Climate Models for Policy?…
“a Bridge Too Far”*

**** an act whose ambition overreaches its capability resulting in or potentially leading to difficulty or failure. (Idioms)***

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Dealing with Claims about Climate Change in 2021 can be extremely frustrating.

We'll look at some IPCC claims, especially from models, and test them with evidence to see if there is a "climate crisis."

Testing climate claims is something a dispassionate, objective scientist should do, but it is heavily discouraged today.

AR6 in Three Charts – SPM Fig. 1a,b, Full Report Fig 4.2

Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

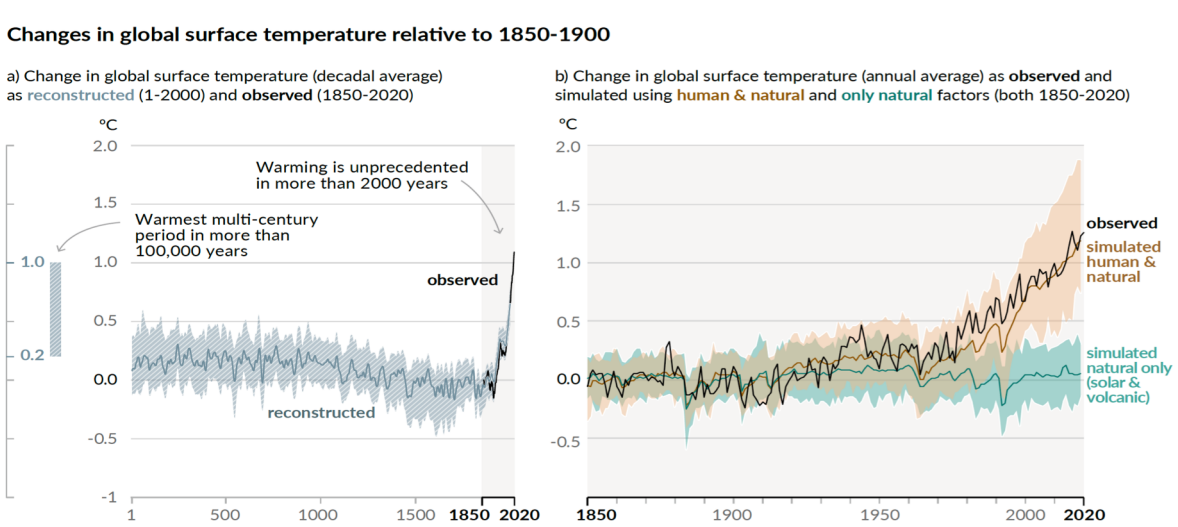

Figure SPM.1: History of global temperature change and causes of recent warming.

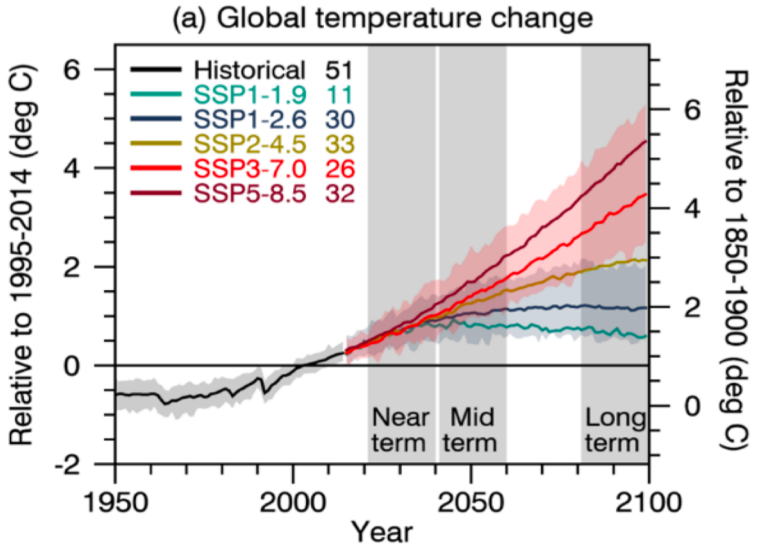

Figure 4.2: Selected indicators of global climate change from CMIP6

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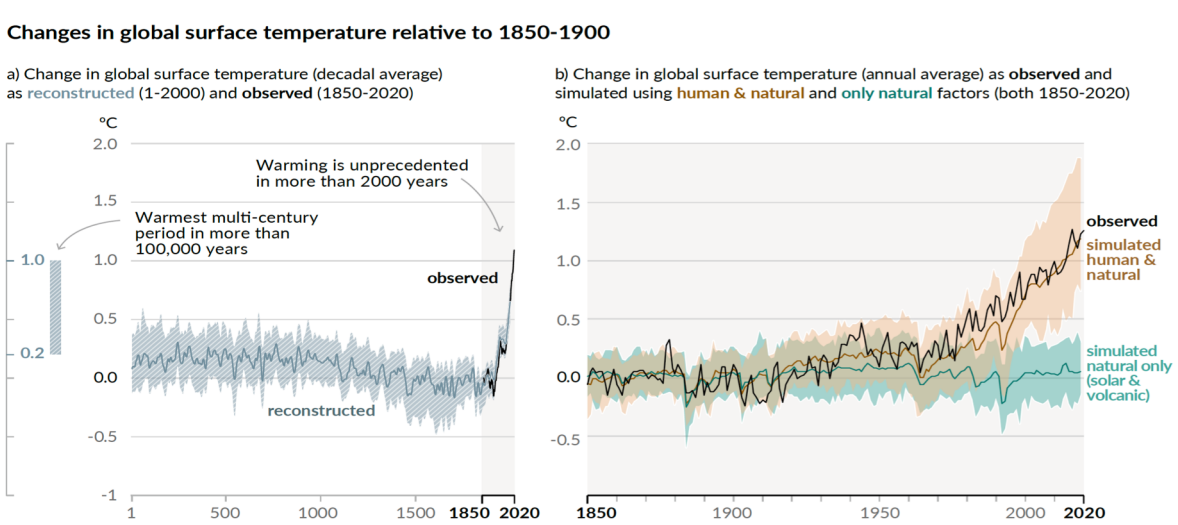

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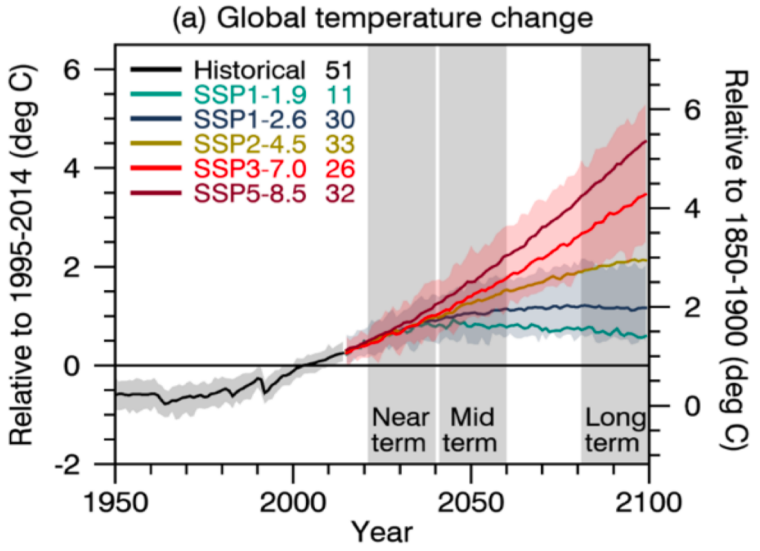


Figure 4.2: Selected indicators of global climate change from CMIP6

The climate is worse now than it's ever been

… and we know why (Greenhouse Gases)

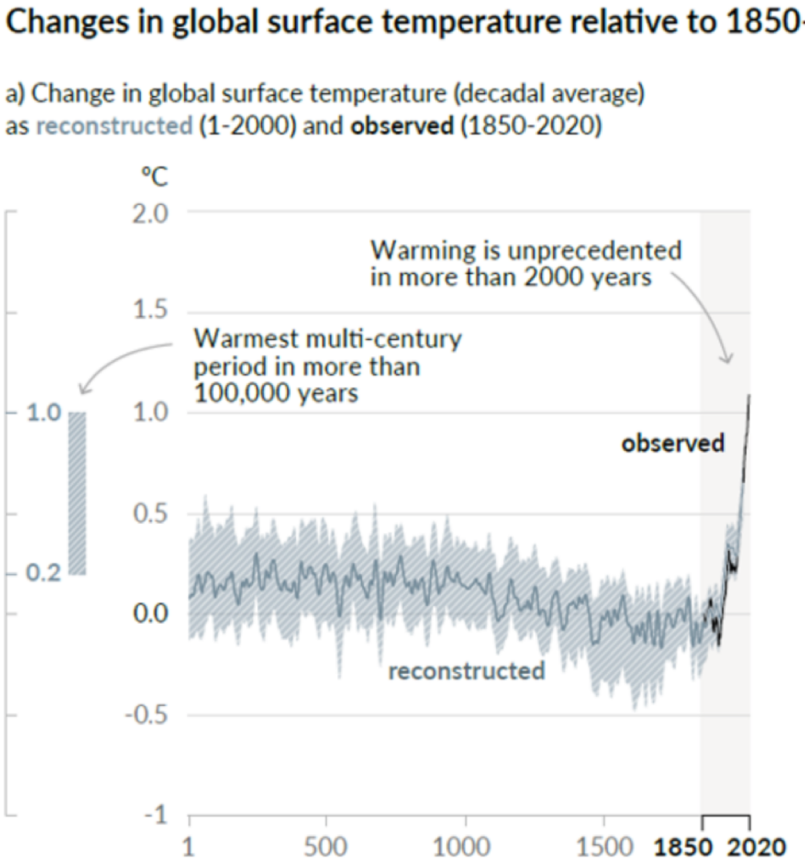
… and it will only get worse in the future

The IPCC AR6 Hockeystick

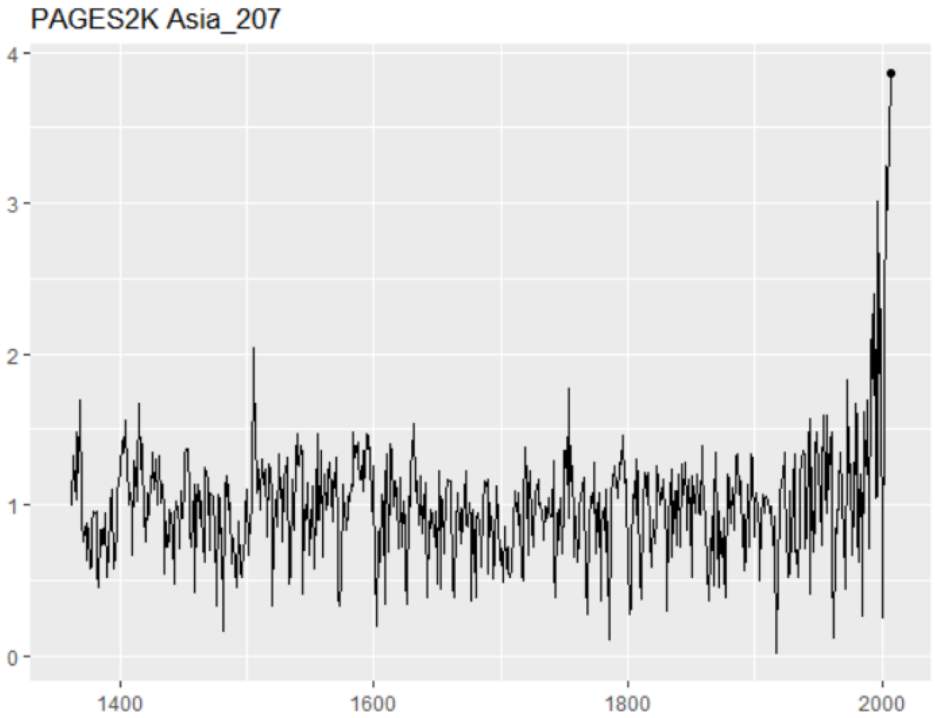
By Stephen McIntyre
Aug 11, 2021 – 3:14 PM

Although climate scientists keep telling that defects in their "hockey stick" proxy reconstructions don't matter – that it doesn't matter whether they use data upside down, that it doesn't matter if they cherry pick individual series depending on whether they go up in the 20th century, that it doesn't matter if they discard series that don't go the "right" way ("hide the decline"), that it doesn't matter if they used contaminated data or stripbark bristlecones, that such errors don't matter because the hockey stick itself doesn't matter – the IPCC remains addicted to hockey sticks: lo and behold, Figure 1a of its newly minted Summary for Policy-makers contains what else – a hockey stick diagram. If you thought Michael Mann's hockey stick was bad, imagine a woke hockey stick by woke climate scientists. As the climate scientists say, it's even worse that we thought.

