

UNFCCC Submission

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The Scientific Basis

The issue of emissions targets is based on the belief that carbon dioxide emissions from industrial activity affects global climate and that, by limiting these emissions, we can ameliorate this effect.

While this belief is held by many scientists, no scientific evidence has yet been found to support it despite the billions of dollars in research funds that have been spent on it over the last 30 years. On the other hand there are a number of observations that indicate that it is not true. These include:

1. The observation that the amount of industrial CO₂ added to the ocean-atmosphere system since the beginning of the industrial revolution, (320 Gt - James Hansen, Congressional testimony), is only a tiny fraction of the total amount in the system (32,000 Gt – IPCC, Third Assessment Report)
2. The observation that existing concentrations of CO₂ and water vapour in the lower atmosphere are sufficient to render it almost completely opaque to out-going long-wave radiation. The observed rate of decrease in temperature with height, the adiabatic lapse rate, is measured many times a day throughout the world by weather balloons and it fits a convective heat transport model of the lower atmosphere. It does not fit a radiation heat transport model.
3. Careful comparisons of small changes in global average temperature with variations in atmospheric CO₂ concentration indicate that the latter lags the former by about ten months indicating that temperature increases cause CO₂ increases and not the other way around (Humlum, Stordahl and Sondheim, 2012).
4. The global distribution of atmospheric CO₂ concentration recently observed by NASA's Orbiting Carbon Observatory does not support the view that increases in this gas are largely due to Western industrial activity. Rather, the gas appears to emanate from the rice paddies and rain-forests of the Third World. Whatever the origin, CO₂ variations in the atmosphere are still not well understood.
5. The observation that global average temperature has a variance spectrum which is “red” at every time scale from a year to 40,000 years (Pelletier, 2002), i.e. the longer the time scale the bigger the variation. This implies that the small variations (~0.8°C) which occurred during the 20th Century are to be expected. Indeed prehistoric temperature records deduced from ice-core samples indicate that we are living in a particularly benign period. However these same records also indicate that climate is chaotic and unpredictable and we have no reason to be complacent.

The predictions of coupled ocean-atmosphere general circulation models (“Climate Models”) are frequently quoted as evidence that atmospheric CO₂ increases are the cause of increased global temperatures. These are not observations; they are theories in numerical form and rest on some dubious assumptions (see the attachment *Climate Modelling Nonsense* below). The recent plateau in global temperature, the “Pause”, was not predicted by any of these models and, as a consequence, their validity as descriptions of the real world must be questioned.

Conclusion

It follows from the above that there is no scientific basis for introducing an emissions scheme. There may well be a political basis for doing so if we do not wish to be seen as an environmental pariah internationally. In which case we should chose the most conservative commitment such as parity with that of, say, China.

However it should be borne in mind that the present “Pause” in global temperature increase could, over the next decade, turn into a full decline and further confound the experts. Likewise the observed steady increase in atmospheric CO₂ concentration may cease or even reverse. In either event, taking an independent line on this issue could serve us well in the long term.

Author's background and affiliations

I make this submission as a private citizen. I am a member of the Liberal Party (Huon Valley Branch) but have no other political or commercial associations. I am a retired scientist, a pensioner and a former employee of the Australian Antarctic Division and of CSIRO. By vocation I am a physicist with a PhD in Upper Atmospheric Physics from the University of Tasmania. Over the last few years I have operated two Web pages concerned with popular science and science commentary, viz.: [Science Heresy](#) and [Blackjay](#). I have also contributed to the magazine Quadrant and Quadrant-on-Line. The appended documentation is taken from my Web pages and from Quadrant.

Supporting Documents

The following supporting documents are appended:

Climate Modelling Nonsense

A Physicist Ponders the Pause

Mapping Carbon

An Inconvenient Truth

Ice Age Climate

Climate Modelling Nonsense

The less a thing is known, the more fervently it is believed.

—Montaigne

In effect a new religion has grown out of secular humanism. Global warming is the central tenet of this new belief system in much the same way that the Resurrection is the central tenet of Christianity. Al Gore has taken a role corresponding to that of St Paul in proselytising the new faith.

There are major differences, however. Whereas it is not possible to call oneself a Christian without entertaining the central belief in the Resurrection, it is certainly possible to be deeply concerned with the order and condition of humanity and so call oneself a humanist without entertaining a corresponding belief in anthropogenic global warming (AGW). Belief in a Resurrection which supposedly occurred some 2000 years ago is a matter of personal faith, whereas AGW is a scientific hypothesis which can and should be tested by observation. Imagine the consequences both to science and to secular humanism should this hypothesis turn out to be untrue and the dire predictions of the climate models fail to materialise.

The quasi-religious nature of AGW is evidenced by the rancour which is generated when people like me express scepticism about the theory. Scepticism is an essential part of science which has, until recently, been a “small-l liberal” pursuit in which the opinions of doubters were respected. Now we sceptics are called “deniers” and, by implication, lumped in with neo-Nazis who question the Holocaust. The accusation that we are somehow in the sway of the oil companies and similar big business interests is commonplace and indeed is the chief argument of non-scientist supporters of the AGW theory. This echoes the “work of the Devil” argument of fundamentalist Christians; it is a mental trick by which the faithful avoid facing the real issues.

Why then do a majority of scientists support the theory? I believe it is largely a matter of loyalty. Very few of us physicists know enough genetics to justify our belief in Darwin’s theory of evolution by natural selection but most of us support it because we believe it to be the outcome of rigorous scientific processes similar to those carried out in our own discipline. Most scientists would support the AGW theory for much the same reason.

