

GLOBAL WARMING IS *NOT* HAPPENING

by
Christopher Monckton



February 21, 2009



Science & Public Policy Institute
“Science-based policy for a better world.”
www.scienceandpublicpolicy.org

GLOBAL WARMING IS NOT HAPPENING

by Christopher Monckton ~ February 21, 2009

The “global warming apocalypse” scare has the potential greatly to enrich scientists, academics, industrialists, and politicians willing to take unscrupulous advantage of it. However, we should do some due diligence before we join in reaping the considerable but short-lived rewards available to those who parrot the scientifically-baseless orthodoxy.

We begin with two graphs from the *Monthly CO₂ Report*¹ (SPPI, 2009). First, on all measures, global temperatures for the past seven years have been falling (though the fall was largely unreported) at a rate equivalent to >2 Celsius degrees/century.



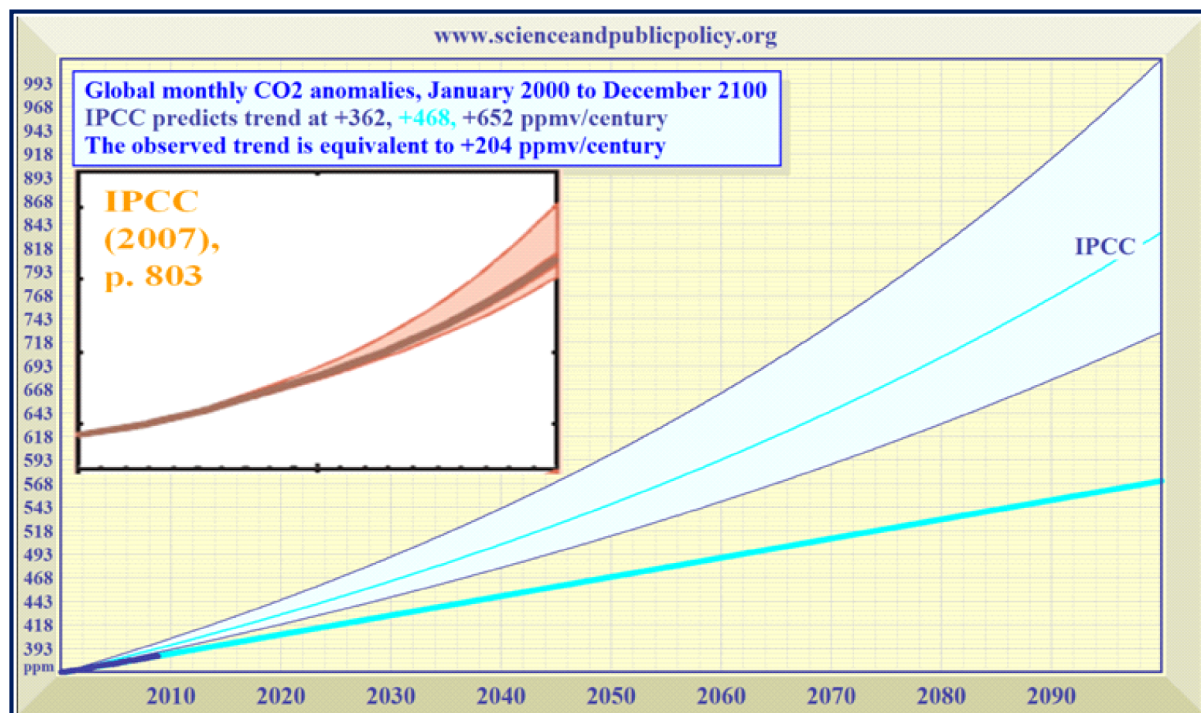
Seven years' global cooling: The arithmetic mean of the Hadley and NCDC monthly terrestrial global-temperature datasets and the RSS and UAH satellite lower-troposphere datasets shows a (largely-unreported) cooling for seven years at a rate equivalent to 2.1 C°/century. The pink region shows the IPCC's projected range of warming rates: the pale pink region is 1 standard deviation either side of the IPCC's central estimate that global temperature will rise 3.9 C° to 2100.

This seven-year decline in global temperatures is of great significance, for the IPCC's current methodology cannot explain it. Throughout the period, CO₂ concentration has risen, and the IPCC quantifies the contribution of natural forcings such as that from the sun as being minuscule. Warming should have resulted.

Our second graph shows that the observed increase in atmospheric CO₂ concentration is well below the IPCC's predicted range of increases.