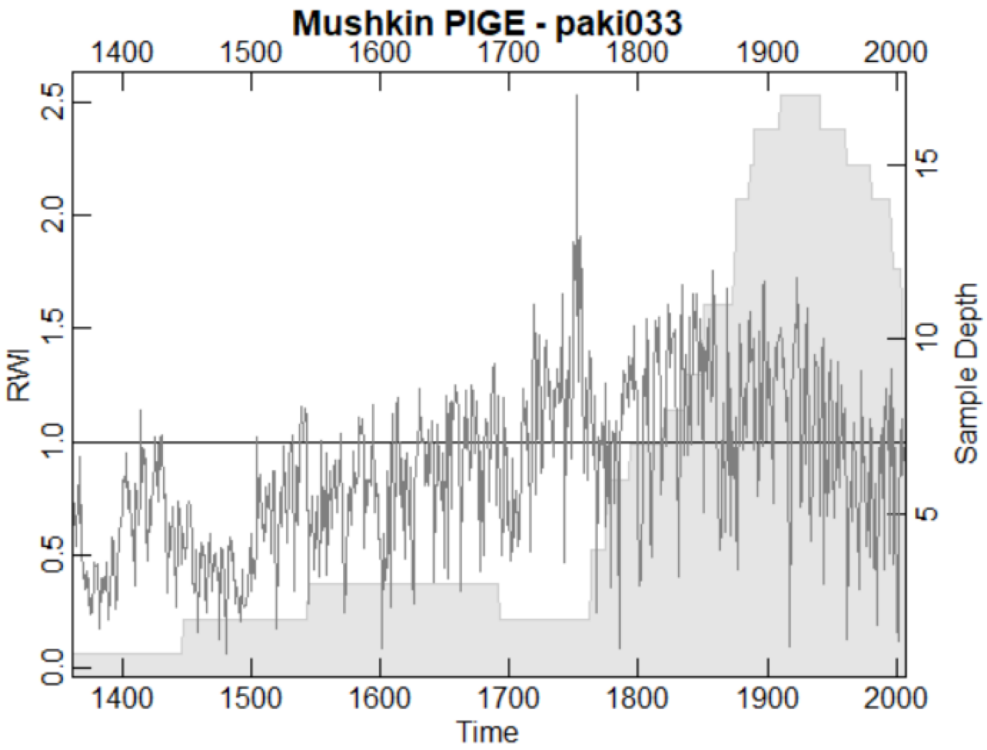
The climate is worse now than it's ever been



PAGES2K Asia Tree Ring Values used in the IPCC Chart using selectively-managed statistical methods



Objectively calculated values from the raw data (McIntyre)



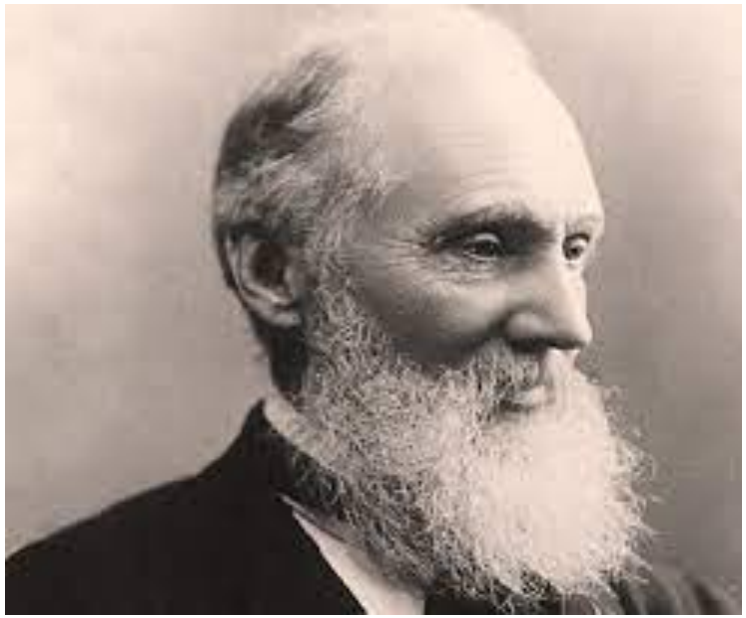
https://climateaudit.org/2021/09/15/pages-2019-0-30n-proxies/

https://climateaudit.org/2021/09/02/pages19-0-30s/

Is the Climate worse now than it has ever been?

Paraphrasing William Thomson (Lord Kelvin)

All Science is Numbers



1824-1907

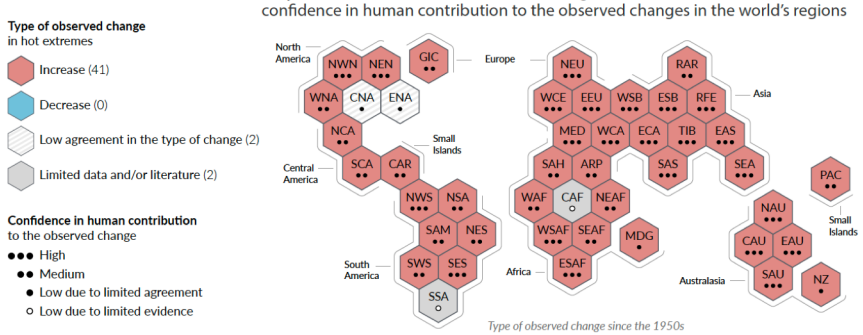
Note: IPCC AR6 "Evidence" includes model output and expert judgement

Climate Is Changing Now

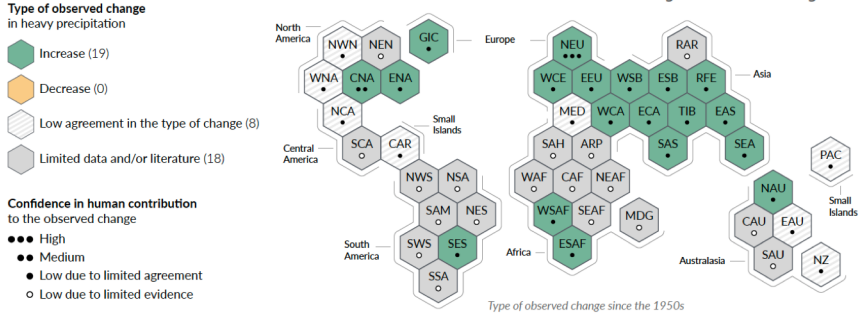
SPM Fig. 3

Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes

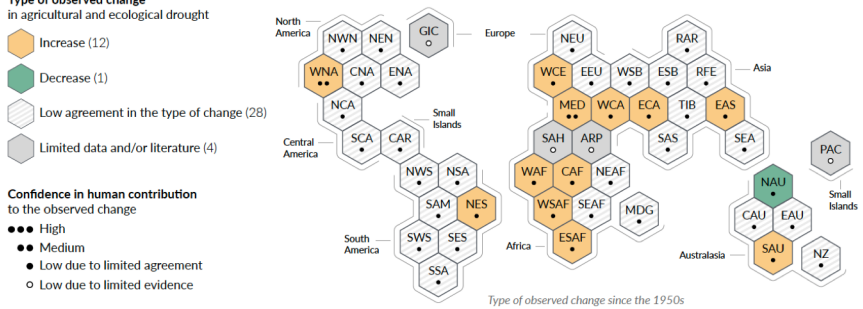
a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions



b) Synthesis of assessment of observed change in **heavy precipitation** and confidence in human contribution to the observed changes in the world's regions



c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions



Each hexagon corresponds to one of the IPCC AR6 WGI reference regions

NWN *North-Western North America*

IPCC AR6 WGI reference regions: **North America:** ***NWN*** *(North-Western North America),* ***NEN*** *(North-Eastern North America),* ***WNA*** *(Western North America),* ***CNA*** *(Central North America),* ***ENA*** *(Eastern North America),* **Central America:** ***NCA*** *(Northern Central America),* ***SCA*** *(Southern Central America),* ***CAR*** *(Caribbean),* **South America:** ***NWS*** *(North-Western South America),* ***NSA*** *(Northern South America),* ***NES*** *(North-Eastern South America),* ***SAM*** *(South American Monsoon),* ***SWS*** *(South-Western South America),* ***SES*** *(South-Eastern South America),* ***SSA*** *(Southern South America),* **Europe:** ***GIC*** *(Greenland/Iceland),* ***NEU*** *(Northern Europe),* ***WCE*** *(Western and Central Europe),* ***EEU*** *(Eastern Europe),* ***MED*** *(Mediterranean),* **Africa:** ***MED*** *(Mediterranean),* ***SAH*** *(Sahara),* ***WAF*** *(Western Africa),* ***CAF*** *(Central Africa),* ***NEAF*** *(North Eastern Africa),* ***SEAF*** *(South Eastern Africa),* ***WSAF*** *(West Southern Africa),* ***ESAF*** *(East Southern Africa),* ***MDG*** *(Madagascar),* **Asia:** ***RAR*** *(Russian Arctic),* ***WSB*** *(West Siberia),* ***ESB*** *(East Siberia),* ***RFE*** *(Russian Far East),* ***WCA*** *(West Central Asia),* ***ECA*** *(East Central Asia),* ***TIB*** *(Tibetan Plateau),* ***EAS*** *(East Asia),* ***ARP*** *(Arabian Peninsula),* ***SAS*** *(South Asia),* ***SEA*** *(South East Asia),* **Australasia:** ***NAU*** *(Northern Australia),* ***CAU*** *(Central Australia),* ***EAU*** *(Eastern Australia),* ***SAU*** *(Southern Australia),* ***NZ*** *(New Zealand),* **Small Islands:** ***CAR*** *(Caribbean),* ***PAC*** *(Pacific Small Islands)*

Not sure that, if deconstructed, this claim has any content since "change" will always be detected across any two periods

Hot extremes have the largest signal in the inhabited world

Heavy precipitation and flooding events are not well documented to say anything with confidence

Not much change in drought - and so no real way to claim small changes were due to humans

Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes

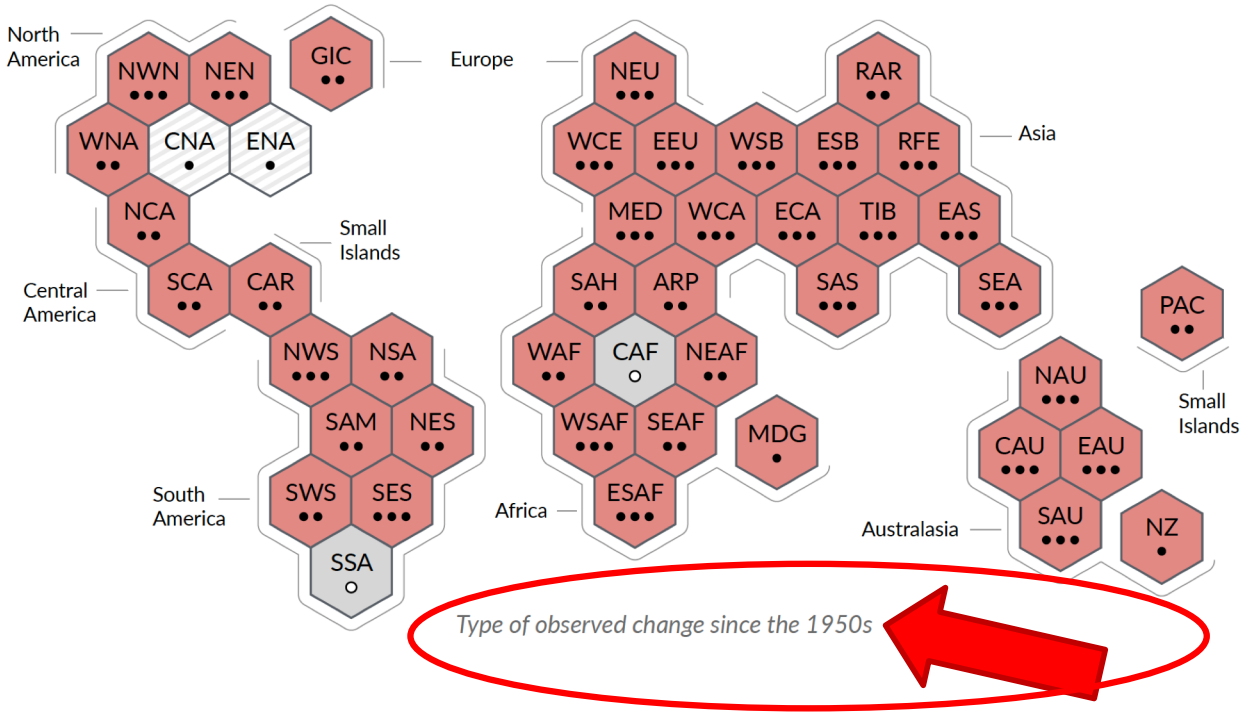
a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions

Type of observed change
in hot extremes

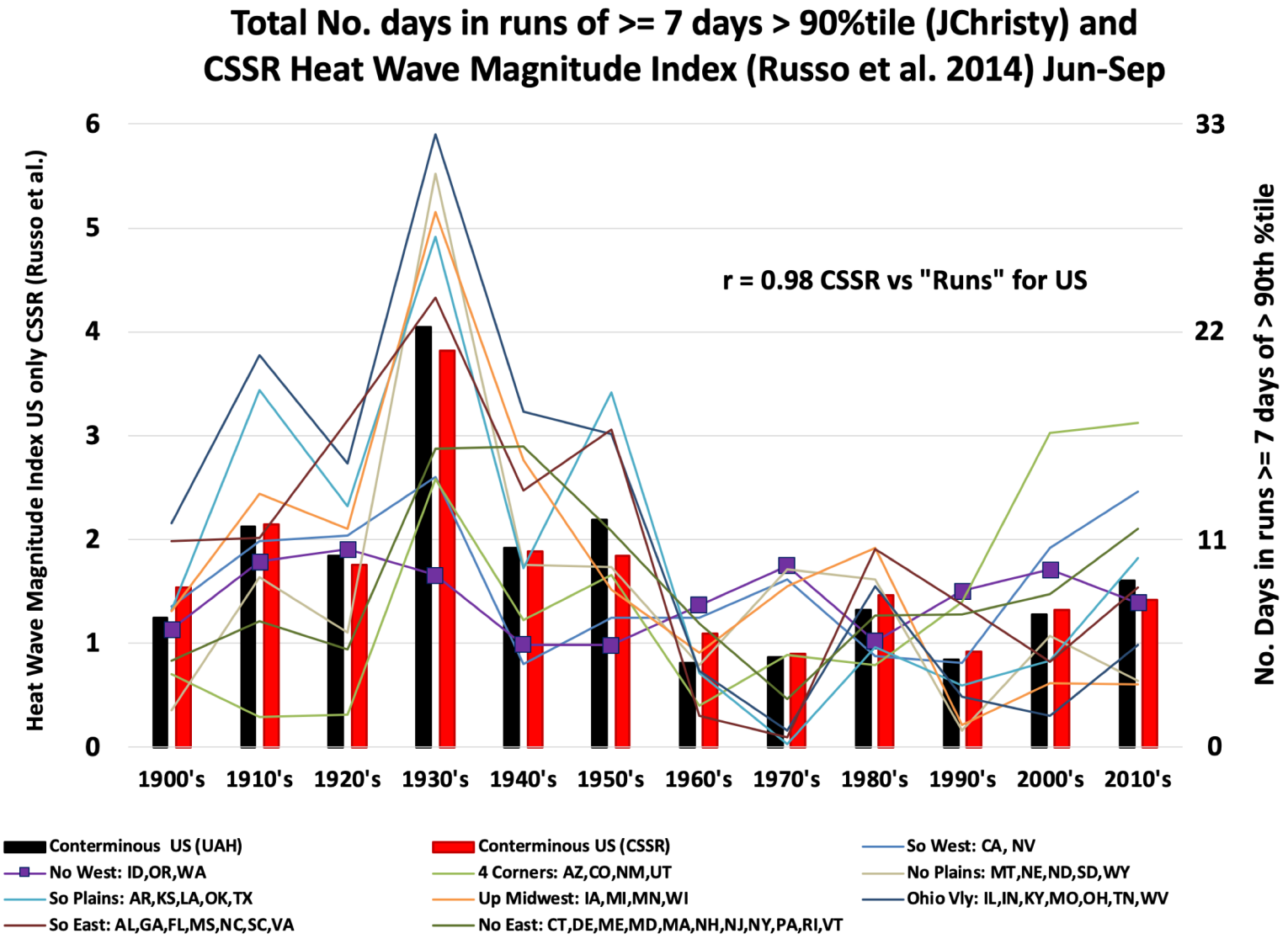
- Increase (41)
- Decrease (0)
- Low agreement in the type of change (2)
- Limited data and/or literature (2)

