Questioning Climate for Policymakers

Highlighting Common Deceptions, Diversions, & Inconvenient Facts in the Climate & Energy Debate

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Many years ago, the debate about Anthropogenic Global Warming moved away from science to become highly political, essentially a pseudo-religion; in some regions also splitting populations along ideological lines. As is typical in such circumstances, facts become twisted; myths are created; lies and exaggeration trump facts; and faith in authority displaces rational, critical thought. This document exposes and highlights some of the inconvenient facts and trickery such that policymakers, and the public, can engage in questioning of the 'climate change' orthodoxy and its associated agendas.

Questioning Climate for Policymakers

Preface

From the humble beginnings of a scientific hypothesis, Anthropogenic Global Warming (AGW) has become a world-wide ideology. Indeed in most parts of the world it has become a pseudo-religion; accepted without questioning. Like its spiritual cult counterparts it has become intolerant of inquiring minds with virtually all arguments being squashed by assertions from an essentially self-proclaimed 'authority'; in this case the 'church' of the United Nation's Inter-governmental Panel on Climate Change (UN IPCC). This institution and the copious other bodies it has spawned have published, promoted and preserved a great deal of false and misleading information about climate over the last couple of decades; becoming increasingly outrageous during the last few years. It has influenced the attitudes of vast swathes of the Earth's population and biased a myriad of diverse policies throughout the world.

In order to persuade politicians and public, numerous types of misdirection, tricks, and other ploys have been used, many originating within the climate science community. That is not the way of science; it is dishonesty and should not be tolerated in civilised society. Most media outlets have also become biased. As a result certain important information has been sidelined in order to reinforce the politically correct view.

This document was written as an aid to UK policymakers, and others, such that they can begin to question the AGW orthodoxy by highlighting a variety of deceptions, misinformation and other tricks, along with basic facts that are generally avoided or obscured due to their inconvenience.

Contents

Introduction

Weather is day to day conditions of precipitation, wind and temperature. Unusual weather and climatic conditions are recorded in the Christian Bible and other ancient manuscripts, some of which refer back to at least the Bronze Age.

Climate is the average weather at a specified location over a long period of time. The climate has never been constant at any place on Earth and tends to go through cycles which are believed to be mostly related to solar activity and variations in the planet's orbit relative to other celestial bodies. These are entirely natural and have been well documented for more than a hundred years but largely dismissed by the climate science experts of the United Nations Intergovernmental Panel on Climate Change (UN IPCC). Despite what this overly influential body claims, the climate is always changing, always has and always will because it is a dynamic and chaotic system. Thus it can be succinctly summarised: ***the only constant in climate is change***.

For more than a century alarming reports have been filed declaring that climate is changing at a startling rate but in the last few years these have become increasingly outrageous and extreme with claims of global catastrophe being widely touted. Virtually all of these assertions include direct or covert calls for funding (normally from the public purse) to further study, explore, predict, or otherwise address the declared situation. To date none of the scares over climate has had any foundation and the present cataclysmic alarm, propagated over about three decades is no different, apart from being driven by a powerful political environmental agenda.

We should not forget that during the 1970's the world was supposed to be headed for an ice age and the term 'Global Cooling' became common place. As time went by, this idea morphed into 'Global Warming' (Anthropogenic Global Warming – AGW) due to rising temperatures and then transmuted into 'Climate Change' because the warming stopped. Latterly the new alias of 'Global Climate Disruption' has been introduced as term to accommodate both warming and cooling as well as to imply human intervention. Modifying the name is part of the evolution of the agenda since the facts inconveniently trump both the ideology and politics.

At this juncture, it is worthwhile taking a brief look at a couple of quotations that illustrate some of the points made earlier. Let us first look back to an era when the Royal Society was closer to science:

> *"It will have come to your Lordships' knowledge that a considerable change of climate, inexplicable at present to us, must have taken place in the Circumpolar Regions, by which the severity of the cold that has for centuries past enclosed the seas in high northern latitudes in an impenetrable barrier of ice has been, during the last two years abated.*
>
> *This affords ample proof that new sources of warmth have been opened and given us leave to hope that the Arctic seas may at this time be more accessible than they have been for centuries past, and that discoveries may now be made in them not only to the advancement of science but also to the future intercourse of mankind and the commerce of distant nations."*

That was the President of the Royal Society, speaking to the Admiralty in London on November 20, 1817. One should note that not only was significant warming reported but that it was seen in a positive light and not the harbinger of thermal Armageddon. Maybe, for example, he knew that the Vikings had enjoyed and benefited from the warmer era when they inhabited Greenland in the Medieval Warm Period (MWP).

Moving to the contemporary scare, here is a quotation from the beginnings of the climate change fad explaining how to exploit it as an environmental common enemy:

> *"The common enemy of humanity is man. In searching for a new enemy to unite us, we came up with the idea that pollution, the threat of global warming, water shortages, famine and the like would fit the bill. All these dangers are caused by human intervention, and it is only through changed attitudes and behaviour that they can be overcome. The real enemy then, is humanity itself."*

That is from the 1st Edition of The First Global Revolution (1991); council of the Club of Rome (Environmental think-tank & consultants to the United Nations). This demonstrates quite succinctly that the issue of climate change (then global warming) was to be used as a means of coercion. The negative and near sinister tones are a disturbing reflection of agendas from the not too distant past. It is yet more concerning that this rhetoric emanates from such a powerful and elite group.

Apparently, many of those within the Club of Rome were unhappy about the document but it was published, has undergone revisions and soon became one of the foundations of 'climate change' tenet.

But enough of the politics for now, we need to look to the science, data and other facts on which the climate scare is supposedly based.

Arctic Sea Ice

Having already mentioned the Arctic, it seems fitting to start there. The variability of Arctic sea ice is regularly used as an indication of global warming, and as Illustrated by the first quotation, is not necessarily an indication of long or even medium term change. Arctic sea ice as the name suggests is floating ice that covers virtually the entire Arctic Ocean during northern hemisphere winters.

In summer much of the ice melts, but that does not cause sea levels to rise. This is Archimedes principle and thus common knowledge that can be demonstrated with a glass of water and some ice cubes. If the ice is floating and the glass full to the brim, it doesn't overflow as the ice melts.

Arctic sea ice covers about 10 million square kilometres and cycles annually; melting in summer and reforming during winter. In summer it melts to about a third of the winter area. It should be noted that because it is partially restricted in maximum expanse by surrounding land masses it is more

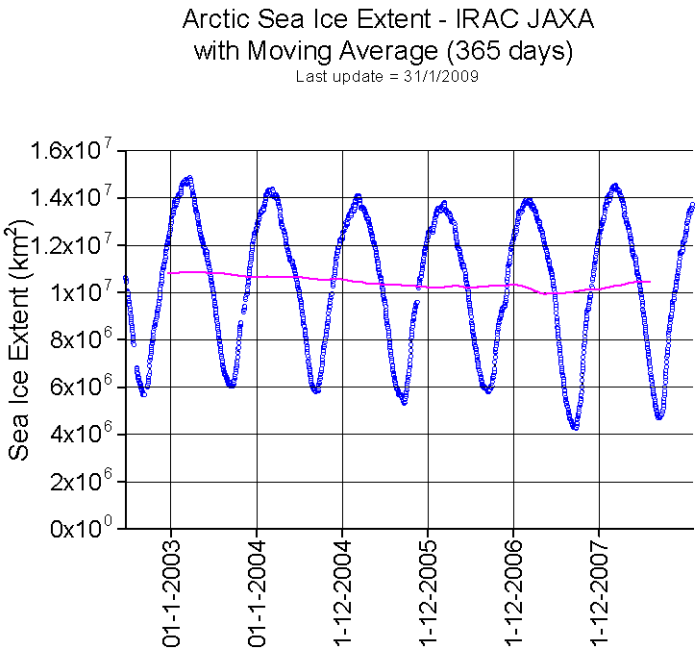


Figure 1: Arctic sea ice extent from satellite showing annual variations.

difficult for the ice expanse to increase than it is to decrease. Moreover, as its expanse increases it enters warmer waters.

The cyclic nature can be seen from satellite data in the graph below (Figure 1). Clearly there is quite a lot of variability in the extent from one year to the next. This variation comprises several components including melting, compaction, and being washed out of the Arctic Ocean by sea currents and winds. The climatic trend is the average of the cycles over time, represented by the moving average line (magenta). This is only a short dataset derived from the AQUA satellite and published by IRAC JAXA. However, records have been obtained from other sources and they provide a history going back over a hundred years. This is shown in Figure 2 and the graph is coloured to identify the differing measures used within the composite. Data from differing sources should

always be identified in such graphs and the fact that it isn't in the source publication and allied material is against scientific best practice and gives a misleading impression of the trend.

It can be readily seen that there was no significant trend in the sea ice extent until the satellite era, but this is only part of the story. The satellite data used is from instruments (SMM/I) on a series of satellites, all of which had decaying orbits. These sensors are known to underestimate ice levels for a variety of reasons and tend to fail in a manner that records lower ice levels.

Fortunately, a recent state-of-the-art system (AMSR-E) on a stable satellite has been available for a several years. Comparing the two systems shows that SMM/I shown in red on Figure 2 is drifting relative to AMSR-E and the linear trend of the difference is also shown. The difference between the two satellite measurements of sea ice extent easily accounts for the entire claimed decline in Arctic sea ice.

But do the scientists involved know about this and if so, why have they not corrected the problem? The answer can be found for all to see on the Internet where NSIDC (National Snow and Ice Data Centre) states: "**However, we do not use AMSR-E data in our analysis because it is not consistent with our historical data**."

Put simply, they refuse to use the data from the latest state-of-the-art instrument on a stable satellite platform because it does not fit with the trend from the old instruments on satellites with decaying orbits and thus contradicts the assertion that Arctic sea ice is declining.

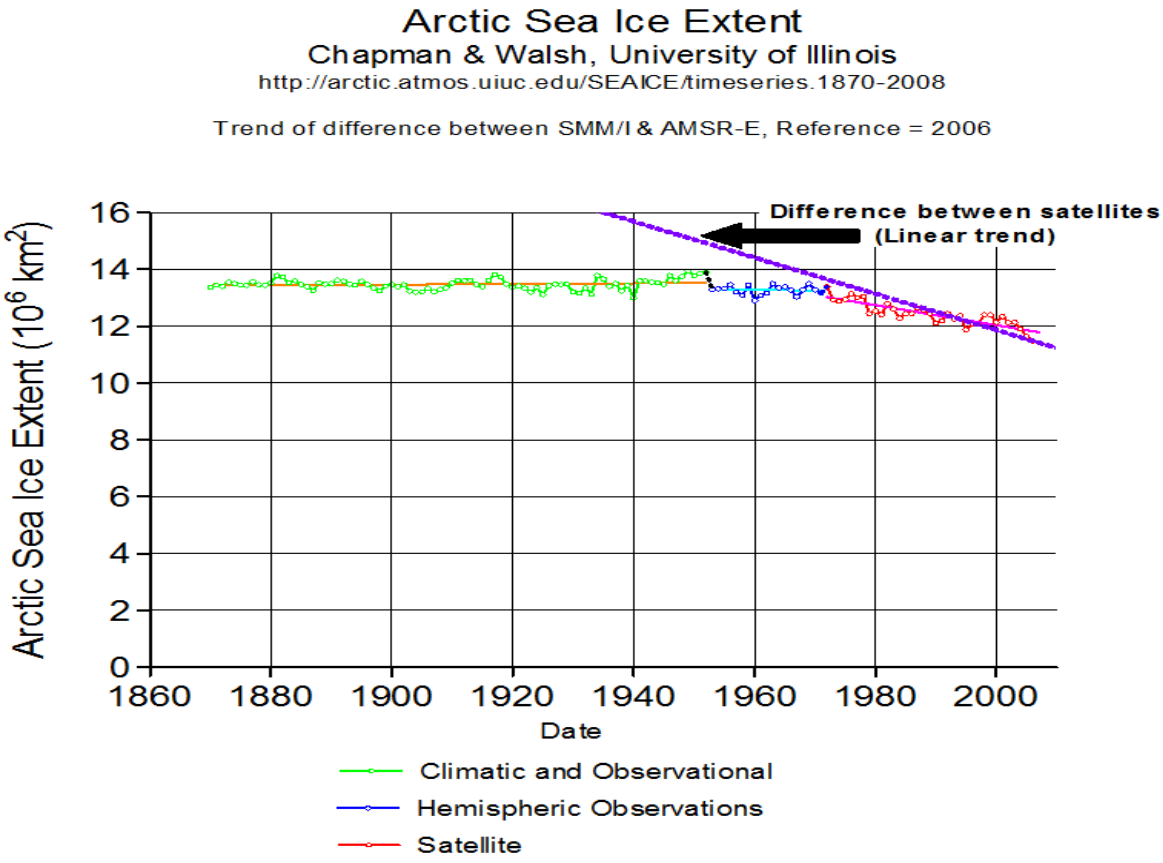


Figure 2: Long Arctic sea ice extent history. The data has been split and coloured so as to show its origin.

Antarctic Sea Ice

However, Arctic sea ice is only part of the story. Global warming should be a worldwide phenomenon, not a local or isolated one, so what is happening to sea ice concentrations in Antarctica?

Again the levels are cyclic, like in the Arctic, although roughly out of phase because Northern and Southern seasons are opposite. The trend in the southern polar region is towards more ice. Increasing sea ice in the Antarctic is another of those inconvenient truths not widely reported.

Figure 3 shows the measured Antarctic sea ice extent where the cyclic nature is very evident. Of more relevance is Figure 4, the same data but converted to an anomaly (difference from an assigned normal) and includes a linear-fit line (red dashed line) to highlight the increasing levels.