¹ http://scienceandpublicpolicy.org/monthly_report/jan_co2_report.html

It is important to draw the distinction between the increase in CO₂ *emission*, which has been at the high end of the IPCC's projections, and the corresponding increase in CO₂ *concentration*, which has recently been very near linear, and is running well below the least of the exponential rates of increase projected by the IPCC.



Observed and predicted CO₂ concentration, 2000-2100: The pale-blue region, bounded by exponential curves, is the IPCC's predicted path for CO₂ concentration. The observed, deseasonalized data from January 2000 to November 2008 (dark blue) is near-coincident with the least-squares linear-regression trend, (solid, light-blue line). The predictive region emulates the IPCC's graph for scenario A2 [inset]. **Sources:** NOAA; [inset] IPCC (2007), p.803, after aspect-ratio adjustment.

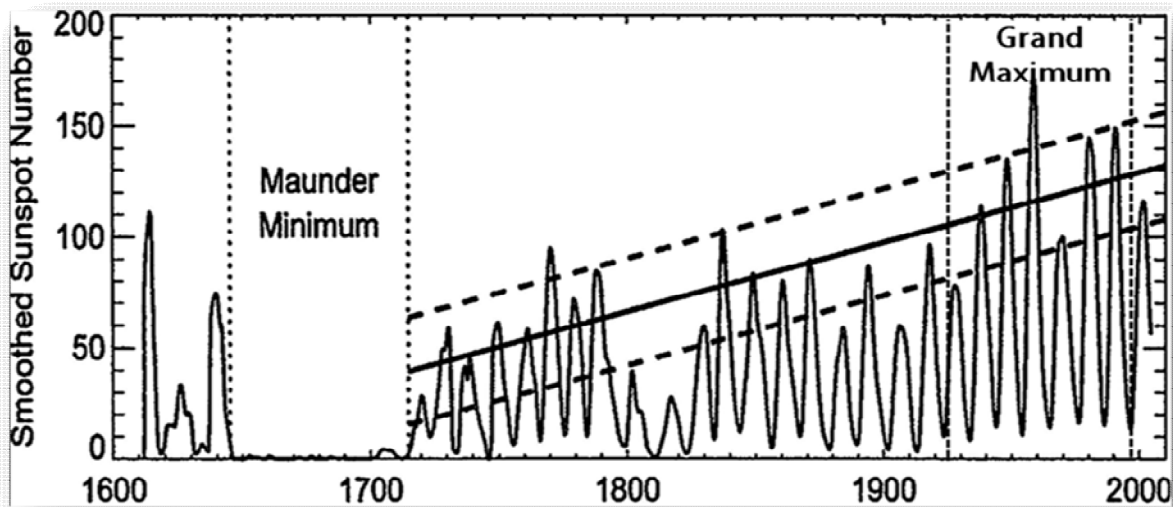
On the current, linear observed trend, CO₂ concentration in 2100 will be just 575 ppmv (IPCC central estimate 836 ppmv), requiring the IPCC's central projection of temperature increase to 2100 to be halved from 3.9 to a harmless 1.9 C°.

The IPCC's prediction of CO₂ increase is greatly exaggerated, chiefly because the IPCC cannot add up the global "carbon budget" to within a factor of two. According to its metric, CO₂ emissions at their current record levels ought to be adding some 4.1 ppmv/year to the atmosphere, yet the actual increase is only 2 ppmv/year. Ever since CO₂ concentration has been measured by modern methods, the increase in concentration has run below half the expected rate.

Nevertheless, the IPCC tries implausibly to claim 90% certainty that more than half of the warming of the past half-century is anthropogenic. It was the political representatives, not the scientists, who reached this conclusion by show of hands – an intriguing instance of the *argumentum ad populum*, an Aristotelian fallacy that has no place in serious thought. Science is not a democracy.

There is compelling evidence that much of the warming of the past half-century was caused by an exceptional increase in solar activity. During the 70 years 1645-1715, the Maunder Minimum, the Sun was less active than in 10,000 years. Then solar activity inexorably increased for almost 300 years until, during the 70 years 1925-1995,

peaking in 1960, the Solar Grand Maximum, the Sun was at least as active as at any time in the previous 11,400 years (Solanki *et al.*, 2005). Hathaway *et al.* (2004) illustrate this solar increase by reference to the 11-year cycles of sunspot numbers –



300 years' growth in solar activity: Smoothed sunspot numbers, showing the Sun's 11-year cycles, reveal the increase in solar activity between the Maunder Minimum and the recent (though largely unreported) solar Grand Maximum. **Source:** Hathaway *et al.* (2004) (indication of Grand Maximum added by the author).