Confidence in human contribution
to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



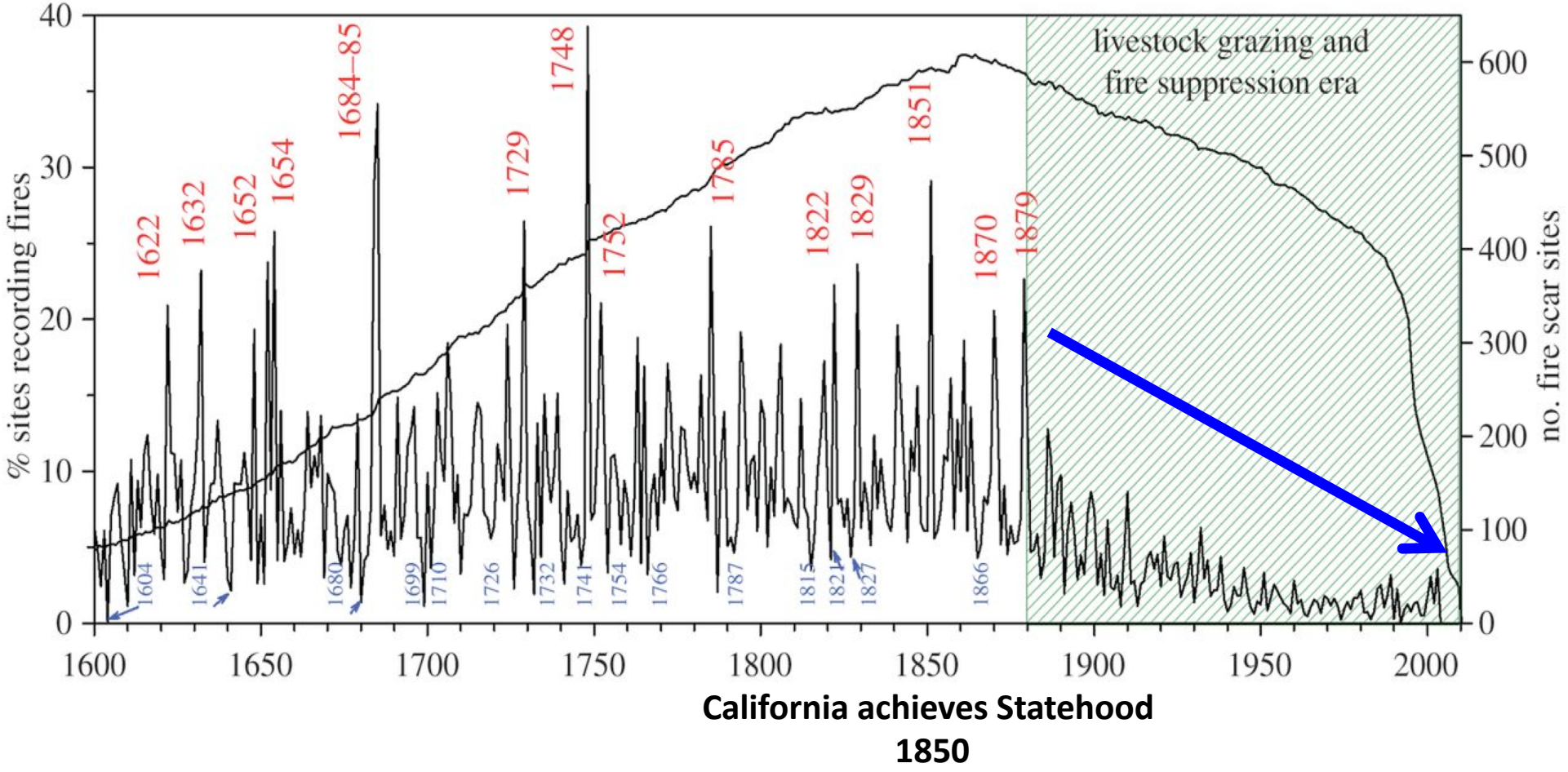
Note: When comparing any two periods, there will always be change because no two periods are identical



Have extra greenhouse gases caused a decline in heatwaves in the U.S.?

Changes in Wildfires? … no, but … IPCC AR6 says:

"*weather conditions* that promote wildfires have become more probable…"



California achieves Statehood 1850

Incidence in wildfires in North America 1600-2000 (It's all about human management)

Swetnam et al. 2016 Phil Trans B

Have extra greenhouse gases caused a decline in wildfires in North America?

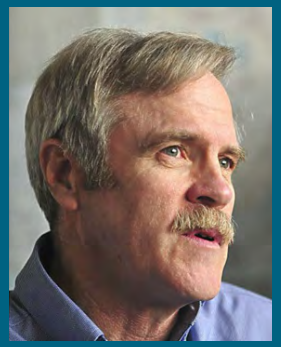
Marking my property line in Fresno Co. This is 4 miles from southern border of Creek Fire.

California was subjected to annual burns by Native Americans or Mother Nature prior to Spanish settlement. ***Pre-European burn area was 4.5 to 12 million acres in CA per year (Stephens et al. 2007.)***

Subsequent settlers practiced “fire suppression” from the late 19th, through the 20th and 21st centuries as public policy. Significant human occupation of and access to formerly natural landscapes. Dry, unburned fuel load rose dramatically.

2020 CA acreage burned was under 4.5 million acres. Set up by (1) 2012-2015 drought, (2) weakening forests, (3) bark-beetles killed ~150 million trees left to stand (80% in areas). No harvesting allowed of dead trees creating a massive fuel debt to be burned … 2020 took care of some of that debt.

What is the source of the climate data about which so much contention arises? How are these datasets constructed? Are they able to give us precise answers about climate change? Dr. Christy examines these questions in detail for one spot on the earth – his hometown of Fresno, California. He delves into the observations, adding some data never before used to build a dataset of temperatures starting in 1887. Along the way he mentions the personal experiences of his Fresno life that dovetail with his passion for climate science. After putting all of the information together, he arrives at a conclusion that implicates humans for the temperature changes Fresno has seen, but not in the way that is popularly promoted today. Finally, he offers insight from his background as a professional Climatologist and former resident of Africa as to how we might approach policy decisions regarding this highly contentious issue.



Dr. John R. Christy is the Distinguished Professor of Atmospheric and Earth Sciences, Director of the Earth System Science Center and Alabama's State Climatologist at the University of Alabama in Huntsville (UAH). His awards include NASA's Exceptional Scientific Achievement Medal, the American Meteorological Society's Special Award and the rank of Fellow of this Society for his satellite research. He has published over 100 scientific papers, appeared as an expert witness on climate in U.S. Federal Court, and has testified before the U.S. Congress 20 times. The greater Fresno area served as his home from birth to graduation from Fresno State (B.A. Mathematics). After teaching Physics and Chemistry in Kenya, East Africa, he earned a Master of Divinity from Golden Gate Baptist Theological Seminary, then served as a bi-vocational pastor while also teaching math at nearby colleges. He headed back to the classroom for M.S. and PhD degrees in Atmospheric Sciences from the University of Illinois which then prepared him for his career at UAH.

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Is it getting hotter in Fresno... or not? A book about my hometown's changing weather by John Christy

Is it getting hotter in Fresno ...or not?

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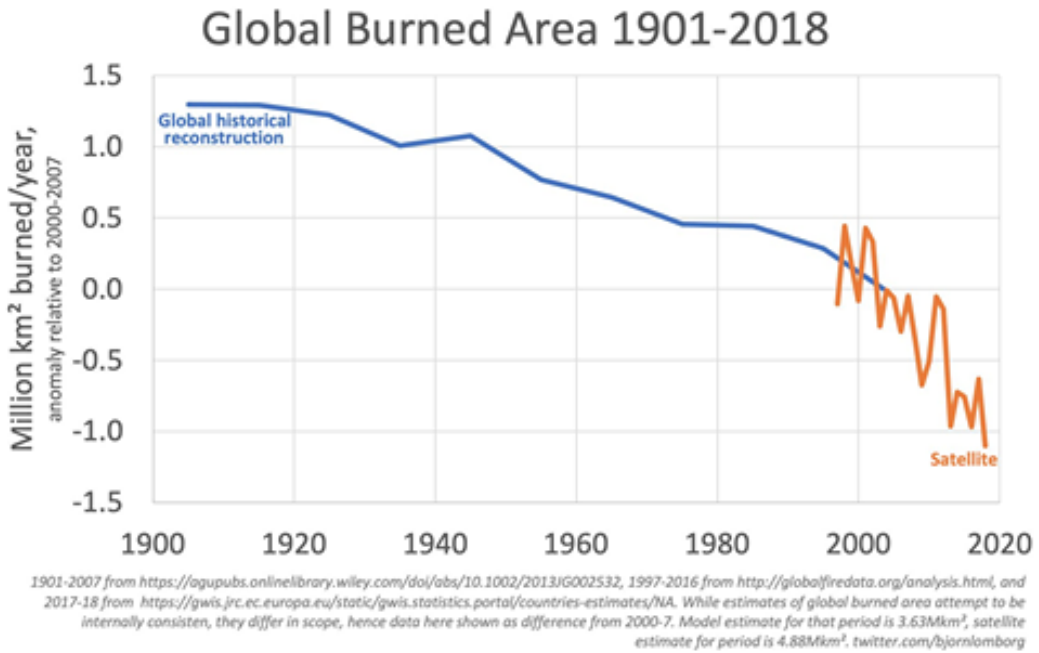
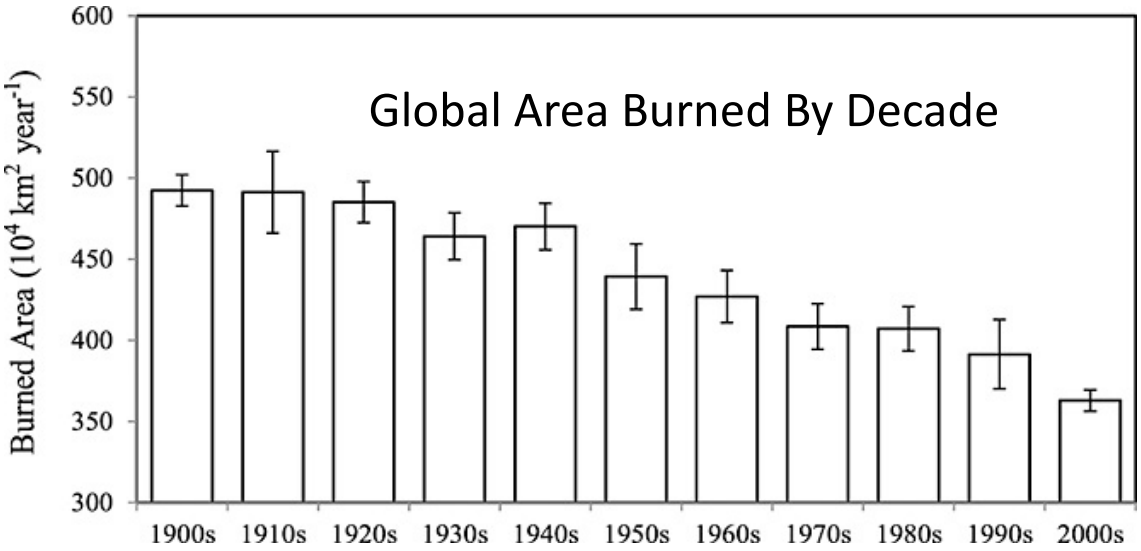


