

Deconstructing Global Warming

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A pdf of these slides is available on request from rlindzen@mit.edu

Why do we need to deconstruct global warming? Simply because it has been an issue that has been routinely treated with misinformation and sophistry abetted by constant repetition, institutional endorsements, and widespread ignorance even (perhaps especially) among the educated. Because of the increasingly dangerous and expensive approaches being promoted to deal with this alleged problem, it is, I think, important to understand what is being said as well as to understand how climate actually works.

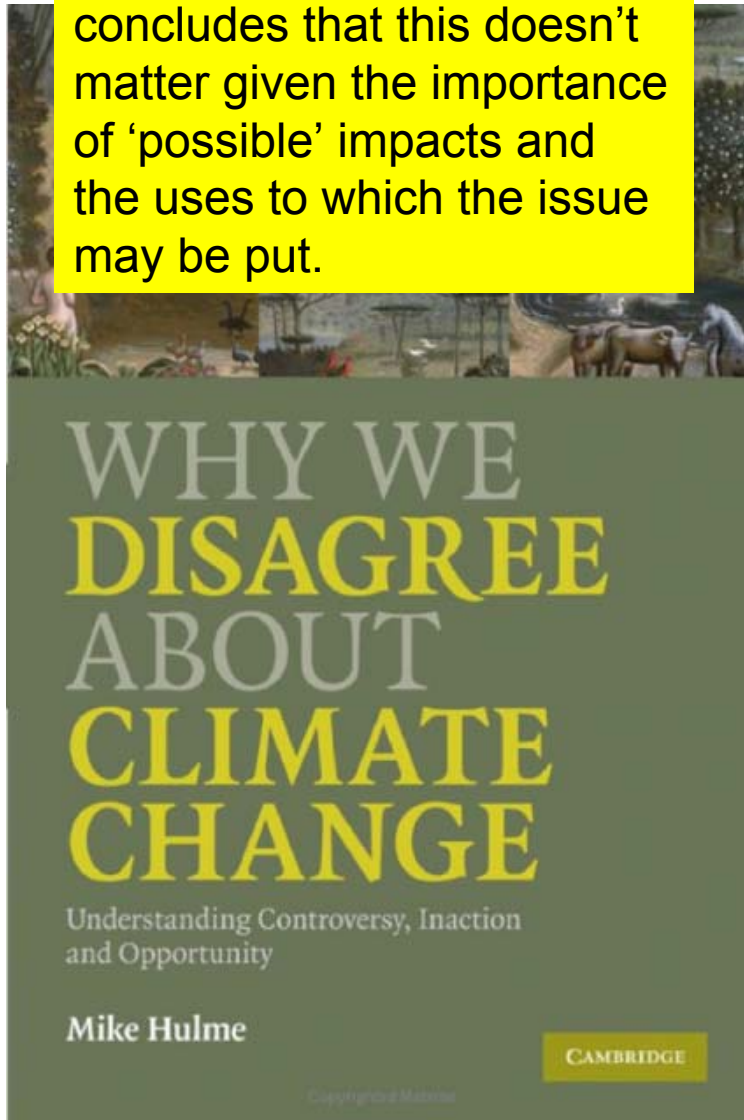
I will begin with a few items that illustrate how this issue has been manipulated, and how, to a great extent, global warming has been merely a device for implementing broader agendas. I will then continue with an emphasis on the science.

From the 1970's, there was a general feeling that 'climate change' would be an excellent vehicle for a variety of agendas. People openly espousing this included Bert Bolin, who was an adviser to the Swedish prime minister, and later the first head of the IPCC.

Once the global issue emerged on the public scene, two cooperating institutions were formed in the 1990's with interlocking leadership: The Tyndall Centre for Climate Studies at the University of East Anglia, and the Potsdam Institute for Climate Impact Research. The latter is headed by Hans Joachim Schellnhuber and the former by Michael Hulme. These institutions epitomize the exploitation of the climate issue. Their members constitute numerous participants in the IPCC.

Recently, Hulme came out with an interesting book.

Note that Hulme readily acknowledges that the science is uncertain, but he concludes that this doesn't matter given the importance of 'possible' impacts and the uses to which the issue may be put.



Here are some revealing quotes:

“The idea of climate change should be seen as an intellectual resource around which our collective and personal identities and projects can form and take shape. We need to ask not what we can do for climate change, but to ask what climate change can do for us.

.....

Because the idea of climate change is so plastic, it can be deployed across many of our human projects and can serve many of our psychological, ethical, and spiritual needs.

.....

We will continue to create and tell new stories about climate change and mobilize them in support of our projects.

.....

These myths transcend the scientific categories of 'true' and 'false' .

As always in propaganda, repetition is an important tool. This was early recognized by Lewis Carroll (as well as by Josef Goebbels).

"Just the place for a Snark!" the Bellman cried,
As he landed his crew with care;
Supporting each man on the top of the tide
By a finger entwined in his hair.

"Just the place for a Snark! I have said it twice:
That alone should encourage the crew.
Just the place for a Snark! I have said it thrice:
What I tell you three times is true."

From Lewis Carroll's "Hunting of the Snark."

Having a simple conceptual picture is also a powerful tool of propaganda:

“Create a concept
and
reality leaves the room”

attributed to Jose Ortega y Gasset

In the case of global warming, the concept appears to be that CO₂ is increasing, that CO₂ is a greenhouse gas (where greenhouse warming is analogized to a ‘blanket’) whose addition should lead to some warming, and that there has been some warming. Whence ‘follows’ the illogical conclusions that CO₂ has caused the warming, and that the warming will be dangerous.

The cooptation of science turns out to be an easy matter that I have described in detail in a recent publication (*Climate Science – is it designed to answer questions?*) The vulnerability of science was certainly well understood by President Eisenhower. His fears for the future were by no means restricted to the military-industrial complex, and have proven even more prescient with time.

President Dwight D. Eisenhower, in his farewell address to the nation in 1961, gave a warning “that public policy could itself become the captive of a scientific-technological elite.” He went on

“Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity...The prospect of domination of the nation’s scholars by Federal employment, project allocations, and the power of money is ever present - and is gravely to be regarded.”

The Foreign Secretary accused the public yesterday of lacking a sense of urgency in the face of the potentially devastating consequences of climate change. David Miliband said that people had grown apathetic about the issue when they needed to be galvanized into action before the Copenhagen climate change summit in December.

--Hannah Devlin, *The Times*, 23 October 2009

After the uprising of the 17th June

The Secretary of the Writers Union

Had leaflets distributed in the Stalinalee

Stating that the people

Had forfeited the confidence of the government

And could win it back only

By redoubled efforts. Would it not be easier

Courtesy of Benny Peiser

In that case for the government

To dissolve the people

And elect another?

--Bertold Brecht, 1953



Here we have a current example of the consequences.



CLAREMONT REVIEW OF BOOKS
VOLUME IX, NUMBER 2, SPRING 2009

®

This is a conservative version of the *New York Review of Books*. The article is discussing the conflict within the Republican Party between Traditionalists and Reformers.

THE WILDERNESS YEARS BEGIN

Essay by William Voegeli

AMERICAN CONSERVATISM, ACCORDING TO John Judis, has “slipped back into the chaos and impotence that prevailed” before *National Review* was launched in 1955. Judis, a careful though not neutral observer of all things conservative, reported in the *New Republic*, “Conservatives’ repudiation of Bush is part of their own self-denial. By pretending that he is entirely separate from them, they can delude themselves” that his unpopularity is not theirs.

any one political party, and be integrated into the shared history of the American people, part of the historical background from which new politics and new coalitions will arise.

The feeling that the lamps are being turned out is not unique to this election cycle. Liberals contemplated the prospect of a long internal exile after 1972, 1984, and 2004. Conservatives did the same after 1964, 1976, and 1992. A sub-

In confronting this choice, Democrats mostly muddled through. The party’s commitment to gun control is quieter and less insistent than it was 30 years ago. Democrats have learned to speak sternly about crime, and respectfully about the military. Most congressional Democrats voted against the 1996 welfare reform bill, but a Democratic president signed it. For 12 years, Democrats seemed to accept that abolishing Aid to Families With Dependent Children meant that the government had negotiated

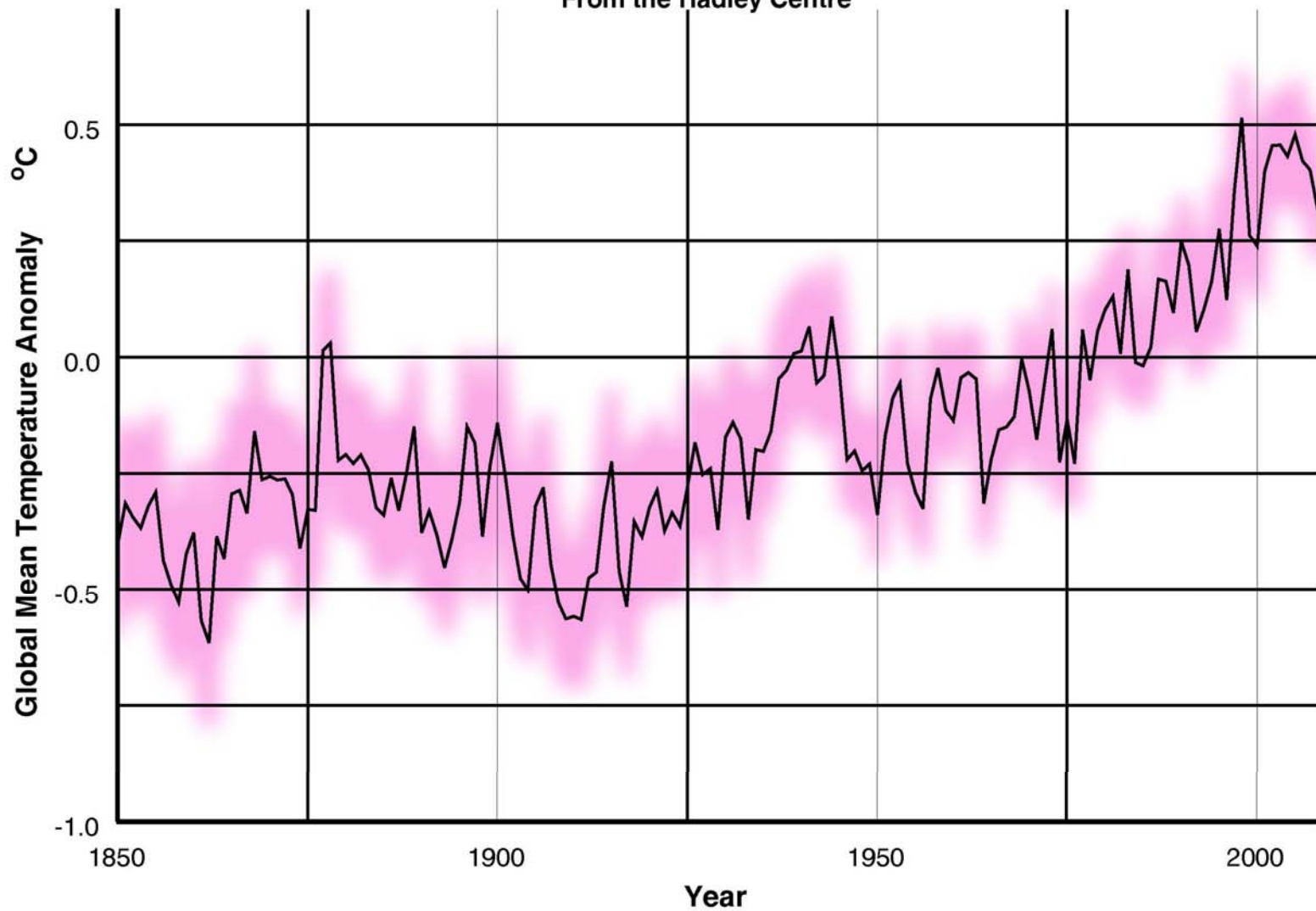
Reformers, by contrast, believing that “American voters will not support a party whose main idea is slashing government,” recommend “new policies to address inequality and middle-class economic anxiety.” They “tend to take global warming seriously,” according to Brooks, not only on the merits, but in the belief that conservatives “cannot continue to insult the sensibilities of the educated class and the entire East and West Coasts.” The most prominent Reformers

Is this really the situation? At least as far as MIT's President and our nation's Science Advisor are concerned, it is.

