

Are Scientists Exaggerating or Incompetent?

Principle Sources and Resources for this Study

October 2024 Temperature Update - Berkeley Earth 2024

Analysis: How well have climate models projected global warming? - Carbon Brief 2017

Climate History of Climate from FIU 2023

*****Timing and Impacts Study - Latest Update 2024**

Analysis: Why scientists think 100% of global warming is due to humans - Carbon Brief 2017

Others of Interest

[Study Confirms Climate Models are Getting Future Warming Projections Right - NASA Science](#) 2020

[Climate models reliably project future conditions | National Academies](#) 2021

[Evaluating the Performance of Past Climate Model Projections - Hausfather - 2020 - Geophysical Research Letters - Wiley Online Library](#) 2020

[Evaluation of Climate Models](#) IPCC 2013

[Climate Change: Evidence and Causes: Update 2020 | The National Academies Press](#) 2020

https://muchadoaboutclimate.wordpress.com/wp-content/uploads/2013/08/blog4_temp.png 2000

[Global annual mean temperature variation of the Earth through time... | Download Scientific Diagram](#) 2019

<https://www.linkedin.com/pulse/why-do-scientists-make-fuss-1%C2%BAC-2%C2%BAC-increase-average-global-maxton/> 2023

Are Scientists Exaggerating or Incompetent (or are they trying to figure out the facts)?

It's a fair question to wonder if climate scientists have always been exaggerating their predictions so that folks will pay attention and/or grant them unwarranted influence of some sort.

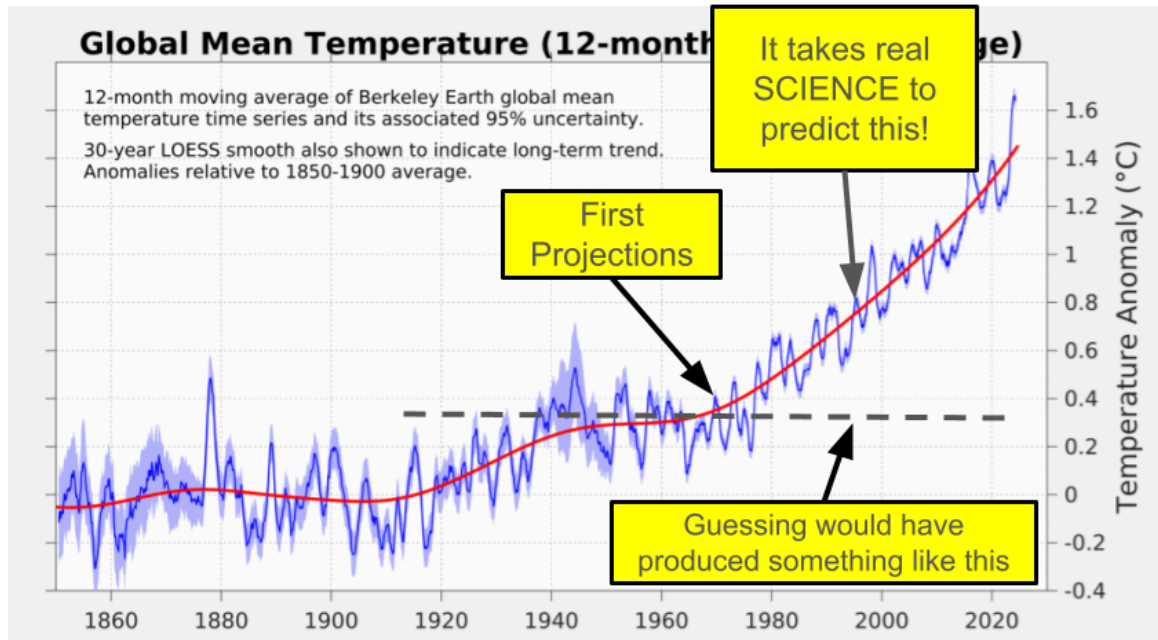
Likewise, it is fair to ask if scientists are so incompetent that their predictions are nonsense and deserve to be ignored.

This study collects some scientific analysis of that very question - in this case with respect to global temperature predictions. This first section takes the above referenced 2017 analysis (which had the best graphics for this purpose) and adds the context of our current (2024) situation. Later assessments are also referenced above and are consistent.

2 *Are Scientists Exaggerating or Incompetent?* CSSG-2.49

Here's how things have unfolded over the last 170 years. The first projections of potential warming started in the **early 1970s - even BEFORE warming was really taking off**. For any non-physics based projection, the previous 50 years would have been a poor basis for a guess.

As we will see, projections were science-based and anticipated the reaction of the planet to the rising concentrations of greenhouse gases. This is a real testimony to me.



Here's how the scientists had to look at it to sort out what to predict:

Analysis: How well have climate models projected global warming?