Bjorn Lomborg

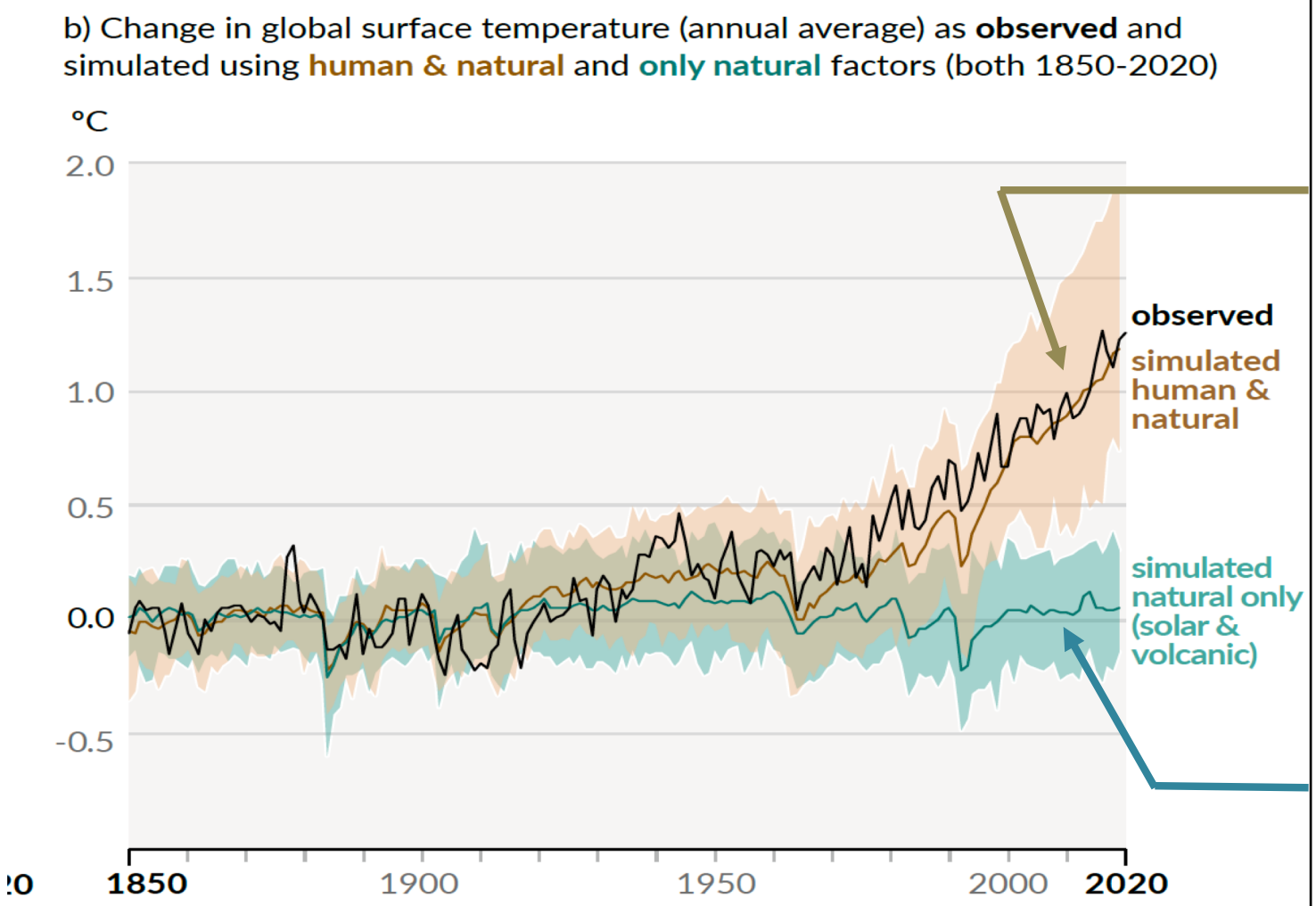


Journal of Geophysical Research: Biogeosciences, Volume: 119, Issue: 3, Pages: 249-263, First published: 14 February 2014, DOI: (10.1002/2013JG002532)

In general IPCC AR6 has *low* confidence that most extreme events have been changing.

Claiming that the few changes that have been observed are related to human emissions is done with minimal confidence based mostly on "Expert Judgement."

Do we know why it has warmed since 1850?

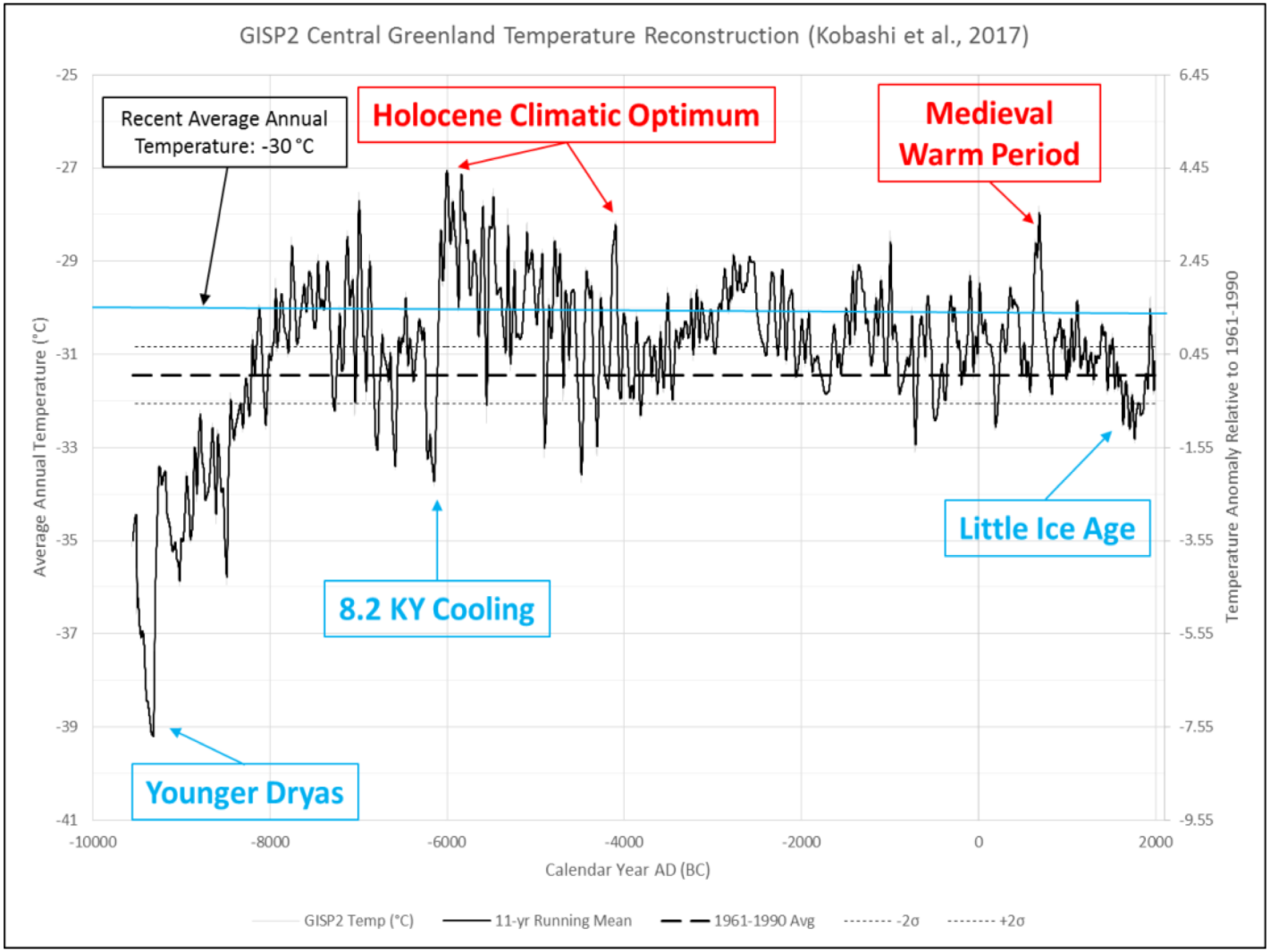


This is a powerful image because it implies that the models have done incredibly well to explain the "why" of the actual temperature change – i.e. it's the overwhelming influence of extra greenhouse gases which have caused very bad things like these rising temperatures along with heat waves, droughts, etc.

If we hadn't broken the climate, the last 50 years we would see virtually no droughts, heatwaves, terrible storms etc.

What is really going on here? Is this "proof" of the dominance of GHG-effect on global temps?

… and we know why (Greenhouse Gases)



Greenland Proxy Temperatures

Ragged decline from 6000 BCE to the 19th century with numerous ups and downs. *How much of the warming since the 19th century could be part of a natural rebound from this general decline seen in previous episodes?*

The IPCC's essential claim is - we can't imagine (nor recreate) how natural variability could cause the 1970-2020 rise. (Think about this, could any of their models reproduce the diagram at the left?)

Modelers say that the recent warmth can't be reproduced in the models unless completely driven by GHGs. The hidden assumption here is that natural variability, as seen in this diagram from NOAA paleo-data, could not have been a factor. But since models can't reproduce natural variability, this argument is logically to be ignored.

CAUSES OF WARMING 1850-1900 to 2010-2019

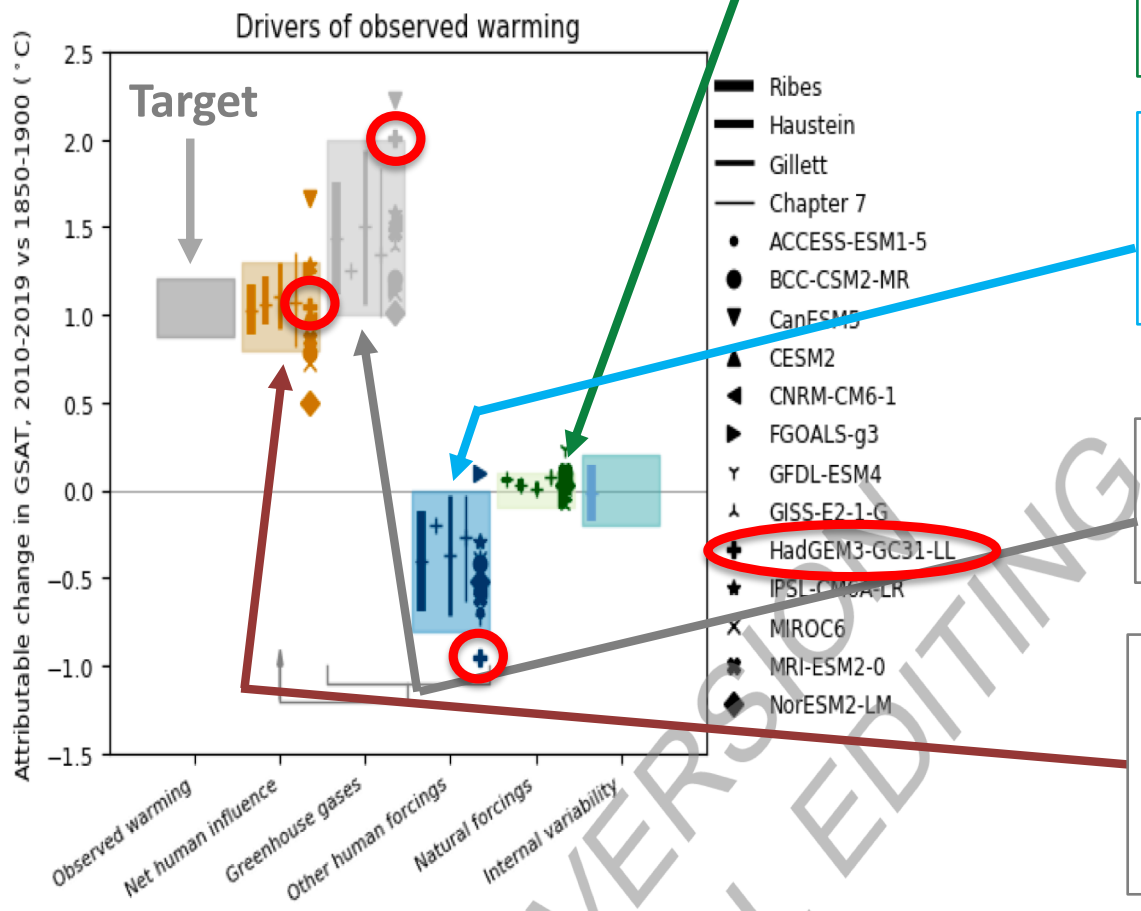


Figure 3.8: Assessed contributions to observed warming, and supporting lines of evidence. Shaded bands show assessed *likely* ranges of temperature change in GSAT, 2010-2019 relative to 1850-1900, attributable to net human influence, well-mixed greenhouse gases, other human forcings (aerosols, ozone, and land-use

available in the chapter data table (Table 3.SM.1).

Between 1850-1900 and 2010-2019, models show no significant contribution of natural forcings and internal variability to the changes that occurred

Between 1850-1900 and 2010-2019, models show contribution of other human influence (aerosols mainly) to temperature change varies from +0.1C to -0.9C

Between 1850-1900 and 2010-2019, models show contribution of GHGs to temperature change varies from +1.0C to +2.2C

Between 1850-1900 and 2010-2019, models show when added together the net of human influence to temperature change varies from < 0.5C to > 1.5C which, on average, matches up with the Target. Work is done.

Because models are tuned to surface temperature they can tune (adjust) the impact of various forcing mechanisms as needed to get the right answer in the end – the physics are not known (i.e. science is not settled) as can be seen by the varying impacts of GHGs (+1.0-+2.2°C), and Aerosols (-0.9 to +0.1°C) among the models. So, the modeler concludes (wrongly) that since natural factors are zero in the models, humans caused all of the warming since the 19th century.

Tuning? From the modeler's own pen:

About the widely-regarded Max Planck Institute model, the authors state: "*We have documented how we tuned the MPI-ESM1.2 global climate model to match the instrumental record warming*; an endeavor which has clearly been successful. Due to the historical order of events, the choice was to do this practically by targeting an ECS of about 3 K using cloud feedbacks, as opposed to tuning the aerosol forcing."

In other words, the modelers *believed* the temperature change should produce an ECS of 3 K (which is well above ECS calculated from actual data.) The MPI model had originally produced very rapid warming with ECS (7 K). Since several other parameters had already been tuned, the modelers selected to re-tune the cloud scheme so as to reduce the temperature change and produce the ECS value they were guessing at 3 K, i.e. "by targeting an ECS of about 3 K."