At a recent symposium on energy held at MIT, President Hockfield described climate change as ‘accelerating.’ I asked her privately what basis she had for this claim, sending her the following figures.

Global Mean Temperature Anomaly (1850-2008)

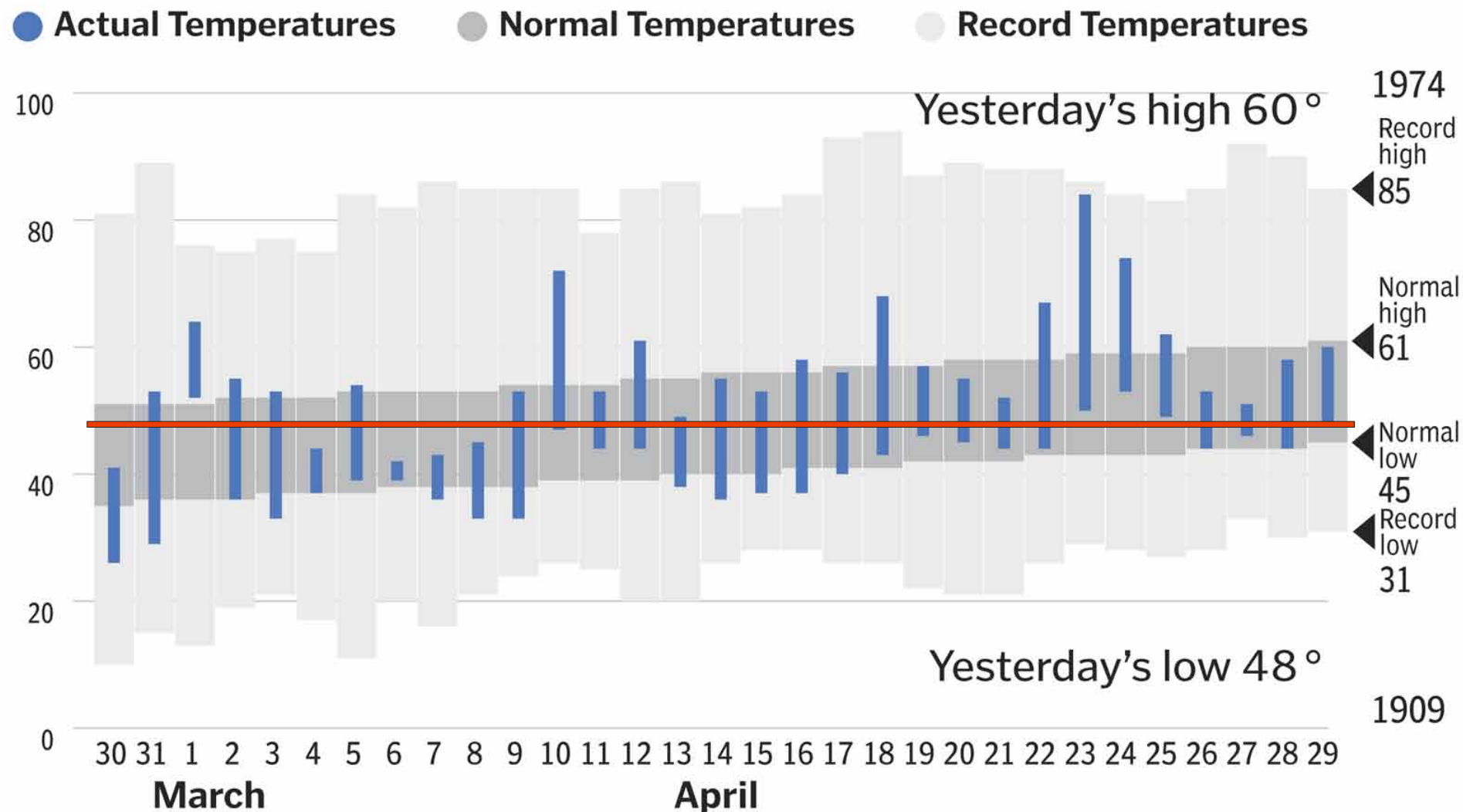
From the Hadley Centre



Pink fuzz represents stated uncertainty.

The thickness of the red line represents the range of global mean temperature anomaly over the past century.

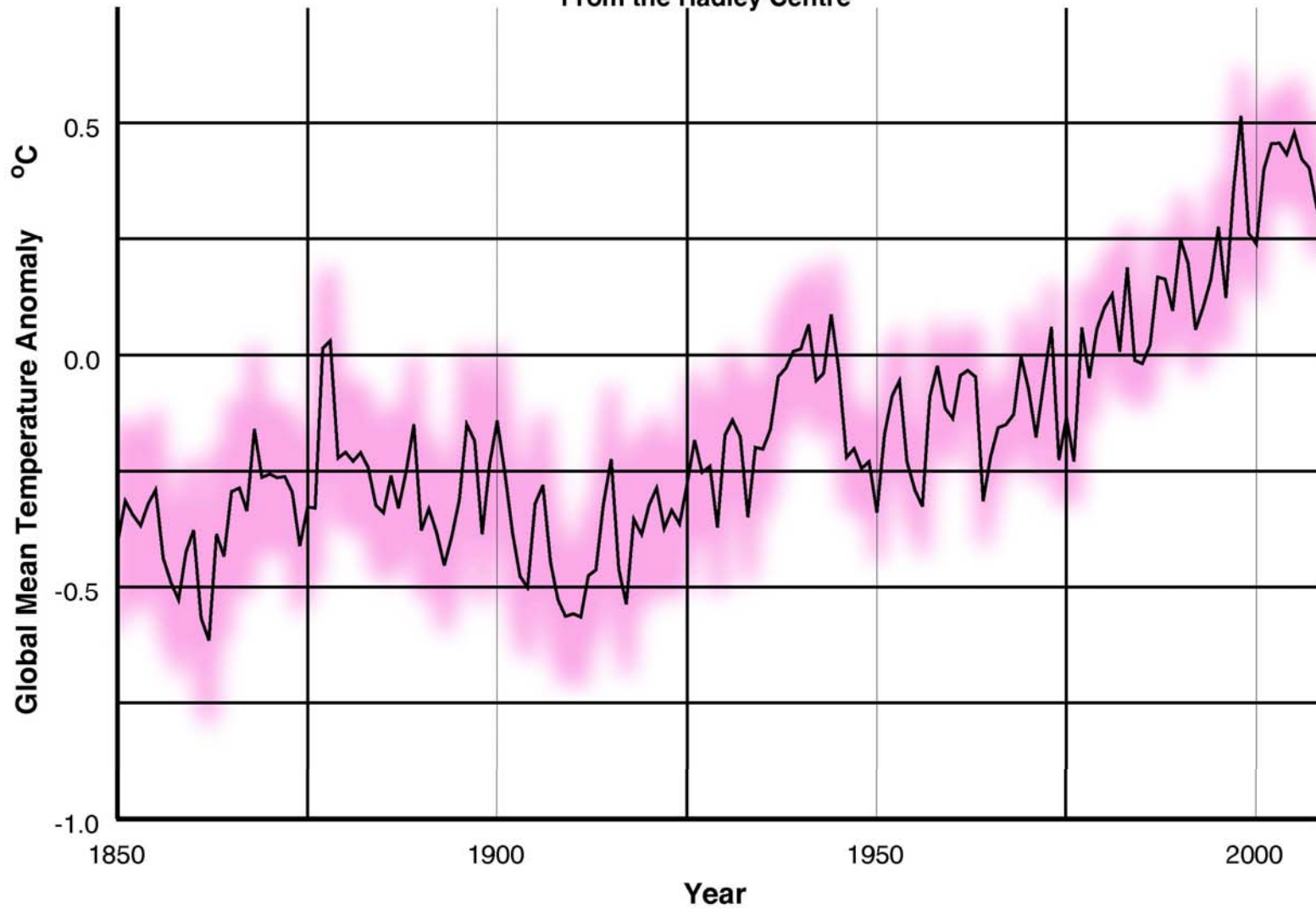
April 30, 2008



This graph is a daily feature of the *Boston Globe*.

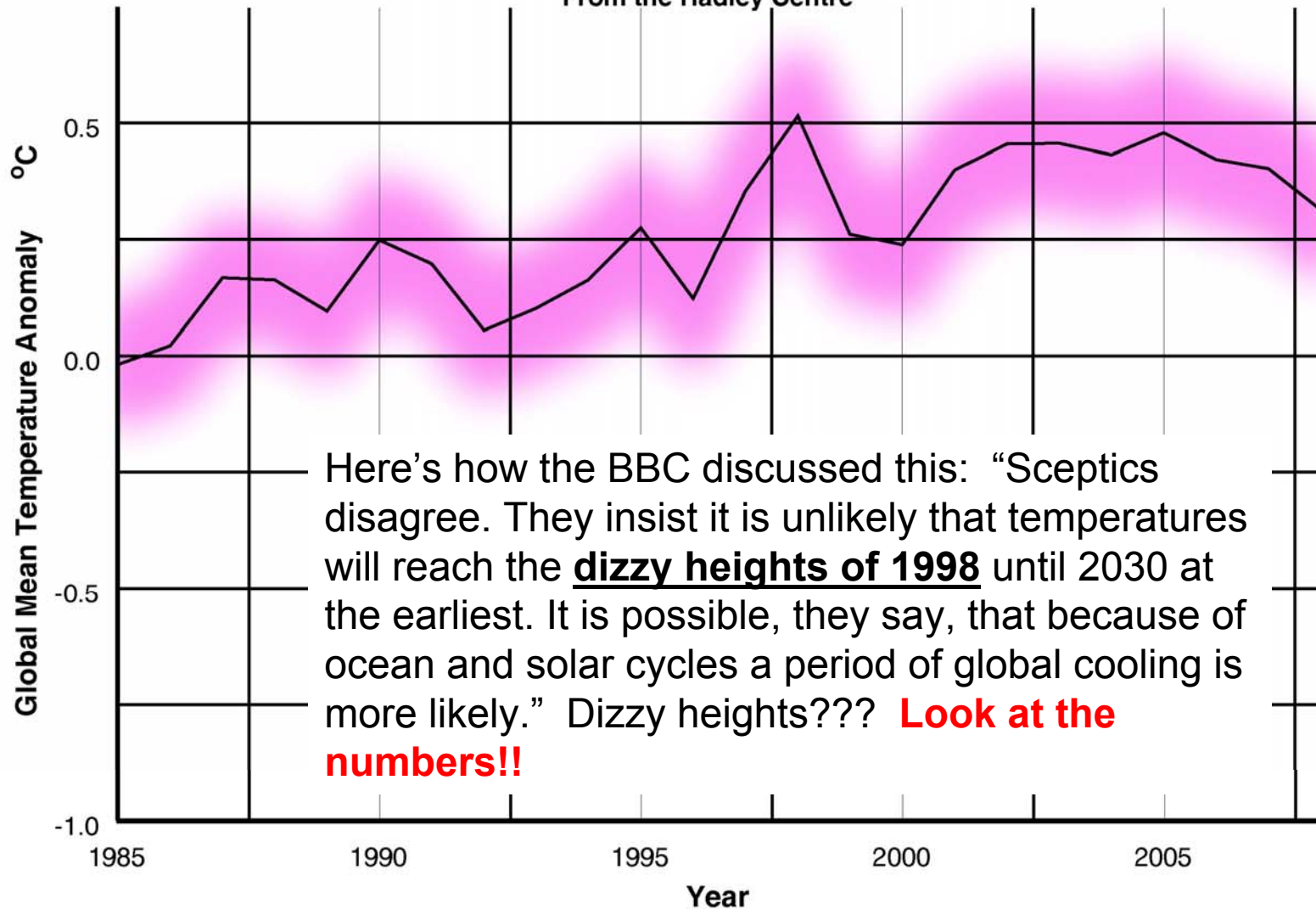
Global Mean Temperature Anomaly (1850-2008)