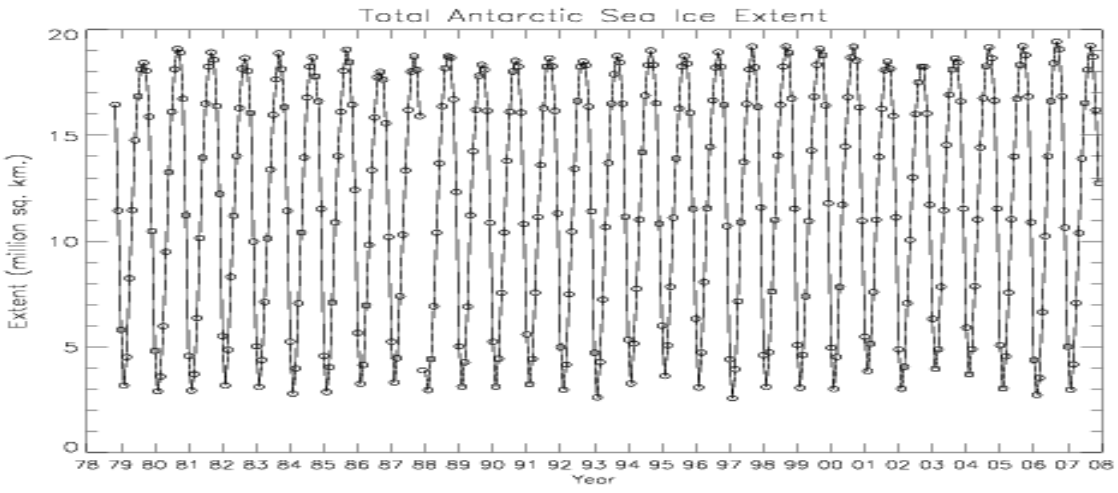


Figure 3: Antarctic Sea Ice Extent [National Snow & Ice Data Center]

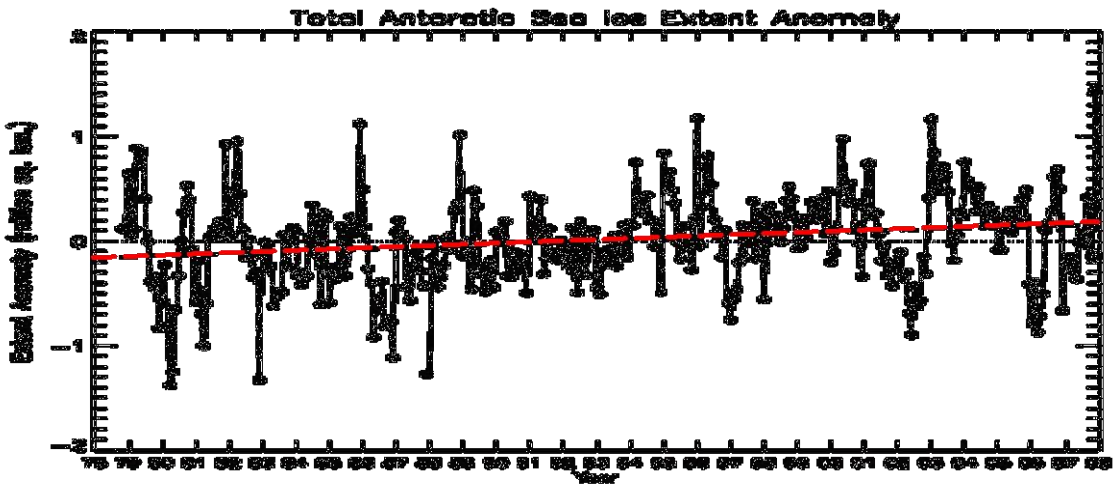


Figure 4: Antarctic Sea Ice Extent Anomaly [National Snow & Ice Data Centre]

Carbon Dioxide (CO_2) Basic Facts

Carbon dioxide (CO_2) is an invisible, tasteless, non-flammable trace gas in the atmosphere at a concentration of 390 parts per million (ppm) or 0.039%. It is entirely natural and is essential for life.

Higher concentrations are beneficial to plants, increasing growth rates and improving water efficacy. Horticulturalists routinely increase the concentration in their glasshouses to at least 1000ppm resulting in 50% enhanced photosynthesis rates and thus better productivity. If atmospheric CO_2 levels dropped to 300ppm plant growth rate would be reduced by about 10%, and below this concentration the rate drops increasing fast as the plants effectively begin to starve and shutdown.

Human health also benefits from increased CO_2 levels with studies showing that it can reduce cardiac attacks and certain breathing problems. Levels of 5% CO_2 in oxygen (to match human exhalation) are used in medicine to address some breathing related ailments.

Like any substance, an excess can have negative effects on health and can even kill but the levels at which that occurs are orders of magnitude above that of today's atmosphere.

Carbon dioxide is found in:

- Carbonated drinks, beer, bubbly wines, etc. at very high levels
- Products made with live yeast and other fermentation processes
- Air near the ground because it is naturally emitted from rocks and volcanoes
- Natural gas at up to 8%
- All liquid water

Carbon dioxide uses:

- Almost endless industrial applications, including aiding hydrocarbon recovery
- Welding, lasers, fire extinguishers, propellants, etc.
- Refrigeration systems. Dry ice is solid carbon dioxide
- Cold sterilisation

Other basic facts about carbon dioxide:

- Specific gravity relative to air of 1.54, meaning that it is denser than air and will tend to sink
- Density is 1.98 kg/m^3
- Boiling point of -78.5°C at 1 atmosphere pressure
- Natural airborne CO_2 accounts for about 2700 Gt of the atmosphere
- Human activity accounts for about 26 Gt of airborne CO_2 or less than 1% of the total
- The annual cycle of CO_2 has amplitude greater than the annual mean increase, see Figure 12
- CO_2 is a small fraction of the so-called greenhouse gases in the atmosphere at less than 4%
- CO_2 has lower specific heat capacity than air, thus for a given energy input will appear hotter than air under the same conditions.

Emissions of CO_2 from Burning Hydrocarbons

The entire underpinning of the AGW alarm is the claim that carbon dioxide from burning hydrocarbons is increasing the atmospheric level and resulting in global temperature increase. Very often policymakers and the public are presented by misleading graphics showing global CO_2 emissions and atmospheric concentrations. This is incorrect as it shows two incomparable measures. The annual increase in concentration should be proportional to the annual increase in emissions if there is a link between them. An analogy might be, adding sequential drops of ink to a bottle of water and observing the relative colour change.

Figure 5 shows the annual increase in CO_2 and corresponding annual emissions. It should be pretty clear that there is little similarity.

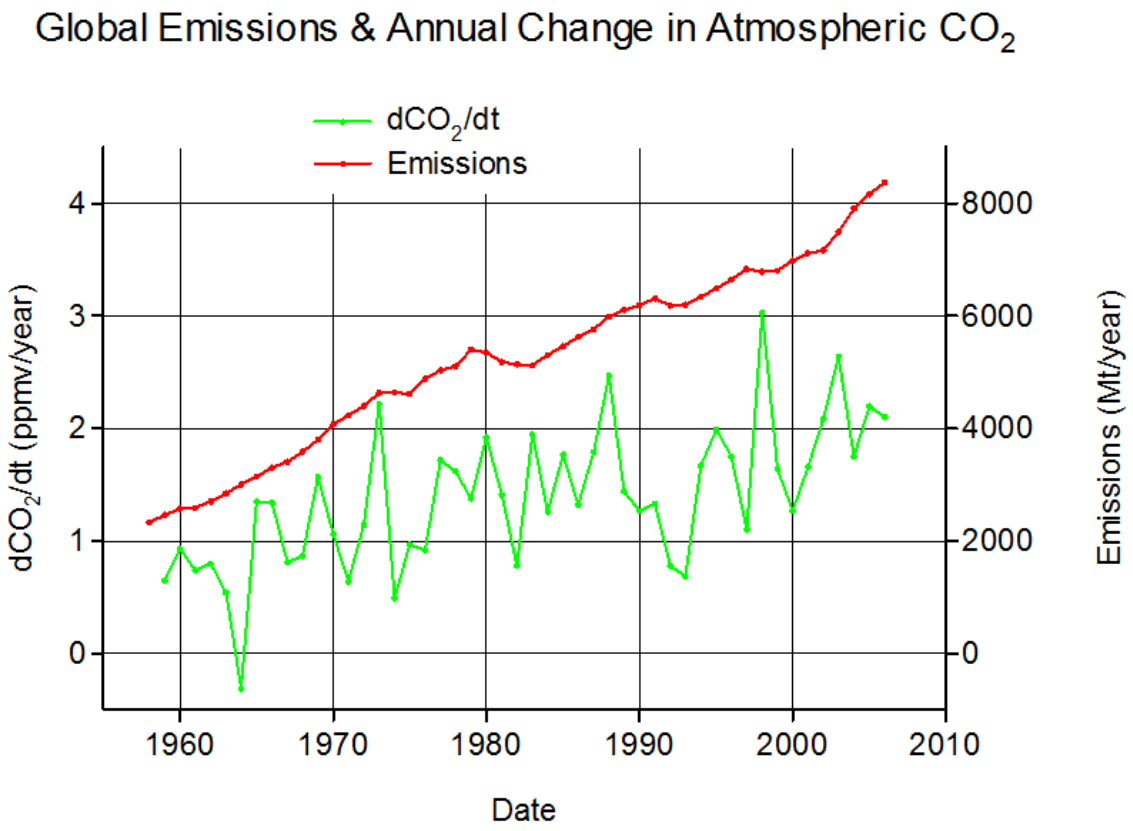


Figure 5: Emissions are in Mt of carbon put into the atmosphere each year and dCO_2/dt is the annual change in atmospheric CO_2 concentration.

We can look at this data another way and that is by calculating the amount of emissions needed to produce a 1ppm increase in the atmosphere. AGW states that the natural sinks of CO_2 are saturated, near saturated, or are so slow at absorbing that they have little effect on decadal time-scales. If this is true then as time goes by either a constant quantity or a smaller amount of emissions would be required to create the 1ppm rise in atmospheric CO_2. Figure 6 shows the ratio of annual CO_2 change to annual emissions. A smoothing filter has been included to make the trend more obvious, along with a linear fit.

This graph clearly shows that the AGW assertion is incorrect because the quantity of emissions needed to produce 1ppm rise in atmospheric CO_2 is increasing, not decreasing or constant as the theory asserts.

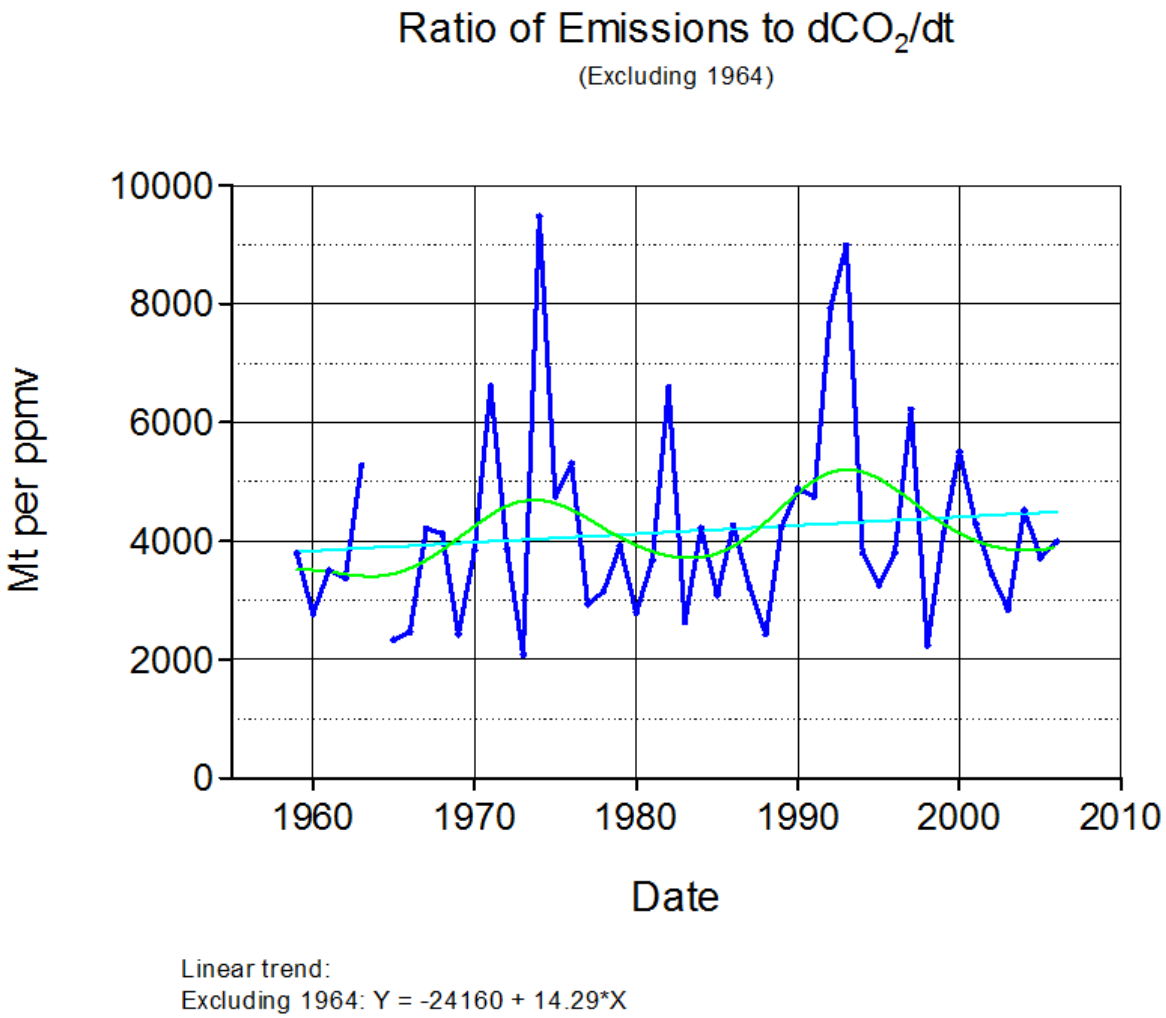
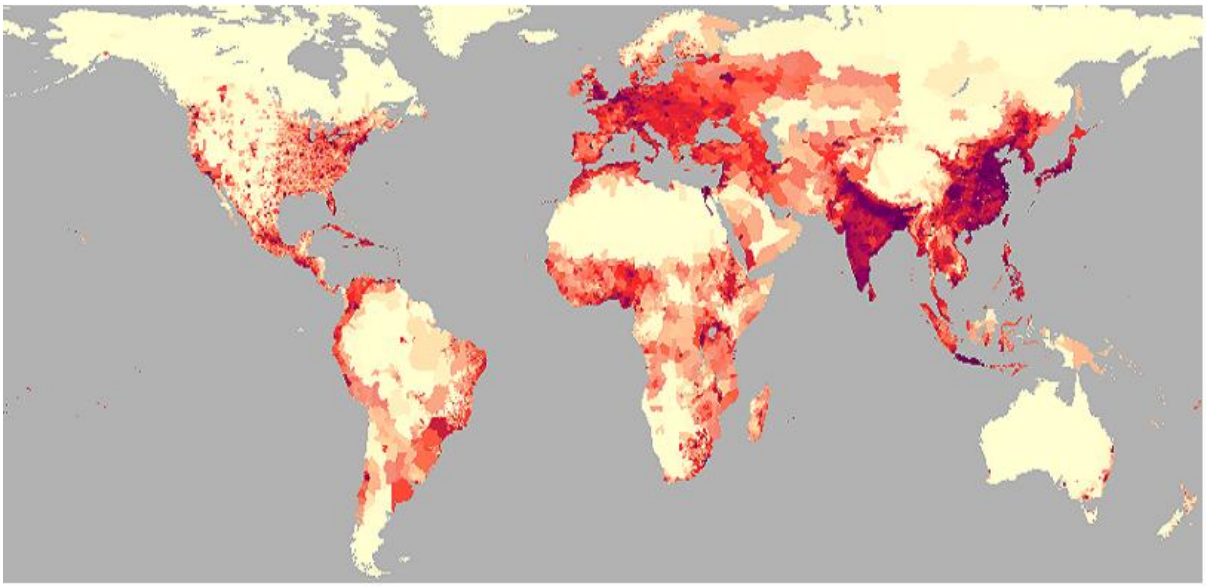


