

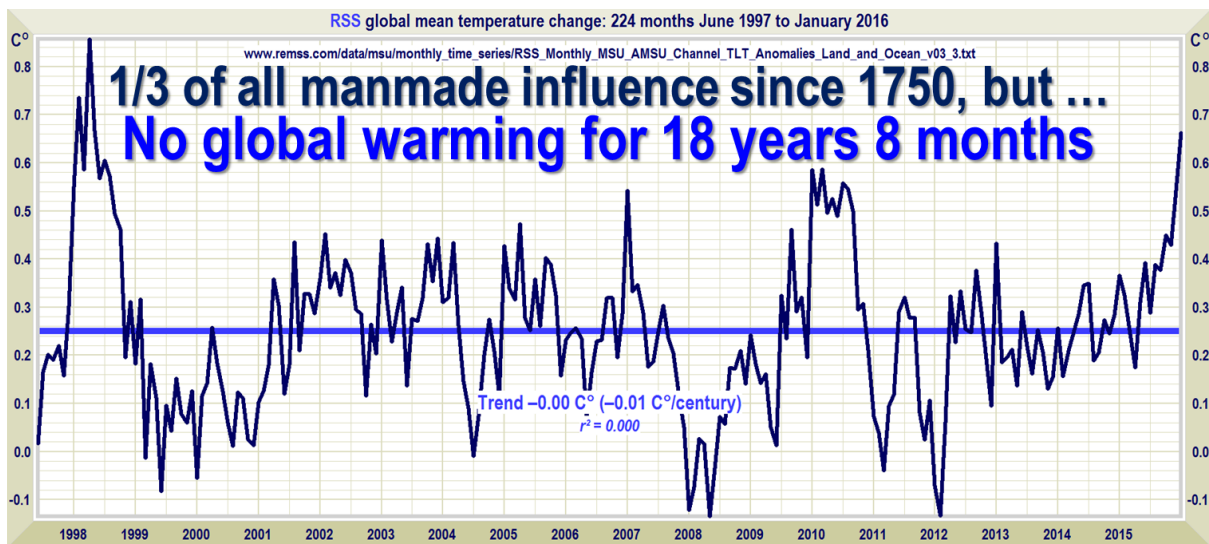
# The Pause clings on by its fingernails

Our impartial monthly global temperature update

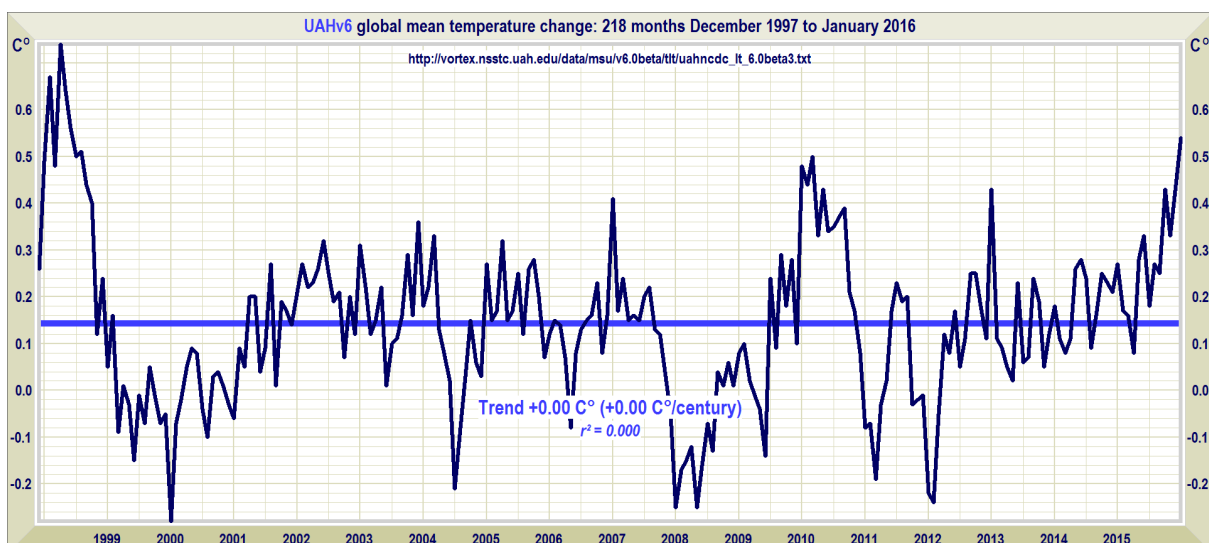
By Christopher Monckton of Brenchley

The sharp el Niño spike is just about to abolish the long Pause in global temperatures – at least for now. This column has long foretold that the present el Niño would be substantial, and that it might at least shorten if not extinguish the Pause. After all, theory requires that *some* global warming ought to occur.

This month, though, the Pause clings on. Though January 2016 was the warmest January in the RSS satellite record since 1979, the El Niño spike has not yet lasted long enough to end the Pause. That will happen by next month's report. The RSS data still show no global warming for 18 years 8 months, notwithstanding record increases in CO<sub>2</sub> concentration over the period.



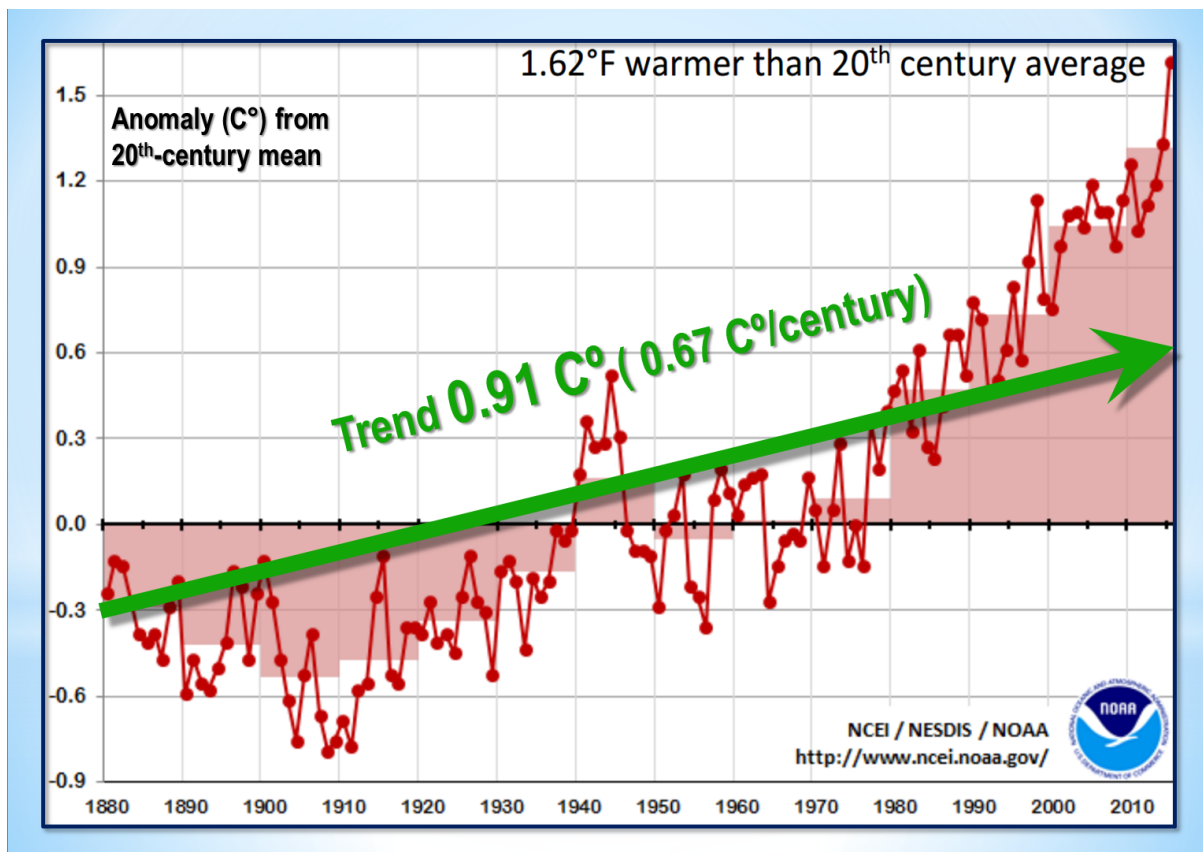
Dr Roy Spencer's UAH v.6 satellite lower-temperature dataset shows the Pause has already (just) disappeared. For 18 years 2 months there has been barely any warming, though to two decimal places the anomaly is zero:



The believers say there was never a Pause in the first place. After many unconvincing alterations to all of the principal global surface temperature datasets over the two years leading up to the Paris climate conference, the Pause all the datasets once showed had been erased.

Significantly, the two satellite datasets continued to show a steadily-lengthening Pause till last month, but over the past year or two, long before the present el Niño set in, the three terrestrial datasets had already succeeded in ingeniously airbrushing it away.

The not necessarily reliable Tom Karl of NOAA and the relentlessly campaigning Gavin Schmidt of NASA held a joint press conference to celebrate the grants their rent-seeking organizations can milk out of their assertion that 2015 was the warmest year since 1880. But they carefully omitted the trend-line from their graph, so I have added it back. It shows the world warming since 1880 at an unexciting two-thirds of a degree per century:



*NOAA's much-altered global surface temperature record, showing a 0.9 C° global warming trend since 1880, equivalent to just two-thirds of a degree per century.*

So here's the Houston problem, the 13<sup>th</sup> chime, the dog that didn't bark in the night-time, the fly in the ointment, the poop in the puree, the jumbo in the Jacuzzi – the \$64,000 question that would once have alerted true scientists to the possibility that somewhere their pet theory might have gone more than somewhat agley.



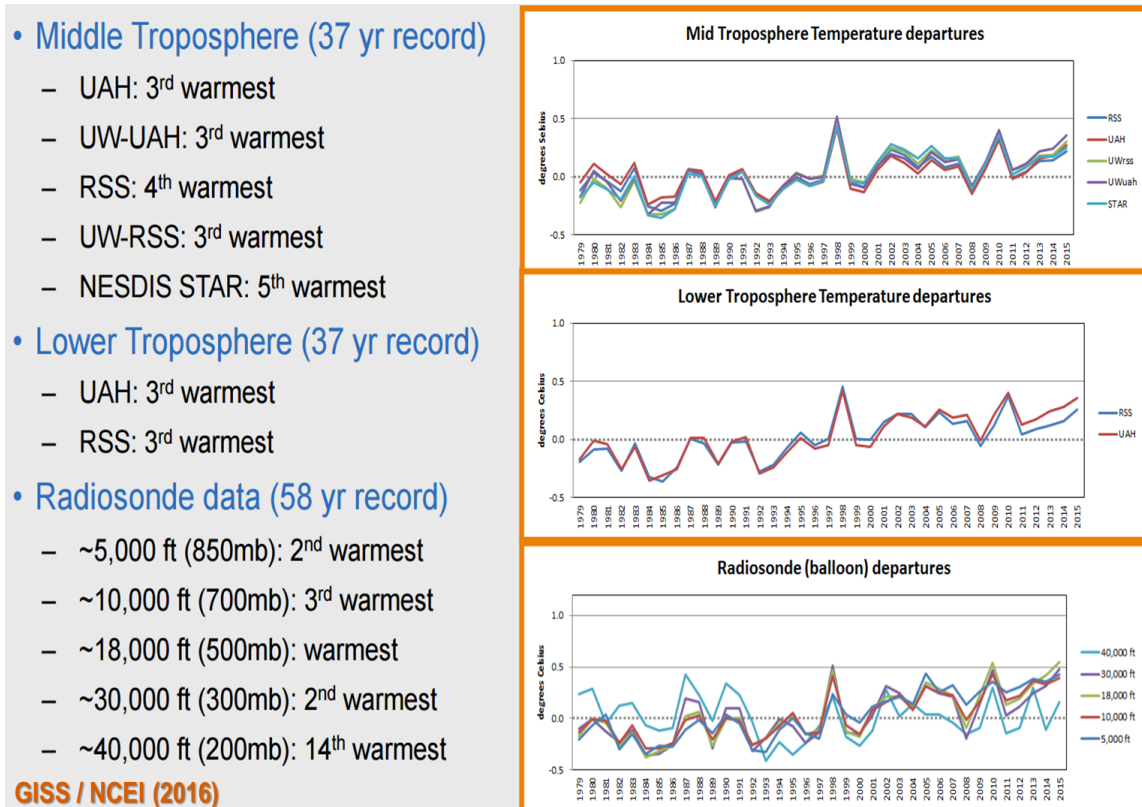
*The Jumbo in the Jacuzzi*

Since the satellites of both UAH and RSS show there has been very little global warming of the lower troposphere over the past decade or two, perhaps Schmidt and Karl would care to answer the following key question, which I have highlighted in red:

*Where has the surface warming of the past 19 years come from?*

Schmidt and Karl, like the Met Office this side of the pond, say there has been rapid surface warming over the past 19 years. If so, where on Earth did it come from? The laws of thermodynamics are not up for repeal. The official theory is that CO<sub>2</sub> warms the atmosphere and the atmosphere warms the surface. But for almost 19 years the satellites show that the lower atmosphere has barely warmed. Even if there had been CO<sub>2</sub>-driven warming higher up, for the official theory says we should expect a faster warming rate in the mid-troposphere than at the surface, how could that higher-altitude warming have magically reached the surface through a lower troposphere that has not warmed at all?

