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## Climate change science and the climate change scare

**Belief in manmade “Global Warming”, now renamed “Climate Change”, has become a ruling conviction of the modern age. It provides funding and careers for large numbers of activists, bureaucrats, journalists, and politicians around the world. They assert that mankind is raising global temperatures dangerously by increasing carbon dioxide (CO<sub>2</sub>) in the air. But basic physics shows that CO<sub>2</sub>, a weak greenhouse gas, can never have an important effect on temperatures. Reliable data confirms this. A thousand years ago, during the worldwide Mediaeval Warm Period, temperatures were higher than now while CO<sub>2</sub> was lower than now. There is no evidence that the slight warming of the 20th Century was not entirely natural, caused by changes in solar activity. In the last 18 years, while CO<sub>2</sub> has increased, there has been no global warming. The earth faces many serious environmental problems, but manmade climate change from rising CO<sub>2</sub> is not a threat at all.**

### Introduction

**B**elief in manmade “Global Warming”, now renamed “Climate Change”, the idea that mankind is changing the climate in a dangerous way, has become a ruling conviction of the modern age. It has also generated a vast and lucrative establishment, receiving enormous amounts of tax-payers’ money, and providing funding, careers, jobs, and reputations for an immense army of activists, scientists, bureaucrats, journalists, and politicians around the world. It has captured the big media, university departments, academic publications and scientific bodies. Anybody who questions it is likely to be demonised, to lose their funding, to have publication of their papers denied, and to have their careers put in jeopardy.

## **The climate is always changing and has been doing so since the Earth was born, some 4.5 billion years ago.**

The essence of the global warming scare is that mankind by increasing carbon dioxide (CO<sub>2</sub>) in the air is causing dangerous global warming. Two facts are incontestable. Mankind, by burning fossil fuels (coal, oil and gas) and by deforestation, has increased carbon dioxide in the atmosphere from about 280 ppm in the 19th century to just over 400 ppm now. (These terms are explained below.) In this period, global temperatures have risen by about 0.8°C. Beyond that, there is no evidence for the scare, and no evidence that the rising CO<sub>2</sub> caused much, if any, of the slight temperature rise.

The climate is always changing. It has been changing since the Earth was born, about 4.5 billion years ago. Given changes in the Sun, changes in the Earth's orbit, changes in the Earth's continents, changes in the Earth's geology, and the Earth's continual rotation, it cannot be otherwise. CO<sub>2</sub> is also changing. It was 15 times higher than now in the Cambrian period 550 million years ago (which saw the most glorious proliferation of life forms in the Earth's history). It dropped to half as low as now in the last Ice Age (which saw misery). These dramatic changes in CO<sub>2</sub> have never been seen to have any significant effect on global temperatures.

The slight warming of the 20th Century was no different from past warming periods in the last few thousand years (except that the past temperatures were rather higher), which were entirely natural. There is no evidence that the recent warming was not entirely natural either. Basic physics shows that CO<sub>2</sub> can never have more than a small effect on the global climate.

There is no basis in science for the notion that rising CO<sub>2</sub> increases the frequency or severity of extreme weather events (floods, droughts, storms, cyclones, extreme heat, extreme cold, and so on). Observation over the last 50 years shows no such increase. South Africa now (in November 2015) is experiencing droughts and heat waves. There is no reason to believe that they are not completely natural, just like those in the past, and they are almost certainly a consequence of the current El Niño, as explained below.

CO<sub>2</sub> has little effect on the climate but it does have a profound effect on plant life – upon which all animals, including us, depend. By slightly increasing CO<sub>2</sub> levels, mankind has done a huge favour to the plants who share our planet. They have responded gratefully. There has been a “greening” of arid regions, notably in Africa's Sahel region, which lies south of the Sahara Desert from Senegal to Sudan.

Science does not support the climate change scare, but there is a gigantic vested interest, financial and ideological, in promoting it. This explains the furious response to any scientist who questions it. Billions of dollars are at stake. If the truth were known, that mankind is not changing the climate in a dangerous way, a multitude of well paid jobs and a fortune in funding could be lost. The ideological interest is at least as important. There is a deep need among people of a certain psychology to blame the modern industrial and consumer society for all the ills in the world and to predict disaster because of it. The climate scare satisfies this need perfectly.

**CO<sub>2</sub> has little effect on climate but a profound impact on the plant life on which we depend.**

Our planet faces many serious environmental problems. Over-fishing is depleting our oceans. African wildlife, the glory of our planet, is being destroyed. Worst of all, desperately poor people, through no fault of their own, are wrecking terrains in a desperate quest for

survival, by chopping down trees for firewood, by slash-and-burn agriculture, and by slaughtering magnificent wild animals because they are seen either as a meal or as a threat.

Manmade climate change is not such a threat. It is no threat at all. For the sake of our planet and of the poor people who live on it, we should end this mad and extravagant belief, and turn to science and reason to protect our environment.

## **There has been no global warming in the past 18 years.**

Fossil fuels have lifted Europe from poverty to prosperity through the Industrial Revolution. They can do the same for poor people in Africa. Attempts to restrict the responsible use of fossil fuel by carbon taxes or prohibitions will harm poor people without doing any good at all for the planet.