[Analysis: How well have climate models projected global warming? - Carbon Brief](#)

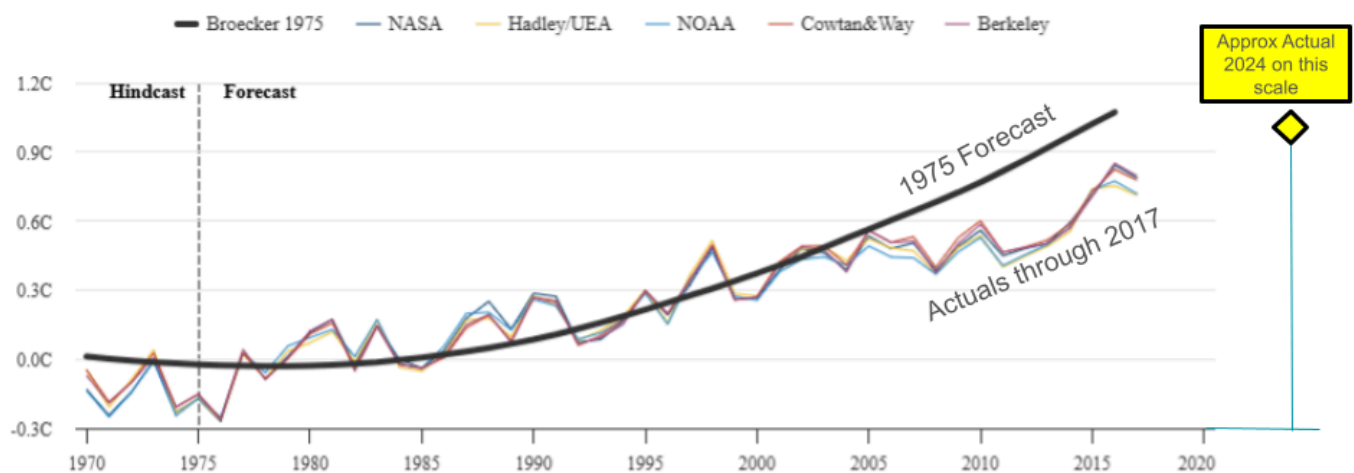
In the examples below, climate model projections published between 1973 and 2013 are compared with observed temperatures from [five different organizations](#). The models used in the projections vary in complexity, from simple [energy balance models](#) to fully-coupled [Earth System Models](#).

(Note, these model/observation comparisons use a **baseline period of 1970-1990** to align observations and models during the early years of the analysis, which shows how temperatures have evolved over time more clearly.) I estimate these values to be **about 0.6 C lower than the usual presentation** using the 1850-1900 baseline as 0 C.

Sawyer, 1973

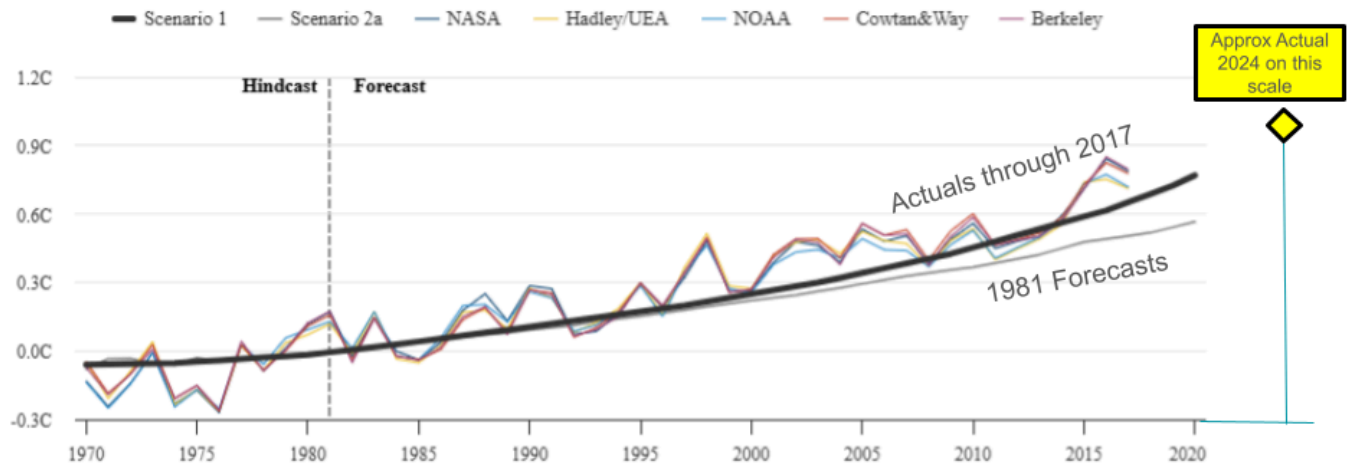
Unlike the other projections examined in this article, Sawyer did not provide an estimated warming for each year, just an expected 2000 value. His warming estimate of 0.6C was nearly spot on.