This exceptional increase in solar activity from Maunder Minimum to Grand Maximum has led solar physicists to accord a far greater role to the Sun than the IPCC finds it expedient to allow.

The 2004 Symposium of the International Astronomical Union concluded that the Sun had been responsible for the warming of the past 250 years; that solar activity was now likely to decline; and that global cooling, not warming, was likely.

In the four years since then:

- Solar activity has declined sharply;
- Magnetic convection currents beneath the surface of both solar hemispheres have slowed to a rate never before observed;
- 266 days without sunspots occurred in 2008, the second-least solar activity in more than a century; and
- Global temperatures have duly fallen at a rate equivalent to 6 C°/century.

If that cooling were to persist, there would be an Ice Age by 2100. Scafetta & West (2008) conclude that the Sun caused 69% of the global warming that ceased in 1998.

The central question – on which there is no consensus – is how much warming a given proportionate increase in CO₂ concentration will cause. Arrhenius (1896) estimated 5 C° at CO₂ doubling; Hansen (1988) 4.2 C°; IPCC (1995) 3.8 C°; IPCC (2001) 3.5 C°; and IPCC (2007) 3.26 ± 0.69 C°.

At its very simplest, climate sensitivity to atmospheric enrichment with CO₂ is a logarithmic function of the proportionate increase in CO₂ concentration. The IPCC's current evaluation of this crucial climatic parameter is childishly *simpliste*: though 3.26 ± 0.69 C° sounds commendably precise, this value may be attained by the following startlingly naive method:

$$\begin{aligned}\Delta T_{S,2x} &= c \ln(C/C_0) \\ &= (4.7 \pm 1) \ln 2 \\ &= 3.26 \pm 0.69 \text{ C}^\circ.\end{aligned}\tag{1}$$

This result is said to be derived from a “multi-model mean”: however, it is – to say the least – suspicious that one obtains exactly one standard deviation above or below the central estimate simply by taking the coefficient $c = 4.7$ and adding or subtracting exactly unity. Plainly, further scrutiny is needed.

In the methodology of the IPCC, climate sensitivity – temperature response ΔT_s to an external perturbation such as anthropogenic greenhouse-gas enrichment – is the product of:

- Direct radiative forcings ΔF ;
- The zero-feedback climate-sensitivity parameter κ ; and
- Temperature feedbacks encompassed in the feedback multiplier f , such that:

$$f = (1 - b\kappa)^{-1},\tag{2}$$

where b is the sum of all positive and negative temperature feedbacks, which are then mutually amplified via Eq. {2}, the Bode linear feedback-amplification equation.

Thus the climate-sensitivity equation is:

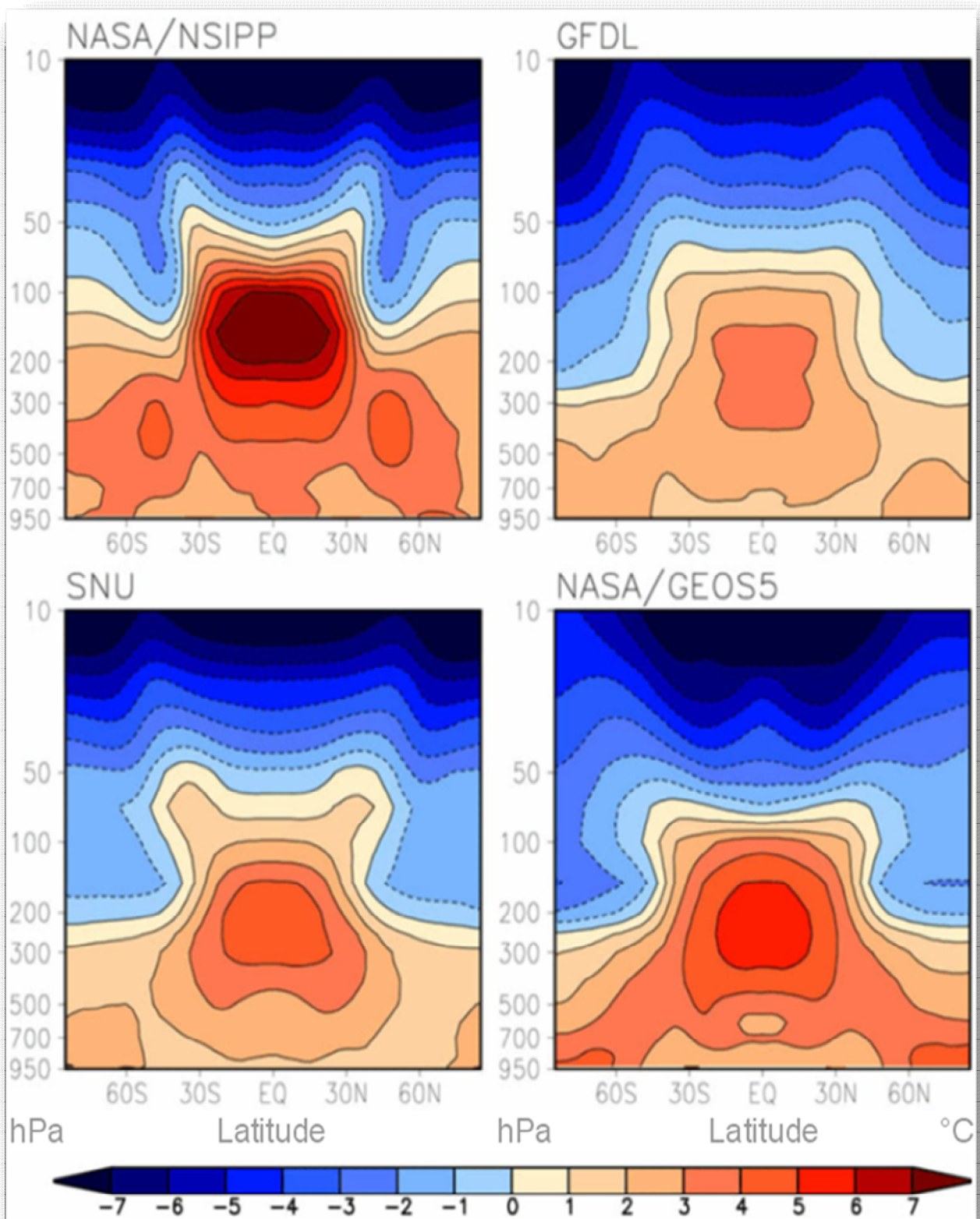
$$\Delta T_s = \Delta F \kappa f = \Delta F \kappa (1 - b\kappa)^{-1}.\tag{3}$$

None of the three key parameters ΔF , κ , f can be definitively evaluated by theoretical demonstration, directly measured by instrumentation, or reliably inferred by experimentation (Monckton, 2008).

Official predictions of climate sensitivity, therefore, being reliant near-exclusively on numerical modeling, cannot be Popper-falsified. To this extent, the anthropogenic-warming contention is untestable, does not qualify as a hypothesis and, *stricto sensu*, is not of interest to science.