By accident of history I find myself in the opposing camp. I was trained as a physicist and was granted a PhD for my postgraduate work in upper atmosphere physics. In the early 1980s I joined the CSIRO’s Division of Oceanography and worked in surface gravity waves (ocean waves) for a time. Much of the theoretical side of oceanography entails fluid dynamics which, because of its heavy mathematical load, is regarded as a sub-discipline of applied mathematics rather than of physics. Because of this, in my view, many practitioners of oceanography and climatology have a cavalier disregard for experimental testing and an unjustified faith in the validity of large-scale computer models.

Later in my career I was involved in running and refining numerical fluid dynamical models, so I gained some insight into how this modelling is done and how rigorously such models need to be tested. Naval architects and aerodynamical engineers do such testing in wave tanks and wind tunnels.

Meteorologists regularly test model “skill”. Climatologists don’t seem to have a concept of testing, and prefer to use the term “verification” instead—that is, they do not seek to invalidate their models; they only seek supporting evidence.

My scepticism about AGW arises from the fact that as a physicist who has worked in closely related areas, I know

how poor the underlying science is. In effect the scientific method has been abandoned in this field.

Back in the early 1990s when I was still working for the CSIRO and the early versions of the AGW theory started to gain currency, I was rather bemused by the passions which were aroused in my colleagues and the gullibility with which predictions of future climate disaster were accepted. Surely the jury is still out, I thought. I remained agnostic about the theory. More recently, after reading the literature and looking in detail at the output of one well-known climate model (HadCM3) I have changed my stand. I now believe it is nonsense for the following reasons.

First there is the argument, commonly used by Al Gore and others, that carbon dioxide forms a layer like a blanket or greenhouse window pane high in the atmosphere which traps long-wave infra-red radiation, thus making the surface of the earth warmer. This is misleading. Certainly carbon dioxide is an infra-red absorber but, like most infra-red absorbing gases, its absorption rate depends on concentration and pressure and is at a maximum at the ground. The atmosphere is a gas, not a solid, and bits of it move up and down, carrying heat as they move. As a meteorological balloon climbs higher in the atmosphere, the measured temperature falls off with increasing height. This phenomenon, referred to as the lapse rate, has been known and described for more than a century. The lapse rate is determined by the thermodynamic properties of the gases that make up the atmosphere and has little to do with radiation. The convection term completely dominates the radiation term in the relevant equation.

Second there are the climate models themselves. In discussions with colleagues, arguments always seem to come down to "But the models show ...". Those who use this argument seldom have modelling experience themselves and share the lay public's naive faith in the value of large computer models.

I have been a fluid dynamical modeller and I know how flaky numerical models can be for even a relatively small chunk of fluid like the Derwent Estuary. The models are highly unstable and need to be carefully cosseted in order to perform at all realistically. One reason for their inherent instability is that the mesh size of the model grid (typically hundreds of metres to hundreds of kilometres) is always much larger than the scale at which friction and molecular diffusion operate (millimetres or less). These are the forces which act to damp down oscillations by converting free energy to heat. In order to get around this difficulty, in order to keep a model stable, it is common practice to set certain parameters such as eddy viscosity unrealistically high to compensate for the absence of molecular friction. This is reasonable if we are using the model to gain insight into underlying processes, but it means that fluid dynamic models are not much good at predicting the future. There is no exact correspondence between model and reality, and the two soon part company. Fluid mechanics and celestial mechanics are very different disciplines.

I recently became interested in sea-floor volcanism and I had the idea of comparing the output of a climate model with the actual observations to see if I could find places on the ocean surface where temperature variations, attributable to sub-sea volcanoes, were significantly greater than variations predicted by the model. Using a variance method I found that the predicted variances bore little resemblance to the observations. It was obvious to me that the model had been over-damped; the viscosity term had been set too high, presumably in the interests of greater stability.

Why then would such an over-damped model predict recent global temperature increases so well (which it does)? The answer is that an over-damped model will always regress to some sort of mean or trend line. Climate models include a number of adjustable parameters and these are tweaked to tune the model to known data. My belief is that early models did not show much increase in global temperature with increasing atmospheric carbon dioxide levels for the reason set out above. However, an ingenious trick was used to make this happen. It is called "water vapour positive feedback" and appears to be used in all the Intergovernmental Panel on Climate Change (IPCC) climate models. Without it, the climate models would show negligible increase in global temperature with increasing atmospheric carbon dioxide. Water vapour positive feedback is only an assumption; but, importantly for the modellers, it is an assumption which makes the models work. There is little experimental evidence that it is true, and radiometer data collected by NASA scientist Roy Spencer and others indicate that it is not true.

Most of us have our cherished beliefs about how things work, such as, "If there is a heavy autumn crop of hawthorn berries it will be a cold winter." Sometimes these are true and sometimes not. Many are just superstitions. Science and superstition are distinguished from one another by testing. Scientific theories are tested, superstitions are not.

A scientific theory is not tested merely by looking for confirmations but by conscientiously trying to “break” the theory, by trying to disprove it. The AGW theory is encapsulated in the IPCC assessment reports. The models discussed in these reports have not been tested in this way. These reports include sections on “Verification and Validation” but none on testing. “Verification” means that only data which support the theory are examined and data which do not support it are ignored. Indeed the authors of this section in the IPCC Third Assessment Report specifically dismiss the need for rigorous testing when they state: “our evaluation process is not as clear cut as a simple search for ‘falsification’” (Section 8.2.2 on page 474). Effectively what they are saying is: *proper scientific testing is too hard and we are not going to bother doing it.*

The implication is that climate prediction, as it is carried out by those organisations which come under the aegis of the IPCC, is not science. It is a superstition similar to astrology or homeopathy. The IPCC is promoting the AGW proposition as if it were an established scientific theory, when it is not.

If the IPCC were a pharmaceutical company it could face fraud charges for doing this. This is a good analogy. The IPCC claims to have diagnosed a planetary disorder, global warming, and has proposed a remedy, the limitation of man-made carbon dioxide production. They have produced no convincing *scientific* evidence that either the diagnosis or the cure is valid.