Figure 6: Emissions (Mt of carbon) needed to produce 1ppm increase with time. Note: a negative outlier was removed at 1964 since it cannot possibly fit the narrative and would make the linear trend (cyan) even steeper.

Further evidence that human activity is insignificant comes from the AIRS project which maps the CO_2 atmospheric concentrations from satellite. If emissions from hydrocarbon burning had an impact there should be a higher concentration of CO_2 around populated regions as they are the source. However, AIRS has shown that there is no significant correlation between population and CO_2 concentrations, Figure 7 .

Map of World Population (Darker Colours = Greater Population)



Below: AIRS Project Map of Carbon Dioxide Concentrations

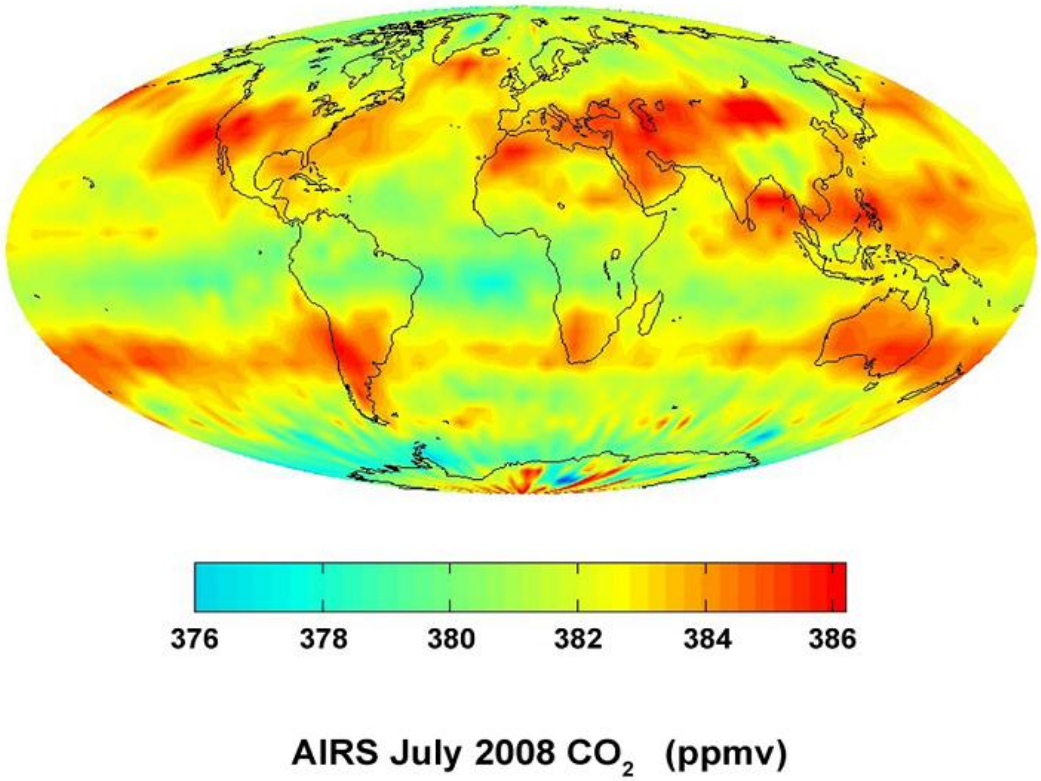


Figure 7: Comparison between Atmospheric CO_2 concentrations and Population.

Temperature and CO_2

According to the AGW storyline, CO_2 in the atmosphere causes a rise in temperature. This provides us with a cause and effect statement. It means that CO_2 must rise in concentration to facilitate an increase in temperature. It is analogous to turning up the heat on a pan of water. The water only heats after the heat is increased.

Fortunately this is easy to check by comparing global temperature and CO_2 data. Again we need to look at the annual change in CO_2 and compare it to temperature, Figure 8.

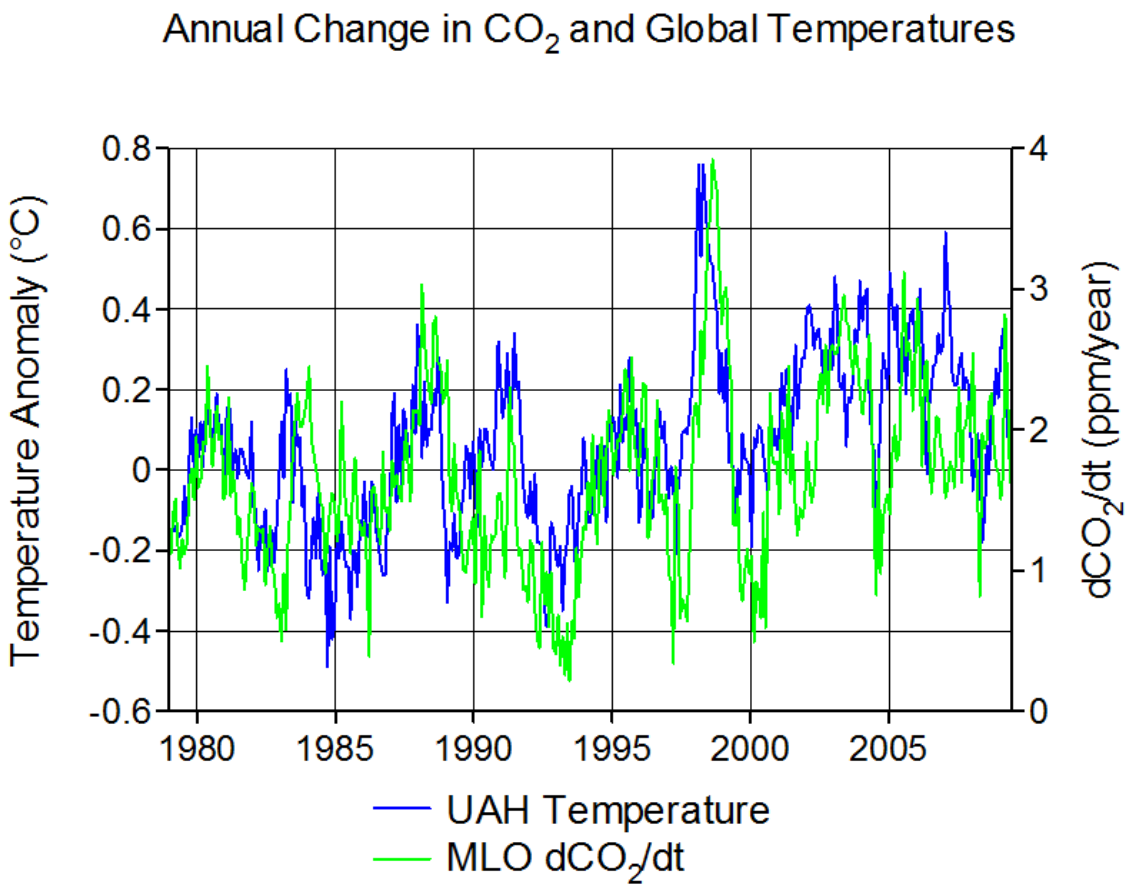


Figure 8: Annual change in CO_2 and Satellite Global temperature.

There is clearly a high degree of similarity between the two measures and to the trained eye there appears to be a relative lag between the two. To examine this, a plot of the correlation between them is created at varying lag times. As expected it shows that temperature leads CO_2 by about 5 months, indicated by the peak value; Figure 9.

From basic chemistry we know that warm water cannot support as much dissolved CO_2 as colder water and thus we would expect CO_2 to be released as temperature increases. Temperature

therefore is driving CO_2 levels, not the other way around. To suggest the opposite argument is the equivalent of saying that wind turbines make the wind but is the line held by climate science.

Observational data therefore trumps the AGW hypothesis and invalidates all the computer models (GCM's) which all contain the wrong cause and effect relationship.

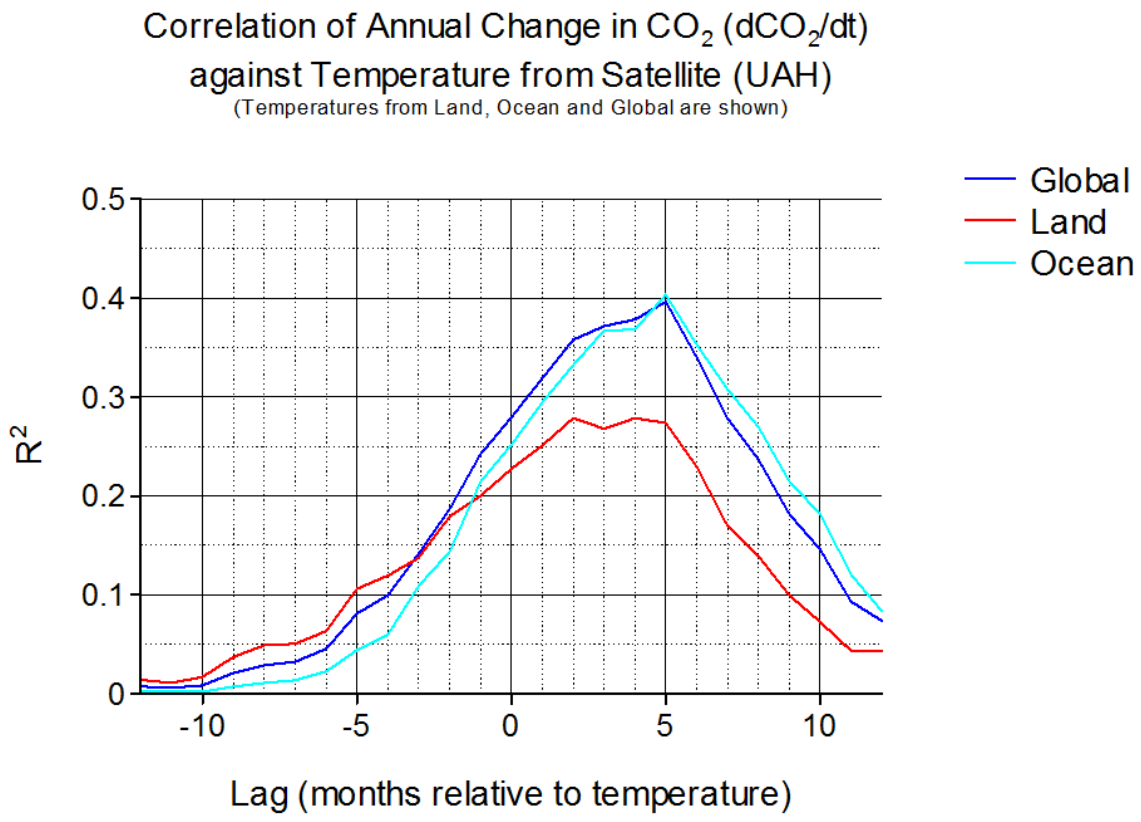


Figure 9: Correlation of CO_2 changes with temperature from satellite. It shows that temperature changes occur about 5 months before changes in CO_2. The data used was unsmoothed.

It is also worth pointing out that as temperature drops a proportional level of CO_2 appears to be removed from the atmosphere. The seasonal cycle which is the easiest way to visualise the re-absorption can be seen in Figure 12.

Ice Cores and Pre-Industrial Atmospheres

Ice core data has been used to propagate the notion of low pre-industrial levels of CO_2. It is claimed that ice is able to capture and retain accurate representations of past atmospheres. However, it has long been known that ice cores are unable to do this.

