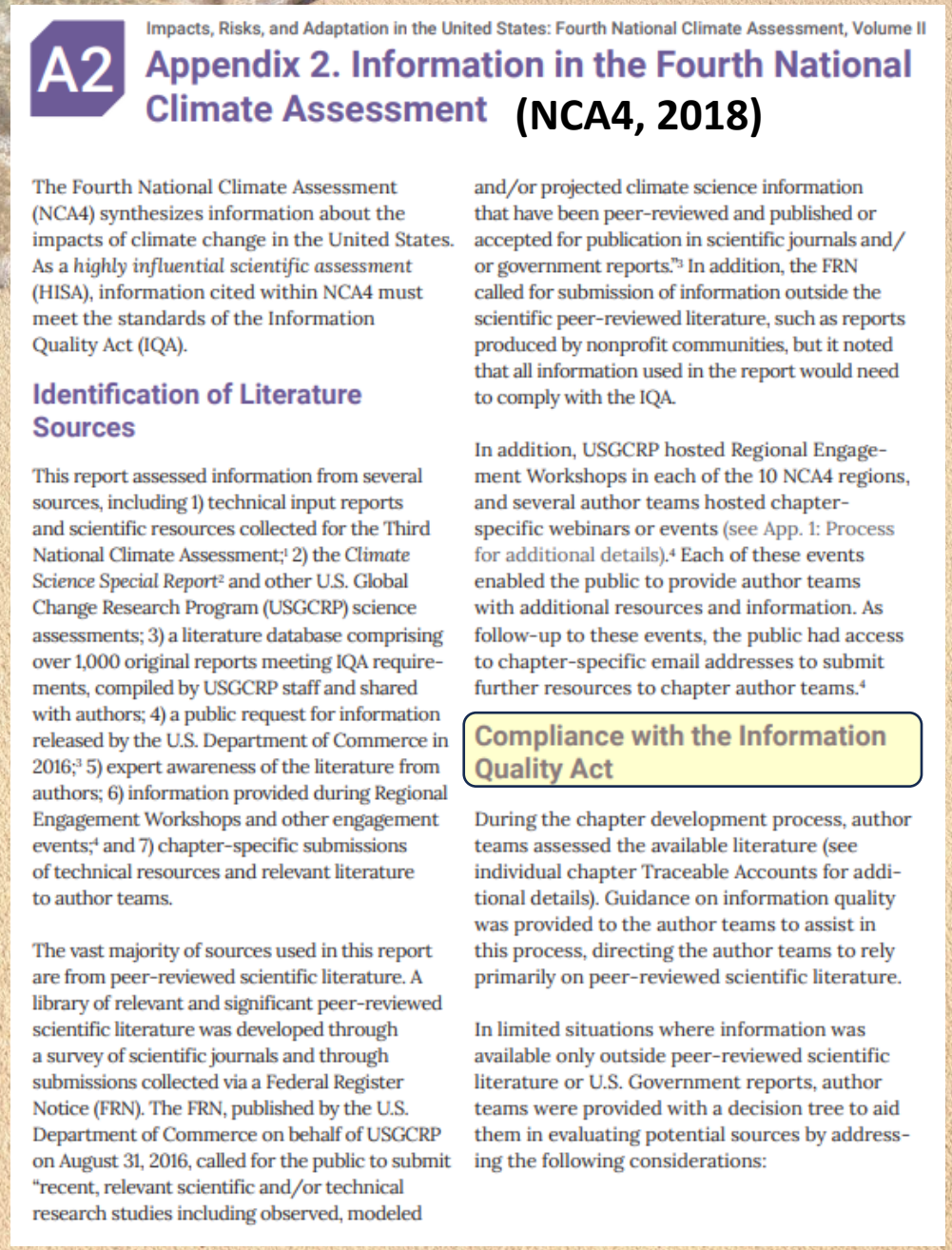
Legal Mandate

USGCRP was established by Presidential Initiative in 1989 and mandated by Congress in the Global Change Research Act (GCRA) of 1990 to develop and coordinate "a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change."

The US Global Change Research Program (USGCRP)



NCA5 report is expected Fall 2023



Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II

A2

Appendix 2. Information in the Fourth National Climate Assessment (NCA4, 2018)

The Fourth National Climate Assessment (NCA4) synthesizes information about the impacts of climate change in the United States. As a *highly influential scientific assessment* (HISA), information cited within NCA4 must meet the standards of the Information Quality Act (IQA).

Identification of Literature Sources

This report assessed information from several sources, including 1) technical input reports and scientific resources collected for the Third National Climate Assessment;[1] 2) the *Climate Science Special Report*[2] and other U.S. Global Change Research Program (USGCRP) science assessments; 3) a literature database comprising over 1,000 original reports meeting IQA requirements, compiled by USGCRP staff and shared with authors; 4) a public request for information released by the U.S. Department of Commerce in 2016;[3] 5) expert awareness of the literature from authors; 6) information provided during Regional Engagement Workshops and other engagement events;[4] and 7) chapter-specific submissions of technical resources and relevant literature to author teams.

The vast majority of sources used in this report are from peer-reviewed scientific literature. A library of relevant and significant peer-reviewed scientific literature was developed through a survey of scientific journals and through submissions collected via a Federal Register Notice (FRN). The FRN, published by the U.S. Department of Commerce on behalf of USGCRP on August 31, 2016, called for the public to submit "recent, relevant scientific and/or technical research studies including observed, modeled and/or projected climate science information that have been peer-reviewed and published or accepted for publication in scientific journals and/or government reports."[3] In addition, the FRN called for submission of information outside the scientific peer-reviewed literature, such as reports produced by nonprofit communities, but it noted that all information used in the report would need to comply with the IQA.

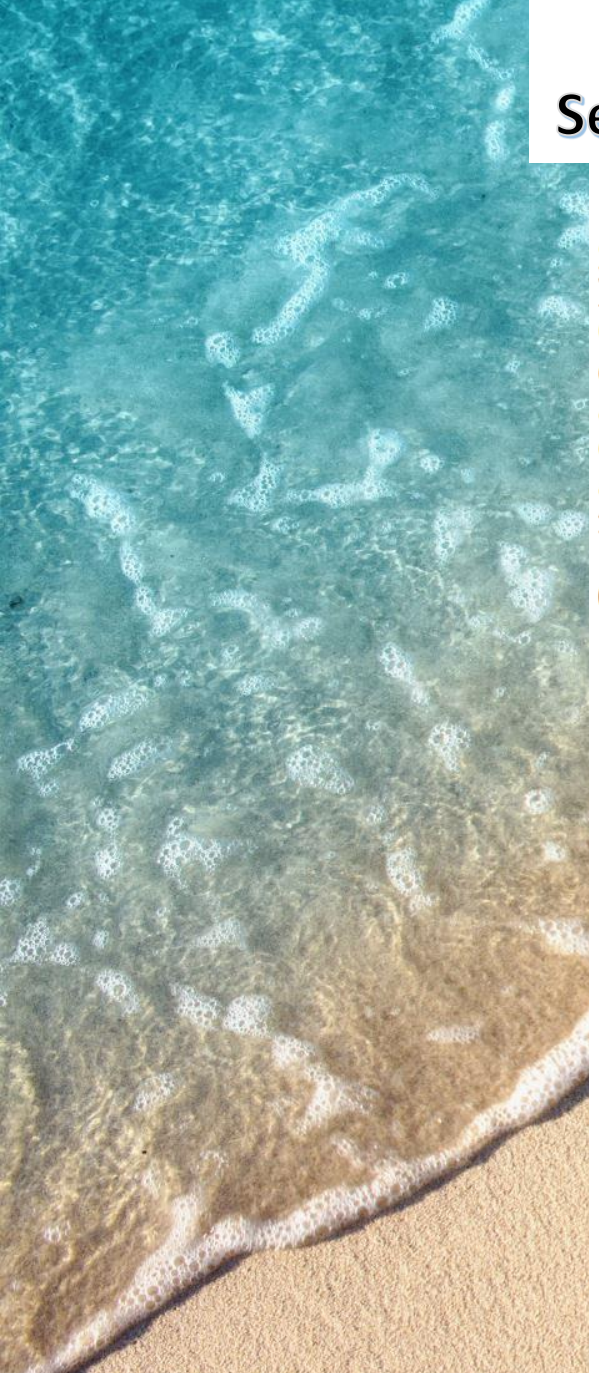
In addition, USGCRP hosted Regional Engagement Workshops in each of the 10 NCA4 regions, and several author teams hosted chapter-specific webinars or events (see App. 1: Process for additional details).[4] Each of these events enabled the public to provide author teams with additional resources and information. As follow-up to these events, the public had access to chapter-specific email addresses to submit further resources to chapter author teams.[4]

Compliance with the Information Quality Act

During the chapter development process, author teams assessed the available literature (see individual chapter Traceable Accounts for additional details). Guidance on information quality was provided to the author teams to assist in this process, directing the author teams to rely primarily on peer-reviewed scientific literature.

In limited situations where information was available only outside peer-reviewed scientific literature or U.S. Government reports, author teams were provided with a decision tree to aid them in evaluating potential sources by addressing the following considerations:

Data Quality Act or Information Quality Act: Section 515 of Consolidated Appropriations Act, 2001



SEC. 515. (a) IN GENERAL.—The Director of the Office of Management and Budget shall, by not later than September 30, 2001, and with public and Federal agency involvement, issue guidelines under sections 3504(d)(1) and 3516 of title 44, United States Code, that provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies in fulfillment of the purposes and provisions of chapter 35 of title 44, United States Code, commonly referred to as the Paperwork Reduction Act.

(b) CONTENT OF GUIDELINES.—The guidelines under subsection (a) shall—

(1) apply to the sharing by Federal agencies of, and access to, information disseminated by Federal agencies; and

(2) require that each Federal agency to which the guidelines apply—

(A) issue guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by the agency, by not later than 1 year after the date of issuance of the guidelines under subsection (a);

(B) establish administrative mechanisms allowing affected persons to seek and obtain correction of information maintained and disseminated by the agency that does not comply with the guidelines issued under subsection (a); and

(C) report periodically to the Director—

(i) the number and nature of complaints received by the agency regarding the accuracy of information disseminated by the agency; and

(ii) how such complaints were handled by the agency.

Source: DataQualityAct2001-PLAW-106publ554.pdf (download October 11, 2023)

The UN Intergovernmental Panel on Climate Change (IPCC)

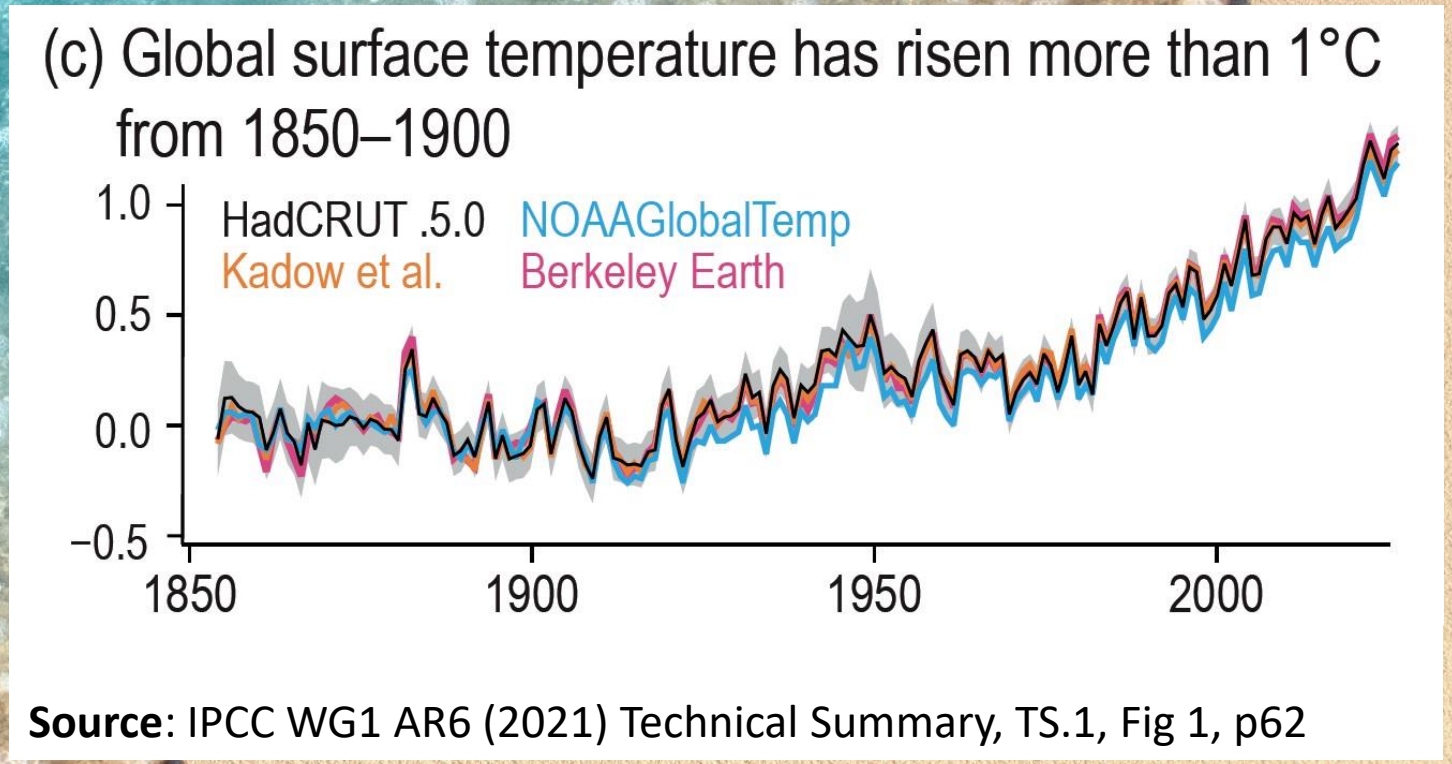
- "Created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), the objective of the IPCC is to provide governments at all levels **with scientific information that they can use to develop climate policies**." - https://www.ipcc.ch/about/

- They have so far published 6 Assessment Reports (AR for short):
  - AR1 (1990); AR2 (1995); AR3 (2001); AR4 (2007); AR5 (2013); AR6 (2021)

- **Most iconic statement**: *The observed global warming since **at least** 1950s is mostly human-caused and also unprecedented*.

- How did they reach this conclusion? And is it scientifically justified?

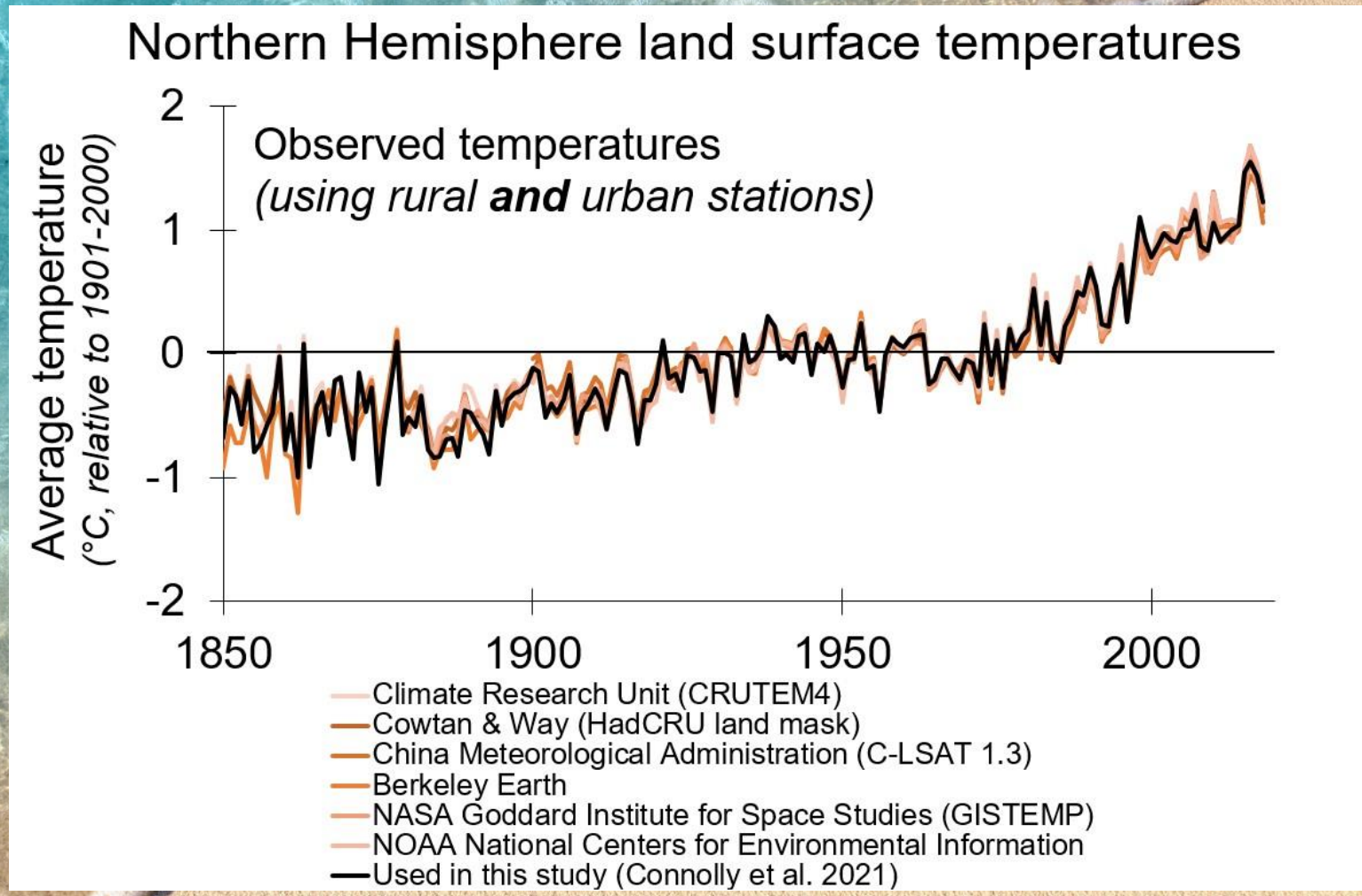
The IPCC's approach: Detection



Source: IPCC WG1 AR6 (2021) Technical Summary, TS.1, Fig 1, p62

IPCC's "Detection" of global warming

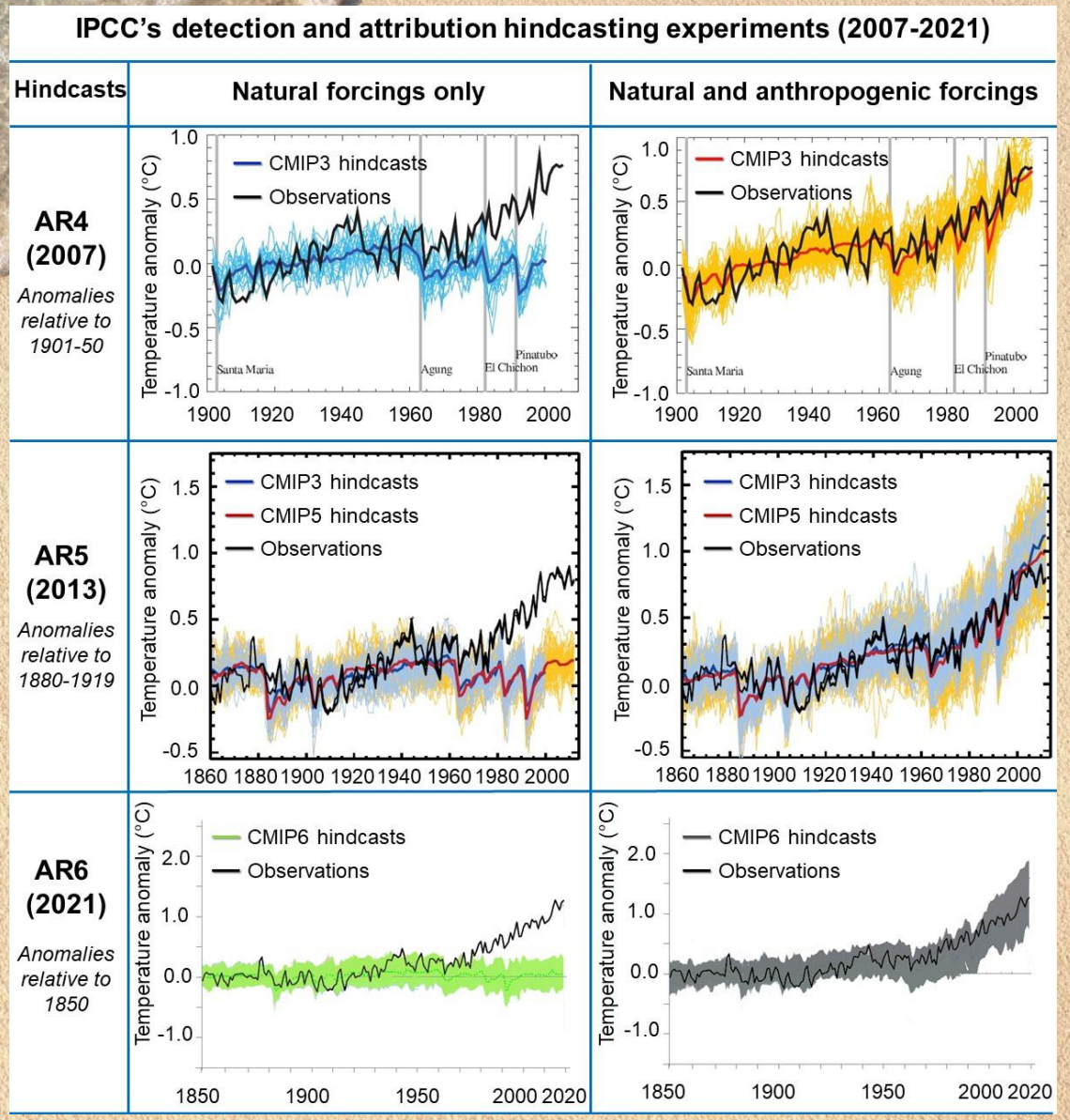
- IPCC compiled several "**global surface temperature anomaly**" time series (1850-2020)
- All of them show an almost continuous "global warming" of 1°C since the 19th century



- Nonetheless, by averaging together all the available records for each year, you can generate graphs like the above!
- The warming shown by these time series is called “global warming”

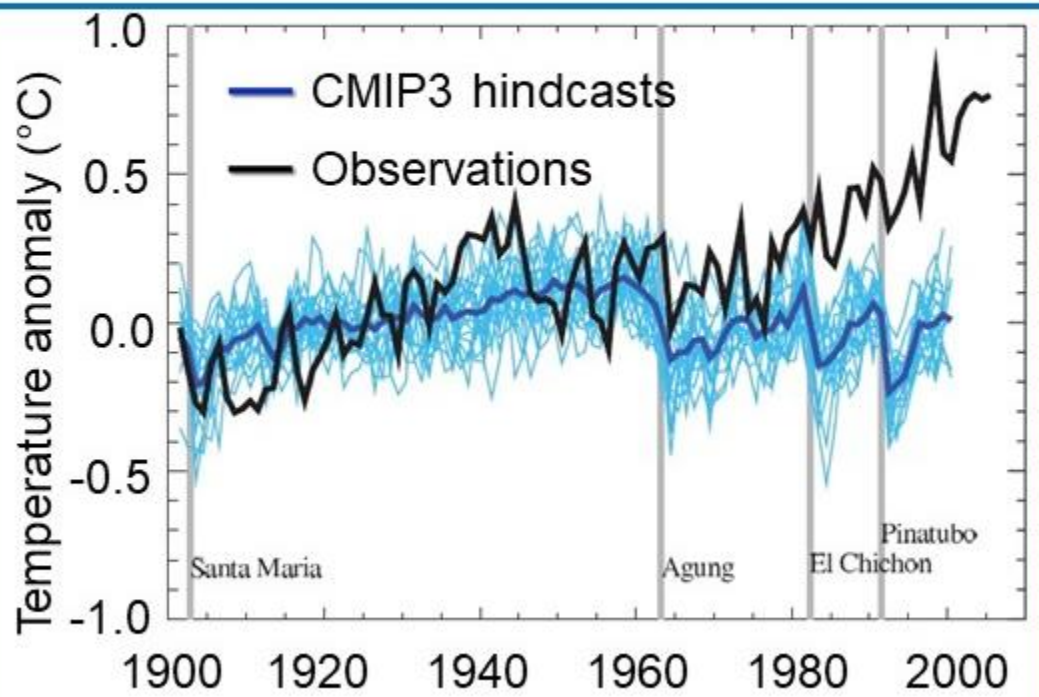
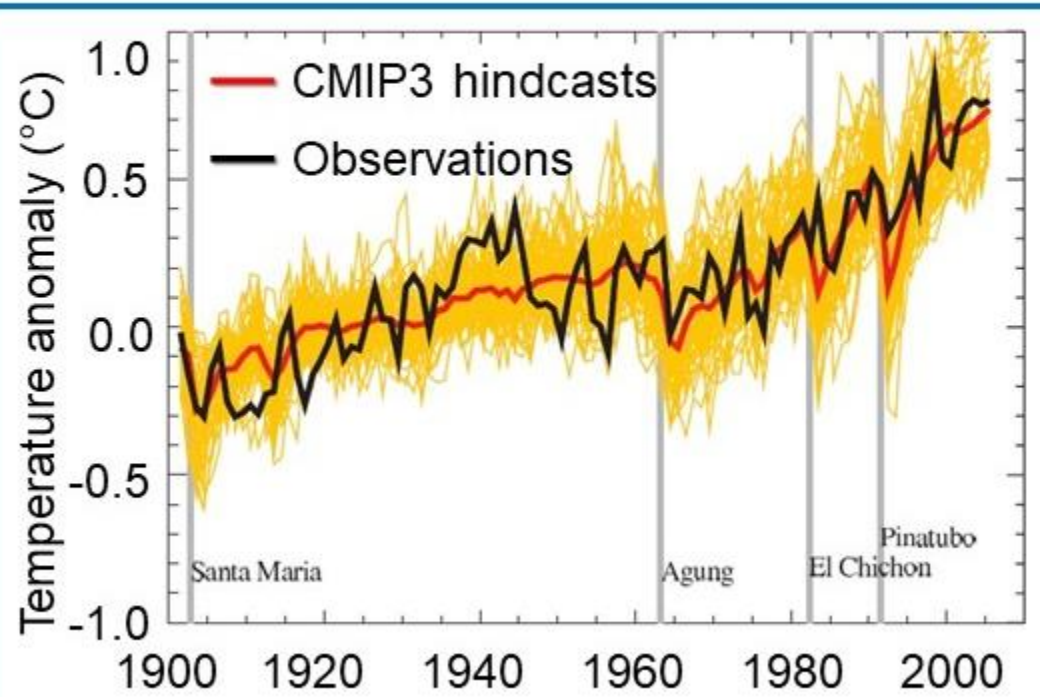
The IPCC's approach: Attribution

- The IPCC's "attribution" statements are based on comparing the "observed" temperature record to computer model "**hindcasts**".
- A computer model "hindcast" is the opposite of a "forecast" – what the model says **should** have happened in the past.
- When the hindcasts use only natural factors (sun & volcanoes), they can't explain the warming after 1950. But, when they add in anthropogenic ("human-caused") factors, they can.
- Their conclusion: "it's mostly human-caused"!