Broecker, 1975

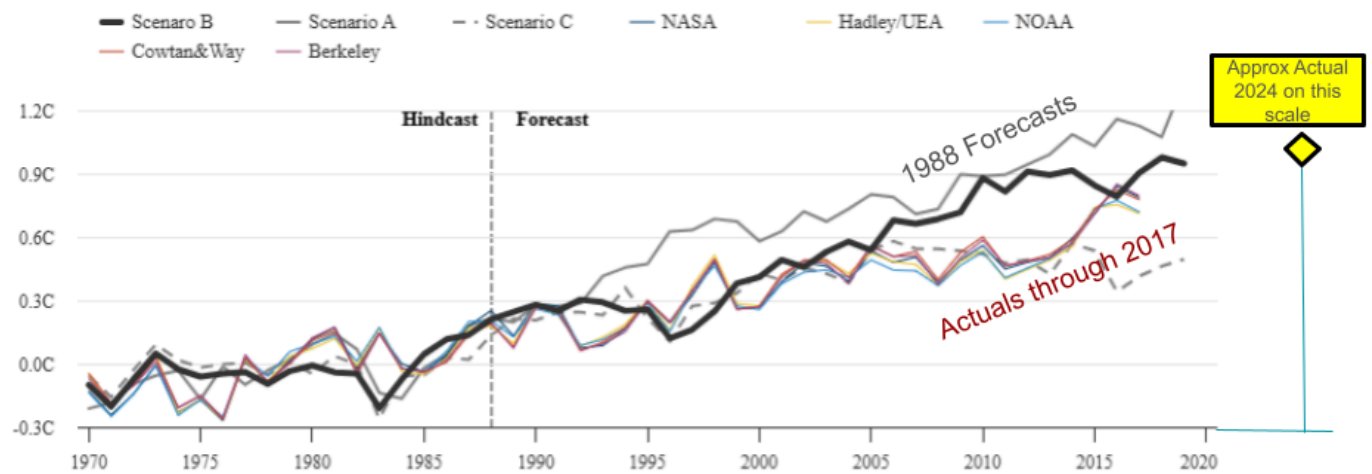


4 Are Scientists Exaggerating or Incompetent? CSSG-2.49

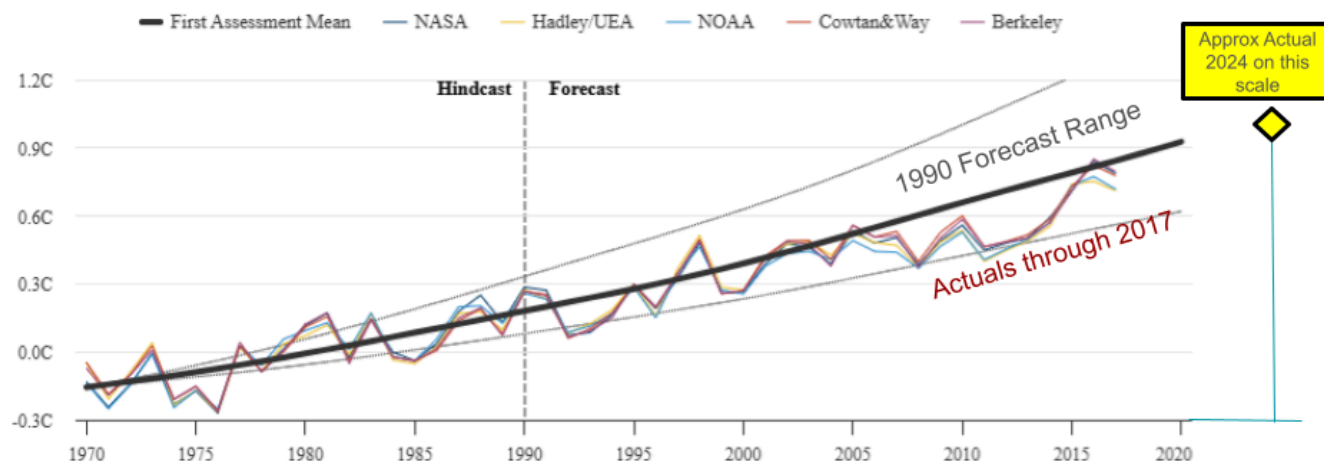
1981: Hansen et al



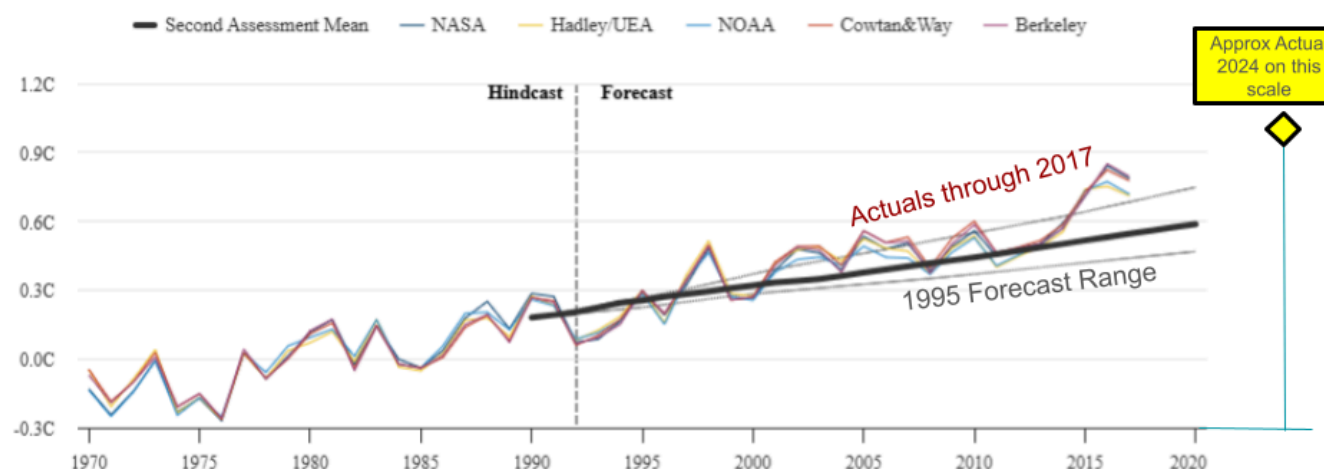
1988: Hansen et al



1990: IPCC First Assessment Report

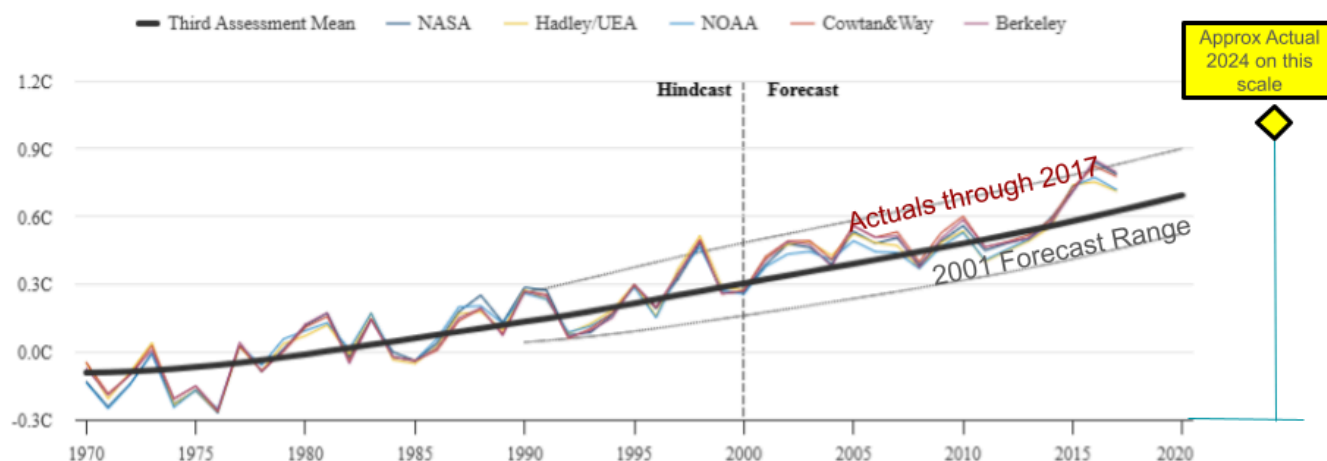


1995: IPCC Second Assessment Report

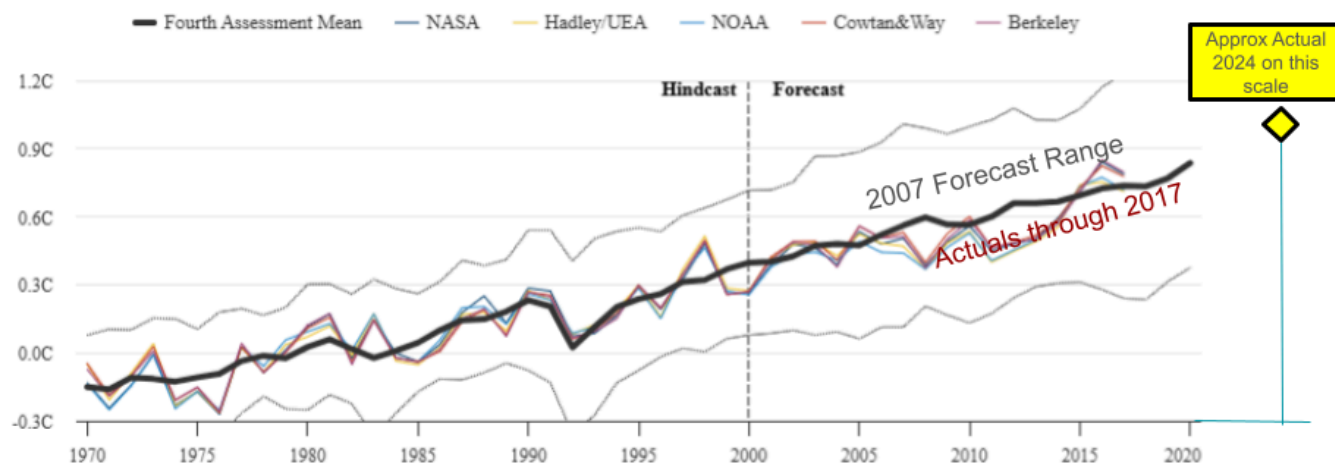


