Lecture to Third-Year Engineering Students, UTS, Friday, February 26, 2010

It's a pleasure to be here and I'd like to thank Professor Peterson for inviting me to address you. My name is Alex Stuart and I'm chairman of the Australian Environment Foundation, a group that insists that public policy be based on evidence, not beliefs.

I looked around for some engineer jokes and I found a good one: to the optimist, the glass is half full; to the pessimist, it's half empty; but to the engineer, the answer's obvious: the glass is twice as big as it needs to be. I am going to challenge you to bring that same practical evidence-based critical thinking to the divisive and emotional issue of climate change.

A chaotic system of infinite complexity

Climate, like weather, is a chaotic system of infinite complexity and our present understanding of its drivers is very limited. Like Mark Twain, we're still not able to say much more than "climate is what you expect, but weather is what you get."

We know that climate arises from the transport of heat energy, received from the Sun mainly in the equatorial regions, through the oceans and the atmosphere to the polar regions. Energy transport in the oceans is a branch of hydrodynamics; in the atmosphere it is a branch of aerodynamics, and we call it meteorology. Either way, these are problems of fluid dynamics; and fluid dynamics is a problem of physics, so understanding the climate is mainly a problem of physics.

A debate of politics, not of science

Now when a question of physics becomes an issue of ideology, it's a fair bet it'll have more to do with ideology than physics. And so it has proved. When you hear people say 'the science is settled', you know at once the speaker's on dodgy ground, because science is never settled.

There's a distinct left-right political split in the climate debate, in what is supposed to be a debate of science. We can see this in many places, but let's take the media as an example: in Britain, you've got the Guardian, the Independent & the BBC on the left vs the Telegraph, the Daily Mail & ITV on the right; in the US, it's the NYT & NPR on one side vs. the WSJ & Fox News on the other; and here in Australia it's The Age & ABC on the left vs. The Australian & talk radio on the right.

The climate debate has become a debate of politics, not of science. I'm going to discuss the subject mainly in terms of logic, where I am qualified, and only touch briefly on research outcomes, where I'm not qualified. But I will start by invoking the principles of the scientific method, which requires that, if you claim an effect is due to a cause, you need to demonstrate it with direct observational evidence explained by a falsifiable theory.

The hypothesis that mankind is causing dangerous climate change is called anthropogenic global warming or AGW. I'm going to show that those who claim mankind is causing a climate catastrophe – to whom I shall refer as catastrophists - don't base this conclusion on logic, but on something else. I don't know what that is, but it appears to be a deeply-held belief that the activities of mankind need to be reined in. I'll show it's a viewpoint based not in scientific method, but in ideology.

Greenhouse theory

There is an accepted theory of climate change, called the greenhouse theory, which states that Earth's surface temperature averages a positive +15^{o}C instead of a negative -18^{o}C due to the

effect of high clouds, which reflect back to the surface some of the outgoing LW radiation of IR heat energy (called OLR for short) that would otherwise keep on going out into space.

I'll show there is no link between man-made trace greenhouse gases and scenarios of climate catastrophe that is supported by direct observational evidence. In fact, the evidence is starting to point to some other explanation for climate change: it calls for a better understanding of, among other possible explanations, changes in solar magnetic effects, in Earth's orbit (eccentricity), its axial tilt (obliquity), its axial orientation (precession), changes in the oceans, the causes of cloud formation, and tectonic forces of the Earth, to name only a few.

No direct observational evidence implicates manmade CO_2

I'm going to show that IPCC and its supporters cannot point to any measurement, experiment, or data point that proves that manmade CO_2 drives global temperature. It is not enough to prove that the world is warming (which it has been); and it is not enough to prove that manmade CO_2 is increasing (which it is). To prove the AGW hypothesis, you must prove that the latter causes the former – and, to this day, that has never been done. It's not enough to say that arctic sea-ice is going in or out, that sea levels are going up or down, that glaciers are advancing or receding, that polar bears are drowning or thriving. Those things may prove something about something else, but they do not prove that manmade CO_2 drives climate change.

I've never seen reported in the literature, or anywhere else, any direct observational evidence that proves that manmade CO_2 cause any detectable increase in average global temperature - and I believe that's because there isn't any.

Fourth Assessment Report, Working Group 1, Ch.9

The most authoritative statement of the catastrophist case is IPCC's Fourth Assessment Report of 2007. The logic of IPCC's case rests on Ch.9 of the section by Working Group 1, which is titled 'The Scientific Basis'. Ch.9 of the WG1 report is titled 'Understanding and Attributing Climate Change', and it lays out the scientific basis of the case for the proposition that climate change is caused by humans.