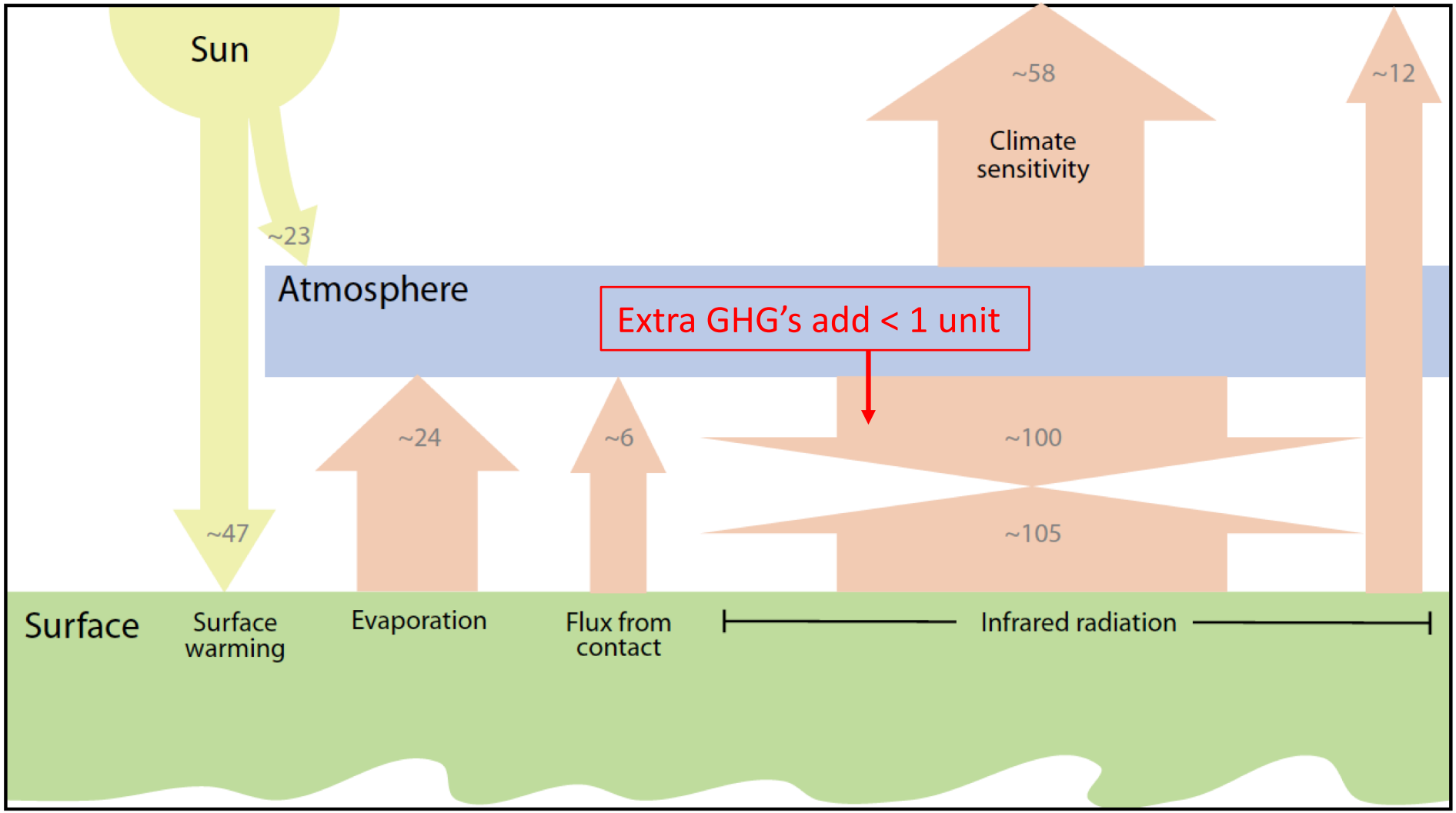
Mauritsen, T., & Roeckner, E. (2020).*Tuning the MPI-ESM1.2 global climate model to improve the match with instrumental record warming by lowering its climate sensitivity*. Journal of Advances in Modeling Earth Systems 12, e2019MS002037; https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2019MS002037

("One may rightfully be concerned that we treated Earth's climate sensitivity as if it was any other observable target used during tuning, in particular given the iconic status of the 3 K best estimate first proposed by Charney et al. (1979). However, the target in the tuning was not a particular climate sensitivity, rather *it was an improved match to the instrumental record*, and changing the climate sensitivity was a means to that end.")

The Models are coerced to agree with surface temperature observations (i.e. tuned) since the basic physics of their models weren't yielding correct values

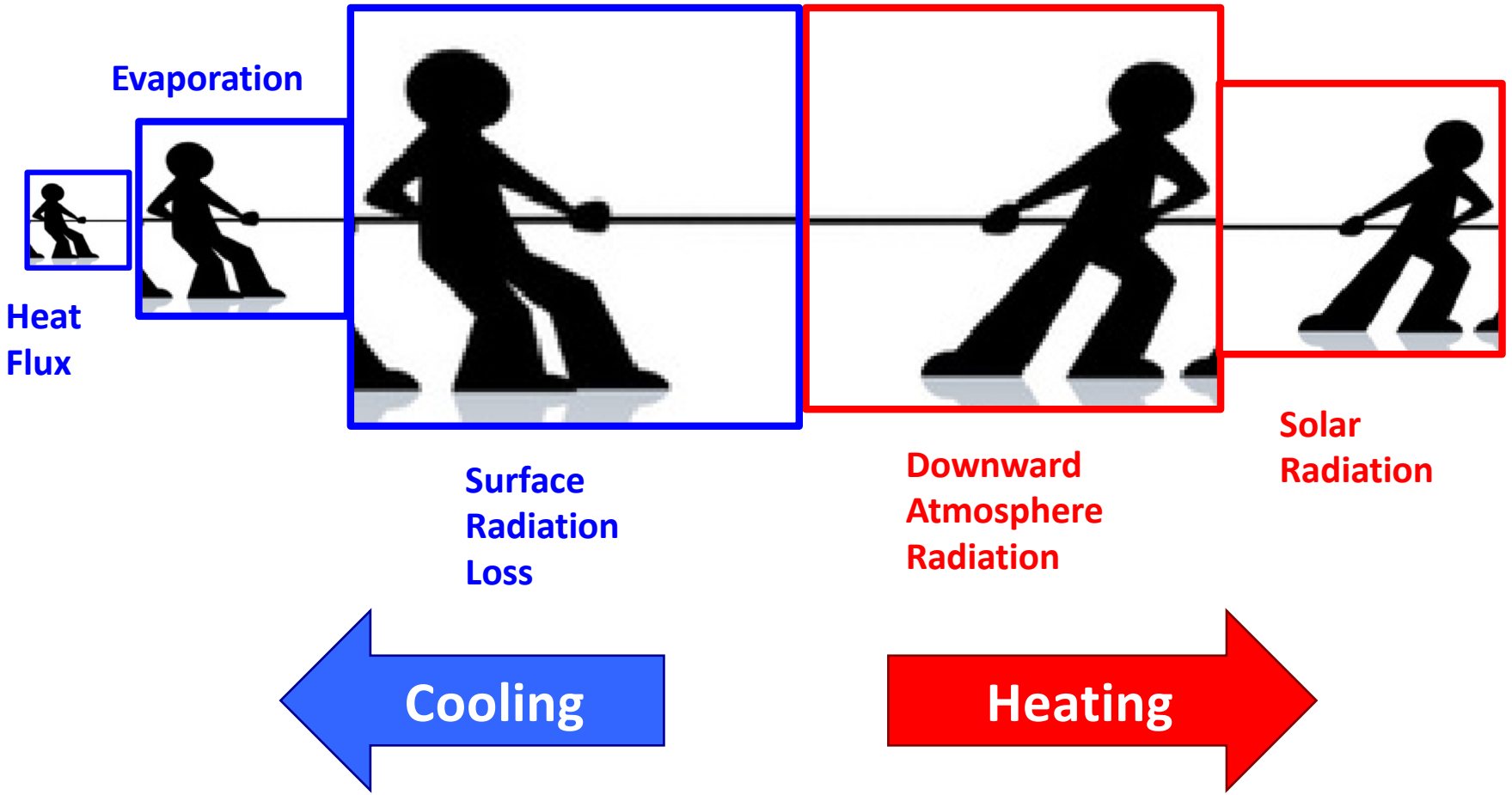
Do models tell us the truth about today and the future?

The problem of determining the influence of extra CO2 on the climate is the difficulty of detecting a tiny influence on a massive, non-linear system



Earth System Energy Flow Rates (1 unit ~ 3.4 W m^{-2}) IPCC

What's happening at the surface?



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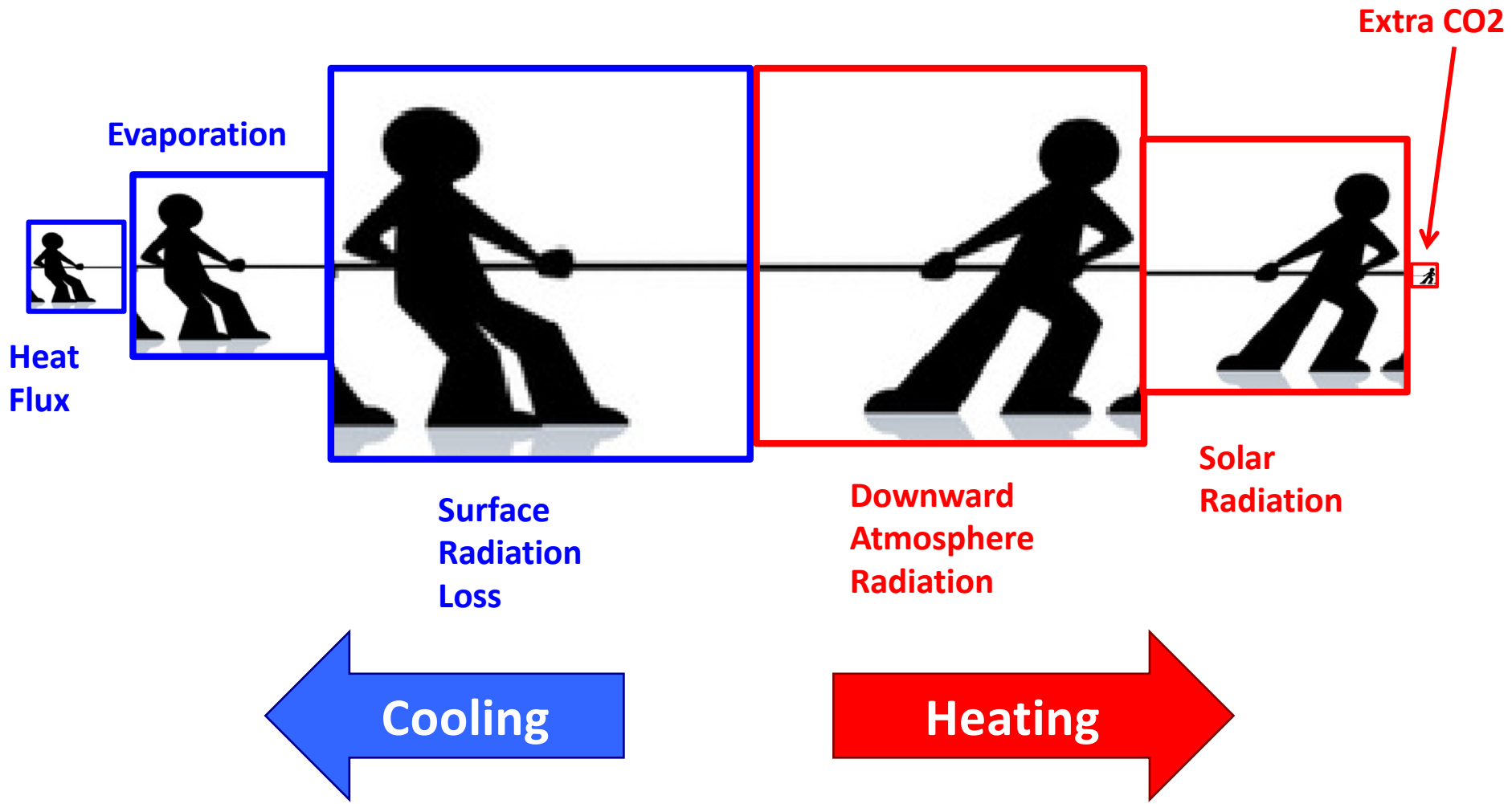

How do we test a claim that current global warming is significant and that it is caused almost entirely by a change of 0.5% of one energy flow component (extra CO2) among numerous larger and more variable components?

