

**TESTIMONY OF THE VISCOUNT
MONCKTON OF BRENCHLEY
BEFORE CONGRESS
6 MAY 2010**



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The Select Committee, in its letter inviting testimony for the present hearing, cites various scientific bodies as having concluded that –

1. The global climate has warmed;
2. Human activities account for most of the warming since the mid-20th century;
3. Climate change is already causing a broad range of impacts in the United States;
4. The impacts of climate change are expected to grow in the coming decades.

The first statement requires heavy qualification and, since the second is wrong, the third and fourth are without foundation and must fall.

The Select Committee has requested answers to the following questions:

1. What are the observed changes to the climate system?

Carbon dioxide concentration: In the Neoproterozoic Era, ~750 million years ago, dolomitic rocks, containing ~40% CO₂ bonded not only with calcium ions but also with magnesium, were precipitated from the oceans worldwide by a reaction that could not have occurred unless the atmospheric concentration of CO₂ had been ~300,000 parts per million by volume. Yet in that era equatorial glaciers came and went twice at sea level.

Today, the concentration is ~773 times less, at ~388 ppmv: yet there are no equatorial glaciers at sea level. If the warming effect of CO₂ were anything like as great as the vested-interest groups now seek to maintain, then, even after allowing for greater surface albedo and 5% less solar radiation, those glaciers could not possibly have existed (personal communication from Professor Ian Plimer, confirmed by on-site inspection of dolomitic and tillite deposits at Arkaroola Northern Flinders Ranges, South Australia).

In the Cambrian Era, ~550 million years ago, limestones, containing some 44% CO₂ bonded with calcium ions, were precipitated from the oceans. At that time, atmospheric CO₂ concentration was ~7000 ppmv, or ~18 times today's (IPCC, 2001): yet it was at that time that the calcite corals first achieved algal symbiosis. In the Jurassic era, ~175 million years ago, atmospheric CO₂ concentration was ~6000 ppmv, or ~15 times today's (IPCC, 2001): yet it was then that the delicate aragonite corals came into being.

Therefore, today's CO₂ concentration, though perhaps the highest in 20 million years, is by no means exceptional or damaging. Indeed, it has been argued that trees and plants have been part-starved of CO₂ throughout that period (Senate testimony of Professor Will Happer, Princeton University, 2009). It is also known that a doubling of today's CO₂ concentration, projected to occur later this century (IPCC, 2007), would increase the yield of some staple crops by up to 40% (lecture by Dr. Leighton Steward, Parliament Chamber, Copenhagen, December 2009).

Global mean surface temperature: Throughout most of the past 550 million years, global temperatures were ~ 7 K (13 F°) warmer than the present. In each of the past four interglacial warm periods over the past 650,000 years, temperatures were warmer than the present by several degrees (A.A. Gore, *An Inconvenient Truth*, 2006).

In the current or Holocene warm period, which began 11,400 years ago at the abrupt termination of the Younger Dryas cooling event, some 7500 years were warmer than the present (Cuffey & Clow, 1997), and, in particular, the medieval, Roman, Minoan, and Holocene Climate Optima were warmer than the present (Cuffey & Clow, 1997).

The “global warming” that ceased late in 2001 (since when there has been a global cooling trend for eight full years) had begun in 1695, towards the end of the Maunder Minimum, a period of 70 years from 1645-1715 when the Sun was less active than at any time in the past 11,400 years (Hathaway, 2004). Solar activity increased with a rapidity unprecedented in the Holocene, reaching a Grand Solar Maximum during a period of 70 years from 1925-1995 when the Sun was very nearly as active as it had been at any time in the past 11,400 years (Hathaway, 2004; Usoskin, 2003; Solanki, 2005).

The first instrumental record of global temperatures was kept in Central England from 1659. From 1695-1735, a period of 40 years preceding the onset of the Industrial Revolution in 1750, temperatures in central England, which are a respectable proxy for global temperatures, rose by 2.2 K (4 F°). Yet global temperatures have risen by only 0.65 K (1.2 F°) since 1950, and 0.7 K (1.3 F°) in the whole of the 20th century. Throughout the 21st century, global temperatures have followed a declining trend. Accordingly, neither global mean surface temperature nor its rates of change in recent decades have been exceptional, unusual, inexplicable, or unprecedented.

Ocean “acidification”: It has been suggested that the oceans have “acidified” – or, more correctly, become less alkaline – by 0.1 acid-base units in recent decades. However, the fact of a movement towards neutrality in ocean chemistry, if such a movement has occurred, tells us nothing of the cause, which cannot be attributed to increases in CO₂ concentration. There is 70 times as much CO₂ dissolved in the oceans as there is in the atmosphere, and some 30% of any CO₂ we add to the atmosphere will eventually dissolve into the oceans. Accordingly, a doubling of CO₂ concentration, expected later this century, would raise the oceanic partial pressure of CO₂ by 30% of one-seventieth of what is already there. And that is an increase of 0.4% at most. Even this minuscule and chemically-irrelevant perturbation is probably overstated, since any “global warming” that resulted from the doubling of CO₂ concentration would warm the oceans and cause them to outgas CO₂, reducing the oceanic partial pressure.