IPCC had predicted in 2007, on the basis of a single bad paper by Ben Santer of Lawrence Livermore National Laboratory, that the tropical mid-troposphere should warm twice or even thrice as fast as the tropical surface. However, as the revealing final slide shown by Schmidt and Karl at their press conference demonstrates, the predicted tropical mid-troposphere hot spot (I had the honor to name it) is in reality absent. Lower and mid-troposphere anomalies are almost identical:



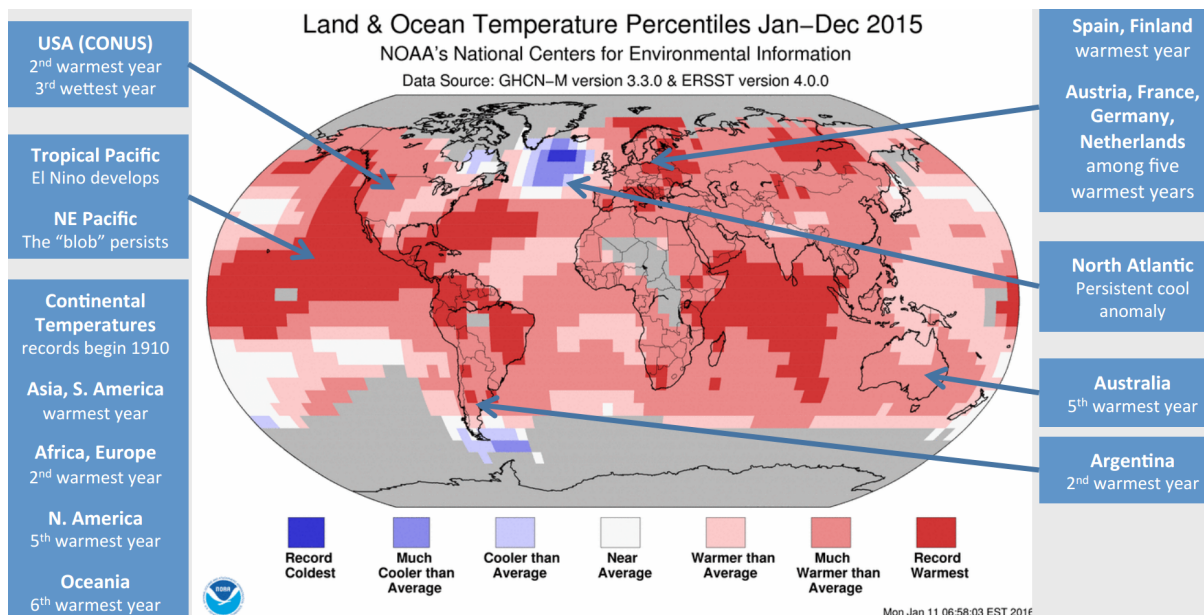
One clue to the source of the warming reported by the surface datasets but not by the satellite datasets over the past 19 years is to be found in another revealing diagram presented by Schmidt and Karl at their presser.

About five-sixths of the areas of “record” surface warming shown in the NOAA diagram are areas of ocean, the el Niño-driven warming of the eastern equatorial Pacific being particularly pronounced.

Aside from the ocean warming, the land-based warming was prominent over Siberia and northern China, Europe and central America, inferentially owing much to urban heat-island effects.

In short, the warming of both land and oceans shows a pattern strongly confirming the satellite record to the extent that the warming – insofar as it is not a mere artefact of the surface-temperature tampering over the past couple of years – displays a pattern suggesting that it originates not from above in the atmosphere, where it would have originated if CO<sub>2</sub> had been the cause, but at or below the surface.





On any view, the significant warming that the terrestrial datasets claim over the past two decades cannot have come from the atmosphere, and accordingly cannot have been caused by our enrichment of that atmosphere with greenhouse gases – if, that is, the satellites are correct that the lower troposphere has not been warming.

When the first temperature-monitoring satellites began to deliver data, NASA said the satellite temperature record would be more reliable than the surface record because the coverage was more complete, the method of measurement standardized and the coverage and coverage-bias uncertainties that plague the terrestrial record were absent.

Now that the satellites of both UAH and RSS have been showing so little warming for so long, expect that story to begin to change. If the satellite data are broadly correct, then either the terrestrial data are wrong owing to unjustifiable tampering or they are detecting genuine warming that may be from urban heat-island influences or from deep-ocean warming but cannot be from the atmosphere and is not caused by our sins of emission.

One way to prop up the specious, crumbling credibility of the terrestrial temperature datasets and of the CO<sub>2</sub> panic at the same time is to attack the satellite datasets and pretend that the measurement method that NASA itself had once said was the best available is somehow subject to uncertainties even greater than those to which the terrestrial datasets are prone.

I am not the only one to sense that Dr Mears, the keeper of the RSS satellite dataset, who labels all who ask questions about the Party Line as “denialists” and in early 2016 took shameful part in a gravely prejudiced video about global temperature change, may be about to revise his dataset sharply to ensure that the remarkable absence of predicted warming that it demonstrates is sent down the memory hole.

What of ocean warming? The ARGO bathythermographs show little warming at the surface from 2004 until the current el Niño began. What is more, ARGO stratigraphy

shows that the warming is generally greater with depth. The warming of the ocean, then, appears to be coming not from above, is it would if CO<sub>2</sub> were the driver, but from below.

I should have liked to show graphs to establish that the warming is greater in the lower than in the upper strata of the 1.25-mile slab that ARGO measures. But the ARGO marine atlas is clunky and does not seem to be as compatible with PCs as it should be. So I have been unable to extract the relevant data. If anyone is able to produce complete stratum-by-stratum anomaly-and-trend plots of the ARGO data for its 12 full years in operation from January 2004 till December 2015, please let me know as soon as the December 2015 ARGO data become available. The latest monthly update is very late, as the ARGO data often are:



If the eventual data confirm what I have some reason to suspect, then a further killer question must be faced by the tamperers:

*Why is the ocean warming not from above  
but from below?*

Though the Pause is gone, the problem it poses for the Thermageddonites remains. For their own theory dictates that, all other things being equal, an initial direct warming should occur instantaneously in response to radiative forcings such as that from CO<sub>2</sub>. However, for almost 19 years there was not a flicker of response from global temperatures, casting serious doubt upon the magnitude of the warming to be expected from anthropogenic influences.

To the believers, therefore, it was important that the Pause should not merely cease, for Nature is, as expected, gradually taking care of that, but vanish altogether. The need to abolish the Pause became still more urgent when at a hearing in December 2015 Senator Ted Cruz, to the great discomfiture of the "Democrats", displayed the RSS graph showing no global warming for 18 years 9 months.

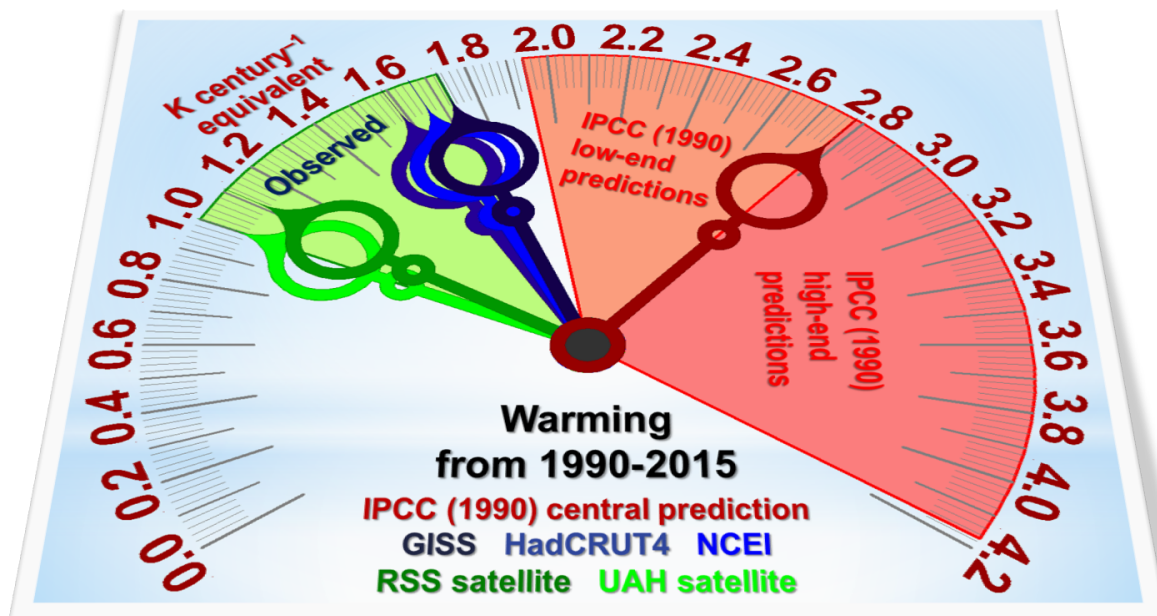
So to another killer question that Schmidt and Karl ducked at their presser, and must now face (for if they do not answer it Senator Cruz can be expected to go on asking it till he gets an answer):

*Why do all the datasets, terrestrial as well as satellite, show less warming than predicted?*

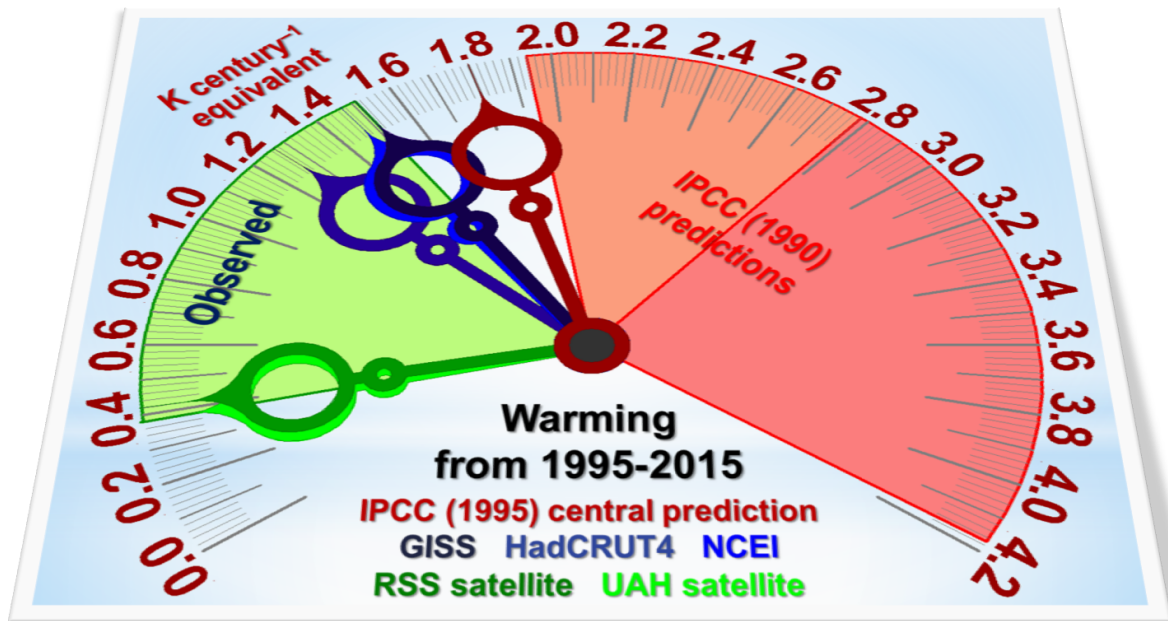
The now-glaring discrepancies between prediction and reality, and between the satellite and terrestrial datasets, are plainly evident from all datasets even after the tampering. Yet until now there has been no systematic analysis to show just how large the discrepancies have become. So here goes.

In 1990, at page xxiv of the *First Assessment Report*, IPCC predicted near-linear global warming of 1.0 [0.7, 1.5] K over the 36 years to 2025, a rate equivalent to 2.78 [1.94, 4.17] K/century. However, in the 26 years since 1990 the reported warming rates are equivalent to only [1.59, 1.73] K/century from the terrestrial datasets (blue needles) and [1.14, 1.23] K/century from the satellites (green needles). IPCC's 1990 central prediction, the red needle, accordingly shows almost double the warming reported by the terrestrial datasets and at least two and a half times that reported by the satellite datasets.

Somehow, the flagrant over-prediction that the discrepancy graphs of temperatures from 1990, 1995 and 2001 to today illustrate did not get a mention in the colourful material circulated to the media by the *SchmidtKarlPropagandaAmt*.