6 *Are Scientists Exaggerating or Incompetent?* CSSG-2.49

2001: IPCC Third Assessment Report

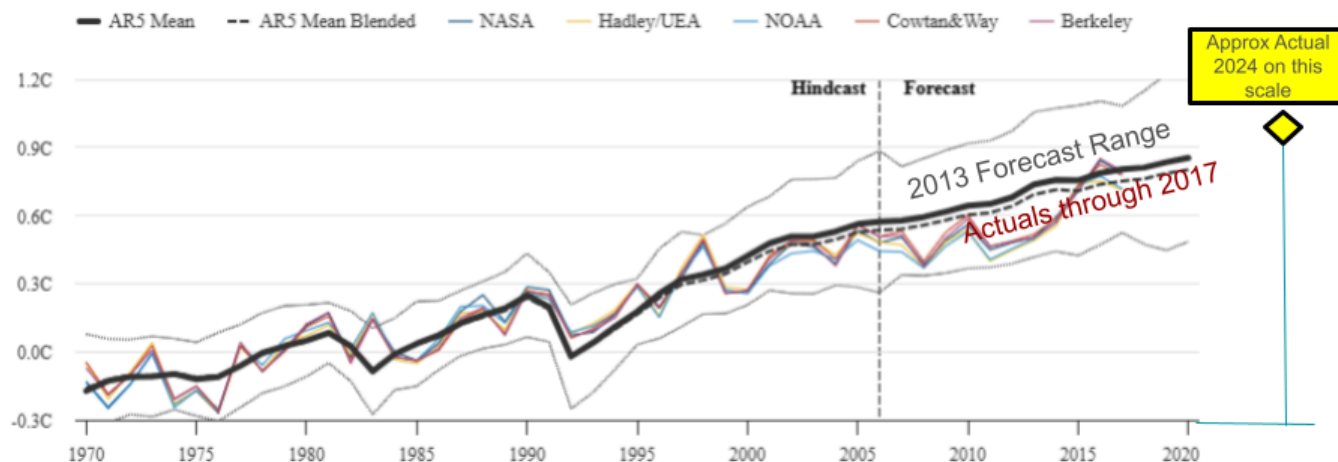


2007: IPCC Fourth Assessment Report



7 Are Scientists Exaggerating or Incompetent? CSSG-2.49

2013: IPCC Fifth Assessment Report



Model	Difference in 1970-2016 mean warming rate vs. Obs
Broecker 1975	+30%
Hansen et al 1981	-20%