Seawater is a highly buffered solution – it can take up a huge amount of dissolved inorganic carbon without significant effect on pH. There is not the slightest possibility that the oceans could approach the neutral pH of pure water (pH 7.0), even if all the fossil fuel reserves in the world were burned. A change in pH of 0.2 units this century, from its present 8.2 to 8.0, even if it were possible, would leave the sea containing no more than 10% of the “acidic”

positively-charged hydrogen ions that occur in pure water. If ocean “acidification” is happening, then CO₂ is not and will not be the culprit.

2. What evidence provides attribution of these changes to human activities?

In the global instrumental record, which commenced in 1850, the three supradecadal periods of most rapid warming were 1860-1880, 1910-1940, and 1975-2001. Warming rates in all three periods were identical at ~0.16 K (0.3 F°) per decade.

During the first two of these three periods, observations were insufficient to establish the causes of the warming: however, the principal cause cannot have been atmospheric CO₂ enrichment, because, on any view, mankind’s emissions of CO₂ had not increased enough to cause any measurable warming on a global scale during those short periods.

In fact, the third period of rapid global warming, 1975-2001, was the only period of warming since 1950. From 1950-1975, and again from 2001-2010, global temperatures fell slightly (HadCRUTv3, cited in IPCC, 2007).

What, then, caused the third period of warming? Most of that third and most recent period of rapid warming fell within the satellite era, and the satellites confirmed measurements from ground stations showing a considerable, and naturally-occurring, global brightening from 1983-2001 (Pinker *et al.*, 2005).

Allowing for the fact that Dr. Pinker’s result depended in part on the datasets of outgoing radiative flux from the ERBE satellite that had not been corrected at that time for orbital decay, it is possible to infer a net increase in surface radiative flux amounting to 0.106 W m⁻² year⁻¹ over the period, compared with the 0.16 W m⁻² year⁻¹ found by Dr. Pinker.

Elementary radiative-transfer calculations demonstrate that a natural surface global brightening amounting to ~1.9 W m⁻² over the 18-year period of study would be expected – using the IPCC’s own methodology – to have caused a transient warming of 1 K (1.8 F°). To put this naturally-occurring global brightening into perspective, the IPCC’s estimated total of all the anthropogenic influences on climate combined in the 256 years 1750-2005 is only 1.6 W m⁻².

Taking into account a further projected warming, using IPCC methods, of ~0.5 K (0.9 F°) from CO₂ and other anthropogenic sources, projected warming of 1.5 K (2.7 F°) should have occurred.

However, only a quarter of this projected warming was observed, suggesting the possibility that the IPCC may have overestimated the warming effect of greenhouse gases fourfold. This result is in line with similar result obtained by other methods: for instance, Lindzen & Choi (2009, 2010 submitted) find that the warming rate to be expected as a result of anthropogenic activities is one-quarter to one-fifth of the IPCC’s central estimate.

There is no consensus on how much warming a given increase in CO₂ will cause.

3. Assuming *ad argumentum* that the IPCC's projections of future warming are correct, what policy measures should be taken?

Warming at the very much reduced rate that measured (as opposed to merely modeled) results suggest would be 0.7-0.8 K (1.3-1.4 F°) at CO₂ doubling. That would be harmless and beneficial – a doubling of CO₂ concentration would increase yields of some staple crops by 40%. Therefore, one need not anticipate any significant adverse impact from CO₂-induced “global warming”. “Global warming” is a non-problem, and the correct policy response to a non-problem is to have the courage to do nothing.

However, *ad argumentum*, let us assume that the IPCC is correct in finding that a warming of 3.26 ± 0.69 K (5.9 ± 1.2 F°: IPCC, 2007, ch.10, box 10.2) might occur at CO₂ doubling. We generalize this central prediction, deriving a simple equation to tell us how much warming the IPCC would predict for any given change in CO₂ concentration –

$$\Delta T_s \approx (8.5 \pm 1.8) \ln(C/C_0) \text{ F}^\circ$$

Thus, the change in surface temperature in Fahrenheit degrees, as predicted by the IPCC, would be 6.7 to 10.3 (with a central estimate of 8.5) times the logarithm of the proportionate increase in CO₂ concentration. We check the equation by using it to work out the warming the IPCC would predict at CO₂ doubling: $8.5 \ln 2 \approx 5.9$ F°.

Using this equation, we can determine just how much “global warming” would be forestalled if the entire world were to shut down its economies and emit no carbon dioxide at all for an entire year. The atmospheric concentration of CO₂ is 388 parts per million by volume. Our emissions of 30 bn tons of CO₂ a year are causing this concentration to rise at 2 ppmv/year, and this ratio of 15 bn tons of emissions to each additional ppmv of CO₂ concentration has remained constant for 30 years.