At the end of Ch.9, there's a summary of what is called 'evidence' but, as you will see, none of it is evidence for outcomes definitely attributable to humankind. I quote:

"The simultaneous increase in energy content of all the major components of the climate system and the pattern and amplitude of warming in the different components, together with evidence that the second half of the 20th century was likely the warmest in 1.3 kyr (Chapter 6) indicate that the cause of the warming is extremely unlikely to be the result of internal processes alone. The consistency across different lines of evidence makes a strong case for a significant human influence on observed warming at the surface."[i]

As you can immediately tell, these are assertions, and are not substantiated by evidentiary proof or references to proof. There is not a single measurement, experiment, or data point to be found anywhere in Ch.9 – or for that matter anywhere else in AR4 - that proves that manmade trace greenhouses gases, particularly CO_2, drive climate.

What exactly does AR4 mean by "the cause of the warming is extremely unlikely to be the result of internal processes alone"? It doesn't mean statistically significant within specified confidence levels, such as 95%, which is often used. It has no scientific meaning at all; it is no more than the writer's opinion.

Nor can you find any evidentiary support in Ch.9 or anywhere else in AR4 for the statement that "different lines of evidence makes a strong case for a significant human influence on observed warming". This is not evidence-based science, but unsupported political advocacy.

Three implied propositions of the IPCC /AGW case

Stripped to its basics, the IPCC /AGW case takes the form of three implied propositions:

1.) that the globe has been warmed at an 'unprecedented' rate since around 1900;

2.) that the cause is increased emissions of 6 trace greenhouse gases, among which the chief culprit is claimed to be carbon dioxide;

3.) that mankind is the source of the increased atmospheric concentration of carbon dioxide measured by spectroscopy since 1952.

IPCC says the case for these propositions is 'unequivocal'. I'll show the IPCC case lacks proof and there's no basis whatsoever for claiming it's 'unequivocal'.

First implied proposition

The first implied proposition in IPCC's case, that the globe warmed at an 'unprecedented' rate since around 1900 has been discredited. Average global temperature rose from 1860 to 1880; it again from 1910 to 1940; then from 1940 to 1975, temperature fell; it rose again from 1975 to 1998; and since then it has been declining. There is no credible or conclusive evidence that this trend is 'unprecedented'; and over geological time, the claim is absurd.

The researcher at the centre of the Climategate scandal, Professor Phil Jones, admitted in an interview with the BBC on February 10th that rates of warming in these periods "are similar and not statistically significantly different from each other."[ii] With these words, Jones demolished a central argument of catastrophism: that recent warming is 'unprecedented'

We also know that the 20th century was probably not the warmest in the last millennium and a half. In the same interview, Jones admitted that the Medieval Warm Period from roughly 900AD to 1400AD was probably warmer than today – and we know for an absolute fact that man-made CO_2 had nothing to do with it. We also know that global temperature plunged in the Little Ice Age, which lasted from around 1400 to 1850, and has risen since – because that's what happens when the planet bounces back from a little ice age.[iii]

Second implied proposition

The second implied proposition, that the warming trend is caused by increases in trace greenhouse gases, is also questionable. To start with, let's clarify what we mean by 'trace'.

Dry atmosphere is 78% nitrogen, 21% oxygen, a bit less than 1% argon, 0.0385% CO_2, and minute fractions of other trace gases. CO_2 is less than one-half of one-tenth of one percent of the atmosphere. Water vapour averages around 1% of wet air, but it comprises 95% of all greenhouse gases by volume. CO_2 accounts for about 3% of all greenhouse gases by volume.

Research just published by NOAA[iv] shows that a third of recent reported warming was caused by high-altitude water vapour, which, as we've just noted, is 95% of all greenhouse gases, versus CO_2 which is 3% by volume. So if warming, as measured by land thermometers, has in fact been less than what IPCC has reported – something I'll demonstrate in a moment – then water vapour, not CO_2, may have caused most of this warming.

Third implied proposition

IPCC's third implied proposition, that the rising trend in trace greenhouse gases is clearly attributable to mankind, while plausible, also remains unproven. Atmospheric CO_2 represents an estimated 760bn tonnes of carbon equivalent. Of this, each year about 226bn tonnes, or 30%, is emitted naturally from, and a similar amount re-absorbed by, oceans and vegetation, in a process of constant exchange. Each year mankind is believed to add an estimated 7bn tonnes - about 0.9% of all atmospheric carbon equivalent and 3% of CO_2 emissions from all sources - of which a third to a half is absorbed by the oceans and biosphere. On the basis of present knowledge, it is equally plausible that much of the measured increase in CO_2 since 1952 has been due to outgassing from warmer ocean surfaces.[v]

Land temperature sources

Now I'm going to address the fundamental question of how atmospheric warming is measured. There are three series of land temperature records, on which the IPCC case relies. The three land temperature data series are the following:

First, the Global Historical Climatology Network (GHCN), compiled by the National Climate Data Center (NCDC), in Asheville, North Carolina, a branch of NOAA[vi]. GHCN is compiled from raw data furnished by met offices around the world, and is subsequently adjusted by NCDC to compensate for various known deficiencies, such as gaps in the data, different times of observation, station moves, etc. These adjustment protocols are published; but the timing and modalities of many other adjustments to GHCN – almost all of which increase the slope of the reported warming trend – are not.