Hansen et al 1988	+30%
IPCC 1st Report, 1990	+17%
IPCC 2nd Report, 1995	-28%*
IPCC 3rd Report, 2001	-14%
IPCC 4th Report, 2007	+8%
IPCC 5th Report, 2013	+16% (+9%)#

* SAR trend differences are calculated over the period from 1990-2016, as estimates prior to 1990 are not readily available.

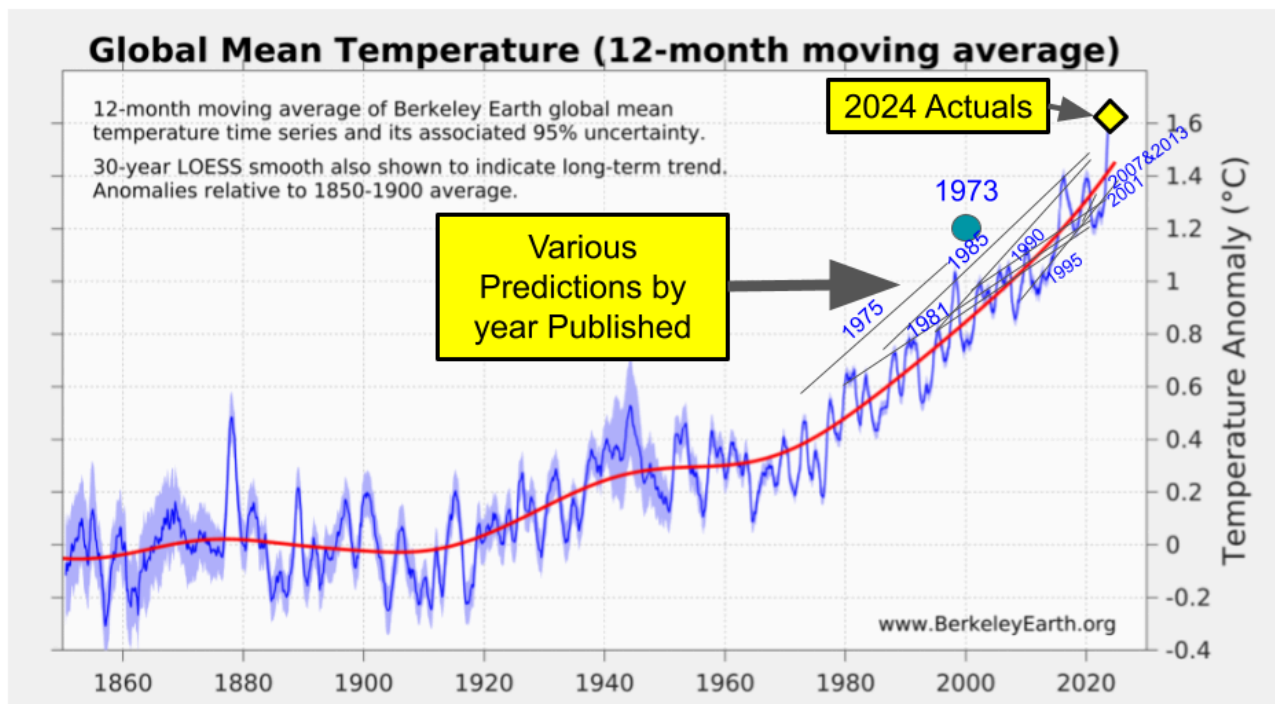
Differences in parenthesis based on blended model land/ocean fields