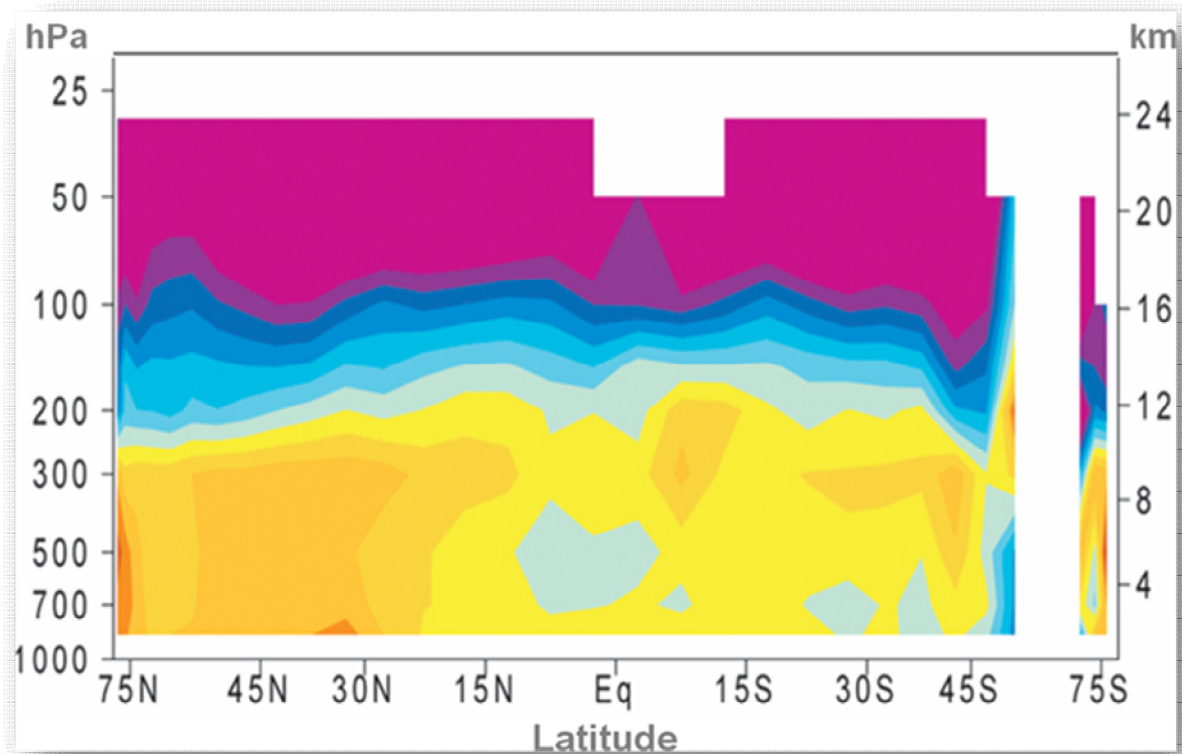
However, we may enquire into the reasonableness of the IPCC's values for the three key parameters ΔF , κ , f , whose product is final climate sensitivity ΔT_s .

First, all of the models on which the IPCC relies predict that most of the atmospheric warming that arises from anthropogenic greenhouse-gas enrichment will occur in the tropical upper troposphere, where the warming rate will be 2-3 times that observed at the surface:



Predicted “hot-spot”: Zonal mean equilibrium temperature change (°C) at CO₂ doubling (2x CO₂ – control), as a function of latitude and pressure (hPa) for 4 general-circulation models. All show the projected fingerprint of anthropogenic greenhouse-gas warming: the tropical mid-troposphere “hot-spot” is projected to warm at 2-3 times the surface rate. **Source:** Lee et al. (2007).

However, the tropical mid-troposphere “hot-spot” that is so confidently predicted by all of the models is not observed in reality:



No “hot-spot”: Altitude-vs.-latitude plot of observed relative warming rates in the satellite era. The greater rate of warming in the tropical mid-troposphere that is projected by general-circulation models is clearly absent in this and all other observational datasets, whether satellite or radiosonde. **Source:** Hadley Centre for Forecasting (HadAT, 2006).

Dr. Richard Lindzen, Alfred P. Sloan Professor of Meteorology at the Massachusetts Institute of Technology, the world’s ranking expert on the behaviour of the atmosphere, has concluded from the absence of the “hot-spot” that:

“... A doubling of CO₂ leads to surface warming of from about 1.5-3.5 K. By contrast, the observed warming over the past century or so amounts to only about 0.6-0.8 K (not all of which need be due to increased greenhouse gases). ... Using basic theory, modeling results and observations, we can reasonably bound the anthropogenic contributions to surface warming since 1979 to a third of the observed warming, leading to a climate sensitivity too small to offer any significant measure of alarm ...”.

This result is very much in line with that of Scafetta & West (2008. *op. cit.*). It requires that we divide the IPCC’s imagined climate sensitivity to CO₂ by *at least* 3.

Furthermore, the IPCC also overstates the zero-feedback climate sensitivity parameter (the “Planck parameter”), whose value cannot exceed 0.27 K W⁻¹ m², taking 0.313 instead. This value is above any in the mainstream literature. It repeals the fundamental equation of radiative transfer, by taking temperature and radiant energy from different radiating surfaces.

Also, the IPCC underestimates the cooling effect of evaporation in calculating the water-vapor feedback (Wentz *et al.*, 2007), and regards the cloud feedback as strongly positive when it should be net-negative (Spencer, 2007), consequently – and substantially – overvaluing the feedback multiplier.

Correcting for each of these exaggerations reduces climate sensitivity to <0.6 C° at CO2 doubling (Monckton, 2008; cf. Lindzen, 2008; Spencer *et al.*, 2007; Schwartz, 2007).