From the Hadley Centre

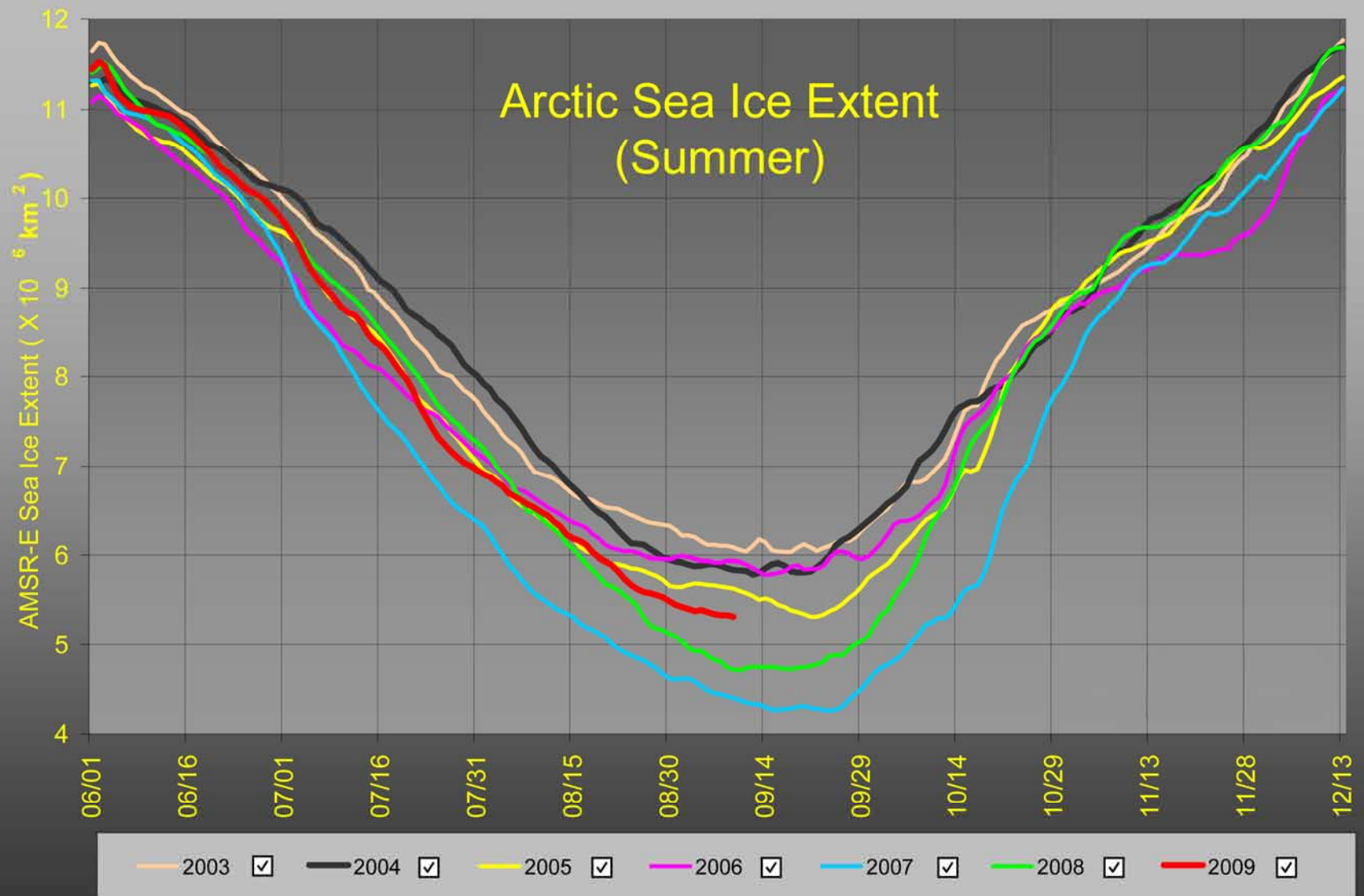


Global Mean Temperature Anomaly (1985-2008)

From the Hadley Centre



Temperatures where the pink fuzz overlaps are not statistically significantly different.

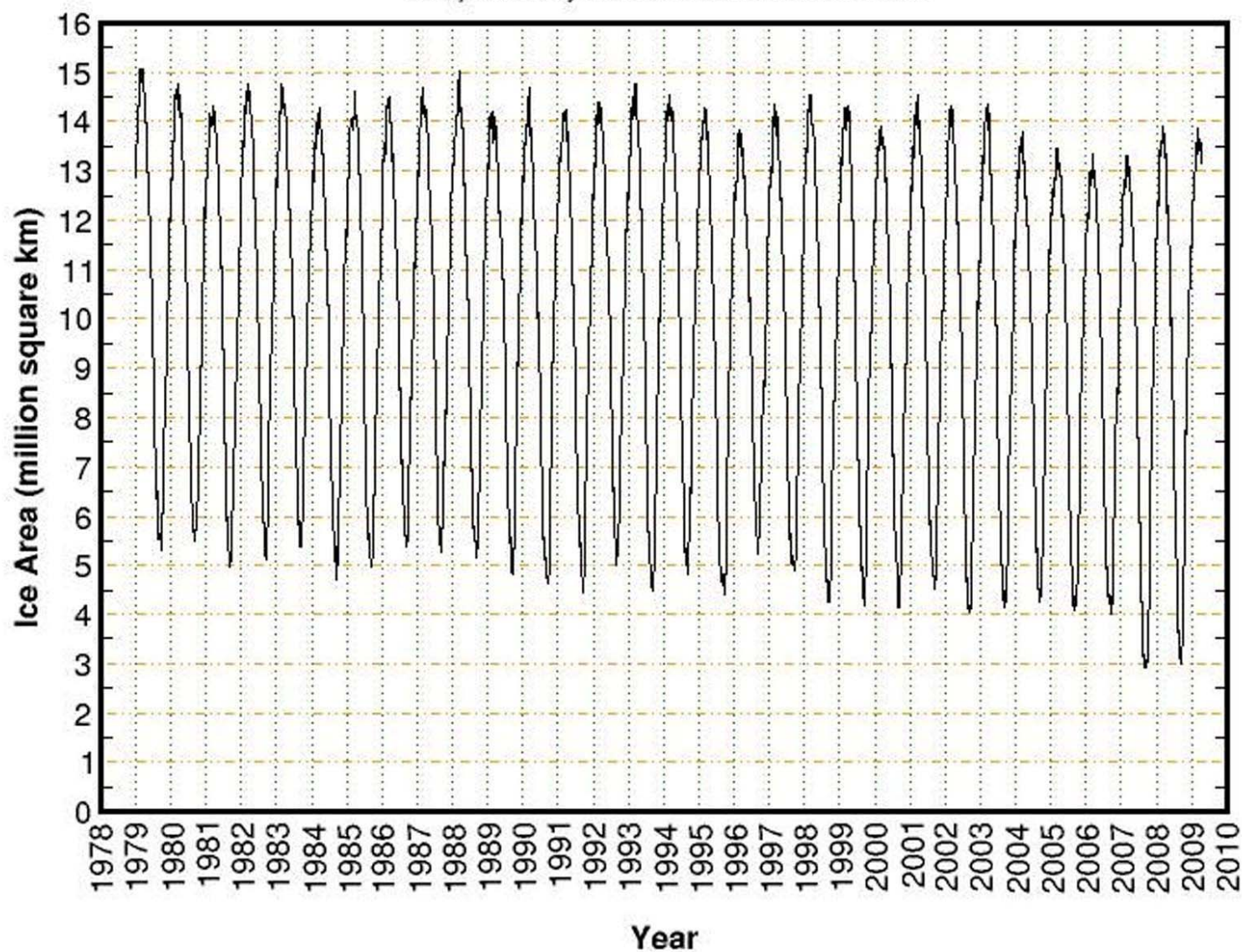


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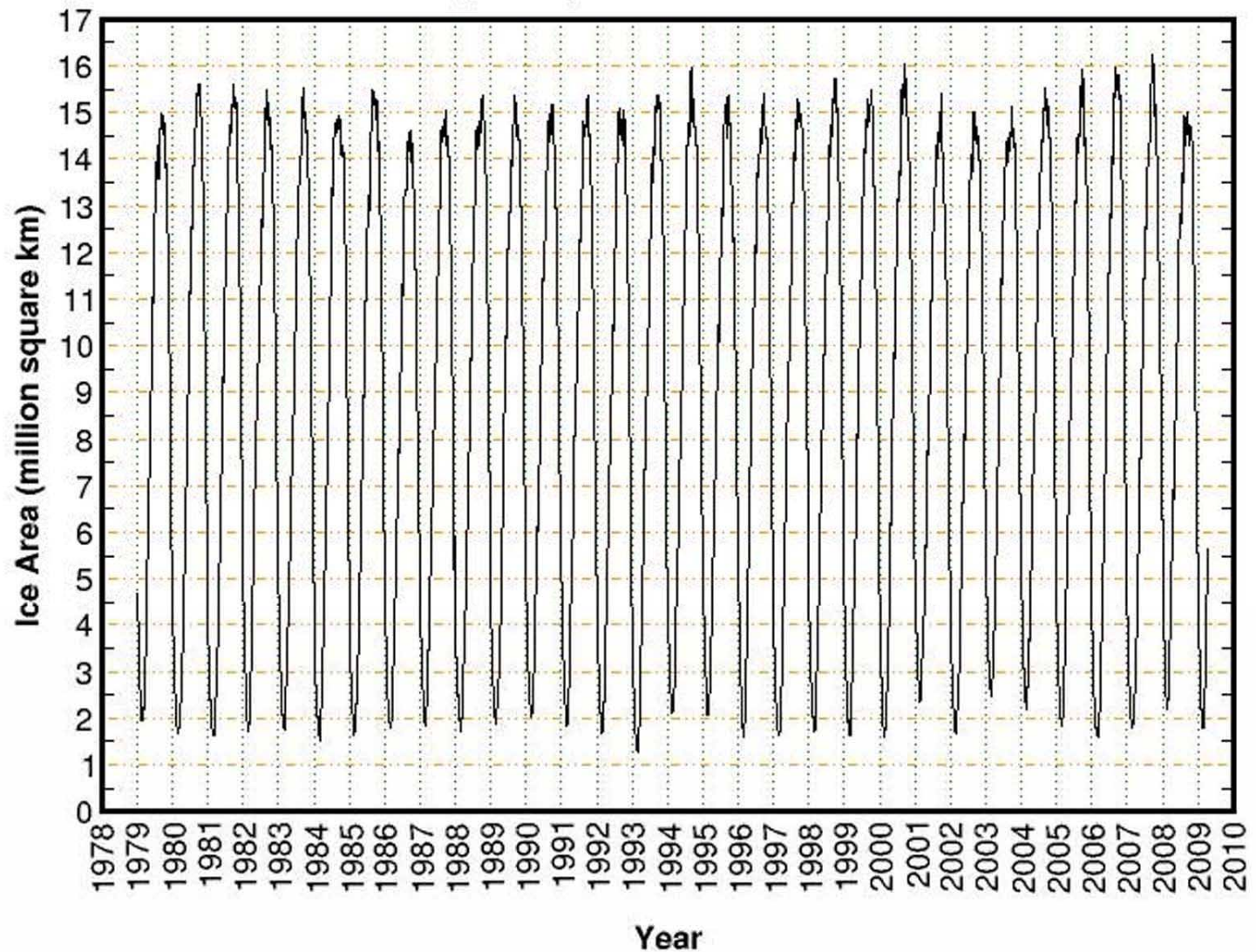
Northern Hemisphere Sea Ice Area

