

**Climate Change 2007: The Physical Science Basis**  
**Summary for Policymakers**

by Vincent Gray

75 Silverstream Road, Crofton Downs, Wellington 6035, New Zealand

Email [vinmary.gray@paradise.net.nz](mailto:vinmary.gray@paradise.net.nz)

## **Introduction**

Since I returned from China in 1991 my whole life has been dominated by the scientific reports from the Working Group WG1 of the Intergovernmental Panel on Climate Change (IPCC). I first became interested in the possible consequences of the enhanced greenhouse effect when I was teaching English in the Teachers' University in Kunming. I spent my spare time in their library where they had an excellent collection of recent scientific journals in English. I became an enthusiast and gave several lectures on the subject to Chinese students.

When I returned to New Zealand the drafts of the first IPCC Report were being circulated and when my interest was known I was asked to make comments, which at that time were forwarded through the New Zealand Government. Over time I became an independent "expert reviewer" on my own. Since then I have provided comments on both drafts of all four major scientific Reports (1990, 1995, 2001, and, now, 2007) plus the subsidiary reports of 1992 and 1994. These have amounted by now to many hundreds of pages. My comments on one draft alone had 90 pages.

My disillusionment with the whole process began very early. The very first Report was dominated by an attempt to persuade the value of computer models. Climate data on the supposed warming were largely confined to the end of the Report, presumably to draw attention from their lack of confirmation of the models. This was concealed by claiming that the size of this warming was "broadly consistent" with the models.

I could claim my first success, that after my comment, all subsequent IPCC Science Reports have placed the climate data at the beginning.

But that was not the only cause for suspicion. In the first draft of the IPCC WGI 1995 Report there was a Chapter headed "Validation of Climate Models" I commented that this word was inappropriate as no model had ever been "validated", and there seemed to be no attempt to do so. They agreed, and not only changed the word in the title to "evaluation", but they did so no less than fifty times throughout the next draft. They have rigidly kept to this practice ever since.

"Validation", as understood by computer engineers, involves an elaborate testing procedure on real data which goes beyond mere simulation of past datasets, but must include successful prediction of future behaviour to an acceptable level of accuracy. Without this process no computer model would ever be acceptable for future prediction. The absence of any form of validation still applies today to all computer models of the climate, and the IPCC wriggle out of it by outlawing the use of the word "prediction" from all its publications. It should be emphasised that the IPCC do not make "predictions", but provide only "projections". It is the politicians and the activists who convert these, wrongly, into "predictions.", not the scientists.

An unfortunate result of this deficiency is that without a validation process there cannot be any scientific or practical measure of accuracy. There is therefore no justified claim for the reliability of any of the “projections”

They have tried to draw attention from the undoubted fact that the models have not been shown capable of making predictions by seeking the “opinion” (or “guess”) of a panel of “experts”, all of whom have a financial stake in the outcome, and apply to these guesses levels of “likelihood” which have even been given a spurious numerical value. If the experts were employees of oil or coal companies, and their opinions were undesired there would be an outcry. As the “experts” are employees or recipients of funding from governments promoting the notion of greenhouse warming, criticism is not heard.

### **The 2007 Summary for Policymakers**

The current document is really a Summary BY Policymakers, since it has been agreed line-by-line by government representatives. It has passed through the usual three drafts, the last of which was circulated only to government representatives. It has broken with the procedure followed previously, as it is issued before the main Working Group 1 (WGI) Report. For most people, this creates a difficulty, but as I have already been through two drafts of all the Chapters with a fine tooth comb and submitted copious comments on them, I have knowledge of the full document which is not available to most others. I have even received leaks and rumours which indicate what might be in the final document.

I wrote an entire book criticising the 2001 IPCC WGI Report (Gray 2002) and a full study of the complete 2007 Report must await its release. I will therefore confine these comments to the aspects of the “2007 Summary for Policymakers” which I find the most distasteful. They come under the headings of unreliable data, inadequate statistical treatment and gross exaggeration of model capacity. The first two tend to need to be treated together.