When I discuss this with informed lay people I commonly encounter the response, “So what if the science is a little suspect. Surely it is a good thing to limit emissions anyway?”

Well, no, it isn't. A whole new regimen for emission capping and trading is about to come into existence. A necessary condition for the reduction of atmospheric carbon dioxide is that major carbon-dioxide-producing nations co-operate in limiting emissions. I believe that is highly unlikely to happen, because international diplomacy is insufficiently evolved for such a goal to be achieved. Given the highly emotive, quasi-religious attitude of many Westerners to this issue there is likely to be a good deal of resentment generated should some countries fail to live up to their obligations. Wars have been fought about less.

This situation can only be exacerbated should global temperature continue to fall as it has been doing for the last five years.

Not only will carbon trading lead to problems between nation-states, but internally different lobbies already clamour for specialist treatment. Carbon trading is proposed as a free-market operation, so avoiding heavy-handed government regulation. But some sort of authority will be needed to monitor the details of how much carbon is being sequestered or released in each situation. Carbon credits will be available for planting trees, say, but what happens when saplings are eaten by wallabies or mature forests are consumed by bushfires? Monitoring and accreditation structures of Byzantine complexity will need to come into existence.

Will carbon trading minutiae favour the most effective lobby groups? The oil and coal industries are positioning themselves to appear benign. Natural gas is “cleaner” than coal, we are told, while coal itself is soon to become so much “cleaner” if industry pronouncements are to be believed. Who is to say otherwise? When a political structure is set up which is based on a lie, we can expect further lies to proliferate. Meanwhile, less influential groups such as farmers can expect to be hounded by “carbon police”.

Whatever the status of AGW scientifically, it is certainly a political truth. It is now a key plank in the platforms of two out of three of the major political parties in this country and the third genuflects piously from time to time. Like Chartism and communism in earlier times, AGW is providing a rallying cry for reform. The zeal with which alternative energy programs are being pushed by government is perhaps desirable and long overdue. This push may have happened anyway as fossil fuel reserves become depleted and fuel costs rise; nevertheless AGW has certainly precipitated activity in this area.

But this still represents an unfortunate distortion, because the emphasis is placed on limiting emissions rather than on limiting consumption. It is my view that Australia's large coal reserves and large distances could make coal-driven railways a viable future transport option as oil and natural gas become scarce and expensive. However, the present demonisation of coal as a major “polluter” makes any switch from oil to coal unlikely.

This country and the world at large have many real political, demographic and environmental issues to contend

with. We do not need to create problems where none exist. The present hysteria diverts money and attention away from problems which do need to be solved. In my view, terrorism, the proliferation of nuclear weapons and pandemic disease are far bigger threats to my family's comfort and security than are global warming and putative "tipping points".

There is a danger that conservation failures will be blamed on "climate change". This happened recently when the removal of feral cats caused a rabbit population explosion on Macquarie Island. Incompetent environmental management resulted in such massive erosion problems that eleven species of birds are now threatened. Climate change has provided a convenient alternative view of the cause of this disaster. Likewise the flooding of oceanic islands by "rising sea levels" has more to do with the removal of coral reefs for construction projects than with global warming.

Over the last few years, with remarkable rapidity, AGW theory has gone from a scientific curiosity to a politically-correct catechism. Nowadays it is not merely politically correct, it is politically essential. Somehow this nineteenth-century oddity has outlasted *Das Kapital* to become the banner of millions of environmentally concerned Westerners. It seems to fulfil a human need for sacrifice, a need to "put something back". It is the ancient myth about guilt and sin and redemption in a new guise.

People are entitled to entertain whatever apocalyptic view of the future they choose, but such ideas have nothing to do with science. Climate prediction is not science, it is pseudo-science, and sooner or later more real scientists are going to wake up to this fact.

In the conduct of human affairs it is surely preferable that we base our actions on reason and evidence rather than on piety and myth.

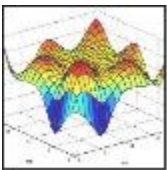
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QUADRANT

John Reid

A Physicist Ponders the Pause

After surviving a storm-tossed voyage, King James I concluded that witches must have conjured tempests to do him ill because nothing ever happens by chance. In promoting the notion that climate trends are shaped by an industrialised world's CO2 emissions, warmists are in the same boat



What bothers me, in the light of the continued denial by some of The Pause — the global climate's prolonged refusal to grow warmer as the “settled science” predicted — is how this whole climate issue reflects a deeper malaise. It suggests a sort of Calvinistic determinism in which the future is cast in concrete and all that remains for us to do is to remove the form-work. This is in sharp contrast to Eastern philosophy, such as Taoism and the I Ching, which are based on the idea of continuous change. As Heraclitus noted quite some time ago, we may never step twice into the same river.

Determinism has long been there, underlying Western Christian thought, but it has recently come to dominate (or perhaps replace) scientific thinking. I believe that this is an unintended consequence of numerical modeling which is now widespread in science. Computers have, in general, been such a boon to science that no-one any longer questions the validity of some applications, particularly those numerical models which are based on differential equations. All such models rest on certain assumptions — assumptions which are very rarely questioned or even acknowledged. These include assumptions about the complete absence of discontinuities — cliffs and fronts and shocks — which are, in reality, widespread in nature.

However, by far the most subtle and far-reaching hidden assumption is that of determinism, the idea put forward by Pierre-Simon Laplace that if *une intelligence* knows the precise state of the universe at one instant it can predict the state of the universe at any future time. This idea underlies computer modeling and, in my view, is the root cause of much of the vitriol expressed by warmists. It goes hand-in-hand with ideas of omniscience and perfectibility.