Data provided by NSIDC: NASA SMMR and SSM/I



Southern Hemisphere Sea Ice Area

Data provided by NSIDC: NASA SMMR and SSM/I



While there really doesn't appear to be that much going on, anecdotal information can be more dramatic.

“THE ARCTIC OCEAN IS WARMING UP, ICEBERGS ARE GROWING SCARCER AND IN SOME PLACES THE SEALS ARE FINDING THE WATER TOO HOT. REPORTS ALL POINT TO A RADICAL CHANGE IN CLIMATE CONDITIONS AND HITHERTO UNHEARD-OF TEMPERATURES IN THE ARCTIC ZONE. EXPEDITIONS REPORT THAT SCARCELY ANY ICE HAS BEEN MET WITH AS FAR NORTH AS 81 DEGREES 29 MINUTES. GREAT MASSES OF ICE HAVE BEEN REPLACED BY MORAINES OF EARTH AND STONES, WHILE AT MANY POINTS WELL KNOWN GLACIERS HAVE ENTIRELY DISAPPEARED.”

—US WEATHER BUREAU, 1922

In fact, the arctic is notoriously variable.

President Hockfield graciously replied without actually answering my question. Here is her reply:

*“That said, I take from your note a strong statement that climate change discussions be grounded in science rather than being politically driven, and on this matter I agree wholeheartedly. **In consultation with MIT’s Center for Global Change Science, our comments about climate change reflect the last IPCC report, the best available consensus of the worlds climate scientists.** Of course, the science must always be open to thoughtful challenge as more observations and analysis accumulate.”*

Interestingly, the latest IPCC report did not claim change was accelerating. However, Hockfield’s response does reveal the characteristic feature of the current presentation of this issue: namely any and every statement is justified by an appeal to authority rather than by scientific argument. (Only last Friday, Pres. Obama did the same at MIT while simultaneously calling for sound science and critical analysis and marginalizing nay sayers concerning global warming.)

President Hockfield was followed by John Holdren, the President’s Science Advisor. Here are slides from the MIT podcast of the event. They have been enhanced to clarify the text.

Clean Power: Building a New Clean Energy Economy

April 13, 2009

Current insights from climate science

- Climate change is happening faster than previously predicted emissions, concentrations, temperatures (regional & global) & sea level all rising at or above those of earlier IPCC 'high' scenarios.
- Significant harm to human well being is already occurring avoiding dangerous human interference is no longer possible; we are experiencing 'dangerous' now
- Evidence is emerging that 'tipping points' into disastrous events could occur sooner rather than later.

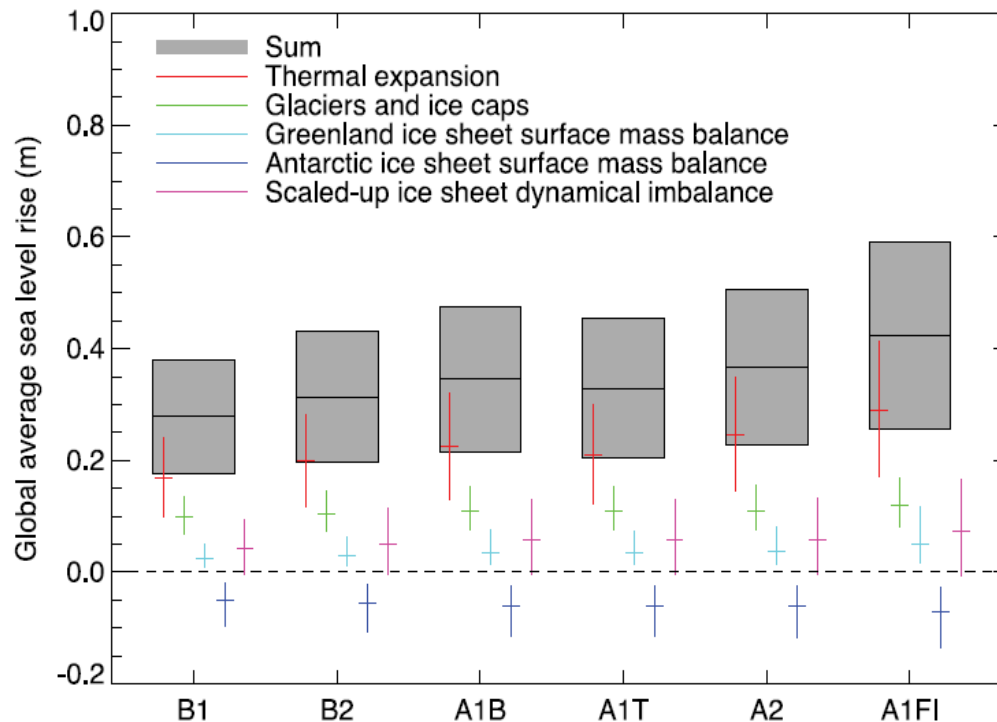


webcast powered by AMPS

Actually, none of these statements is true – at least as concerns anthropogenic warming!

To be sure, CO₂ is increasing, but that does not constitute climate change per se.

100-year Sea Level Projections, IPCC Mid-range 10 year is 1.26 INCHES



This is not readily distinguishable from the change that has been occurring since the end of the last ice age.

Figure 10.33. Projections and uncertainties (5 to 95% ranges) of global average sea level rise and its components in 2090 to 2099 (relative to 1980 to 1999) for the six SRES marker scenarios. The projected sea level rise assumes that the part of the present-day ice sheet mass imbalance that is due to recent ice flow acceleration will persist unchanged. It does not include the contribution shown from scaled-up ice sheet discharge, which is an alternative possibility. It is also possible that the present imbalance might be transient, in which case the projected sea level rise is reduced by 0.02 m. It must be emphasized that we cannot assess the likelihood of any of these three alternatives, which are presented as illustrative. The state of understanding prevents a best estimate from being made.

As my colleague at MIT, the oceanographer, Carl Wunsch has noted:

“It remains possible that the data base is insufficient to compute mean sea level trends with the accuracy necessary to discuss the impact of global warming—as disappointing as this conclusion may be.”

Please note that this is the statement of someone who by and large supports global warming alarm.

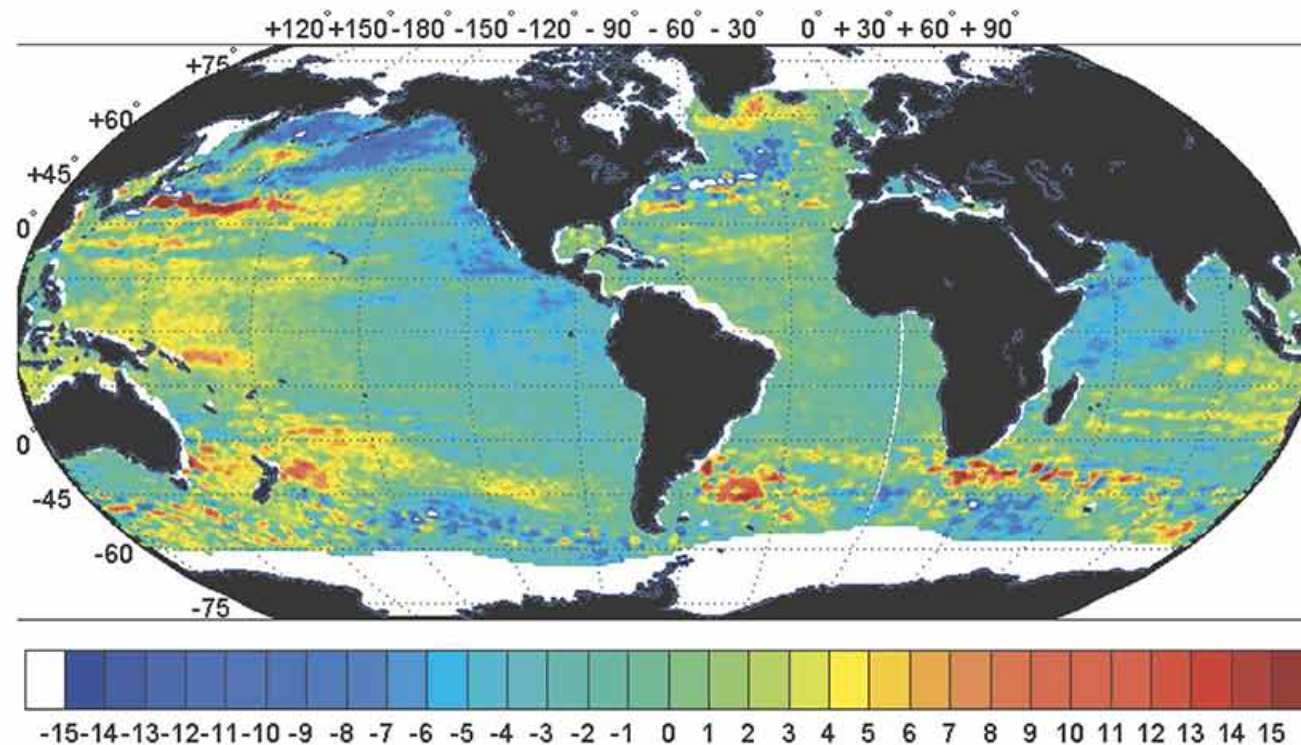


FIG. 1. Twelve-year (1993–2004) trend in sea level (mm yr^{-1} ; updated from CN2004) as determined directly from the TOPEX/Poseidon altimetric data. An area-weighted spatial mean of 2.8 mm yr^{-1} was removed prior to plotting for direct comparison with the model results. Missing data areas show as white, as do a few obvious areas offscale in the negative direction.