Second, the Goddard Institute of Space Studies (GISS)[vii], at Columbia University in New York, which is funded by NASA, draws its basic data from GHCN and then applies further adjustments of its own, most of which are also unpublished. (It is noteworthy that GISS is directed by Dr. James Hansen, who has been a political activist for many years and has advocated political positions and made statements that have bordered on the extreme.)

Third, also drawing its basic data from GHCN, and also applying further adjustments of its own, is the Climatic Research Unit (CRU)[viii] at the University of East Anglia, in Norwich, England, headed until recently by Professor Phil Jones of Climategate fame. The Climategate documents have shown that CRU's data series rests on a chaotic mess, which the UK Met Office is now sorting out and publishing as and when they can.

Satellite temperature sources

There are also two series of inferred satellite temperatures, inferred using slightly different methodologies. The first is published by the Earth System Science Center at the University of Hunstville, Alabama (UAH)[ix], by Dr. Roy Spencer & Dr. John Christy.

The second is published by Remote Sensing Systems (RSS)[x], a private firm based in Santa Rosa, CA. Both satellite temperature series – UAH & RSS – are widely reported and studied by the research community.

Reasons to favour satellite records include the fact that they report values for the entire planet except the poles; they measure uniformly and automatically; and they measure at consistent altitudes. The problem with satellite records is that they go back only to 1979, so we have barely 30 years of data. There was also a past issue of orbital decay, which has reportedly been solved and is now properly compensated.

Ocean temperature sources

Until very recently, sea surface temperatures were not systematically reported at all. Between 2003 and 2007, NOAA inserted 3000 Argo buoys across the world's oceans. These are remarkable pieces of kit, consisting of small, robotic probes that descend to a depth of 2km. Every 10 days, the probes rise to the surface, from where the data measuring conductivity, salinity and temperature, are transmitted to shore via satellite.

And what do the Argo buoys tell us? – that sea surface temperatures have cooled slightly since their deployment began.[xi]

Problems with land temperature records

Reasons to question land temperature records as the basis of public policy become obvious when you start to think about them:

- land is only 29% of the surface of Earth, and most of it is in the Northern Hemisphere;
- the longest-lived records come from advanced societies in northern latitudes;
- shorter-lived records come from warmer climates, which creates a warming bias;
- consistent time of observation is a huge problem, even in advanced countries;
- consistent measurement in terms of location, height, shading, etc, are problems;
- the greatest problem of all, however, is the urban heat island effect (UHI).

The UHI effect refers to the unavoidable growth of urbanisation around a thermometer station. In advanced countries, such as USA and Australia, many weather stations are located at airports. Airports are often operated by counties or local governments, but the measuring equipment is owned by the national weather service or bureau of meteorology, which leases from the local county the patch of ground occupied by its gear. Over time, these sites tend to become less remote, to attract more vehicles, roads, parking lots, structures, heaters and air conditioners, prop planes and jet aircraft. I leave it to your imagination to decide the effect this has on the challenge of keeping consistent records of temperature that can usefully be compared from one century to the next, or even one decade to the next.

In 2004, Dr. Ross McKittrick of Guelph University, Ontario and Dr. Patrick Michaels of the University of Virginia published a study[xii] that showed UHI had 23 times as much influence (0.14^{o}C /decade) as IPCC subsequently claimed in AR4 (0.006^{o}C /decade).[xiii] McKittrick & Michaels claim UHI accounted for 50% of warming as measured by land thermometers.

Anthony Watts & surfacestations.org

In a path-breaking exercise, a retired meteorologist in California by the name of Anthony Watts in 2007 organised a group of volunteers to photograph most of the 1221 weather stations in USA. In May 2009, he published the results for almost 1000 of them in a pdf titled 'Is the US Surface Temperature Record Reliable?'[xiv]. The upshot can only be described as shocking: he documented an accumulation of heat sources around most of the weather stations, including paved access roads and parking lots, added buildings, air conditioner exhausts, jet aircraft exhausts, waste treatment heat, and even burn barrels. He found that fully 89% of his sample didn't meet NOAA's own guidelines for acceptable siting. This publication triggered a major program by the agency to upgrade it facilities. Watts showed that, in the case of many stations, UHI alone explained more warming than the total trend claimed by IPCC.