All gas species and isotopic concentrations fractionate during and after capture in snow and subsequent enclosure in the ice of glaciers and ice-sheets. Neither the absolute concentration nor the relative concentrations of the gaseous constituents of air are retained. The so-called pre-industrial levels of gases obtained from ice cores are grossly erroneous and most certainly do not reflect the composition of ancient atmospheres.

> *"Thus each element or compound diffuses at a different rate, and each isotope of a compound diffuses at a different rate. In consequence, the covariation between the composition of one gas and another (e.g., CO2 and CH4) in firn is different from their historical covariation in air. The isotopic composition of a gas (e.g., CO2) in firn air also varies with the concentration of that gas in a way that is different from the historical relationship."*

Bender et al; Proc. Natl. Acad. Sci. USA, Vol. 94, pp. 8343–8349, August 1997

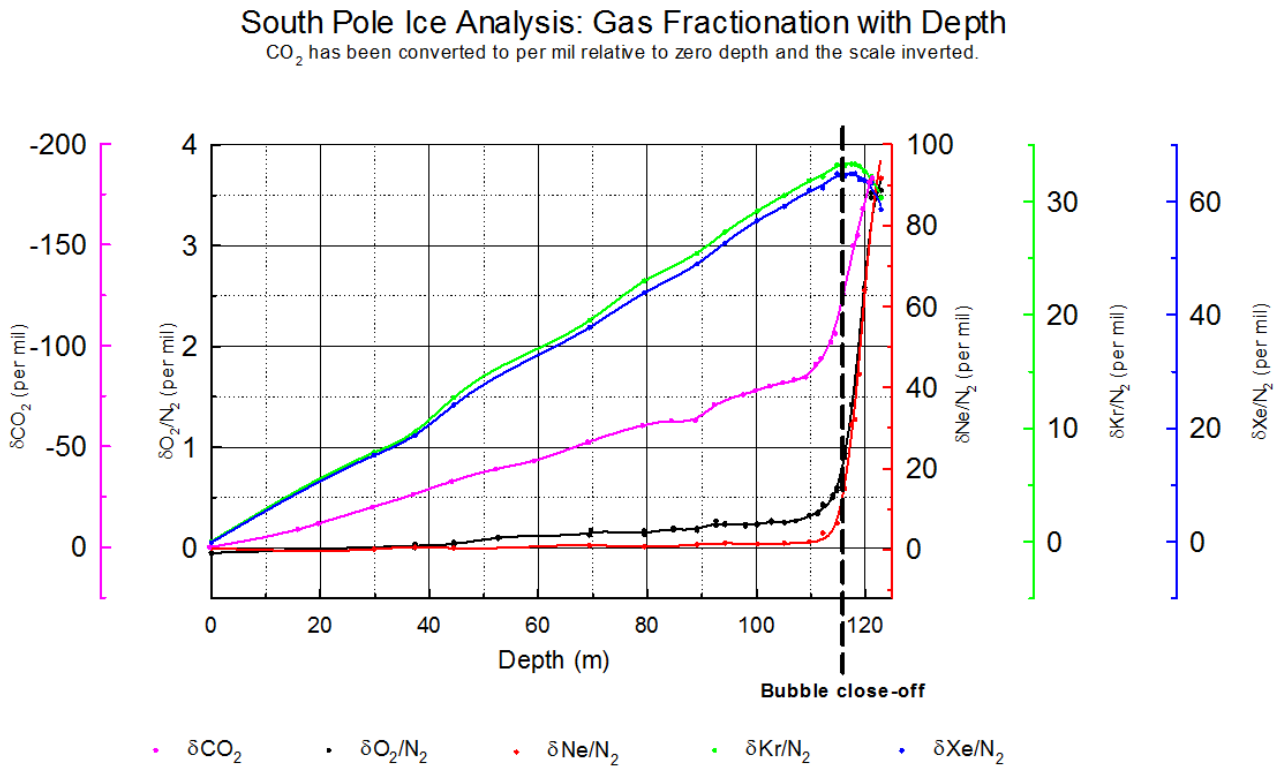


Figure 10: Data from Severinghaus & Battle, EPSL 2006: South Pole 2001 and Siple Dome 1996 firn air experiments. The plot shows the concentrations (relative to atmosphere) of a number of gases and isotopes as a function of depth. NB: A reversed CO_2 scale is used to keep the graphic compact. CO_2 is a smaller molecule than the others shown and so fractionates to lower concentrations, relative to the bulk of air, instead of increasing.

Graphical confirmation of the changes in concentration with depth is presented in Figure 10. There is fractionation in both the firn (from the surface to 'bubble close-off') and the ice below bubble close-off; the point at which the air is completely enclosed. If accurate atmospheric concentrations were retained in the ice then there would be no slope in the data trends which is clearly not the case.

Ice-cores do not reveal the true levels of CO_2 or any other gas or isotope in ancient atmospheres and the so-called pre-industrial levels of CO_2 are merely an artefact of the capture process. Certain glaciologists have knowingly misled for decades in order secure funding via the AGW bandwagon.

Policymakers will likely be unaware that almost exclusively ice-core data used in support of AGW comes from Antarctica. However, ice-cores have been obtained from many other places including Greenland and mountain glaciers across the world. Why is that data are not presented? The simple answer is that they do not conform to the storyline of AGW and in fact thoroughly discredit it.

If you want to believe in ice-cores then you will doubtless know that the long-lived carbon isotope C13 is supposed to show unprecedented change as a result of humans burning hydrocarbons. This argument is often held up as proof that man affects the atmospheric CO_2 levels and is again principally based upon ice-core data. By far the best way to check is to look at some data and so a graph of historic dC13 within CO_2 from some ice-cores is presented in Figure 11.

It should be clear, based upon these datasets, that past levels were similar to contemporary times. If the ice retains true records what caused the ancient C13 depletion? It certainly was not human activity.

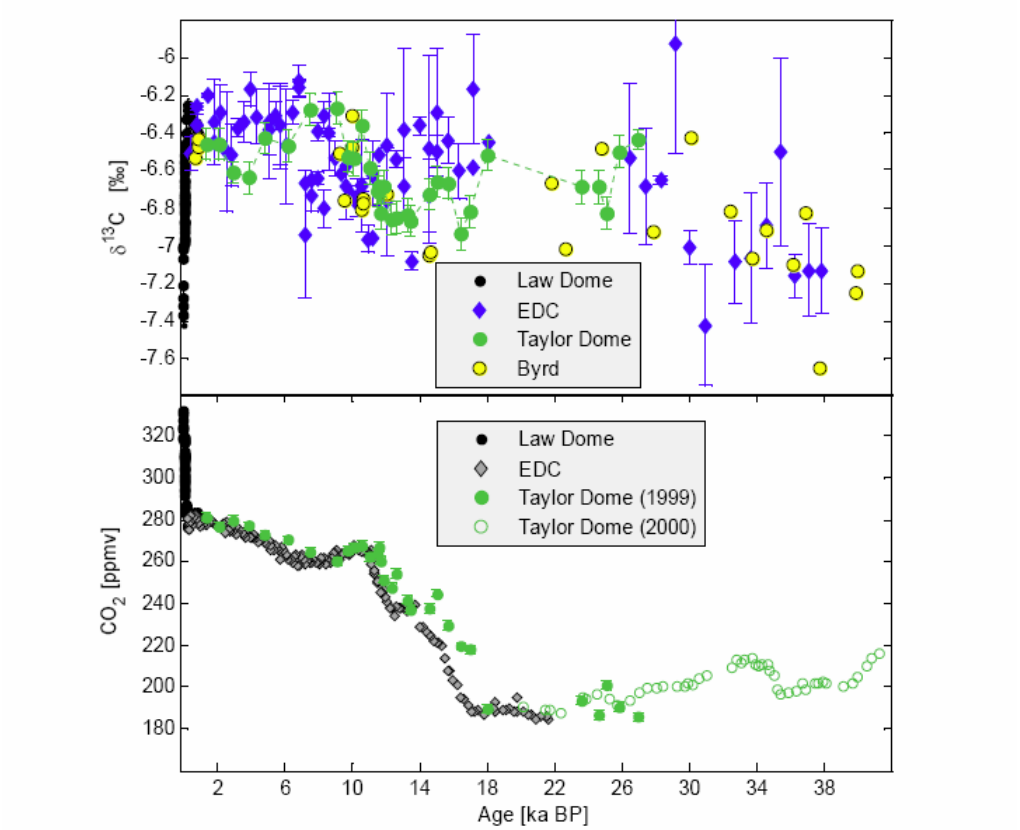


Figure 1-7 Compilation of $\delta^{13}C$ data and CO_2 concentrations reaching back to the glacial period. Top panel: $\delta^{13}C$ data from Law Dome (black circles, *Francey et al.*, 1999), EDC (blue diamonds, *Eyer*, 2004), Taylor Dome (green circles, *Indermühle et al.*, 1999; *Smith et al.*, 1999) and from the Byrd ice core (yellow circles, *Leuenberger et al.*, 1992). Lower panel CO_2 records from Law Dome (black circles, *Francey et al.*, 1999), EDC (grey diamonds, *Monnin et al.*, 2001; *Monnin et al.*, 2004), 'Taylor Dome (1999)' (green circles, *Indermühle et al.*, 1999; *Smith et al.*, 1999) is the corresponding CO_2 data to the $\delta^{13}C$ values, and the open green circles the 'Taylor Dome (2000)' data measured by *Indermühle et al.* (2000) extending the record further back in time.

Figure 11: dC13 levels from ice-cores. [Jochen Schmitt at University of Bremen' Bremerhaven; October 2006]

A Note on Units and Relative Values

The use of units and relative measures play an important role in misguiding people unacquainted with such language and the science. For example, to many people 390 parts per million sounds a large and frightening number, whereas 0.0390%, which is just another way of writing it, appears trivial. Similarly, 390,000 parts per billion (ppb) is still 0.0390% but can sound much more worrying.

An illustration of relative comparison can be found in the claim that carbon dioxide has increased in concentration over the last 150 years by around 40%, from 280ppm to 390ppm. However this number has no relevance to the argument central to AGW; that CO_2 absorbs thermal radiation and causes a heating of the planet. It is the absolute concentration of CO_2 in the atmosphere that is important, not the relative change and thus the correct value for the increase is 0.011% (110ppm). However, even that ought to be qualified by stating the initial or final concentration, not least because the relationship between the purported heat trapping potential and CO_2 concentration is non-linear.

Here are some examples from NOAA (National Oceanic & Atmospheric Administration) that covers a selection of greenhouse gases over the period 1979 to 2009, Figure 12.

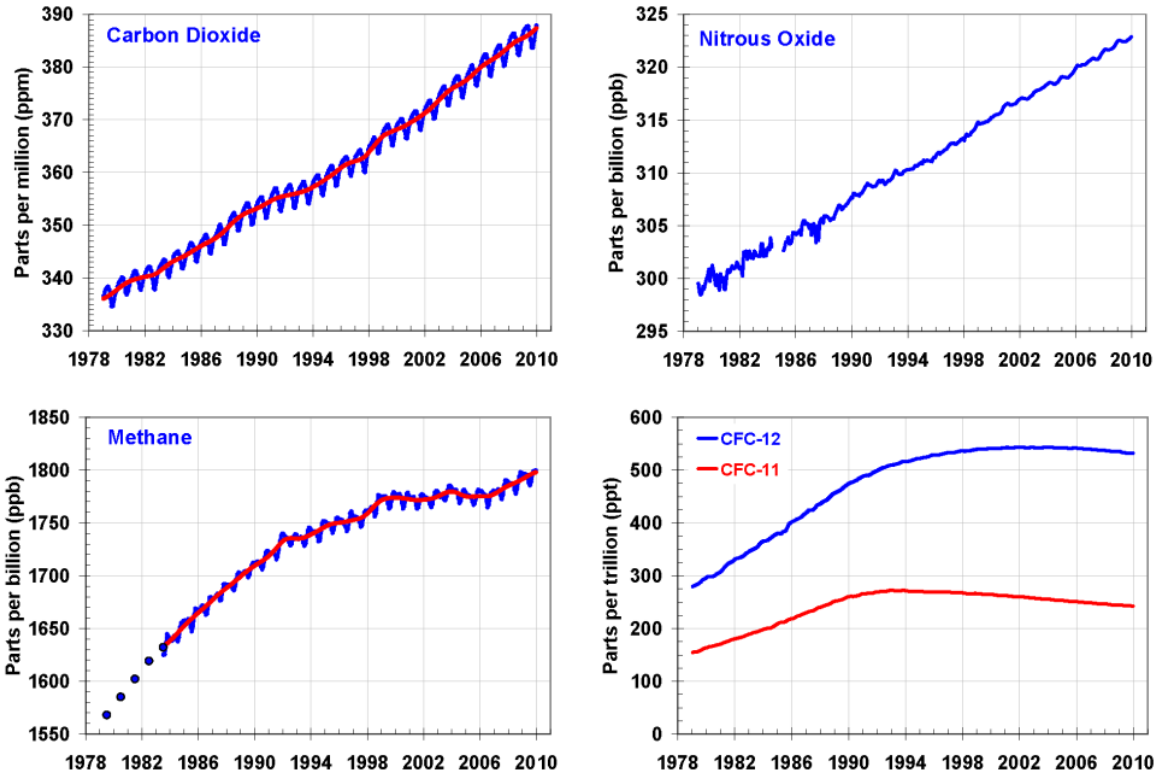


Figure 12: NOAA greenhouse gas index.

The absolute and relative changes are shown in Figure 13. It is worth reiterating that the change in absolute concentration is the important figure, not the relative amount. Note that some of the gases are measured in parts per trillion (ppt).