### **Climate Data**

The 2007 Summary begins by discussing the concentrations of the minor greenhouse gases in the atmosphere. As with almost all of their data, the figures are the results of averages from unrepresentative samples. The worst of these are the concentrations derived from ice cores. Not only are these averages from a somewhat indefinite number of years that it takes for the deposited snow to consolidate, the number of samples is pathetically small to assume that they can be considered to represent a global average. Any variability over different parts of the globe, or over relatively short periods is just unknown.

More recent measurements are not much better. The numerous measurements of carbon dioxide in the atmosphere by the likes of Haldane and Callender between 1920 and 1950 are not mentioned and the measurements since 1955 are mere averages of samples taken mainly over ocean sites. There is hardly any information about carbon dioxide over the places where they claim that it matters; land surfaces. It is said that measurements over land are difficult because of “noise”. This proves that the excuse given for the lack of attention to variability, that the gases are “well-mixed”, is simply not true. Even the averages are shown to vary seasonally and geography. The recent discovery that methane is emitted by plants shows how land areas are unknown territory.

The relationship between these gases and such climate effects as temperature are non linear. With carbon dioxide the accepted mathematical relationship is logarithmic. This means that calculations based on linear averages are bound to be wrong, because fluctuations below the average are more important than fluctuations above the average. Until these fluctuations are known, and extended to land surfaces the calculations of “radiative forcing” for greenhouse gases are suspect and less certain than is claimed.

Of the other minor greenhouse gases, the average atmospheric methane concentration has shown a declining “rate of growth” ever since measurements began in 1984. The rate of growth is at present fluctuating above, and mainly below, zero, which means it is heading downwards at an increasing rate. With the last (2001) Report they doctored the curve to imply it was rising and they have played the same trick again, involving an embargo on official figures since 2004. All the “emissions scenarios”, of course, assume immediate future increases in atmospheric methane concentration in contrast to admitted facts.

Although emissions of greenhouse gases are almost exclusively involved in the Kyoto process this paper mentions emissions only briefly and does not explain that they are not the same as atmospheric concentrations, or the difficulties or delays in measurement, both nationally and internationally, again involving poor sampling and calculations of doubtful accuracy. The exact relationship between emissions and atmospheric concentrations is not known, but this difficulty is not discussed either.

### **Radiative Forcing**

The essential claim of the greenhouse theory is that increases in greenhouse gases are responsible for a change in the radiant energy experienced by the earth. This change is called “radiative forcing” The most important feature of this 2007 IPCC Summary is therefore the description of the elements of radiative forcing which are considered to have arisen since the beginnings of industrialization in 1750 (Figure 1). A Figure similar to this has appeared in all the IPCC WGI Reports, but this one has some novel features.

It may surprise some lay persons that there are so many components of radiative forcing, by no means confined to carbon dioxide. Some of them have negative effects which, it is admitted, could be greater than the positive effects of the greenhouse gases themselves.

The problem with these components is the reliability of the estimates. The previous diagram, in “Climate Change 2001” also supplied “error bars” as an indication of reliability, but rather destroyed this by saying in the caption to the diagram that they possessed “no statistical significance”. This time there is a claim of statistical significance for them, but they have altered the usual goalposts, which are 95% confidence levels to 90%, to make them look better. The value of these, though, is rather undermined again by the additional qualification, now at one side of the diagram, that these levels are further subject to various “Levels of Scientific Understanding”. The figures for the main gases are regarded as “High Level”, but unless there is some idea what that could mean we are still in the dark. I have already indicated possible doubts about the figure, anyway. The components with “Low Levels of Scientific Understanding” could obviously swamp the others,

The previous diagram included a warning that the various components could not be added together to produce a net radiative forcing because they were not uniformly applied in time or space. This time they have carried out the sum in violation of their own warning. If you carry

out the same forbidden procedure on the previous figures you get 1.05 Watts per square meter. This time it is 1.6 W/sqm with a 90% confidence of 0.6 to 2.4.

They have, in any case, still left out the most important contributors to radiative forcing, which are water vapour and clouds. These are not only possibly larger than those shown, but they also suffer from a high degree of uncertainty plus low “Levels of Scientific Understanding” The excuse given is that they are “feedbacks” which has the advantage that they can be concealed from the public. The idea of “feedback” implies that both these quantities can be considered to be functions of global temperature but this has no scientific or experimental basis for the real non equilibrium climate system. It is illogical to include two sets of cloud effects and not the most important ones. If you take note of the low “Levels of Scientific Understanding” of so many of the components and take heed of only a few of my doubts, you have to conclude that there is a good chance that the globe is not warming at all.