Christy: "Temperature records cannot be relied on"

Other researchers have analysed GHCN, the foundational temperature record, as well as GISS and CRU records. Among other facts they uncovered is that, around 1990, GHCN discontinued records from over 75% of stations around the world, with the general result that temperatures higher-latitude, higher-altitude and rural locations, all of which had a tendency to be cooler, were no longer used. In effect, thermometers closer to the tropics, the sea, and airports near bigger cities, came to predominate.

Worse, the resulting geographic gaps were then filled with averages of values from warmer records. Amateur researcher E.M. Smith noted the astonishing example of Bolivia, a nation whose Andean regions are 4000m high, for which, through this averaging process to fill gaps, missing temperatures are now taken from the Pacific coast and the Amazon basin.[xv] Yet GNCN still uses stations that were deleted from the record to compile base period average temperatures – an artifact that further increases the bias towards overstatement of warming.

All three sources of land temperature records are unreliable for other reasons, including published adjustments, as well as other unpublished modifications made in ways that exaggerate the warming trend. As a result, these records have to be judged unfit for the purpose of drawing definite conclusions with major implications on how we live our lives and allocate our resources.

It is now impossible to argue that the land temperature record used by IPCC has the credibility needed to underpin its case and recent warming is 'unprecedented'. In direct contrast to land records, satellite data show that atmospheric temperatures have no significant trend since records began in 1979. Taken together, temperature records can no longer be said to support the global warming story.

Commenting on the temperature records used by IPCC, Dr. Christy of UAH, who is a former lead author for IPCC assessment reports, was quoted in The Times in February as saying: "temperature records cannot be relied on as indicators of global change."[xvi]

Climate sensitivity

The issue on which the entire argument will be settled is climate sensitivity: by how much will temperatures rise if CO_2 levels double? If climate sensitivity is greater than 1 - or 'positive' - it would suggest that warming from more CO_2 is amplified. According to IPCC, this is due to water vapour; and if so, there'd be a theoretical case for catastrophism, although there'd still be no direct observational evidence to implicate CO_2. If on the other hand climate sensitivity is less than 1 - or 'negative' – it'd show that warming from rising trace greenhouse gases is attenuated of its own accord and there'd be no reason to blame CO_2.

Lindzen's evidence of an equilibrium-seeking greenhouse

All current climate models assume that water vapour amplifies greenhouse warming from additional trace greenhouse gases. IPCC's 2007 assessment report uses climate sensitivity values of between 2.0°F and 4.5°F, with a median value of 3.0°F. Dr. Richard Lindzen, Alfred P. Sloan professor of meteorology at MIT, recently published in Geophysical Research Letters research based on direct observation of outgoing LW radiation measured by satellites.[xvii] Lindzen pegged climate sensitivity due to water vapor at between 0.3°F and 1.2°F, which suggests that IPCC has overstated true climate sensitivity by a factor of 4 to 7. It highlights the central problem of the entire debate: we do not know the value of climate sensitivity and when we do, the argument will be settled, one way or the other, for good.

Miskolczi's theory of an equilibrium-seeking greenhouse

The observational findings of Lindzen & Choi as published in GRL could be explained by the Saturated Greenhouse Effect Theory, a modified greenhouse theory proposed by an ex-NASA physicist, Dr. Ferenc Miskolczi.[xviii] Miskolczi examined 61 years worth of temperature and humidity data from the TIGR archive of weather balloon radiosonde data going back to 1948. He discovered a natural climatic equilibrium-seeking effect whereby any increase in warming potential from an increase in trace greenhouse gases is exactly offset by a reduction in warming potential due to a counterbalancing fall in atmospheric humidity. Miskolczi developed a mathematical basis for this self-regulating process, showing that the greenhouse is a result of a process of equilibrium-seeking, and not a cause of atmospheric temperature change. Because it was published in Hungarian, Miskolczi's Saturated Greenhouse Effect Theory has not been widely studied but nor, so far, has it been disputed.

Revisiting the role of CO2

If the new empirical research of Lindzen and the theoretical discovery of Miskolczi are upheld, the implied propositions of IPCC and its supporters will have to be discarded. The greenhouse theory will have to be refined; the theoretical greenhouse effect of water vapour will have to strengthened; and that of the trace gases reduced. The role of manmade CO_2 will have to be revisited, as it could no longer be responsible for dangerous global warming.

In fact, there are several simple empirical reasons to suggest that manmade CO_2 is probably not a problem. You don't have to be scientist, just a logical thinker, to understand them:

The weak correlation problem

First, the correlation between temperature and CO_2 is weak. Atmospheric CO_2 has risen steadily since spectroscopic measurement began in 1952, but since then temperature has gone down and up, and is now going down. From 1975 to 1998, it got warmer; in the past decade, warming has ceased. During the '80s and '90s, CO_2 offered a good theory of climate change; now better theories of this poorly-understood subject, such as solar and oceanic effects, have emerged.