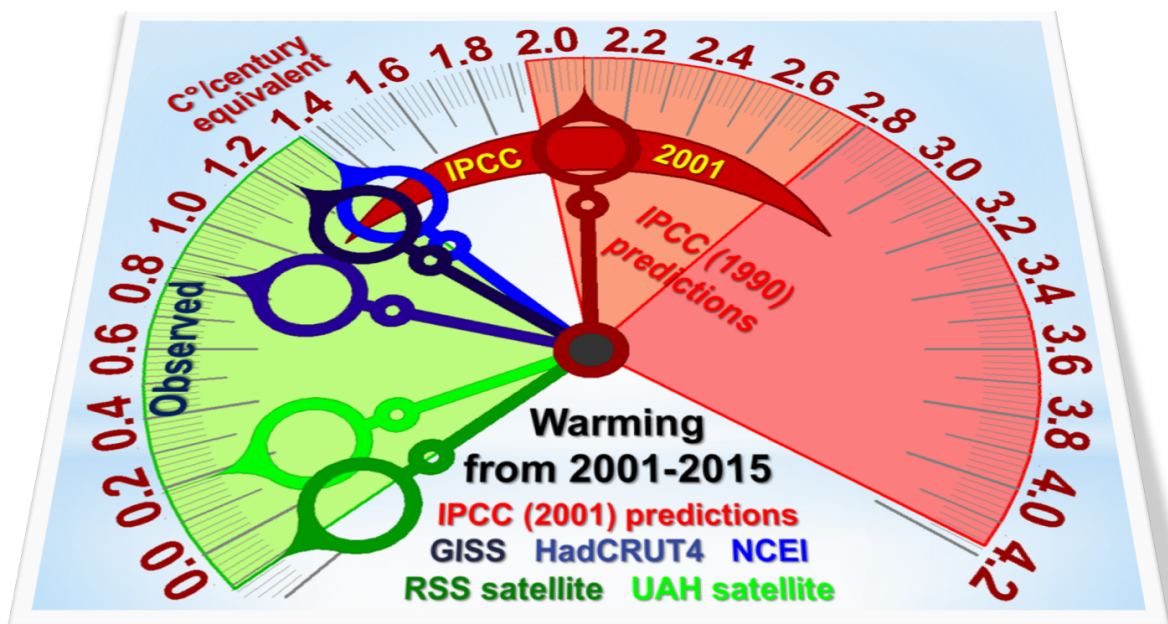


The models' extravagant over-prediction becomes still more self-evident when one looks at IPCC's next excitable prediction. In fig. 6.13 of the 1995 *Second Assessment Report*, IPCC predicted a medium-term warming rate of 0.38 K over 21 years, equivalent to 1.8 K per century, assuming the subsequently-observed 0.5%-per-year increase in atmospheric CO<sub>2</sub> concentration.



Here, at least, IPCC's prediction is within shouting distance of the terrestrial temperature data, though still extravagantly above the satellite temperature data. But IPCC's 1990 least prediction was well above its own central prediction made just five years later. IPCC's 1990 central prediction was 50% above its 1995 prediction, and its 1990 high-end prediction was 130% above its 1995 prediction.

The reliability of IPCC's predictions deteriorated still further in 2001. On page 8 of the *Summary for Policymakers*, it predicted that in the 36 years 1990-2025 the world would warm by [0.4, 1.1] K, equivalent to [1.11, 3.05] K/century, again a significant downshift compared with the interval of medium-term predictions it had made in 1990, and implying a central estimate equivalent to about 2.08 K/century (the red needle on the following temperature clock) over the 25-year period:



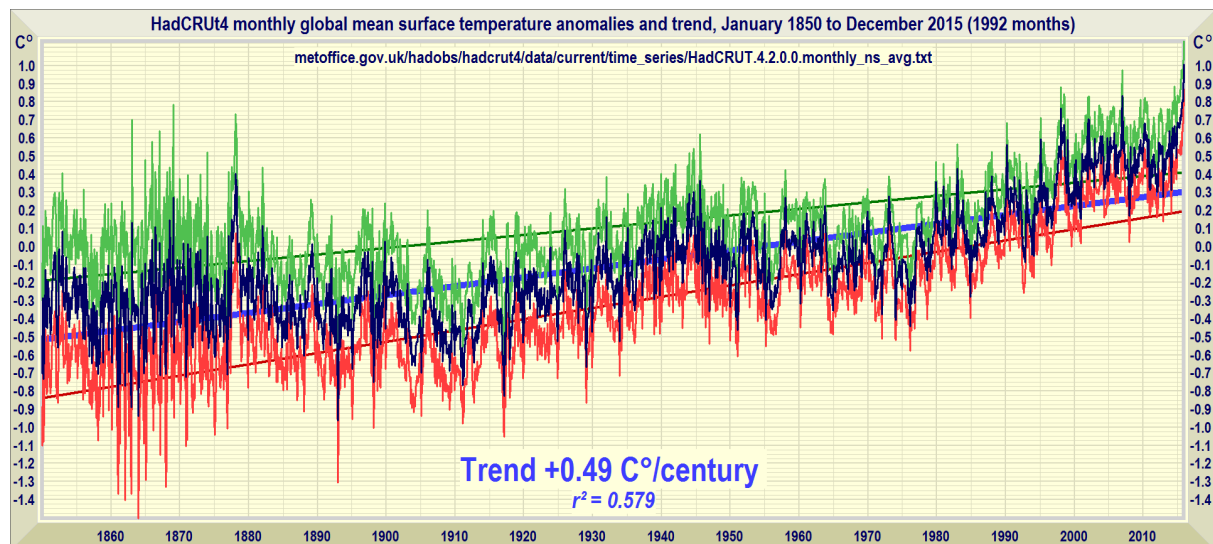


Three points are startlingly evident in these graphs. First, IPCC has inexorably and very substantially cut its predictions of medium-term warming since the exaggerated predictions in its *First Assessment Report* got the climate scam going in 1990.

Secondly, even its revised predictions are substantial exaggerations compared with observed, reported reality.

Thirdly – and this is very odd – the most basic measure of the uncertainties in temperature measurement in any time-series, which is the interval between the least and greatest reported trends on that series, has widened when most indications are that it should be narrowing.

To demonstrate that error-bars on temperature measurement should be narrowing in response to all those taxpayer dollars being flung at it, the HadCRUT4 dataset – which to Professor Jones’ great credit publishes the error-bars as well as the central estimate of observed temperature change – shows a considerable narrowing of the uncertainty interval over time, as methods of measurement become less unreliable:



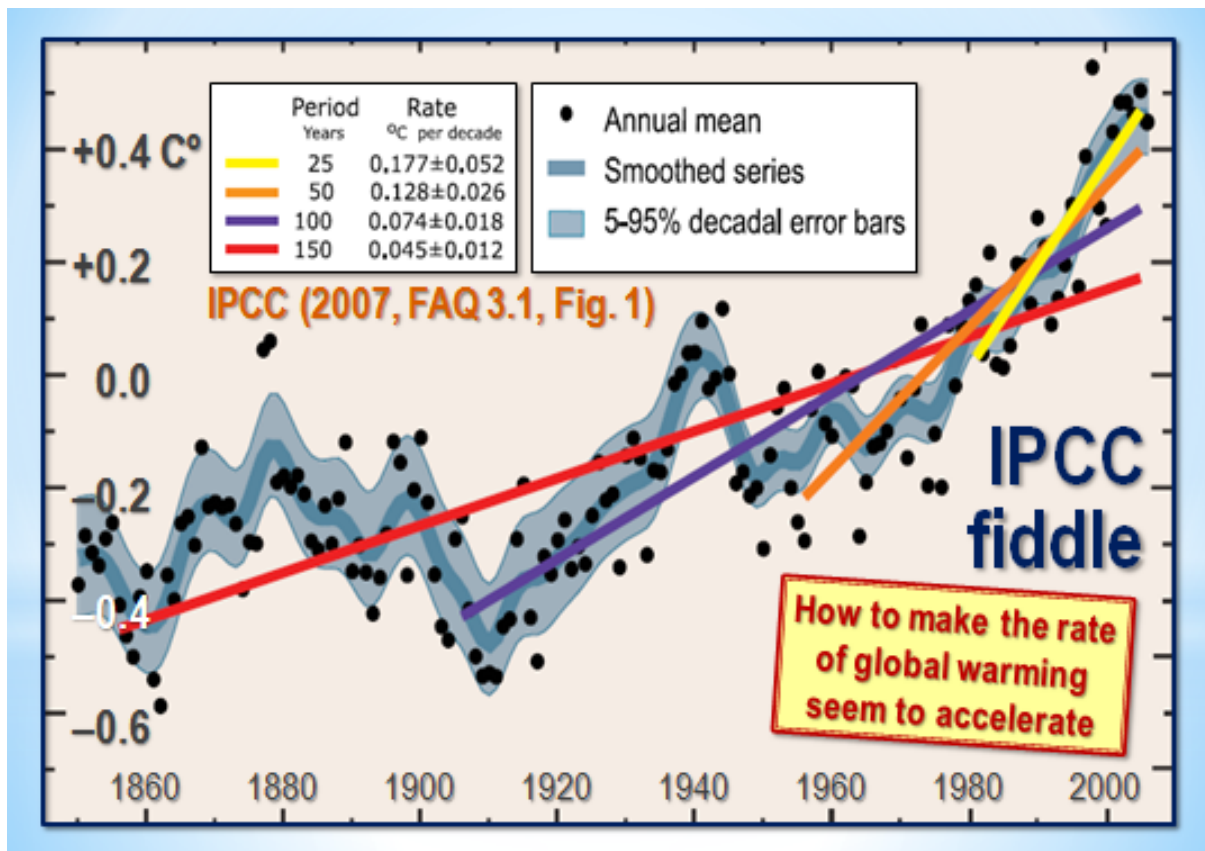
The very reverse of what the HadCRUT4 dataset shows should be happening is happening. As Table 1 shows, the discrepancy between the least (yellow background) and the greatest (purple background) reported temperature change over successive periods is growing, not narrowing:

Start date	GISS	HadCR4	NCEI	RSS	UAH	Uncertainty
Sat:1979	0.60	0.61	0.37	0.45	0.42	<b>0.51</b>
<b>K/century</b>	<b>1.63</b>	<b>1.65</b>	<b>1.55</b>	<b>1.23</b>	<b>1.14</b>	<b>K/century</b>
AR1:1990	0.45	0.41	0.43	0.29	0.26	<b>0.73</b>
<b>K/century</b>	<b>1.73</b>	<b>1.59</b>	<b>1.66</b>	<b>1.11</b>	<b>1.00</b>	<b>K/century</b>
AR2:1995	0.33	0.28	0.32	0.09	0.09	<b>1.14</b>
<b>K/century</b>	<b>1.55</b>	<b>1.31</b>	<b>1.53</b>	<b>0.42</b>	<b>0.41</b>	<b>K/century</b>
AR3:2001	0.18	0.13	0.20	-0.02	0.03	<b>1.46</b>
<b>K/century</b>	<b>1.22</b>	<b>0.85</b>	<b>1.35</b>	<b>-0.11</b>	<b>0.19</b>	<b>K/century</b>



Table 1: Reported (dark blue) and centennial-equivalent (dark green) temperature trends on the three terrestrial (pale green background) and two satellite (blue background) monthly temperature anomaly datasets for periods starting respectively in January of 1979, 1990, 1995 and 2001 and all ending in December 2015.

Note how, on all datasets, the warming rate declines the closer to the present one begins. This, too, is contrary to official theory, which says that the warming rate should at least remain constant given the ever-increasing anthropogenic forcings acting on the climate. It is also contrary to one of the most mendacious graphs in the IPCC reports:

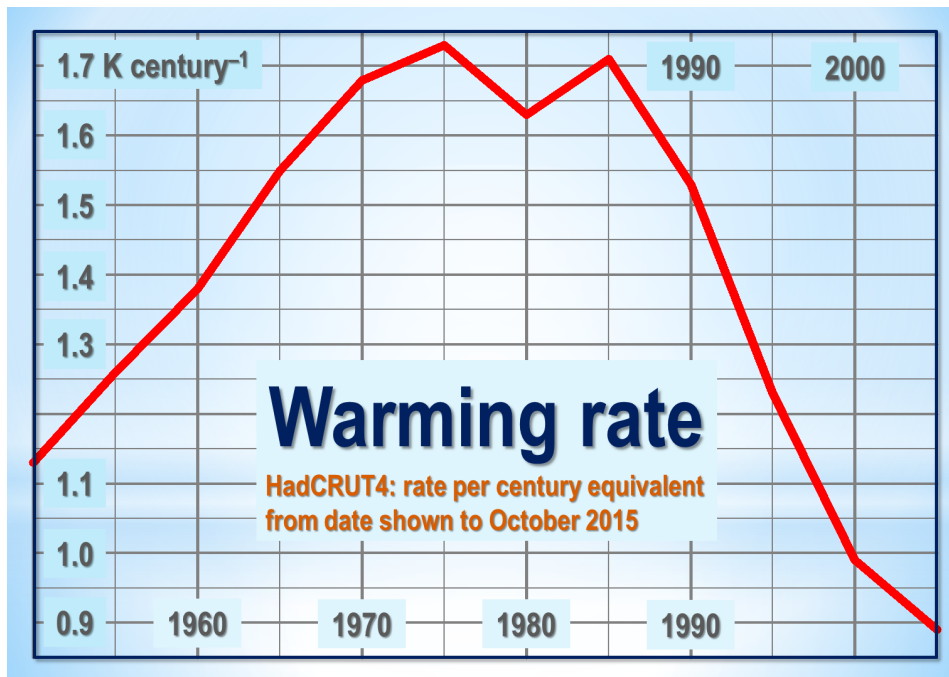


The official storyline, derived from the bogus statistical technique illustrated in the above IPCC graph, is that the rate of global warming is itself accelerating, and that we are to blame. The Swiss *Bureau de l'Escroquerie* is investigating this and, no doubt, many other outright frauds in IPCC documents.