## Temperature Trends

The central claim of the IPCC is that the major result of increases in greenhouse gases is “global warming”, an increase in the mean globally averaged surface temperature. The IPCC’s “Climate Change 2001” promotes the version of mean annual surface temperature anomalies put out by the Climate Research Unit of the University of East Anglia no less than seven times (directly) and eleven times (indirectly with others). This “2007 Summary for Policymakers” depends on it once more, and features it in the only quotable conclusion that

**“Most of the observed increase in globally averaged temperatures since the mid-20<sup>th</sup> century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations”**

The level of “warming” involved is very small; an amount of only 0.7°C since 1850 and only 0.5°C since the designated mid-20<sup>th</sup> century. And only “most” of that: perhaps 0.3°C. or 0.4°C? And it all took place between 1976 and 1998, only 21 years of the 56. Between 1950 and 1976 there was a slight cooling, despite the increases in anthropogenic greenhouse gases over that period, and since 1998, for eight years, there has been no increase at all in stark contrast to the model “projections”

The choice of “since the mid-20<sup>th</sup> century” is made so that alternative measurements of globally averaged temperatures such as the NASA satellites which have been in operation since 1979, and radiosondes, for which there is a reliable record since 1960, can be eliminated from consideration, since they do not confirm the conclusion.

Let us then look at the “annual global surface temperature anomaly record” to examine its reliability.

It is based on a procedure for making use of temperature measurements at meteorological weather stations, and those from ships. It is therefore, to begin with, based on a biased sample as these cover only a small proportion of the earth’s surface, and, on the land, are mostly close to cities. It is not only impossible in principle to obtain a reliable average from such a sample, but also any average that is derived cannot be associated with a measure of its reliability.

There is an unresolved controversy as to whether temperature measurements from ships could be incorporated into such a global system at all, since these measurements suffer from impossible problems of quality control and continuity which have led the two US providers of comparable records to decide that they are unusable. Since the ocean is 71% of the earth's surface this makes the sampling even less representative.

The basic surface quantity made use of is the mean daily temperature. This quantity is derived by the vast majority of weather stations from an average of the daily maximum and minimum temperatures. We are faced at once with a quantity which could not possibly be regarded as a reliable average. The most elementary textbook on statistics begins by explaining how an average should be calculated. You hopefully have a large number of measurements, you plot these as a distribution curve, you hope it is symmetrical and if it roughly resembles the so-called Gaussian, or "bell" curve you can use the simple mathematics that this implies to calculate the mean and a measure of accuracy. The procedure is on every "scientific" calculator and computer spreadsheet.

What you must not do is calculate the average from the maximum and minimum values. So what error does this involve? I was puzzling how it might be possible to find this out.

I thought I would try "Google". To my astonishment, I found that the necessary information is on the NIWA website as a student exercise at

[http://www.niwascience.co.nz/edu/resources/climate/minairtemp/data\\_minairtemp\\_excel.xls/view\\_file](http://www.niwascience.co.nz/edu/resources/climate/minairtemp/data_minairtemp_excel.xls/view_file)

They supply two Excel spreadsheets giving hourly temperature measurements from 24 New Zealand weather stations, one in summer and one in winter. You are invited to compare the supposed average obtained by halving the sum of the maximum and minimum with a more reliable average from the 24 readings.

The results are as follows.