The other edge of this deterministic sword is the idea of the Malevolent Force. Under this mentality nothing ever happens by chance and so, when things do go wrong and our predictions fail, then there must be a reason. The reason is usually human. If a divinely appointed king is threatened by a storm at sea then it must be the fault of witches, as James I concluded after a pair of tempest-tossed voyages. If a Communist utopia fails, then it must be the fault of recidivists. If a climate model is called into question, it must be the mischief of deniers.

This is not science. This is not physics. Physicists have understood the underlying stochastic (i.e.random) propensities of nature for more than a century. To a physicist, deterministic, numerical models of natural processes may have their uses, but they are known to be limited in scope. Meteorological models cannot predict beyond about a week ahead. These models are typically time-domain models and their underlying assumption of continuity is known to be wrong and no more than a useful approximation.

On the other hand stochastic models (i.e. models which contain some random elements) are usually frequency-domain models and are much more powerful. If the theory doesn't fit the data, then the theory is wrong; there is no room for special pleading. Stochastic models frequently involve an examination of the distribution of energy or variance with frequency known as a "power spectrum". It was this sort of modeling which led to the invention of quantum mechanics in the last decade of the nineteenth century, one of the great triumphs of modern physics.

Today the climate field is once again dominated by time-domain, deterministic modeling; computer programmers have replaced physicists. A deterministic modeler looks at the graph of global average temperature for the last century and sees that it is increasing. This small change in temperature must have a cause because everything has to have a cause, according to his or her world view. A good candidate must be increasing levels of atmospheric CO₂ due to modern industry. In the laboratory CO₂ absorbs radiant heat, so this must be more of the same on a global scale. The modeler ignores the simple physical facts that total man-made production of CO₂ since the start of the Industrial Revolution only accounts for about one percent of the total CO₂ in the ocean-atmosphere system and that convection completely dominates radiation in the transport of heat through the atmosphere. Never mind, they tell themselves, we can always plug in enough feedbacks and fudge factors to make the model work.

At least in the short term.

A stochastic modeler (i.e. a physicist) looks at the same data and sees quasi-cyclic random fluctuations superimposed on a linear trend. It looks like red noise, which means that random variations are bigger at longer time scales than at shorter time scales. The apparent linear trend in recent global average temperature is quite possibly the outcome of noise components which are longer than the record length. Examination of much longer records of temperature data from ice-cores shows that this is indeed the case. The data does indeed have a red spectrum, and the observed temperature record is typical of what you get when you take a short sample from such a red noise time series. There is nothing unusual about the twentieth century climate.

The stochastic modeler then takes a longer look at the ice core time series over the last half million years or so. It is very interesting. There have indeed been large swings in climate. The last one ended 11,000 years ago. Climate at this longer time scale looks very much like a particular type of red spectrum known as a "random walk". (A random walk is the sum that you get if you throw a coin over and over again and add one for heads and subtract one for tails after each throw.) There is a big difference though. Random walks tend to wander further and further away from zero (variance

increases with time) but the temperature throughout the succession of ice ages remains within a narrow channel (between about -18 and +10 deg C). It is a “bounded random walk”.

Why should it be bounded?

Simple physics tells us that, even in the complete absence of greenhouse gases, the planet cannot get any colder than the Ice Age temperature of -18 C because, at that temperature, the earth’s surface radiates the same amount of heat that it receives from the sun. This is the Stefan-Boltzman Law and it accounts for the lower boundary.

It is an observed fact that, in the present epoch, the surface temperature of the sea under natural conditions in the tropics rarely rises above 28 deg C. Any extra heat causes no increase in temperature. Instead, adding heat causes more rapid evaporation, followed by more vigorous turbulent convection (a stochastic process) which carries the extra heat to the top of the atmosphere where it radiates into space. This accounts for the upper boundary.

The stochastic modeler’s theory of climate as a bounded random walk is physically reasonable.

On the other hand, a deterministic modeler (e.g. palaeoclimatologist, Richard Alley, in his YouTube video) looking at the same Ice Age temperature time series, sees that there have been large, rapid fluctuations which he cannot explain because he does not understand stochastic process. His response? Climate is obviously highly unstable and we don’t understand it and so we cannot be too careful, therefore we must de-industrialise the world immediately.

And the present pause? To a stochastic modeler it comes as no surprise. It could have been predicted 20 years ago on a desktop computer using a simple autoregressive (AR) model. However, such mundane predictions are rarely published or funded. Only alarmism works.

John Reid is a retired physicist in Cygnet, Tasmania

References:

Richard Alley’s Global Warming – YouTube: <https://www.youtube.com/watch?v=T4GThA35s1s>

Pelletier, J.D. (2002) “Natural variability of atmospheric temperatures and geomagnetic intensity over a wide range of time scales”. PNAS, 99, supp. 1, pp 2546-2553.

Posted in Quadrant Online on 20 October 2014:

<https://quadrant.org.au/opinion/doomed-planet/2014/10/physicist-looks-pause/>

Comments

Rob:

Strikes me his basic premise is wrong: invoking Chinese philosophy doesn't make his statement that numerical modelling assumes perfect knowledge of the starting state (correct).

More wrong is the statement that the result of a numerical model is assumed to be perfect knowledge of the future state. In the real world, models are tested against observations, and ensembles run because the starting state is not perfect.

Maybe right wing economists use models in this way, and therefore assume the rest of the world must be as simplistic.