The IPCC's approach: Attribution

IPCC's detection and attribution hindcasting experiments (2007-2021)

Hindcasts	Natural forcings only	Natural and anthropogenic forcings
AR4 (2007) *Anomalies relative to 1901-50*		

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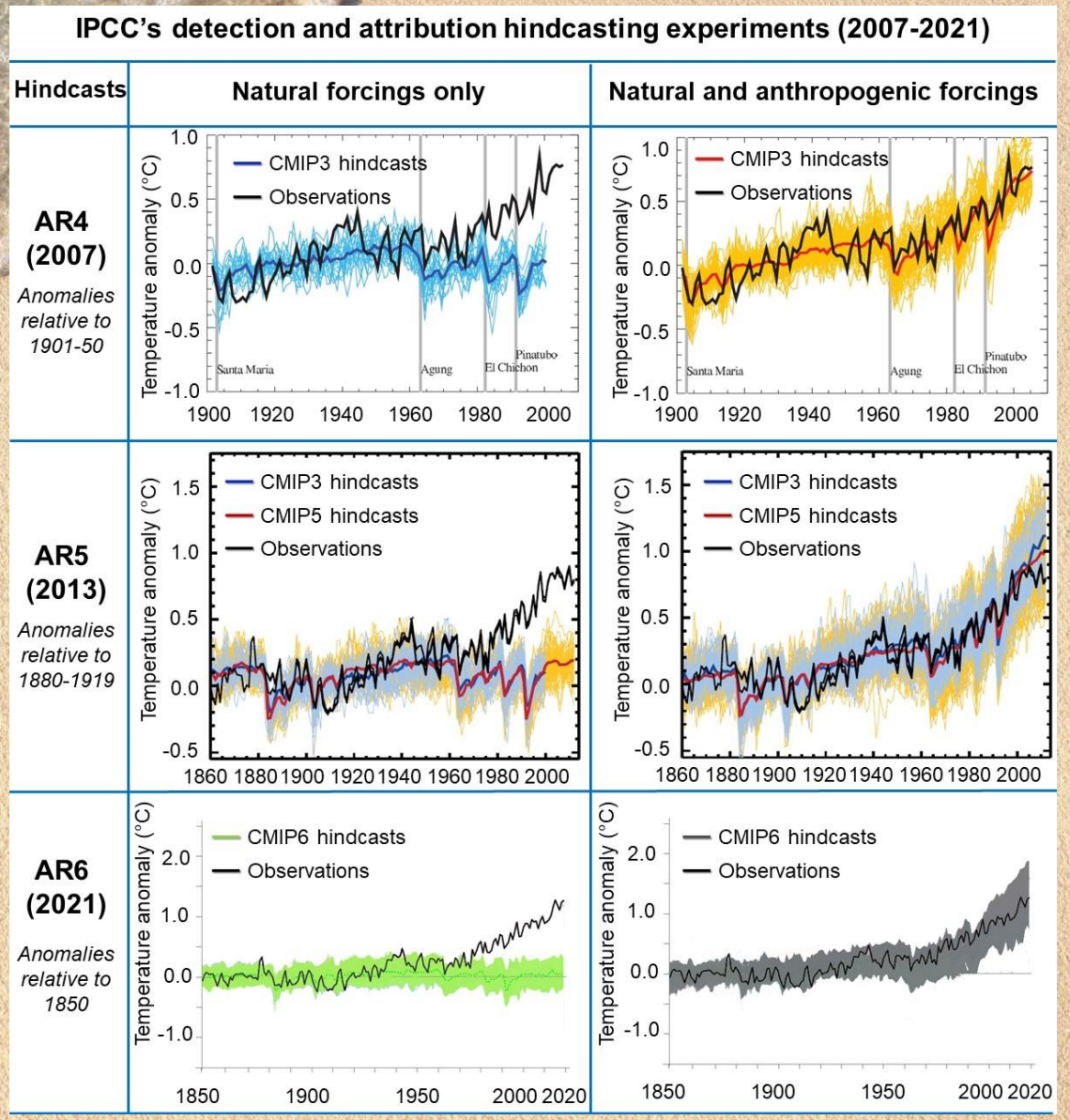
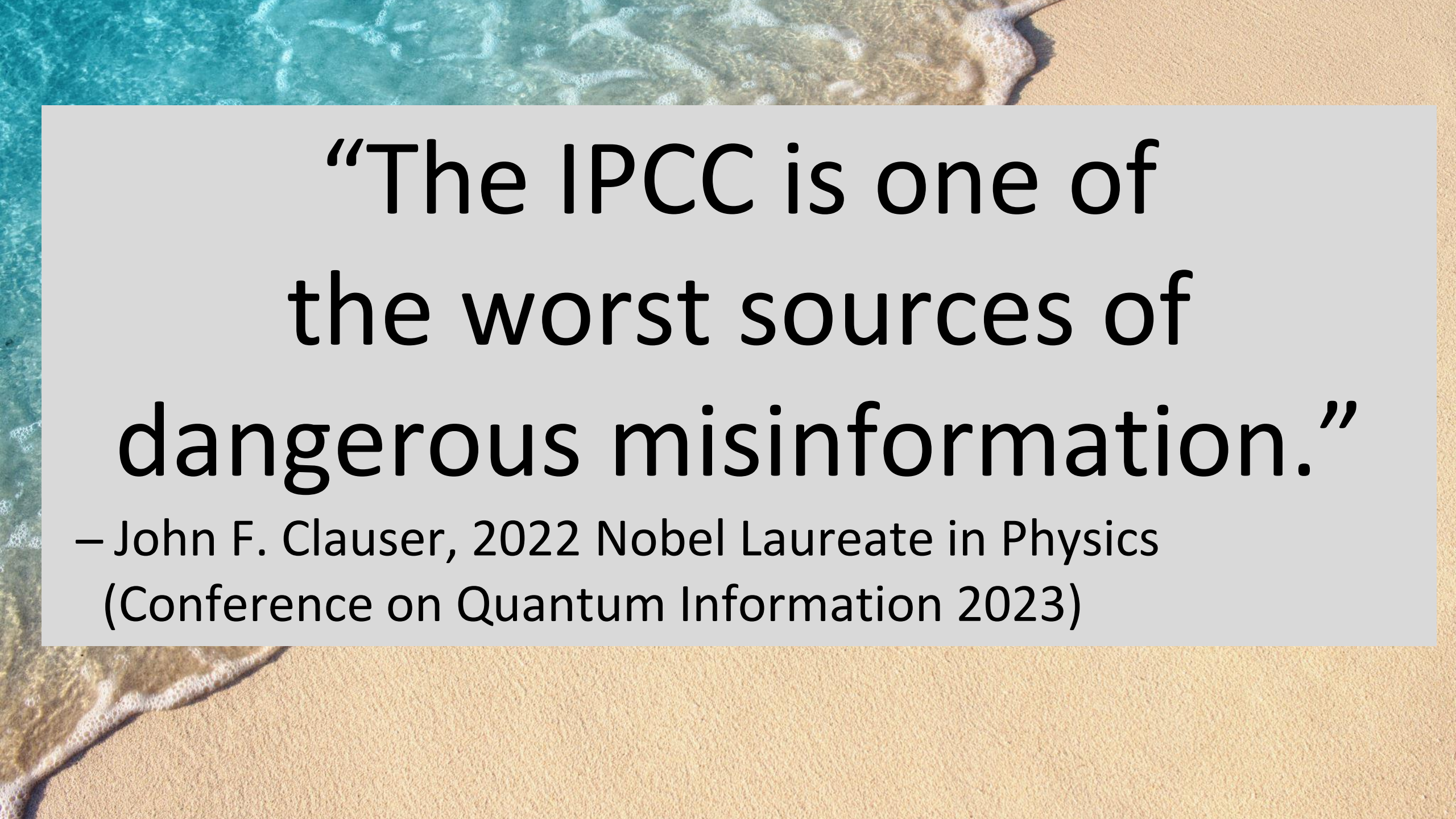
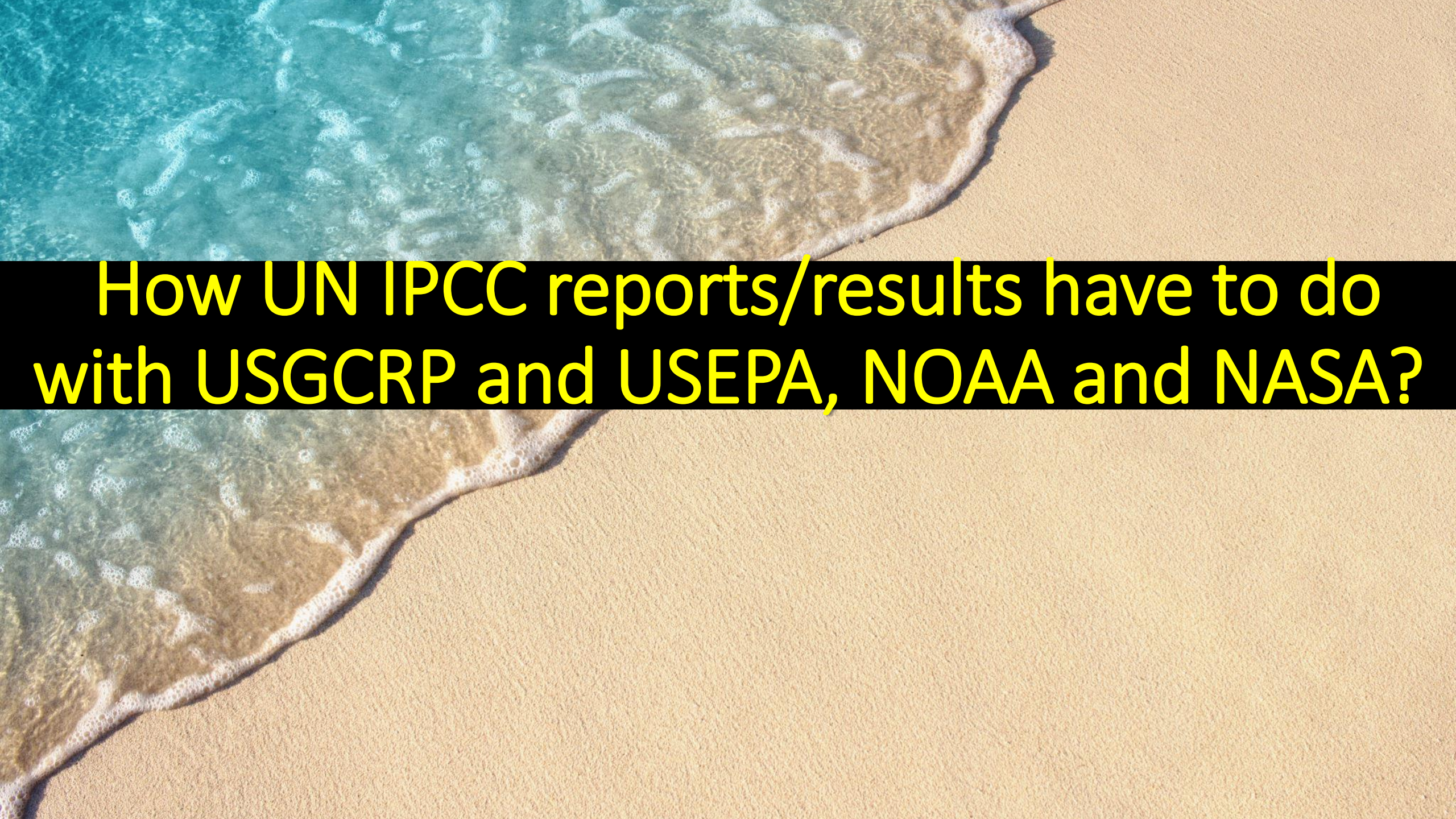




"The IPCC is one of the worst sources of dangerous misinformation."

– John F. Clauser, 2022 Nobel Laureate in Physics
(Conference on Quantum Information 2023)


How UN IPCC reports/results have to do with USGCRP and USEPA, NOAA and NASA?

Global Climate Change Impacts in the United States

2009

U.S. Global Change Research Program

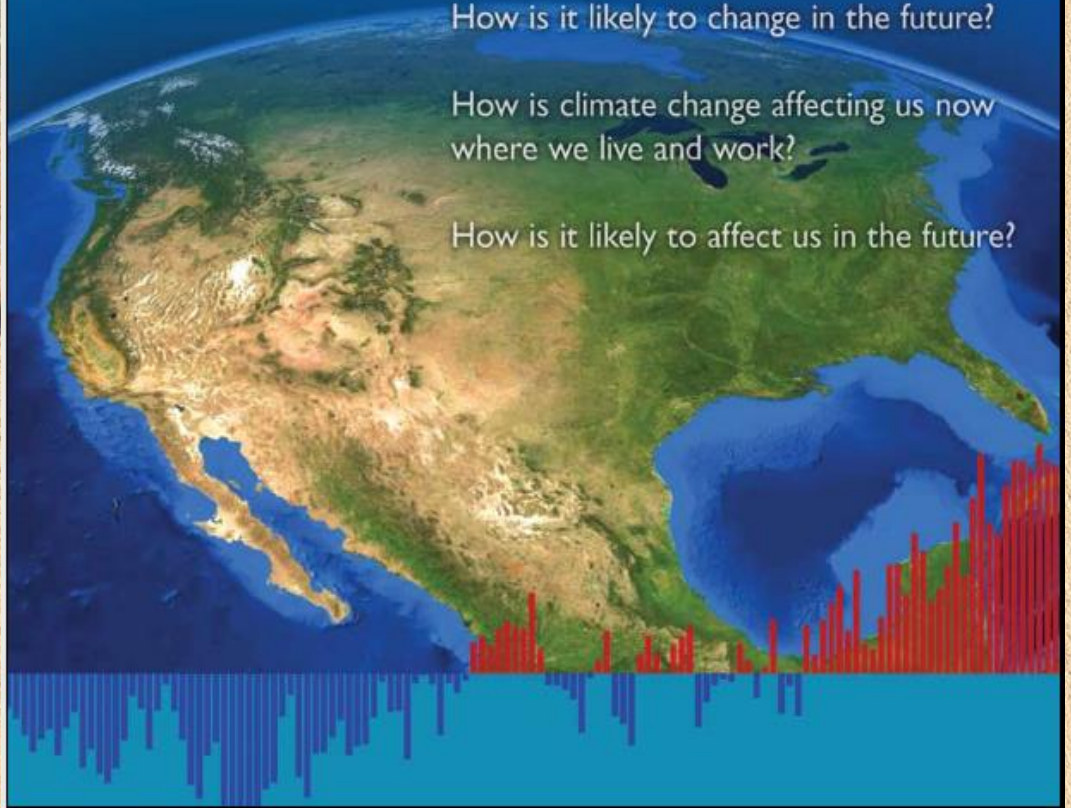
HIGHLIGHTS

How has climate already changed?

How is it likely to change in the future?

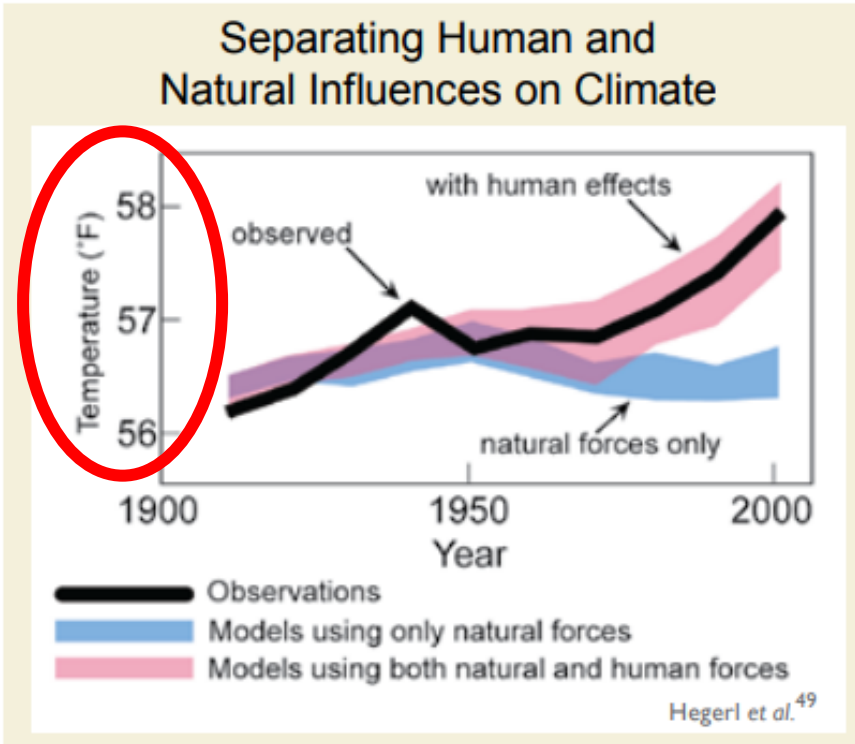
How is climate change affecting us now where we live and work?

How is it likely to affect us in the future?



Serious mis-representations in USGCRP 2009 (p. 20) report!

U.S. Global Change Research Program



The blue band shows how global average temperatures would have changed due to natural forces only, as simulated by climate models. The red band shows model projections of the effects of human and natural forces combined. The black line shows actual observed global average temperatures. As the blue band indicates, without human influences, temperature over the past century would actually have first warmed and then cooled slightly over recent decades.[58]

Source: https://nca2009.globalchange.gov/download-report/index.html (last accessed October 13, 2023)

How USGCRP authors mistakenly re-transformed global temperature from "anomalies" units to **absolute** units!

From UN IPCC's AR4 (2007) Report

Global and Continental Temperature Change

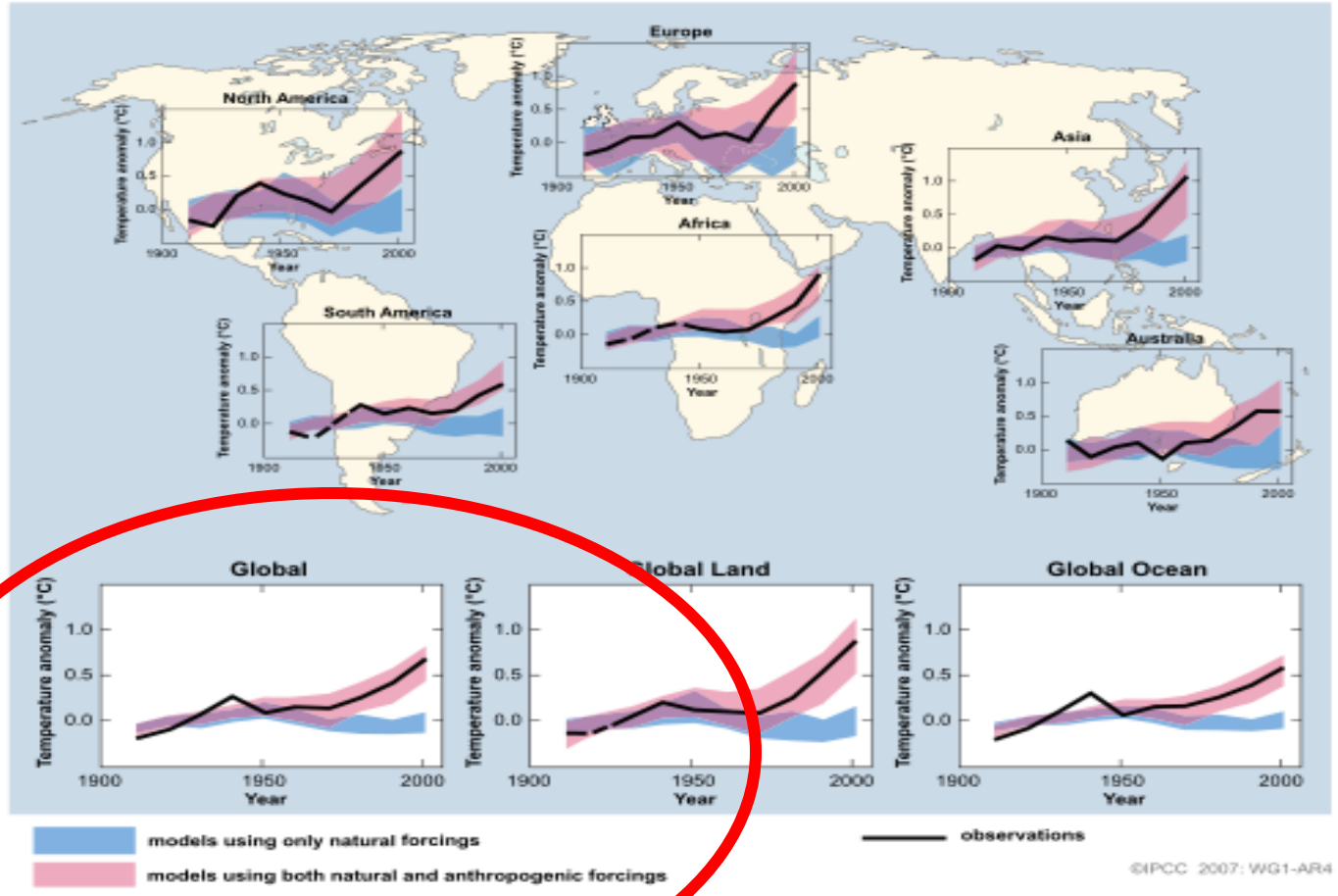
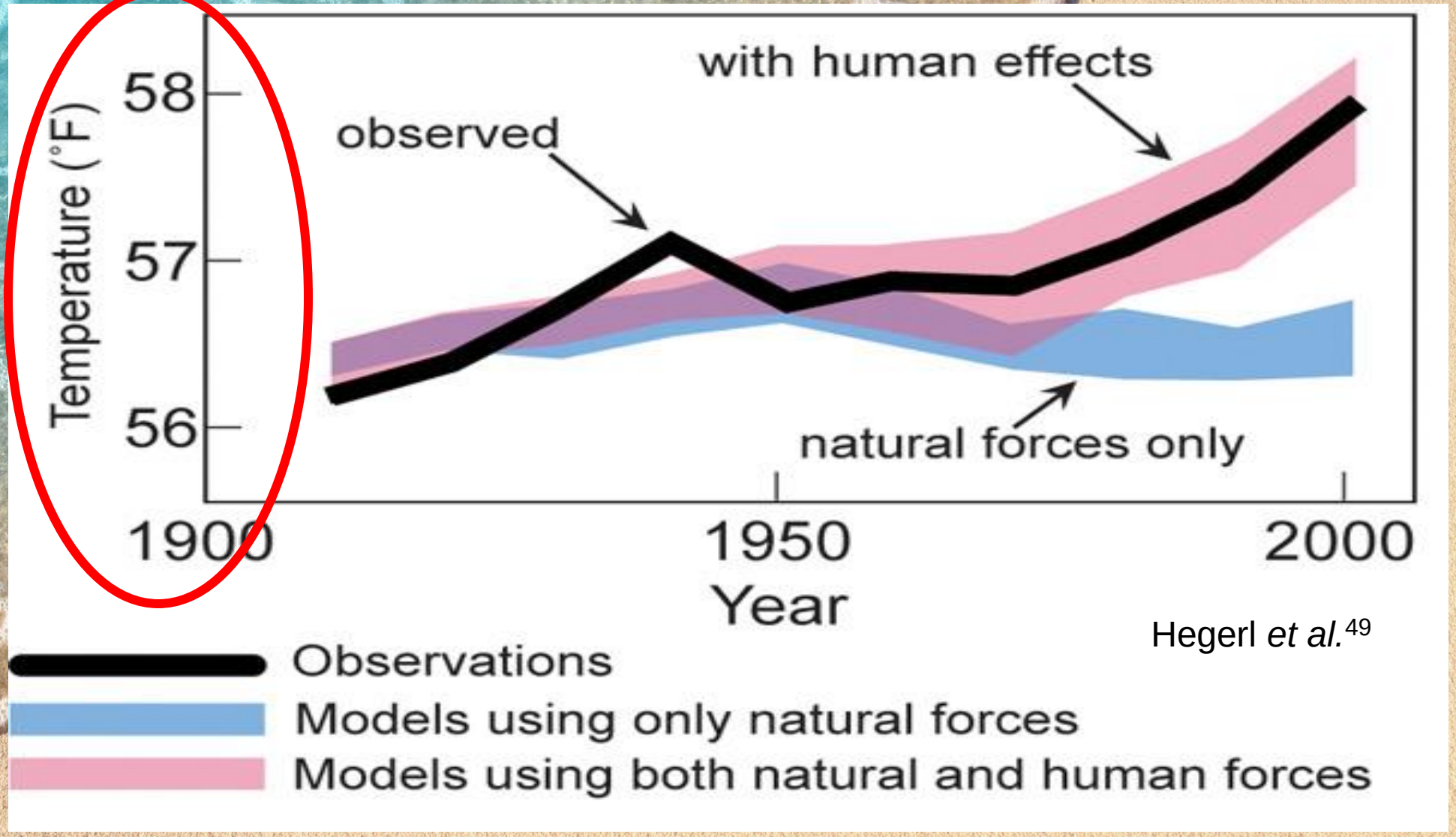


Figure SPM.4. *Comparison of observed continental- and global-scale changes in surface temperature with results simulated by climate models using natural and anthropogenic forcings. Decadal averages of observations are shown for the period 1906 to 2005 (black line) plotted against the centre of the decade and relative to the corresponding average for 1901–1950. Lines are dashed where spatial coverage is less than 50%. Blue shaded bands show the 5–95% range for 19 simulations from five climate models using only the natural forcings due to solar activity and volcanoes. Red shaded bands show the 5–95% range for 58 simulations from 14 climate models using both natural and anthropogenic forcings. (FAQ 9.2, Figure 1)*

Damaging side-effect: Persisting error in US EPA webpage (from 2009 – 2013) !

"This figure illustrates one piece of evidence that shows that recent global warming is primarily a result of greenhouse gas emissions from human activities."

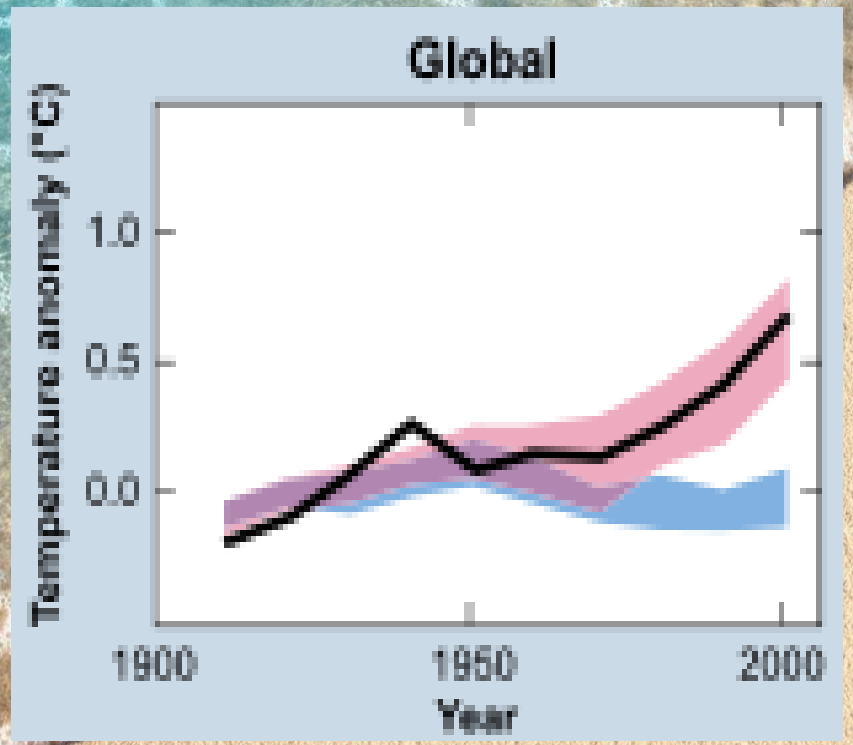


Hegerl *et al.*[49]

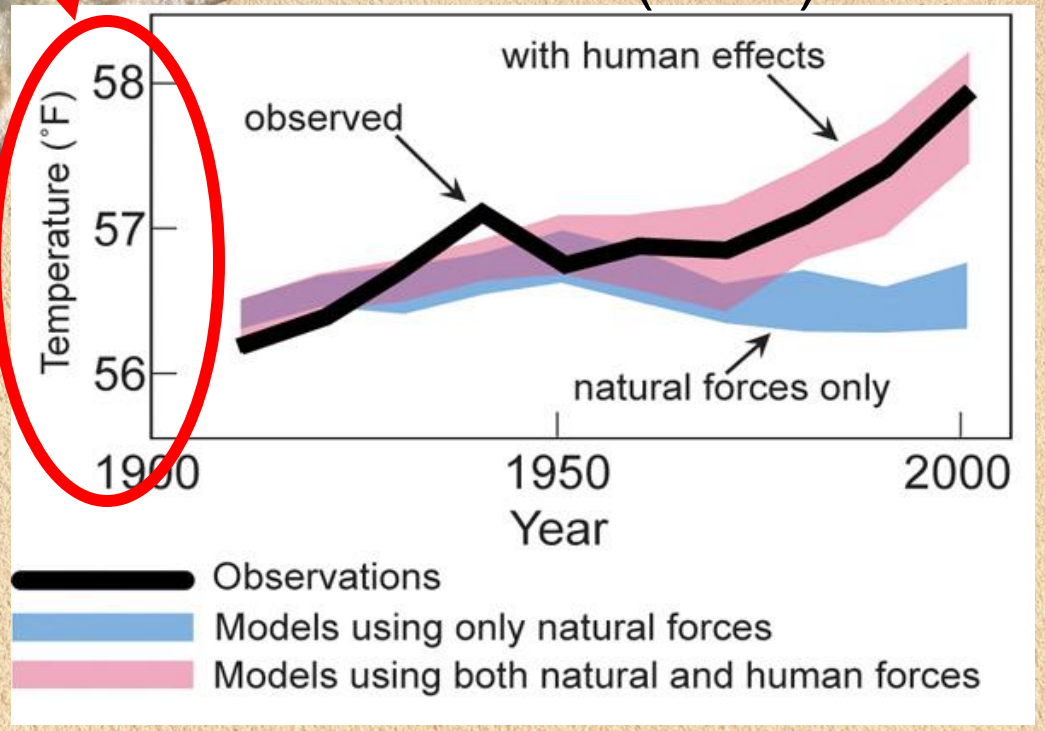
http://www.epa.gov/climatechange/facts.html

From “anomaly” to “absolute” units of change: Serious flaws in USEPA report

IPCC (2007)



USEPA (2013)



Hegerl *et al.*[49]

http://www.epa.gov/climatechange/facts.html (last checked September 13, 2013---uncorrected)

Climate Change Home
Basic Information
Greenhouse Gas Emissions
Science
Impacts
Adaptation
What EPA is Doing
What You Can Do
Newsroom
Glossary
Students' Site

Climate Change Facts: Answers to Common Questions

This page answers some of the most commonly asked questions about climate change and its impacts. Explore more questions using our Frequently Asked Questions Database.

September 18, 2015

+ Show All Responses

Is there a scientific consensus on climate change?

Answer >

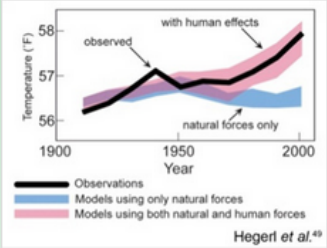
What is the evidence that proves the climate is changing?

Answer >

Are human activities or natural variations in climate responsible for the climate change being observed today?

The Earth does go through natural cycles of warming and cooling, caused by factors such as changes in the sun or volcanic activity. This has been closely examined, and the warming we have seen in the past 50 years cannot be explained by natural factors alone.[2] This figure illustrates one piece of evidence that shows that recent global warming is primarily a result of greenhouse gas emissions from human activities.