However, note how rapidly the measurement uncertainty, here defined as the difference between the least (yellow) and greatest (pink) reported centennial-equivalent temperature trend in Table 1, widens even as the start-date of the period under consideration comes closer to the present, when by rights it should narrow. Another killer question for the believers to answer, therefore:

## *Why is the rate of global warming falling even as CO<sub>2</sub> concentration rises?*

If one excludes the data after October 2015, which are temporarily influenced by the current el Niño spike in global temperatures, the warming rate since 1950 is lower now than at any previous date since that year.



This widening of the divergence between the terrestrial and satellite datasets is clear evidence that the effect of the tampering with all three terrestrial datasets in the two years preceding the Paris climate summit has been what one would, alas, expect of the tamperers: artificially to increase the apparent warming rate ever more rapidly as the present approaches.

A legitimate inference from this observation is that the tampering, however superficially plausible the numerous excuses for it, was in truth intended and calculated to overwhelm and extinguish the Pause that all the datasets had previously shown, precisely so that those driving and profiting from the climate scam could declare, as they have throughout the Marxstream news media, that there was never any Pause in the first place.

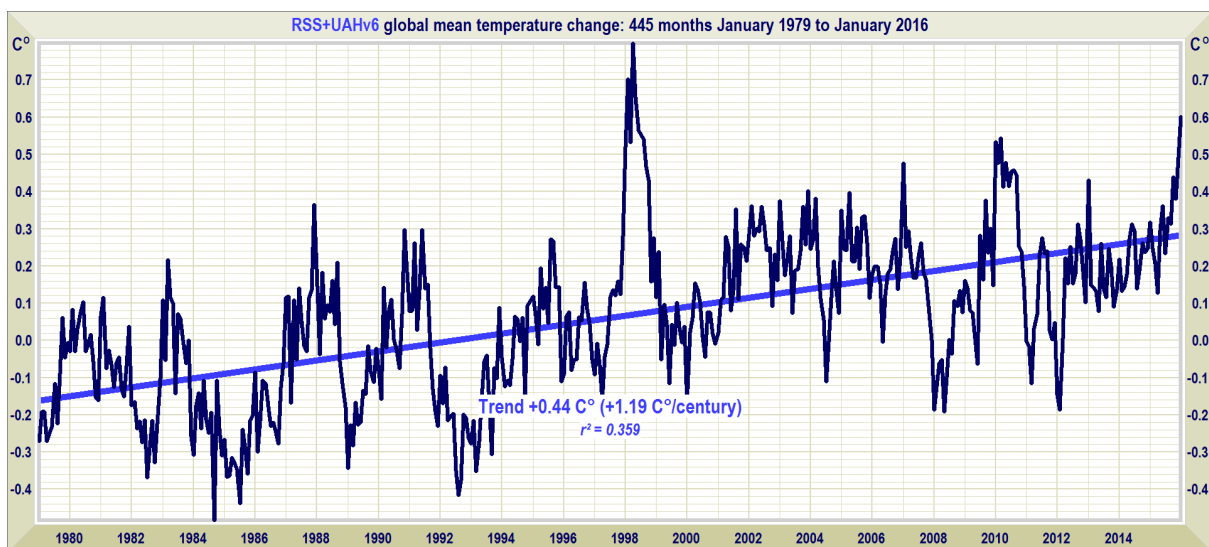
Let us hope that Professor Terence Kealy, former Vice Chancellor of Buckingham University, takes a very close look at this posting as he conducts his own review of the tamperings with the various terrestrial datasets.

The current el Niño, as Bob Tisdale's distinguished series of reports here demonstrates, is at least as big as the Great el Niño of 1998. The RSS temperature record is now beginning to reflect its magnitude. If past events of this kind are a guide, there will be several months' further warming before the downturn in the spike begins.

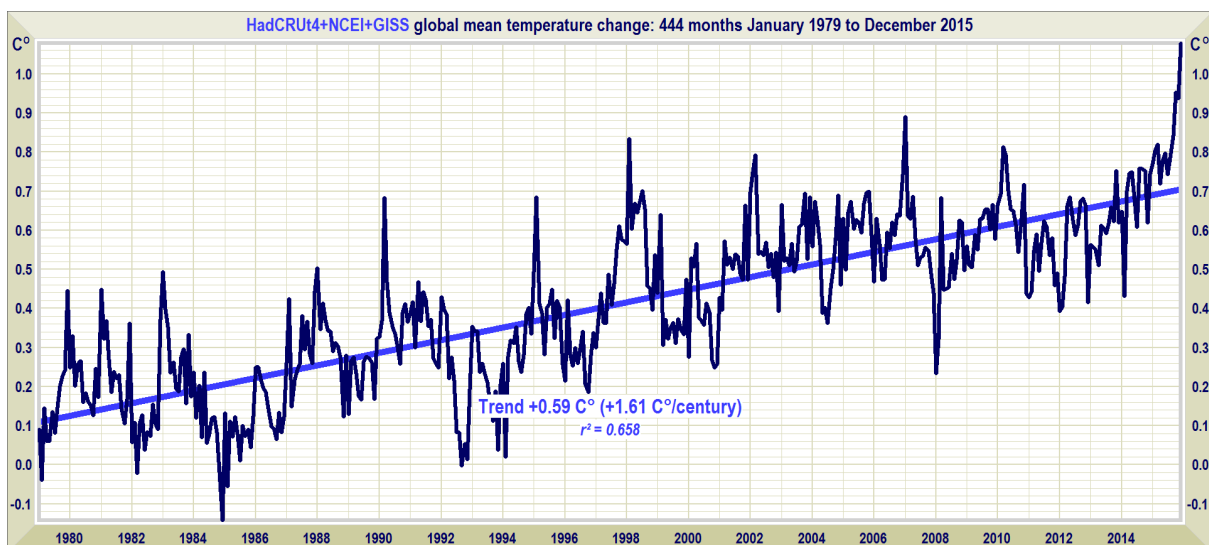
However, if there is a following la Niña, as there often is, the Pause may return at some time from the end of this year onward. Perhaps Bob could address the likelihood of a la Niña in the next of his series of posts on the ENSO phenomenon.

The hiatus period of 18 years 8 months is the farthest back one can go in the RSS satellite temperature record and still show a sub-zero trend. The start date is not cherry-picked: it is calculated. And the graph does not mean there is no such thing as global warming. Going back further shows a small warming rate. And yes, the start-date for the Pause has been inching forward, though just a little more slowly than the end-date, which is why the Pause has continued on average to lengthen.

The warming rate taken as the mean of the RSS and UAH datasets since they began in 1979 is equivalent to 1.2 degrees/century:



However, the much-altered surface temperature datasets show a 35% greater warming rate, equivalent to 1.6 degrees/century:



Bearing in mind that one-third of the  $2.4 \text{ W m}^{-2}$  radiative forcing from all manmade sources since 1750 has occurred during the period of the Pause, a warming rate equivalent to little more than  $1 \text{ C}^\circ/\text{century}$  is not cause for concern.

As always, a note of caution. Merely because there has been little or no warming in recent decades, one may not draw the conclusion that warming has ended forever. Trend lines measure what has occurred: they do not predict what will occur.

The Technical Note explains the sources of the IPCC's predictions in 1990 and in 2005, and also demonstrates that according to the ARGO bathythermograph data the oceans are warming at a rate equivalent to less than a quarter of a Celsius degree per century. In a rational scientific discourse, those who had advocated extreme measures to prevent global warming would now be withdrawing and calmly rethinking their hypotheses. However, this is not a rational scientific discourse.

## Key facts about global temperature

These facts should be shown to anyone who persists in believing that, in the words of Mr Obama's Twitteratus, "global warming is real, manmade and dangerous".

- The RSS satellite dataset shows no global warming at all for 224 months from June 1997 to December 2015 – more than half the 445-month satellite record.
- There has been no warming even though one-third of all anthropogenic forcings since 1750 have occurred since 1997.
- Since 1950, when a human influence on global temperature first became theoretically possible, the global warming trend has been equivalent to below  $1.2 \text{ C}^\circ$  per century.
- The HadCRUT4 global warming trend since 1900 is equivalent to  $0.77 \text{ C}^\circ$  per century. This is well within natural variability and may not have much to do with us.
- The fastest warming rate lasting 15 years or more since 1950 occurred over the 33 years from 1974 to 2006. It was equivalent to  $2.0 \text{ C}^\circ$  per century.
- Compare the warming on the Central England temperature dataset in the 40 years 1694-1733, well before the Industrial Revolution, equivalent to  $4.33 \text{ C}^\circ/\text{century}$ .
- In 1990, the IPCC's mid-range prediction of near-term warming was equivalent to  $2.8 \text{ C}^\circ$  per century, higher by two-thirds than its current prediction of  $1.7 \text{ C}^\circ/\text{century}$ .
- The warming trend since 1990, when the IPCC wrote its first report, is equivalent to little more than  $1 \text{ C}^\circ$  per century. The IPCC had predicted close to thrice as much.
- To meet the IPCC's original central prediction of  $1 \text{ C}^\circ$  warming from 1990-2025, in the next decade a warming of  $0.75 \text{ C}^\circ$ , equivalent to  $7.5 \text{ C}^\circ/\text{century}$ , would have to occur.
- Though the IPCC has cut its near-term warming prediction, it has not cut its high-end business as usual centennial warming prediction of  $4.8 \text{ C}^\circ$  warming to 2100.
- The IPCC's predicted  $4.8 \text{ C}^\circ$  warming by 2100 is well over twice the greatest rate of warming lasting more than 15 years that has been measured since 1950.
- The IPCC's  $4.8 \text{ C}^\circ$ -by-2100 prediction is four times the observed real-world warming trend since we might in theory have begun influencing it in 1950.
- The oceans, according to the 3600+ ARGO buoys, are warming at a rate of just  $0.02 \text{ C}^\circ$  per decade, equivalent to  $0.23 \text{ C}^\circ$  per century, or  $1 \text{ C}^\circ$  in 430 years.
- Recent extreme-weather events cannot be blamed on global warming, because there has not been any global warming to speak of. It is as simple as that.

## Technical note

Our latest topical graph shows the least-squares linear-regression trend on the RSS satellite monthly global mean lower-troposphere dataset for as far back as it is possible to go and still find a zero trend. The start-date is not “cherry-picked” so as to coincide with the temperature spike caused by the 1998 el Niño. Instead, it is calculated so as to find the longest period with a zero trend.

The fact of a long Pause is an indication of the widening discrepancy between prediction and reality in the temperature record.

The satellite datasets are arguably less unreliable than other datasets in that they show the 1998 Great El Niño more clearly than all other datasets. The Great el Niño, like its two predecessors in the past 300 years, caused widespread global coral bleaching, providing an independent verification that the satellite datasets are better able than the rest to capture such fluctuations without artificially filtering them out.

Terrestrial temperatures are measured by thermometers. Thermometers correctly sited in rural areas away from manmade heat sources show warming rates below those that are published. The satellite datasets are based on reference measurements made by the most accurate thermometers available – platinum resistance thermometers, which provide an independent verification of the temperature measurements by checking via spaceward mirrors the known temperature of the cosmic background radiation, which is 1% of the freezing point of water, or just 2.73 degrees above absolute zero. It was by measuring minuscule variations in the cosmic background radiation that the NASA anisotropy probe determined the age of the Universe as 13.82 billion years.

The RSS graph (Fig. 1) is accurate. The data are lifted monthly straight from the RSS website. A computer algorithm reads them down from the text file and plots them automatically using an advanced routine that automatically adjusts the aspect ratio of the data window at both axes so as to show the data at maximum scale, for clarity.