Then the “global warming” that we might forestall if we shut down the entire global carbon economy for a full year would be $8.5 \ln[(388+2)/388] = 0.044$ F°. At that rate, almost a quarter of a century of global zero-carbon activity would be needed in order to forestall just one Fahrenheit degree of “global warming”.

Two conclusions ineluctably follow. First, it would be orders of magnitude more cost-effective to adapt to any “global warming” that might occur than to try to prevent it from occurring by trying to tax or regulate emissions of carbon dioxide in any way.

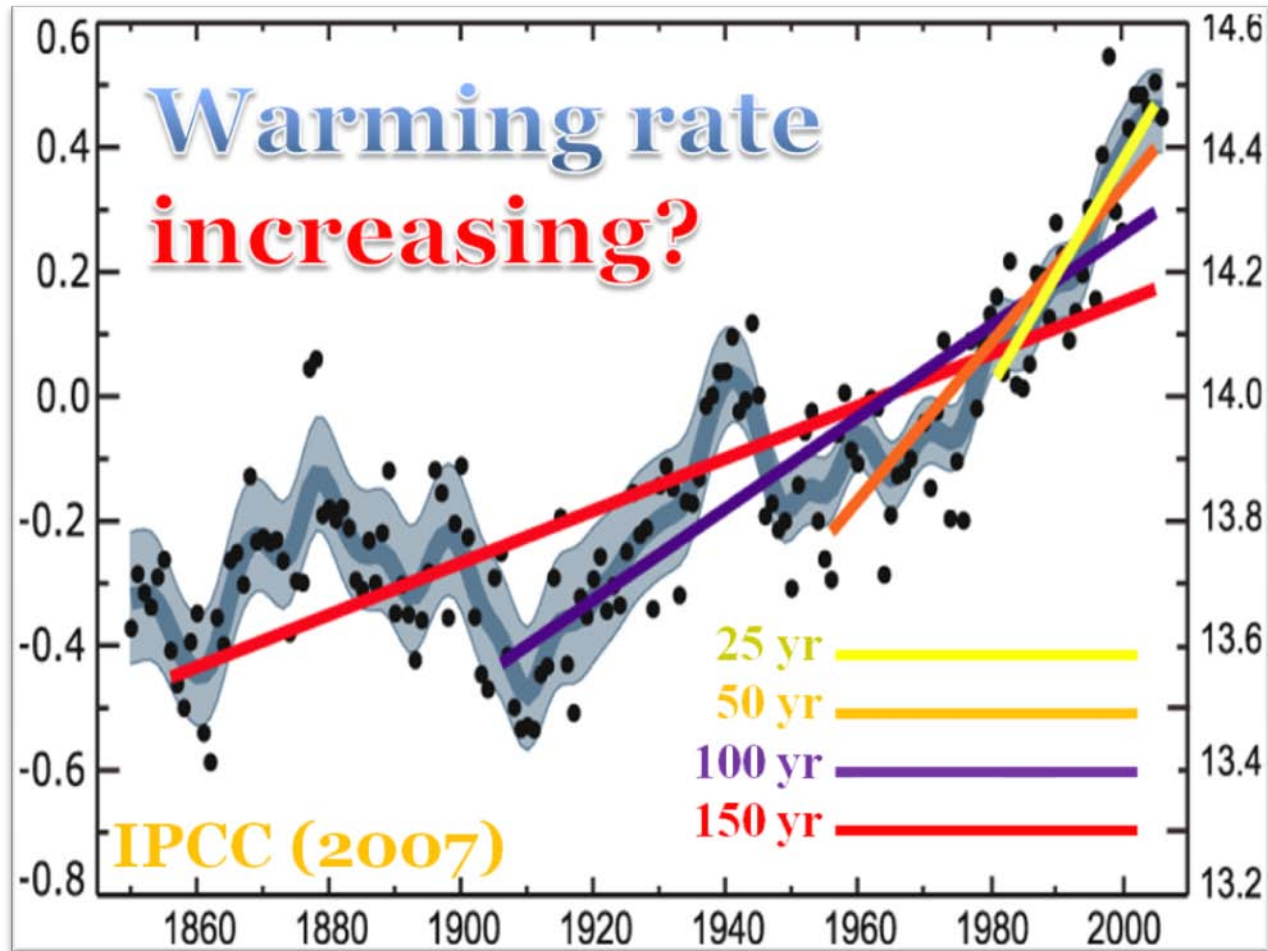
Secondly, there is no hurry. Even after 23 years doing nothing to address the imagined problem, and even if the IPCC has not exaggerated CO₂'s warming effect fourfold, the world will be just 1 F° warmer than it is today. If the IPCC has exaggerated fourfold, the world can do nothing for almost a century before global temperature rises by 1 F°.

There are many urgent priorities that need the attention of Congress, and it is not for me as an invited guest in your country to say what they are. Yet I can say this much: on any view, “global warming” is not one of them.