The prior warm periods problem

Second, looking at history, you find that every millennium or so, there's been a warm period roughly every thousand years in the recent past, interspersed with a colder period. During the warm spells, civilisations rose and flourished, including the Mesopotamian, the Minoan, the Roman and the Medieval, all of which are believed to have been noticeably warmer than today. Clearly, man-made CO_2 had nothing to do with these warm spells.

The CO2 lag problem

Third, re-analysis in 2003 of the original Vostok ice-cores shows that temperature changes precede, and do not follow, changes in CO_2 levels, by an interval of around 800 years. The reason isn't known, but it is surmised that warmer air leads to warmer ocean surfaces, and warming oceans emit CO_2 in the same way warming beer does. Just as lung cancer doesn't cause smoking, more CO_2 doesn't cause warmer air – it's the other way round.

The diminishing absorption problem

Fourth, the warming effect of CO_2 is logarithmically attenuated: the first 50ppmv accounts for most of the warming, and thereafter each doubling has less and less effect, to the point where a doubling from the supposed pre-industrial level of 280ppmv to 560ppmv might cause warming of 0.5-1.0^{o}C.

It is generally known that the greenhouse effect of diminishes logarithmically with increasing concentration. The largest lick of climate forcing by CO_2, by far, comes from the first 50ppmv of CO_2; the next 50ppmv absorbs far less IR heat energy, and so on, for each doubling of CO_2.[xix] If the pre-industrial level of 270ppmv were doubled to 560ppmv, the theoretical increase in temperature would be about 0.5^{o}C - far less than the several degrees projected by the 23 computer models on which IPCC relies.

The no acceleration problem

Fifth, there's no evidence that recent warming has accelerated to the point where the trend is 'unprecedented'. This was recently admitted by a leading climate researcher for IPCC. As we saw earlier, Phil Jones, erstwhile director of CRU and central figure in the Climategate scandal, has admitted to a BBC interviewer that the rates of global warming from 1860-1880, 1910-1940 and 1975-1998 were "not statistically significantly different." With these words, Jones agreed there has been no recent acceleration in the rise in temperature.

The inter-hemispheric transport problem

Sixth, changes in CO_2 levels are detected simultaneously and uniformly in both hemispheres, at Cape Grim in Tasmania, at Mauna Loa in Hawaii and Point Barrow, Alaska. Research on airborne carbon isotopes from atomic tests in the southern hemisphere in the1950s shows that man-made CO_2 took several months to fully mix with northern hemisphere air. The largest emissions of man-made CO_2 come from north of the Equator, so if rising CO_2 levels are mainly caused by man, these rising concentrations should be detected first in the northern hemisphere. But changes in CO_2 levels are detected uniformly and simultaneously all over the globe. This supports the concept that rising levels of CO_2 probably come from a global or perhaps equatorial source, which supports the view that changes could be mainly due to respiration from the oceans.

The missing fingerprint problem

Seventh, the clincher: the theory of CO_2 as the main source of temperature change fails a simple 'fingerprint' test against observed real-world data. Greenhouse theory, as reflected in all 23 computer models of climate relied upon by IPCC, requires that in order to raise the temperature of the surface when CO_2 levels rise, a belt of warm air should form around the tropics from latitude 30^{o}N to 30^{o}S, between 8km and 12km of altitude.[xx]

In 2006, NOAA's US Climate Change Science Program published balloon radiosonde measurements of temperature, collected by the UK Met Office over the 20 warming years from 1979 to 1999, up to 25km.[xxi] These data show clearly that no such belt of warm air exists. This is a direct test of AGW theory against observed data, and AGW theory fails.

You don't need to be a degreed physicist to understand these arguments – just an informed and logical thinker.

Doesn't an 'overwhelming majority' of scientists agree with AGW?

The problem here is that the evidence doesn't support the statement. For example, IPCC claimed in its flyer for AR4 that it was complied by over 2500 scientific expert reviewers, over 800 contributing authors and over 450 lead authors, for a total of 3750. But when you eliminate double-counting and mis-spellings, the total drops to 2879; and, on a closer look, we find that a large number of these are not climate scientists at all, but government officials, lawyers and NGO employees.

The pivotal Ch.9 of AR4 WG1 had 53 authors, of whom 40 had previously worked together, and many were climate modelers. The final exposure draft received comments from 55 reviewers and 7 governments; of these, only 5 reviewers explicitly endorsed the overall chapter. So a more accurate view of IPCC's basic claim in AR4 - that the case for man-made CO_2 as the cause of a dangerous rise temperature is 'unequivocal'- is that, besides the 53 who wrote it, only 5 reviewers fully agreed with it. The notion that 3750 IPCC scientists support the AGW proposition of Ch.9 is a myth.[xxii]

Don't 'thousands of peer-reviewed papers' support AGW?