The latest monthly data point is visually inspected to ensure that it has been correctly positioned. The light blue trend line plotted across the dark blue spline-curve that shows the actual data is determined by the method of least-squares linear regression, which calculates the  $y$ -intercept and slope of the line.

The IPCC and most other agencies use linear regression to determine global temperature trends. Professor Phil Jones of the University of East Anglia recommends it in one of the Climategate emails. The method is appropriate because global temperature records exhibit little auto-regression, since summer temperatures in one hemisphere are compensated by winter in the other. Therefore, an AR( $n$ ) model would generate results little different from a least-squares trend.



Dr Stephen Farish, Professor of Epidemiological Statistics at the University of Melbourne, kindly verified the reliability of the algorithm that determines the trend on the graph and the correlation coefficient, which is very low because, though the data are highly variable, the trend is flat.

RSS itself is now taking a serious interest in the length of the Great Pause. Dr Carl Mears, the senior research scientist at RSS, discusses it at [remss.com/blog/recent-slowing-rise-global-temperatures](http://remss.com/blog/recent-slowing-rise-global-temperatures).

Dr Mears' results are summarized in Fig. T1:

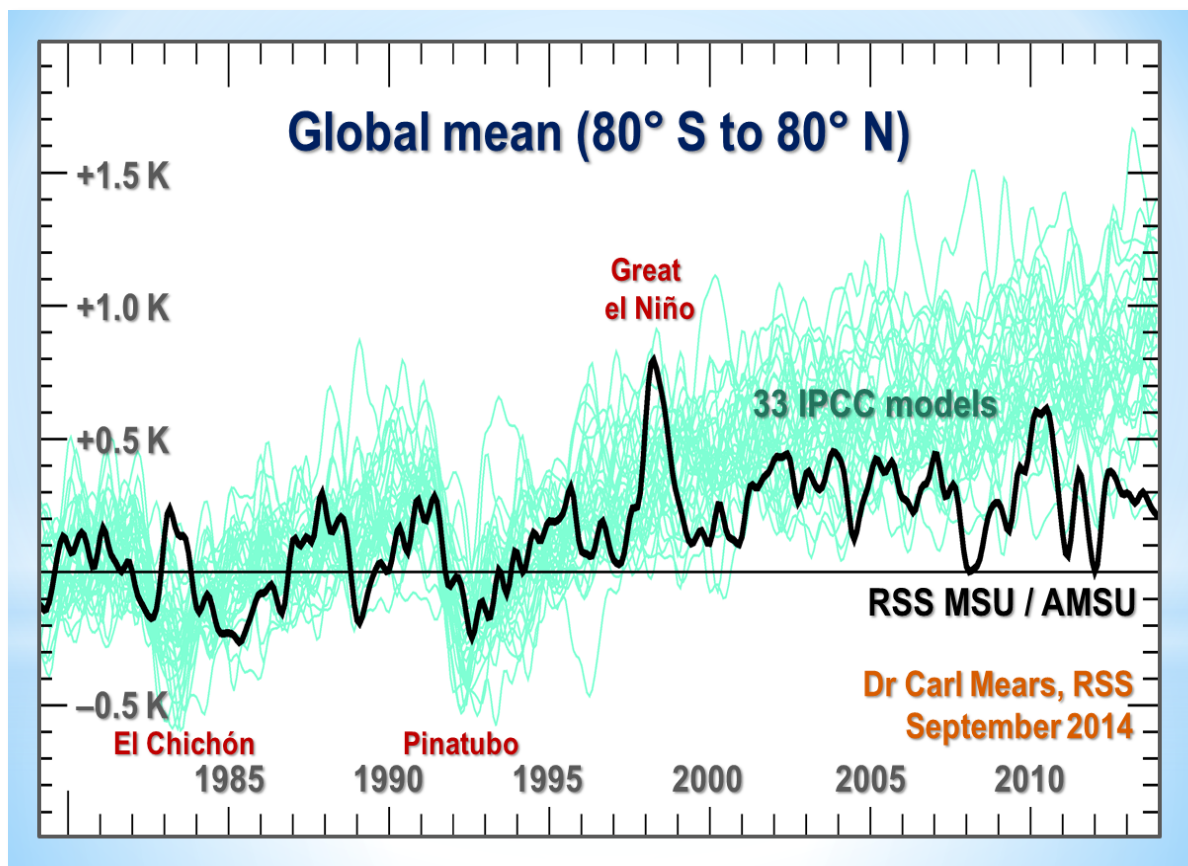


Figure T1. Output of 33 IPCC models (turquoise) compared with measured RSS global temperature change (black), 1979-2014. The transient coolings caused by the volcanic eruptions of Chichón (1983) and Pinatubo (1991) are shown, as is the spike in warming caused by the great el Niño of 1998.

Dr Mears writes:

“The denialists like to assume that the cause for the model/observation discrepancy is some kind of problem with the fundamental model physics, and they pooh-pooh any other sort of explanation. This leads them to conclude, very likely erroneously, that the long-term sensitivity of the climate is much less than is currently thought.”

Dr Mears concedes the growing discrepancy between the RSS data and the models, but he alleges “cherry-picking” of the start-date for the global-temperature graph:

“Recently, a number of articles in the mainstream press have pointed out that there appears to have been little or no change in globally averaged temperature over the last two decades. Because of this, we are getting a lot of questions along the lines of ‘I saw this plot on a denialist web site. Is this really your data?’ While some of these reports have ‘cherry-picked’ their end points to make their evidence seem even stronger, there is not much doubt that the rate of warming since the late 1990s is less than that predicted by most of the IPCC AR5 simulations of historical climate. ... The denialists really like to fit trends starting in 1997, so that the huge 1997-98 ENSO event is at the start of their time series, resulting in a linear fit with the smallest possible slope.”

In fact, the spike in temperatures caused by the Great el Niño of 1998 is almost entirely offset in the linear-trend calculation by two factors: the not dissimilar spike of the 2010 el Niño, and the sheer length of the Great Pause itself. The headline graph in these monthly reports begins in 1997 because that is as far back as one can go in the data and still obtain a zero trend.

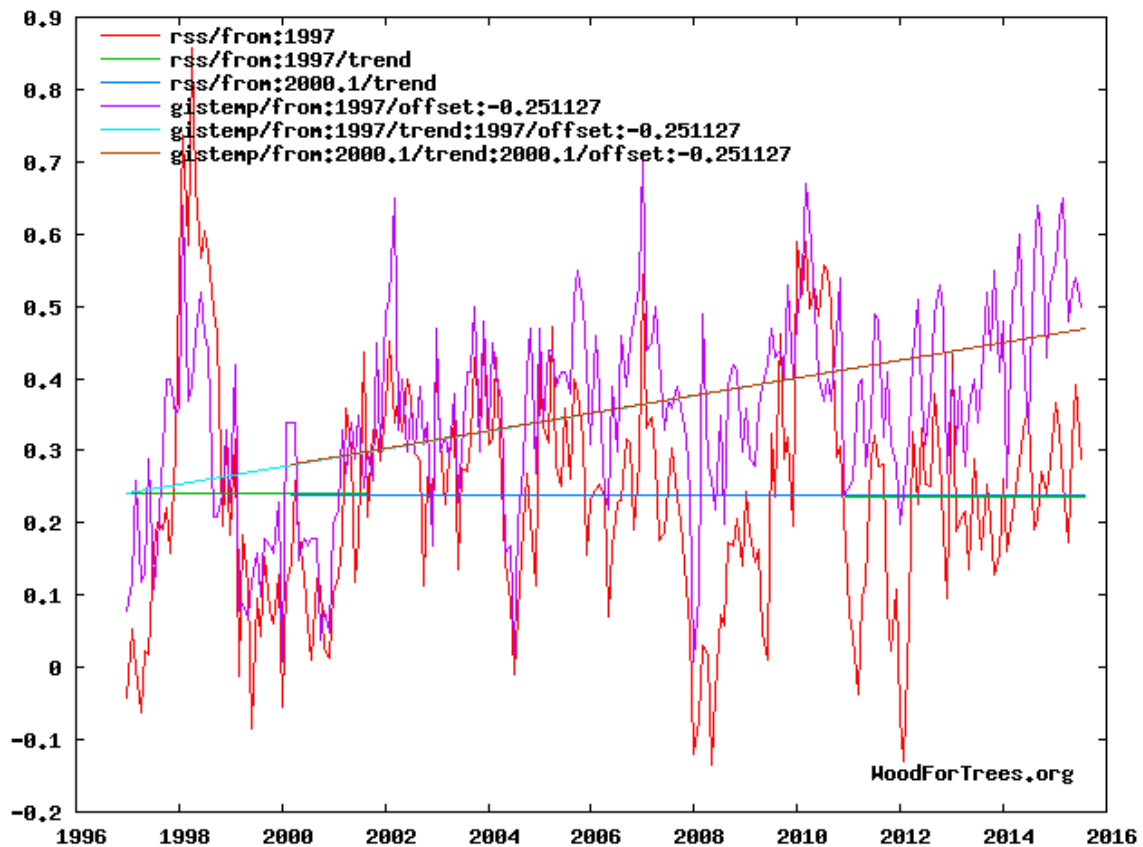


Fig. T1a. Graphs for RSS and GISS temperatures starting both in 1997 and in 2001. For each dataset the trend-lines are near-identical, showing conclusively that the argument that the Pause was caused by the 1998 el Nino is false (Werner Brozek and Professor Brown worked out this neat demonstration).

Curiously, Dr Mears prefers the terrestrial datasets to the satellite datasets. The UK Met Office, however, uses the satellite data to calibrate its own terrestrial record.

The length of the Pause, significant though it now is, is of less importance than the ever-growing discrepancy between the temperature trends predicted by models and the far less exciting real-world temperature change that has been observed.

## Sources of the IPCC predictions

IPCC's *First Assessment Report* predicted that global temperature would rise by 1.0 [0.7, 1.5] C° to 2025, equivalent to 2.8 [1.9, 4.2] C° per century. The executive summary asked, "How much confidence do we have in our predictions?" IPCC pointed out some uncertainties (clouds, oceans, etc.), but concluded:

"Nevertheless, ... we have substantial confidence that models can predict at least the broad-scale features of climate change. ... There are similarities between results from the coupled models using simple representations of the ocean and those using more sophisticated descriptions, and our understanding of such differences as do occur gives us some confidence in the results."

That "substantial confidence" was substantial over-confidence. For the rate of global warming since 1990 – the most important of the "broad-scale features of climate change" that the models were supposed to predict – is now below half what the IPCC had then predicted.

In 1990, the IPCC said this:

"Based on current models we predict:

"under the IPCC Business-as-Usual (Scenario A) emissions of greenhouse gases, a rate of increase of global mean temperature during the next century of about 0.3 C° per decade (with an uncertainty range of 0.2 C° to 0.5 C° per decade), this is greater than that seen over the past 10,000 years. This will result in a likely increase in global mean temperature of about 1 C° above the present value by 2025 and 3 C° before the end of the next century. The rise will not be steady because of the influence of other factors" (p. *xii*).

Later, the IPCC said:

"The numbers given below are based on high-resolution models, scaled to be consistent with our best estimate of global mean warming of 1.8 C° by 2030 [compared with pre-industrial temperatures]. For values consistent with other estimates of global temperature rise, the numbers below should be reduced by 30% for the low estimate or increased by 50% for the high estimate" (p. *xxiv*).

The orange region in Fig. 2 represents the IPCC's medium-term Scenario-A estimate of near-term warming, i.e. 1.0 [0.7, 1.5] K (compared with 1990) by 2025.

The IPCC's predicted global warming over the 25 years from 1990 to the present differs little from a straight line (Fig. T2).

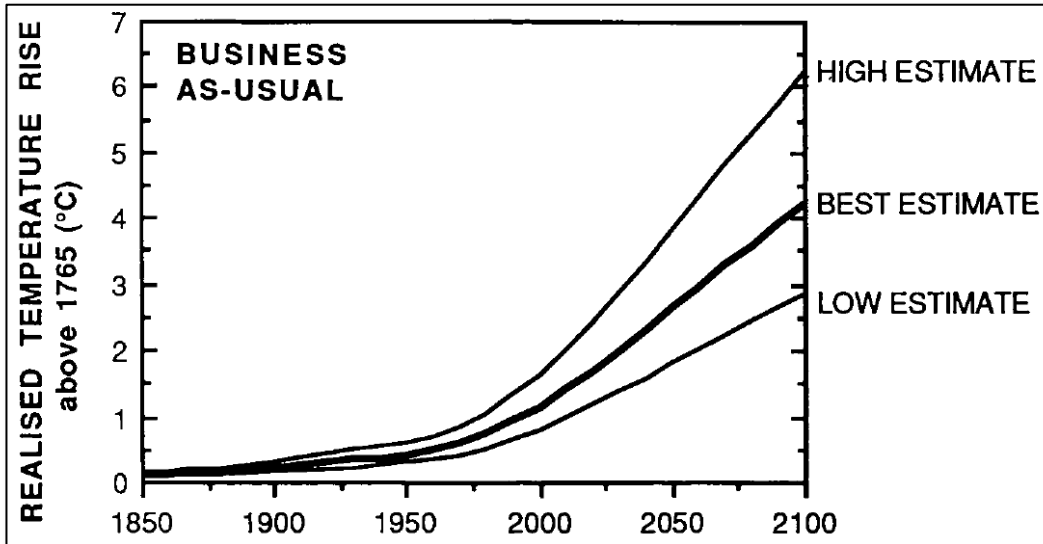


Figure T2. Historical warming from 1850-1990, and predicted warming from 1990-2100 on the IPCC's "business-as-usual" Scenario A (IPCC, 1990, p. xxii).