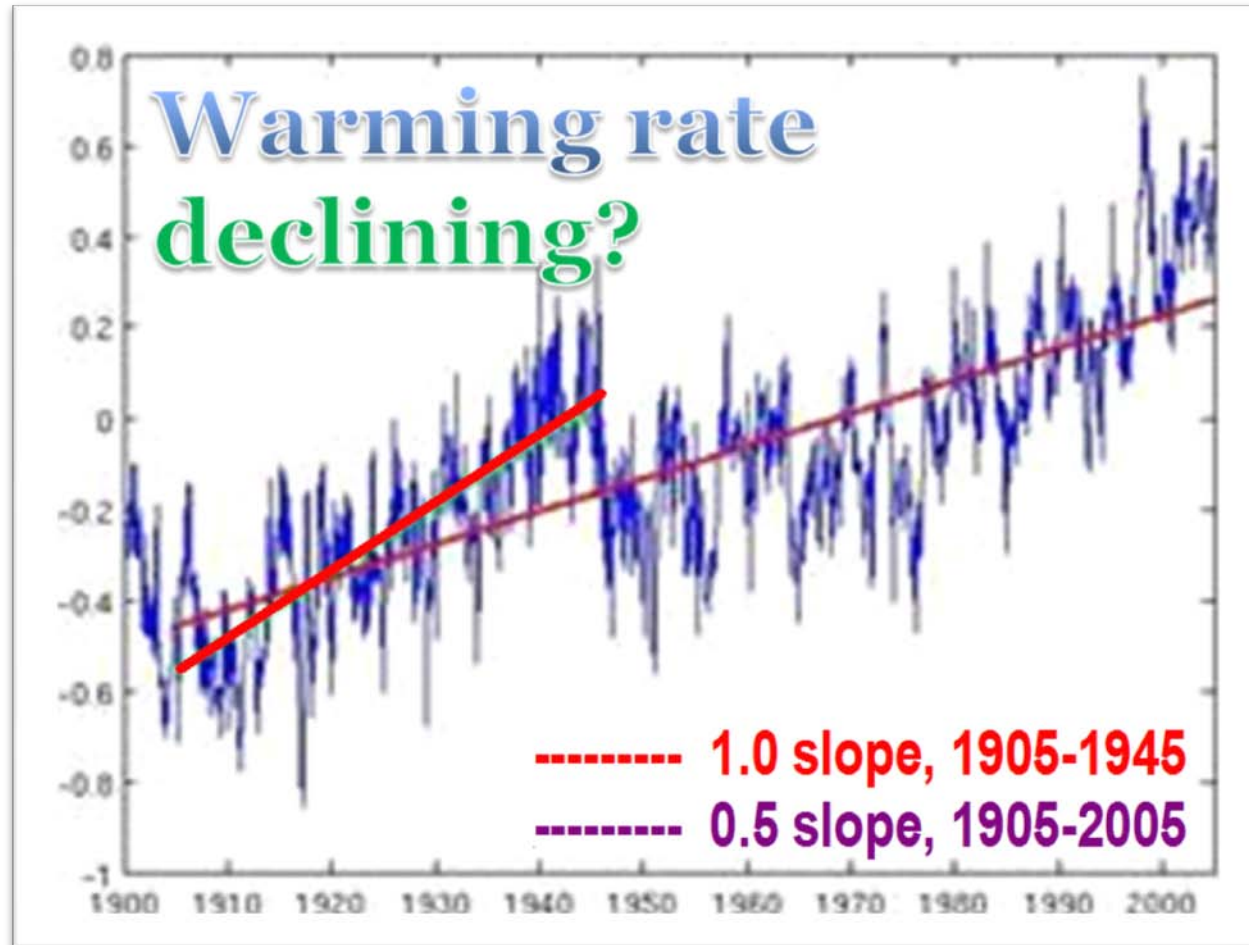
SUPPLEMENTAL POWERPOINT SLIDES

[SLIDE 1]