I'd fail my introductory GIS students if they asserted a model was deterministic reality. All the same I wish he was right

Response:

Rob has misunderstood my point which is that climate models are an attempt to model stochastic process with deterministic equations. Running an ensemble of predictions from a variety of starting points does not make a deterministic model stochastic and statistical deductions based on such ensembles are highly dubious. For one thing the various parameterisations within the model should be randomized as well as the initial conditions. These include all those processes which have a stochastic character, e.g. turbulent convection, cloud formation, sea surface wind stress and so on. The problem is that if you do this the various model runs rapidly diverge from one another and model predictions become obviously worthless. Furthermore some forcings such as sea floor heating by volcanic activity are assumed to be evenly distributed over the entire ocean floor and to be steady state. Volcanoes on land are sparse and intermittent and it is reasonable to assume sub-aqueous volcanoes are as well. As such they constitute a major stochastic forcing which exceeds both tidal friction and wind stress in magnitude but this forcing is completely ignored by the modelers.

Rob says "In the real world, models are tested against observations ...". Yes some models are. I once ran models of tide and tropical cyclone impacts on ocean currents off the North West Shelf. These models were rigorously tested against wind and current meter data. Met models are routinely tested and their "skill" measured and improved. When climate models fail instead of questioning them, the modelers look around for the "missing heat", the assumption being that we know a priori that the models are correct and there must be something wrong with the data. That is not what a physicist would call "testing".

My article was addressed to the lay public and proposes that the philosophical underpinnings of climate models are a return to a pre-Planck, 19th century, deterministic view of nature as typified by Laplace. In my view Eastern philosophies are closer to post-Planck physics.

Jon:

is the opprobrium aimed at fossil fuels solely based on their perceived impact on climate? I would have thought not. Issues around conservation of non-renewable resources (or at least a focus on what sort of use to which they can be put other than burning them up), pollution (other than simply Co₂), of course the climate will change. I applaud your critique of modelling (observing it occur in sectors about which I'm better informed has led me to conclude that its little different than voodoo doll making - the presumption that the model not only represents reality but often is reality). But if sea levels may rise, if food baskets may become deserts etc, would it not be a good idea to be thinking about whether it might be possible to mollify these effects?

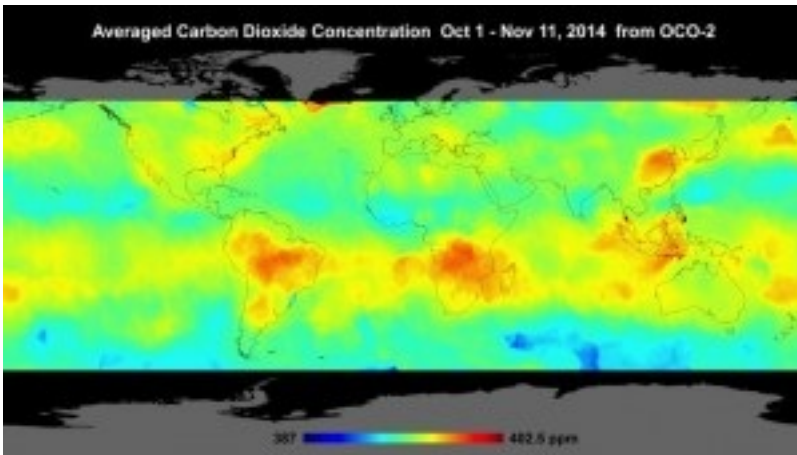
Response:

Jon, there may well be good reasons for replacing fossil fuels but right now they are the only price-competitive source of energy available on a large scale. It would be nice to have clean, switchable hydro everywhere but it requires a fortuitous combination of topography and rainfall. We need cheap energy. Without it living standards would fall dramatically and it would be the less fortunate (like age pensioners) who would bear the brunt of escalating electricity prices. Until a cheap storage is found wind and solar are just not going to make it, except perhaps as boosters for hydro. I think hot-rock geothermal is the best long term bet but it requires a much faster and cheaper rock drilling process than any currently available.

"If sea levels may rise, food baskets may become deserts ...". We may be invaded by little green men from Mars but that would not justify spending megabucks on an interplanetary defense force. There has to be a reasonable likelihood of the problem occurring and the possibility of fixing it if it does. Yes, we should be thinking about it but a couple of backroom guys down at CSIRO is all it takes, not this massive climate modelling boondoggle.

I am not a Pollyanna. A single Krakatoa-style eruption in Indonesia at the wrong time could destroy the entire SE Asian rice crop but there is very little we can do about it.

You are right about "... but often is reality". That seemed to be the mentality in the modeling group at CSIRO where I was the sole experimental physicist among applied mathematicians.



NASA/JPL-Caltech. [Click to enlarge.](#)

Mapping Carbon

John Reid

After ten years in the planning and numerous technical setbacks and glitches (which included a rocket failure) NASA's Orbiting Carbon Observatory - 2 (OCO-2) is finally sending high quality data back to earth. The satellite makes continuous, precise measurements of atmospheric CO₂ concentrations over most of the planet by means of absorption spectroscopy. The diagram is a compilation of mean atmospheric CO₂ concentrations for the 6 week period commencing 1st October 2014.

Hopefully this satellite is likely to be returning similar data for many years into the future so these results are only a tentative "sneak preview" of what is to come. They were obtained during northern fall and southern spring. Since CO₂ concentrations are most likely influenced by biological processing in plants, animals and fungi, future measurements in other seasons will be of prime importance in understanding the earth's carbon cycle.