Because this difference between a straight line and the slight uptick in the warming rate the IPCC predicted over the period 1990-2025 is so small, one can look at it another way. To reach the 1 K central estimate of warming since 1990 by 2025, there would have to be twice as much warming in the next ten years as there was in the last 25 years. That is not likely.

But is the Pause perhaps caused by the fact that CO<sub>2</sub> emissions have not been rising anything like as fast as the IPCC's "business-as-usual" Scenario A prediction in 1990? No: CO<sub>2</sub> emissions have risen rather above the Scenario-A prediction (Fig. T3).

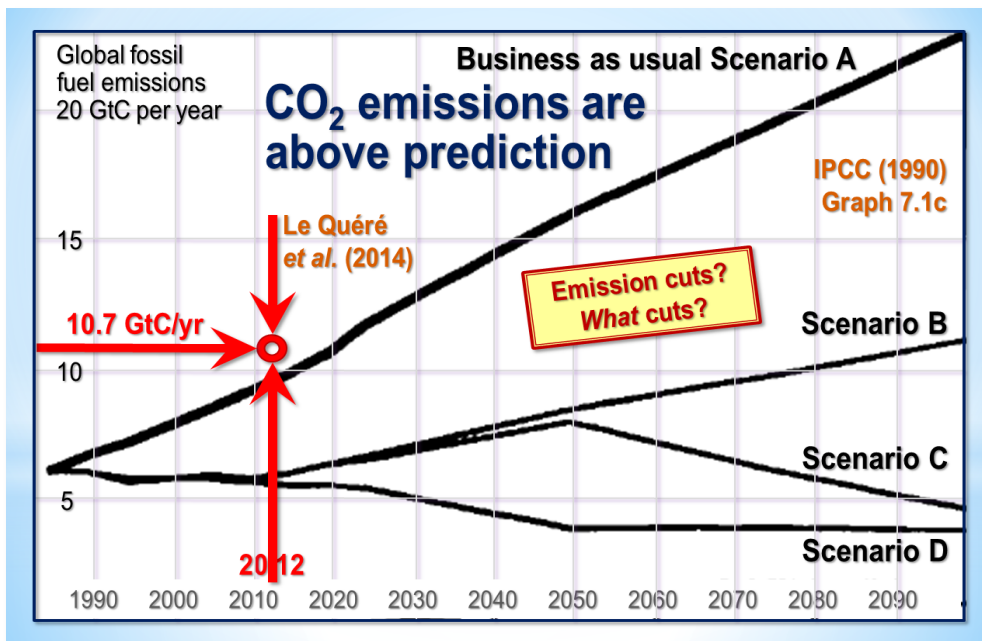


Figure T3. CO<sub>2</sub> emissions from fossil fuels, etc., in 2012, from Le Quéré *et al.* (2014), plotted against the chart of "man-made carbon dioxide emissions", in billions of tonnes of carbon per year, from IPCC (1990).

Plainly, therefore, CO<sub>2</sub> emissions since 1990 have proven to be closer to Scenario A than to any other case, because for all the talk about CO<sub>2</sub> emissions reduction the fact is that the rate of expansion of fossil-fuel burning in China, India, Indonesia, Brazil, etc., far outstrips the paltry reductions we have achieved in the West to date.

True, methane concentration has not risen as predicted in 1990 (Fig. T4), for methane emissions, though largely uncontrolled, are simply not rising as the models had predicted. Here, too, all of the predictions were extravagantly baseless.

The overall picture is clear. Scenario A is the emissions scenario from 1990 that is closest to the observed CO<sub>2</sub> emissions outturn.

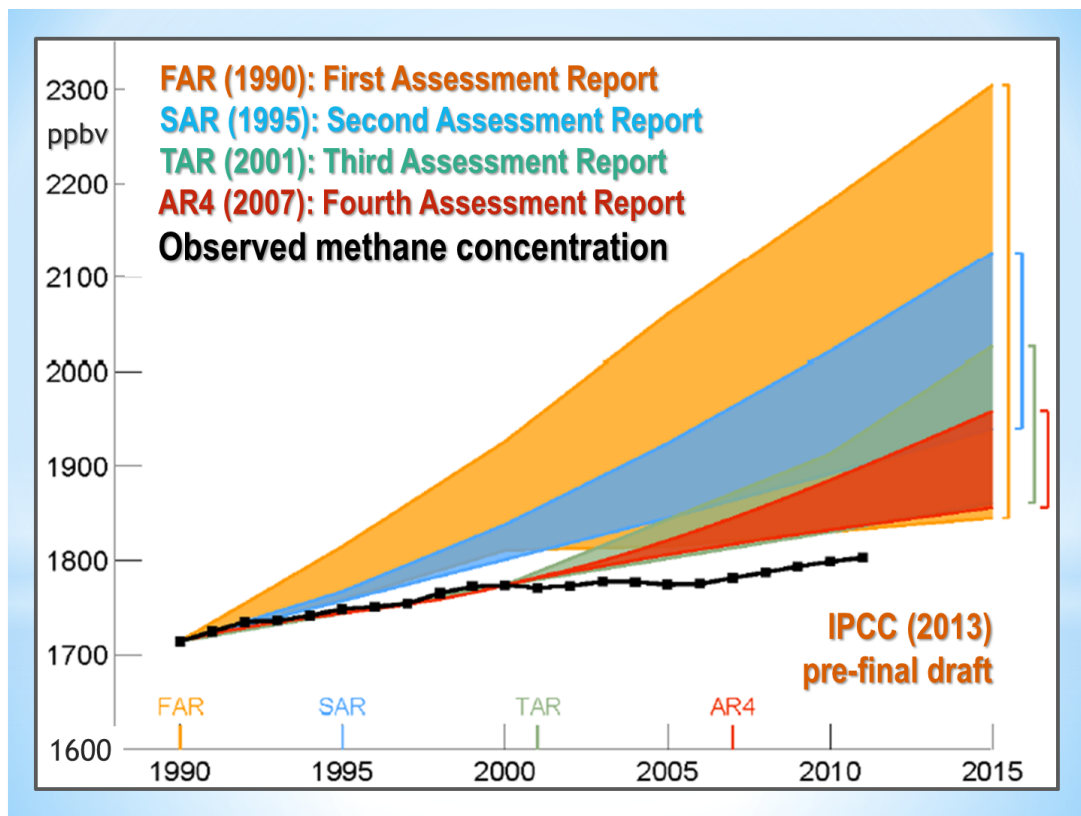


Figure T4. Methane concentration as predicted in four IPCC *Assessment Reports*, together with (in black) the observed outturn, which is running along the bottom of the least prediction. This graph appeared in the pre-final draft of IPCC (2013), but had mysteriously been deleted from the final, published version, inferentially because the IPCC did not want to display such a plain comparison between absurdly exaggerated predictions and unexciting reality.

To be precise, a quarter-century after 1990, the global-warming outturn to date – expressed as the least-squares linear-regression trend on the mean of the RSS and UAH monthly global mean surface temperature anomalies – is 0.28 C°, equivalent to little more than 1 C°/century. The IPCC’s central estimate of 0.71 C°, equivalent to 2.8 C°/century, that was predicted for Scenario A in IPCC (1990) with “substantial confidence” was approaching three times too big. In fact, the outturn is visibly well below even the least estimate.



In 1990, the IPCC's central prediction of the near-term warming rate was higher by two-thirds than its prediction is today. Then it was 2.8 C/century equivalent. Now it is just 1.7 C° equivalent – and even that is proving to be a substantial exaggeration.

In 1995 the IPCC offered a prediction of the warming rates to be expected in response to various rates of increase in CO<sub>2</sub> concentration:

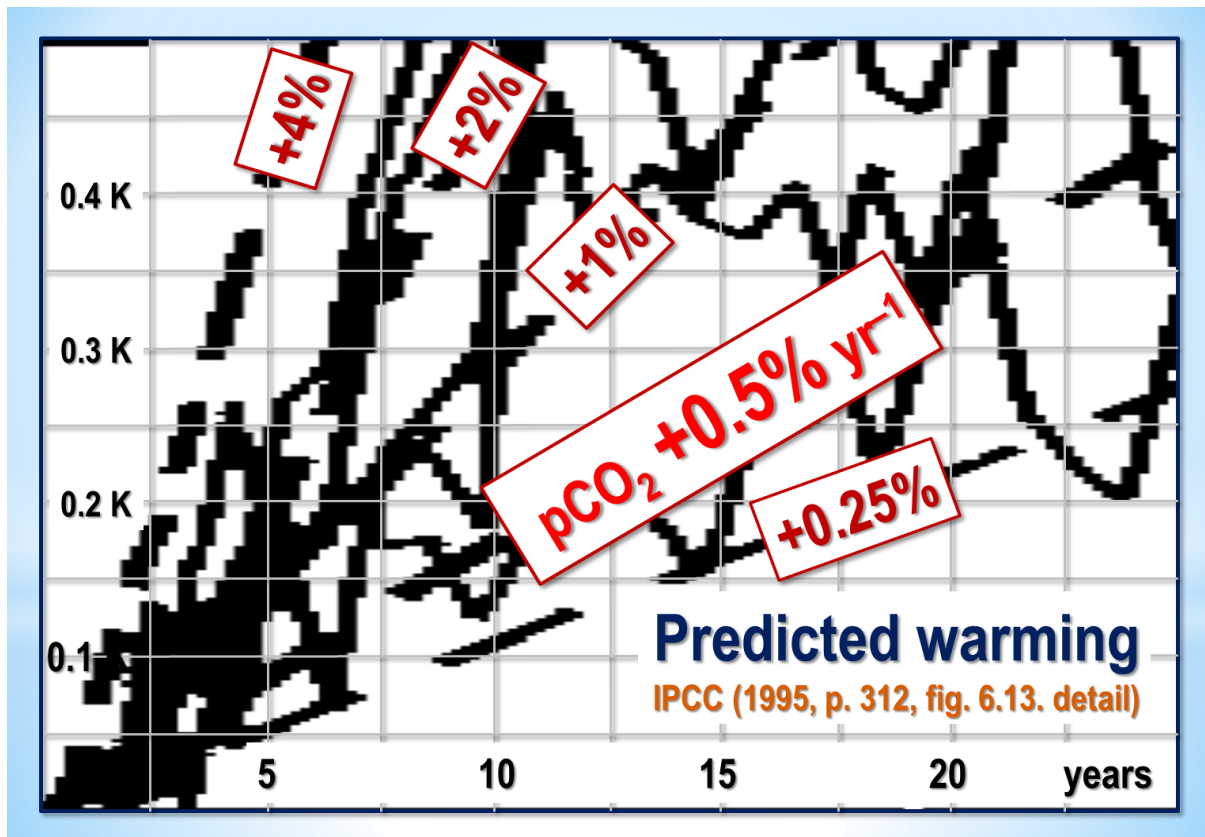


Figure T4a. IPCC (1995) predicted various warming rates. The prediction based on the actual rate of change in CO<sub>2</sub> concentration since 1995 is highlighted.

The actual increase in CO<sub>2</sub> concentration in the two decades since 1995 has been 0.5% per year. So IPCC's effective central prediction in 1995 was that there should have been 0.36 C° warming since then, equivalent to 1.80 C°/century.

In the 2001 *Third Assessment Report*, IPCC, at page 8 of the *Summary for Policymakers*, says: "For the periods 1990-2025 and 1990 to 2050, the projected increases are 0.4-1.1 C° and 0.8-2.6 C° respectively."

Is the ocean warming?

One frequently-discussed explanation for the Great Pause is that the coupled ocean-atmosphere system has continued to accumulate heat at approximately the rate predicted by the models, but that in recent decades the heat has been removed from the atmosphere by the ocean and, since globally the near-surface strata show far less warming than the models had predicted, it is hypothesized that what is called the

“missing heat” has traveled to the little-measured abyssal strata below 2000 m, whence it may emerge at some future date.

Actually, it is not known whether the ocean is warming: each of the 3600 automated ARGO bathythermograph buoys takes just three measurements a month in 200,000 cubic kilometres of ocean – roughly a 100,000-square-mile box more than 316 km square and 2 km deep. Plainly, the results on the basis of a resolution that sparse (which, as Willis Eschenbach puts it, is approximately the equivalent of trying to take a single temperature and salinity profile taken at a single point in Lake Superior less than once a year) are not going to be a lot better than guesswork.