Low climate sensitivity is to be expected, for CO2 is no more than a trace gas, occupying only 1 part in 10,000 more of the atmosphere than 250 years ago. Its effect on temperature is logarithmic: each additional molecule causes less warming than its predecessors. Indeed, the IPCC's formula for evaluating the radiative forcing from CO2 ceases to apply once concentration reaches 915 ppmv, above which adding CO2 has very little effect on temperature. Half a billion years ago, there was 25 times as much CO2 in the atmosphere as today. The planet did not fry.

It is often said that the effect of the warming we are causing will be observed for millennia to come. This is not so. The IPCC's central estimate of the *equilibrium* increase in global temperature from 2000-2100 (on its "business-as-usual" Scenario A2) is:

$$\begin{aligned}\Delta T_{S,2x} &= 4.7 \ln(836/368) \\ &= 3.9 \text{ C}^\circ.\end{aligned}\quad \{5\}$$

Yet the IPCC's stated estimate of *transient* climate sensitivity by 2100, in Table SPM.3, is 3.4 C°. Accordingly, if CO2 concentration were to be stabilized by 2100, temperature would rise thereafter by no more than 0.5 C° – and only by that much on the probably-incorrect assumption that the IPCC's estimates of climate sensitivity to atmospheric CO2 enrichment have not been absurdly exaggerated.

There are two obvious and fatal omissions in the IPCC's analysis, without which its climate-sensitivity values cannot be seriously taken at face value. First, in 1600 pages the IPCC neglects to mention any of the laboratory experiments on the basis of which it wishes us to believe that CO2 will in future have an effect on temperature far larger than that which it is visibly exerting today, still less how such experiments can be reliably translated from the lab to the atmospheric column.

Secondly, the IPCC does not mention whether the outgoing longwave radiation from the Earth's surface, as measured by satellites, has declined as fast as its models have predicted. As Professor Lindzen has pointed out, it was established in several papers published decades ago that the observed decline in outgoing longwave radiation has been far less than predicted, confirming empirically that climate sensitivity to further CO2 enrichment is small, and that the models – programmed to assume an excessive climate sensitivity – are indeed overegging the pudding.

Finally, what are the consequences of 300 years' planetary warming, during all but the last 30 of which we cannot have been to blame for the warming?

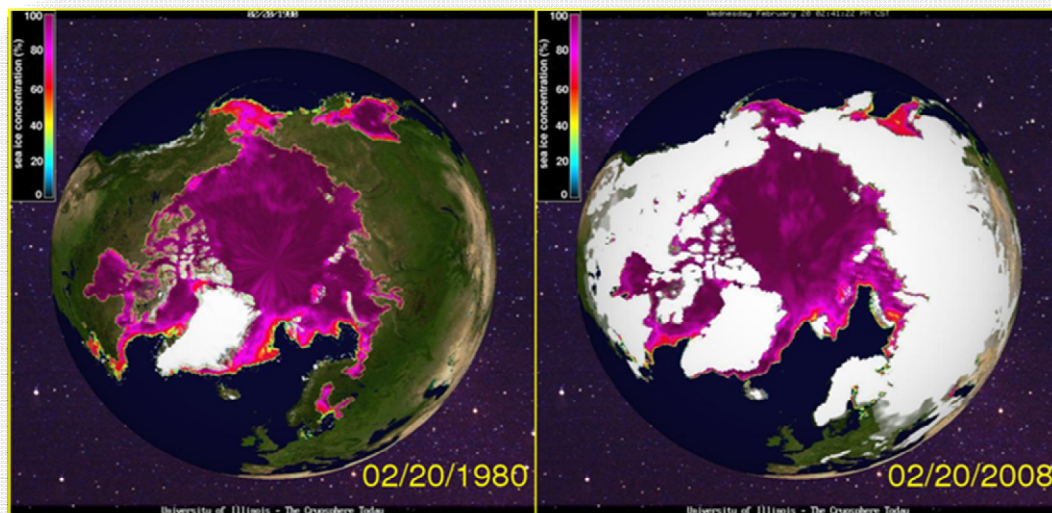
First, as expected, there are more warm years at the end of the period than at the beginning. This is often cited as a reason to believe that anthropogenic "global warming" is occurring: however, it is merely a reason to believe that warming (of whatever origin) has been occurring.