Actual sea level varies both up and down irregularly and, frequently, by far larger amounts than does mean sea level. Moreover, at many coastal regions, locally measured sea level (using tide gauges) varies mostly due to changes in land level.

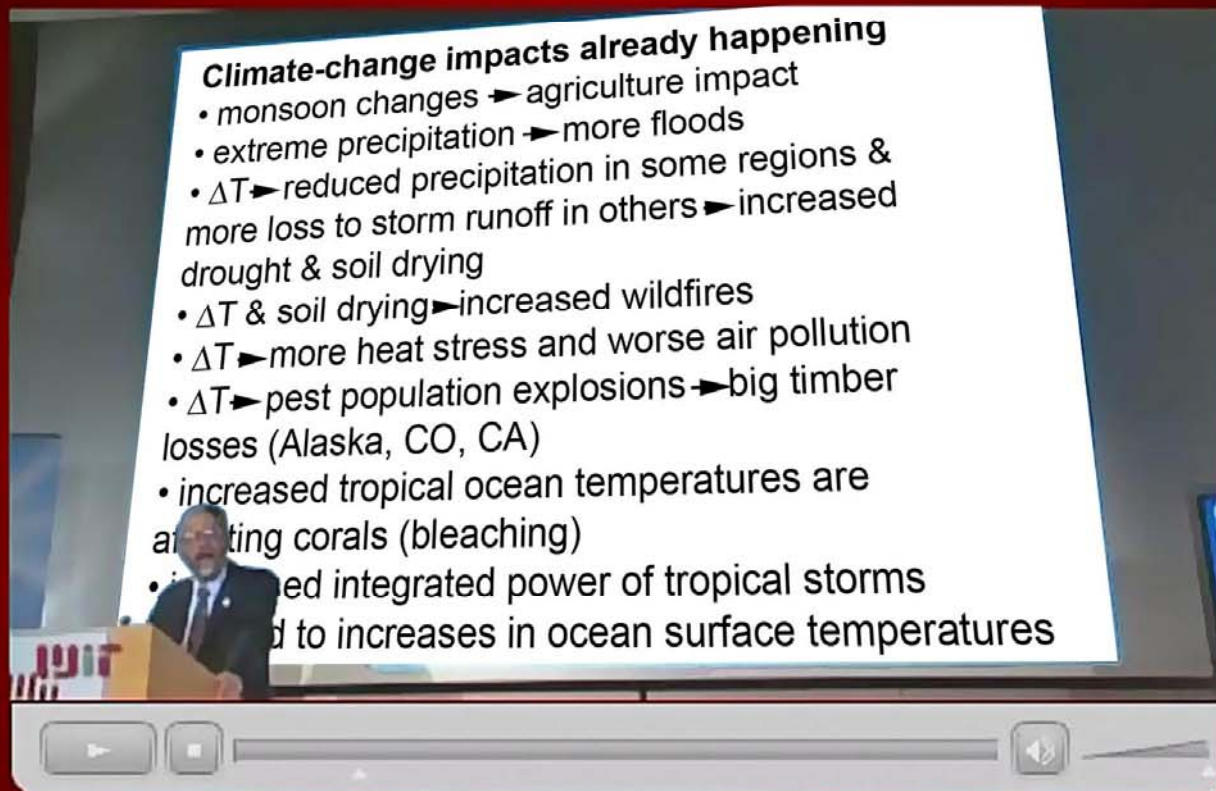
Also, there is no physical basis for suggesting ‘tipping points’ – especially given that the impact of each added amount of CO₂ is less than the impact of its predecessor (ie, we have diminishing returns).

What we are seeing again is the tendency for any claims to be made once the basis for the claim need only be ‘authority.’ Interestingly, the ‘authority’ frequently doesn’t say what it is claimed to have said. However, advocates (especially when in high government position) can rest assured that some ‘authority’ will come along to assent.

Holdren continued with the next slide.

Clean Power: Building a New Clean Energy Economy

April 13, 2009



Climate-change impacts already happening

- monsoon changes → agriculture impact
- extreme precipitation → more floods
- ΔT → reduced precipitation in some regions & more loss to storm runoff in others → increased drought & soil drying
- ΔT & soil drying → increased wildfires
- ΔT → more heat stress and worse air pollution
- ΔT → pest population explosions → big timber losses (Alaska, CO, CA)
- increased tropical ocean temperatures are affecting corals (bleaching)
- increased integrated power of tropical storms due to increases in ocean surface temperatures

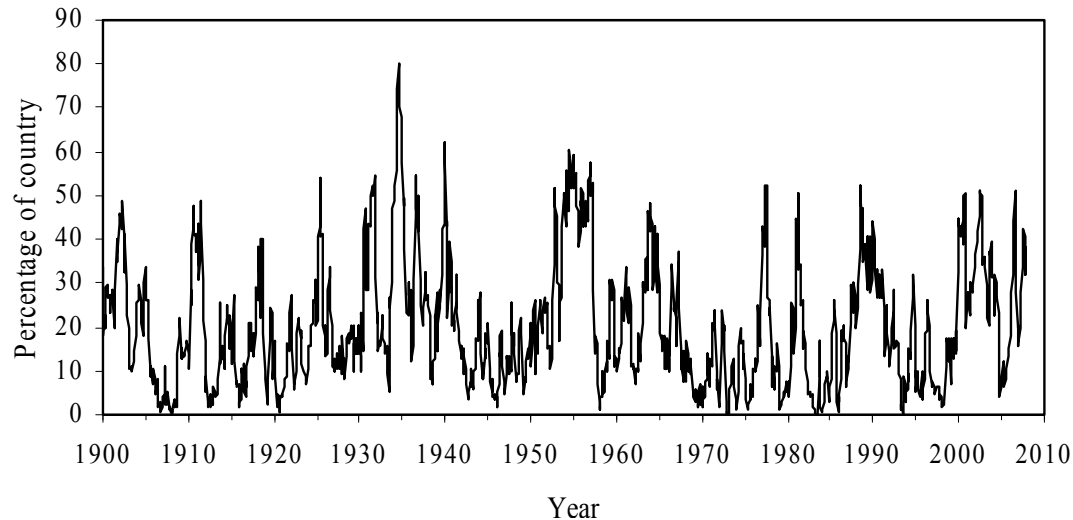


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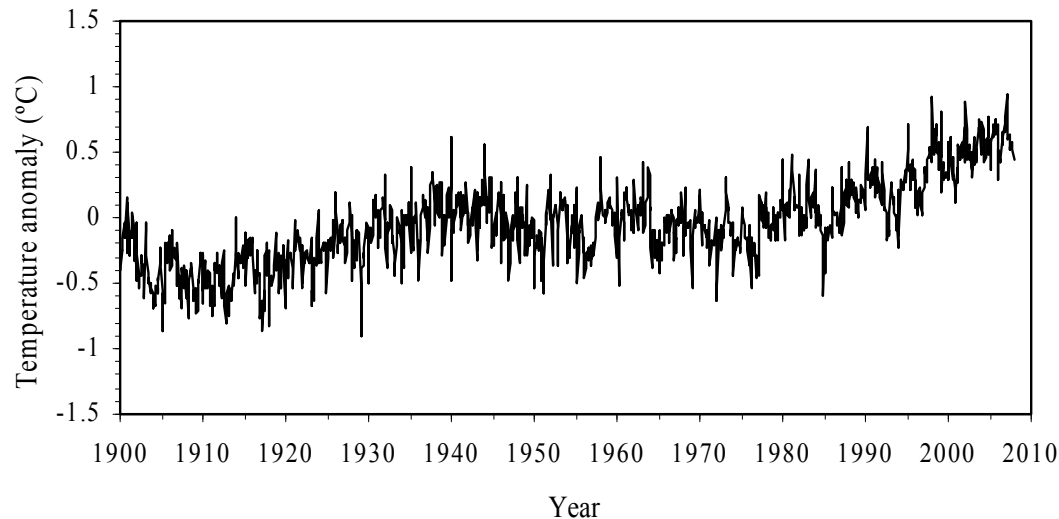
Quite apart from the fact that climate is always changing, and such changes have consequences, Holdren's statements are sometimes untrue, and even when true, unattributable to anthropogenic warming.

The consequences cited, moreover, depend on the confluence of many factors besides global mean temperature.

Percentage of the U.S. Experiencing Drought Conditions



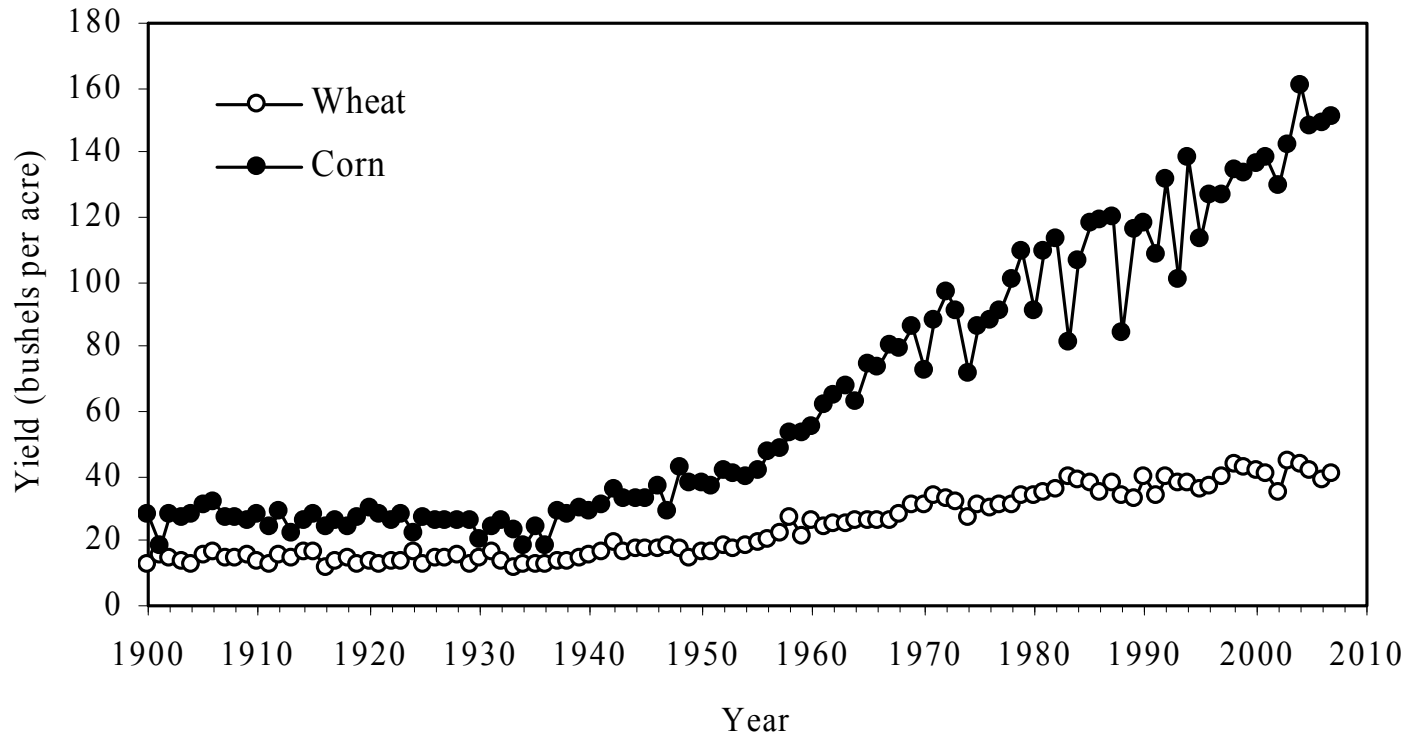
We see no evidence of any correlation.