World Vegetation Map

Nevertheless there are already some real surprises, viz.:

1. Over land, CO₂ concentrations are dominated by vegetation type – the high concentrations over South America, Southern Africa and Indonesia correspond closely to tropical evergreen rainforest and tropical deciduous forest and scrub (click on global vegetation map above).
2. There are unexpected but significant concentrations over the oceans. The concentrations in the South Atlantic and near Madagascar may well be due to an eastward drift from the nearby continental concentrations due to the general easterly trend in atmospheric circulation. However the concentrations east of Japan and north of New Zealand cannot be explained in this way, nor can the concentration near the southern tip of Greenland. Some of these have been attributed to tectonic activity in an [article by Prof. Martin Hovland of the University of Bergen](#).
3. There is little evidence that CO₂ from industry plays much part in the total scheme of things. Western Europe as a whole shows little evidence of excess CO₂ production apart from the Eastern side of the Adriatic Sea where there is little industrial activity. England appears to have been a net sink for CO₂ in autumn.
4. The high concentrations over China may well be due to industrial activity but it could also be attributed to excess emissions from subtropical broadleaf rainforest at this time of the year. We will have to wait another six months to get a clearer picture. A similar argument applies to the SE corner of the United States

It is already obvious that these observations are a serious embarrassment to NASA's front office. NASA's caption to this map reads as follows:

Global Atmospheric Carbon Dioxide

Global atmospheric carbon dioxide concentrations from Oct. 1 through Nov. 11, as recorded by NASA's Orbiting Carbon Observatory-2. Carbon dioxide concentrations are highest above northern Australia, southern Africa and eastern Brazil. Preliminary analysis of the African data shows the high levels there are largely driven by the burning of savannas and forests. Elevated carbon dioxide can also be seen above industrialized Northern Hemisphere regions in China, Europe and North America.

This cannot go unchallenged:

above northern Australia,

er, that country is called Indonesia, I-n-d-o-n-e-s-i-a. Perhaps it is politically incorrect to name a third world country in this context.

high levels driven by burning of savannas and forests

Indeed? Levels that massively exceed the industrial emissions of Western Europe? I look forward to the peer-reviewed paper on this one. That certainly is a lot of grass.

Elevated carbon dioxide can also be seen above industrialized ...Europe Where? I must be looking at a different map.

The situation may well change as more data becomes available – new ideas will certainly emerge and it may be decades before it is all understood.

The fact remains that in six weeks this satellite changed the face of climate science. NASA should be proud of the people who carried this through and not seek to obfuscate their findings.

8 THOUGHTS ON "MAPPING CARBON"



Cygnetician

JANUARY 12, 2015 AT 5:31 AM

Michael, your ideas apply equally well to forestry which is also carbon neutral. This whole climate thing started out purely as

an argument for not burning *fossil* fuels, which, on the face of it, was not such a bad idea back around 1990 when both temperatures and CO₂ were rising and not much research work had been done. Since then it has become a gigantic boondoggle for numerical modellers and a basic tenet of militant Environmentalism. Now all technology is suspect as we hanker for some mythical paleolithic past. Even farming has to kow-tow to the new God and apologise for “taking from the Earth”. Reasoned argument has become a thing of the past. Nowadays it is all about “raising awareness”. It used to be called “spreading the faith”.

 **Michael**

JANUARY 12, 2015 AT 3:00 AM

I hear about farting cows a lot and as a small scale farmer with an interest in science I wonder why cows or ruminants in general are singled out as contributors to CO₂ equivalent emissions. Cows ideally eat grass so their source of carbon to convert into methane comes from grass. Often they are finished on grain. Either way they mostly burp and cough their methane laden gases with the carbon derived from the food they eat. So if they are making any significant contribution to atmospheric carbon, then soil carbon must be being lost at an astronomic rate.

I do realise that net soil carbon is often lost through intensive agriculture but blaming cows seems to be a bit of vegan propaganda. In my case, my grass fed cows and sheep seem to be doing the opposite. My grasses have improved over the past six years so I presume I am at worst carbon neutral and likely to be actually using ruminants to sequester more carbon than they expel on my previously poorly grazed paddocks.

The only serious candidate I can see to grazing ruminants as a contributor to atmospheric carbon is the tractor and transport fuels used on broad acres grain farming. So if the cows don't eat the grain and humans do then human methane would also be a problem.

So lets leave the ruminants out of the equation unless someone can explain where all their carbon comes from and show me how it isn't a closed loop with grasses.

 **Rob Thompson.**

JANUARY 8, 2015 AT 12:25 AM

“To every complex problem there is a simple solution”.

It is invariably wrong.

I first heard of scientific concern for increased atmospheric CO₂ at a science day visit to Syd. Uni. with my ten year old son, 32 years ago. Our academic hosts suspected anthropogenic causes. The graph line illustrating increased CO₂ was geometric comprising horizontal and vertical steps of six month intervals. These were credibly explained by northern hemisphere deciduous forests.

More recently I attended Prof. Garnaut's final lecture at the University of Tasmania and heard that the case for global warming was proven by a consensus of scientists with a guilty verdict on human habitation. Supporting evidence ignored major variables such as farting cows, vehicle exhausts, erupting volcanoes, tectonic activity, etc.

SCC (single cause certainty) propelled the economics professor to a quantitative diagnosis of how we can eliminate the effect of human existence on climate change. This was based on computer modeling presented as science. This jingoistic political course can only wreck our best hope of improving the well being of all – the global economy.

 **Larry**

JANUARY 11, 2015 AT 7:07 AM

In late 1986 I purchased a car from a CSIRO meteorologist who, during the conversation assured me that CO₂ levels had reached the levels needed for run away greenhouse effect global warming in March of that year.

Like all of the warmenistas other predictions, I'm still waiting for it to be proven right.

Scientific method says that if your hypothesis isn't supported by empirical results then your hypothesis is wrong. It's as simple as that, and as the AGW hypothesis has not only failed to be supported by empirical results, but has also managed to bet every single prediction over a period of 30 years wrong, maybe they should try going back to the scientific method and not the Frankfurt School's Critical Theory.

 **Simon Loveday**

JANUARY 13, 2015 AT 12:50 PM

Sooooo agree!

 **Prof Cliff Ollier**

JANUARY 6, 2015 AT 8:33 PM

I agree with you entirely that the terrestrial pattern simply follows vegetation. No need for forest fires, etc.

Over the sea the situation is more complex. I see no point in cherry-picking a few spots and guessing tectonic correlations. The pattern fails to pick up sea floor spreading sites, or the global distribution of volcanoes.