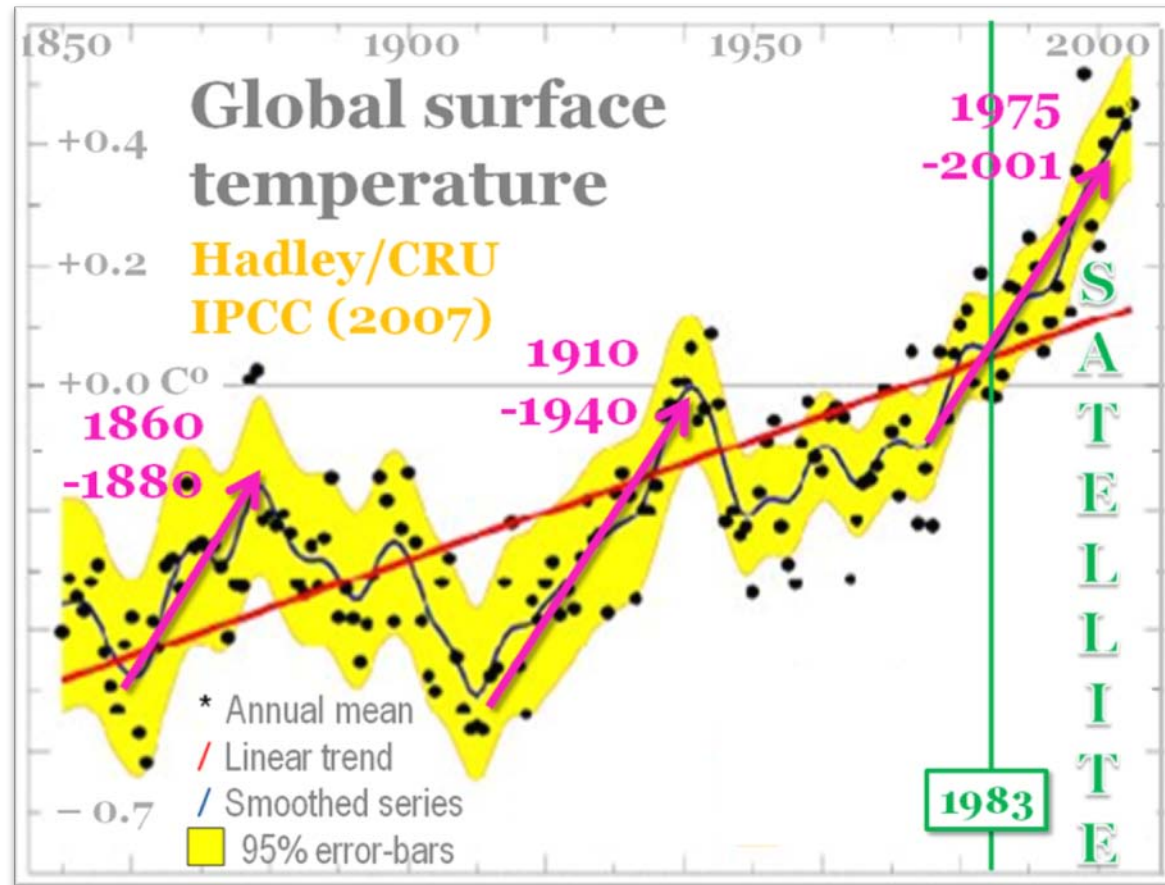
Slide 1. The IPCC was wrong to adopt a statistical technique, well known to be bogus, by which, on a stochastic dataset, the slopes of multiple trend-lines with arbitrarily-chosen startpoints and endpoints are compared and conclusions are drawn as to whether and at what rate the rate of change in the data is itself changing.

[SLIDE 2]



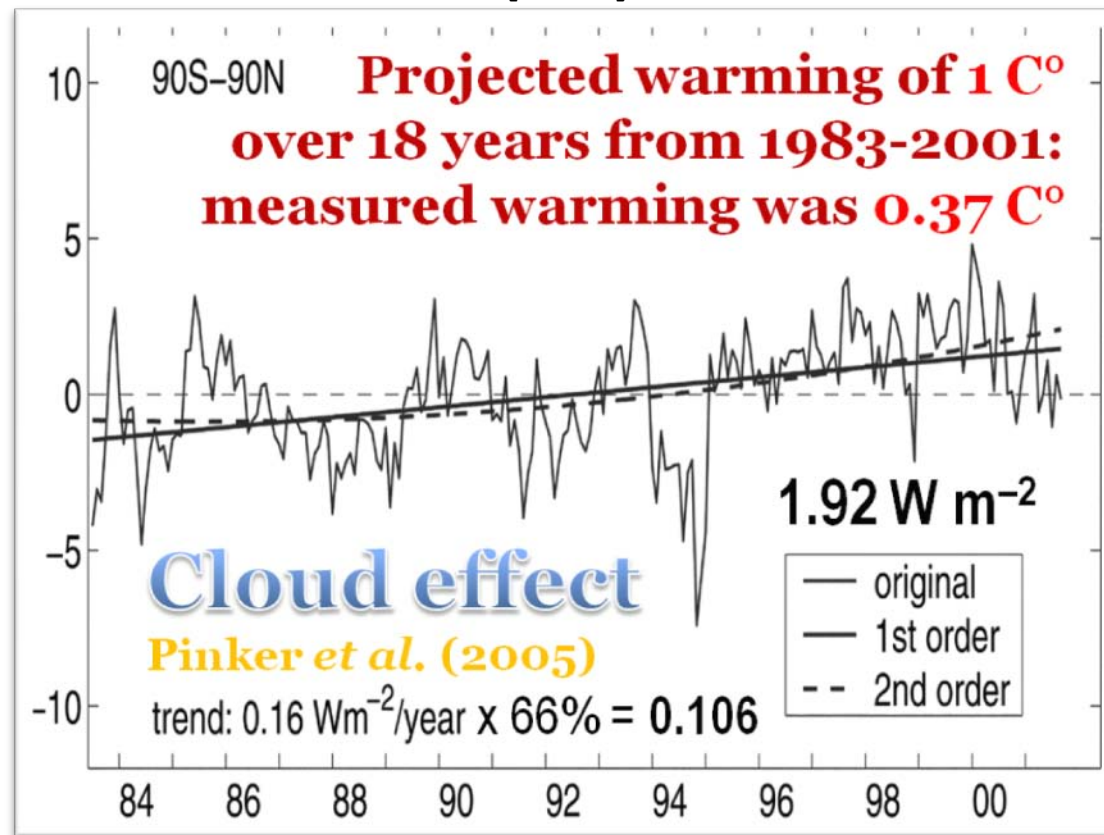
Slide 2. The bogosity of the IPCC's statistical technique is demonstrable by arbitrarily choosing 1905 as the common start-date for two trend-lines, the first ending in 1945, the second ending in 2005. The trend-line for 1905-2005 has half the slope of the trend-line for 1905-1945, implying that the rate of "global warming" shown in the graph is in fact declining, not increasing as the IPCC's graph had purported to show. Since opposite results are obtainable by using the same statistical technique on the same data but with different arbitrarily-chosen start-points and endpoints for the trend-lines, the technique must of necessity be defective.