Gas	Concentration in 1979	Concentration in 2009	Increase	Relative % change	Absolute % change
Carbon dioxide	336ppm	388ppm	52ppm	15.5%	0.0052%
Nitrous oxide	299ppb	323ppb	24ppb	8.0%	0.0000024%
Methane	1560ppb	1800ppb	240ppb	15.4%	0.000024%
CFC-12	275ppt	530ppt	255ppt	93%	0.0000000255%
CFC-11	150ppt	250ppt	100ppt	67%	0.00000001%

Figure 13: Changes in concentration of gasses in the atmosphere over the period 1979 to 2009.

Always be suspicious of graphs showing concentrations with offset vertical scales, i.e. No zero level shown. Several of the figures within this text are like this. There is nothing wrong about presenting data in that way but it can be used create a false impression

Annual Global Temperatures

We hear a lot about global temperatures from those pushing the AGW tenet but most people are unaware that the average world temperature varies throughout the course of the year. Again it is cyclic in nature and is due to the shape of the Earth's orbit around the Sun. It should be remembered that the global warming over the last 100 years or so is about 0.6°C, much less than the temperature variation of a human body through the course of a day.

Figure 14 illustrates the annual global temperature cycle. Average ocean and land temperatures are shown along with a combined curve which is the global temperature. By coincidence, the global ocean temperatures vary annually by almost exactly the same amount as global warming over the last century.

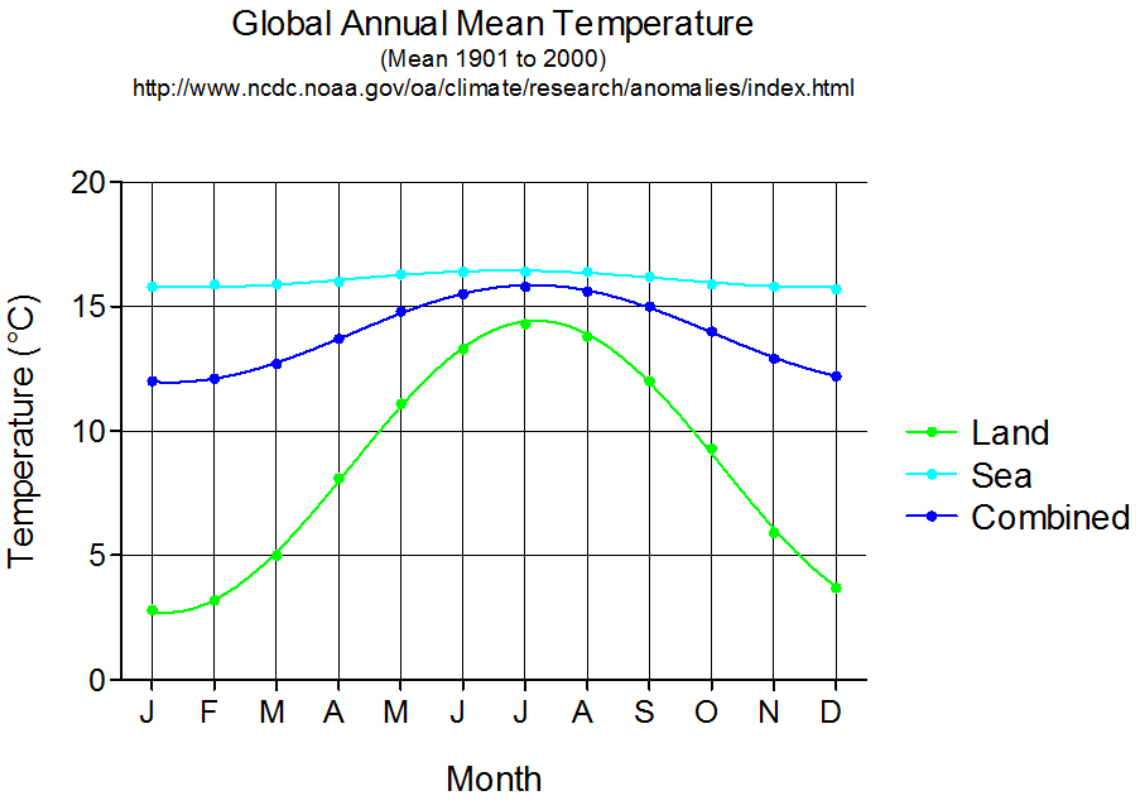


Figure 14: Annual Global Temperature Cycle as a function of month.

It is perhaps more instructive to display the average global temperatures (combined) from the start and end of the last century as shown in the left in Figure 15. As can be seen, the global warming is much less than the annual range of global temperature throughout the course of the year.

Note: there has been no statistically significant warming this century.

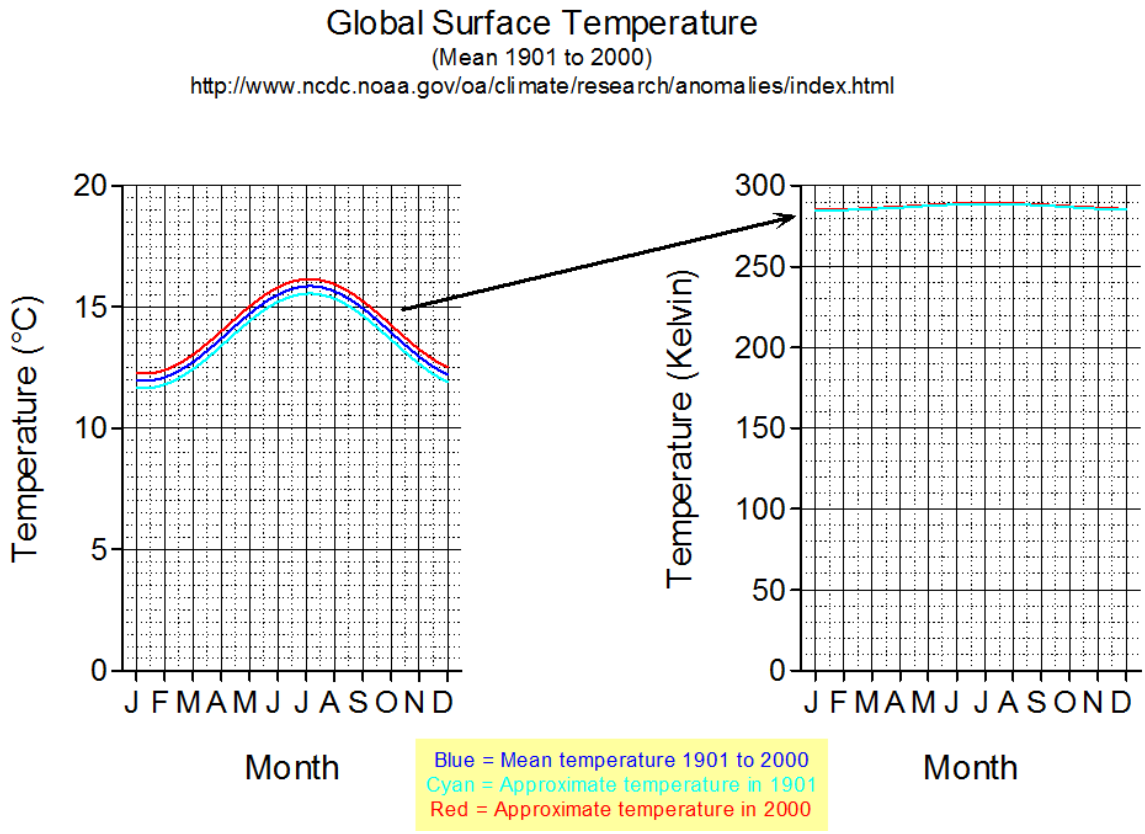


Figure 15: Annual cycle in global temperature. The bounds of Global warming are shown by curves for temperatures in 1901 to 2000.

However, putting the temperatures on the Celsius scale, whilst easy to understand for the layperson, is not really very appropriate. Without delving to deeply into the science, the basis of AGW is that CO_2 interferes with radiated thermal energy. A body's ability to radiate heat (thermal) energy is related to its absolute temperature which is measured on the Kelvin scale. Hence that is the scale that should be used, as shown on the right hand side of Figure 15.

Now that puts a very different perspective on it and one that most policymakers and the public would not realise or anticipate. It should be apparent that the level of global warming is tiny. Ask yourself why none of this has been explained to you by those pushing the AGW view.

Note: There has been no statistically significant change in global temperatures from 2000 to date.

Sea Level Rise

For many people the most frightening prediction of the UN IPCC and its advocates is that of dramatic and accelerating sea level rise. However, there is no evidence to support the claim. Long term tide gauges from around the world show very little increase in mean sea level (MSL). Satellite MSL data appears to have a cyclic component and is showing deceleration, not the acceleration necessary to fulfil the UN IPCC projections.

Tide gauges from a NOAA analysis shows the average MSL change per year as 1.37mm/year as can be seen from Figure 16.

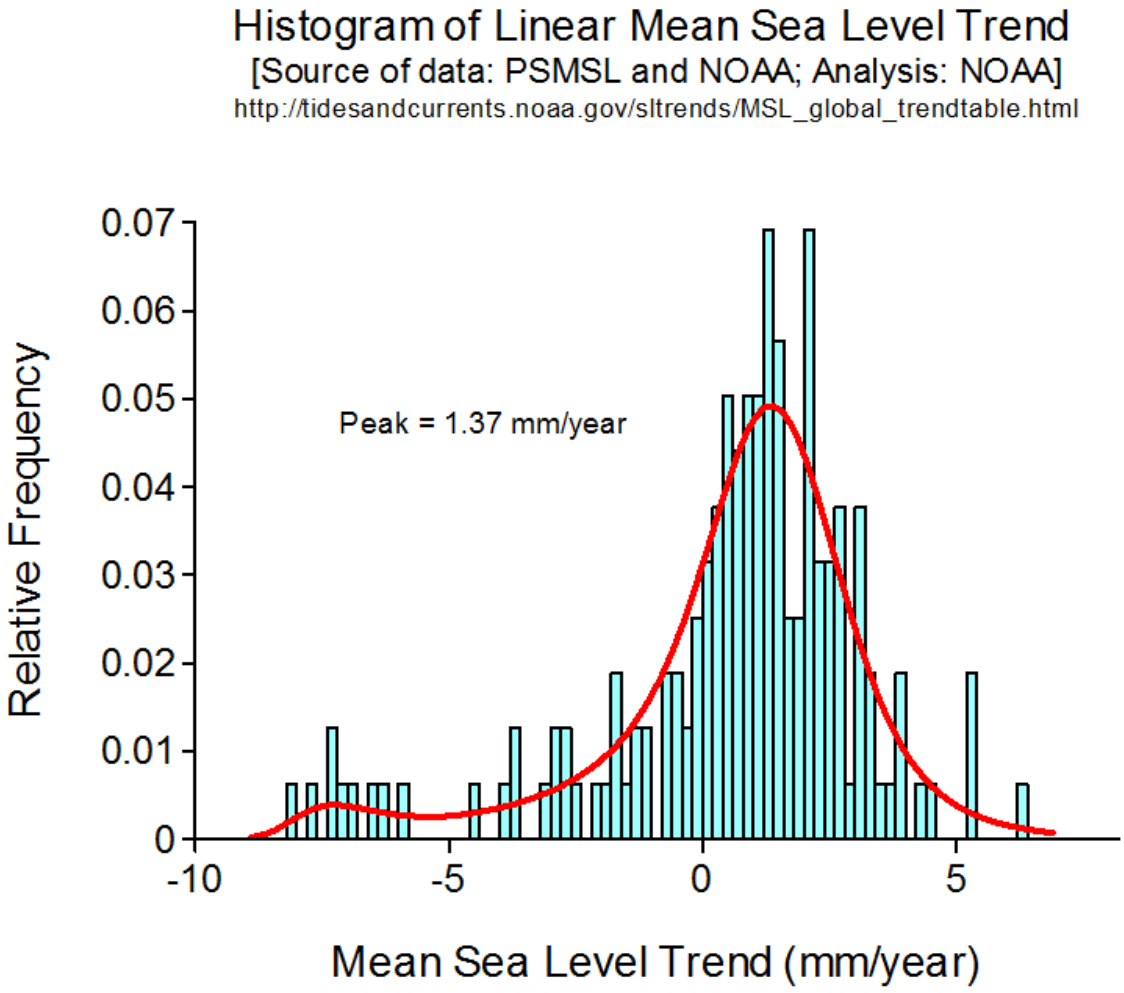


Figure 16: Linear trends from tide gauge data. Analysis provided by NOAA. Average record length is 85 years.

At the rate of 1.37mm/year it would take 730 years for a rise of 1m. To put it another way, mean sea level rise would be about 10cm (4 inches) over a human lifetime. By any standard, it is difficult to describe that as alarming.

Mean sea level data from satellites does not extend over a long time period, only around 30 years. It shows a somewhat higher rate of change but at the same time it displays a deceleration, Figure 17.