» Learn more about the causes of climate change.



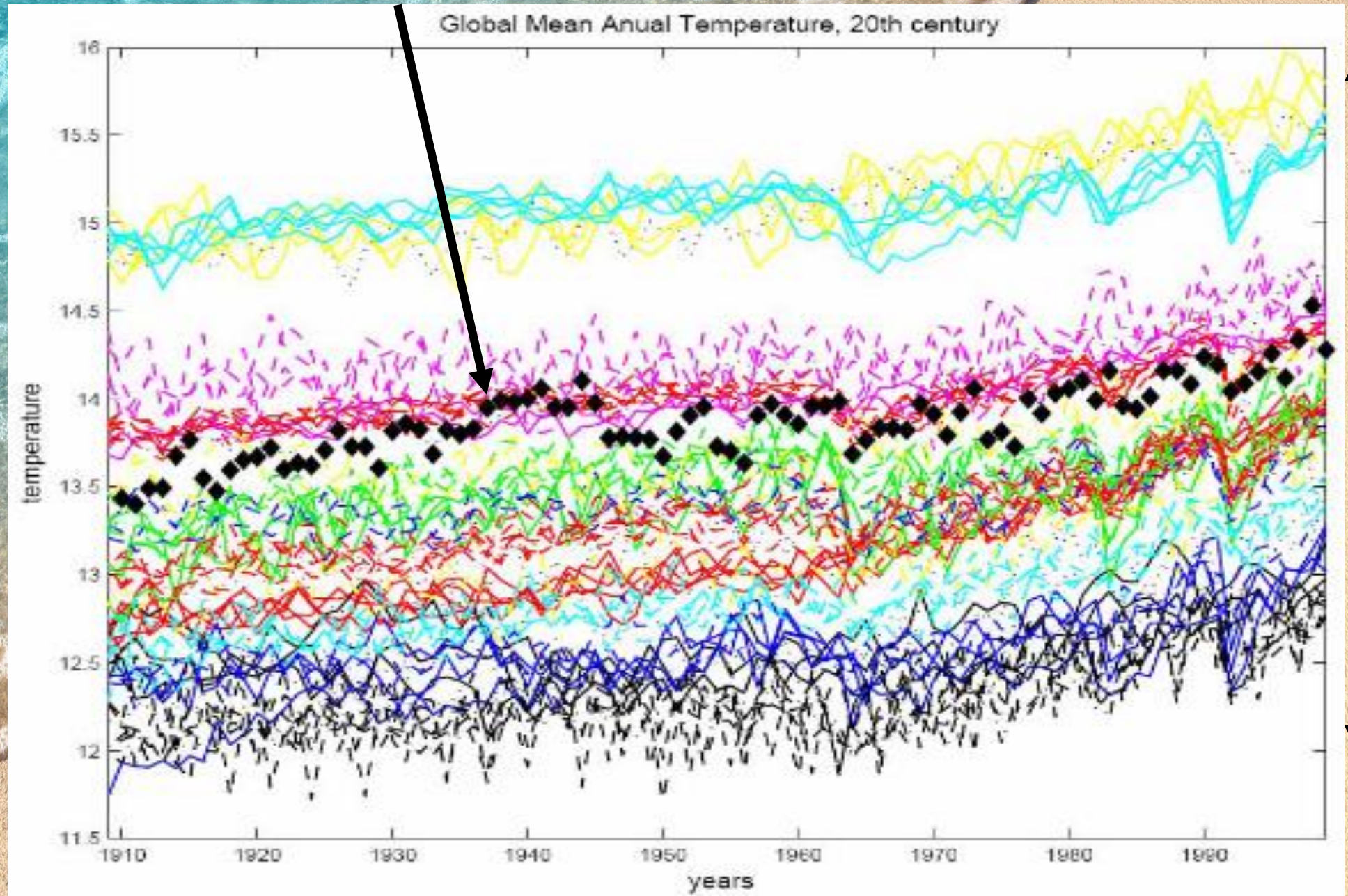
Hegerl *et al.*[49]

View enlarged image

This figure shows the observed average global temperatures from 1900 to 2000 (black line) along with the temperature ranges predicted by climate models. The blue band shows the expected temperature range based on climate models that account only for natural forces. The pink band represents the temperature range predicted by climate models that also include emissions of greenhouse gases from human activities. The recent increase in average global temperatures aligns with the predicted temperatures from the model that includes the greenhouse gas emission.
Source: USGRCP 2009

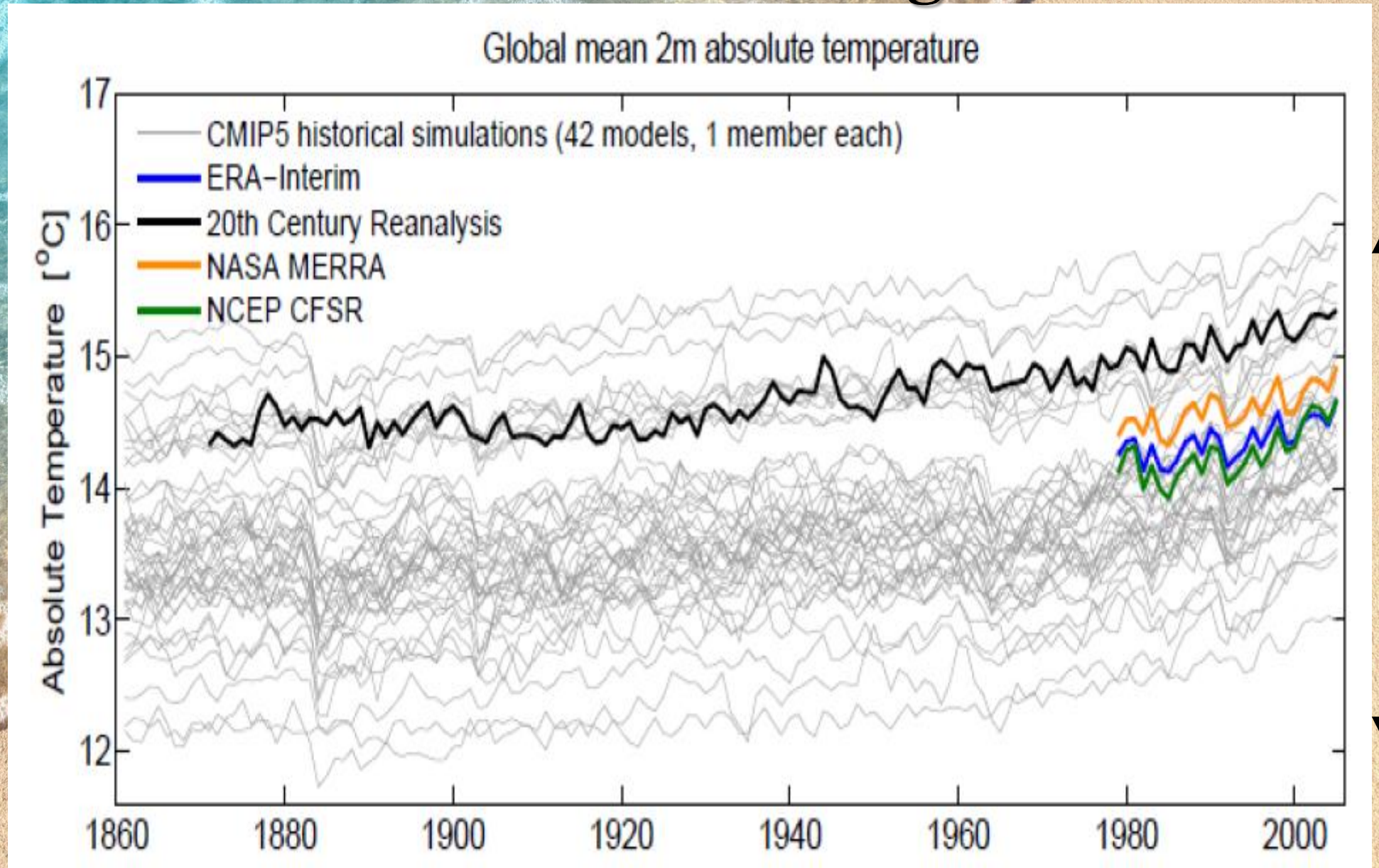
Close

Reality: Does this looks like reasonable agreement between observation and model calculations of Earth temperature?



The real story on climate models and modeling:

"Not even wrong"



61° F

54° F

Where is the peer-review checking or DQA/IQA?

Federal Advisory Committee Authors

Co-Chairs and Editors-in-Chief

Thomas R. Karl,
NOAA National Climatic Data Center

Jerry M. Melillo,
Marine Biological Laboratory

Thomas C. Peterson,
NOAA National Climatic Data Center

Author Team

David M. Anderson,
NOAA World Data Center for Paleoclimatology

Donald F. Boesch,
University of Maryland Center for Environmental Science

Virginia R. Burkett,
U.S. Geological Survey

Lynne M. Carter,
Adaptation Network

Stewart J. Cohen,
Environment Canada and University of British Columbia

Nancy B. Grimm,
Arizona State University

Jerry L. Hatfield,
U.S. Department of Agriculture

Katharine Hayhoe,
Texas Tech University

Anthony C. Janetos,
Pacific Northwest National Laboratory

Jack A. Kaye,
National Aeronautics and Space Administration

Jay H. Lawrimore,
NOAA National Climatic Data Center

James J. McCarthy,
Harvard University

A. David McGuire,
U.S. Geological Survey/University of Alaska Fairbanks

Edward L. Miles,
University of Washington

Evan Mills,
Lawrence Berkeley National Laboratory

Jonathan T. Overpeck,
University of Arizona

Jonathan A. Patz,
University of Wisconsin at Madison

Roger S. Pulwarty,
NOAA Climate Program Office and Earth System Research Laboratory

Benjamin D. Santer,
Lawrence Livermore National Laboratory

Michael J. Savonis,
U.S. Department of Transportation

H. Gerry Schwartz, Jr.,
Consultant/Transportation

Eileen L. Shea,
NOAA National Climatic Data Center/ Integrated Data and Environmental Applications Center

John M.R. Stone,
Carleton University

Bradley H. Udall,
University of Colorado/NOAA Earth System Research Laboratory

John E. Walsh,
University of Alaska Fairbanks

Michael F. Wehner,
Lawrence Berkeley National Laboratory

Thomas J. Wilbanks,
Oak Ridge National Laboratory

Donald J. Wuebbles,
University of Illinois

Senior Science Writer and Lead Graphic Designer

Senior Science Writer

Susan J. Hassol,
Climate Communication, LLC

Lead Graphic Designer

Sara W. Veasey,
NOAA National Climatic Data Center

U.S. Global Change Research Program
1717 Pennsylvania Avenue, NW • Suite 250 • Washington, DC 20006 USA
1-202-223-6262 (voice) • 1-202-223-3065 (fax)
http://www.globalchange.gov

June 2009

A total of 13 different agencies in 2009

The USGCRP and EPA/NASA/NOAA have split pants?

Is the USGCRP + IPCC's analysis scientifically justified?

- We have published a number of papers since NCA4/AR5 highlighting at least two major problems with their "detection and attribution" modelling experiments:

  1. The land component of their global temperature record ("observations") is contaminated by "**urbanization bias**" due to the "**urban heat island**" (**UHI** for short) effect.

  2. Their estimates for the changes in solar activity ("**Total Solar Irradiance**" or **TSI** for short) are **only a small subset** of those used by the scientific community. And, this subset coincidentally only comprises "**low variability**" reconstructions that imply a negligible solar contribution.

Our relevant papers on the challenges of the detection and attribution of global warming

1. **S2015**: Soon, Connolly & Connolly (**2015**). *Earth-Science Reviews*, 150, 409-452. https://doi.org/10.1016/j.earscirev.2015.08.010.
2. **C2017**: Connolly, Connolly & Soon (**2017**). *Hydrological Sciences Journal*, 62, 1317-1340. https://doi.org/10.1080/02626667.2017.1324974.
3. **S2018**: Soon and 7 co-authors (**2018**). *Earth-Science Reviews*, 185, 80-101. https://doi.org/10.1016/j.earscirev.2018.05.013.
4. **S2019**: Soon and 7 co-authors (**2019**). *Earth-Science Reviews*, 189, 102950. https://doi.org/10.1016/j.earscirev.2019.102950.
5. **C2020**: Connolly and 3 co-authors (**2020**). *Energies*, 13, 1365. https://doi.org/10.3390/en13061365.
6. **C2021**: Connolly and 22 co-authors (**2021**). *Research in Astronomy and Astrophysics*, 21, 131. https://doi.org/10.1088/1674-4527/21/6/131.
7. **O'N2022**: O'Neill and 16 co-authors (**2022**). *Atmosphere*, 13(2), 285. https://doi.org/10.3390/atmos13020285.
8. **K2023**: Katata, Connolly & O'Neill (**2023**). *Journal of Applied Meteorology and Climatology*. 62(8), 1095-1114. https://doi.org/10.1175/JAMC-D-22-0122.1.
9. **C2023**: Connolly and 19 co-authors (**2023**). *Research in Astronomy and Astrophysics*. https://doi.org/10.1088/1674-4527/acf18e.
10. **S2023**: Soon and 36 co-authors (**2023**). *Climate*, 11(9), 179; https://doi.org/10.3390/cli11090179.

Connolly et al. (2021): The "total nonsense" that IPCC didn't want you to read?

RAA 2021 Vol. **21** No. **6**, 131(68pp) doi: 10.1088/1674-4527/21/6/131

http://www.raa-journal.org *http://iopscience.iop.org/raa*

Research in Astronomy and Astrophysics

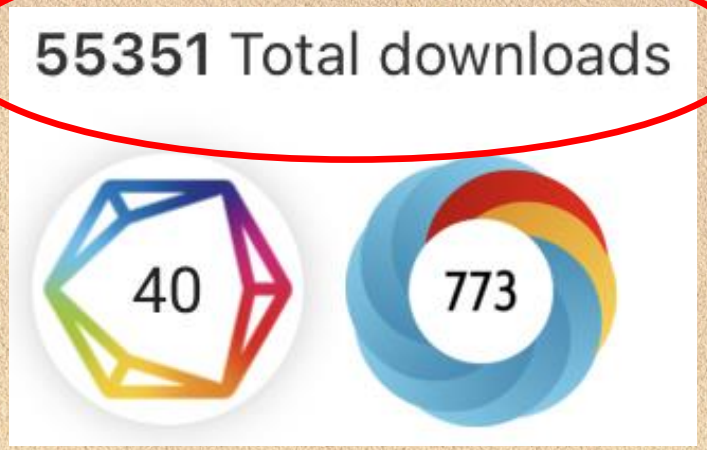
INVITED REVIEWS

How much has the Sun influenced Northern Hemisphere temperature trends? An ongoing debate.

Ronan Connolly[1,2], Willie Soon[1], Michael Connolly[2], Sallie Baliunas[3], Johan Berglund[4], C. John Butler[5], Rodolfo Gustavo Cionco[6,7], Ana G. Elias[8,9], Valery M. Fedorov[10], Hermann Harde[11], Gregory W. Henry[12], Douglas V. Hoyt[13], Ole Humlum[14], David R. Legates[15], Sebastian Lüning[16], Nicola Scafetta[17], Jan-Erik Solheim[18], László Szarka[19], Harry van Loon[20], Víctor M. Velasco Herrera[21], Richard C. Willson[22], Hong Yan (鄢杆畯)[23] and Weijia Zhang[24,25]

1 Center for Environmental Research and Earth Science (CERES), Salem, MA 01970, USA; *ronan@ceres-science.com*
2 Independent scientists, Dublin, Ireland
3 Retired, formerly Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138, USA
4 Independent researcher, Malmö, Sweden
5 Retired, formerly Armagh Observatory, College Hill, Armagh BT61 9DG, Northern Ireland, UK
6 Comisión de Investigaciones Científicas de la Provincia de Buenos Aires, Argentina
7 Grupo de Estudios Ambientales, Universidad Tecnológica Nacional, Coløn 332, San Nicolás (2900), Buenos Aires, Argentina
8 Laboratorio de Física de la Atmósfera, Facultad de Ciencias Exactas y Tecnología, Universidad Nacional de Tucumán, Av. Independencia 1800, 4000 Tucumán, Argentina
9 Instituto de Física del Noroeste Argentino (Consejo Nacional de Investigaciones Cientficas y Técnicas - Universidad Nacional de Tucumán), 4000 Tucumán, Argentina
10 Faculty of Geography, Lomonosov, Moscow State University, Leninskie Gory St. 1, Moscow 119991, Russia
11 Helmut-Schmidt-University, Hamburg, Germany
12 Center of Excellence in Information Systems, Tennessee State University, Nashville, TN 37209 USA
13 Independent scientist, Berkeley Springs, WV, USA
14 Emeritus Professor in Physical Geography, Department of Geosciences, University of Oslo, Norway
15 College of Earth, Ocean, and the Environment, University of Delaware, Newark DE 19716-2541, USA
16 Institute for Hydrography, Geoecology and Climate Sciences, Hauptstraβe 47, 6315 Ägeri, Switzerland
17 Department of Earth Sciences, Environment and Georesources, University of Naples Federico II, Complesso Universitario di Monte S. Angelo, via Cinthia, 21, 80126 Naples, Italy
18 Retired, formerly Department of Physics and Technology, UiT The Arctic University of Norway, 9037 Tromsø, Norway
19 ELKH Institute of Earth Physics and Space Science, 9400 Sopron, Csatkai utca 6-8, Hungary
20 Retired, formerly National Center for Atmospheric Research, Boulder, Colorado, USA
21 Instituto de Geofisica, Universidad Nacional Autónoma de México, Ciudad Universitaria, Coyoacán, 04510, México D.F., México
22 Active Cavity Radiometer Irradiance Monitor (ACRIM), Coronado, CA 92118, USA
23 State Key Laboratory of Loess and Quaternary Geology, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an 710061, China
24 Department of Mathematics and Physics, Shaoxing University, Shaoxing, China
25 Department of AOP Physics, University of Oxford, Oxford, UK

Received 2020 December 7; accepted 2021 April 14



23 co-authors
from
14 countries
and
530 references

A comparison of citations/references cited by IPCC reports and Connolly et al. (2021)

Assessment report	Published	Solar activity as a climate driver	Urbanization bias problem	Both topics
IPCC AR6	pre-AR5	17	7	24
	post-AR5	51	21	72
	total	68	28	96
Connolly et al. (2021)	pre-AR5	261	15	276
	post-AR5	135	17	151
	total	396	32	428
Common citations	pre-AR5	7	1	8
	post-AR5	13	1	14
	total	20	2	22

Table 1. Total numbers of citations considered by both assessment reports specifically with respect to (i) the potential role of solar activity as a driver of recent climate change and (ii) the magnitude of the urbanization bias problem. Note that one reference was cited for both topics by Connolly et al. (2021) but is only counted once for the "Both topics" column.

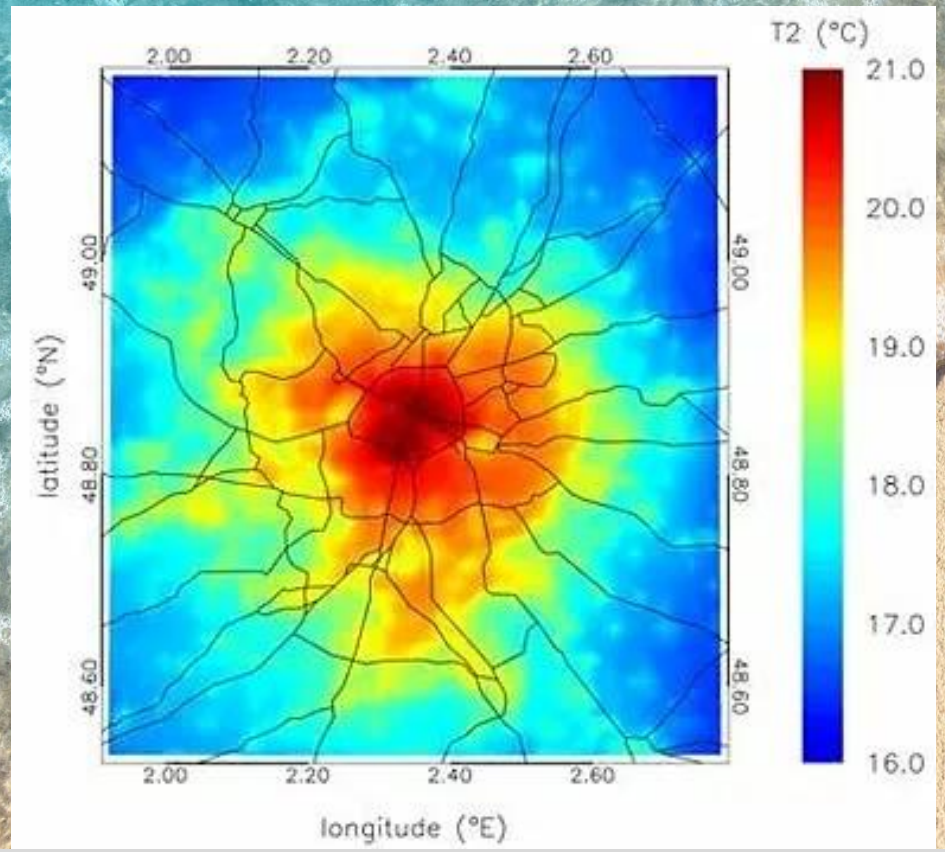
The IPCC's detection process

- The IPCC's global temperature estimates from 1850-present comprise two components:
  1. Land Surface Temperatures (LST) based on weather station thermometer records
  2. Sea Surface Temperatures (SST) based on ship-based samplings of ocean temperatures and more recently (since 1980s), thermometers on buoys

- The IPCC's claims that the recent warming is "unprecedented" in thousands of years are based on combining these instrumental temperature measurements with "temperature proxies", e.g., tree-ring widths, ice cores, lake sediments, glacier changes.

The Urban Heat Island (UHI) problem

UHI heat map for Paris, France (summer 2003)



Mean air temperature in Paris, France at 22:00 CEST in summer 2003. Credits: VITO, Planetek.

UHI heat map for Singapore (2016)

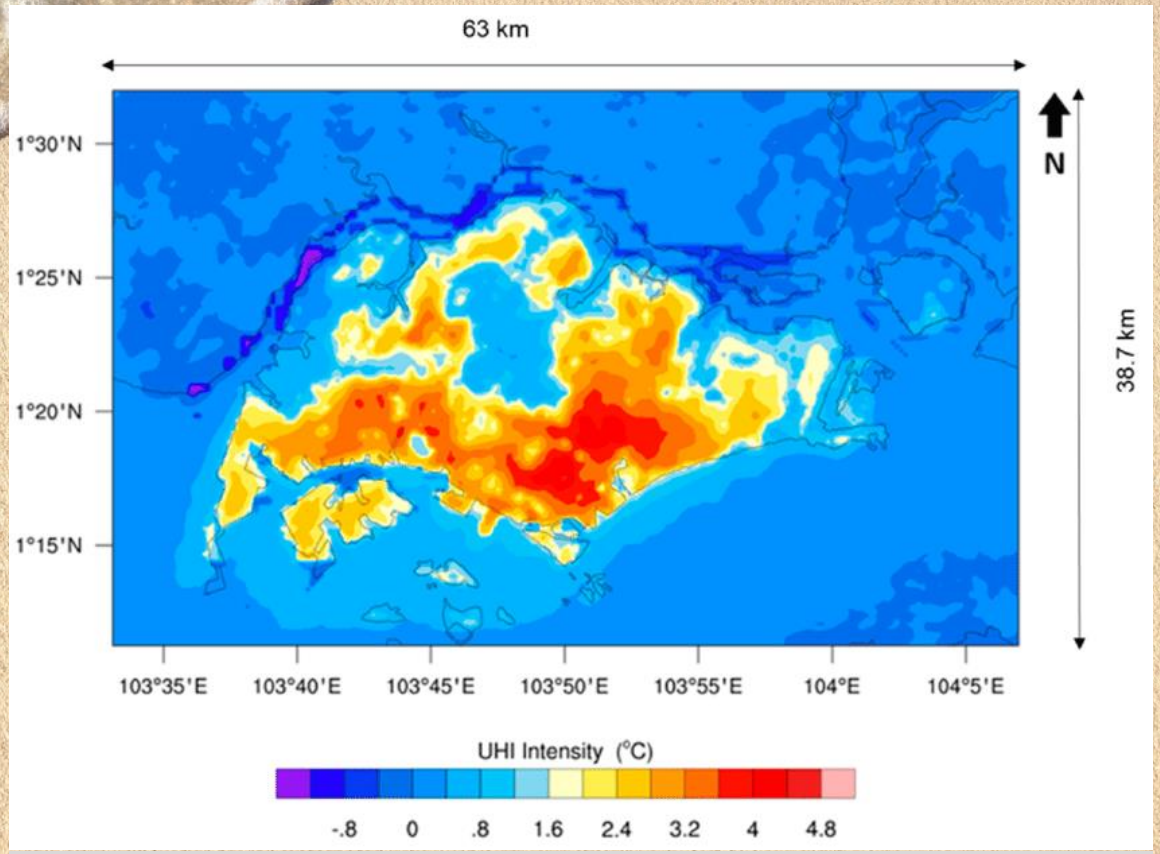
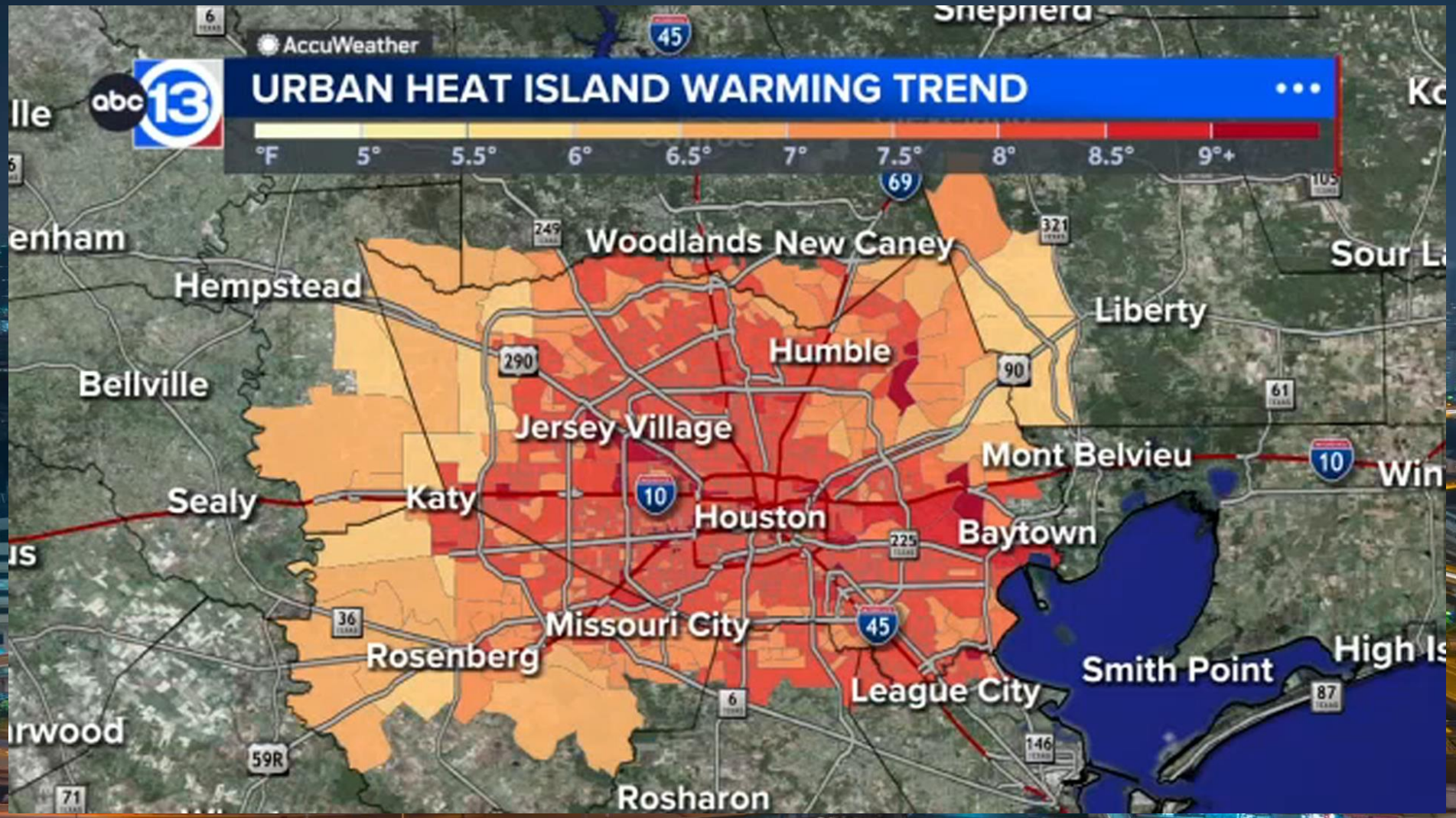


Figure 2 from Natalia Borzino et al. (2020). Climate, 8, 82; doi:10.3390/cli8070082