For the summer figures, the max/min reading is on average, +0.9°C above the average of 24 hourly readings, with a range of +2.6 to +0.4

For the winter figures the max/min reading is on average only +0.3°C above average of 24 hourly readings, but the range is much greater; from +7.6°C to -6.9°C

The annual global surface temperature anomaly record is compiled by multiple averaging of the difference between monthly or annual averages from several weather stations in a defined area and the figures for a reference period. Each process would involve extra uncertainties. The above figures show that there is a positive bias from using maximum/minimum averages and there are huge differences in this bias between individual stations, so the closure or moving of stations would have large effects. When you consider that the number of available stations was only 200 in 1850, grew to 6000 in 1980, and then fell to 2500 today, it is obvious that an alleged rise of only 0.7°C over 156 years, or 0.4°C over 56 years is simply swamped with uncertainty,

There are a very few reliable surface records from individual sites which may have incorporated a fairly constant bias from the incorrect method of recording daily mean

temperature, and therefore can give a reliable guide to the local surface temperature trend. Almost all of these records show no evidence of a warming trend for the past 100 years or so (See Gray 2000 and John Daly). An example from New Zealand is the record for Christchurch where the maximum temperature was in 1917.

In the circumstances, the only global temperature record with any credence is that supplied by NASA satellites from Microwave Sounder (MSU) measurements in the lower atmosphere (Figure 2). It is genuinely global and its accuracy has been confirmed by the intense scrutiny of teams of opponents. This 2007 IPCC Summary even tries to claim that its results are “consistent” with the surface record. Since the surface record is so unreliable, it is easy, for once, to agree with them and accept that the satellite record is to be preferred.

It will be seen, from Figure 2, that the globally averaged monthly MSU temperature is passing through a warm spell since 1979, similar to, but more extensive than those from 1987-89 and 1990-92. A linear regression shows an upwards slope because of two volcanic eruptions (El Chichon in 1982 and Pinatubo in 1991), which caused cooling in the first part, and a very severe El Niño weather pattern which came and went suddenly in 1998. The continued fairly unchanging warm weather since 1998 shows no signs of increasing, and is probably influenced by changes in the sun which the IPCC Summary is reluctant to admit.

The entire pattern is incompatible with a theory that predicts a steady increase. The extent of the current warm spell, and its persistence for as long as 8 years has undoubtedly had climatic effects. This IPCC 2007 Summary ignores the periodic behaviour of temperatures in the Arctic, which had a similar hot period in the 1950s. There are some indications that the current warm spell is coming to an end. This has already happened in New Zealand and it is also showing up in the recent fall in ocean temperature and little change in sea levels.

The uncertainties in global temperature estimates escalate with “proxy” data from the past. Tree ring thicknesses relate only to summer temperatures, and they are influenced by a host of other climatic factors.

“Climate Change 2001” made a feature of an extrapolation to the past 1000 years, for the Northern Hemisphere only which was used to support the statement:

**“New analyses of proxy data for the Northern Hemisphere indicate that the increase in temperature in the 20<sup>th</sup> century is likely to have been the largest of any century during the past 1000 years”.**

The mathematics that derived the 2001 curve have been comprehensively trashed by McIntyre and McKittrick (2003). The curve does not appear in this Summary, and I understand it has been withdrawn. Despite this embarrassment, this IPCC Summary claims:

**“the warmth of the last half century is unusual in at least the previous 1300 years”**

This statement tries to deny the well-authenticated “Medieval warm period” in the 15<sup>th</sup> century which was supported by the first IPCC Report in 1990. Also the “warmth of the last half century” only began in 1976, so it only 30 years, on the unreliable surface record, which boils down to only nine years, since 1997, if the more reliable MSU record is taken.

## **Model “Projections”**

The IPCC 20-07 Summary goes to great lengths to promote claims for the value of the “projections” from models. Yet they have admitted that no model has ever been subjected to a sufficiently rigorous testing and capacity for prediction to render it suitable for “prediction” instead of “projection”.

The fact that no scientifically established confidence level can be placed on any model “projection” means that they are wholly worthless, and all of them, comprising a large section of this summary, should be discarded,

The parameters and equations that comprise the models are so uncertain that it is possible to adjust them to fit some, but not all, past climate sequences. An attempt to simulate the surface temperature record concluded that greenhouse gas effects were necessary to complete it only by leaving out the most important contributor to warming, the 1998-9 El Niño event, and, of course, all consideration for the inherent bias of that record which also affects it.