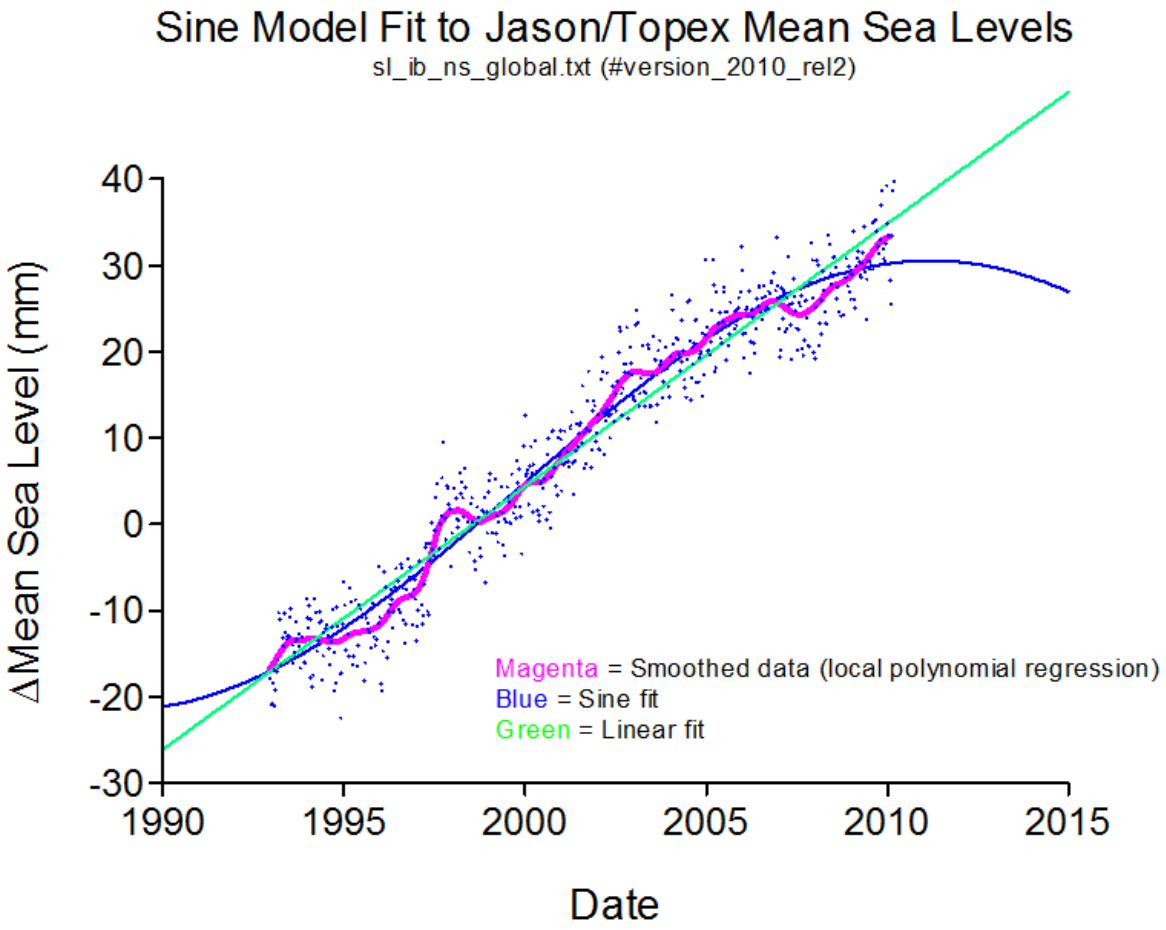


Figure 17: Satellite mean sea levels with linear and sine fits.

It may not be obvious but the sine fit is significantly better than the linear fit and it is expected that it will continue to follow a non-linear trajectory into the future. Whether a linear or non-linear trend is considered, there has been a deceleration in the annual MSL rise recently. This is contrary to the consensus stance which requires accelerating MSL rise to meet UN IPCC climate model projections.

At the time of the analysis the linear MSL was calculated at 3.05 mm/year or 328years for a 1m rise, or 0.22m (less than 9 inches) over a human lifetime. Again some context is helpful. Compare these figures to the tidal ranges at some UK seaports:

Port	Spring Tides (m)	Neap Tides (m)
Falmouth	5.3	4.2
Poole (Unusually low range due to geography)	1.6	0.5
Severn Estuary (One of the highest in the world)	11 (14.5 max.)	6

Moreover, a change in atmospheric pressure (weather system) of 10mBar can result in a MSL change of about 100mm or 0.1m. Pressure changes of 30mBar (equivalent to about 0.3m MSL change) are commonplace around the UK. These fluctuations put the tiny annual signal into perspective.

Greenhouse Gases

There are many greenhouse gases in the atmosphere, in fact it could be argued that all gases are greenhouse gases (GHG) in that they all absorb energy in one or more wavelength bands, but by far the most important and abundant is water vapour. Water vapour is gaseous water; more generally known as moisture or steam.

Some context on the levels of greenhouse gases is given by the bullet points below:

- Greenhouse gases (standard definition) account for 0.439% of the atmosphere.
- CO_2 is only about 0.039% of total atmosphere.
- CO_2 is less than 4% of all greenhouse gas.
- Water vapour is 95% of total greenhouse gas.
- The remainder of greenhouse gas (standard definition) is made up from gases such as methane, CFC's, etc.

It can be readily seen from these figures that the notion of tweaking the global temperature by attempting to control carbon dioxide levels can only have a very minor effect, if any. Water vapour the main greenhouse gas cannot possibly be modulated by human intervention and indeed it varies naturally in such a way as to stabilise temperatures (termed negative feedback).

Any gas in the atmosphere that absorbs electromagnetic radiation can only interact with specific wavelengths. At high altitudes these are very tightly defined lines but closer to the Earth they broaden and merge covering a range of wavelengths known as bands. In any band there is a limited amount of radiation and thus there is a limit to the amount of radiated energy that can be absorbed by the gas. If we start with air containing no GHG then all the infrared radiation passes straight through. When GHG is added it has a large effect but as the concentration increases the additional gas makes less difference. It is in essentially a law of diminishing returns and close to logarithmic.

An online model is available that can be used to analyse the response; the results of which have been normalised and displayed in Figure 18. The climate sensitivity to increases in CO_2 is basically defined as the change in energy for a doubling of CO_2; hence points have been plotted for increases of factors of 2 from 50ppm.

Both the so-called pre-industrial level of CO_2 and that of today are marked on the plot. They demonstrate that the ascribed change in out-going IR radiation caused by hydrocarbon burning is small and about half of what would be expected from a doubling of CO_2.

Because this absorbance relationship is logarithmic and emissions are growing exponentially the resultant effect would be expected increase in temperature from human activity can be (simplistically) assumed to be linear. As such, linear trends are widely used within climate science when analysing data.

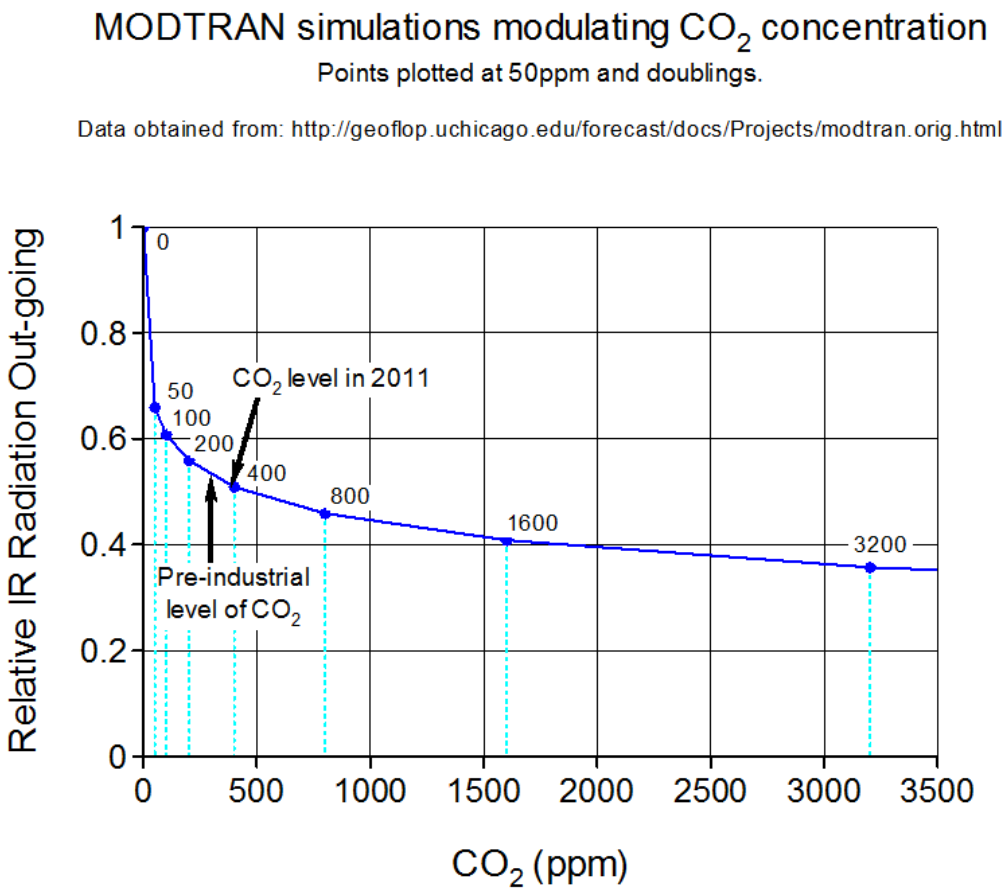


Figure 18: Relative Effect of Carbon Dioxide on Out-going IR Radiation

Flawed Experiments

Many TV programmes and online presentations claim to show the effect of carbon dioxide as a greenhouse gas through simple experiments; often using bottles of air/gas, incandescent light sources, and some thermometry. The vast majority of these are flawed and/or misleading. Rather than try to explain all the possible problems here are some questions you should ask and points you could raise, where appropriate:

1. Why has only the heating phase been shown? The planet is heated on the sunlit side but cools on the dark, night-side.
2. What happens in the cooling phase?
3. How do you know that all the samples are exposed to the same amount of light? Eyes are non-linear so the perception of light intensity is not an accurate guide to the radiant energy. There are huge tolerances in the light outputs of bulbs with identical wattage.
4. How is the difference in specific heat capacity between the samples of different gases accounted for? The lower specific heat capacity of carbon dioxide means it will attain a higher temperature for the same amount of input energy compared to ordinary air. Some other non-greenhouse atmospheric gases such as oxygen will show a similar effect to CO_2.
5. Where a container is rapidly filled with CO_2 gas, ask where it came from and its temperature, and what happens if the test was run for a longer time.
6. Are the containers pressure sealed or vented?
7. Have the thermometers been calibrated and checked against each other if there is more than one used?
8. Is there water vapour in the CO_2 gas? Water vapour is a far more powerful greenhouse gas than CO_2.

There many more aspects that would be addressed by scientists correctly conducting such experiments but the above should suffice to demonstrate that there is more to it than most people realise. Moreover, it is important to note that the atmosphere is not a simple closed box system. It has a multitude of inter-related energy transport mechanisms and operates on very large scales which cannot be readily replicated in a laboratory.

Misleading Terms & Imagery

Terminology modification has been utilised to alter public psyche in an attempt to deceive. A couple of the more prominent manifestations are presented below.

Cooling /Warming /Change/Disruption

During the 1970's Earth was purportedly diving into an ice age and the scare was universally known as 'Global Cooling'. By the late 1980's new data suggested that the planet had stopped cooling and was in fact warming, so Global Warming or more precisely Anthropogenic Global Warming (AGW) became the new narrative.

By the early part of the twenty-first century world temperatures had apparently stopped rising which was rather inconvenient and Global Warming transmuted into 'Climate Change' and at the same time 'anthropogenic' was dropped . Such an ambiguous idiom was supposed to provide more flexibility by encompassing warming and cooling both natural and anthropogenic but with the implication it meant man-made.

Latterly a new alias has evolved in the form of 'Global Climate Disruption' in order to convey the impression of human intervention in climate change. Also in recent years the term 'Catastrophic Climate Change' has emerged, along with some variants, with the idea of creating a more dramatic impression and a sense of urgency.

Carbon dioxide/Carbon

Moving along, we find carbon dioxide called carbon. It is not carbon. Referring to CO_2 as such is incorrect and misleading. This inappropriate terminology is a propagandist's construct allowing the association of carbon dioxide with the traditionally black coloured balls used in visualisation of molecular structure in chemistry, as well as providing a linkage to soot and dark coloured emissions from inefficiently combusted organic material. Black, as a colour, has close and ancient association with evil, death and of course, more recently, the largely coal-powered industrial revolution. Therefore by implication carbon, 'fossil' fuels and CO_2 are all malevolent substances.

Carbon is a solid but is not necessarily black. For example, diamonds are pure carbon but colourless and transparent. Carbon dioxide on the other hand is an invisible gas; colourless liquid, or white solid that resembles water ice/snow, hence the name dry ice.

Would it make sense to extend this false nomenclature to rust so that it is called iron, or for quartz (silicon dioxide) to be known as silicon, or water to be renamed hydrogen?

Deception & Cognitive Reinforcement through Images

Using imagery to reinforce or deceive has a major role in the transmitted message of those pushing the AGW agenda. It is common practice for exhaust flues from industry, and in particular power plants, to be back-drops of articles on TV, magazines and almost anywhere an image can be used. All industrial emissions from plants in North America, EU, Australia and similar countries have stringent regulations that prevent toxic discharge. In the vast majority of instances the 'clouds of pollutants' shown coming from chimneystacks are actually water vapour and completely harmless. The same is true of car exhausts unless there is a bad engine fault. Remember, carbon dioxide as a gas is invisible!

Another favourite, regularly seen on TV is video of collapsing ice-sheets. In recent years such footage has been recycled. Why is it necessary to show the same video sequence in different years but claim it as new? Leaving that to one side, is it unusual for calving (ice-sheets to break-up and collapse into the sea) to occur? Of course not, it is part of the hydrological cycle and has been going on for millions of years. What would happen if the ice didn't flow downhill, break-off into the ocean, to float away and melt?

Mountain glaciers are often shown in before and after formats to show they have disappeared but are these typical of all glaciers? By now you should be able to guess the answer. Not all glaciers are in retreat, many are growing, but don't let that stand in the way of a good scare story.

Hottest, Coldest, Driest, Wettest, etc and the length of records

Whenever you hear a claim of this type you should treat it with great scepticism. There are very few long term datasets that were made with instruments. The longest instrumental temperature record is about 350 years but the earlier records are rather subjective. Around 150 years ago was the end of the Little Ice Age (LIA). Would you expect temperature to go up or down when moving out of the LIA?