It will be interesting to see how the pattern changes with time – or if it does.

 **ABChester**

JANUARY 5, 2015 AT 11:27 PM

NASA is primarily a media machine so I am not surprised that anything they release might distort or bias the facts. Especially since countries like India are achieving for a miniscule budget what costs NASA a fortune, and private companies are closing in on their (extraterrestrial) turf.

It is clear that the summary of the CO2 map is poor and inaccurate and may have the old anti-science approach of moulding the data to fit predetermined ideas. I am not convinced against man induced global warming but I do feel that natural variations and non-man-made influences probably play a part.

 **Vera Prevalabit**

JANUARY 5, 2015 AT 11:17 PM

NASA exercise turning up some interesting stuff – just in time for Paris 2015.

Developing world attribution of greatest global CO2 emissions to developed world may turn out to be (at best) a dubious hypothesis, thus making its demands for 'climate reparations' even shakier.

COMMENTS ARE CLOSED.

blackjay

AN INCONVENIENT TRUTH

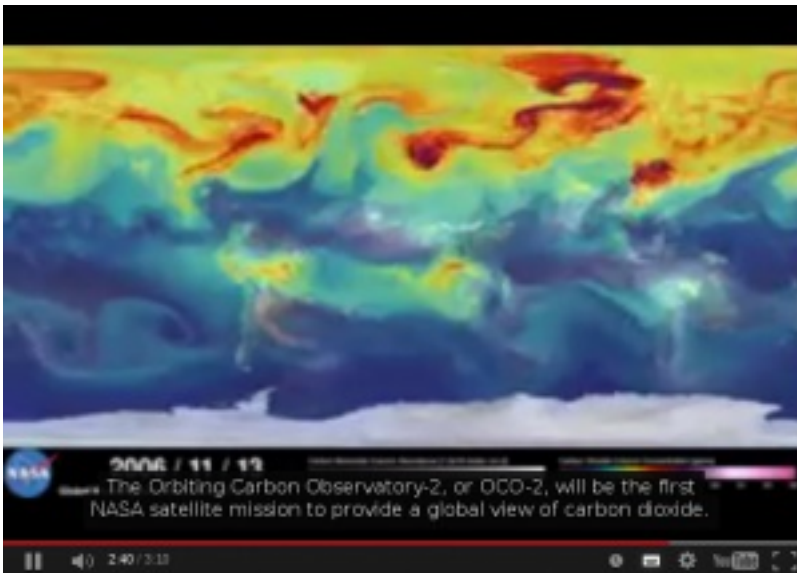
JANUARY 9, 2015 | ADMIN

An Inconvenient Truth

John Reid

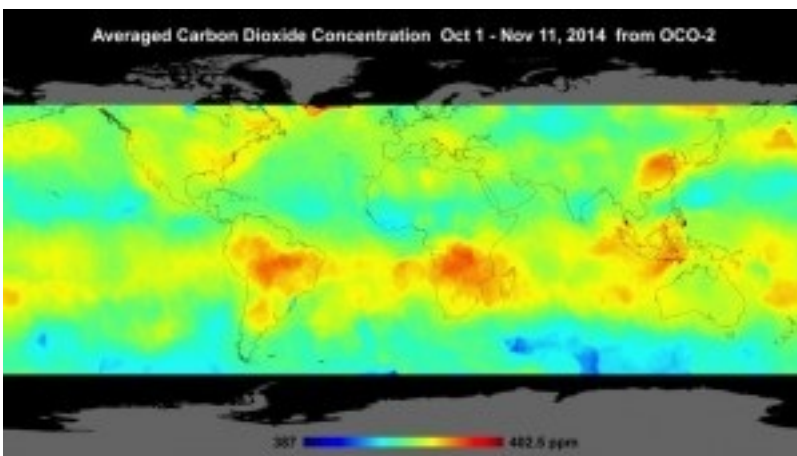
A new satellite, OCO-2, shows that most CO2 is coming from the rain forests and rice paddies of the Third World.

This is what was expected:



GEOS-5 predicted CO2 concentrations for 13 November 2006

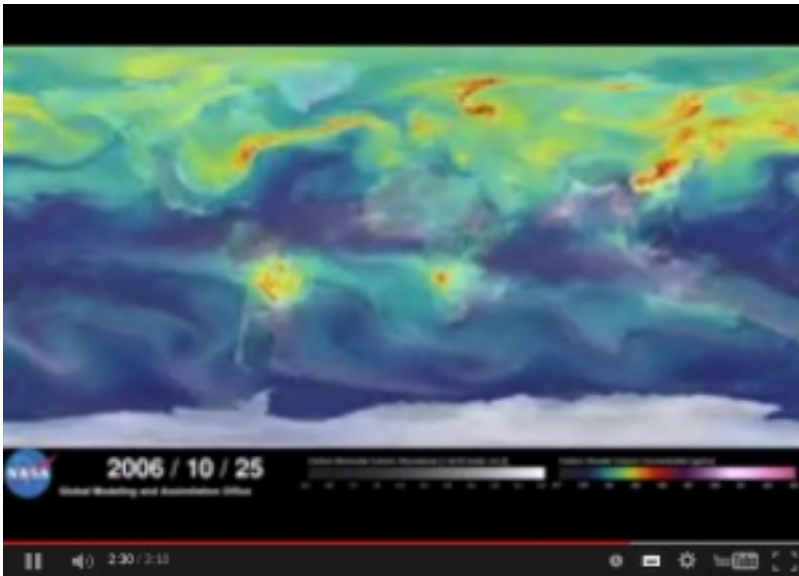
This is what was observed:



OCO-2 observed mean CO2 concentrations for the period 1 October to Nov 11 2014 (see previous post).