Unfortunately ARGO seems not to have updated the ocean dataset since December 2014. However, what we have gives us 11 full years of data. Results are plotted in Fig. T5. The ocean warming, if ARGO is right, is equivalent to just  $0.02\text{ C}^\circ\text{ decade}^{-1}$ , equivalent to  $0.2\text{ C}^\circ\text{ century}^{-1}$ .

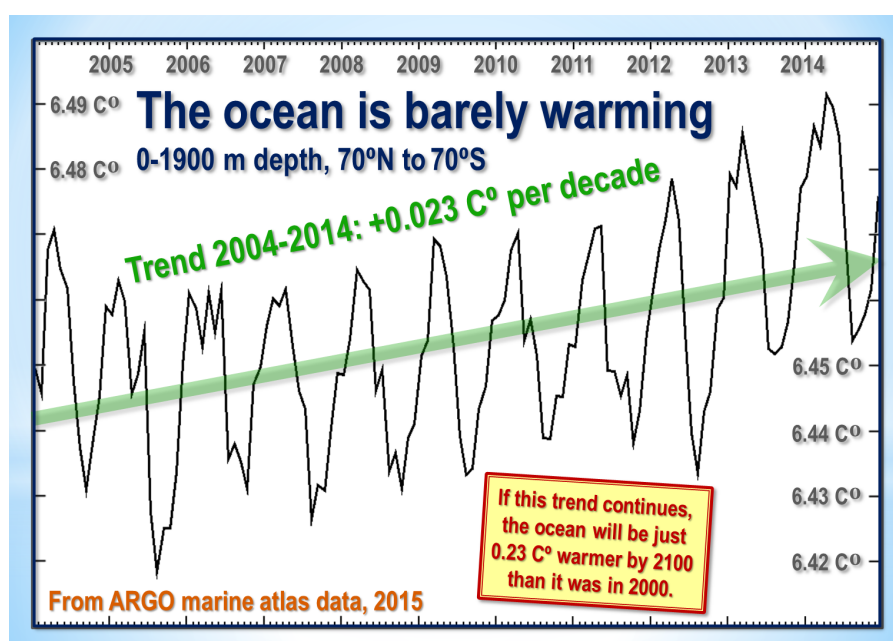


Figure T5. The entire near-global ARGO 2 km ocean temperature dataset from January 2004 to December 2014 (black spline-curve), with the least-squares linear-regression trend calculated from the data by the author (green arrow).

Finally, though the ARGO buoys measure ocean temperature change directly, before publication NOAA craftily converts the temperature change into zettajoules of ocean heat content change, which make the change seem a whole lot larger.

The terrifying-sounding heat content change of 260 ZJ from 1970 to 2014 (Fig. T6) is equivalent to just  $0.2\text{ K/century}$  of global warming. All those “Hiroshima bombs of heat” of which the climate-extremist websites speak are a barely discernible pinprick. The ocean and its heat capacity are a lot bigger than some may realize.

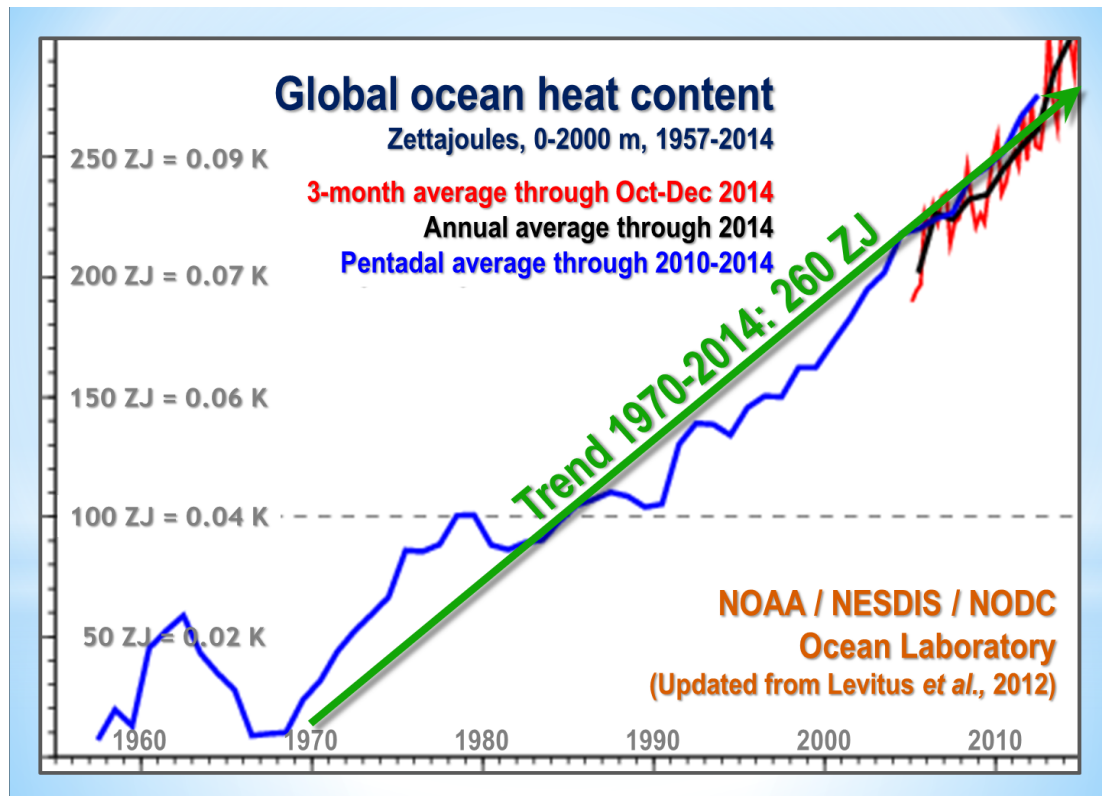


Figure T6. Ocean heat content change, 1957-2013, in Zettajoules from NOAA’s NODC Ocean Climate Lab: [http://www.nodc.noaa.gov/OC5/3M\\_HEAT\\_CONTENT](http://www.nodc.noaa.gov/OC5/3M_HEAT_CONTENT), with the heat content values converted back to the ocean temperature changes in Kelvin that were originally measured. NOAA’s conversion of the minuscule warming data to Zettajoules, combined with the exaggerated vertical aspect of the graph, has the effect of making a very small change in ocean temperature seem considerably more significant than it is.

Converting the ocean heat content change back to temperature change reveals an interesting discrepancy between NOAA’s data and that of the ARGO system. Over the period of ARGO data, from 2004-2014, the NOAA data imply that the oceans are warming at  $0.05\text{ }^{\circ}\text{C decade}^{-1}$ , equivalent to  $0.5\text{ }^{\circ}\text{C century}^{-1}$ , or rather more than double the rate shown by ARGO.

ARGO has the better-resolved dataset, but since the resolutions of all ocean datasets are very low one should treat all these results with caution.

What one can say is that, on such evidence as these datasets are capable of providing, the difference between underlying warming rate of the ocean and that of the atmosphere is not statistically significant, suggesting that if the “missing heat” is hiding in the oceans it has magically found its way into the abyssal strata without managing to warm the upper strata on the way.

On these data, too, there is no evidence of rapid or catastrophic ocean warming.

Furthermore, to date no empirical, theoretical or numerical method, complex or simple, has yet successfully specified mechanistically either how the heat generated by anthropogenic greenhouse-gas enrichment of the atmosphere has reached the deep ocean without much altering the heat content of the intervening near-surface

strata or how the heat from the bottom of the ocean may eventually re-emerge to perturb the near-surface climate conditions relevant to land-based life on Earth.

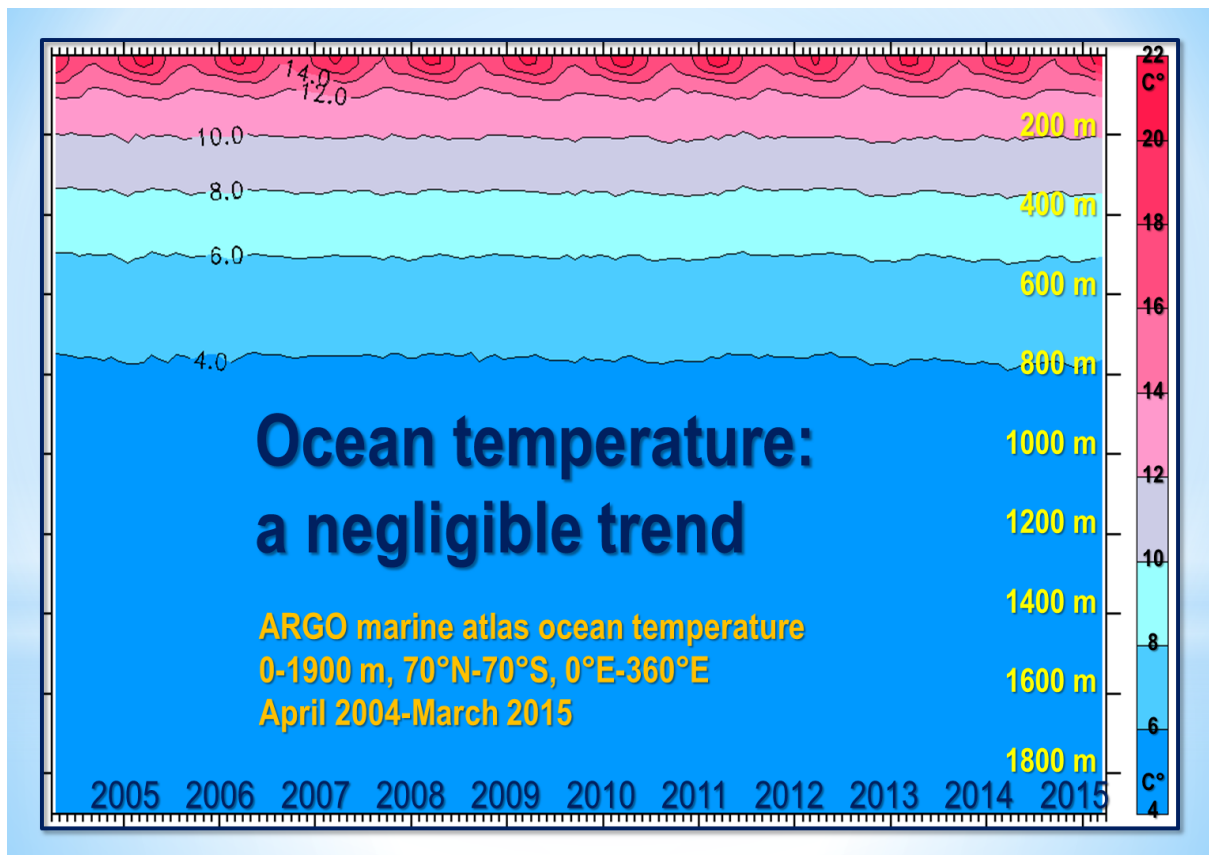


Figure T7. Near-global ocean temperatures by stratum, 0-1900 m, providing a visual reality check to show just how little the upper strata are affected by minor changes in global air surface temperature. Source: ARGO marine atlas.

Most ocean models used in performing coupled general-circulation model sensitivity runs simply cannot resolve most of the physical processes relevant for capturing heat uptake by the deep ocean.

Ultimately, the second law of thermodynamics requires that any heat which may have accumulated in the deep ocean will dissipate via various diffusive processes. It is not plausible that any heat taken up by the deep ocean will suddenly warm the upper ocean and, via the upper ocean, the atmosphere.

If the “deep heat” explanation for the Pause were correct (and it is merely one among dozens that have been offered), the complex models have failed to account for it correctly: otherwise, the growing discrepancy between the predicted and observed atmospheric warming rates would not have become as significant as it has.

In early October 2015 Steven Goddard added some very interesting graphs to his website. The graphs show the extent to which sea levels have been tampered with to make it look as though there has been sea-level rise when it is arguable that in fact there has been little or none.