The Urban Heat Island (UHI) effect

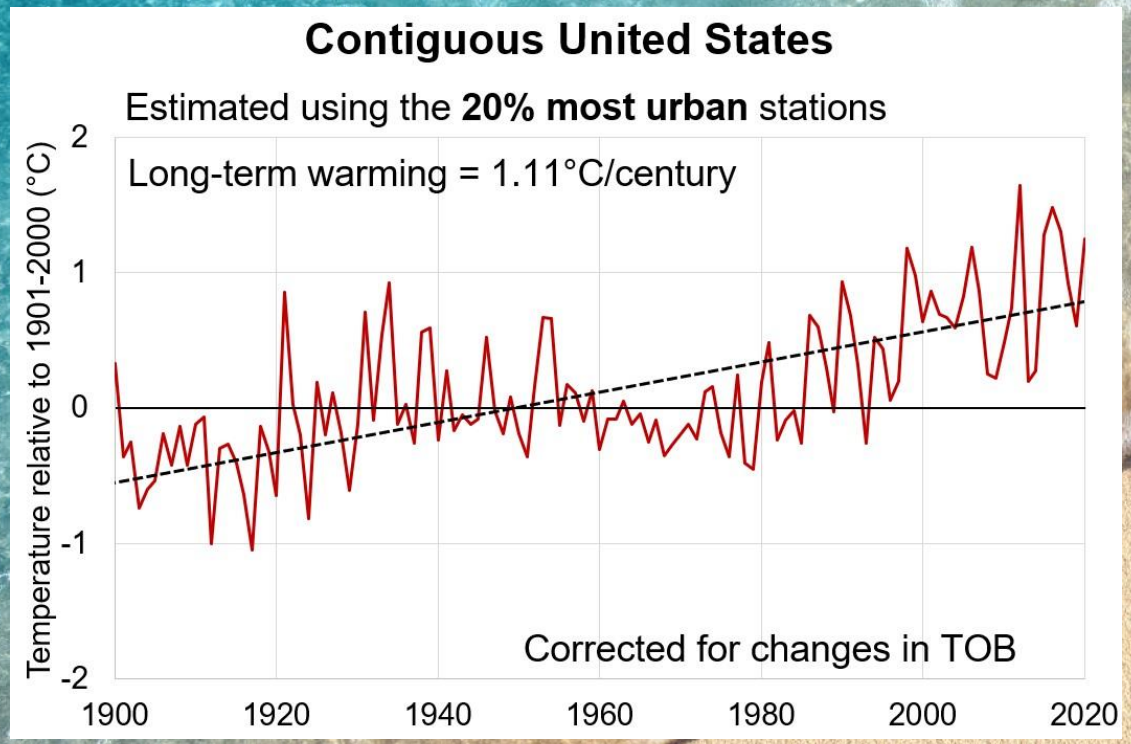


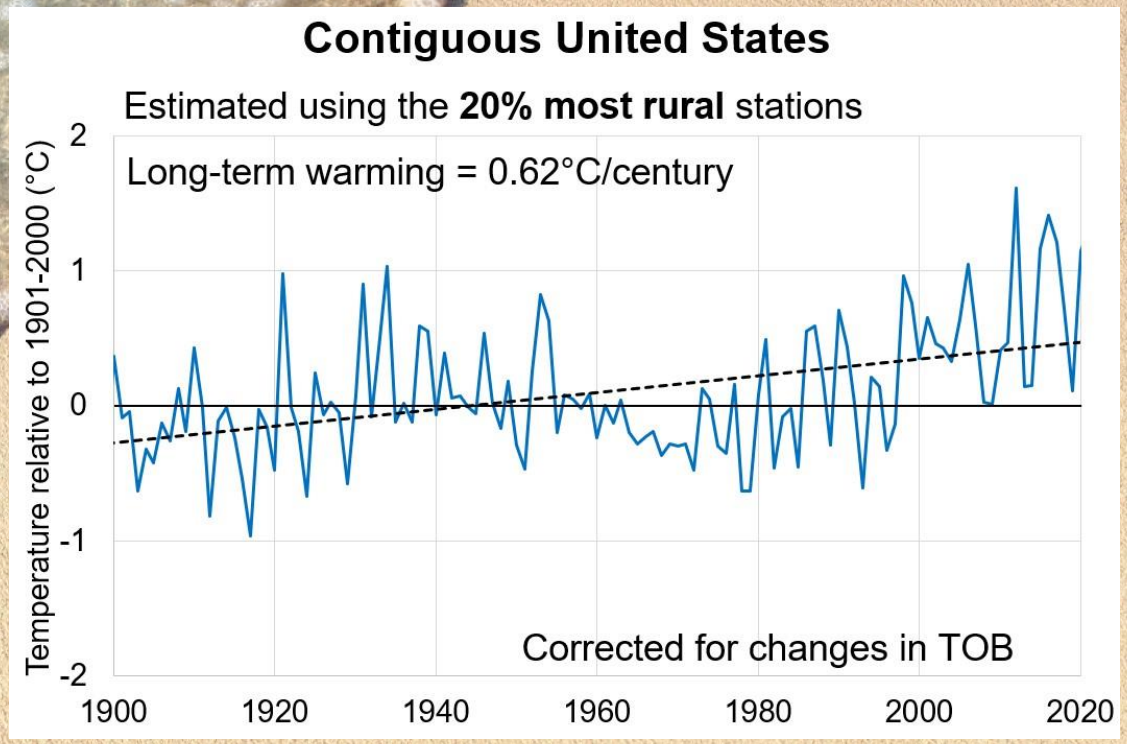
July 26, 2023 News: https://abc13.com/urban-heat-island-effect-climate-central-how-to-cool-down-cities-houston-area-temperatures/13546151/

Urban climate change

- The urban heat island (UHI) has been known since 1800s
- Cities are getting bigger and UHIs are also getting bigger
- Urban areas still only make up 3-4% of the land and less than 2% of planet
- But, more than 75% of weather stations are in areas that are now urbanized
- Since 2011, more than half of the world's population live in urban areas. This means **for most people** the biggest local climate change they experience is urban warming

The urbanization bias problem





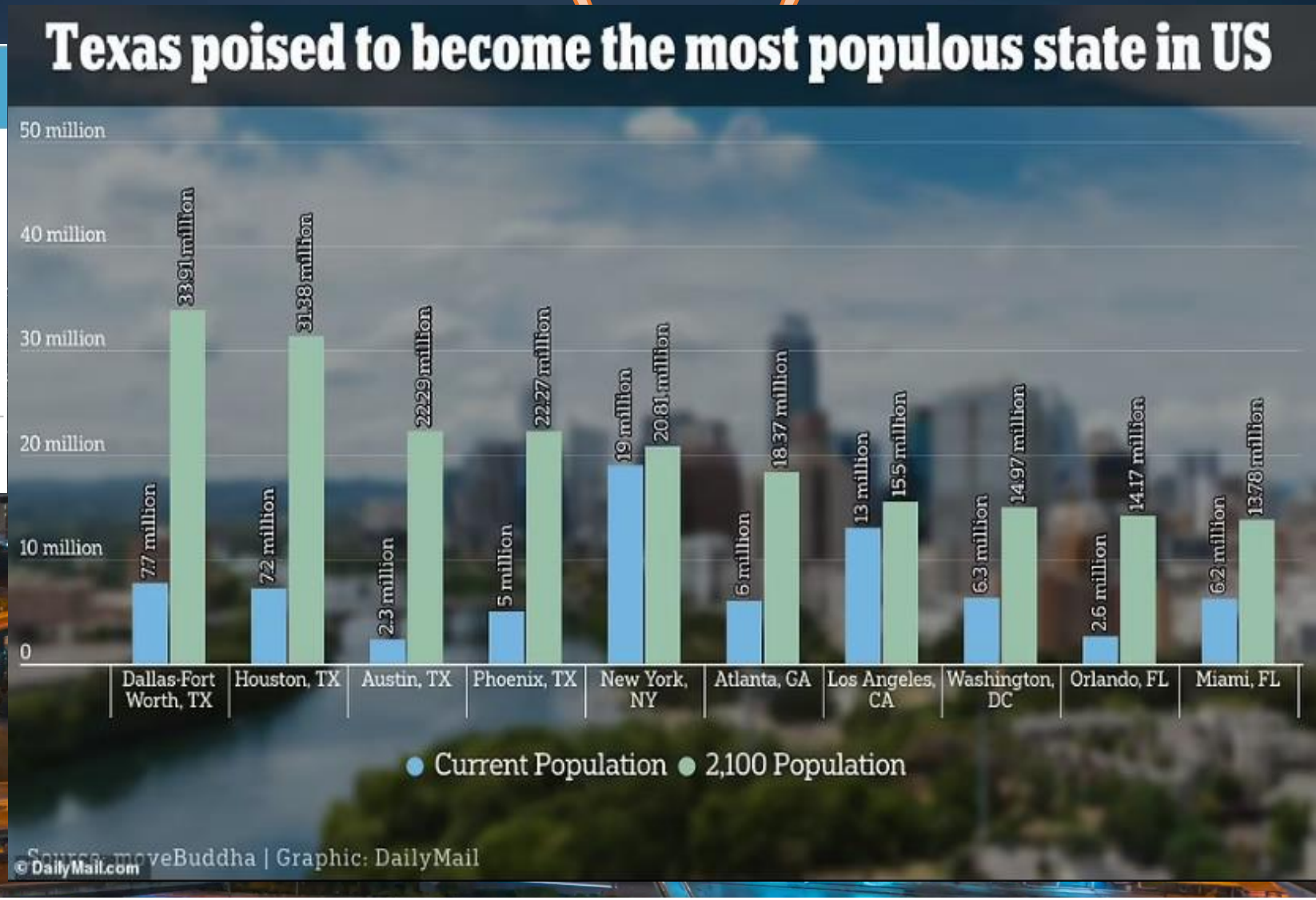
- As the area around a weather station becomes increasingly urbanized, the growing UHI introduces an extra warming trend to the station's record.
- For US analysis above, urban stations show 1.8 times the warming of the rural stations
- This is a real (human-caused!) climatic change – but it's a local one.
- Urban areas only represent 2-4% of global land area but most of the weather stations!

The Urban Heat Island (UHI) effect

Daily Mail .com | News 18

Is the future of America in Texas? Dallas, Houston and Austin are poised to replace New York City, Los Angeles and Chicago as the largest cities in the US ... but not for another 77 years

By Maryann Martinez, Texas Bureau Chief For Dailymail.Com
06:59 EDT 22 Oct 2023 , updated 06:59 EDT 22 Oct 2023

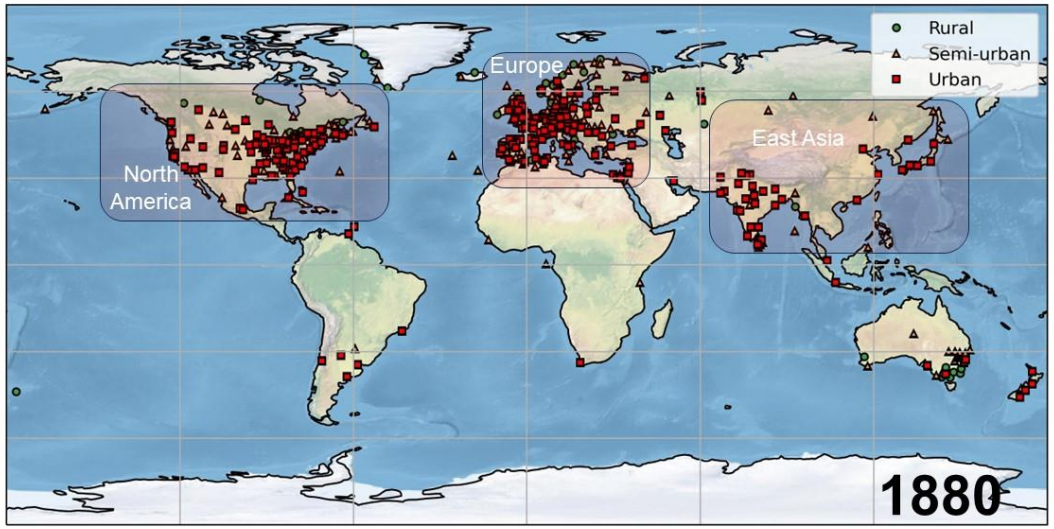


October 22, 2023 News: https://www.dailymail.co.uk/news/texas/article-12637061/Is-future-America-Texas-Dallas-Houston-Austin-poised-replace-New-York-City-Los-Angeles-Chicago-largest-cities-not-77-years.html

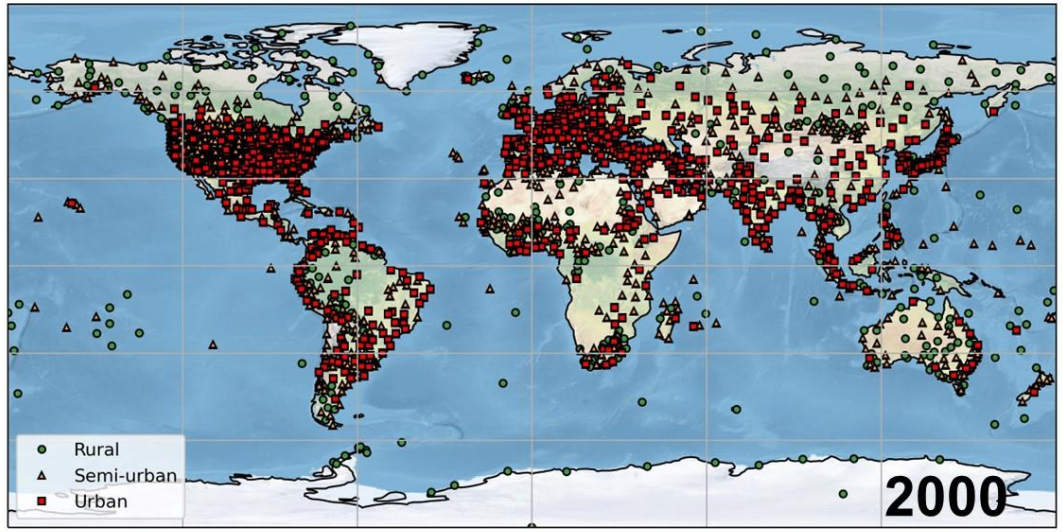
Not enough rural data globally?

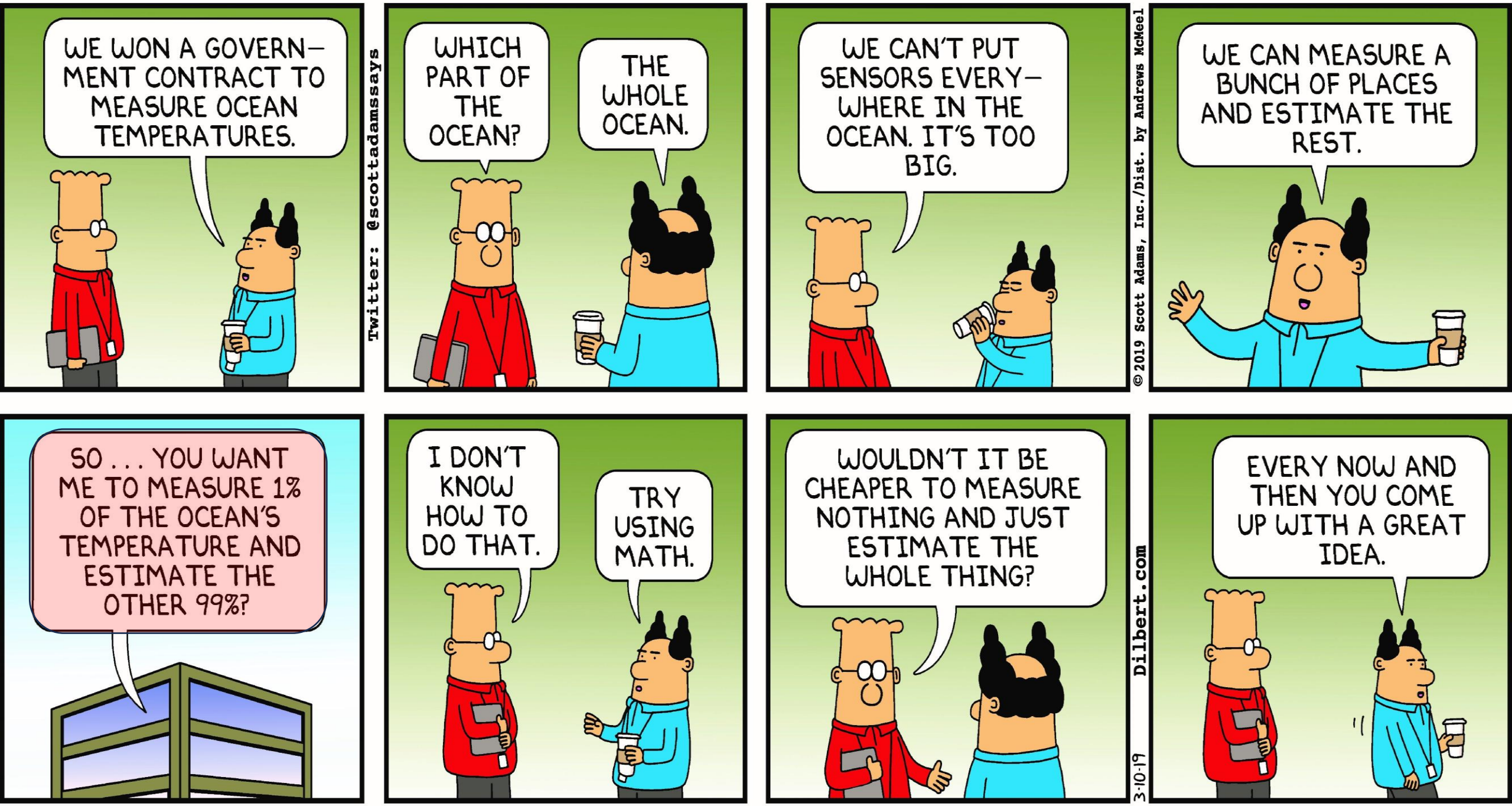
- For late 19th century, most of the weather stations are in North America and Europe with some East Asian stations (mostly urbanized) – **not** "global", but "**Northern Hemisphere**"
- More than 75% of the weather stations have become urbanized
- For the longest and most complete station records that reach back to the early 20th century or earlier, it's more like 80-90% of the stations

Distribution of rural, semi-urban and urban stations available in **1880**
Global Historical Climatology Network (GHCN), version 3

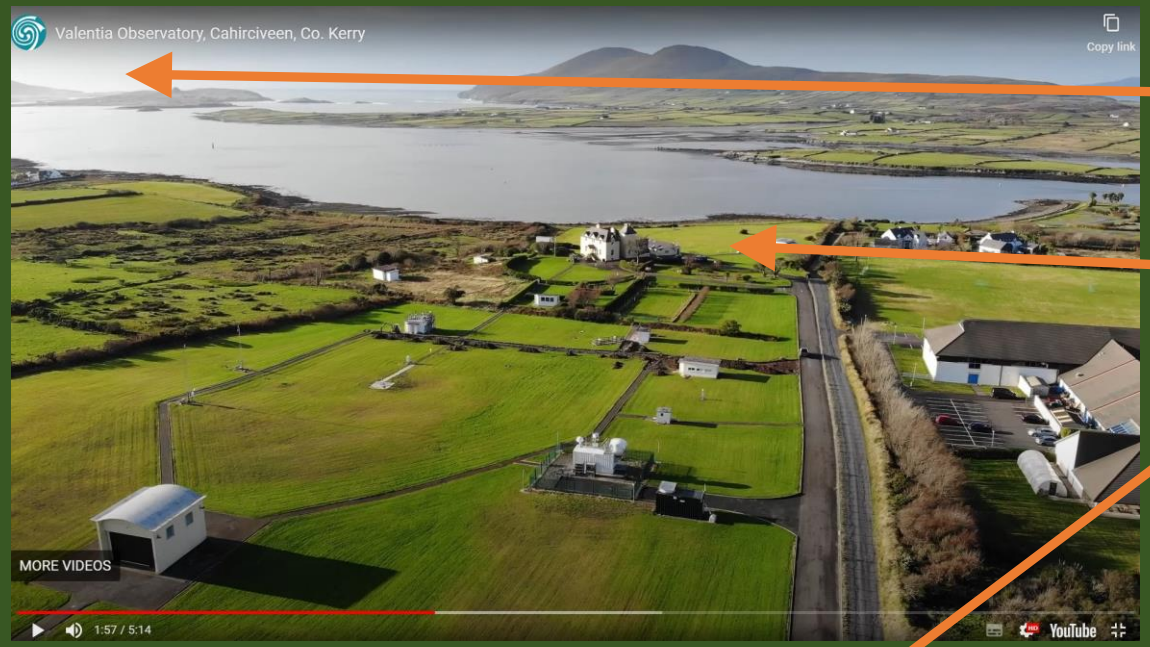


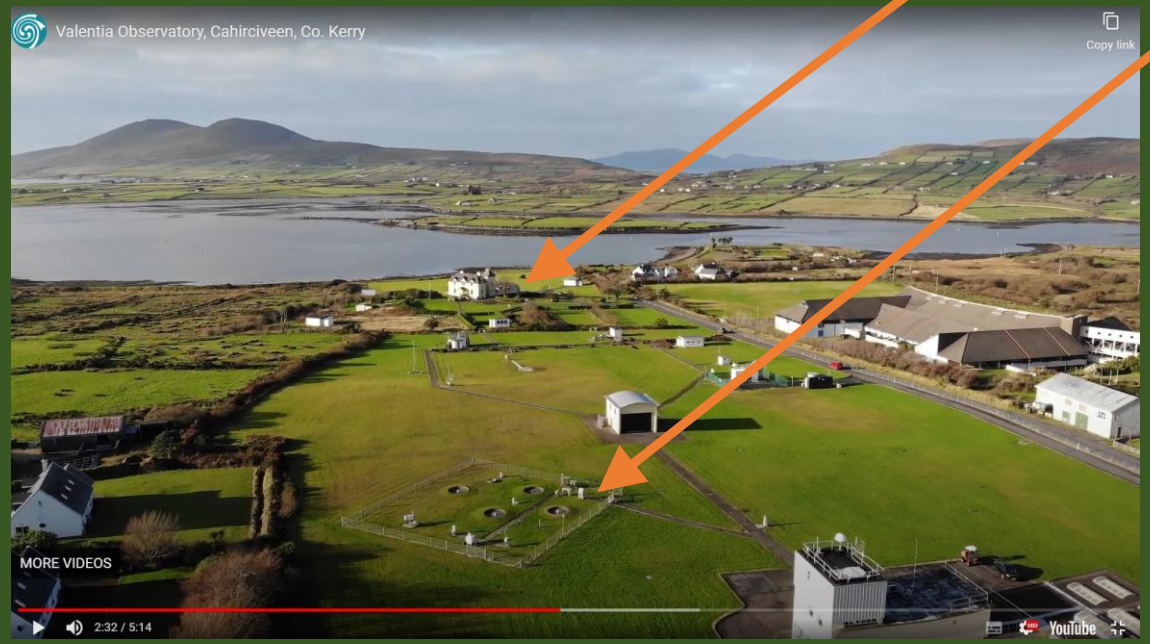
Distribution of rural, semi-urban and urban stations available in **2000**
Global Historical Climatology Network (GHCN), version 3




WE WON A GOVERNMENT CONTRACT TO MEASURE OCEAN TEMPERATURES.
Twitter: @scottadamssays
WHICH PART OF THE OCEAN?
THE WHOLE OCEAN.
WE CAN'T PUT SENSORS EVERYWHERE IN THE OCEAN. IT'S TOO BIG.
© 2019 Scott Adams, Inc./Dist. by Andrews McMeel
WE CAN MEASURE A BUNCH OF PLACES AND ESTIMATE THE REST.
SO . . . YOU WANT ME TO MEASURE 1% OF THE OCEAN'S TEMPERATURE AND ESTIMATE THE OTHER 99%?
I DON'T KNOW HOW TO DO THAT.
TRY USING MATH.
WOULDN'T IT BE CHEAPER TO MEASURE NOTHING AND JUST ESTIMATE THE WHOLE THING?
Dilbert.com
3-10-19
EVERY NOW AND THEN YOU COME UP WITH A GREAT IDEA.

A rare long, rural record: Valentia Observatory, Ireland





1867-1892: Located on Valentia Island

1892-2001: Located near ocean

2001-present: Current location.
Automatic weather station since 2012

Station history metadata (key changes)

- 1892. Station move. Valentia Island to the mainland
- 1937. Change in government. Republic of Ireland formed. But staff and observations remained the same.
- 2001. Station move 350 m inland (~20 m higher)
- 2012. Instrumentation change. Manual weather station to automatic

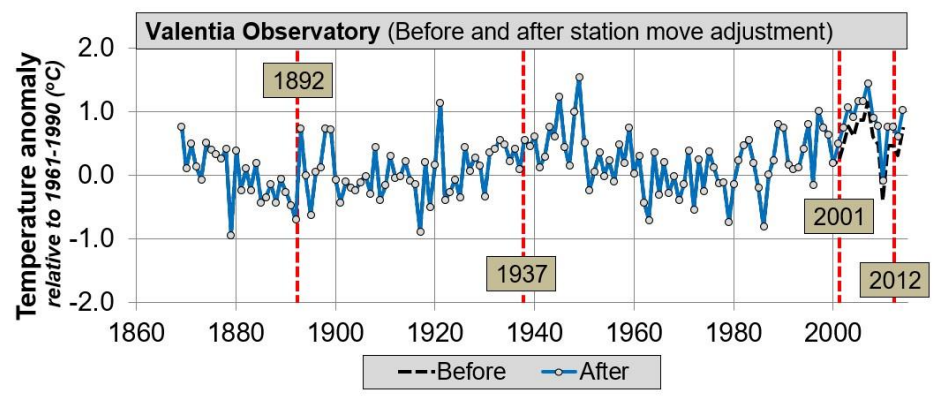
Correcting the raw Valentia Observatory record

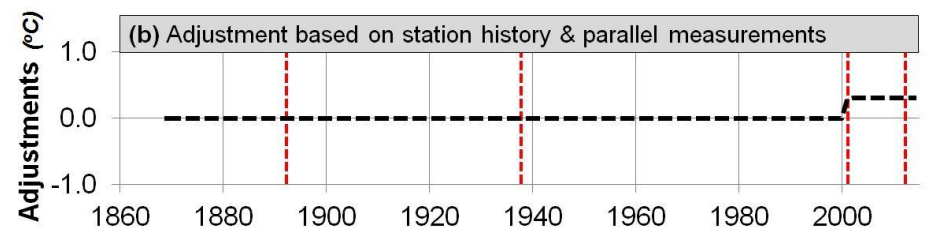
Earth-Science Reviews 150 (2015) 409–452

Re-evaluating the role of solar variability on Northern Hemisphere temperature trends since the 19th century

Willie Soon [a,*], Ronan Connolly [b], Michael Connolly [b]

[a] Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138, USA
[b] Independent research scientists, Dublin, Ireland



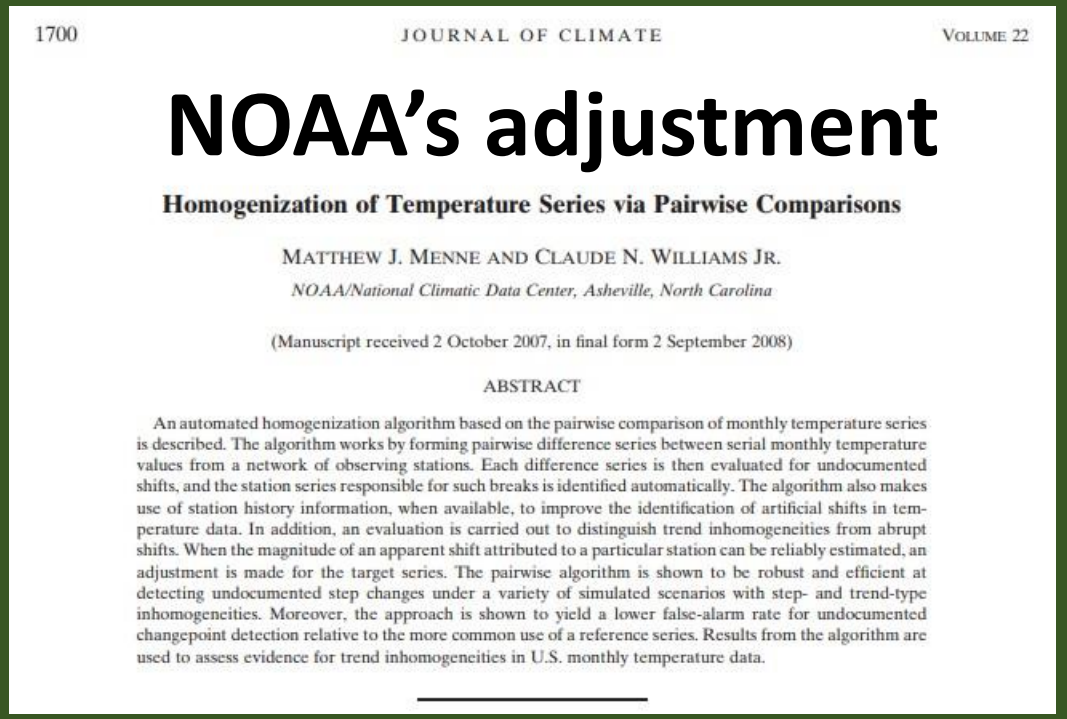


Soon et al. 2015: Corrections for non-climatic biases

- **1892**. Station move. Valentia Island to the mainland. Possible bias, but unclear what magnitude or sign. **No adjustments applied**.
- **1937**. Change in government. Republic of Ireland formed. But staff and observations remained the same. **No adjustments necessary**
- **2001**. Station move. 350 m. Parallel measurements reveal the new location was 0.3 °C colder. **+0.3 °C adjustment applied**.
- **2012**. Instrumentation change. Parallel measurements show bias was less than 0.1 °C. **No adjustments necessary**

The standard approach: NOAA's "temperature homogenization"

- Other groups **don't** take our approach of combining known station history metadata & information to develop empirical corrections.
- Instead, they mostly rely on automated computer programs that use statistical algorithms to try and identify and remove "non-climatic biases".
- NOAA's Menne & Williams (2009) "PHA" is one of main ones
- Compares each station record to neighboring stations & applies adjustments – usually run without using station history metadata



1700 JOURNAL OF CLIMATE VOLUME 22

NOAA's adjustment

Homogenization of Temperature Series via Pairwise Comparisons

MATTHEW J. MENNE AND CLAUDE N. WILLIAMS JR.