Besides the 'overwhelming majority of scientists' myth, there's also been game-playing in creating and perpetuating the story that 'thousands of peer-reviewed papers' support AGW. A principal source of this story is a 2004 paper by Dr. Naomi Oreskes of UCSD titled 'Beyond the Ivory Tower: The Scientific Consensus on Climate Change'.[xxiii] She studied 928 abstracts published in refereed scientific journals between 1993 and 2003 with the keywords 'global climate change'; she concluded that 75% supported AGW and none dissented from it. In a reanalysis in 2007, she altered her findings to claim that 20% fully supported AGW, while 55% 'implicitly' endorsed it.

Another researcher, Dr. Benny Peiser of John Moore's University in Liverpool, England reviewed the same material and claimed that Oreskes had grossly exaggerated her result. He found that the vast majority of Oreskes' abstracts didn't mention AGW, and only 13 of 928 explicitly endorsed what Oreskes called the "consensus view".[xxiv] Peiser's bio on Wikipedia was then repeatedly hacked and altered by, as it turned out, a climatologist called William Connolly, who frequently acted as a Wikipedia editor. After many complaints to Wikipedia, Connolly's privileges were terminated and he faded into history as 'the Wikipedia terrorist'.

Some balance was brought to the issue in September 2009, when Popular Technology published a list of 500 peer-reviewed papers that supported a skeptical view of the manmade global warming narrative.[xxv]

The Climategate scandal of scientific method

The tipping point for catastrophism, when it started to fall from favour scientifically – though not necessarily socially - came on November 17th, 2009, when the Climategate scandal broke at CRU, soon to be followed by an apparently endless set of scandals of ill-founded research and accreditation by IPCC.

For those who haven't followed it, Climategate involved the unintended release from CRU into the public domain of a huge number of documents, including numerous emails among leading catastrophist researchers, most of whom turned out to belong to the inner clique responsible for putting together IPCC's assessment reports.

Damaging as the emails were, perhaps more destructive to the catastrophist position was the coding in outmoded FORTRAN of routines to organise and 'adjust' CRU's temperature data.

Faced with the need to bring order to their ancient coding – probably in case they had to release it under FOI – CRU hired some programmers to deal with it. Among these was a fellow named Harry, who left extensive documentation of his attempts to organise what seemed to him to be chaotic, overlapping, missing and mislabeled data sets.[xxvi] The effect has been to reveal for all to see just how disorganised and unreliable one of the foundations of IPCC's catastrophist case actually is.

Climategate has had a devastating effect not only on individuals at CRU and UEA, but also to entire political structures built on catastrophism. It probably contributed to the failure of the Copenhagen climate conference; it has certainly put paid to emissions trading in USA; and it looks likely to do the same to emissions trading in Australia.

Successive IPCC scandals of scientific method

Since Climategate broke, an apparently never-ending series of scandals of scientific malpractice has engulfed IPCC. Most of these concerned a lack of acceptable scientific attribution of catastrophe scenarios in the WG2 or 'mitigation' section of the report:

- Glaciergate was the first scandal to erupt. It led to IPCC apologizing for having sourced its claim that all Himalayan glaciers could disappear by 2035 after it was shown to have been based on a 1995 phone call from a reporter in London to a glaciologist in India, which was written up in Science magazine, from which a 2005 WWF report repeated it, from which AR4 in turn sourced the claim. This scandal instantly diminished the authority of AR4 and put great pressure on IPCC's chairman to resign (which he hasn't yet done).

- Disastergate: AR4 WG2 claimed that severe weather events were increasing in intensity due to manmade CO_2, on the basis of an unsubstantiated claim by the advocacy group WWF.

- Amazongate: AR4 WG2 claimed that 40% of the South American rainforest was threatened by manmade CO_2, a threat greatly exaggerated by deceptive substitution of text and facts from yet another story by the advocacy group WWF.

- Mountainicegate: AR4 WG2 claimed that mountain ice-fields were shrinking due to manmade CO_2, based on a student's thesis and a story in a mountaineering magazine.

- Africanfarmgate: AR4 WG2 claimed that much of northern Africa's farmland could see declines in rainfall of 50% due to manmade CO_2, a claim based on distortions of unpublished work by a Moroccan researcher for a Canadian advocacy group.

- Dutchpoldergate: AR4 WG2 claimed that 55% of the Netherlands was below sea level, when the true figure is 26%.

- Pachaurigate: Dr. Ravendra Pachauri is chairman of IPCC; because he directly relied on and repeated to international audiences the misrepresentations of Glaciergate and Africanfarmgate, his suitability and professionalism have been called into question and his resignation has been demanded by people on both sides of the debate.