Secondly, sea level is rising at ~1 ft/century, compared with a mean centennial rate of rise of 4ft/century over the past 10,000 years. There is little sign of acceleration in this rate, and no evidence that sea level will imminently rise by 20 ft, as imagined by

Al Gore. The UK High Court has bluntly commented: “The Armageddon scenario that he depicts is not based on any scientific view” (Dimmock v. S of S Educ., 2007). *A fortiori*, a recent statement by a NASA researcher that sea level will rise by almost 250 feet is mere rodomontade. The oceans have been cooling since 2003, when 3175 automated bathythermographs were deployed to provide the first reliable measurements of ocean temperature.

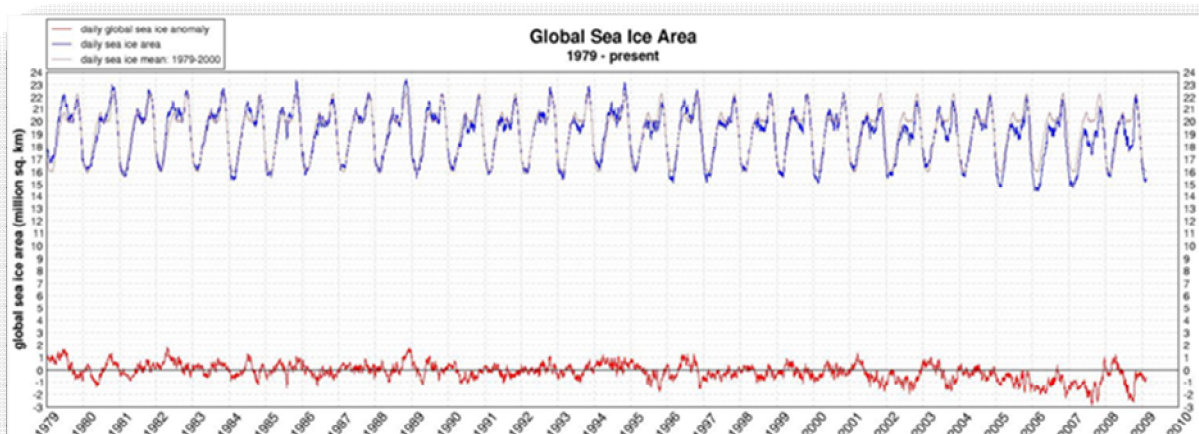
Thirdly, landfalling Atlantic hurricanes show no trend in 100 years, and severe typhoons and tropical storms have been in decline for 30 years. Losses from hurricane damage, adjusted for inflation, population changes and changes in the built environment in harm’s way, have declined. Extra-tropical storms, expected to decrease in both frequency and intensity as warmer weather reduces temperature extremes, have indeed decreased.

Sea ice in the Arctic has been melting a little, particularly in the summer, but its winter extent (purple in the chart below) is much as it was 30 years ago when the satellites first looked. Note that more recent data are not available because the sensor has degraded:



The changes in Arctic sea ice are well within natural variability over the period. The Arctic was in fact warmer in the late 1930s and early 1940s than it is at present.

Sea ice in the Antarctic reached a record high (but largely-unreported) extent in October 2007. Globally, sea-ice extent shows little trend in 30 years:



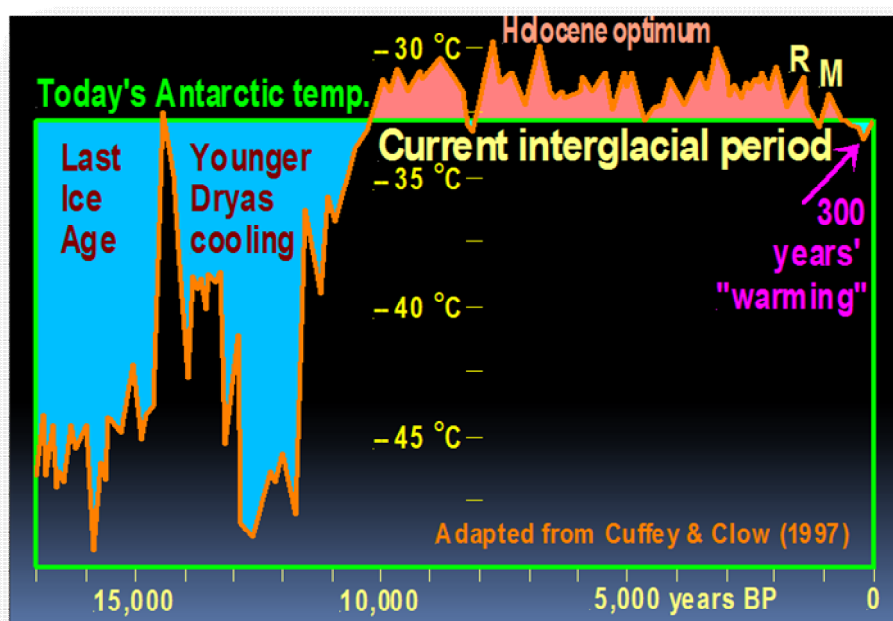
Land ice in Antarctica (90% of the world's total) and in Greenland (5%) has been accumulating throughout the period (Doran *et al.*, 2002; Johannesen *et al.*, 2005). Mountain glaciers had begun to decline in 1820-1800: there has been no increase in the rate of decline during the past 30 years, when we might have had some influence. Kilimanjaro's glacier has ablated owing to regional cooling and consequent desiccation of the atmosphere: the temperature at the summit has never risen above -1.6 degrees Celsius in 30 years of satellite observation, and the mean is -7 Celsius.