NOAA/National Climatic Data Center, Asheville, North Carolina

(Manuscript received 2 October 2007, in final form 2 September 2008)

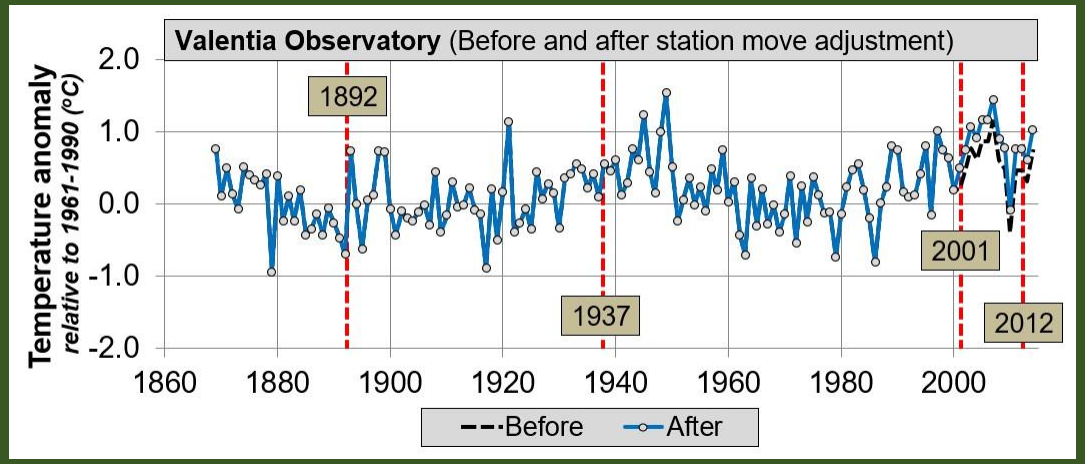
ABSTRACT

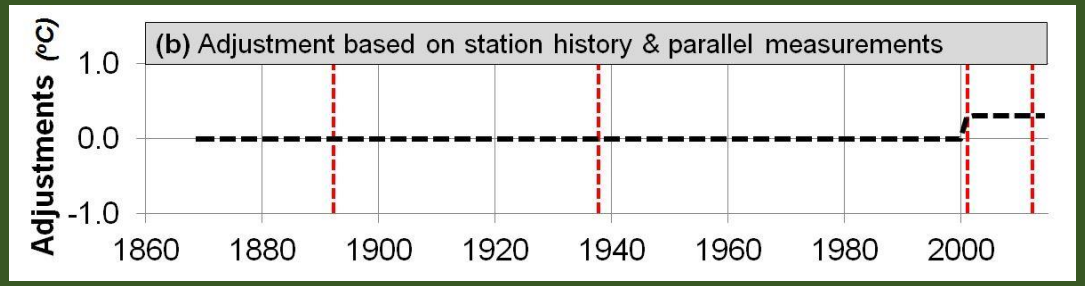
An automated homogenization algorithm based on the pairwise comparison of monthly temperature series is described. The algorithm works by forming pairwise difference series between serial monthly temperature values from a network of observing stations. Each difference series is then evaluated for undocumented shifts, and the station series responsible for such breaks is identified automatically. The algorithm also makes use of station history information, when available, to improve the identification of artificial shifts in temperature data. In addition, an evaluation is carried out to distinguish trend inhomogeneities from abrupt shifts. When the magnitude of an apparent shift attributed to a particular station can be reliably estimated, an adjustment is made for the target series. The pairwise algorithm is shown to be robust and efficient at detecting undocumented step changes under a variety of simulated scenarios with step- and trend-type inhomogeneities. Moreover, the approach is shown to yield a lower false-alarm rate for undocumented changepoint detection relative to the more common use of a reference series. Results from the algorithm are used to assess evidence for trend inhomogeneities in U.S. monthly temperature data.

How well does statistical homogenization work?

Soon et al. 2015:

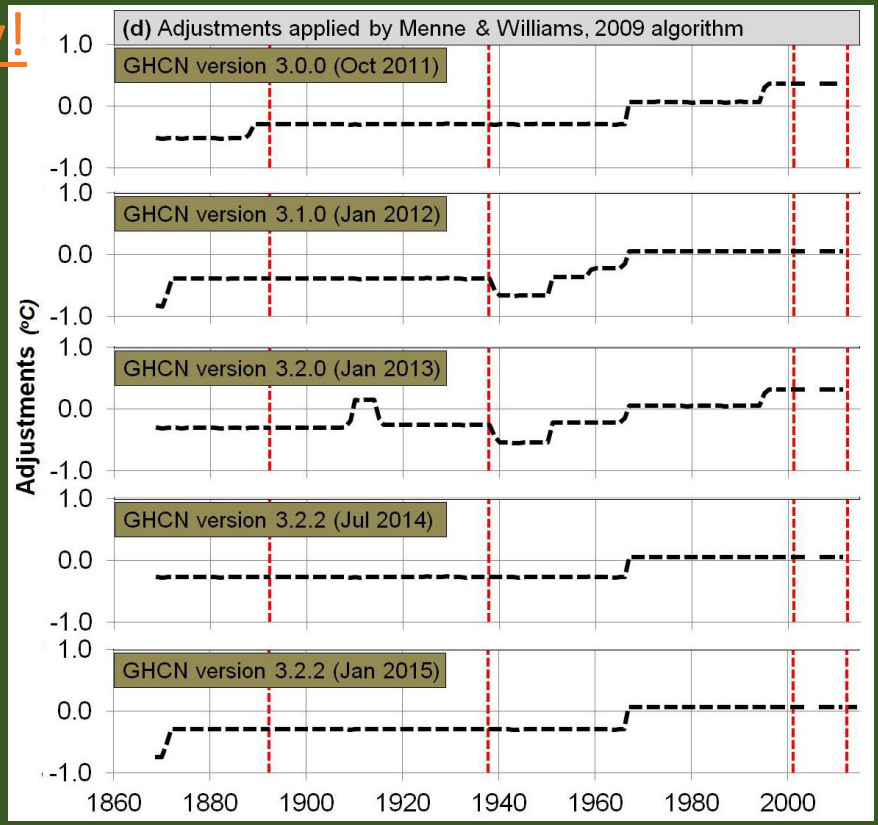
Our empirically-based corrections for non-climatic biases using station histories

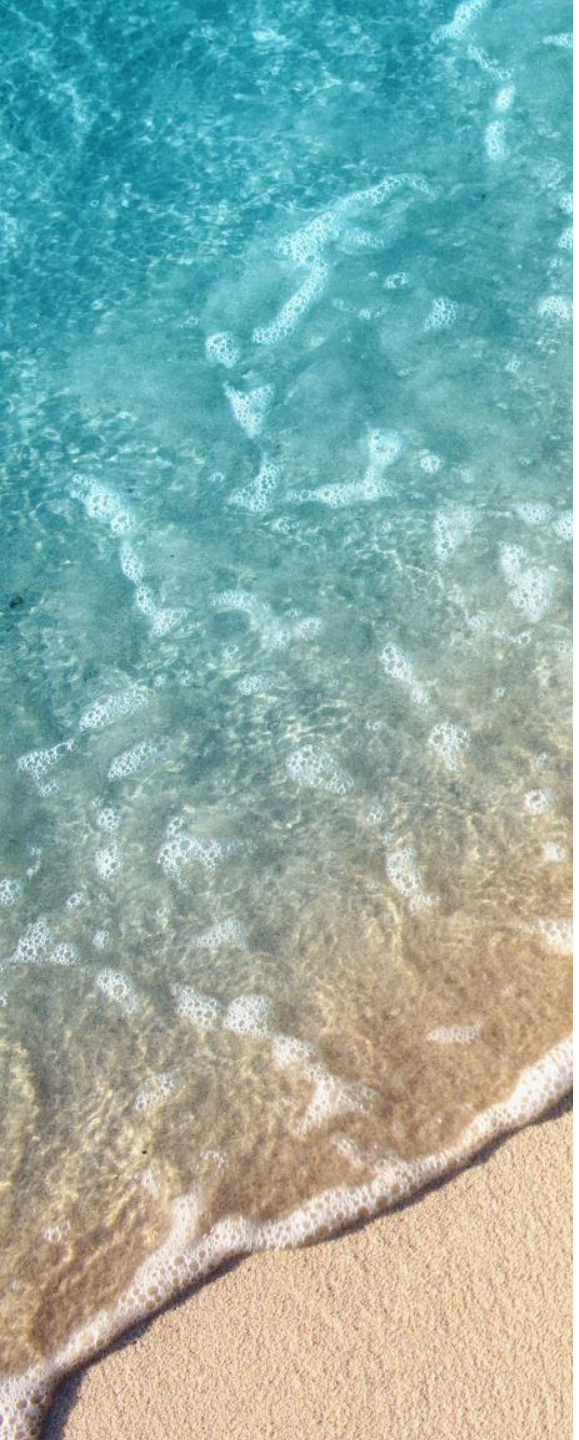




NOAA's statistical homogenization adjustments

- Every time they run the program, NOAA changes their mind!
- None of their adjustments matched with reality!





atmosphere

MDPI

Article

Evaluation of the Homogenization Adjustments Applied to European Temperature Records in the Global Historical Climatology Network Dataset

Peter O'Neill [1], Ronan Connolly [2,3,*], Michael Connolly [3], Willie Soon [2,4], Barbara Chimani [5], Marcel Crok [6], Rob de Vos [7], Hermann Harde [8], Peter Kajaba [9], Peter Nojarov [10], Rajmund Przybylak [11,12], Dubravka Rasol [13], Oleg Skrynyk [14,15], Olesya Skrynyk [14,16], Petr Štěpánek [17,18], Agnieszka Wypych [19,20] and Pavel Zahradníček [17,18]

1 School of Mechanical and Materials Engineering, University College Dublin, Belfield, D04 Dublin, Ireland; peter.oneill@ucd.ie
2 Center for Environmental Research and Earth Science (CERES), Salem, MA 01970, USA; willie@ceres-science.com
3 Independent Researcher, D01 Dublin, Ireland; michael@ceres-science.com
4 Institute of Earth Physics and Space Science (ELKH EPSS), H-9400 Sopron, Hungary
5 Zentralanstalt für Meteorologie and Geodynamik (ZAMG), Hohe Warte 38, 1190 Wien, Austria; barbara.chimani@zamg.ac.at
6 CLINTEL Foundation, Zekeringstraat 41, 1014 BV Amsterdam, The Netherlands; marcel.crok@clintel.org
7 Independent Researcher, 5751 HM Deurne, The Netherlands; rob@klimaatgek.nl
8 Electrical Engineering, Helmut-Schmidt-University, Holstenhofweg 85, 22043 Hamburg, Germany; harde@hsu-hh.de
9 Slovak Hydrometeorological Institute, 833 15 Bratislava, Slovakia; peter.kajaba@shmu.sk
10 National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences, Akad. G. Bonchev Str., Bl. 3, Room 327, 1113 Sofia, Bulgaria; pnojarov@abv.bg
11 Department of Meteorology and Climatology, Faculty of Earth Sciences and Spatial Management, Nicolaus Copernicus University, 87-100 Toruń, Poland; rp11@umk.pl
12 Centre for Climate Change Research, Nicolaus Copernicus University, 87-100 Toruń, Poland
13 Meteorological and Hydrological Service of Croatia, 10 000 Zagreb, Croatia; dubravka.rasol@cirus.dhz.hr
14 Ukrainian Hydrometeorological Institute, 03028 Kyiv, Ukraine; skrynyk@uhmi.org.ua (O.S.); skrynyk@nubip.edu.ua (O.S.)
15 Center for Climate Change C3, Universitat Rovira i Virgili, 43480 Tarragona, Spain
16 Department of Agronomy, National University of Life and Environmental Sciences of Ukraine, 03041 Kyiv, Ukraine
17 Global Change Research Institute, Czech Academy of Sciences, 603 00 Brno, Czech Republic; stepanek.p@czechglobe.cz (P.Š.); zahradnicek.p@czechglobe.cz (P.Z.)
18 Czech Hydrometeorological Institute, Brno Regional Office, 616 67 Brno, Czech Republic
19 Department of Climatology, Jagiellonian University, 7 Gronostajowa St., 30-387 Kraków, Poland; agnieszka.wypych@uj.edu.pl
20 Institute of Meteorology and Water Management—National Research Institute, 61 Podleśna St., 01-673 Warszawa, Poland
* Correspondence: ronan@ceres-science.com

Citation: O'Neill, P.; Connolly, R.; Connolly, M.; Soon, W.; Chimani, B.; Crok, M.; de Vos, R.; Harde, H.; Kajaba, P.; Nojarov, P.; et al. Evaluation of the Homogenization Adjustments Applied to European Temperature Records in the Global Historical Climatology Network Dataset. *Atmosphere* **2022**, *13*, 285. https://doi.org/10.3390/atmos13020285

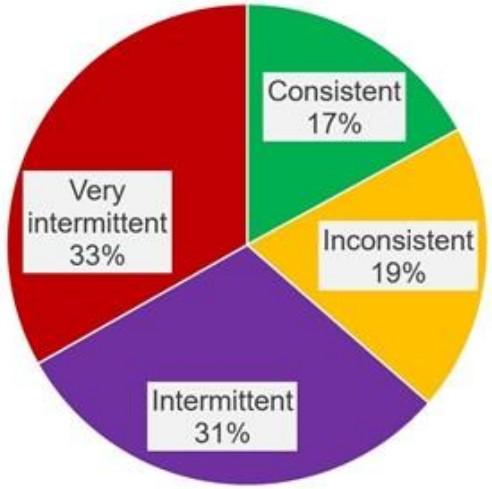
Academic Editor: Amal Chandran

Received: 13 January 2022
Accepted: 6 February 2022
Published: 8 February 2022

European Thermometers Project at CERES-science.com

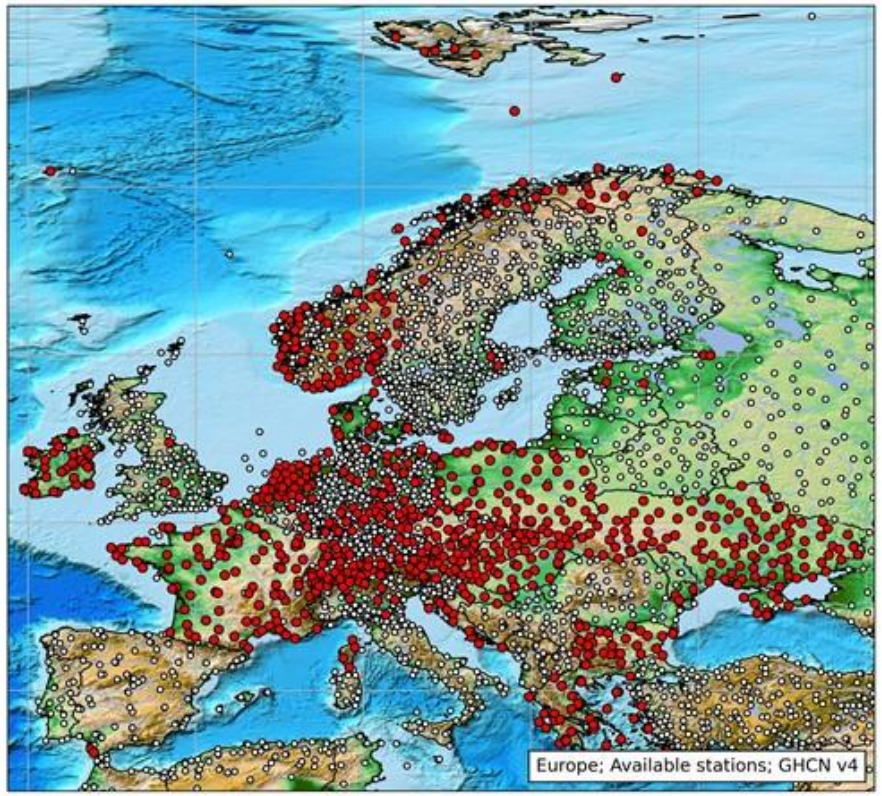
Summary of the new study on NOAA's temperature adjustments

Consistency of NOAA's adjustments for each station

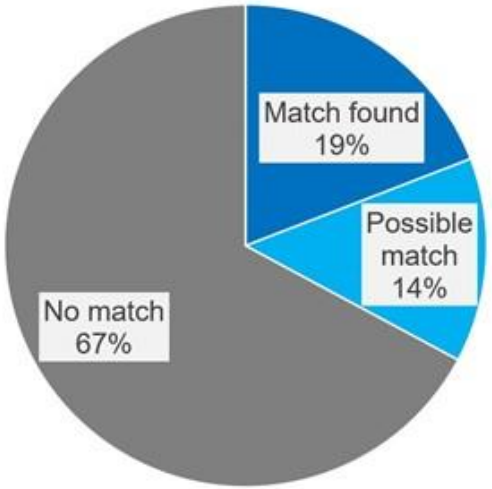


Only 17% of NOAA's adjustments are applied consistently

Details on the histories of more than 800 weather stations from 24 European countries were collected to check if the adjustments corresponded to documented changes associated with the weather station. The locations of these stations are indicated below in red.



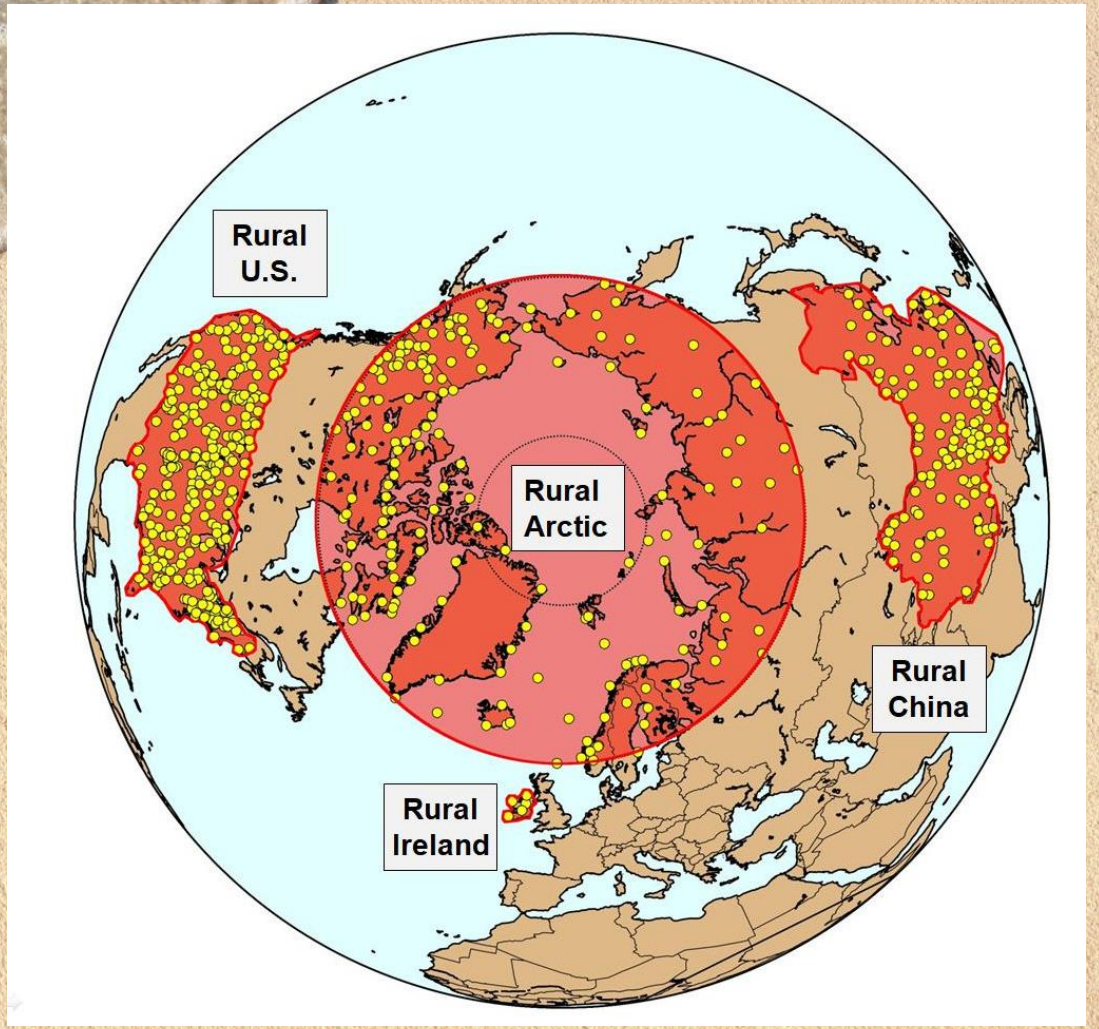
How often do NOAA's adjustments match to known documented station events?



Less than 20% of NOAA's adjustments were clearly associated with a documented change to the weather station observations

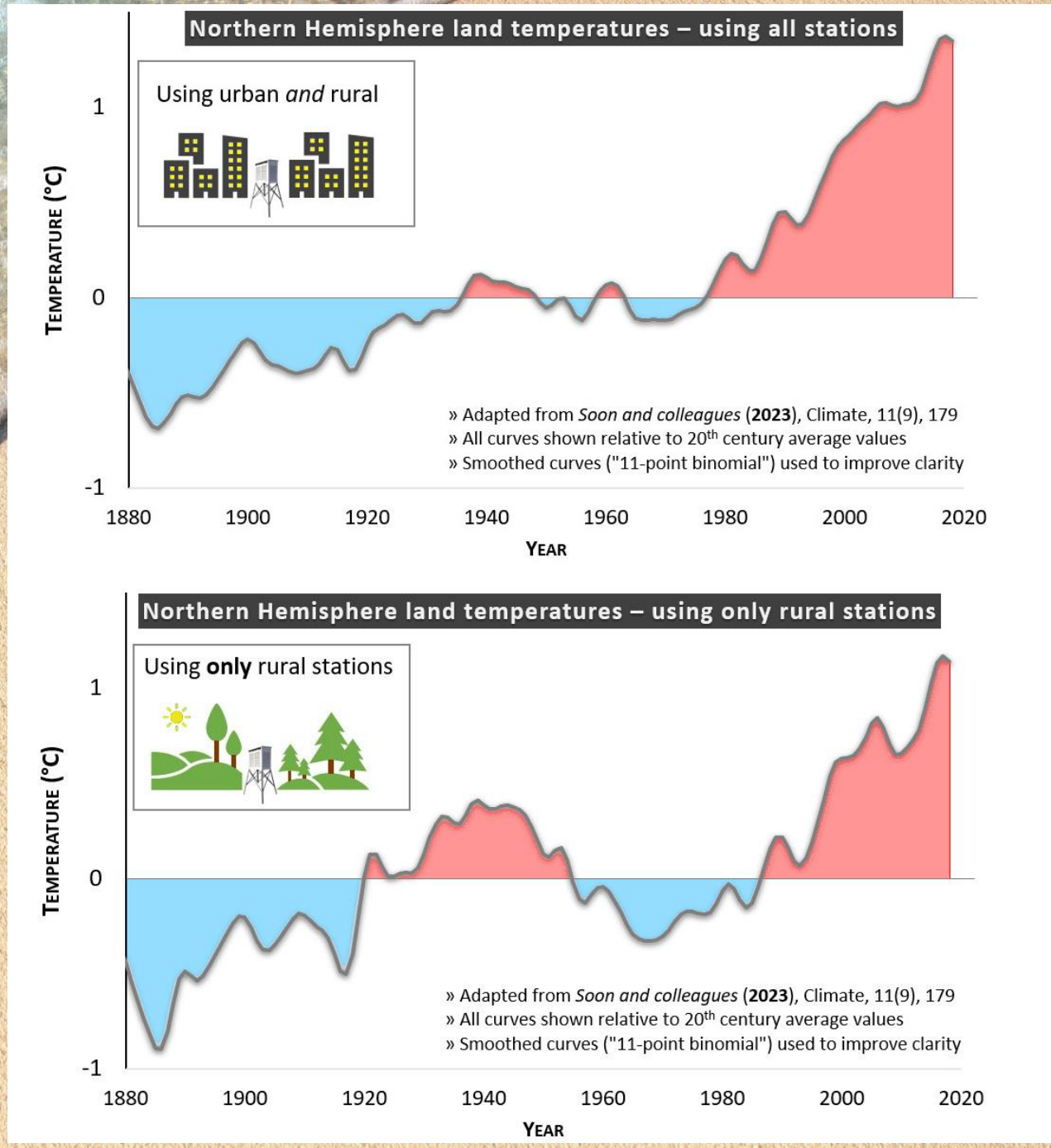
Our current rural-only Northern Hemisphere record

- In the meantime, in S2015 and C2021, we developed a rural-only temperature record using version 3 of NOAA's GHCN temperature dataset (1850-2018)
- Only uses 10-15% of the available temperature records, and confined to four geographical regions (all in N. Hemisphere)
- However, these regions account for more than 90% of the rural records that cover long enough to reach back to 19th century
- All four regions are geographically isolated from each other and cover tropics to poles



How does our rural record compare to IPCC's?

- Our rural-only record is "noisier" because only uses 10-15% of the data of the standard "urban & rural" records
- Shows roughly same timings for warming/cooling/warming periods
- Except early warming to 1940s and cooling to 1970s is more pronounced
- Long-term warming (0.6°C per century) is **much less** than the "urban and rural" estimates (0.9°C per century)



Are there other climate change indicators?

- The weather station-based land component actually is the best data – **direct** temperature measurements taken daily from the **same physical location** (between station moves) for centuries or longer. [Direct ✓ + Fixed spot ✓ + long records ✓]

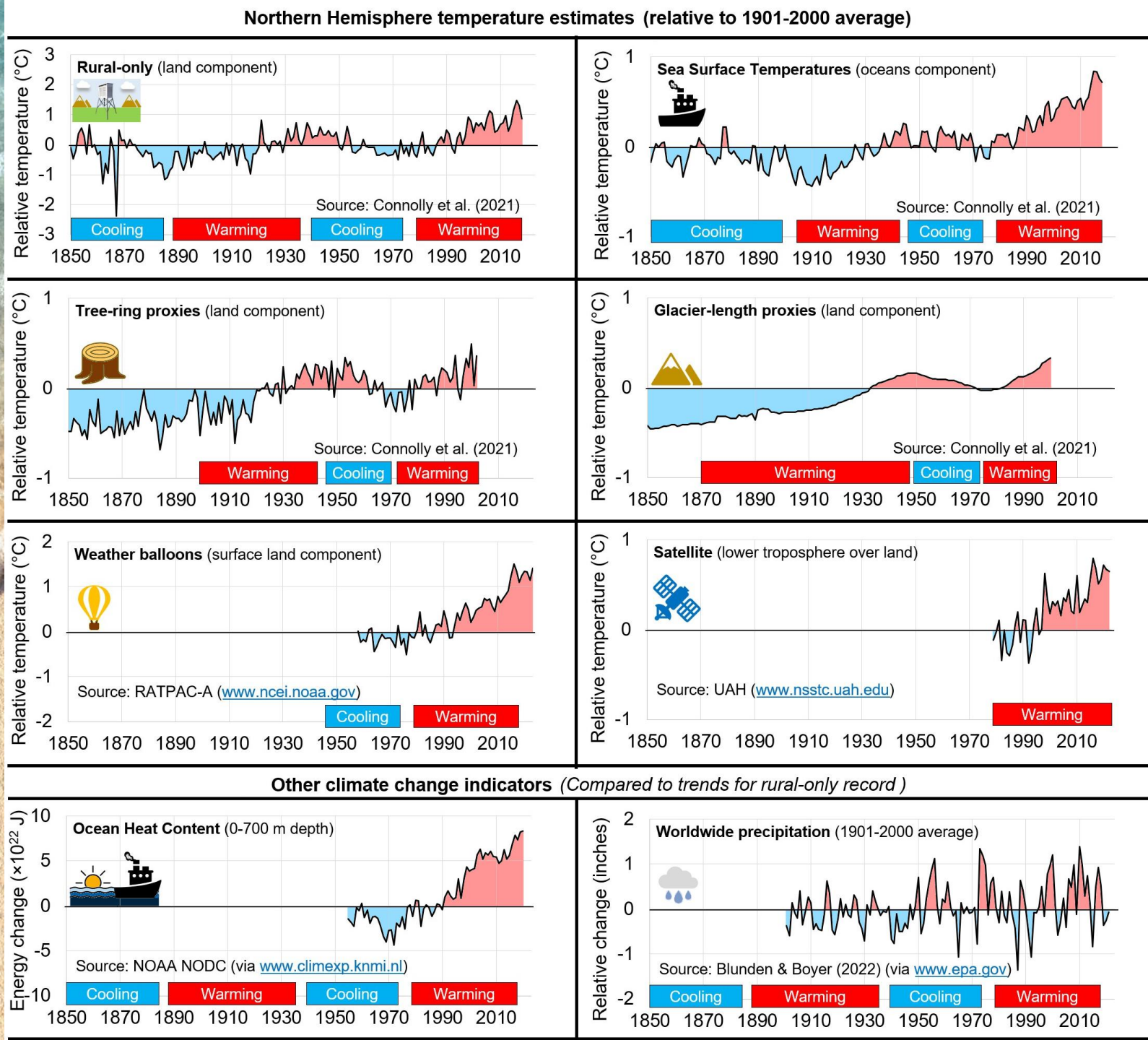
- Sea surface temperature (SST) and marine air temperature (MAT) measurements are direct measurements, but different locations and measurement methods (until fixed buoys began deployment in 1980s-1990s)
  [Direct ✓ + long records ✓, but inconsistent measurements ✗]

- Temperature proxies (tree-ring widths, lake sediments, etc.) are **indirect** estimates of temperatures that are also affected by other factors.
  [Fixed spot ✓ + long records ✓, but indirect ✗]

- Other climate records typically **only began** in the 1950s (e.g., weather balloons), the 1970s (e.g., satellite temperature records) or 2000s (ice sheet monitoring)

How does it compare?