Electronic measurements of CO_2 levels are circa 50 years long; however there were accurate chemical assessments made long before this and could add as much as 200 years to the record. These extra data are ignored by climate scientists because they counter the pre-industrial level claims.

By contrast satellite records are around 30 years long at most and many measurement types are very much shorter. Many well known natural cycles relating to climate have periods of decades, centuries, and millennia. Short term linear trends based upon parts of cycles do not provide an overview of the system and have zero predictive skill. An analogy could be the amount of tilt on a boat when exposed to waves of different wavelengths; if the wavelength is short compared to the boat there will be little tilt; if the wavelength is long compared to it then it will move more and maybe 'ride the wave'.

Medieval Warm Period

The UN IPCC has spent a great deal of effort trying to remove the Medieval Warm Period (MWP) from history. A data plot that became known as the Hockey Stick graph, created by Dr. Michael Mann, was prominent for many years and applauded by the IPCC for erasing the MWP. However, it was shown to be flawed, the resultant shape being due to poor mathematical practices.

In reality there is considerable evidence that the MWP was real and not limited to specific geographic regions but worldwide. There is an online free database dedicated to the MWP and containing published data from over 1015 scientists from 584 research institutions in 44 countries. It is available here: http://www.co2science.org

Not only does this illustrate the global nature of the event but it also tells us that it was significantly warmer than today.

Another, earlier, warm period was the Roman Warm Period (RWP); an epoch in which the Romans grew vines in northern England; something that is not possible today.

The Missing Hotspot

Climate computer models produce a profile of the atmosphere showing the temperature trends that are expected as a result of AGW. Only greenhouse gas induced warming could create the hotspot so it is considered the fingerprint for the hypothesis. However, even after decades of searching for it, it has not been found. Again, data trumps climate models. See Figure 19.

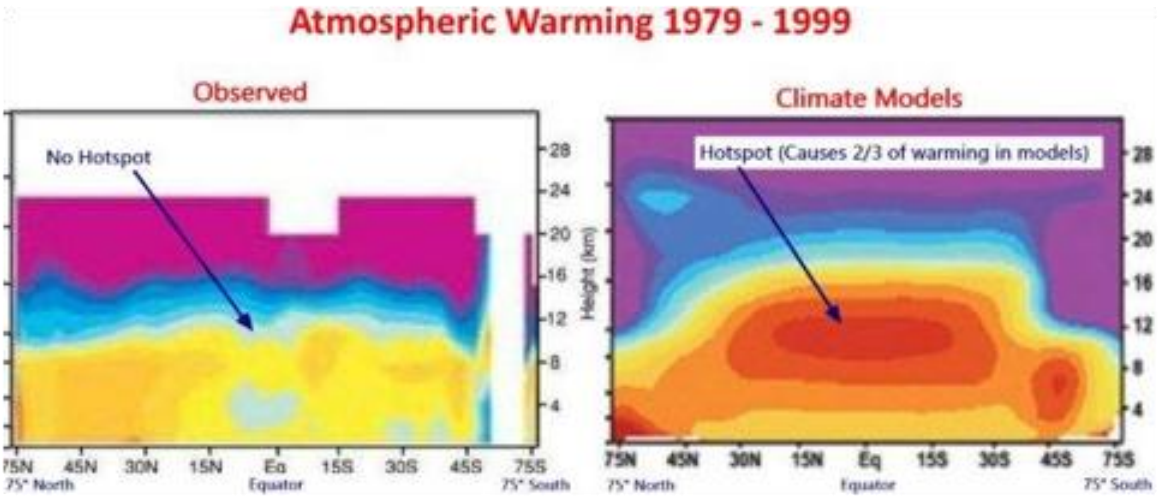


Figure 19: Missing Hotspot. The data shows no hotspot whereas the computer models say it should be present.

Summary

This document has presented just a few of the more easily understandable facts and aspects of climate science that are not generally known to policymakers because they run contrary to the current orthodoxy. These should form a basis from which questions can be asked about AGW in order to establish the truth and to aid decision making.

- Sea ice is floating ice that cannot affect sea levels and which is highly variable following an annual melt/freeze cycle.
- Arctic sea ice records showed no trend until the satellite era (1979 onwards). A decline in its extent is only evident when not using data from the later state-of-the-art systems.
- Antarctic sea ice is increasing.
- Carbon dioxide (CO_2) is an invisible gas that is essential to life and perfectly natural.
- Emissions from burning hydrocarbons (fossil fuels) have no correlation with changes in global CO_2 levels.
- Temperature change causes CO_2 levels to change, not the other way around.
- Ice-cores do not provide evidence of past atmospheres because all gases and isotopes are fractionated as they are captured in the ice. This means that the so-called pre-industrial levels of CO_2 are a fallacy.
- There has been no significant change in global temperature this century and the purported global warming attributed to man is tiny in absolute terms.
- Sea level rise is small and decelerating, not accelerating as the UN IPCC projects.
- CO_2 is only about 0.039% of total atmosphere, less than 4% of all greenhouse gas, whereas water vapour is 95% of total greenhouse gas.
- Medieval Warm Period (MWP) was global and real according to over 1015 scientists from 584 research institutions in 44 countries.
- The fingerprint of AGW, the Hotspot, is missing. Empirical data has been unable to show the existence of the Hotspot which all climate models say should be there if warming is due to greenhouse gases. This further discredits the idea of AGW.

Appendix

Climategate including 'Hide the Decline'

In November 2009 a substantial number of emails, documents and files from the Climatic Research Unit (CRU) at the University of East Anglia (UEA) were released to the internet. As a result of the content, several serious allegations were made against some of the scientists. The main accusations were that:

• Scientists from CRU had not presented an impartial, accurate and comprehensive review of scientific evidence to either policy makers or the UN IPCC.

• When their methods and data were to be scrutinised by critics with different views, they blocked access to the requested material.

• They flouted Freedom of Information legislation.

• Attempts were made to prevent and/or manipulate the publication of rival scientific papers.

There were a number of other issues that also drew attention including, for example tax evasion through the use of personal bank accounts. However, most of them are regarded as insignificant compared to those in the bullet points above.

On the back of Climategate, as it became known, three inquiries were set by various interested 'authorities'. These, as it turned out, and had been anticipated by most commentators, were severely flawed and generally lacking on many levels. Andrew Montford has authored a detailed analysis titled 'The Climategate Inquiries'; published by the Global Warming Policy Foundation (GWPF).

Rather than try to reproduce Montford's work, I present extracts from the Climategate archive that refer to each of the bullet points respectively:

- ***"I've just completed Mike's Nature trick of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) and from 1961 for Keith's to hide the decline."***

  This refers to a prominent graph published in the highly influential UN IPCC report. Basically, the datasets were manipulated so that they would all show a warming or an enhanced warming trend over recent history when in reality they showed a substantial cooling after about 1960. Policymakers should ask themselves why it was necessary from him to deceive in this way. Further, all scientific institutions ought to be castigating such behaviour but so far most have been silent on this issue.

  The paleo-temperature records were from tree-rings and indicted a rather linear decline up to the 20th century after which they rise rapidly. However, after about 1960 the trend reverses and is opposite to the instrumentation record of the same period. To hide the decline, the tree-ring series was truncated and merged with the instrumental record. The curves were smoothed to conceal the tampering.

  If tree-rings are unable to reproduce the same temperature trend as instruments over the

period where both records are available, how certain can you be that they can be relied upon as evidence of past temperatures? Do trees only respond to temperature or are they also affected by water, nutrients (including CO_2), sunshine, disease, etc? If it is not obvious, ask at your local garden centre.

To understand this, screen captures taken from a presentation explaining the issue by Professor Muller of Berkley University are given in Figure 20. The right side of the each graph is the important section; i.e. In the No Hidden Decline graph, temperatures do not exceed the zero line.

- ***"We have 25 years or so invested in the work. Why should I make the data available to you, when your aim is to try and find something wrong with it?"***

  That was the response of Prof. Phil Jones to Warwick Hughes when a request was made for a certain dataset. Science works by providing data and methods at sufficient level that the results can be replicated by others. Academics have a particular responsibility to foster and promote their work. Jones failed to carry out his scientific and academic duties. Moreover, one ought to ask what he was so afraid Hughes would discover.

- ***"Can you delete any emails you may have had with Keith [Briffa] re AR4? Keith will do likewise. He's not in at the moment – minor family crisis. Can you also email Gene [Wahl] and get him to do the same? I don't have his new email address. We will be getting Caspar [Ammann] to do likewise."***

  On 29 May, Prof. Phil Jones made that request in an email headed 'IPCC & FOI'. His intent was clear in wanting all correspondence related to the IPCC AR4 deleted. Jones was obviously afraid that correspondence requested under the FoI Act would be read, but why? The transparency supposedly part of the UN IPCC process has also been called into question as a result of this action.

- ***"I can't see either of these papers being in the next IPCC report. Kevin and I will keep them out somehow—even if we have to redefine what the peer-review literature is!"***

  Prof. Phil Jones to Prof. Michael Mann, demonstrating intent to influence both the UN IPCC report and scientific peer review process. Can it be any more explicit?

These four quotations alone should be more than enough to make any policymaker of integrity distinctly concerned; and any credible scientist ought to be utterly alarmed by such revelations since they represent gross misconduct.

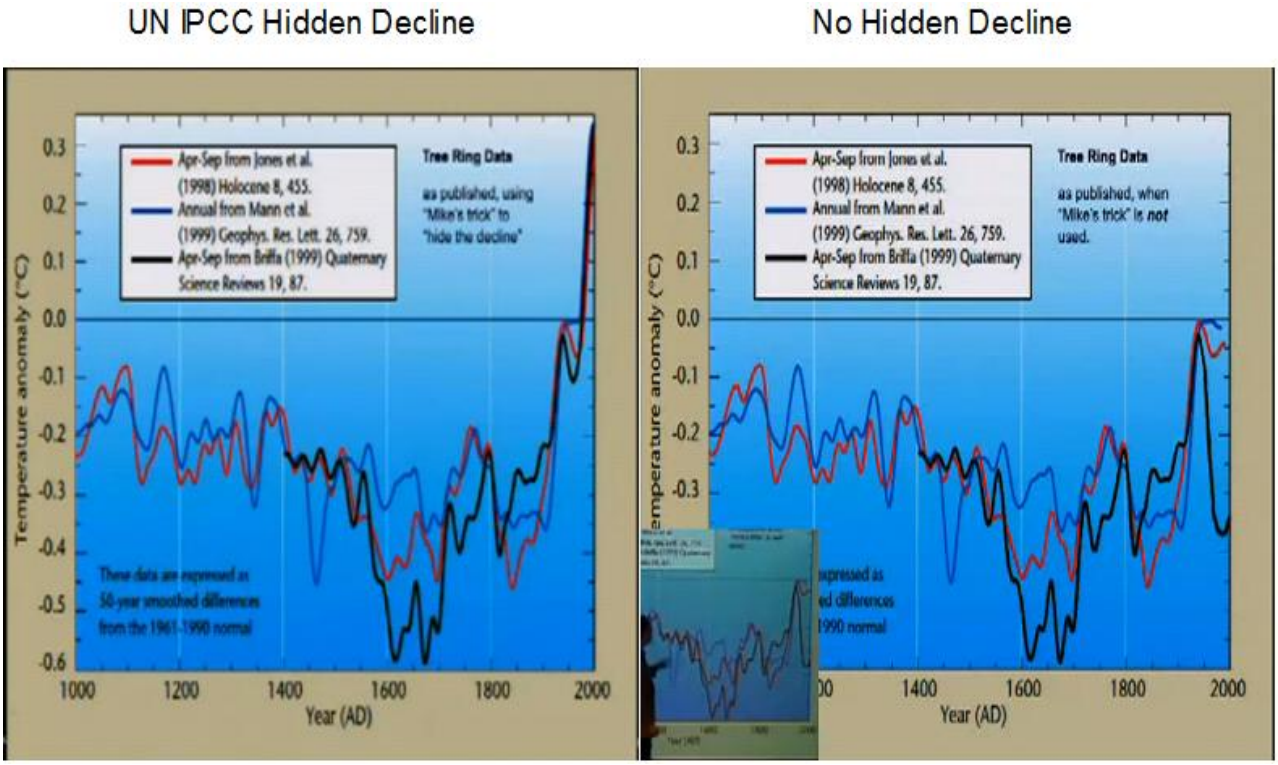


Figure 20: The Effect of Mike's Nature Trick to Hide the Decline. Images from Professor Muller (Berkley University): Climategate 'Hide the Decline' video presentation.

UK Emissions of CO_2 put into Perspective

Many headlines promote the notion that the UK is a major source of carbon dioxide emissions and that is true. UK was the 7th highest contributor in 2006, producing less than Japan (5th) and Germany (6th), but more than Canada (8th) and Republic of Korea (9th). However this ranking tells us nothing about the proportion of emissions created by each country and thus distorts the picture. Below is a table indicating the percentage of total global CO_2 emissions attributed to the top 10 ranked nations:

Rank	Country	% of Global CO_2 [2006]
1	CHINA (MAINLAND)	21.26
2	UNITED STATES OF AMERICA	20.04
3	RUSSIAN FEDERATION	5.45
4	INDIA	5.26
5	JAPAN	4.51
6	GERMANY	2.80
7	UNITED KINGDOM	1.98
8	CANADA	1.90
9	REPUBLIC OF KOREA	1.66
10	ITALY (INCLUDING SAN MARINO)	1.65

Source: CDIAC - doi 10.3334/CDIAC/00001

Clearly, the contribution of the UK is swamped by that of China and the USA. This means that even if the UK went back to the Stone Age in terms of energy usage there would be marginal effect on the global CO_2 emissions scenario.