Northern Hemisphere Temperature

U.S. Crop Yields **INCREASING** with warming

Corn (filled circles) and Wheat (open circles)



Here, there would appear to be correlation, but there are many other reasons why crop yields happen to be increasing.

When it comes to unusual climate (which always occurs some place), most claims of evidence for global warming are guilty of the 'prosecutor's fallacy.' For example this confuses the near certainty of the fact that if A shoots B, there will be evidence of gunpowder on A's hand with the assertion that if C has evidence of gunpowder on his hands then C shot B.

However, with global warming the line of argument is even sillier. It generally amounts to something like if A kicked up some dirt, leaving an indentation in the ground into which a rock fell and B tripped on this rock and bumped into C who was carrying a carton of eggs which fell and broke, then if some broken eggs were found it showed that A had kicked up some dirt.

What really is the 'claimed' IPCC consensus, and how was it arrived at?

IPCC 'Consensus.'

It is likely that most of the warming over the past 50 years is due to man's emissions.

Note that this is hardly a basis for concern.

How was this arrived at?

What was done, was to take a large number of models that could not reasonably simulate known patterns of natural behavior (such as ENSO, the Pacific Decadal Oscillation, the Atlantic Multidecadal Oscillation), **claim that such models nonetheless accurately depicted natural internal climate variability**, and use the fact that these models could not replicate the warming episode from the mid seventies through the mid nineties, to argue that forcing was necessary and that the forcing must have been due to man.

The argument makes arguments in support of intelligent design sound rigorous by comparison. It constitutes a rejection of scientific logic, while widely put forward as being 'demanded' by science.

Equally ironic, the fact that the global mean temperature anomaly ceased increasing by the mid nineties is acknowledged by modeling groups as **contradicting the main underlying assumption of the so-called attribution argument** (Smith et al, 2007, Keenlyside et al, 2008, Lateef, 2009). Yet the iconic statement continues to be repeated as authoritative gospel, and as implying catastrophe.

Now, all projections of dangerous impacts hinge on climate sensitivity. (To be sure, the projections of catastrophe also depend on many factors besides warming itself.) Embarrassingly, the estimates of the equilibrium response to a doubling of CO₂ have basically remained unchanged since 1979.

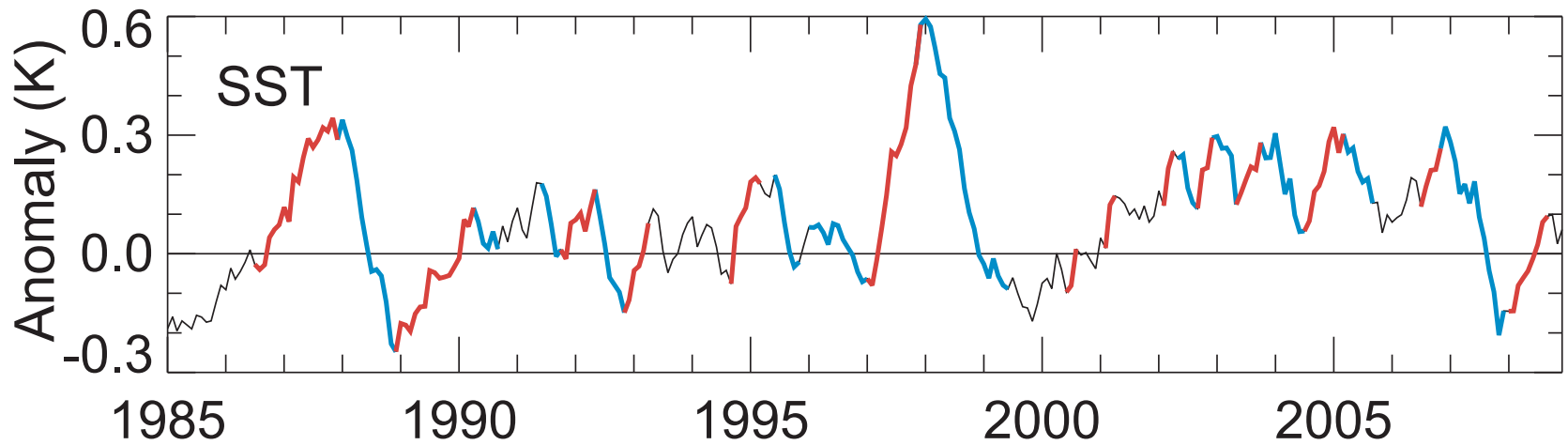
They are that **models** project a sensitivity of from 1.5-5C. Is simply running models the way to determine this? Why hasn't the uncertainty diminished?

There follows a much more rigorous determination using physics and satellite data.

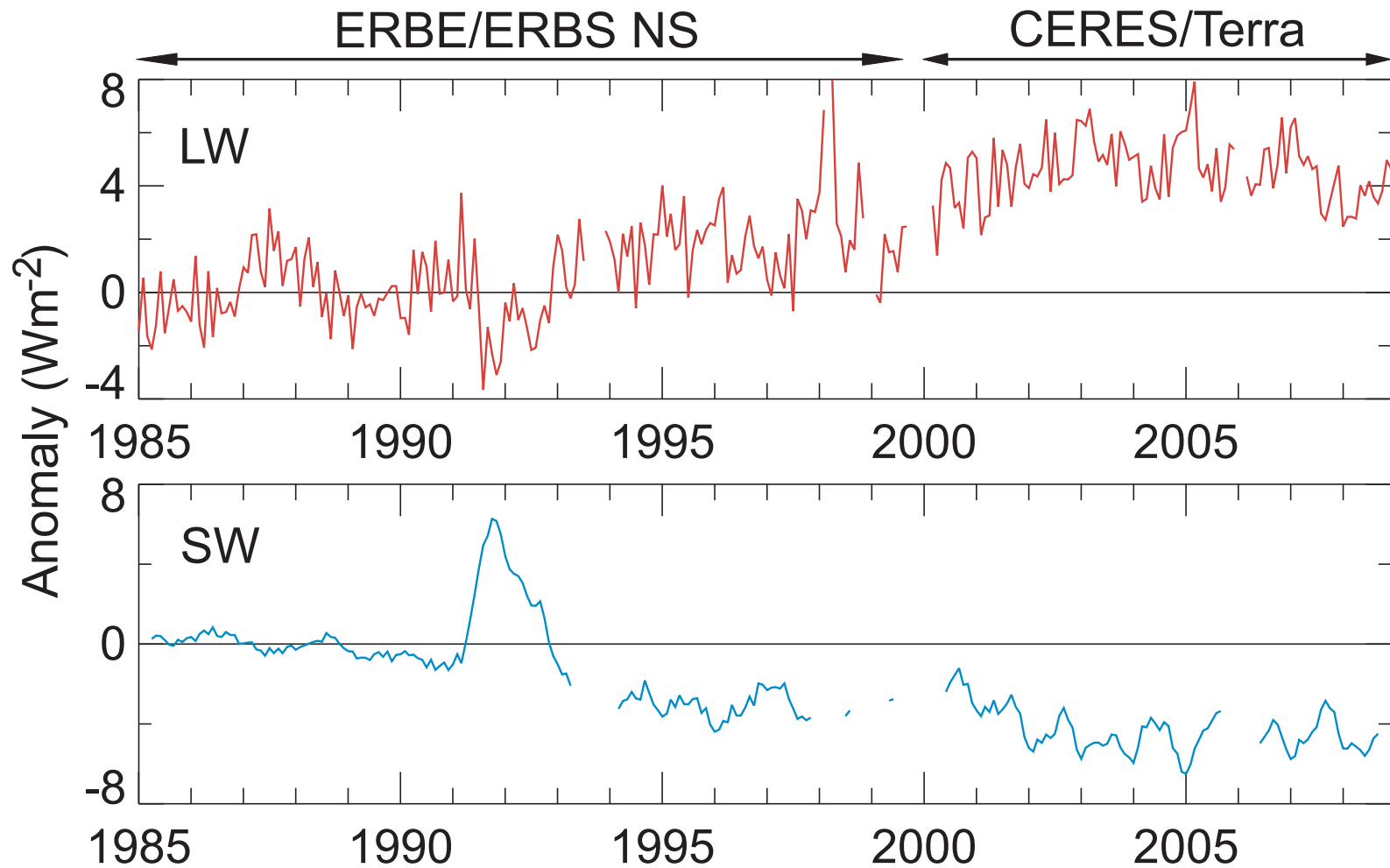
We have a 16-year (1985–1999) record of the earth radiation budget from the Earth Radiation Budget Experiment (ERBE; Barkstrom 1984) nonscanner edition 3 dataset. This is the only stable long-term climate dataset based on broadband flux measurements and was recently altitude-corrected (Wong et al. 2006). Since 1999, the ERBE instrument has been replaced by the better CERES instrument. From the ERBE/CERES monthly data, we calculated anomalies of LW-emitted, SW-reflected, and the total outgoing fluxes.

We also have a record of sea surface temperature for the same period from the National Center for Environmental Prediction.