After three decades of breast beating, a single set of observations by NASA satellite OCO-2 has shown that the conventional

wisdom about CO2 is fundamentally wrong. Prior to launching the satellite NASA developed a numerical model called GEOS-5 to predict where concentrations of CO2 were likely to occur and to help interpret the satellite data. A super-computer used the model to generate daily maps of the expected global distribution of CO2. These were compiled into a 3 minute video which can be seen in full at <http://www.nasa.gov/press/goddard/2014/november/nasa-computer-model-provides-a-new-portrait-of-carbon-dioxide/>. The diagrams shown here are screenshots from that video. The above image is, admittedly, a worst case. A better fit occurred three weeks earlier in model time:



GEOS-5 predicted CO2 concentrations for 25 October 2006

The comparison is better but still cannot be described as “good”. Obviously something is happening in the real world which is not accounted for by the model.

This good science. The GEOS-5 model is almost as important as the satellite observations themselves. The model tells us what to expect based on current knowledge of both CO2 production and atmospheric circulation and explains some of the features observed in the satellite map, e.g. the high levels of CO2 observed near the southern tip of Greenland resemble the plume from industry in Eastern USA and Canada seen in some of the GEOS-5 maps

But the important thing is that the model greatly underestimates CO2 production in South America and central southern Africa and none of the frames in the video indicate any significant production in Indonesia at all. NASA lamely attributes the Indonesian hot-spot to Australia. Australian industry is confined to the diagonally opposite corner of the continent and winds generally blow from Indonesia *towards* S.E. Australia.

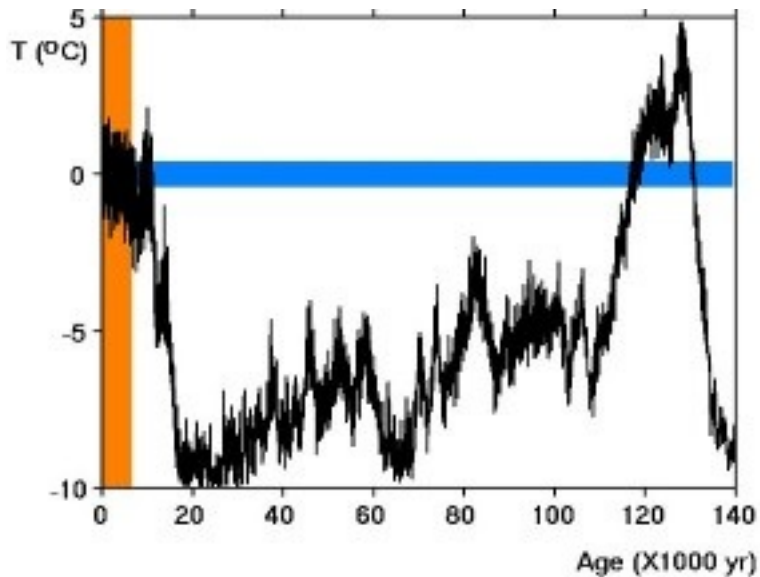
We must conclude that CO2 production is closely associated with subtropical vegetation and that the magnitude of this source has hitherto been greatly underestimated.

Of course this does not in itself account for the rising trend in globally averaged CO2 observed over several decades at atmospheric baseline monitoring stations such as Mauna Kea and Cape Grim but it does imply that we may need to re-examine the glib assumption that this is entirely due to Northern Hemisphere industrialization. These observations suggest increasing CO2 could be just as readily attributed to vegetation changes associated with increasingly intensive rice cultivation in S.E. Asia.

The 2013 Climate Change Conference (COP) in Warsaw, Poland was a critical step in obtaining financial commitments from industrialized countries for the ‘loss and damage’ that global warming has already caused to poor nations (also known as ‘climate debt’ or ‘climate reparations’). This thrust is expected to continue at the Paris Climate Convention commencing November 30, 2015.

It will prove much harder to win this blame-and-liability argument if it becomes evident that Western industrial activity may not be the sole cause of elevated CO2 levels.

ICE AGE CLIMATE



Ice Age Climate

John Reid

The above graph gives an indication of global average temperature variations over the last 140,000 years. This has been calculated from hydrogen isotope ratios found in ice cores from EPICA Dome C in Antarctica. (This ratio varies because the ice is made up of water which originally evaporated from the surface of the ocean. The ratio reflects the temperature at which evaporation took place.) The horizontal blue band is centred on present-day temperature. Its width is 0.8°C, the variation in average global surface air temperature during the 20th Century. The vertical orange band shows the extent of recorded history, i.e. about 7,000 years before the present.

The plateau which includes “recorded history” is known as “the present interglacial” or “the Holocene”. It began 11,200 years ago; 20,000 years ago the world was in the depths of an ice-age. The dramatic rise in temperature between the two states is known as “Termination I”. The dip towards ice age conditions half way through Termination I is called “The Younger Dryas”. It lasted from 12,800 years ago to 11,200 years ago. The temperature peak near 130,000 year ago, the previous interglacial, is known as the Eemian Interglacial. It was evidently 2 or 3 degrees warmer than during the present interglacial. It was preceded by “Termination II”. There have been five terminations and five interglacials in all. Both humans and polar bears have survived all of them although the megafauna did not.

Large excursions in temperature of several degrees lasting a few thousand years occur during ice-ages. Similar events are even more marked in the Greenland ice record where they are known as Dansgaard-Oeschger Events. Sea bed sediments from the Atlantic show similar anomalies and include pebbles from icebergs (Heinrich Events). These events may well be due to the collapse of the North Atlantic ice sheet. On the other hand they may simply be random walk excursions from the Ice Age boundary.

At present we are living in a time when the climate is particularly benign and yet some scientists express alarm about tiny variations in temperature during the 20th Century. Surely they must be aware of the above facts.