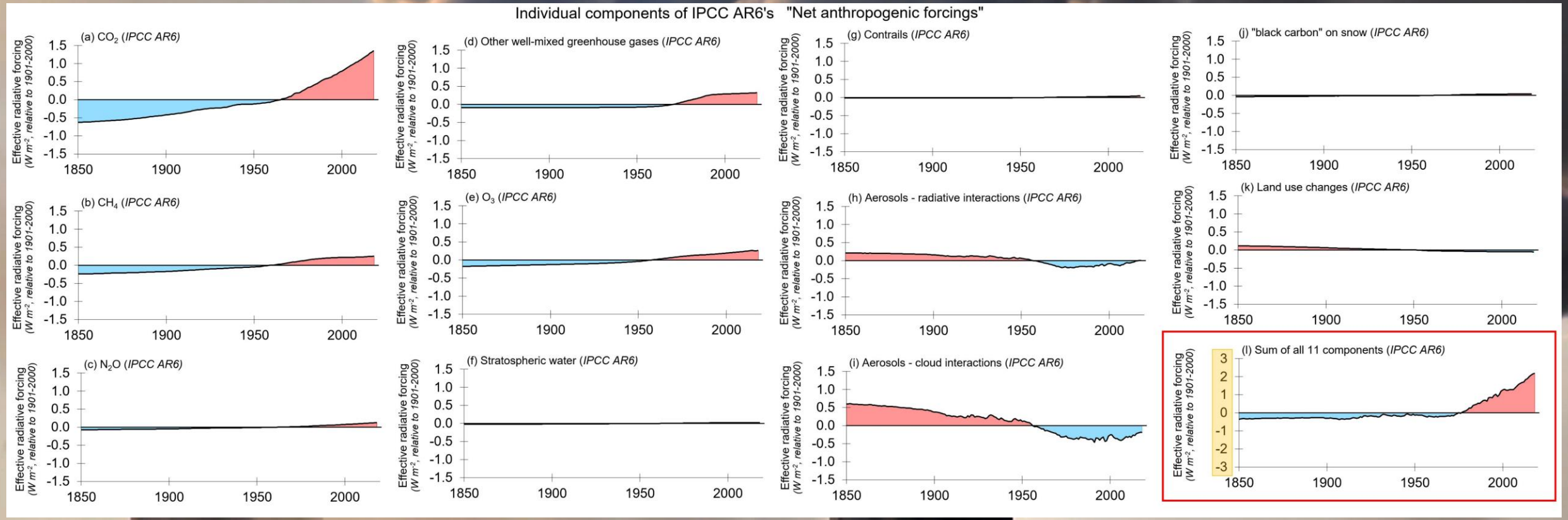
- Nonetheless, our rural-only Northern Hemisphere temperature estimates match surprisingly well to the other non-urbanized climate records
- All capture warming to 1940s, then cooling to 1970s then warming (if long enough)
- One exception: worldwide precipitation – no clear trend



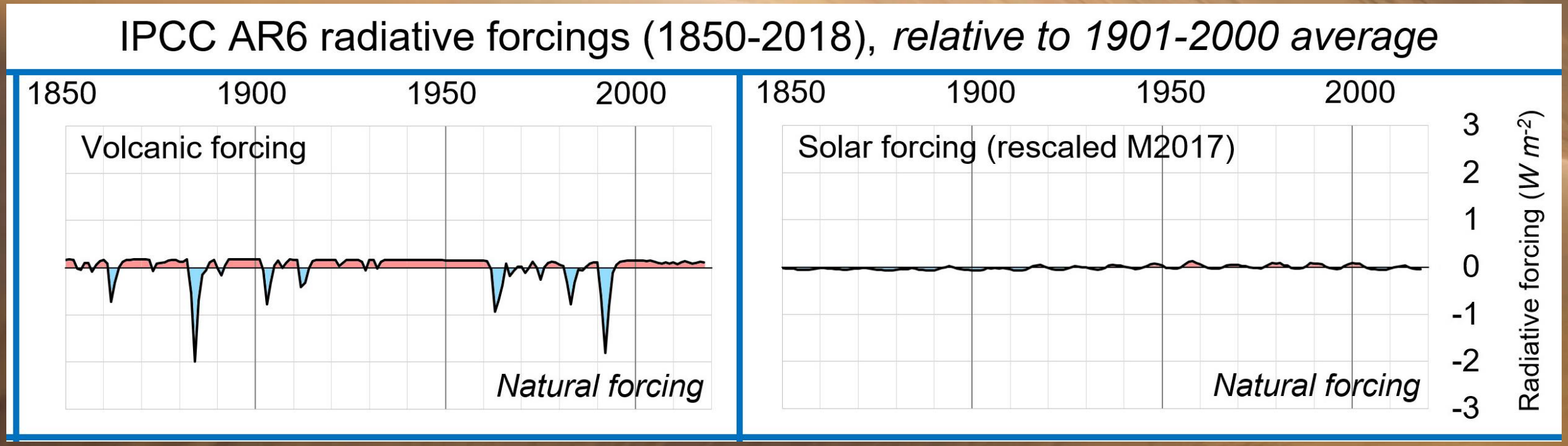
The IPCC's attribution process

- The computer model hindcasts used by the IPCC for their attribution involve plugging two types of climatic drivers:
  - natural factors and human-caused ("anthropogenic") factors
- IPCC describe drivers in terms of "radiative forcings" in Watts per m^2
- The hindcasts only consider two natural climatic drivers ("solar" and "volcanic")
- But, they consider 11 human-caused climatic drivers (mostly greenhouse gases and aerosol particles)

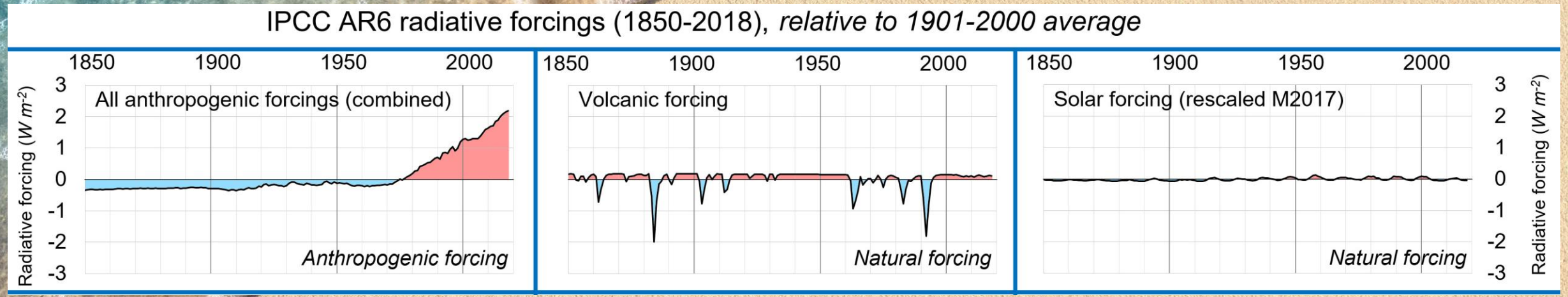
The IPCC thinks human-activities are the 11 smoking guns



They are not so interested in finding natural climate drivers



These are all the "natural and anthropogenic" forcings used for the IPCC AR6 hindcasts



The weather-climate system is powered by solar energy

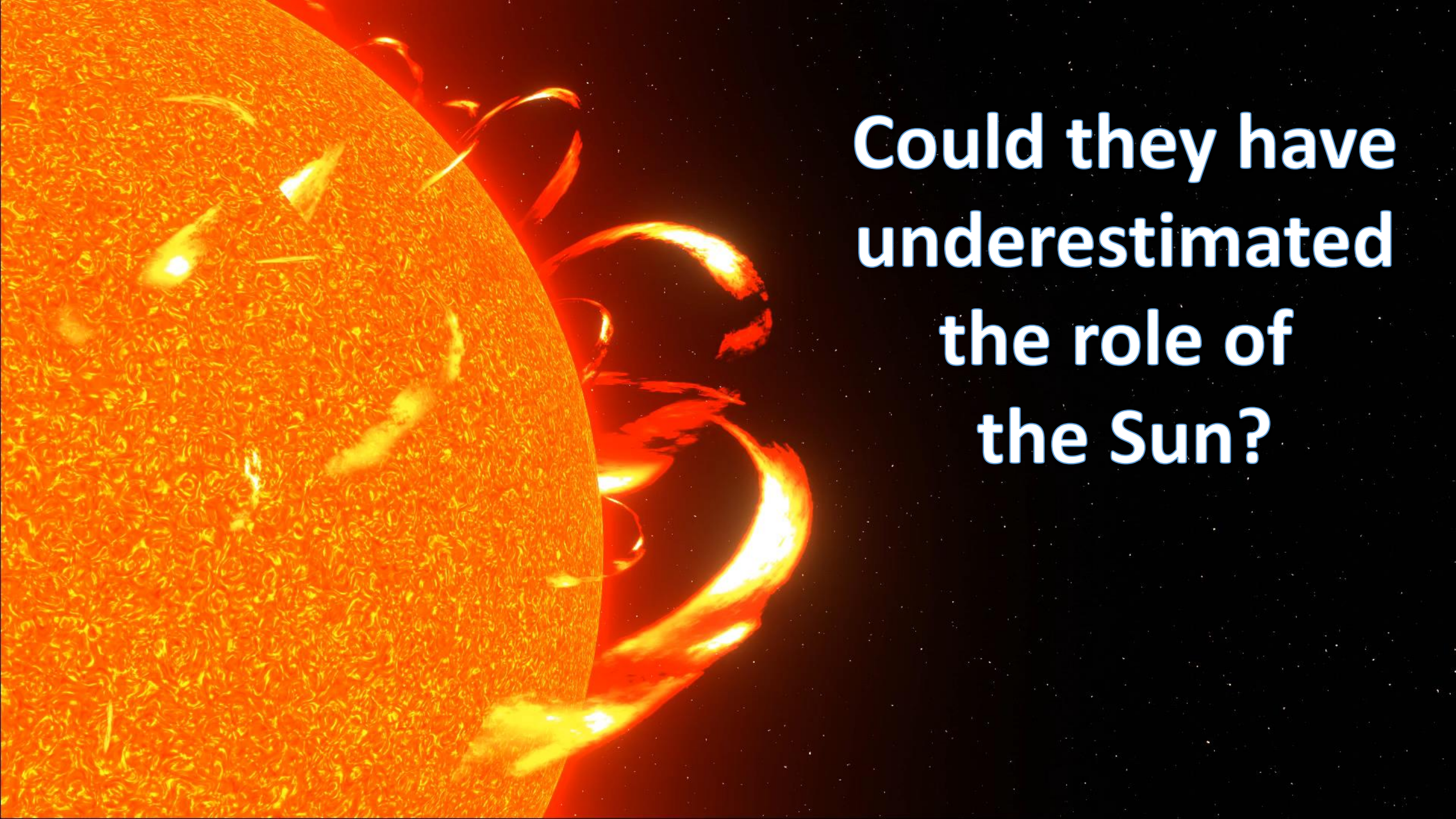
Power: 4×10^{26} W (Earth is 2 billion times weaker) 2×10^{17} W

radiogenic heat = 2×10^{13} W

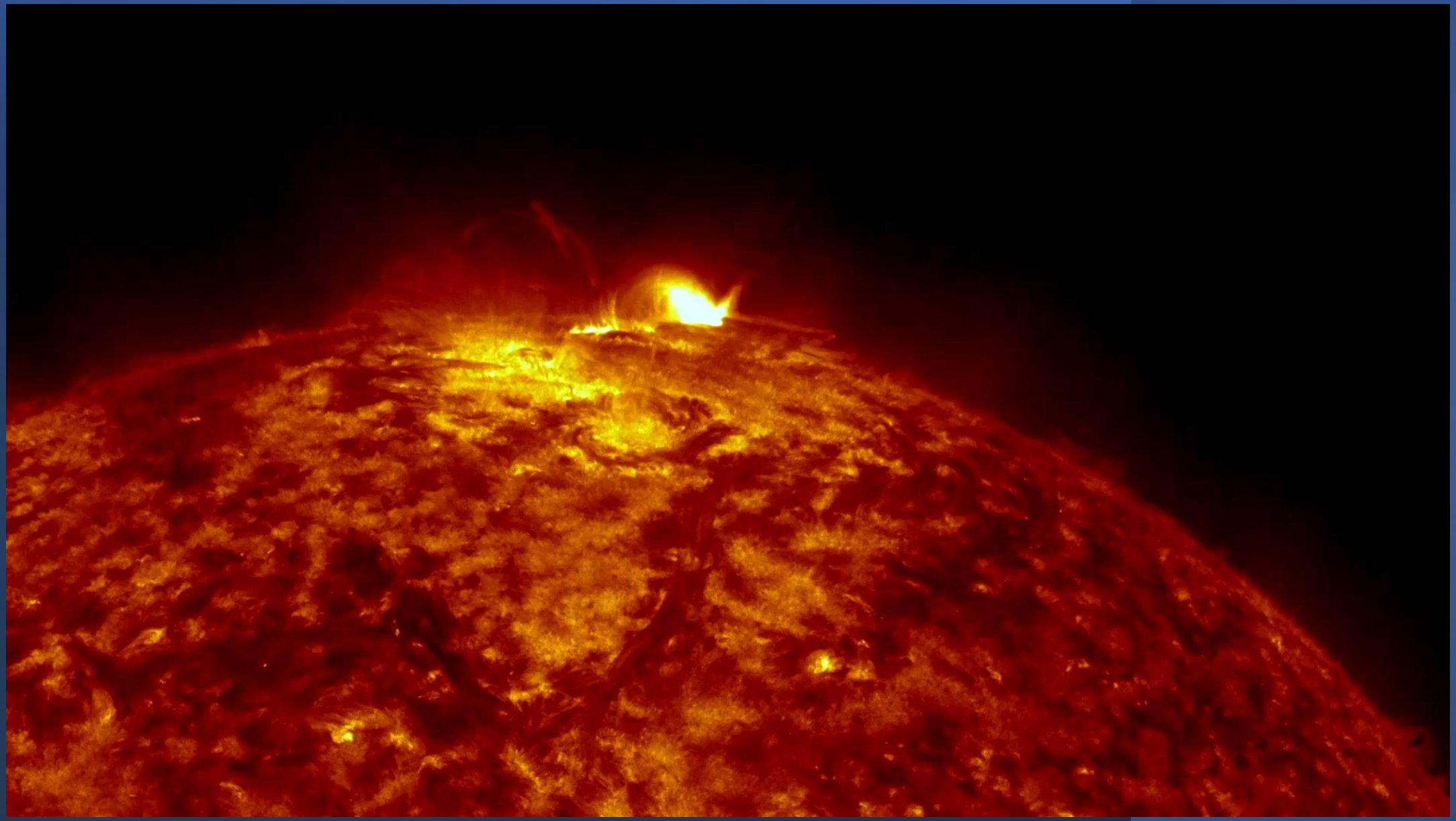
(world's most powerful laser: 5-10 x 10^{15} W; 100 petawatts pulse coming*)

Adapted from Jurg Beer 2007's presentation

*Ruxin Li, Shanghai Superintense Ultrafast Laser Facility (January 24, 2018 Science Magazine News)


Could they have
underestimated
the role of
the Sun?

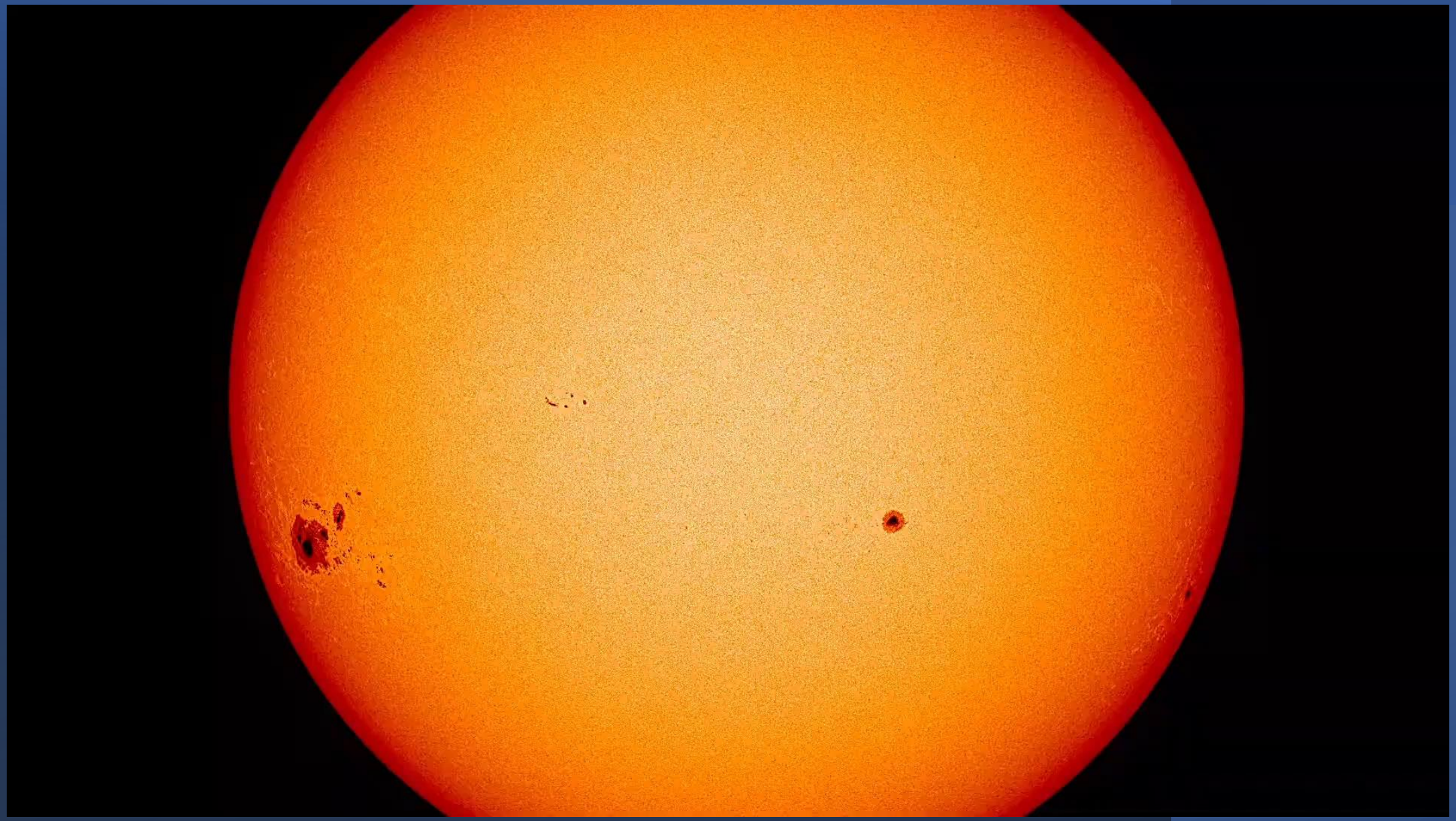
The Sun is a very dynamic source of energy



Source: NASA GSFC

"Cosmic Cycles: The Sun" (https://svs.gsfc.nasa.gov/14313)

Oldest noticed feature: “sunspots”



Source: NASA GSFC

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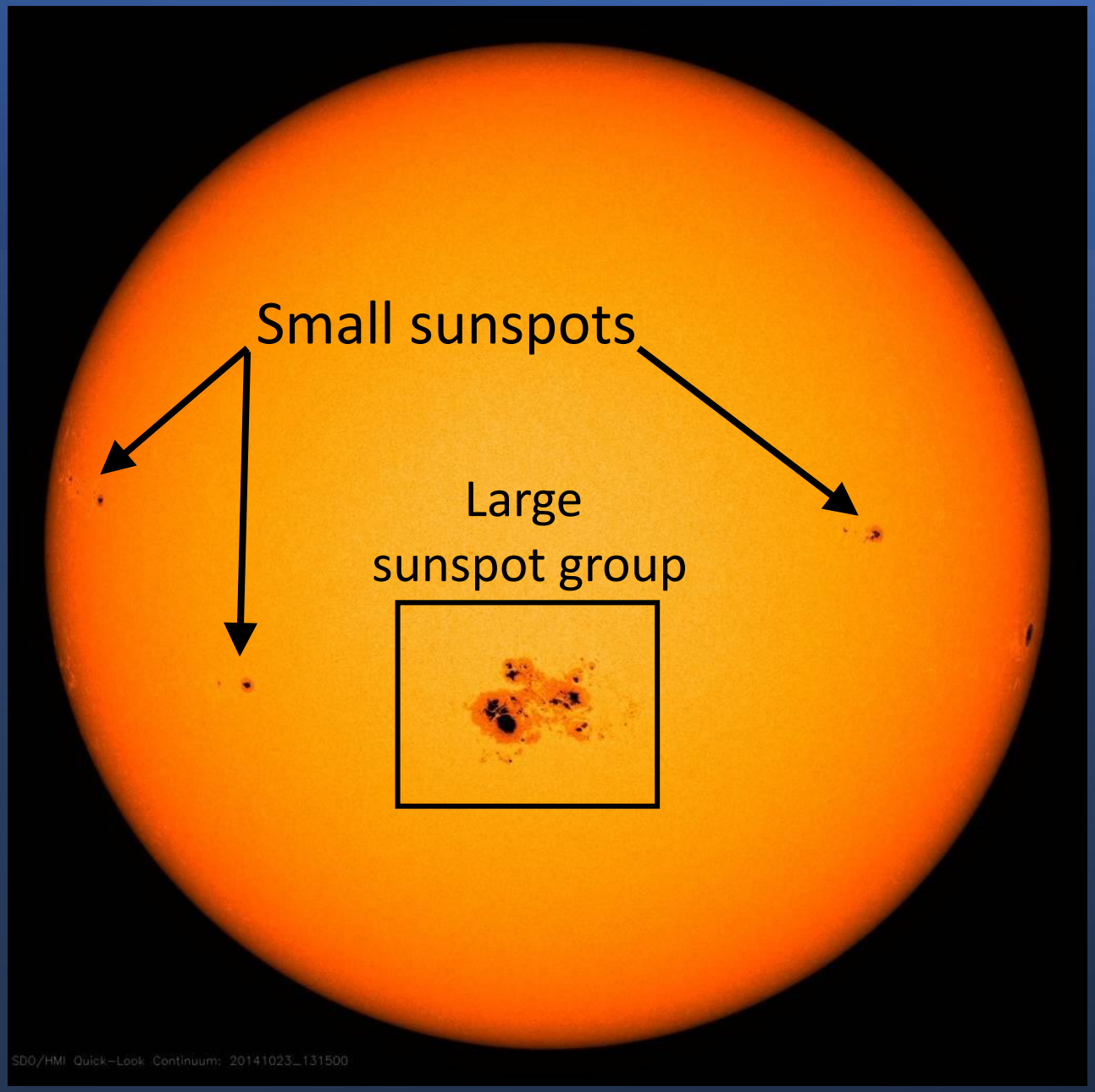
Some “sunspots”

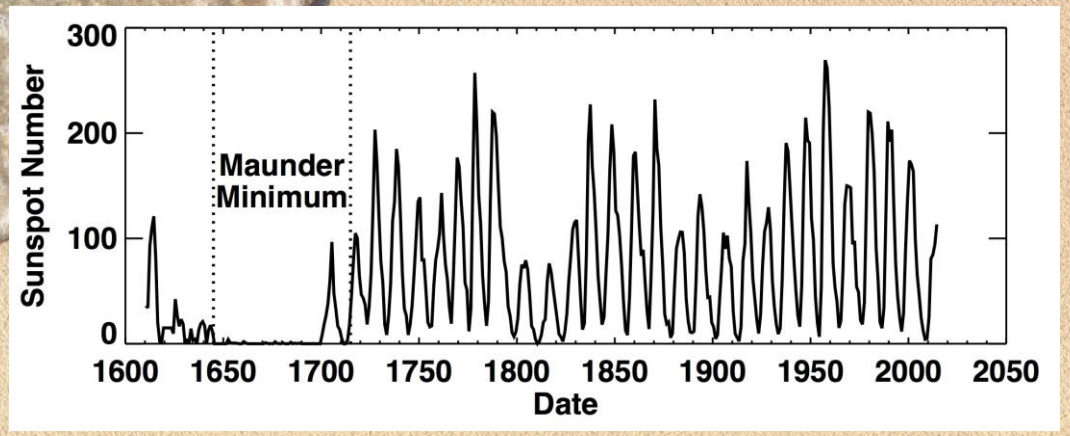


Source: NASA

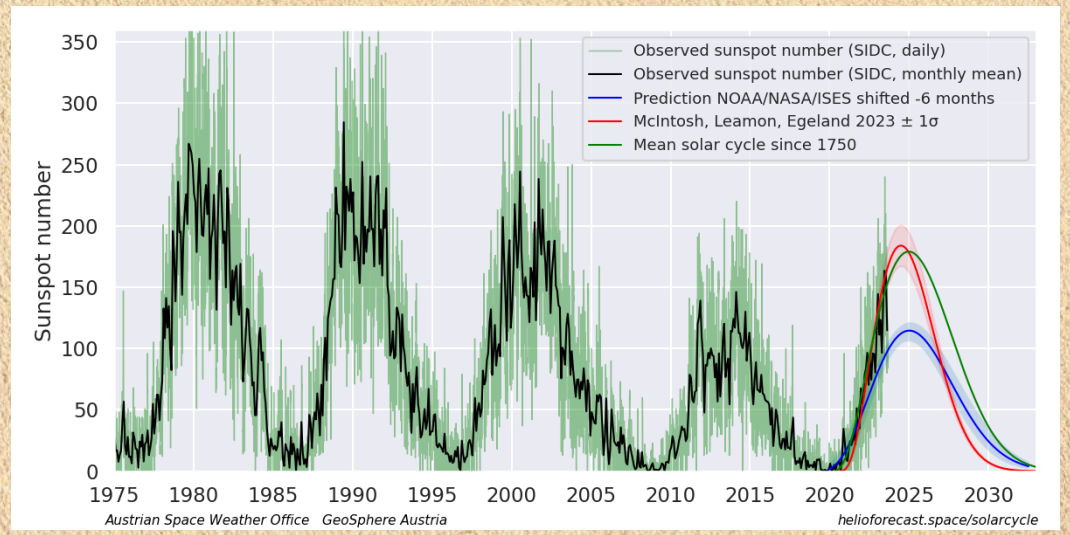
Sunspots have been recorded since Galileo

- Galileo noticed dark spots on the Sun with his early telescope in 1610 – called “sunspots”
- Number of sunspots increases to a maximum and then decreases to zero over a **roughly** 11 year cycle (“Sunspot cycle” or “solar cycle”)
- Sunspots disappeared from 1645-1715 (“Maunder Minimum”), but then reappeared
- Sunspot numbers (SSN) are clearly a measure of solar activity – but not a direct measurement of TSI – just a “solar proxy”
- There are other solar proxies, e.g., Ca(II)+H/K emission lines, penumbra/umbra ratios, etc.