[SLIDE 3]



Slide 3. The true position is that the three periods of most rapid multi-decadal global warming in the 160-year global-temperature record of the Hadley Centre and Climate Research Unit - 1860-1880, 1910-1940, and 1975-2001 - exhibit near-identical warming rates at ~ 0.16 K/decade. The first two warming rates cannot have been principally or significantly caused by increases in CO₂ concentration because, on any view, the increases over the periods in question were too small. Accordingly, though we do not know what caused those two periods of rapid warming, their causes cannot have been primarily anthropogenic and must have been natural. The question arises whether the third and most recent period of warming was also natural. This question may be addressed by examination of the satellite records of temperature, radiative flux and cloud cover that became available in the early 1980s.

[SLIDE 4]



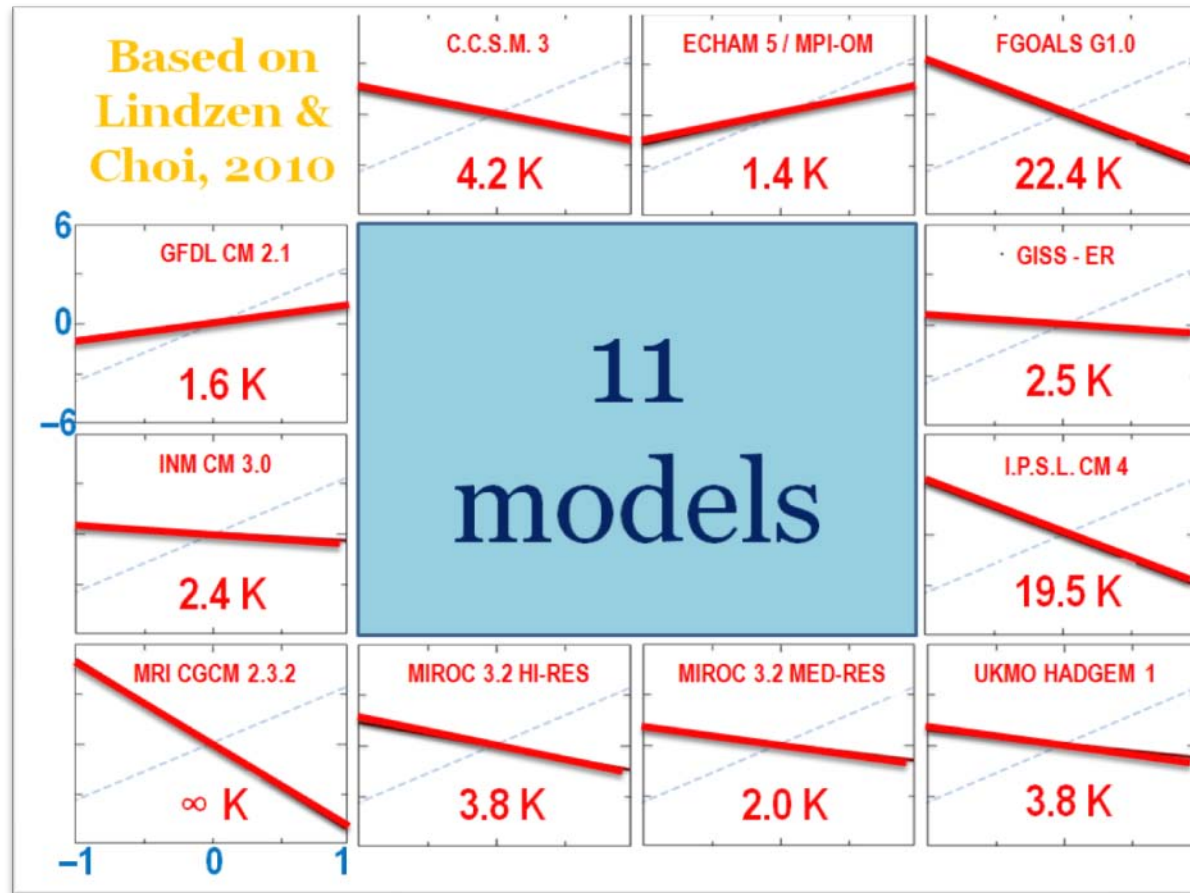
Slide 4. There was indeed a natural cause for the period of rapid warming from 1983-2001: namely, a well-measured global brightening. Global brightening is an increase in the flux of solar radiation reaching the Earth's surface, usually caused by a reduction in cloud cover, or possibly also by a reduction in anthropogenic particulate aerosols. Pinker *et al.* (2005), based on analyses of data from the satellites of the International Satellite Cloud Climatology Project (ISCCP) and the Earth Radiation Budget Experiment (ERBE), found a global brightening of 0.16 Watts per square meter per year, or almost 3 Watts per square meter over the 18-year period. However, the authors were relying in part upon ERBE data that had not been corrected for orbital drift, so that the true global brightening was probably a little under 2 Watts per square meter. This value is highly significant: to put it in perspective, the IPCC's estimate of the total anthropogenic influence on the climate in the 256 years 1750-2005 is just 1.6 Watts per square meter.