How does this compare to natural CO_2 levels? From the UN IPCC, the input of global CO_2 emissions to the atmosphere is 3.6% of the natural level. Calculating the UK contribution to the overall inward flux shows it to be minuscule:

Human CO_2 as a proportion of the natural = 3.6%

UK contribution of human related emissions = 2%

UK overall contribution to the atmosphere = 3.6% x 2% = **0.072%**

Is emission per country really the most appropriate and fair metric? As should be expected, countries with larger populations tend to use more resources so a far more suitable measure would be per capita emissions. Again, this produces a very different picture to that generally portrayed by the media and advocates of the AGW position. Taking this measure the UK doesn't even rate in the top 30 by rank, but appears well down the list in 38th place, Figure 21. Perhaps surprisingly the UK performs rather well with per capita CO_2 emissions being lower than, for example Germany and Denmark despite their greater adoption of renewable energy at that time.

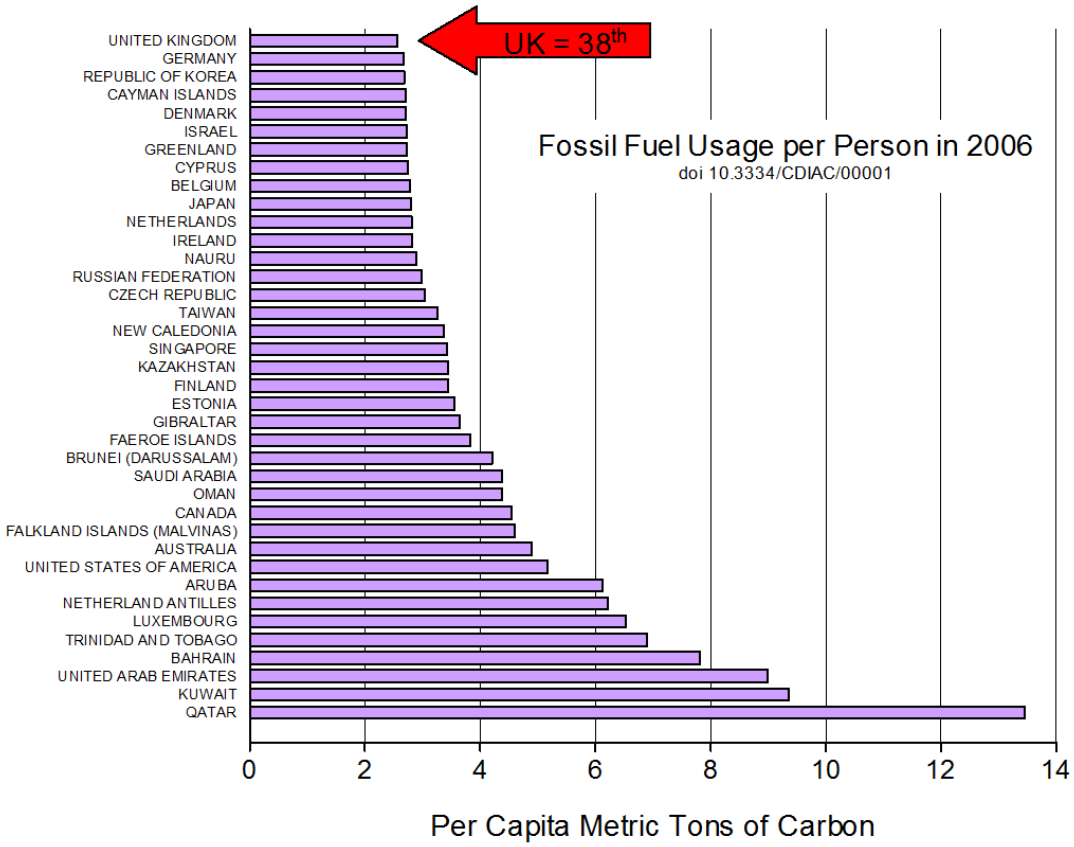


Figure 21: Per Capita carbon dioxide Emissions in 2006. Source: CDIAC – doi 10.3334/CDIAC/00001

According to CDIAC there has been little change in the global per capita emissions since about 1970, Figure 22. So it would seem that emissions are potentially closely linked to global population.

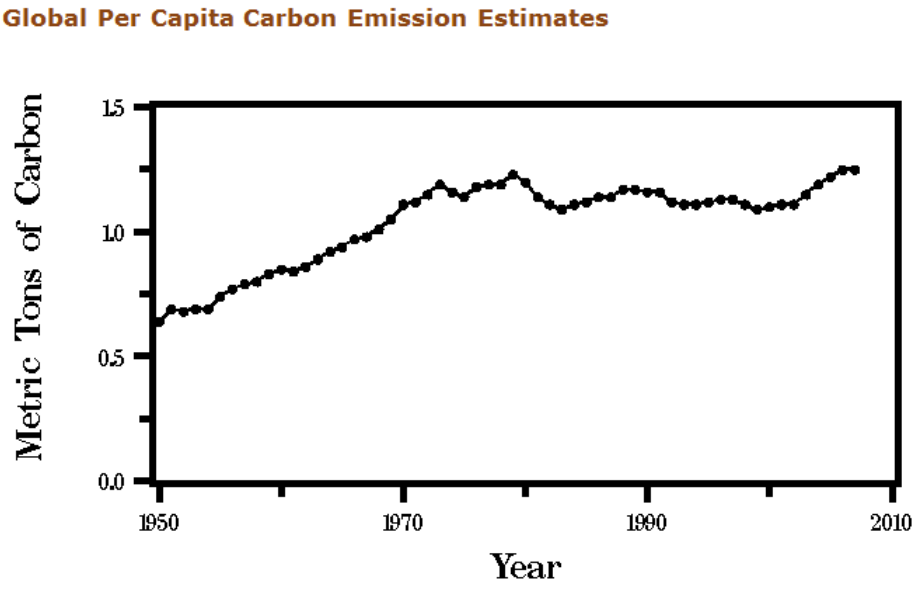


Figure 22: CDIAC Global per capita emission estimates show virtually no change since about 1970.

Another important economic relationship is found between per capita energy usage and per capita gross domestic product (GDP) as shown in Figure 23. Again the UK can be seen to be one of the most efficient in the group with steadily increasing GDP but little increase in energy demand.

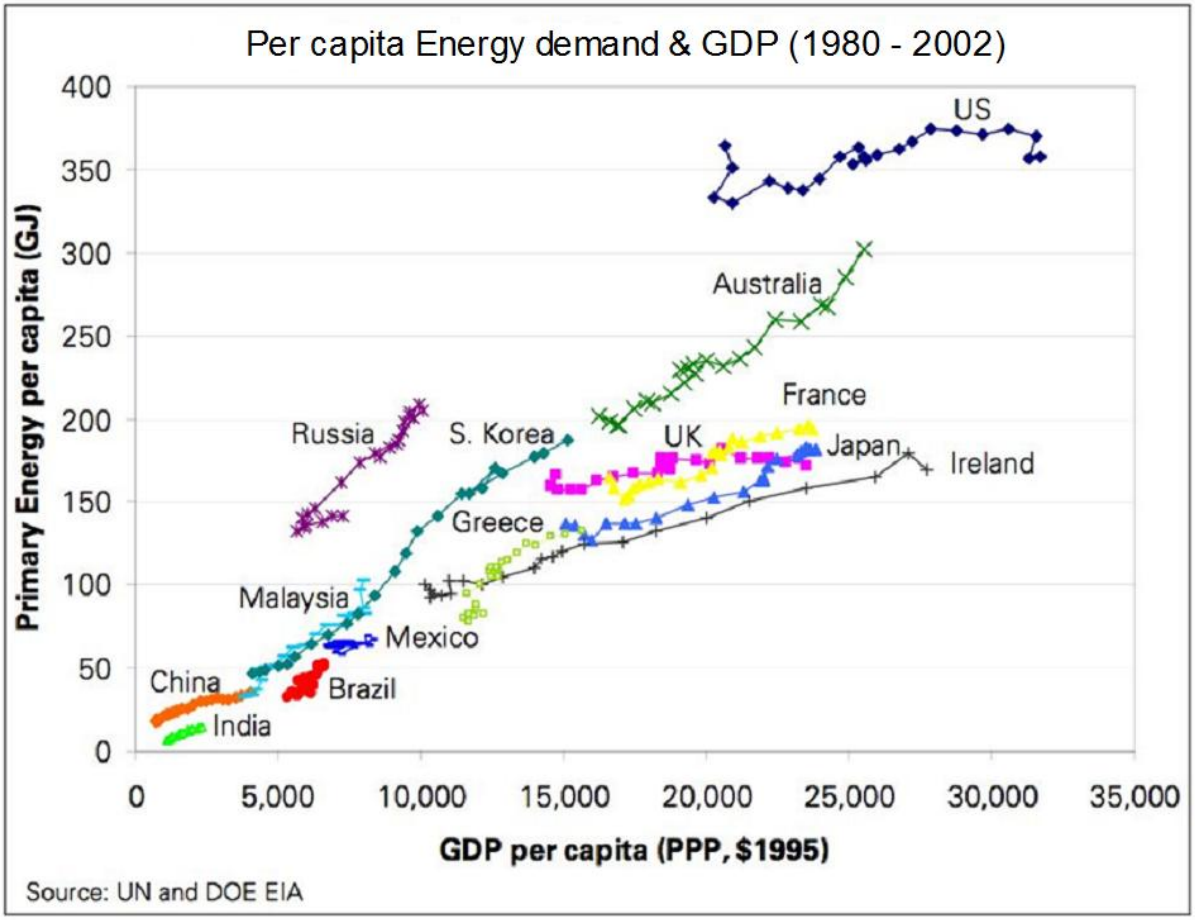


Figure 23: Energy demand and per capita GDP (1980 - 2002), [Steve Koonin, BP]

It could thus be argued that the UK is already one of the leaders in terms of per capita energy efficiency.

UK Electricity Bills

British Gas has kindly provided a breakdown of the cost of electricity as shown in Figure 24. It will come as little surprise that 'Government obligation to help the environment' accounts for a sizeable proportion, presently 12%. This slice of the cake is set to dramatically rise as increasing subsidies are provided to the renewable energy industry. It currently equals the operating costs and is more than twice the amount going as VAT and corporation tax (5%). Profit is just over half this amount at 7%.

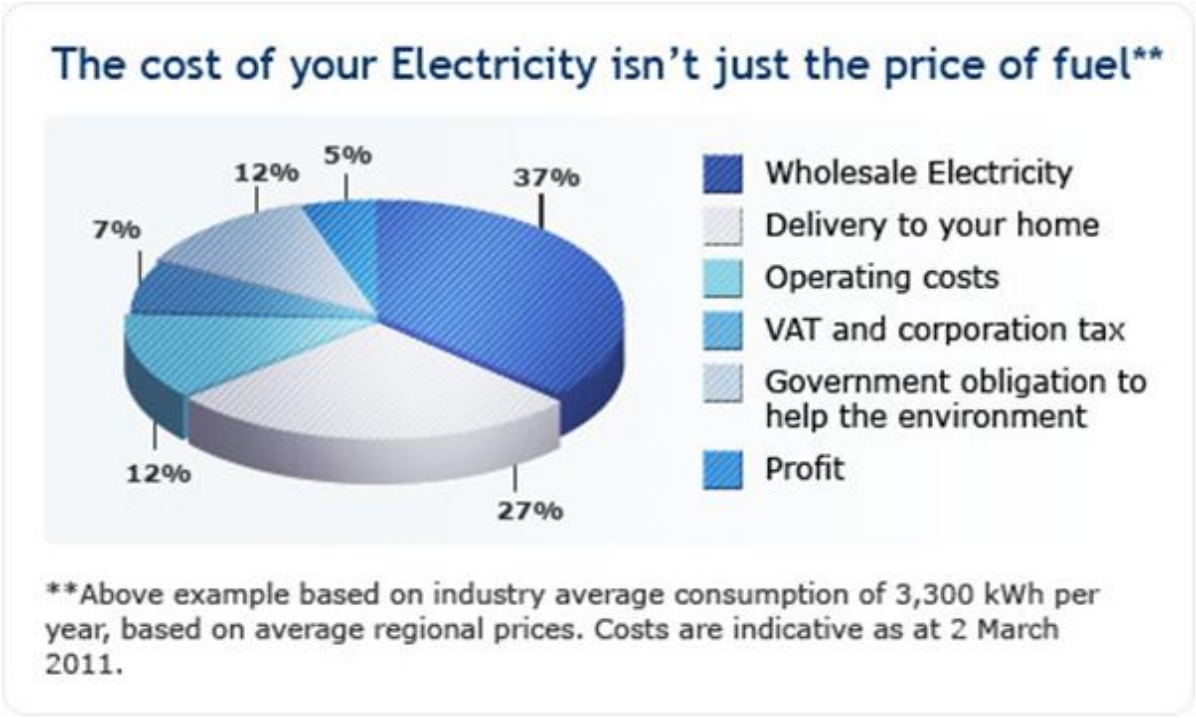


Figure 24: The cost of your electricity isn't just the price of fuel - British Gas

Under the Climate Change Act and EU directives the proportion of cost related to environmental obligations, wholesale prices, and delivery costs (Infrastructure upgrades& changes) will increase rapidly, as will the absolute level. It will have massive adverse effects on the economy and negative social implications such as more fuel poverty.

Appendix Summary

A few less well known facts regarding energy and some of the politics associated with climate change science have been documented. The purpose is to offer some perspective and balance such that policymakers can make more informed decisions and engage in active debate.

- Climategate: The leak of emails and other files of climate scientists from the University of East Anglia demonstrate some of the deceit and trickery employed by UN IPCC authors. It also shows their intent to drive a predetermined agenda rather than being objective reporters of scientific facts.
- Per capita UK CO_2 emissions are nowhere near as high as similar countries; ranking 38th in the world.
- In the UK, 'Government obligation to help the environment' accounts for a sizeable proportion of electricity bills; presently about 12%.