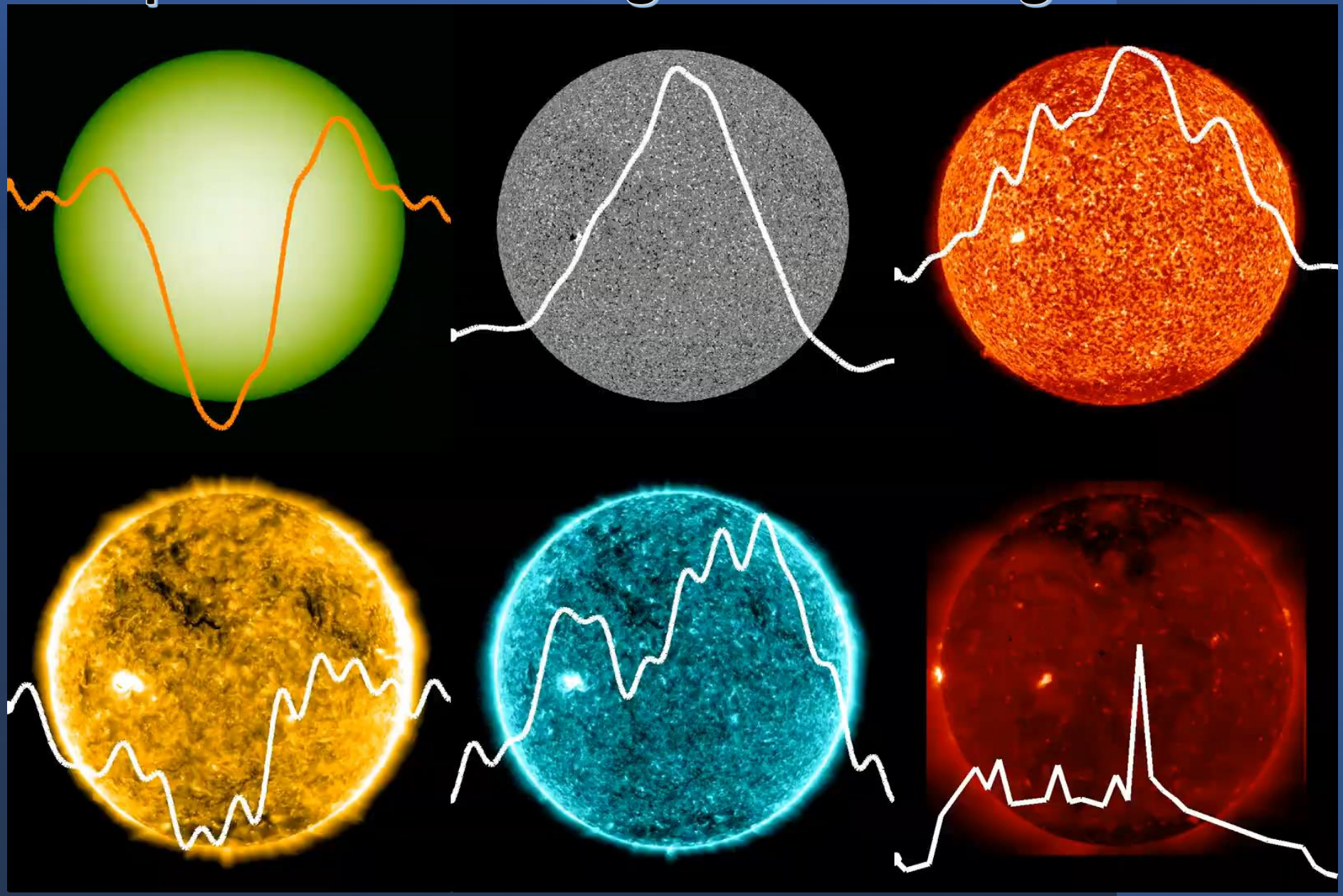
Yearly sunspots (Galileo to present)



Daily sunspots (1975 to the future!)



Different aspects of solar magnetism during solar rotation

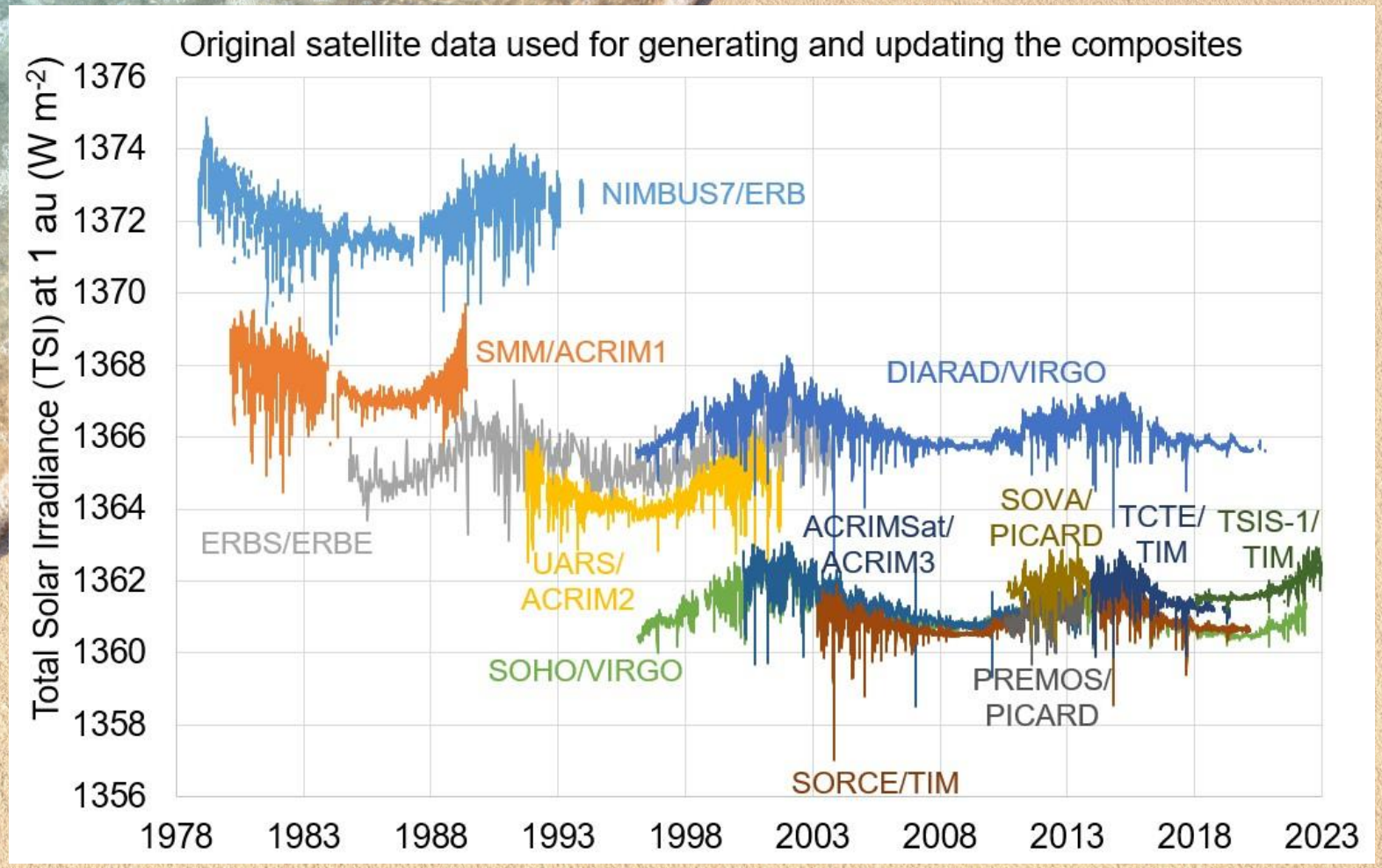


Source: NASA

https://www.nasa.gov/feature/goddard/2020/a-new-look-at-sunspots-is-helping-nasa-scientists-understand-major-flares-and-life-around/

The satellite era TSI problem!

- Direct measurements of Total Solar Irradiance (TSI) above the Earth's atmosphere **only** began in 1978
- Each satellite only lasts 10-15 years. And implies a different average TSI!
- All capture the up/down roughly 11 year sunspot cycle.
- But, each shows different trends between cycles.



NASA Announces Plans To Launch Chimpanzee Into Sun **At Midnight**

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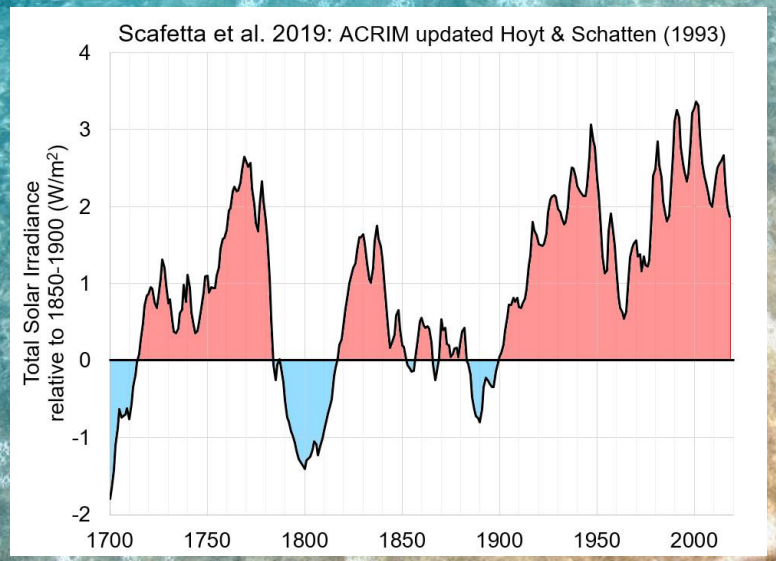
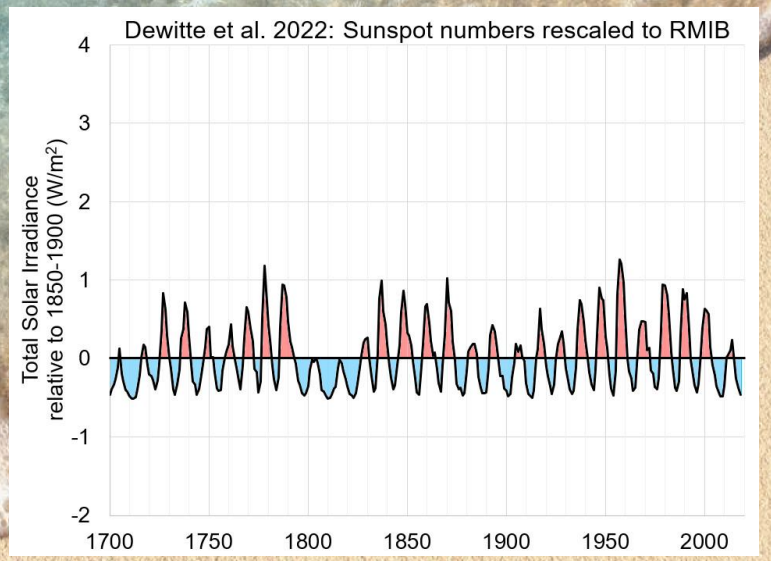
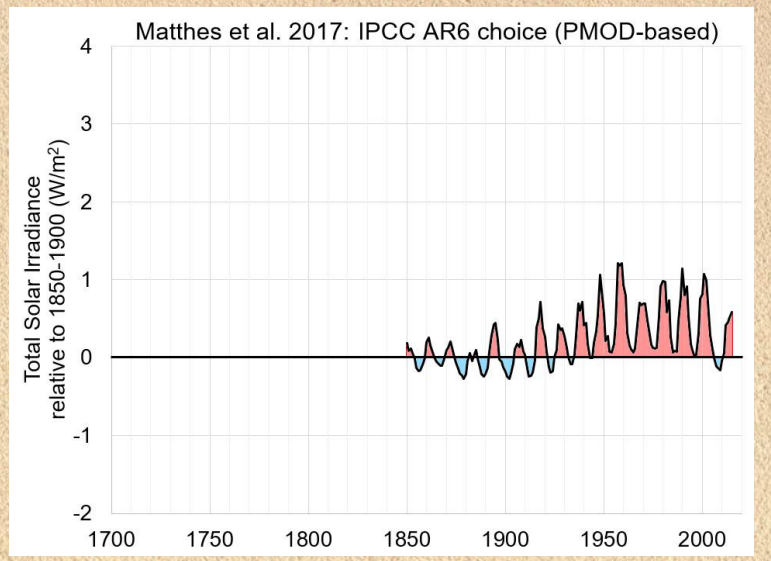
Using satellite TSI composites to calibrate solar proxies: Three examples of very different TSI estimates







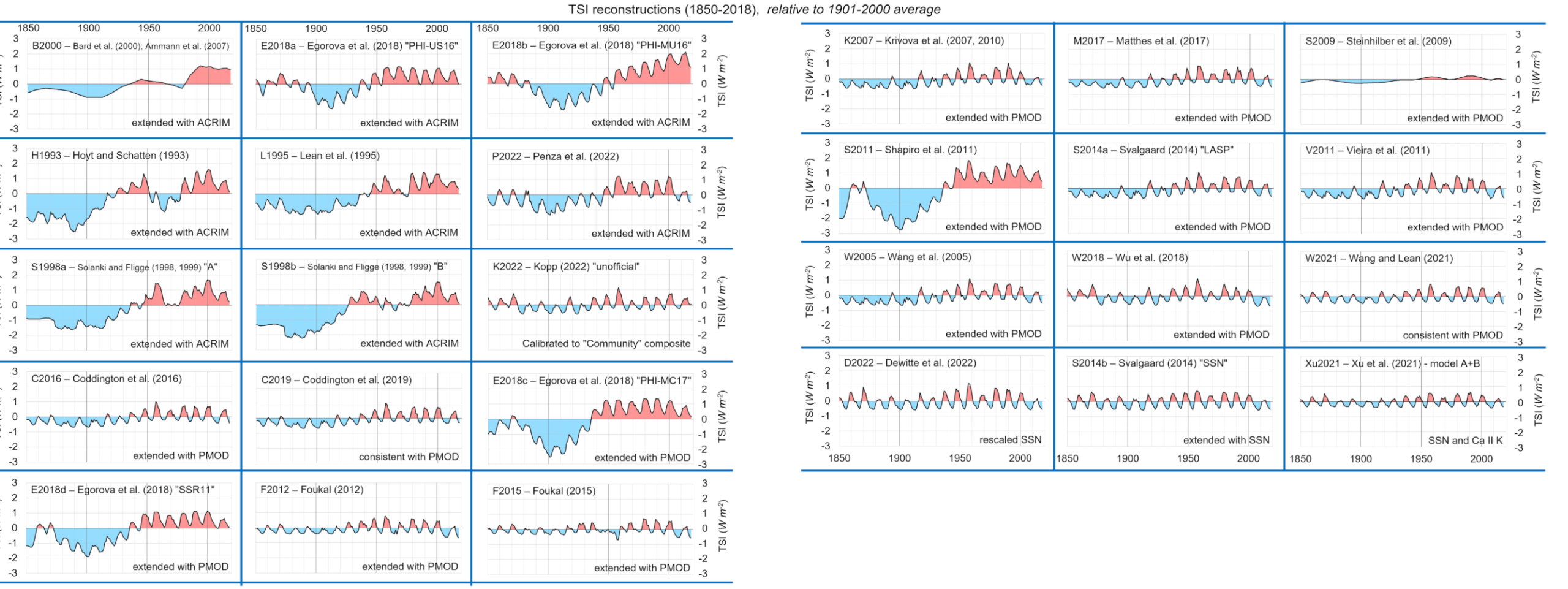
ACRIM-calibrated
5 solar proxies used

RMIB-calibrated
1 solar proxy used (SSN)

PMOD-calibrated
2-3 solar proxies used

Which of the 27 estimates is correct?

- We compiled 27 different TSI estimates and updated them all to cover period 1850-2018
- 8 ACRIM, 15 PMOD, 1 “Community” composite and 3 “SSN-based” estimates
- IPCC AR5 considered 4 of these: K2007, S2009, V2011 and W2005 (AR4 2007: 6 TSI)
- IPCC AR6 only considered 1 of them: M2017 (the average of C2016 and K2007)



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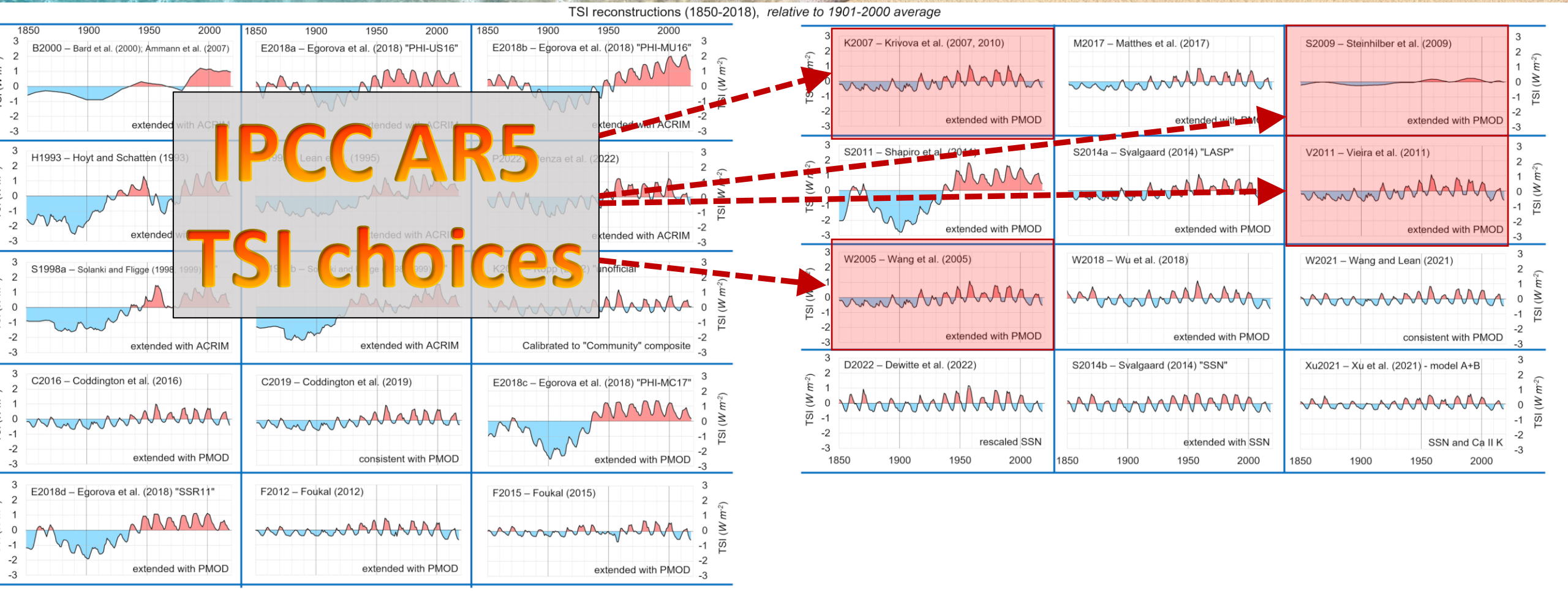

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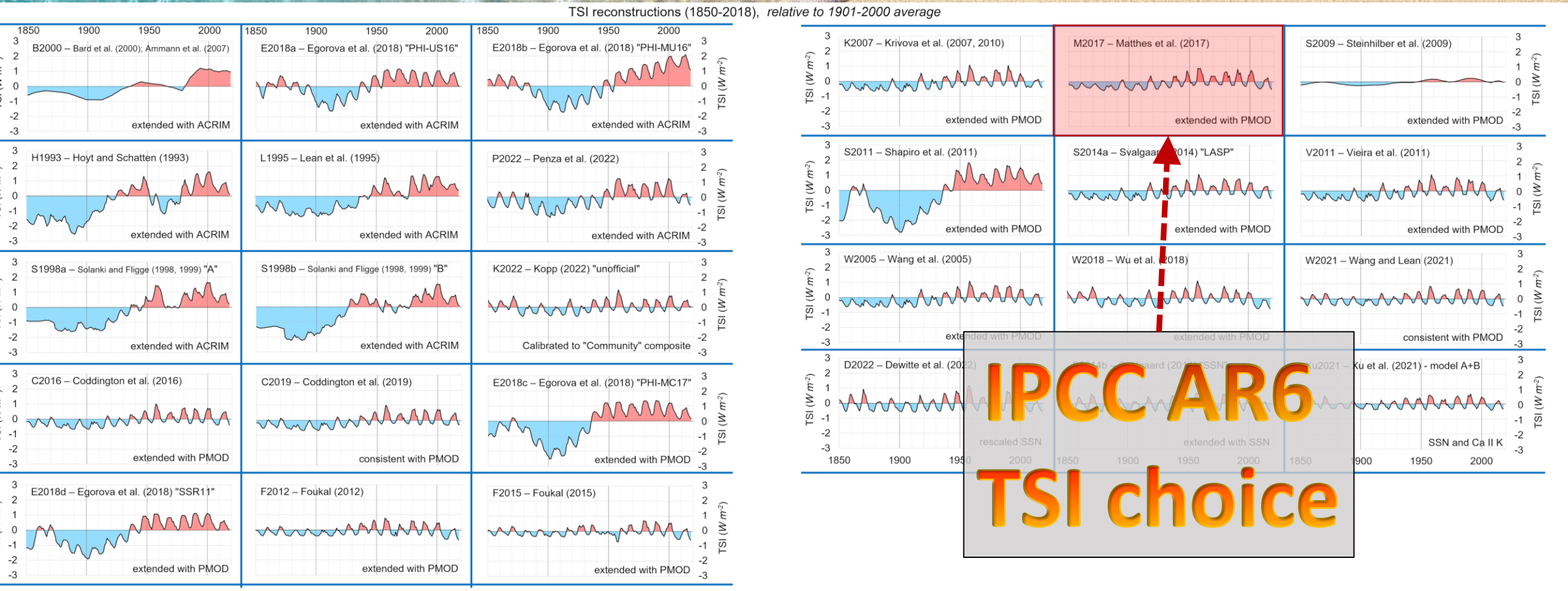

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8 ACRIM-calibrated

Available now

climate September 2023 MDPI

Article

The Detection and Attribution of Northern Hemisphere Land Surface Warming (1850–2018) in Terms of Human and Natural Factors: Challenges of Inadequate Data

Willie Soon [1,2], Ronan Connolly [1,3,*], Michael Connolly [1,3], Syun-Ichi Akasofu [4], Sallie Baliunas [5,†], Johan Berglund [6], Antonio Bianchini [7,8], William M. Briggs [9], C. J. Butler [10,†], Rodolfo Gustavo Cionco [11,12], Marcel Crok [13], Ana G. Elias [14], Valery M. Fedorov [15], François Gervais [16], Hermann Harde [17], Gregory W. Henry [18], Douglas V. Hoyt [19], Ole Humlum [20], David R. Legates [21,22,†], Anthony R. Lupo [23], Shigenori Maruyama [24,†], Patrick Moore [25], Maxim Ogurtsov [26,27], Coilín ÓhAiseadha [28], Marcos J. Oliveira [29], Seok-Soon Park [30], Shican Qiu [31], Gerré Quinn [32], Nicola Scafetta [33], Jan-Erik Solheim [34,†], Jim Steele [35,†], László Szarka [2], Hiroshi L. Tanaka [36,†], Mitchell K. Taylor [37], Fritz Vahrenholt [38], Víctor M. Velasco Herrera [39] and Weijia Zhang [40]

1 Center for Environmental Research and Earth Sciences (CERES), Salem, MA 01970, USA
2 Institute of Earth Physics and Space Science (EPSS), H-9400 Sopron, Hungary
3 Independent Researcher, D08 Dublin, Ireland
4 International Arctic Research Center, University of Alaska Fairbanks, Fairbanks, AK 99775, USA
5 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138, USA
6 Independent Researcher, 211 10 Malmö, Sweden
7 Osservatorio Astronomico di Padova, INAF, Vicolo Osservatorio 5, 35122 Padova, Italy
8 Department of Physics and Astronomy, University of Padua, Via Francesco Marzolo, 8, 35131 Padova, Italy
9 Independent Researcher, Charlevoix, MI 49720, USA
10 Armagh Observatory, College Hill, Armagh BT61 9DG, UK
11 Comisión de Investigaciones Científicas de la Provincia de Buenos Aires, Calle 526 entre 10 y 11, La Plata 1900, Argentina
12 Grupo de Estudios Ambientales, Universidad Tecnológica Nacional, Colón 332, San Nicolás, Buenos Aires 2900, Argentina
13 CLINTEL Foundation, Zekeringstraat 41, 1014 BV Amsterdam, The Netherlands
14 Laboratorio de Ionosfera, Atmosfera Neutra y Magnetosfera (LIANM), Facultad de Ciencias Exactas y Tecnologia, Universidad Nacional de Tucumán, Av. Independencia 1800, Tucumán 4000, Argentina
15 Faculty of Geography, Lomonosov Moscow State University, Leninskie Gory St. 1, Moscow 119991, Russia
16 Faculty of Sciences and Techniques, University of Tours, Parc de Grandmont, 37200 Tours, France
17 Experimental Physics and Materials Science, Helmut-Schmidt-University, Holstenhofweg 85, 22043 Hamburg, Germany
18 Center of Excellence in Information Systems, Tennessee State University, Nashville, TN 37209, USA
19 Independent Researcher, Berkeley Springs, WV 25411, USA
20 Department of Geosciences, University of Oslo, Sem Sælands vei 1, 0371 Oslo, Norway
21 Department of Geography and Spatial Sciences, University of Delaware, Newark, DE 19716, USA
22 Cornwall Alliance for the Stewardship of Creation, Collierville, TN 38017, USA
23 Atmospheric Science Program and Missouri Climate Center, School of Natural Resources, University of Missouri, Columbia, MO 65211, USA
24 Earth-Life Science Institute, Tokyo Institute of Technology, 2-12-1-IE-1 Ookayama, Meguro-ku, Tokyo 152-8550, Japan
25 Independent Researcher, Ecosense Environmental Inc., Comox, BC V9M 1T8, Canada
26 Laboratory of Cosmic Rays, Ioffe Physico-Technical Institute, St. Petersburg 194021, Russia
27 Central Astronomical Observatory at Pulkovo, Pulkovskoye Shosse, 65, St. Petersburg 196140, Russia
28 Department of Public Health, Health Service Executive, Dr Steevens' Hospital, D08 W2A8 Dublin, Ireland
29 Núcleo de Climatologia Aplicada ao Meio Ambiente (CliMA), Centro de Recursos Hídricos e Estudos Ambientais (CRHEA), Escola de Engenharia de São Carlos (EESC), Universidade de São Paulo (USP), Área 1-Avenida Trabalhador são-carlense, 400 Pq Arnold Schimidt-CEP, São Carlos 13566-590, SP, Brazil
30 Department of Environmental Science and Engineering, College of Engineering, Ewha Womans University, 34-1 Sinchon-dong, Seodaemun-gu, Seoul 03760, Republic of Korea
31 Department of Geophysics, College of the Geology Engineering and Geomatics, Chang'an University, Xi'an 710054, China
32 Centre for Molecular Biosciences, Ulster University, Coleraine BT52 1SA, UK

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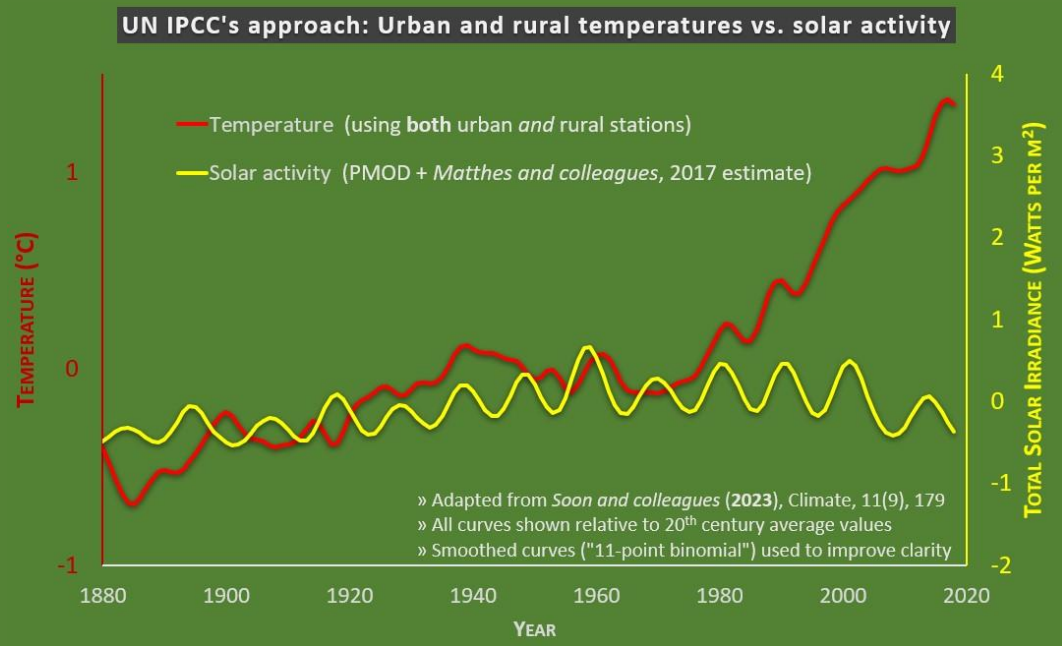
Citation: Soon, W.; Connolly, R.; Connolly, M.; Akasofu, S.-I.; Baliunas, S.; Berglund, J.; Bianchini, A.; Briggs, W.M.; Butler, C.J.; Cionco, R.G.; et al. The Detection and Attribution of Northern Hemisphere Land Surface Warming (1850–2018) in Terms of Human and Natural Factors: Challenges of Inadequate Data. *Climate* **2023**, *11*, 179. https://doi.org/10.3390/cli11090179