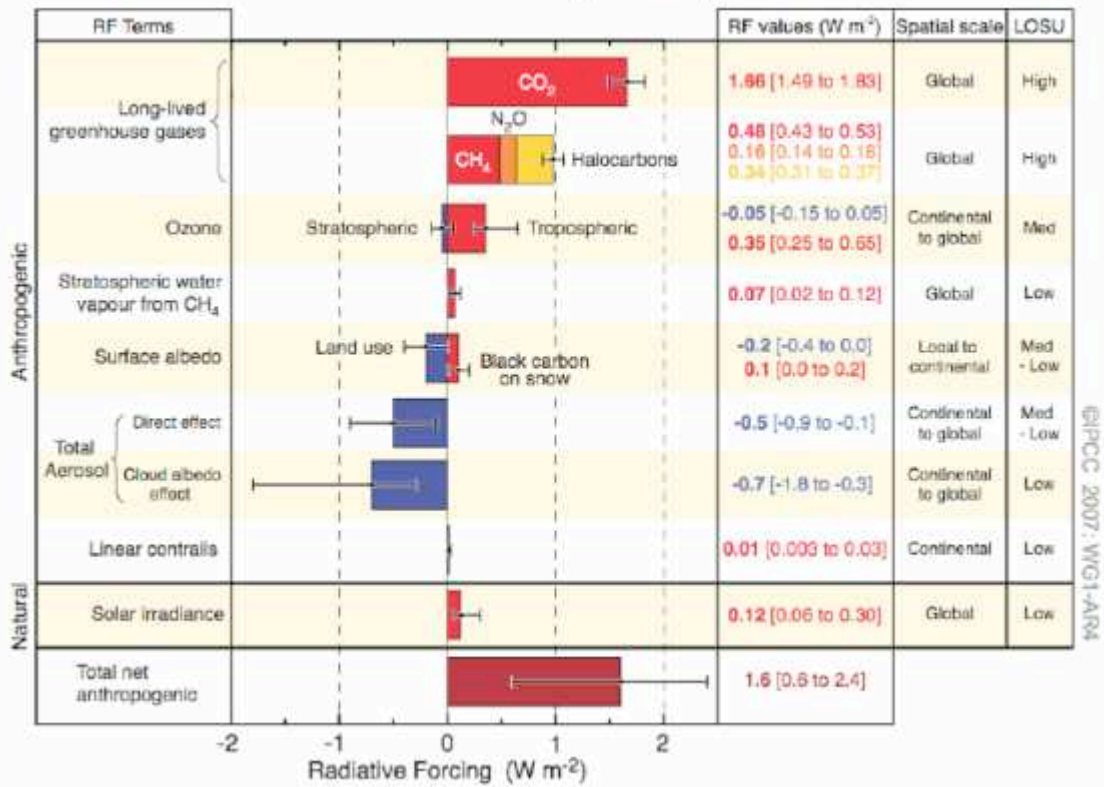
Another problem has been the series of future “emissions scenarios”, the latest of which were devised for the IPCC’s 2001 Report by a sub-committee of Working Group III (“Mitigation”). The drafts of their document were not circulated for discussion to scientists. I claim to have been the only scientist who found out about it, managed to borrow a copy of the first draft, and send comments and receive the second draft. It was foisted on the scientists working on Working Group I of “Climate Change 1995” without their knowledge or consent. The scenarios have been vigorously attacked by several senior economists as biased. I confirmed this in my publication of 1998 “The IPCC future projections: are they plausible?” (for the earlier scenarios), and in my book “The Greenhouse Delusion; A Critique of “Climate Change 2001” where I showed that even their figures for 2000 in the current series were wrong. If they cannot predict the past; what hope for the future?

The maximum future temperature “projection” for the year 2100 in the 1990 IPCC Report was 4.2°C and in the IPCC 1995 Report, an equivocal range, depending on aerosols, of 3.5°C to 4.5°C, In the first draft of the 2001 report it was 4.0°C, but this must have been considered to be insufficient, so it was raised to 5.8°C in the second draft and in the final Report by the device of inventing an extra, even more extreme, emissions scenario, A1F1.