[SLIDE 5]

1983-2001	$q = 0.719$	Transient warming
Global brightening	0.185 x 2.813 x 1.917	0.995 K
Carbon dioxide	342-370 ppmv: 0.421 q	0.303 K
Methane	1630-1775 ppbv: 0.054 q	0.039 K
Nitrous oxide	304-312 ppbv: 0.024 q	0.018 K
Ozone	Proport. to CO ₂ : 0.077 q	0.055 K
CFC-11	183-256 pptv: 0.018 q	0.013 K
CFC-12	343-541 pptv: 0.065 q	0.047 K
$\Delta T_{S,proj}$	Projected warming	1.470 K
$\Delta T_{S,obs}$	Observed warming	0.370 K
Excess ratio	$\Delta T_{S,proj} / \Delta T_{S,obs}$	4.0

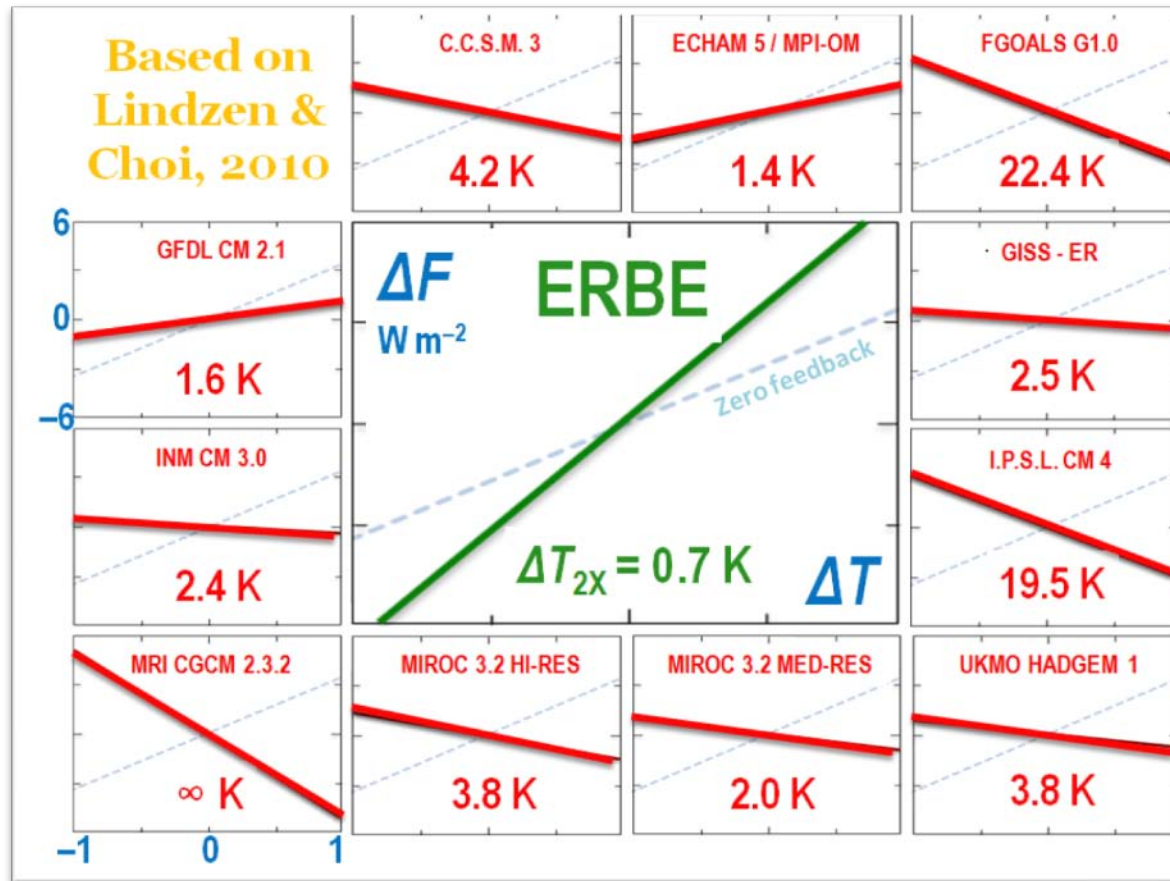
Slide 5. We convert the 1.917 Watts per square meter of additional solar radiance between 1983 and 2001 to temperature change as follows: first, we multiply by the first differential of the Stefan-Boltzmann equation at the Earth's surface, which is 0.185 Kelvin per Watt per square meter, to obtain the warming that might be expected to have resulted from the global brightening where temperature feedbacks are absent or sum to zero. Next, we multiply the pre-feedback warming by 2.813, the IPCC's implicit central estimate of the temperature-feedback factor, to allow for amplifications in the original warming that occur precisely because the planet has warmed. This simple calculation shows that the warming that the IPCC would predict in response to an increase of 1.917 Watts per square meter in surface radiance is around 1 K. Yet only 0.34 K of warming was actually observed over the period. In addition to the warming that arose from the global brightening, there should also have been warming - according to the IPCC - caused by increases in the atmospheric concentrations of various greenhouse gases, the most prominent of which are listed in the table shown in this slide. In total, therefore, 1.47 K of transient warming ought to have occurred during the 18-year period. Because only 0.34 K of global warming actually occurred, it seems that the IPCC's method for calculating the warming effect of greenhouse gases has led it to exaggerate the warming effect of greenhouse gases 4.4 times over. If so, the warming to be expected from the doubling of CO₂ concentration that the IPCC thinks will arise later this century will cause not the 3.26 K warming that the IPCC's 2007 assessment report suggests, but a harmless 0.74 K.