Conclusions as of 2017

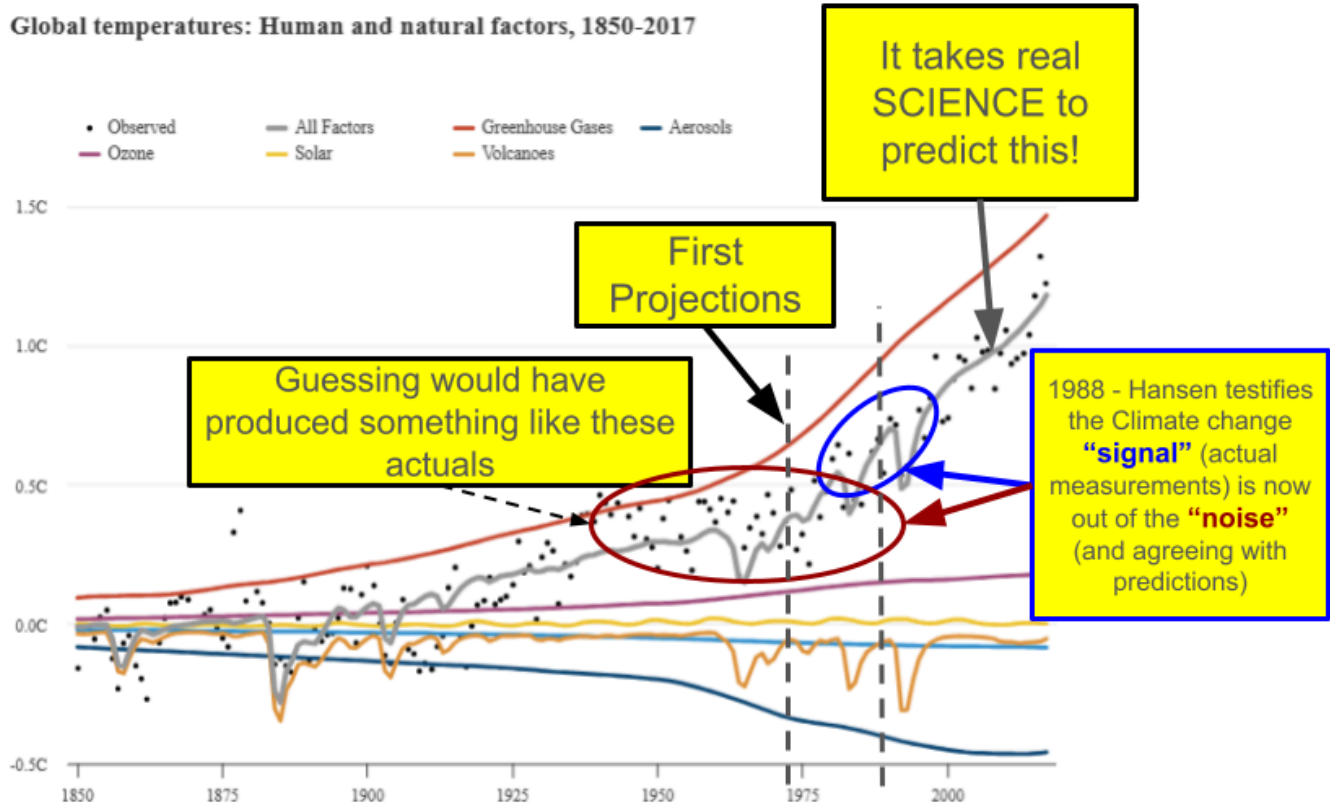
Climate models published since 1973 have generally been quite skillful in projecting future warming. While some were too low and some too high, they all show outcomes reasonably close to what has actually occurred, especially when discrepancies between predicted and actual CO₂ concentrations and other climate forcings are taken into account.

Models are far from perfect and will continue to be improved over time. They also show a fairly large range of future warming that **cannot easily be narrowed** using just the changes in climate that we have observed.

Nevertheless, the close match between projected and observed warming since 1970 suggests that estimates of future warming may prove similarly accurate.



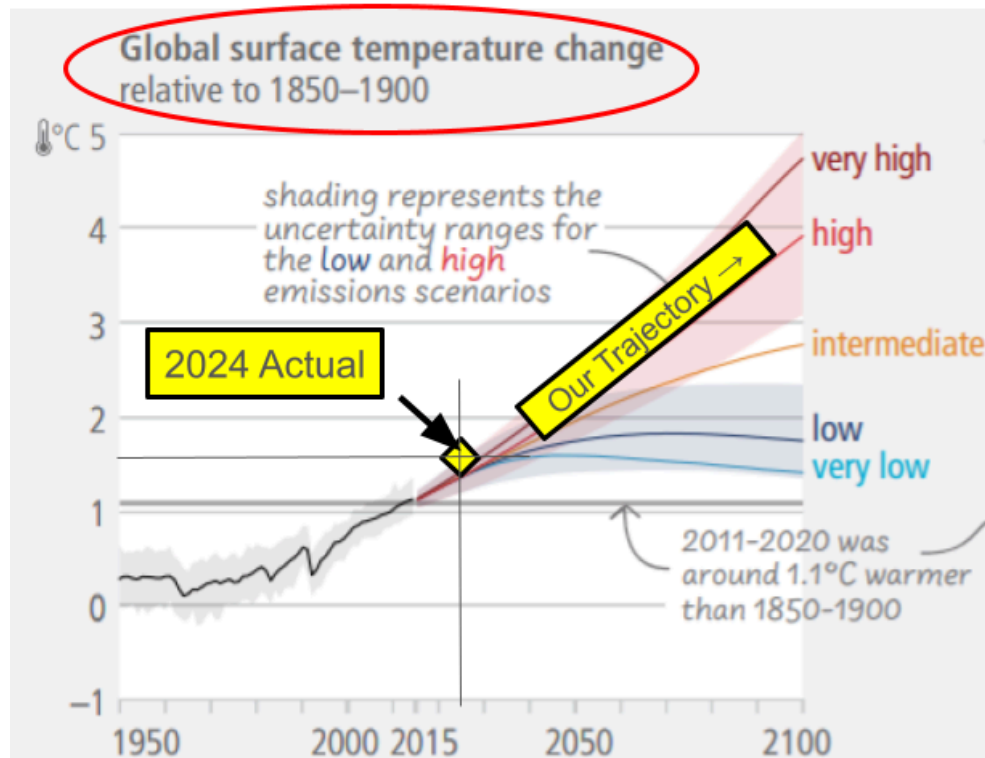
The Data that Proved that the Scientists knew what they were talking about