- Antarcticgate: AR4 WG1 relied on research by an insider to claim that Antarctic sea-ice was expanding, while ignoring research by outsiders that demonstrated the opposite.

But at least one scandal directly undermines the case presented in the WG1 section of AR4:

- UHIgate: In 1990, Phil Jones & Wei-Chyung Wang published a paper,[xxvii] which claimed that, based on data from 84 stations in China, which were stated to have had very few significant relocations, UHI effects were relatively inconsequential. Based on data acquired through FOIA, Douglas Keenan leveled an accusation of scientific fraud against Wang, who had provided the data,[xxviii] on the grounds the records were incomplete, misrepresented, or

missing.[xxix] Keenan writes:

"Of the stations, 42 were classified as rural and 42 as urban. For 40 of the rural stations, no histories exist (hence moves cannot be determined); the other 2 stations had substantial moves. For 9 of the urban stations, no histories exist; most of the other 33 had substantial moves." [xxx]

On the basis of this paper, IPCC has consistently claimed, and repeated in successive assessment reports, that UHI has had minimal effect on temperature data.

Then in 2008 Phil Jones demolished this position when he published a paper expressing the opposite view, namely that UHI in China accounted for 70% (0.57°C) of all CRU-reported warming since 1951 (0.81°C).[xxxi] This paper in effect refutes IPCC and makes it clear that the urban heat island effect is a major element of reported warming.

Summary

To summarise, it is not enough to prove that the world is warming (which it has been), and it is not enough to prove that manmade CO_2 is increasing (which it is). To prove the AGW hypothesis, you must prove that the latter causes the former – and, to this day, not a single measurement, experiment, or data point has shown that manmade CO_2 drives global temperature.

We have shown that IPCC's case for dangerous man-made global warming consists of three propositions:

1.) that the globe has warmed at an 'unprecedented' rate since around 1900;

2.) that the cause is increased emissions of 6 trace greenhouse gases, among which the chief culprit is claimed to be carbon dioxide;

3.) that mankind is the source of the increased atmospheric concentration of carbon dioxide as measured since 1952 by spectroscopy.

None of these propositions is supported by direct observational evidence:

1.) Professor Phil Jones of CRU has stated that warming spells of the past 150 years are statistically similar. Warming in the late 20th century as shown by land temperature records is greatly exaggerated by UHI, and has been further exaggerated by the reporting agencies. Much of the warming is due to recovery from the Little Ice Age; and it is certainly not 'unprecedented'.

2.) 20th century warming has never been shown by observational evidence to be due to rising levels of trace greenhouse gases; one third of 20th century warming has been shown to be due to high altitude water vapour; and we simply lack both theory and data to explain the rest.

3.) measured increases in CO_2 emissions may be due in part to human activity, but may also be due in part to oceanic outgassing.

Land temperatures are unreliable and unfit for purpose, as all of the three official sources have been found to be publishing adjusted, corrupted, exaggerated and misleading data.

Satellite temperature data, which have been validated by radiosonde records, contradict reported land temperature trends and show no statistically significant global warming trend since 1979.

Sea surface temperature data from Argo buoys indicate that SSTs have declined since 2003.

The key to understanding whether recent temperature changes are dangerous to mankind is the value of climate sensitivity, which has not been definitively established. IPCC's 23 climate models, used in its AR4 publication of 2007, cover a range from 2.0°C to 4.5°C, with a median value of 3.0°C. This entire range of supposed values is strongly positive, which would support a story of rising temperatures and potentially catastrophic outcomes.

53. Research recently published by Lindzen shows that Earth's climate system, in the short term at least, is equilibrium-seeking and self-adjusting. Based on observed data from satellites, it implies a range for climate sensitivity of 0.3°C to 1.2°C, a range of values largely in negative territory. This direct observational evidence in recently published peer-reviewed literature suggests that the theoretical values relied on by IPCC have exaggerated climate sensitivity by a factor of 4 to 7. It suggests that any temperature increase from additional trace greenhouse gases is naturally attenuated and cannot lead to catastrophic outcomes.

54. Miskolczi's new theory could explain why. On the basis of meticulous study of 61 years of balloon radiosonde data, he discovered and developed the Saturated Greenhouse Effect Theory. It explains a natural climatic equilibrium-seeking effect, whereby any increase in warming potential from an increase in trace greenhouse gas is exactly offset by a reduction in warming potential due to a counterbalancing fall in atmospheric humidity.