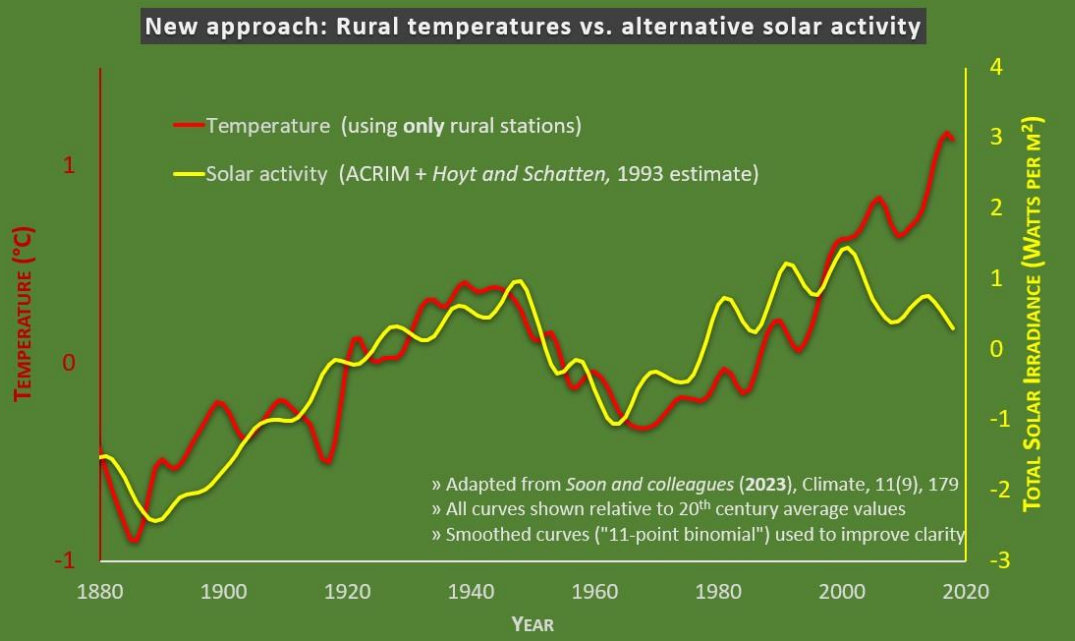
Academic Editor: Ned Nikolov

Received: 19 July 2023
Revised: 21 August 2023
Accepted: 22 August 2023
Published: 28 August 2023

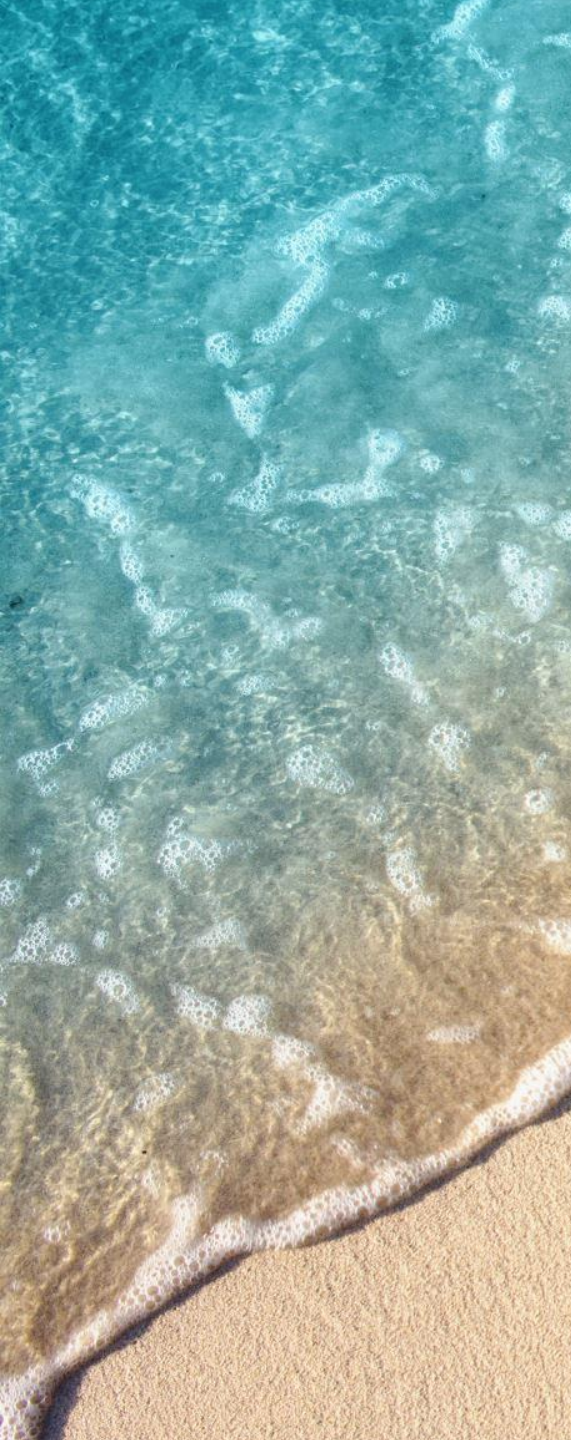
37 co-authors
from
18 countries
and
188 references

S2023: Urban & rural vs. Rural-only and Two TSI series





- IPCC AR6 uses both urban and rural data for calculating global temperatures
- Their chosen estimate of solar activity was that of Matthes and colleagues (2017) ("M2017).
- **IPCC**: Solar activity cannot explain any of the warming since the mid-20th century
- If we use our rural-only record, we see a more cyclical behavior and less overall warming.
- If we use one of the ACRIM-calibrated TSI estimates (H1993) it suggests that most of the rural temperature changes since the 19th century have been natural



Research in Astronomy and Astrophysics, 23:105015 (20pp), 2023 October
https://doi.org/10.1088/1674-4527/acf18e

October 2023

Challenges in the Detection and Attribution of Northern Hemisphere Surface Temperature Trends Since 1850

Ronan Connolly[1,2], Willie Soon[1,3], Michael Connolly[1,2], Sallie Baliunas[4], Johan Berglund[5], C. J. Butler[6], Rodolfo Gustavo Cionco[7,8], Ana G. Elias[9,10], Valery M. Fedorov[11], Hermann Harde[12], Gregory W. Henry[13], Douglas V. Hoyt[14], Ole Humlum[15], David R. Legates[16], Nicola Scafetta[17], Jan-Erik Solheim[18], László Szarka[3], Víctor M. Velasco Herrera[19], Hong Yan[20], and Weijia Zhang[21]

[1] Center for Environmental Research and Earth Science (CERES), Salem, MA 01970, USA; ronan@ceres-science.com
[2] Independent scientists, Dublin, Ireland
[3] Institute of Earth Physics and Space Science (EPSS), Sopron, Hungary
[4] Retired, formerly Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138, USA
[5] Independent researcher, Malmö, Sweden
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[10] Instituto de Física del Noroeste Argentino (Consejo Nacional de Investigaciones Científicas y Técnicas—Universidad Nacional de Tucumán), 4000 Tucumán, Argentina
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[16] Professor Emeritus, College of Earth, Ocean, and the Environment, University of Delaware, Newark DE 19716-2541, USA
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[18] Retired, formerly Department of Physics and Technology, UiT The Arctic University of Norway, 9037 Tromsø, Norway
[19] Instituto de Geofisica, Universidad Nacional Autónoma de México, Ciudad Universitaria, Coyoacán, 04510, México D.F., México
[20] State Key Laboratory of Loess and Quaternary Geology, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an 710061, China
[21] Department of Mathematics and Physics, Shaoxing University, Shaoxing 312000, China
Received 2023 July 26; revised 2023 August 9; accepted 2023 August 15; published 2023 September 27

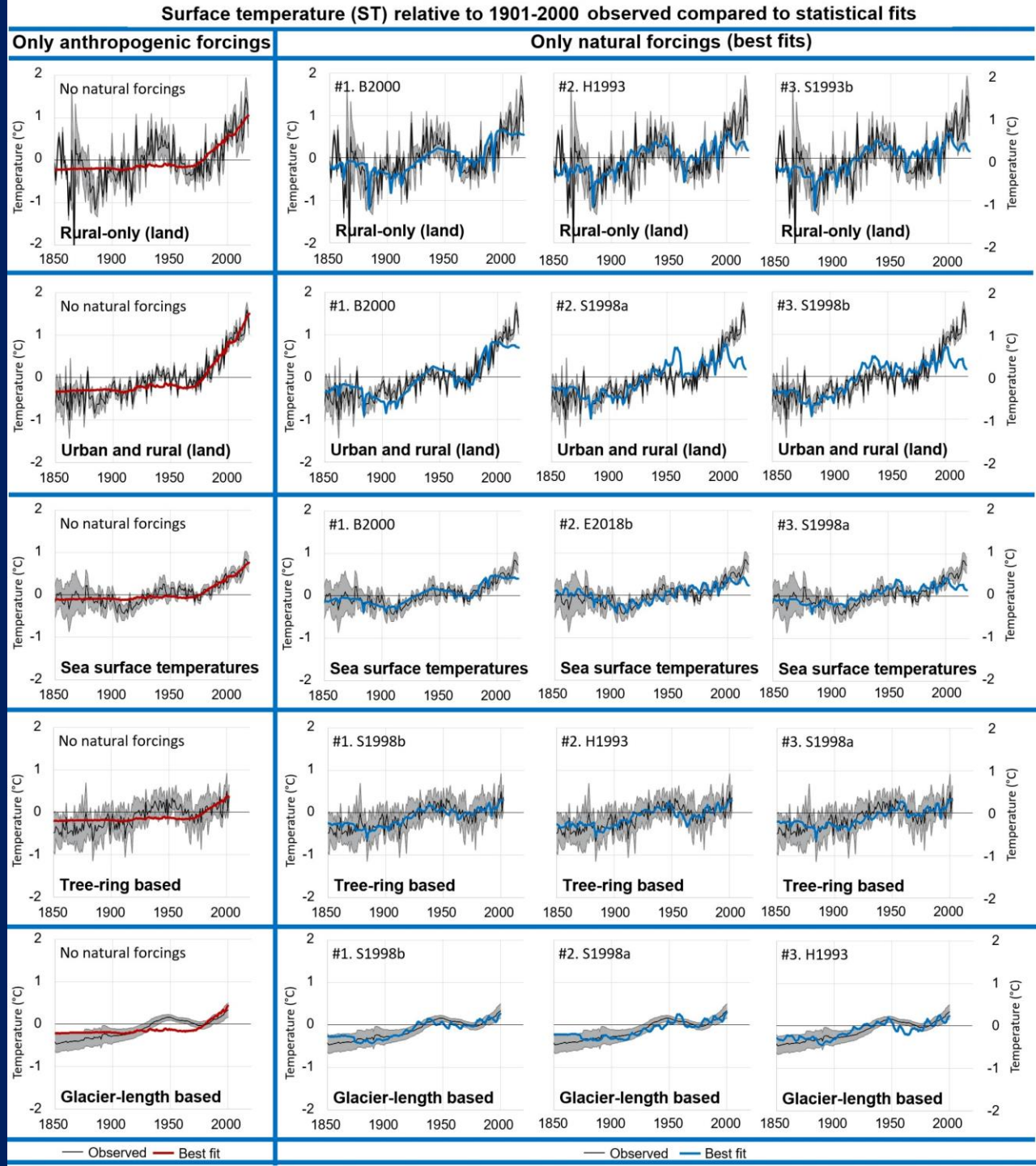
Abstract

Since 2007, the Intergovernmental Panel on Climate Change (IPCC) has heavily relied on the comparison between global climate model hindcasts and global surface temperature (ST) estimates for concluding that post-1950s global warming is mostly human-caused. In Connolly et al., we cautioned that this approach to the detection and attribution of climate change was highly dependent on the choice of Total Solar Irradiance (TSI) and ST data sets. We compiled 16 TSI and five ST data sets and found by altering the choice of TSI or ST, one could (prematurely) conclude anything from the warming being "mostly human-caused" to "mostly natural." Richardson and Benestad suggested our analysis was "erroneous" and "flawed" because we did not use a multilinear regression. They argued that applying a multilinear regression to one of the five ST series re-affirmed the IPCC's attribution statement. They also objected that many of the published TSI data sets were out-of-date. However, here we show that when applying multilinear regression analysis to an expanded and updated data set of 27 TSI series, the original conclusions of Connolly et al. are confirmed for all five ST data sets. Therefore, it is still unclear whether the observed warming is mostly human-caused, mostly natural or some combination of both.

Key words: Sun: activity – (Sun:) solar-terrestrial relations – Earth

C2023: Five temperature estimates and 27 TSI series

- If we look at the fits themselves, we find that the best-fitting ACRIM-calibrated TSI records capture the warming and cooling periods surprisingly well
- In contrast, the “only anthropogenic factors” can only really capture the recent warming since the 1970s
- We don’t know which of the 27 TSI is most accurate – but neither does the IPCC!!!



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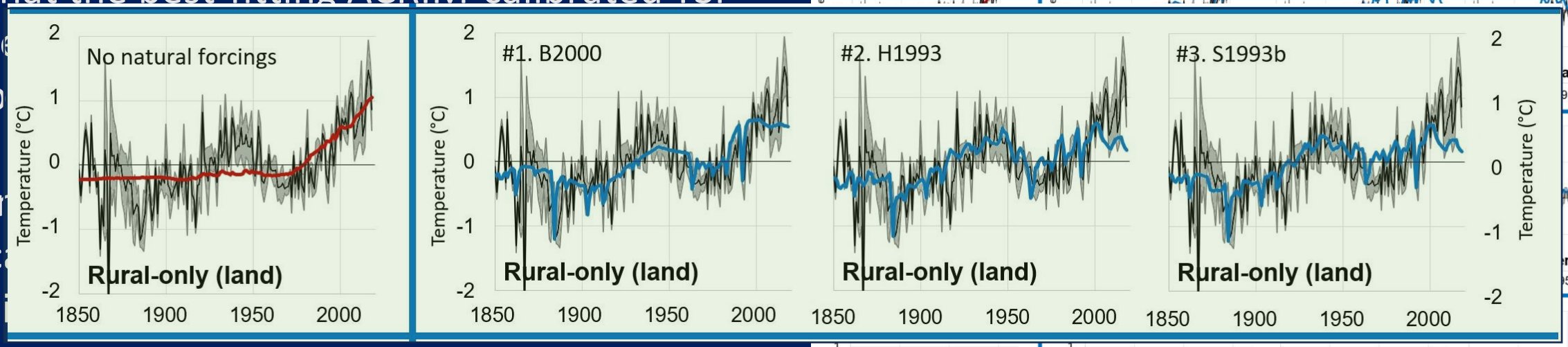

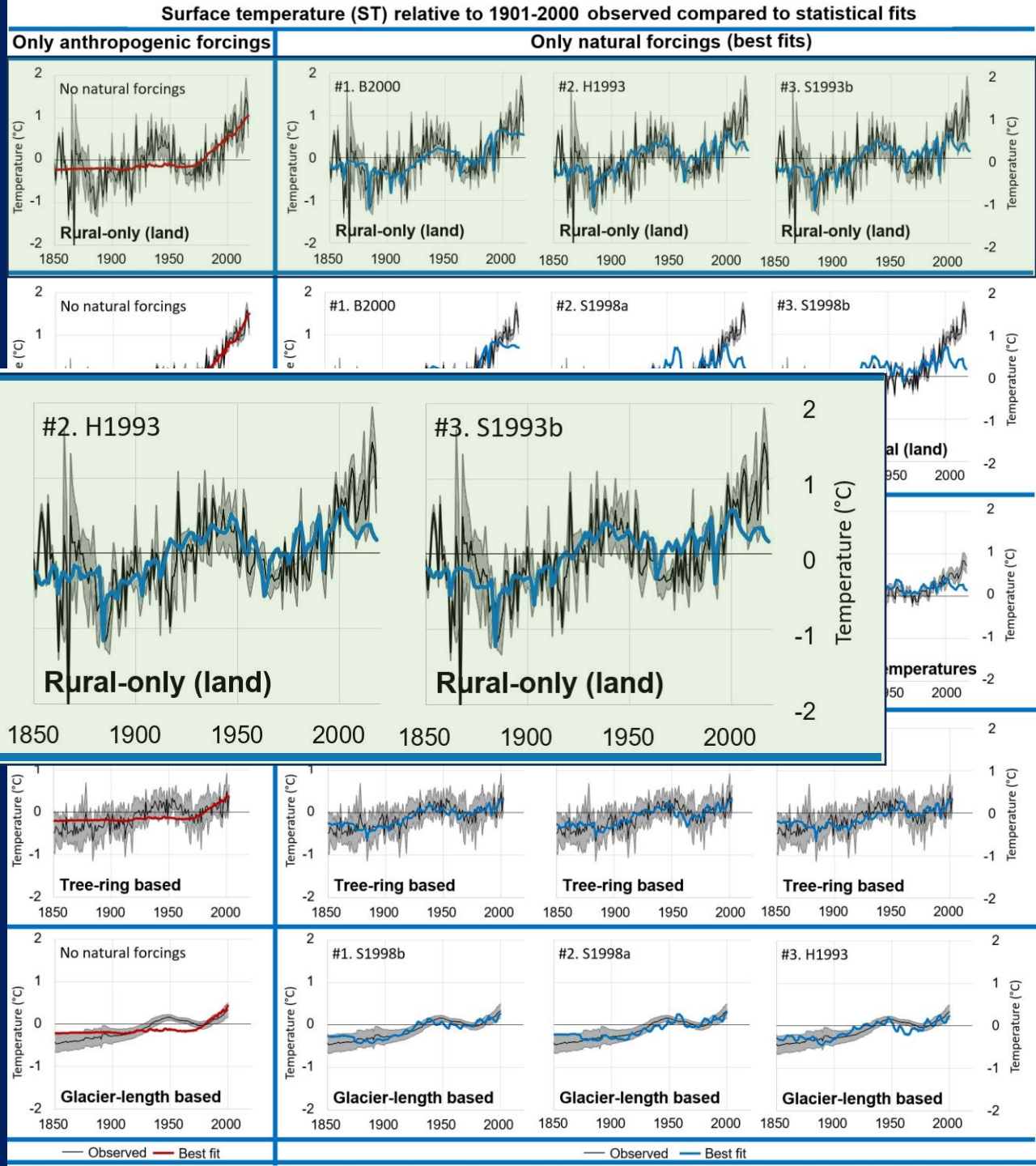

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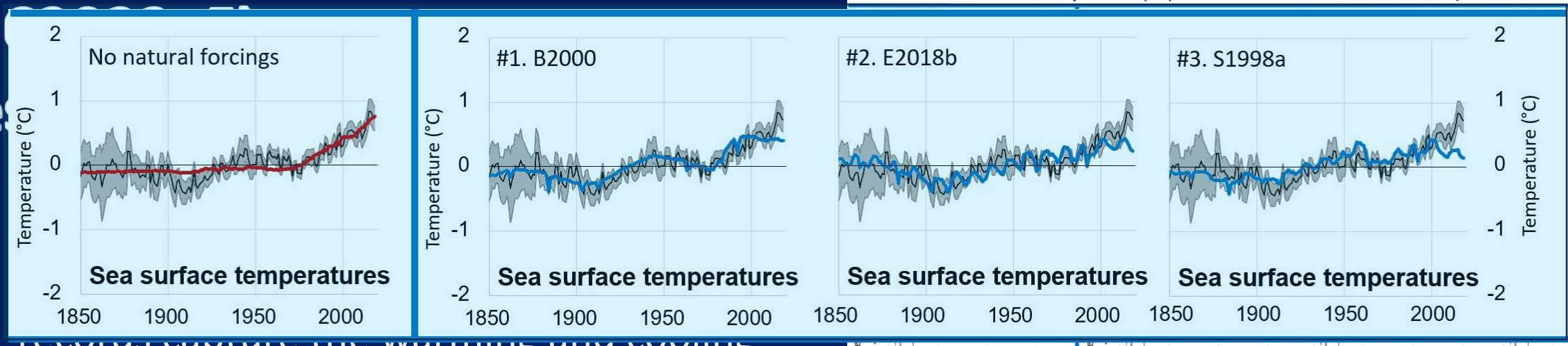

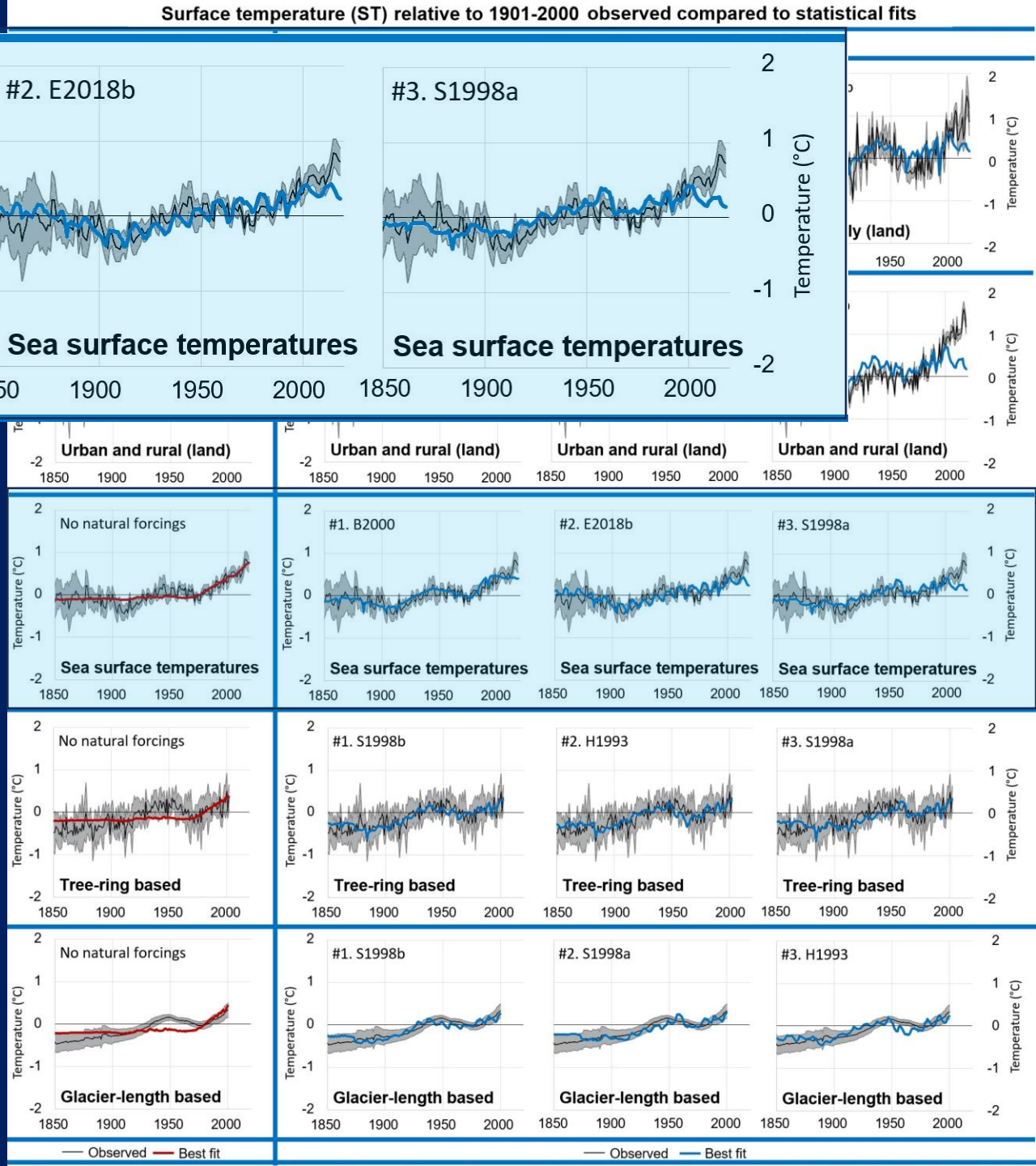

Conclusions

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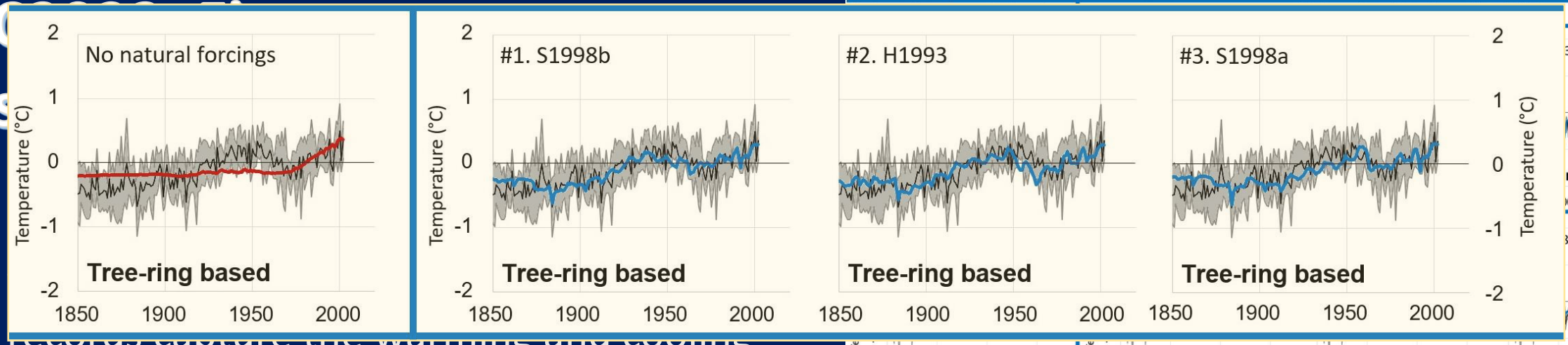

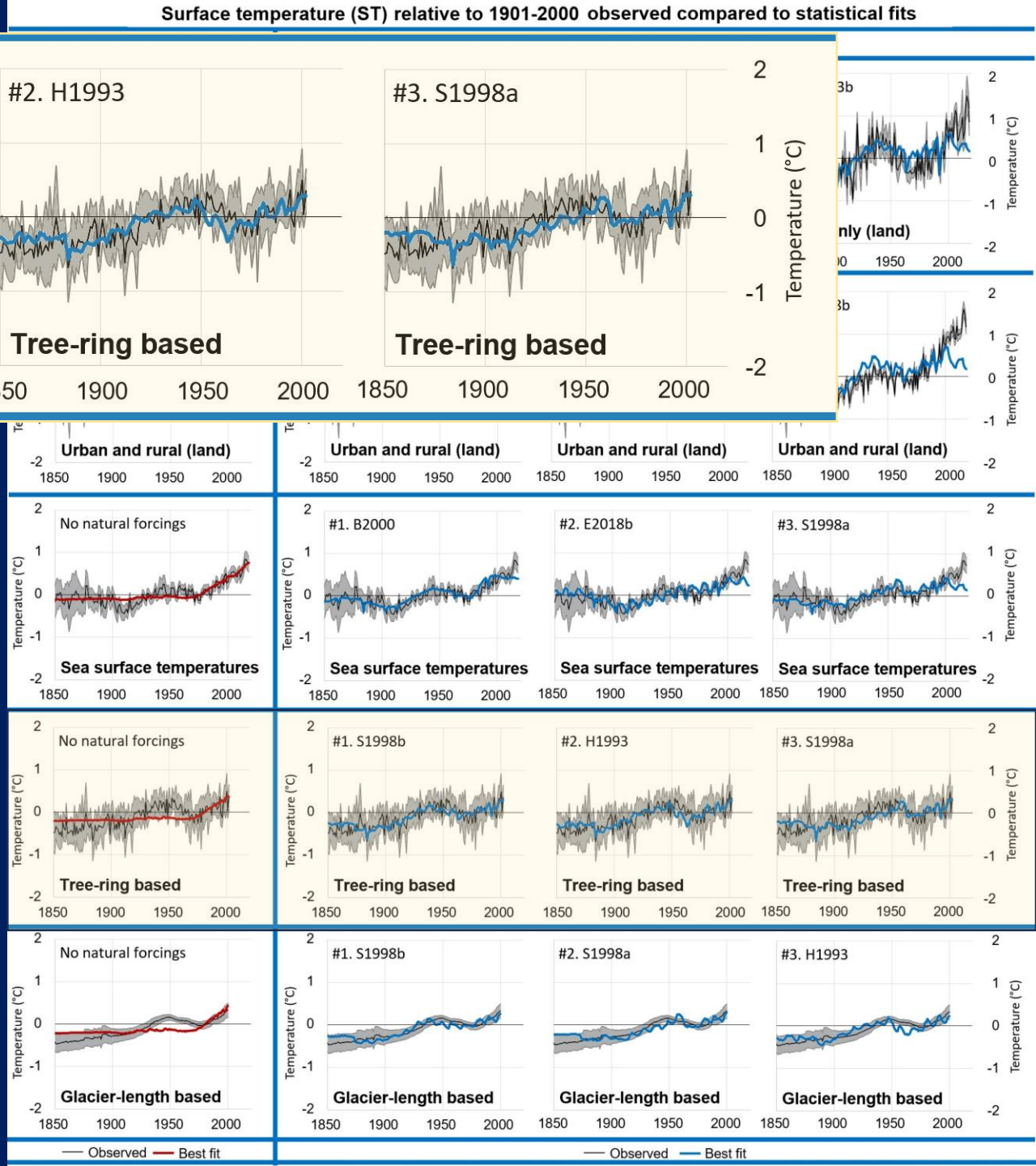

Conclusions

- The IPCC insist that urbanization bias is less than 10% of the warming and therefore doesn't need to be accounted for – They are wrong on this!
- The IPCC insist that they have already resolved the best solar activity ("TSI") records, for their latest 6th Assessment Report (2021), they only considered one estimate. But, we have found 27. They are wrong on TSI too!
- When we consider the non-urbanized temperature data, we can explain almost all the observed warming **and** cooling periods since 1850 in terms of changes in the Sun: whether looking at rural temperatures, ocean temperatures or temperature proxies (tree-rings and glaciers).
- The scientific community is not yet able to establish if the global warming since 1850 is: a) "mostly natural", b) "both natural and human-caused" or c) "mostly human-caused".
- The USGCRP reports are likely to have violated DQA or IQA as the thermometer and solar activity data they used from NOAA and NASA are of similar quality if not the same as IPCC reports.

Conclusions

- The USGCRP reports are shown to have violated DQA or IQA for the thermometer and solar activity data they used based on NOAA and NASA.
- Various anti-scientific and pseudo-science ideas and notions have infected the US governmental environmental rule makings.
- Decision making processes at US EPA and other agencies are not scientific nor objective.
- Most of the written laws are merely paying lip services as the law making steps are not transparent nor permit any dissent or alternative scientific voices or opinions.


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