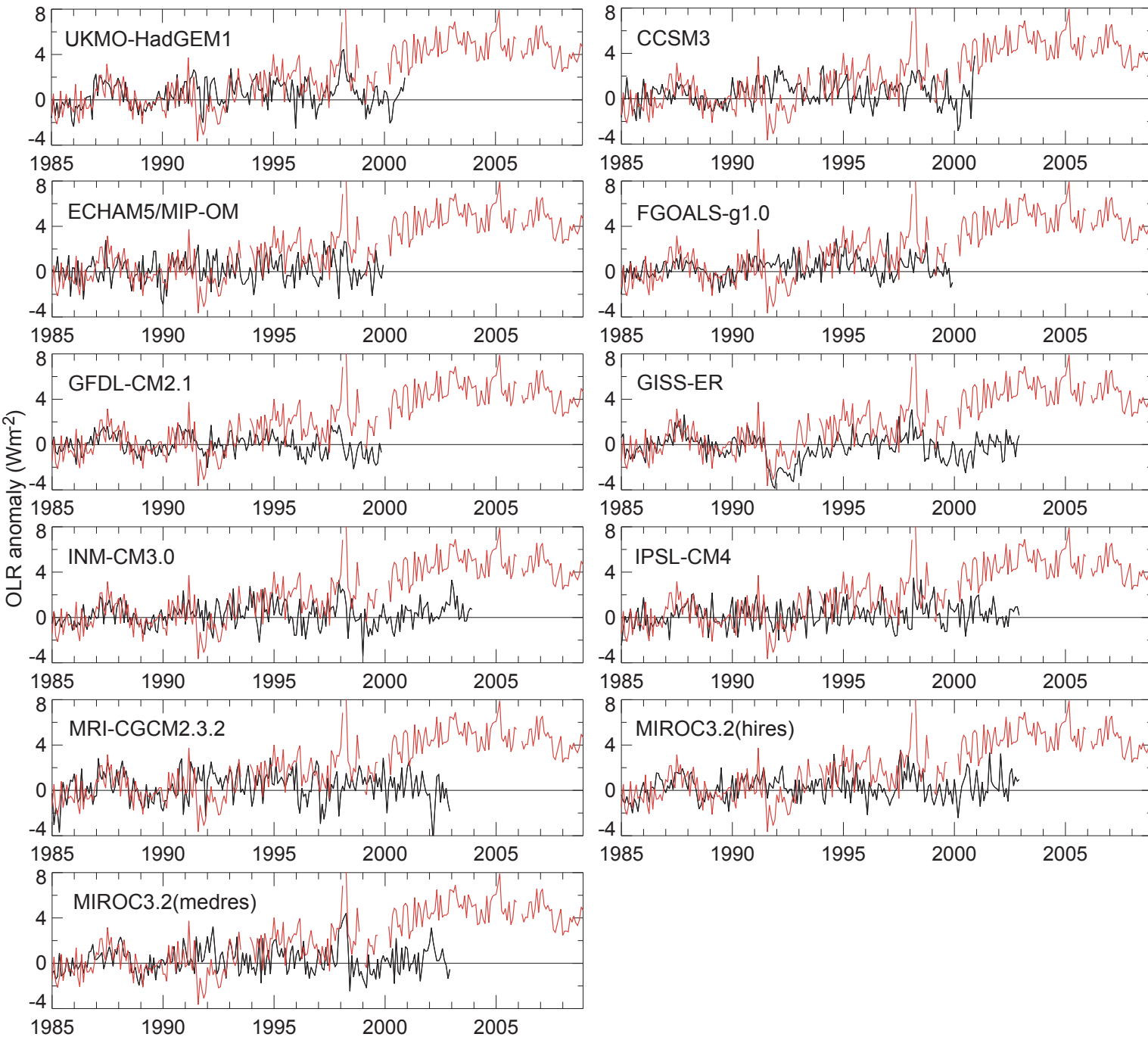
Finally, we have the IPCC model calculated radiation budget for models forced by observed sea surface temperature from the Atmospheric Model Intercomparison Program at the Lawrence Livermore Laboratory of the DOE.



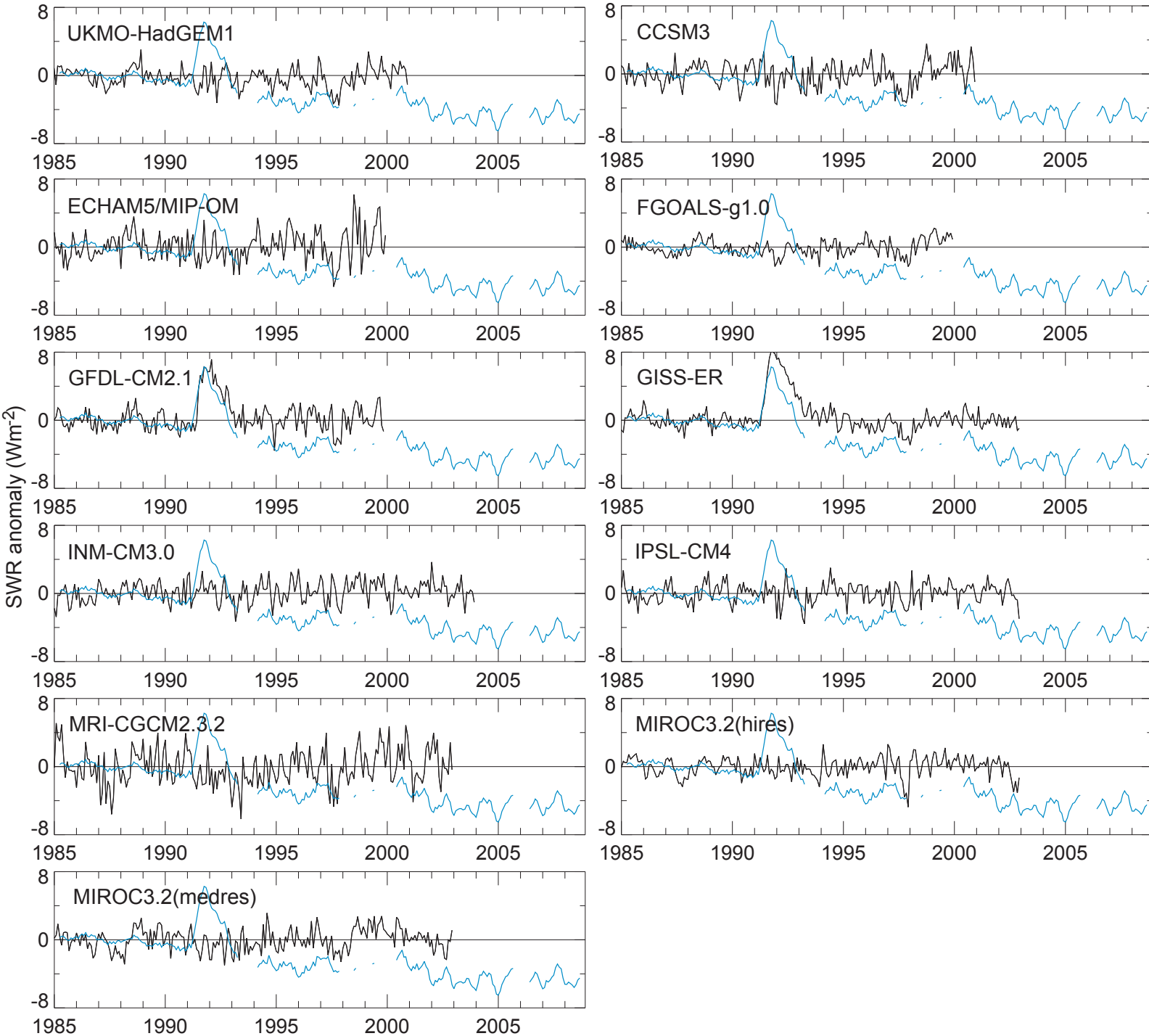
This is the sea surface temperature (SST) record.
Red indicates warming incident, while Blue indicates
cooling incident.



The red curves are the anomalies of satellite OLR relative to the average for the period 1985-89. The blue curves show reflected sunlight.

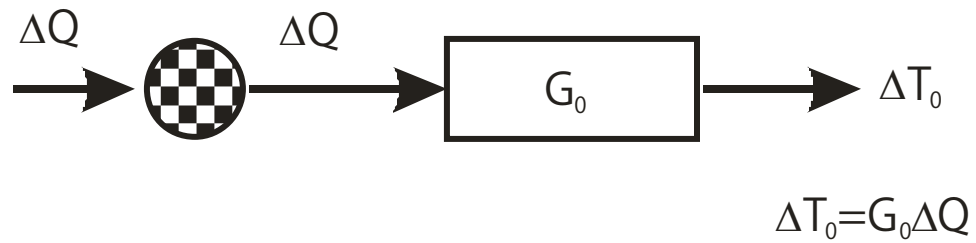


The red curves are the anomalies of satellite OLR relative to the average for the period 1985-89. The black curves are the OLR's obtained from IPCC models forced by the observed SST.

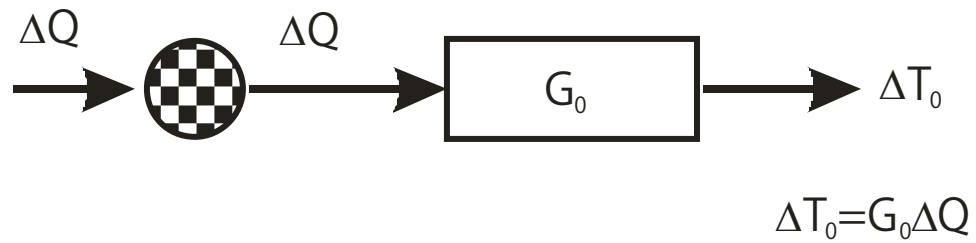


The blue curves are the anomalies of satellite SW radiation relative to the average for the period 1985-89. The black curves are the SWR's obtained from IPCC models forced by the observed SST.