Northern-hemisphere snow cover, on which 40% of the world's population depends for its water supply, reached a record high extent in 2007/8 and shows no trend in 30 years.

Patterns of heatwave, cold snap, drought, and flood continue to change, as they always have. There is no evidence for worsening extremes: the drought of the early 20th century in the American Great Plains, for instance, was far worse than anything seen since, and the incidence of major flooding in the UK from mediaeval times (when the whole of the city of Derby was flooded) via the 18th century (when the entire county of Norfolk was underwater for six months) to the present shows no trend.

Though some extravagant claims for widespread species loss have been made, most of the world's life-forms thrive in the tropics, not at the Poles. Warmer weather will lead to speciation, not extinction. The warming of the 20th century, like that of the 19th and 18th centuries, was around 0.75 C°: not enough to cause harm. In Central England, in just one-third of a century between 1700 and 1735, temperatures rose by 2.2 Celsius degrees, equivalent to a centennial rate nearly nine times that which was observed globally in the 20th century. There is little reason to suppose that the warming of the present century (if and when it begins) will be any more severe than that of the 20th century.

Putting today's "global warming" in perspective, global temperatures were 7 C° warmer than the present throughout most of the past half-billion years; 5 C° warmer in each of the past four interglacial periods; $2-3$ C° warmer throughout most of the past 10,000 years; and, notwithstanding a clumsy and now-discredited attempt by the IPCC to abolish it, $1-3$ C° warmer during the medieval (M) warm period:



We conclude that catastrophic “global warming” is a fantasy; and that the warming from CO₂ enrichment will be small, harmless, and beneficial.

Even if temperature had risen above natural variability, the recent solar Grand Maximum may have been chiefly responsible. Even if the sun were not chiefly to blame for the past half-century’s warming, the IPCC has not demonstrated that CO₂ has contributed more than a small fraction of the warming.

Even if CO₂ were chiefly responsible for the warming that ceased in 1998 and may not resume until 2015 (Keenlyside *et al.*, 2008), the distinctive, projected fingerprint of anthropogenic “greenhouse-gas” warming is entirely absent from the observed record.

Even if the fingerprint were present, computer models are long proven (Lorenz, 1963) to be inherently incapable of providing projections of the future state of the climate that are sound enough for policymaking. Even if *per impossibile* the models could ever become reliable, it is evident that the world will not – indeed, cannot – warm as much as the IPCC imagines as a result of atmospheric greenhouse-gas enrichment.

Even if the world were to warm that much, the overwhelming majority of the scientific, peer-reviewed literature does not predict that catastrophe would ensue (Schulte, 2008). Even if catastrophe might ensue, proposals to mitigate future climate change by reducing emissions of carbon dioxide would make very little difference to the climate.

Even if mitigation were likely to be effective, it would do more harm than good: already millions face starvation as the environmentally-disastrous dash for biofuels takes agricultural land out of essential food production, a warning that taking precautions, “just in case”, can do untold harm unless there is a sound, scientific basis for them.

Finally, even if mitigation might do more good than harm, adaptation when (and if) necessary would be far more cost-effective and far less likely to be harmful.

There is no case for spending a single penny more of taxpayers’ money on “global warming” unless and until mean global surface temperatures shall have risen by at least 1 C° above the year 2000. On current evidence and trends, that will not happen for at least a century, if then. This is a scare that has been oversold for political reasons. It is time for a calmer, more science-based approach.