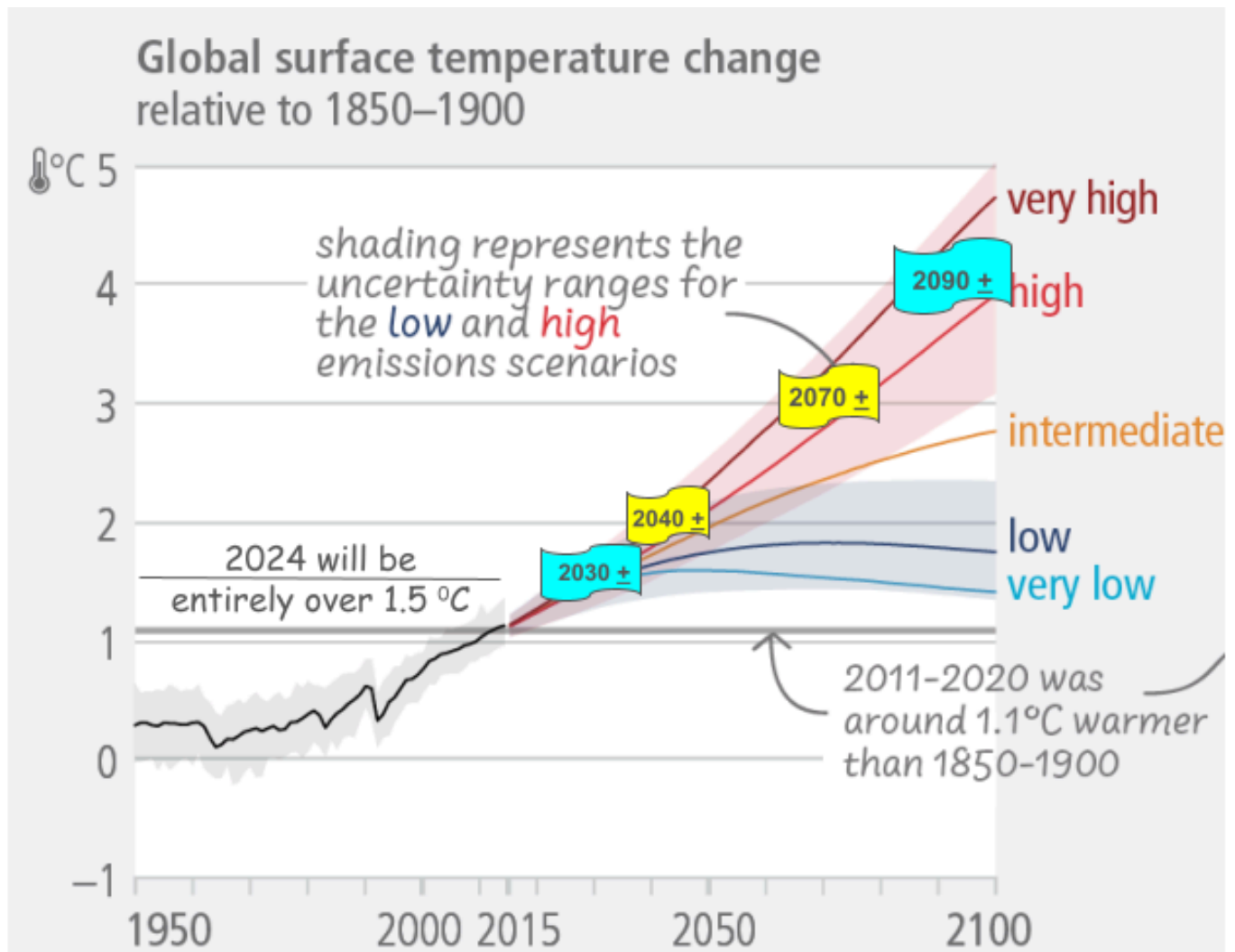
The story of these scientific predictions is amazing to me. Notice the gray line in the graphic above. That is the "Actual" data available (actually it is a running average of the black dots which show the average global temperature measured for each year). Climate scientists by 1933 had actually started sorting out how the individual factors they understood (all the other lines) should be adding up to give the gray line of actuals. The period from 1950 - 1980 seemed stable and stimulated a discussion of global cooling from ice age factors or from aerosols. The conclusion was that the aerosol (particulate) pollution was hiding the warming. So, the "Signal" was still not emerging from the "Noise". By 1988, predictions were being validated by the data and the world conversation clarified.

Updating to present time - where are we heading?