To test the claim we must locate a test metric (i.e. a measureable response) that has the following robust and scientifically defensible characteristics:

McKitrick and Christy (2018)

The metric should have these characteristics:

The response is seen in all models as a dominate characteristic

Response is not there when extra greenhouse gases are not included (i.e. control and experiment are always different)

The metric cannot have been used in the tuning and development of the model

Observations should come from multiple, independent sources

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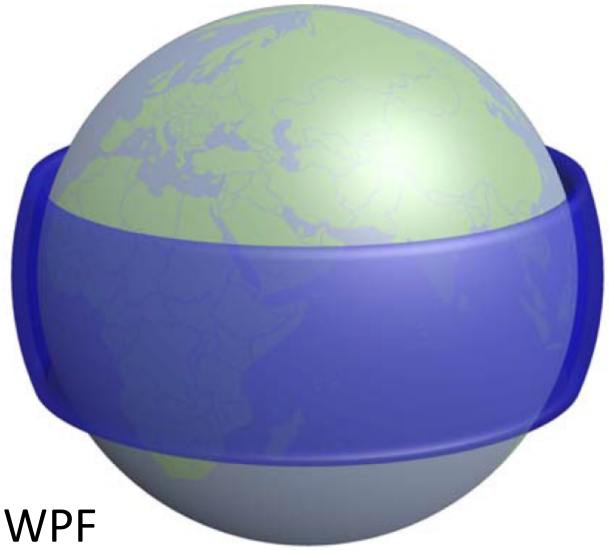
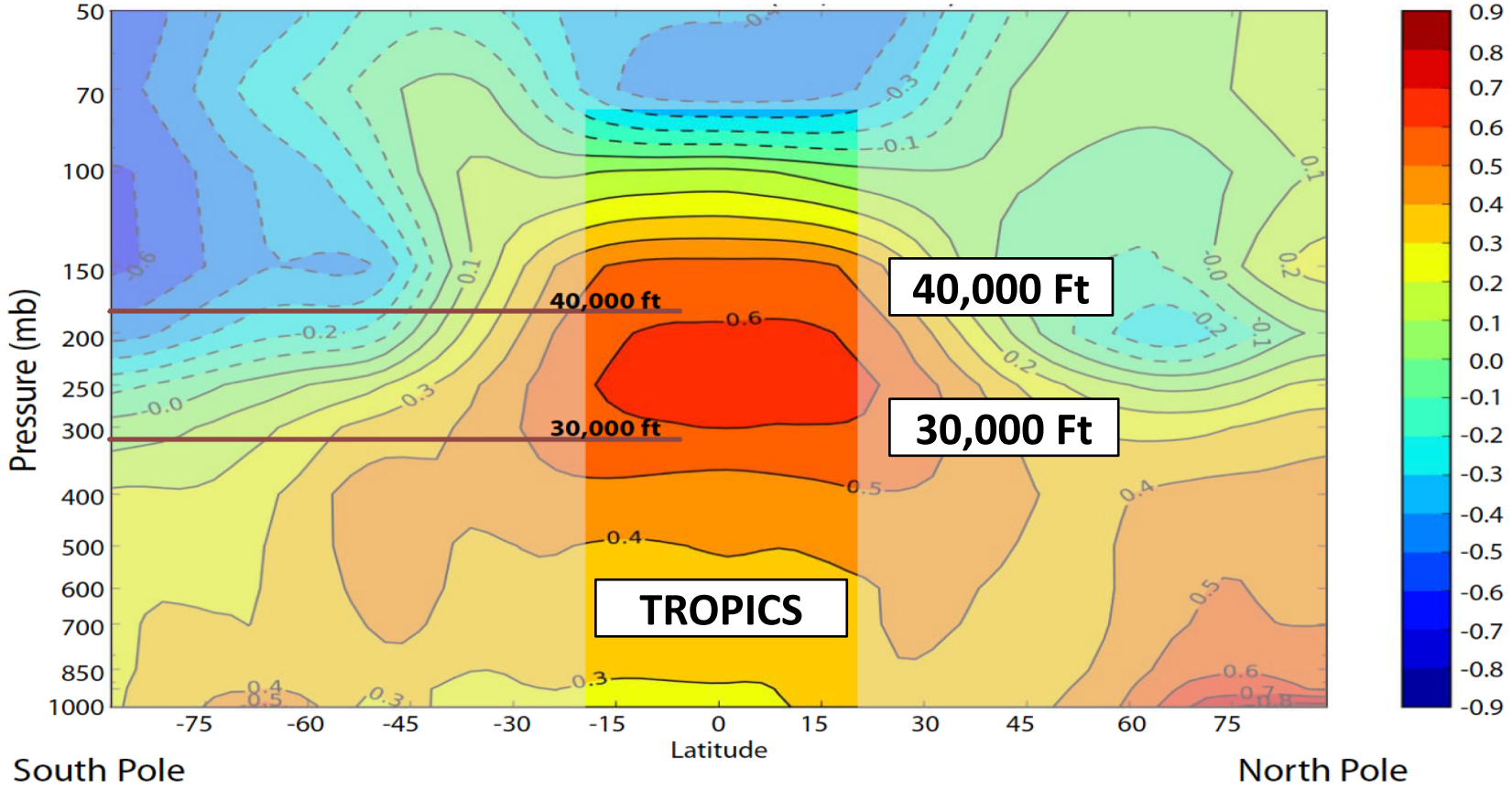


GWPF

Test Metric: Temperature, Tropical upper troposphere 300-200 hPa (~30k-40k ft)



Canadian Model

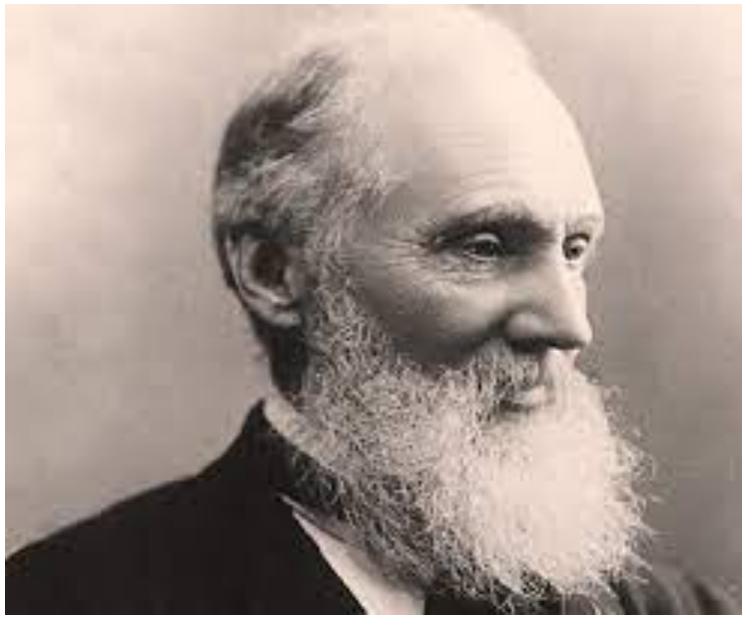
Trends 1979-2018

Model claim (or hypothesis): significant warming should have *already* occurred here to change our climate.

We are able to test this claim which is important because temperature changes in the upper tropical troposphere are directly related to global surface temperature changes.

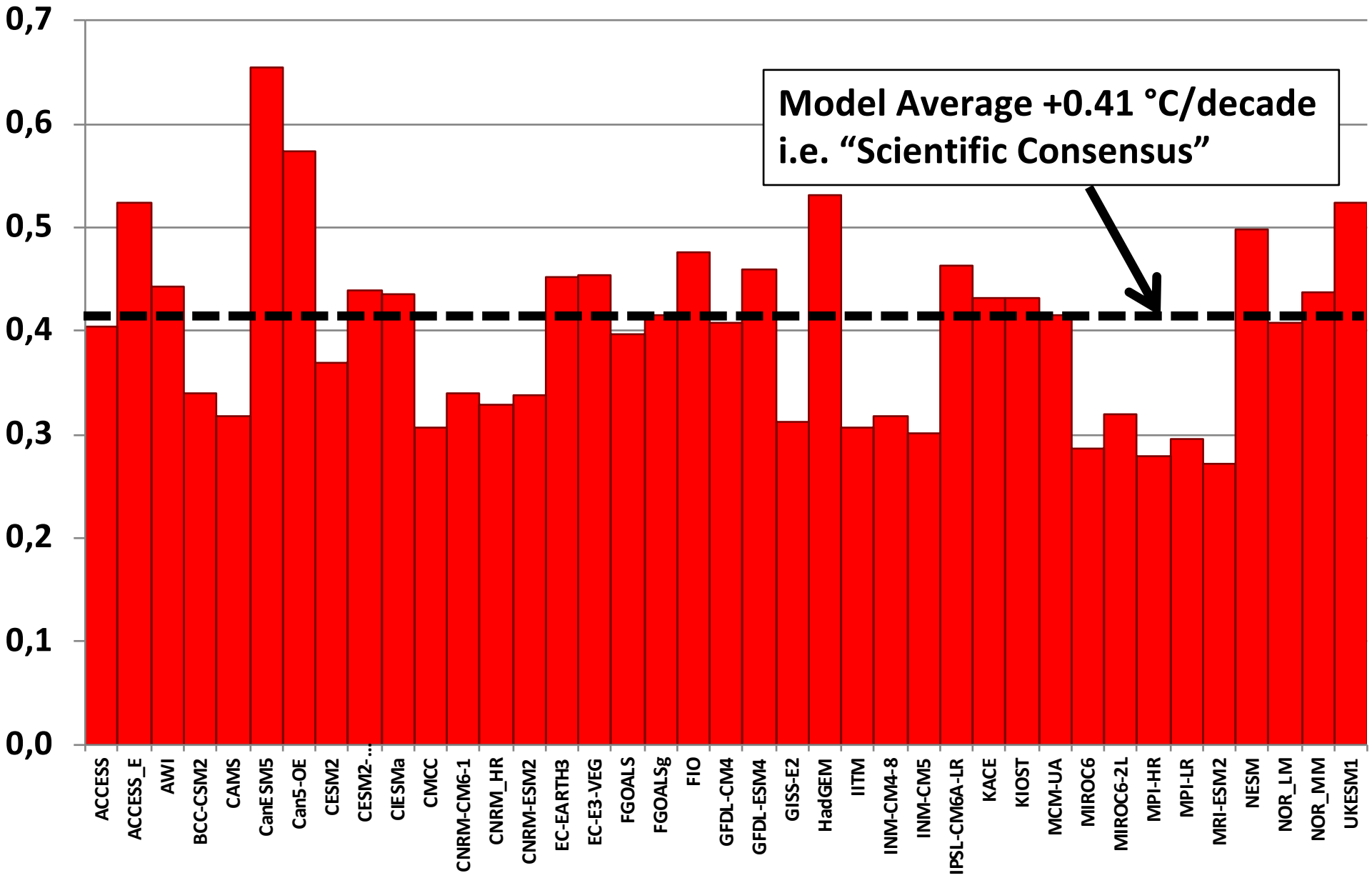
Paraphrasing William Thomson (Lord Kelvin)