## Why were the models' predictions exaggerated?

In 1990 the IPCC predicted – on its business-as-usual Scenario A – that from the Industrial Revolution till the present there would have been 4 Watts per square meter of radiative forcing caused by Man (Fig. T8):

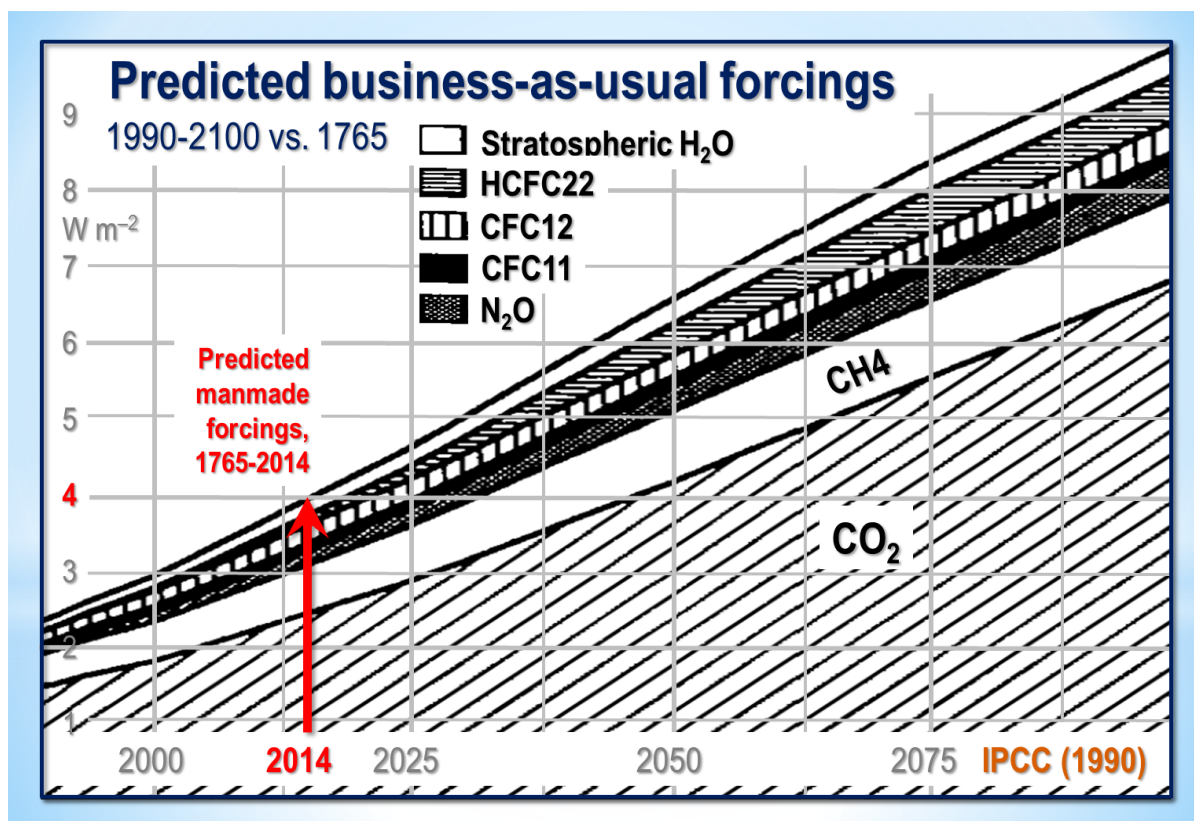


Figure T8. Predicted manmade radiative forcings (IPCC, 1990).

However, from 1995 onward the IPCC decided to assume, on rather slender evidence, that anthropogenic particulate aerosols – mostly soot from combustion – were shading the Earth from the Sun to a large enough extent to cause a strong negative forcing. It has also now belatedly realized that its projected increases in methane concentration were wild exaggerations. As a result of these and other changes, it now estimates that the net anthropogenic forcing of the industrial era is just 2.3 Watts per square meter, or little more than half its prediction in 1990 (Fig. T9):

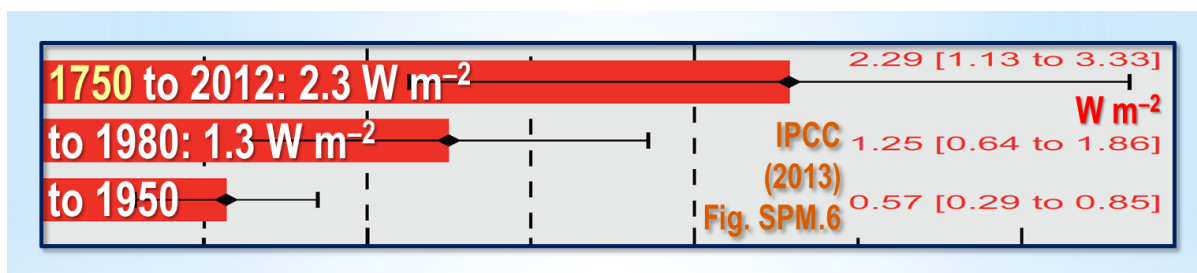


Figure T9: Net anthropogenic forcings, 1750 to 1950, 1980 and 2012 (IPCC, 2013).



Even this, however, may be a considerable exaggeration. For the best estimate of the actual current top-of-atmosphere radiative imbalance (total natural and anthropogenic net forcing) is only 0.6 Watts per square meter (Fig. T10):

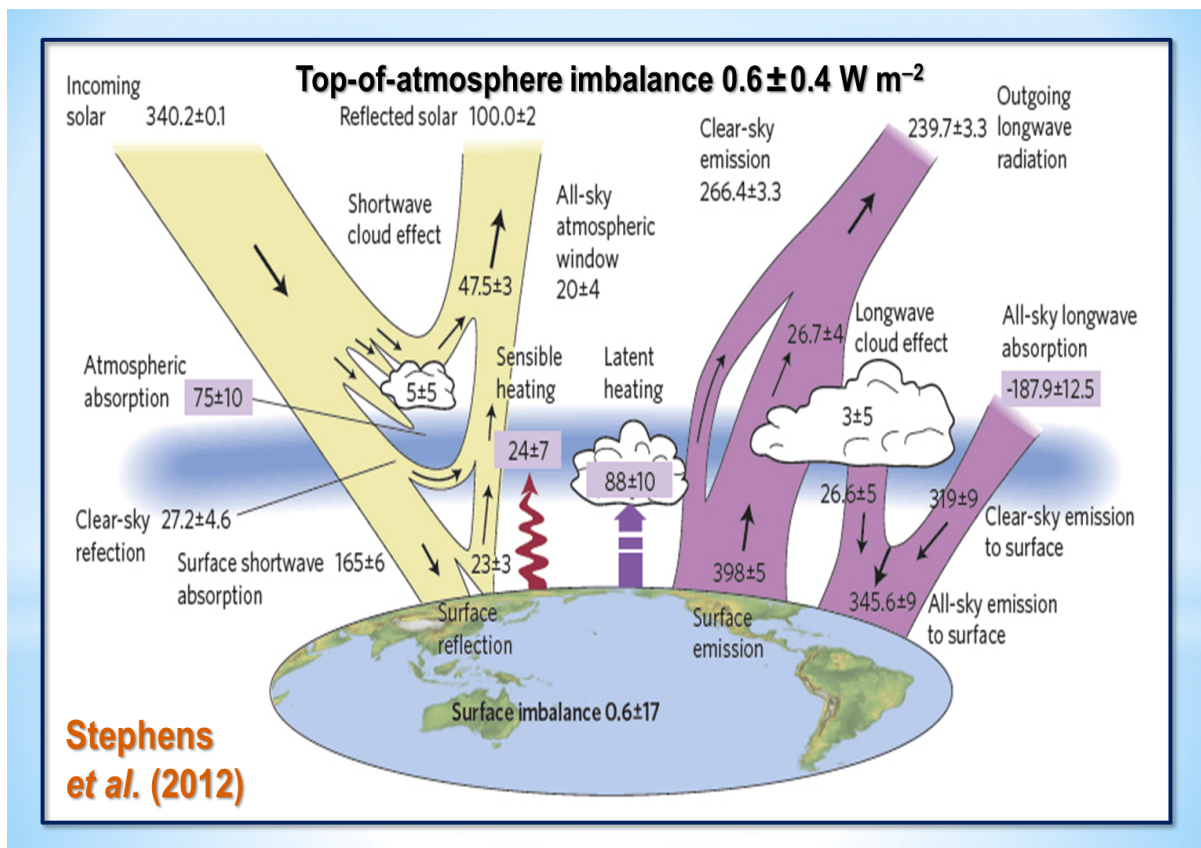


Figure T10. Energy budget diagram for the Earth from Stephens *et al.* (2012)

In short, most of the forcing predicted by the IPCC is either an exaggeration or has already resulted in whatever temperature change it was going to cause. There is little global warming in the pipeline as a result of our past and present sins of emission.

It is also possible that the IPCC and the models have relentlessly exaggerated climate sensitivity. One recent paper on this question is Monckton of Brenchley *et al.* (2015), which found climate sensitivity to be in the region of  $1 \text{ C}^\circ$  per  $\text{CO}_2$  doubling (go to scibull.com and click “Most Read Articles”). The paper identified errors in the models’ treatment of temperature feedbacks and their amplification, which account for two-thirds of the equilibrium warming predicted by the IPCC.

Professor Ray Bates gave a paper in Moscow in summer 2015 in which he concluded, based on the analysis by Lindzen & Choi (2009, 2011) (Fig. T10), that temperature feedbacks are net-negative. Accordingly, he supports the conclusion both by Lindzen & Choi (1990) (Fig. T11) and by Spencer & Braswell (2010, 2011) that climate sensitivity is below – and perhaps considerably below –  $1 \text{ C}^\circ$  per  $\text{CO}_2$  doubling.

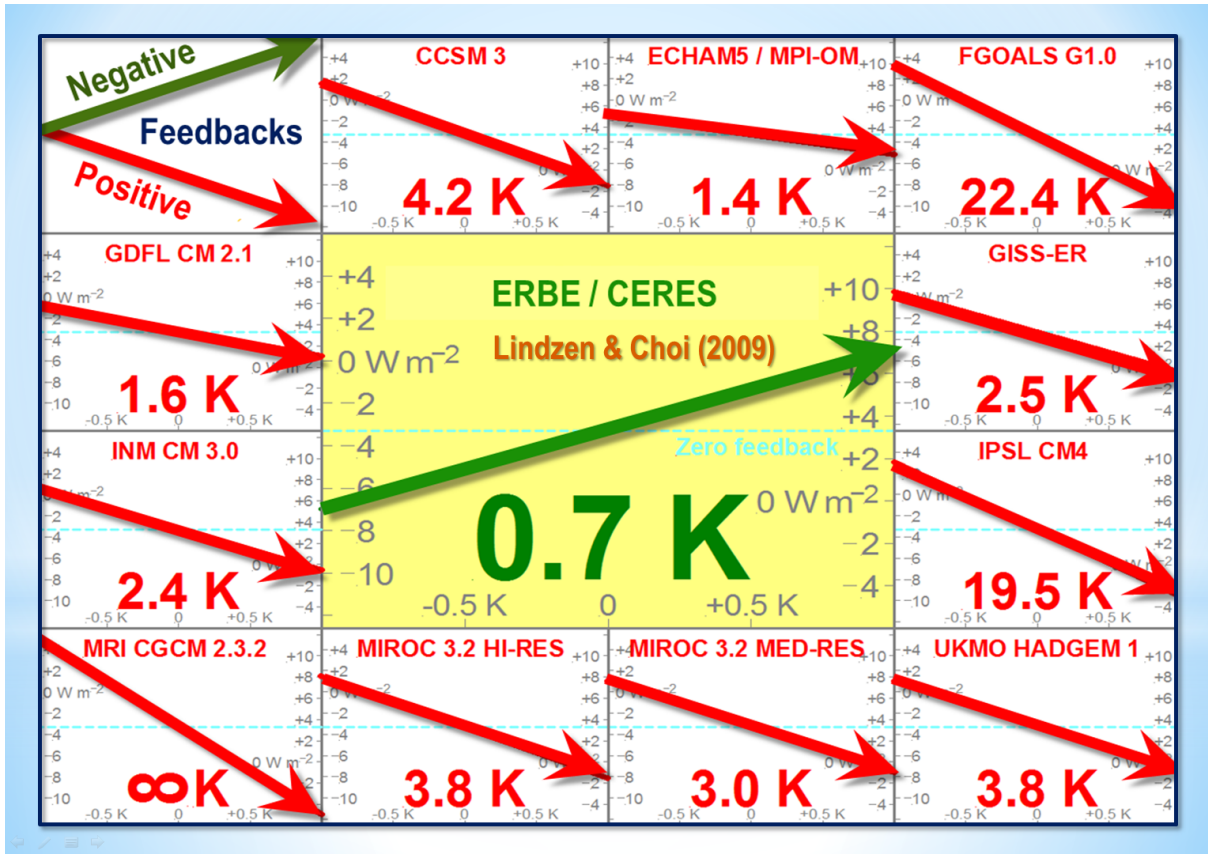


Figure T11. Reality (center) vs. 11 models. From Lindzen & Choi (2009).

A growing body of reviewed papers find climate sensitivity considerably below the 3 [1.5, 4.5] C° per CO<sub>2</sub> doubling that was first put forward in the Charney Report of 1979 for the U.S. National Academy of Sciences, and is still the IPCC's best estimate today.

On the evidence to date, therefore, there is no scientific basis for taking any action at all to mitigate CO<sub>2</sub> emissions.

Finally, how long will it be before the Freedom Clock (Fig. T12) reaches 20 years without any global warming? If it does, the climate scare will become unsustainable.



Figure T12. The Freedom Clock approaches 20 years without global warming