This time they have shown figures for the “projected” temperature increase by 2100 for each of the scenarios. The most extreme, and totally implausible scenario, A1F1 has a “Best Estimate” figure of 4.0°C, with a “range” of 2.4°C to 6.4°C. Some commentators seem to think that this is a reduction, but I am not so sure. They postulate quite reasonable figures (0.6°C with a “range of 0.3°C to 0.9°C) IF ONLY the carbon dioxide concentration were to remain constant

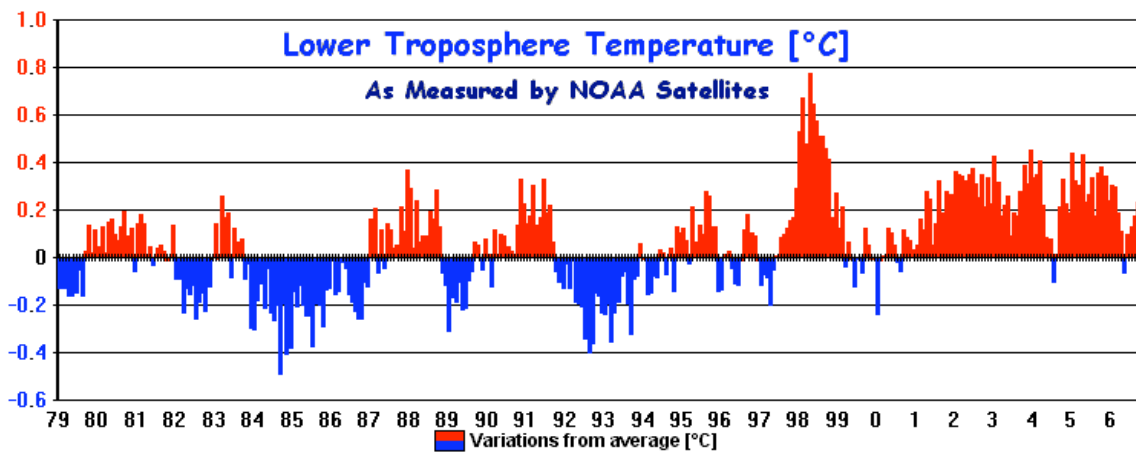
The absence of any scientifically acceptable measure of reliability of “projections” also means that the results can be manipulated to supply any expectation of warming suitable for political purposes. Some of the extreme “projections” in this Summary have been reduced from previous values, but since they can so easily be adjusted up or down on demand, it is of only minor importance.

## Radiative Forcing Components



©IPCC 2007: WG1-AR4

**Figure 1.** Radiative forcing components according to the IPCC. “LOSU” means “Level of Scientific Understanding



**Figure 2.** Monthly globally averaged temperature anomalies in the lower atmosphere as measured by NASA satellites (MSU)



## References

Christy, J. MSU Homepage <http://www.ghcc.msfc.nasa.gov/MSU/msusci.html>

Daly, J. What the Stations Say <http://www.john-daly.com/stations/stations.htm>

Gray V R 1998. "The IPCC future projections: Are they plausible?". *Climate Research* **10** 155-162

Gray, V R. 2000. "The Cause of Global Warming". *Energy and Environment* **11** 613-629

Gray, V R 2002 "The Greenhouse Delusion: A Critique of 'Climate Change 2001'" *Multi-Science Publishing U K*

Gray V R 2006 "Temperature Trends in the Lower Atmosphere" *Energy and Environment* **17** 707-714

Houghton, J T, Y Ding, D J Griggs, M Noguer, P.J van der Linden, X Dai, K Maskell, & C A Johnson (Editors) 2001."Climate Change 2001: The Scientific Basis". *Cambridge University Press*

Intergovernmental Panel on Climate Change 2007 Climate Change 2007: The Physical Science Basis: Summary for Policymakers". <http://www.ipcc.ch/SPM2feb07.pdf>

McIntyre S & McKittrick R 2003 "Corrections to Mann et al (1998) proxy data base and northern hemisphere average temperature series." *Energy and Environment* **14** 751-777

New Zealand Institute of Water and Air (NIWA). "Daily mean temperatures."  
[http://www.niwascience.co.nz/edu/resources/climate/minairtemp/data\\_minairtemp\\_excel.xls/view\\_file](http://www.niwascience.co.nz/edu/resources/climate/minairtemp/data_minairtemp_excel.xls/view_file)