[SLIDE 6]



Slide 6. By an entirely different method, and studying broadly the same period, Lindzen and Choi (2009, revised 2010 in light of remarks in Fassullo *et al.*, 2009) found that the IPCC had indeed predicted the warming to be expected from anthropogenic increases in greenhouse gases by exactly the same margin as our own independent calculations demonstrate. Lindzen and Choi analyzed the outputs of 11 separate computer models relied upon by the IPCC, and found that in response to an increase in sea surface temperature (*x* axis) nearly all of the models predicted that there would be a *reduction* in outgoing radiation from the top of the atmosphere (*y* axis). All of the models predicted, as the graph in this slide shows, that temperature feedbacks would be positive - i.e., that they would amplify any "global warming". The implication from the 11 models was that a doubling of CO₂ concentration would cause warming of 1.4 K to infinity.

[SLIDE 7]



Slide 7. Measurements from the ERBE satellite show a result that is different in essence as well as in degree from all of the models' results. The measurements show that there is a significant *increase* in outgoing radiation at the top of the atmosphere in response to an increase in sea-surface temperature, and that temperature feedbacks in the climate system must accordingly be negative. This result, identical to ours to two decimal places, suggests that the warming to be expected from a doubling of CO₂ concentration would not be the 3.26 K imagined by the IPCC in its 2007 assessment report but just 0.7 K. Note that all such calculations cannot really produce reliable results to a closer precision than one-tenth of a Kelvin: nevertheless, the two independent results agree to the nearest one-hundredth of a Kelvin.

Cap & trade cannot work

Atmospheric CO₂ concentration, 2010	NOAA global CO ₂	388 ppmv
Adding 2 ppmv/yr causes warming of	UN est.: $8.5 \ln(390/388)$	0.044 F°
No. of years to stop 1 F° warming	Based on UN est.: 0.044^{-1}	23 years
If warming was overstated 4-fold	23 years x 4	92 years

Slide 8. This simple table demonstrates why it is extravagantly cost-ineffective to attempt to mitigate "global warming" by reducing CO₂ emissions. Even if the UN's central estimate of the warming effect were correct (rather than exaggerating 4.4-fold), *all* global CO₂ emissions would have to be shut down for almost a quarter of a century - and more like a century if the IPCC has indeed exaggerated the warming effect of CO₂ and other greenhouse gases 4.4-fold - to forestall just 1 Fahrenheit degree of future "global warming". That is the fundamental reason why no form of "cap and trade" can possibly make any significant difference to the climate. Instead, it would be better to adapt to any climatic changes that might occur, and to do so only as and when and where *and if* they occur. That is why the correct policy to address the non-problem of "global warming" is to have the courage to do nothing.

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