IPCC 2021 projections are shown below, and I have included the 2024 status for comparison.



It turns out that I used this same chart in my [***Timing and Impacts Study - Latest Update 2024](#). Here it is again, with my guesses for the timing when we might endure the benchmark temperature changes, if we do not change our behaviors (which we are not, so far):



PUNCHLINES

Given the above, it is reasonable to conclude that the scientists:

- Are competent enough to make projections which prove to be consistent with reality
- Are not prone to exaggeration
- Are moving to more and more complex models which still deliver a significant range of possibilities. Important reasons include sorting out the planet's sensitivity to incoming energy, real-time changes in particulate pollution levels, limits to computing power and the details of topography, etc.
- Have good reason to be concerned about our future (as do we).

GOOD NEWS CORNER

[America Is Building the World's Biggest Battery—And It Will Run on Rust](#)



Our Natural World



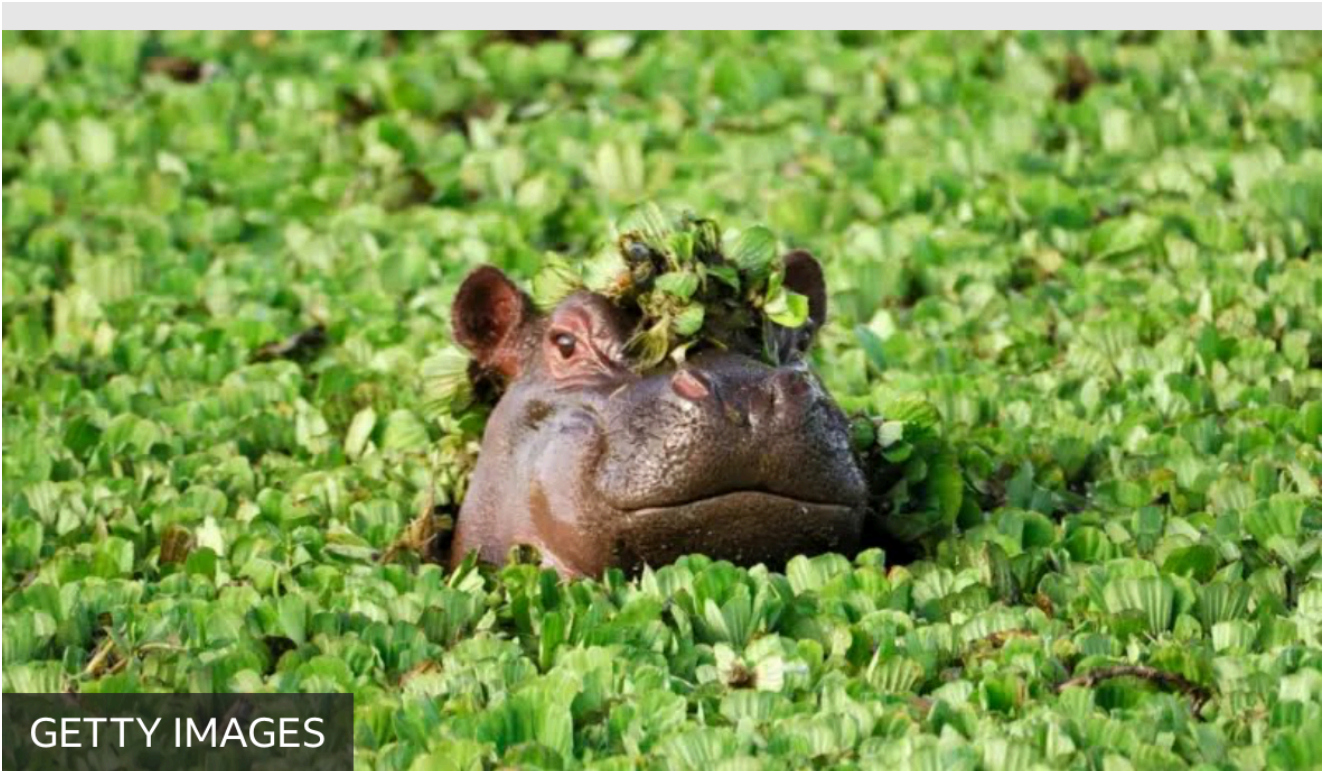
Deeply strange

NAZCA RIDGE, CHILE

First discovered in 2016, 4,290m (approx 14,000ft) below the surface of the Pacific Ocean near Hawaii, the Casper octopus is a remarkable species. Ghostly in appearance due to a lack of pigment, it takes its name from the famously friendly cartoon spectre.

Eight years after the discovery of the species, this example was observed by researchers from the Schmidt Ocean Institute during an expedition to the Nazca Ridge off the coast of Chile.

<https://schmidtocan.org/>



GETTY IMAGES

Understanding the value of nature is key to addressing the global biodiversity crisis, according to IPBES scientists

<https://www.bbc.co.uk/news/articles/cwyxkz41knzo.amp>

Supplemental Materials

Approximate “Cheat Sheet”:

1 meter → 3 feet	1 degree Celsius (°C) → 2 degree Fahrenheit (°F)
ppm = parts per million	CO ₂ = Carbon Dioxide
1 tonne = 1000 kilograms = 2205 pounds	1 gigatonne (1 Gt) = 1 billion tonnes
1 trillion tonnes (1Tt) = 1000 gigatons	