All Science is Numbers



1824-1907

Note: IPCC AR6 "Evidence" includes model output and expert judgement


39 IPCC Climate Model Simulations CMIP6
300-200 hPa Temperature Trend 1979-2020
Model Average +0.41 °C/decade
i.e. "Scientific Consensus"
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0,0
ACCESS
ACCESS_E
AWI
BCC-CSM2
CAMS
CanESM5
Can5-OE
CESM2
CESM2-...
CIESMa
CMCC
CNRM-CM6-1
CNRM_HR
CNRM-ESM2
EC-EARTH3
EC-E3-VEG
FGOALS
FGOALSg
FIO
GFDL-CM4
GFDL-ESM4
GISS-E2
HadGEM
IITM
INM-CM4-8
INM-CM5
IPSL-CM6A-LR
KACE
KIOST
MCM-UA
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MPI-LR
MRI-ESM2
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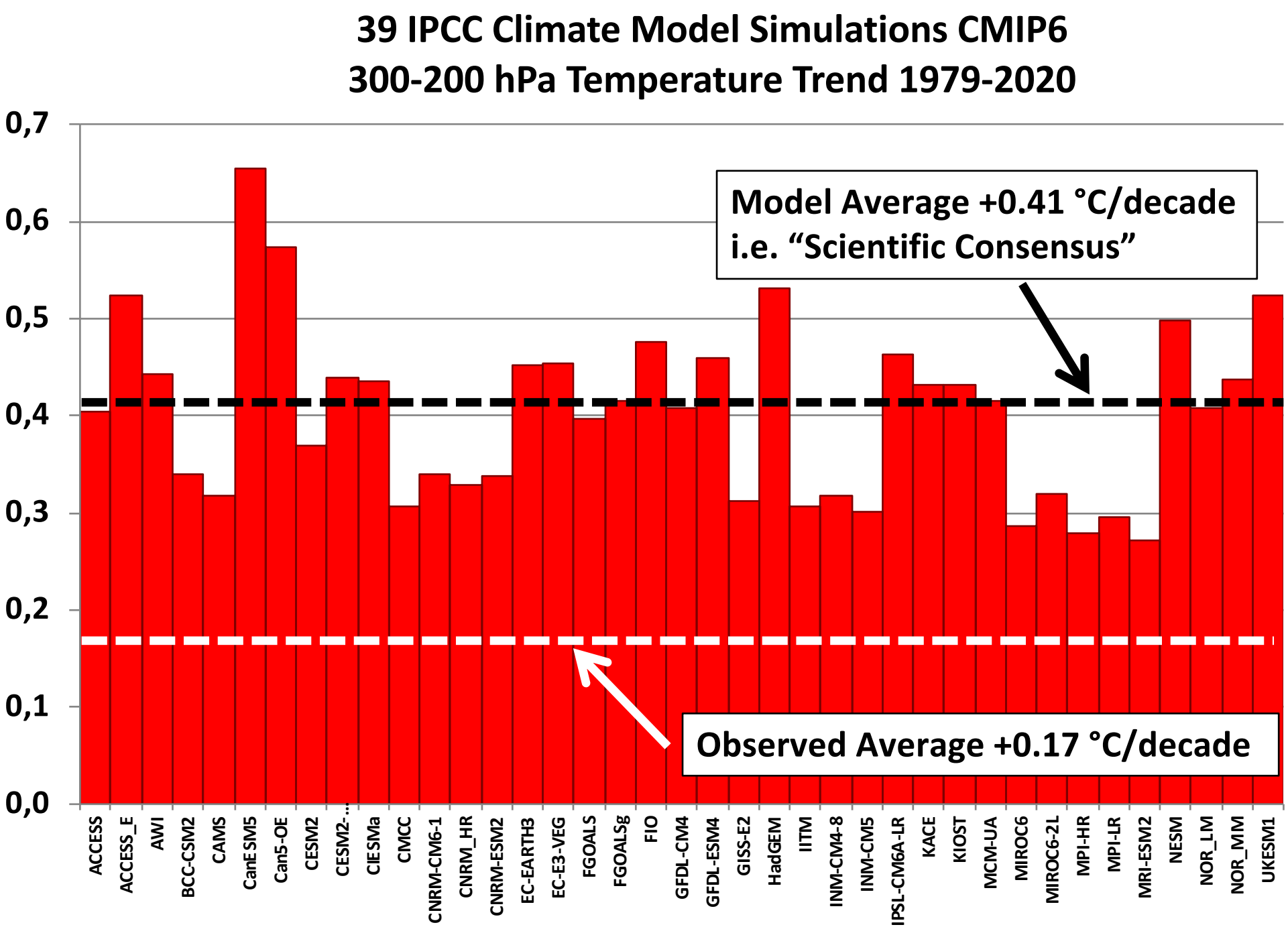
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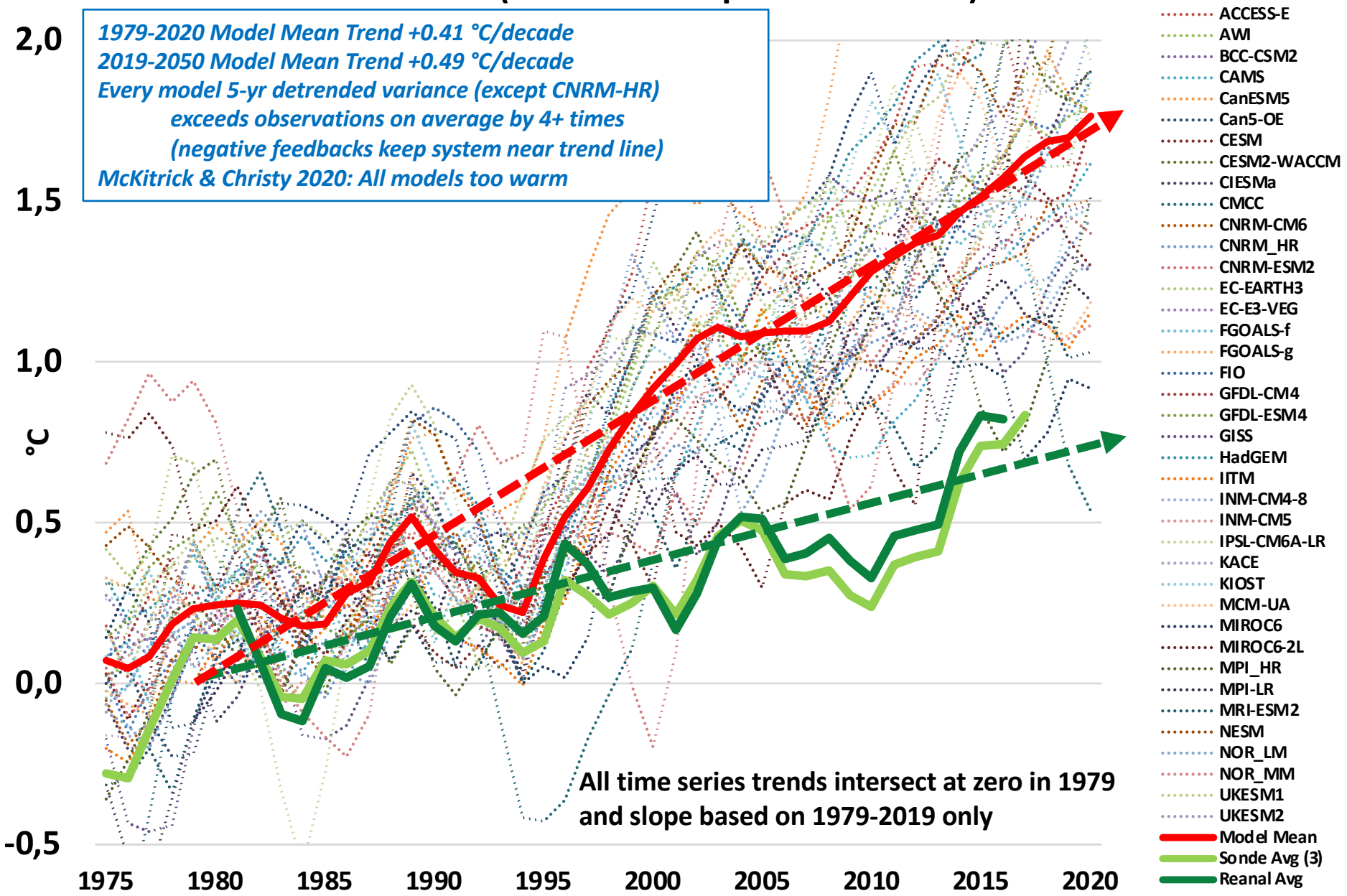
0,0
Model Average +0.41 °C/decade
i.e. "Scientific Consensus"
Observed Average +0.17 °C/decade
ACCESS
ACCESS_E
AWI
BCC-CSM2
CAMS
CanESM5
Can5-OE
CESM2
CESM2-...
CIESMa
CMCC
CNRM-CM6-1
CNRM_HR
CNRM-ESM2
EC-EARTH3
EC-E3-VEG
FGOALS
FGOALSg
FIO
GFDL-CM4
GFDL-ESM4
GISS-E2
HadGEM
IITM
INM-CM4-8
INM-CM5
IPSL-CM6A-LR
KACE
KIOST
MCM-UA
MIROC6
MIROC6-2L
MPI-HR
MPI-LR
MRI-ESM2
NESM
NOR_LM
NOR_MM
UKESM1

5-yr Running mean 300-200hPa Tropical Temperature Anomalies
CMIP-6 (Historical + ssp245 after 2014)

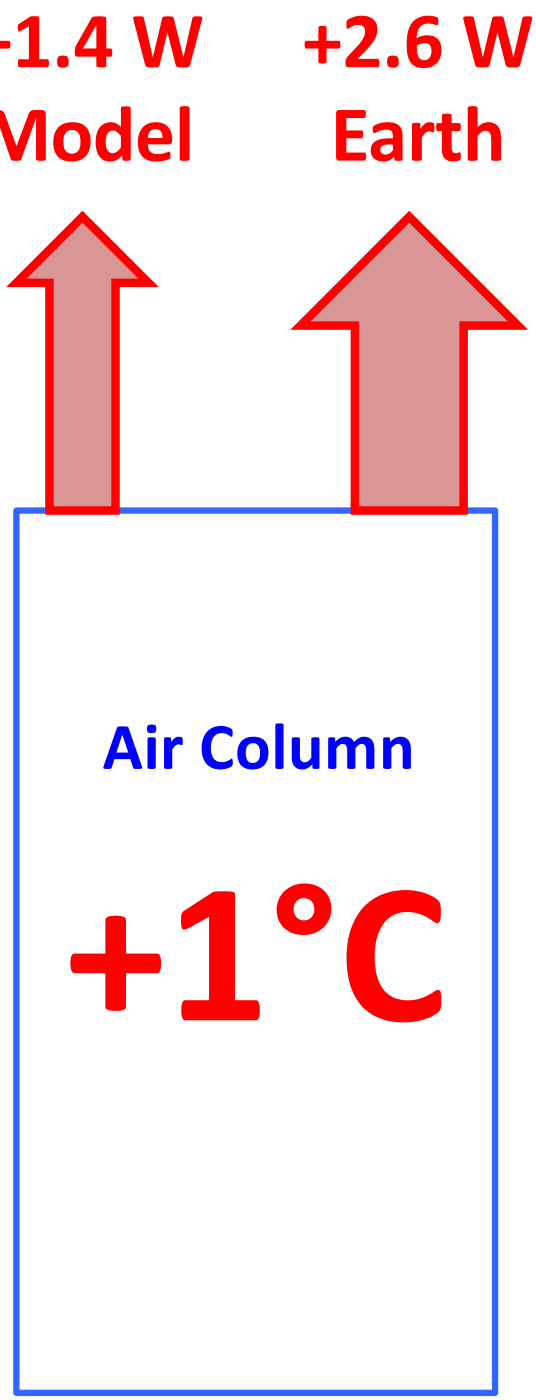


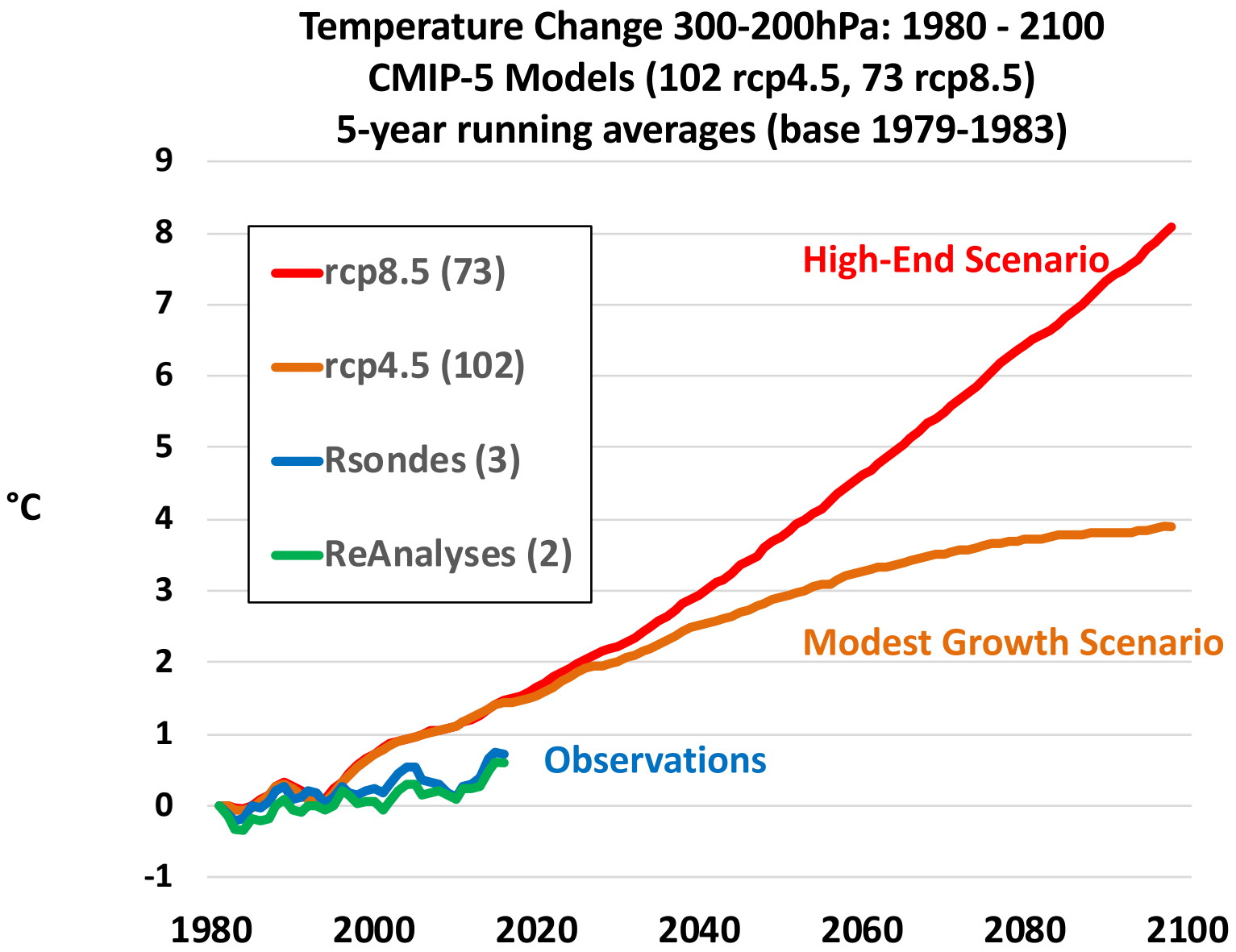
John R. Christy, The University of Alabama in Huntsville

Why do models warm too fast, and vary more wildly than observations?

Likely related to model processes which do not allow enough heat to escape to space (negative feedback) when warming events occur. This is likely related to the greater magnitudes of of heat trapping clouds and/or water vapor. Roy Spencer UAH

Thus, the flow of energy is misrepresented in these hypotheses we call models




Temperature Change 300-200hPa: 1980 - 2100
CMIP-5 Models (102 rcp4.5, 73 rcp8.5)
5-year running averages (base 1979-1983)
°C
9
8
7
6
5
4
3
2
1
0
-1
1980
2000
2020
2040
2060
2080
2100
rcp8.5 (73)
rcp4.5 (102)
Rsondes (3)
ReAnalyses (2)
High-End Scenario
Modest Growth Scenario
Observations

Model Problems are briefly mentioned, but not seriously examined

Tuning models to surface temperature using a high sensitivity to CO2 generated other problems.

The tropical upper air is the vent through which enormous amounts of heat escape into space. If this vent inhibits heat to escape (e.g. too much water vapor), the entire atmosphere down to the surface will be forced to warm un-characteristically.

Temperature change in the tropical troposphere, especially the upper troposphere, is a vital metric for testing the accuracy of the physical processes (moist thermodynamics) which enable heat absorption and transmission and which govern the global surface temperature.

Model results (red) warmed this region way too much over the last 36 years.