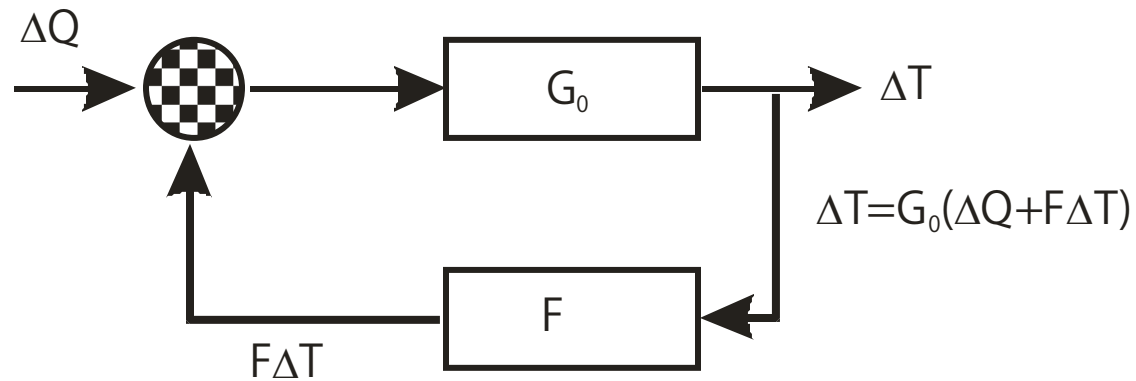
a. No Feedback Case



a. No Feedback Case



b. Feedback Case



$$\Delta T_0 = G_0 \Delta Q,$$

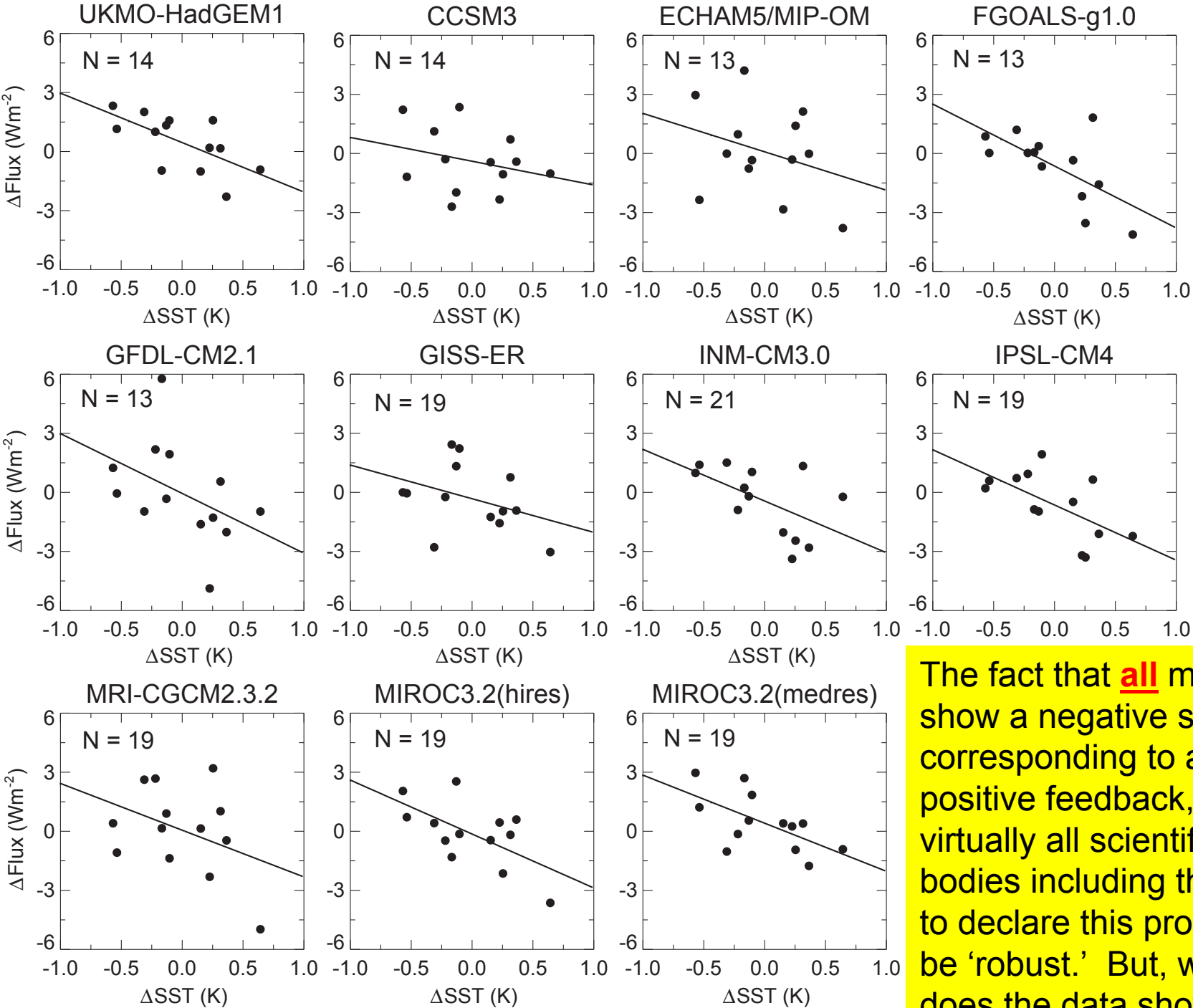
$$\Delta T = G_0 (\Delta Q + F \Delta T),$$

$$\Delta T = \frac{\Delta T_0}{1 - f},$$

where $f = G_0 F$ is the feedback factor. The net feedback is positive for $0 < f < 1$, and negative for $f < 0$. **The feedback parameter F is $-\Delta \text{Flux} / \Delta T$, assuming the same incoming radiation in the system.** The **negative** sign is because increased outgoing flux means energy loss. For example, with $\Delta T = 0.2 \text{ K}$ and $\Delta \text{Flux} = 0.9 \text{ W m}^{-2}$, F is $-4.5 \text{ W m}^{-2} \text{ K}$ ($= -0.9/0.2$).

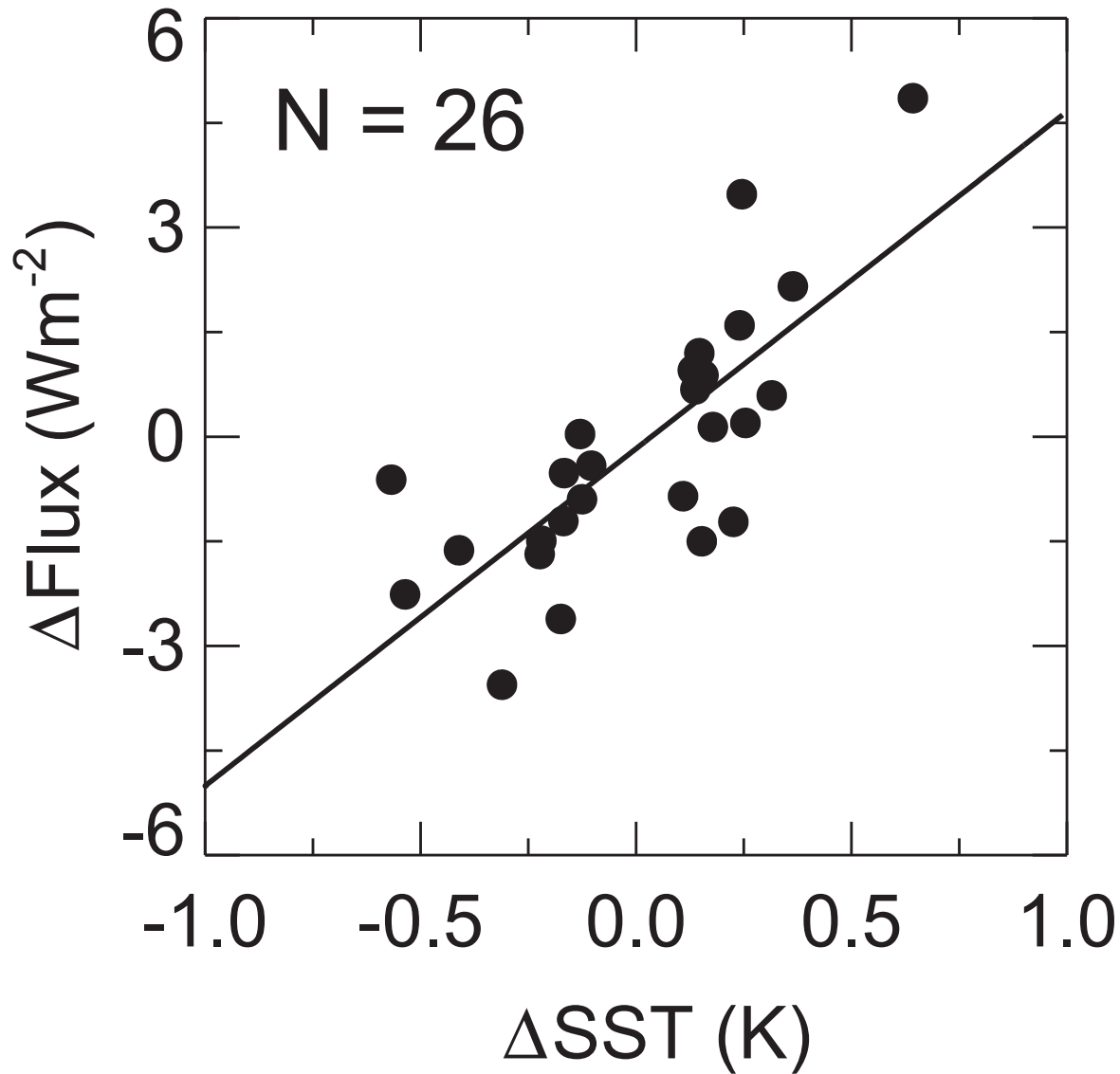
The idea now is to take fluxes observed by satellite and produced by models forced by observed sea surface temperatures, and see how these fluxes change with fluctuations in sea surface temperature. This allows us to evaluate the feedback factor.

Remember, we are ultimately talking about the greenhouse effect. It is generally agreed that doubling CO₂ alone will cause about 1C warming due to the fact that it acts as a 'blanket.' **Model projections of greater warming absolutely depend on positive feedbacks from water vapor and clouds that will add to the 'blanket' – reducing the net cooling of the climate system.**



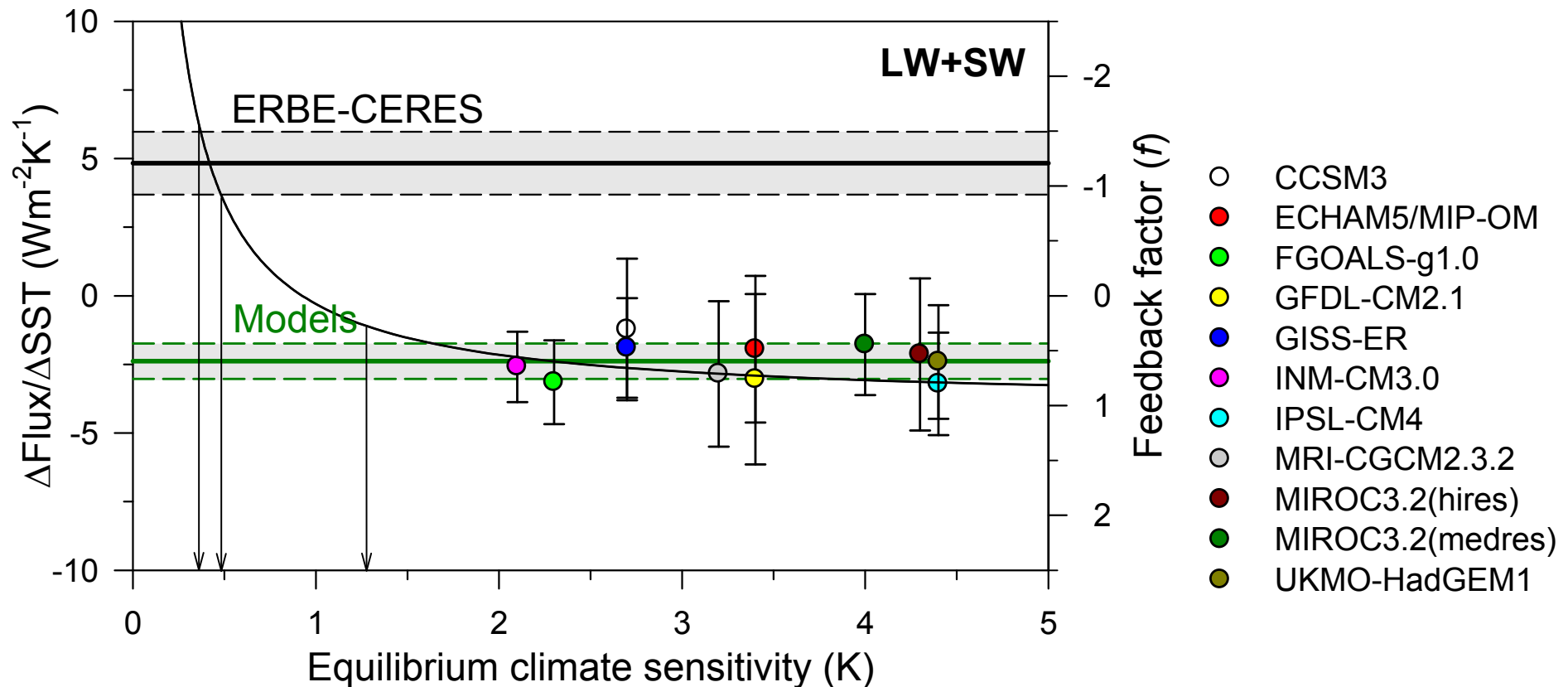
The fact that **all** models show a negative slope corresponding to a positive feedback, has led virtually all scientific bodies including the IPCC to declare this property to be 'robust.' But, what does the data show?

ERBE & CERES



Once one has the feedback factor, it is easy to relate this factor to climate sensitivity via the equation

$$\Delta T = \frac{\Delta T_0}{1 - f},$$



We see that for models, the uncertainty in radiative fluxes makes it impossible to pin down the precise sensitivity because they are so close to unstable 'regeneration.' This, however, is not the case for the actual climate system where the sensitivity is about 0.5C for a doubling of CO_2 . From the brief SST record, we see that fluctuations of that magnitude occur all the time.

What we see is that the very foundation of the issue of global warming is wrong.

So where do we go from here?

It is hard to tell, given that to note this constitutes an “insult to the sensibilities of the educated class and the entire East and West Coasts.”