55. We've also seen some simple logical reasons to question whether manmade CO_2 can cause a climate catastrophe. I've cited at least seven logical problems with catastrophism and you don't have to be a scientist to make a judgment on them:

- the weak correlation problem
- the prior warm periods problem
- the CO_2 lag problem
- the diminishing absorption problem
- the no acceleration problem
- the inter-hemispheric transport problem
- the missing fingerprint problem

Consequences for AGW theory

These problems with CO_2-driven AGW are good reasons to distrust the notion that manmade CO_2 is to blame for recent warming. If, as we now know, a third of measured warming is due to high-altitude water vapour, and 50%-70% is an artifact caused by UHI, then the manmade CO_2 signal may be barely detectable. If so, oft-repeated calls to 'combat' climate change would be pointless, and the huge cost of implementing them would be a tremendous waste of money. The notion of CO_2-driven AGW would have to be abandoned; and politically-correct amateur catastrophists who embraced it would look at best credulous and at worst ridiculous.

Consequences for IPCC

For IPCC, the game is probably over: it will be very difficult to recover its previous authority in climate matters and from now on it is likely either be ignored or possibly even abolished. Its constant advocacy of a political viewpoint, instead of disinterested science, shows it was always a political body, as its name implies, and never a scientific panel. Intensified scrutiny since the recent scandals broke has shown it to be politicised, conflicted, procedurally corrupt and scientifically incompetent. This recognition could have major consequences politically, diplomatically and legally; and the effects of the potential failure of its predictions of catastrophe could be profound.

Consequences for the UN

The problems engulfing IPCC will further damage the reputation of the UN. It is already seen by many in the West as dysfunctional, hugely expensive, minimally capable and prone to contradict its own principles. When one of its best-known agencies is exposed as having recklessly led the world down a mistaken but hugely costly path, its reputation can only be further eroded. And this will affect many other areas of international collaboration, which will be less likely to find support from western voters.

Consequences for science

If leaders of the scientific world advocate a program with immense cost implications for the general citizenry that is subsequently exposed as having no logical basis, that CO_2-driven catastrophism was never more than an unsubstantiated hypothesis, and that other more compelling theories of climate exist, the credibility of science will be deeply compromised. International and national scientific bodies will be devalued, academic institutions and learned journals will be tarnished and individual reputations will be destroyed.

Academics at the University of East Anglia, who have nothing to do with CRU or climate change, are already being affected by the fallout from Climategate. Comments posted online suggest that research is being questioned solely because it emanates from UEA. Academics there have warned that the attitudes displayed were becoming a problem and the name UEA now had 'negative connotations'.

Consequences for CO2 reduction schemes

Energy consumption is highly correlated with living standards and raising living standards is impossible without increasing energy consumption. With today's technology, fossil fuels are by far the most economic sources of energy and will not be supplanted in the foreseeable future. It is certainly sensible to reduce the dependence of the western world on energy supplies from unstable or hostile countries, but if that is the objective, it should be so stated and separately pursued with that end in mind.

Australia's great competitive advantage is low-cost power from low-cost coal. It would be irresponsible to throw it away when grave questions surround the case for doing so. Raising the cost of energy - a basic input into every product and service – would reduce resources for other purposes, distort national economies, and impoverish the global economy as well.

Consequences for the green movement

There are numerous environmental problems that kill people today and should be addressed today: unhealthy air, lack of clean water, pollution of the oceans, pollution of rivers, loss of wildlife habitat, extinction of species, and high costs of food. It makes no sense to tax the developed world and spend huge amounts of money to achieve a negative return in combating a problem that, even if unambiguously proven, wouldn't harm anyone for decades. If the effects of manmade CO_2 are ultimately shown to be to be inconsequential, it could destroy the credibility of green politics for years.

Also among the losers in such a debacle would be those mainstream politicians who espoused the 'science is settled' and 'moral imperative of our time' mantras. It will permanently taint others who advocated costly social engineering programs (such as ceiling insulation and green loans here in Australia). It would also taint journalists at nationally-known publishers

and broadcasters, as well as the many thousands of teachers and academics who have preached CO_2-driven climate catastrophism to their captive audiences.

Consequences for governments

When and if the financial bubble of CO_2 securities and credits eventually bursts, as it probably will if billions of dollars worth of CO_2 securities are suddenly perceived to be worthless, there is likely to be a financial crash that could sweep institutions away. The financial costs – particularly in Europe – could well be massive, the legal liabilities enormous, and unemployment severe. Litigation to resolve the legal problems would lead to misdirection of yet more resources that could be put to better use elsewhere.

And if the great inverted pyramid of CO_2-related treaty, legal and social obligations that have developed, particularly in Europe, is seen to be pointless, as it potentially may, the finger-pointing will begin, it will be ugly and it will cause divisions in society with political consequences that could last for years.

Endnotes

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Period	Length (years)	Trend (deg.C /dec.)	Statistically significantly similar?
1860-1880	21	0.163	Yes
1910-1940	31	0.150	Yes
1975-1998	24	0.166	Yes

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xx IPCC AR4, WG1, Ch.9, fig. 5.7E, p.675 (http://ipccwg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch09.pdf)

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