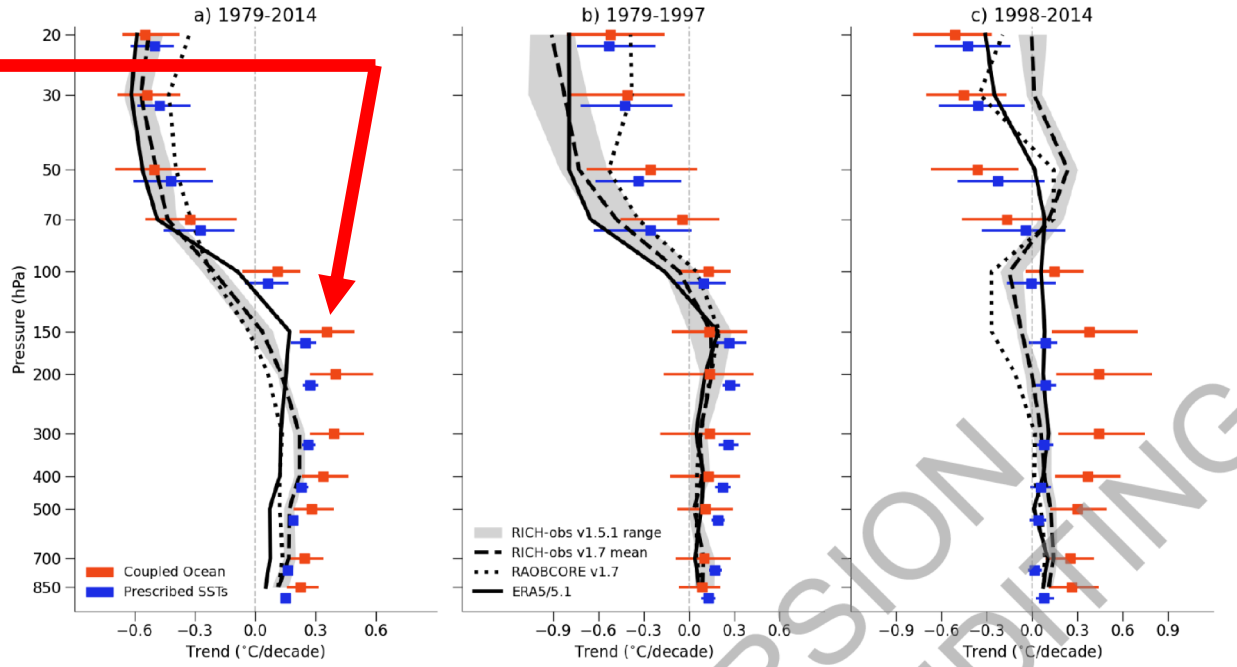


Figure 3.10: Observed and simulated tropical mean temperature trends through the atmosphere. Vertical profiles of temperature trends in the tropics (20°S-20°N) for three periods: (a) 1979-2014 (b) 1979-1997 (ozone depletion era) (c) 1998-2014 (ozone stabilisation era). The black lines show trends in the RICH 1.7 (long dashed) and RAOBCORE 1.7 (dashed) radiosonde datasets (Haimberger et al., 2012), and in the ERA5/5.1 reanalysis (solid). Grey envelopes are centred on the RICH 1.7 trends, but show the uncertainty based on 32 RICH-obs members of version 1.5.1 of the dataset, which used version 1.7.3 of the RICH software but with the parameters of version 1.5.1. ERA5 was used as reference for calculating the adjustments between 2010 and 2019, and ERA-Interim was used for the years before that. Red lines show trends in CMIP6 historical simulations from one realization of 60 models. Blue lines show trends in 46 CMIP6 models that used prescribed, rather than simulated, sea surface temperatures (SSTs). Figure is adapted from Mitchell et al. (2020), their Figure 1. Further details on data sources and processing are available in the chapter data table (Table 3.SM.1).

JChristy's Versions

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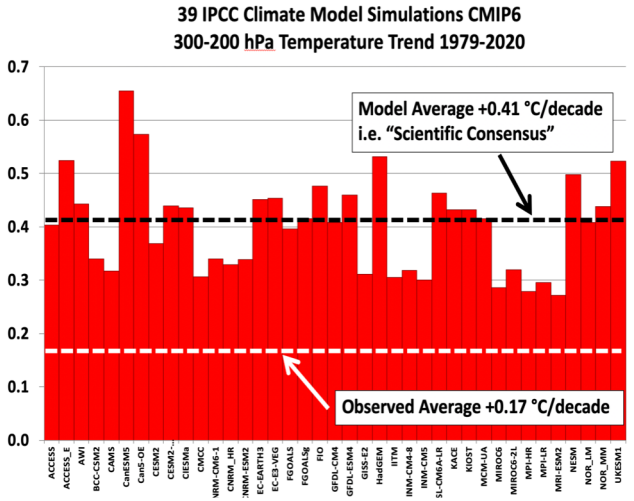

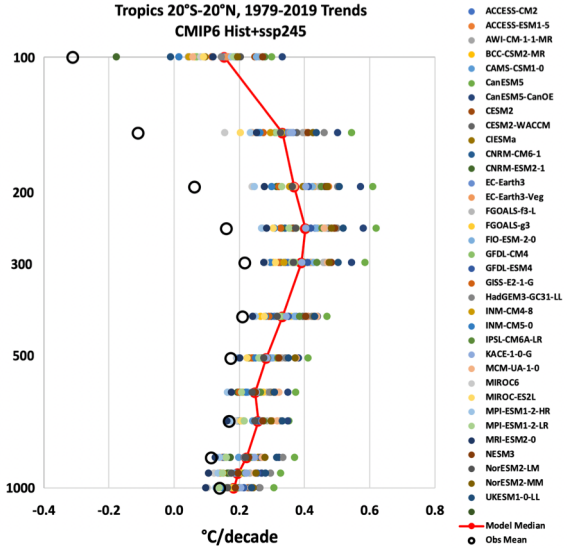

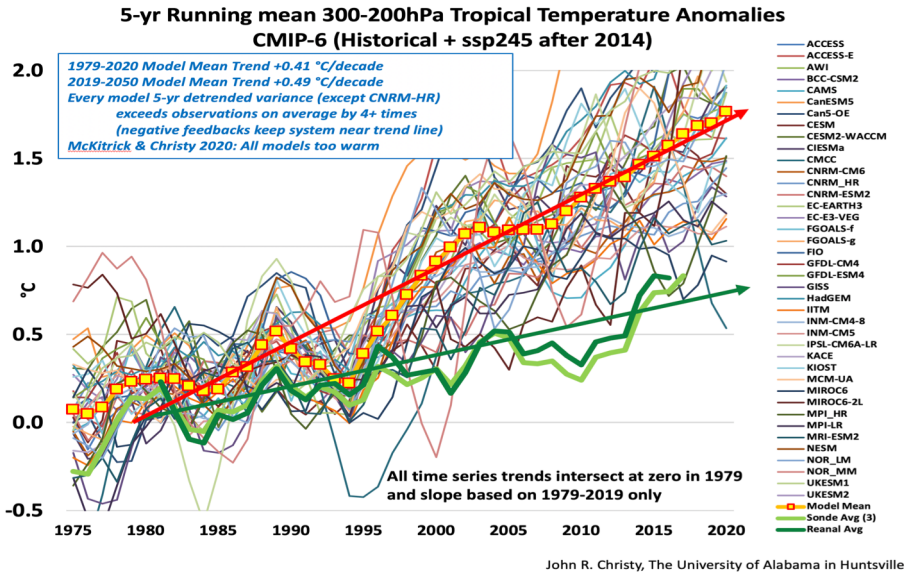

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IPCC AR6 quietly admits there is a problem but does not address its implications

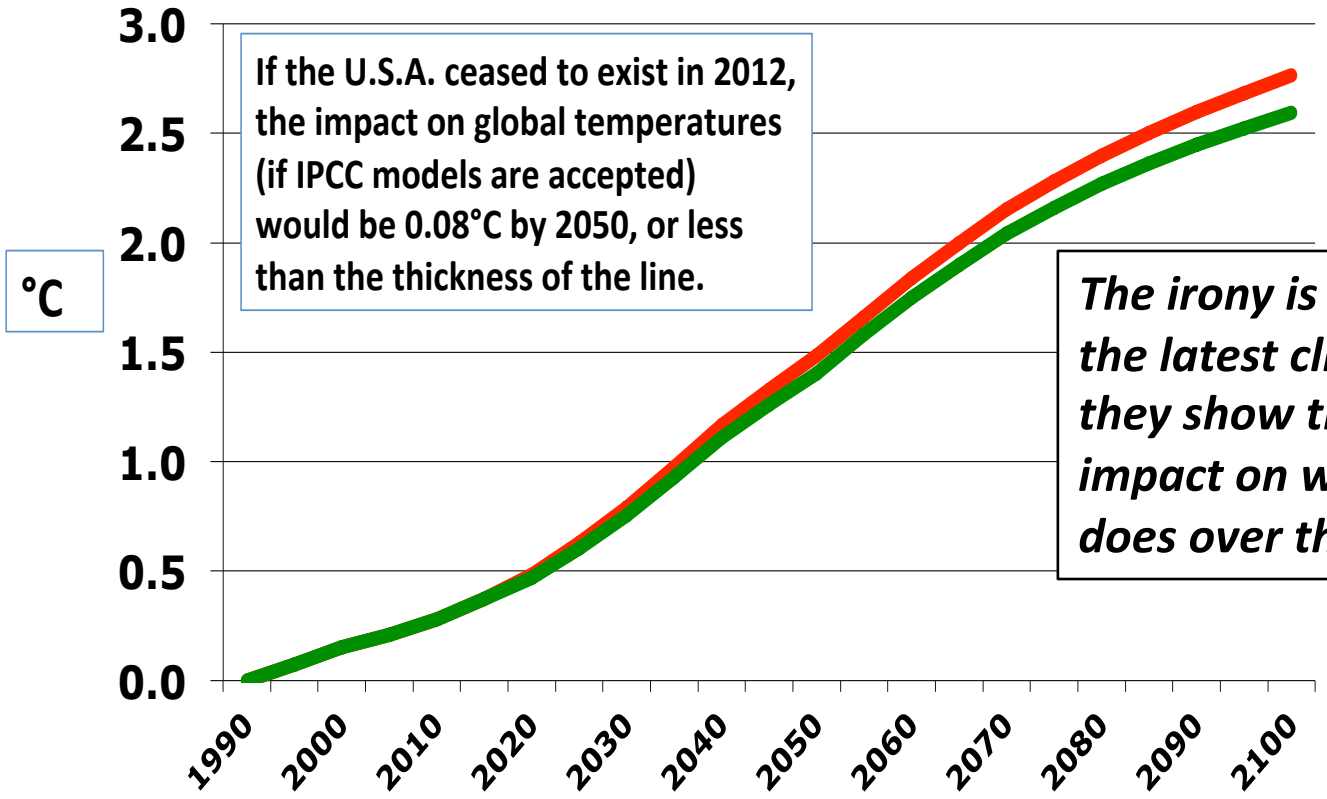
Models vs. Observations. Deep Atmosphere Ch 3.

"… studies continue to find that CMIP5 and CMIP6 simulations warm more than observations in the tropical mid and upper troposphere over the 1979-2014 period …"

IPCC AR6

The Irony: Even if climate models were perfect, would US CO2 regulations "save" the planet?

Red – Temperature IPCC A1B Emissions
Green – U.S. stops all emissions 2012



If the U.S.A. ceased to exist in 2012, the impact on global temperatures (if IPCC models are accepted) would be 0.08°C by 2050, or less than the thickness of the line.

No

The irony is that even if you accept the latest climate model simulations, they show that the US will have little impact on whatever the temperature does over the next century

Data from SPPI, Paul Knappenberger

AR6 in Three Charts – SPM Fig. 1a,b, Full Report Fig 4.2

Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

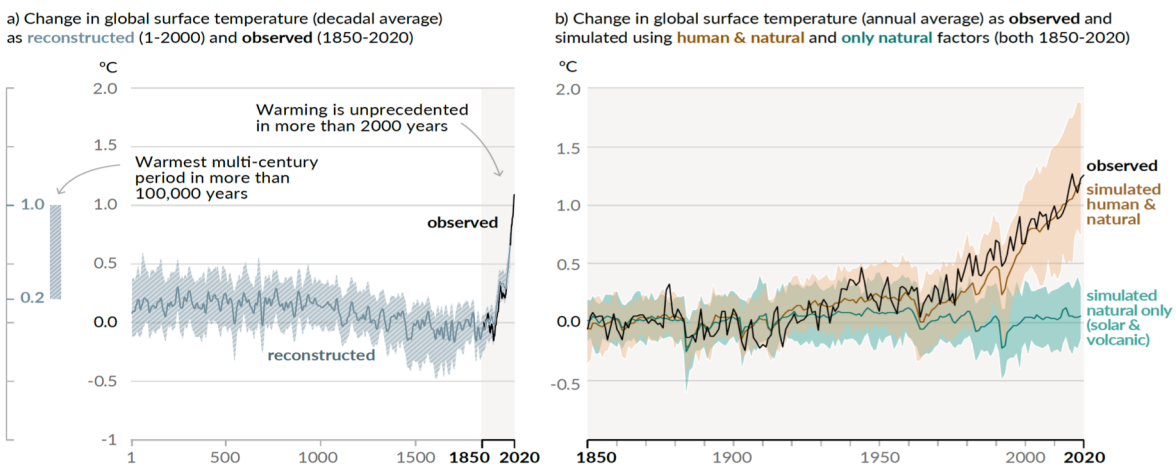


Figure SPM.1: History of global temperature change and causes of recent warming.

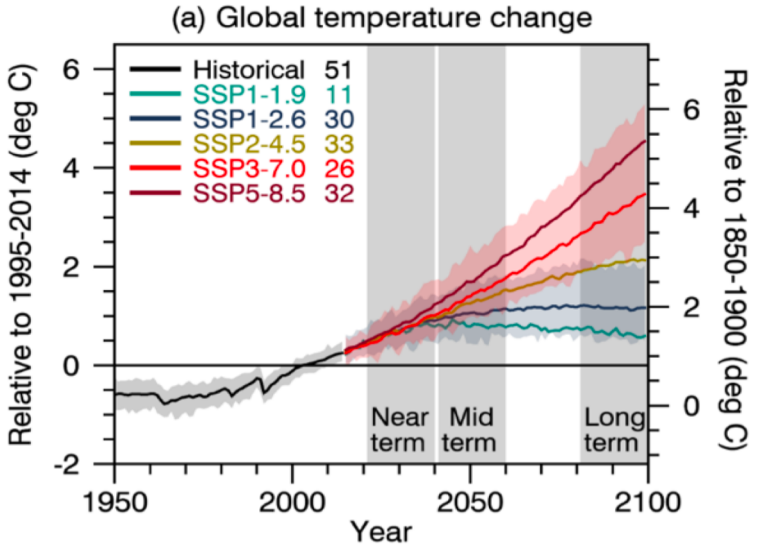


Figure 4.2: Selected indicators of global climate change from CMIP6

The climate is worse now than it's ever been – biased techniques, most extremes not increasing

… and we know why (Greenhouse Gases) … model result based largely on artificial tuning rather than fundamental physics

… and it will only get worse in the future … models do not reproduce present climate and its energy flows, so have little credibility for future

Thank You