### **1 Short list of points disproving the manmade climate scare**

Here is a short list of points showing that mankind is not changing the climate in a dangerous way. Each will be discussed more fully in the sections that follow and all the technical terms will be explained.

- There has been no global warming in the last 18 years, contrary to all the alarming predictions of the models put forward by the Intergovernmental Panel on Climate Change (IPCC). In this period CO<sub>2</sub> has steadily increased but the Sun has been quiet.
- The slight warming of the 20th Century was no different from the worldwide Mediaeval Warm Period (roughly 900AD to 1 200AD) or the warming periods before that – except that past temperatures were rather higher than now.
- Basic physics shows that CO<sub>2</sub>, a weak greenhouse gas, can never have a significant effect on the climate. Reliable data covering hundreds of millions of years shows that it never has.
- For the last half a billion years (the period of multi-celled life), CO<sub>2</sub> in the air has averaged over 2 000 ppm (parts per million). It is now 400 ppm.
- There is no reason why rising CO<sub>2</sub> should cause any increase in the frequency or severity of extreme weather events. Over the last 50 years, there has been so such increase.
- Changes in the Sun correlate closely with changes in global temperature, and seem to be the driving influence on the Earth's climate.
- Since satellite measurements began in 1979, the Antarctic ice has increased to a record extent and it has become slightly colder. In this period the Arctic ice has decreased, but it is still within normal variations evident over the last 100 years.
- Sea levels are rising at a very slow rate, about 3 mm a year, almost certainly simply a recovery from the cold climate of the past. There has been no significant increase in ocean acidity (drop in pH).
- Rising CO<sub>2</sub> has brought wonderful benefits to plant life and a greening of the planet.
- Some Climate Nonsense: 97% of scientists / Hockey Stick / 95% certainty / Climategate / 2°C rise.

**Changes in the Sun are the driving influence on the Earth's climate.**

## By far the most important greenhouse gas is water vapour.

### 2 Some technical terms and explanations

**Fossil Fuels.** These are carbon-based fuels such as coal, oil and natural gas. They are called “fossil” because they are made of the materials of decomposing plant life

that lived hundreds of millions of years ago. These plants took energy from sunlight and converted it into their tissues via photosynthesis. Mankind now releases that energy by burning their fossils.

**ppm.** The concentrations in the atmosphere of trace gases such as CO<sub>2</sub> are measured in ppm, which stands for “parts per million” by volume. (The correct unit is ppmv.) To say that CO<sub>2</sub> levels in the atmosphere are 400 ppm means that there are 400 parts by volume of CO<sub>2</sub> compared with 1 000 000 parts by volume of all gases.

**Greenhouse gas.** The Earth has an average surface temperature of about 15°C. It has only one means of receiving heat from space and only one means of losing heat. This is by radiation. The peak energy of the Earth’s emitted radiation is in the IR (infra-red) range. This is of wavelengths a little longer than red light, which human eyes cannot see. Some gases in the Earth’s atmosphere capture some of this outgoing IR. These are known as “greenhouse gases”. These gases keep the Earth’s surface about 33°C higher than it would be without them. Higher life forms could not exist without the greenhouse gases.

By far the most important greenhouse gas is water vapour, which accounts for about 90% of the greenhouse effect on Earth. Carbon dioxide is a minor greenhouse gas. Greenhouse gases absorb IR only at certain wavebands. Water vapour has many such bands, whereas CO<sub>2</sub> has only a single significant one. (The term “greenhouse” gas is unfortunate since greenhouses are not warmed by the greenhouse effect but by the fact that their glass prevents cool air from blowing in and warm air from blowing out.)

**Measurement of Temperature.** Temperatures past and present are measured by three methods. The first is by thermometer. Reliable thermometers were developed in the 19th century. For measurement of air temperatures, they suffer from several inaccuracies, the chief being their location. If a thermometer was set up in 1930 on the outskirts of a town and the town gradually expanded to encompass it, by 1990 the heat of the town would give an artificially high temperature reading. This is known as the “heat island” effect.

Second, by far the best measure of temperature is by satellite, a recent development of about the last forty years. The satellites measure temperature from radiant heat from oxygen. Their measurements are comprehensive, reliable, and accurate.

Third, assessments of temperatures before the 19th century come from a wide variety of measures, sometimes known as “proxies”. Different temperatures give different evaporation rates of water, and by looking at isotope ratios of oxygen in the water of the time, you can get a good measure of temperatures then. Other methods include the measurement of sediment in lakes and boreholes, and (least reliable) the measurement of the thickness of tree rings, which indicate when growing seasons were longer because temperatures were warmer.

**By far the best measurement of temperature is by satellite.**

**Measurement of CO<sub>2</sub> and Solar Activity.** Small bubbles trapped in ice at the poles can be dated (the more deeply they are lodged in the ice, the older they are) and analysed for CO<sub>2</sub> concentrations and oxygen isotopes, which give a measure of temperature. Measurements

of isotopes in the elements of materials that can be dated in the past give a good measure of CO<sub>2</sub> levels at those times and also of solar activity.

## The climate scare is based on computer models, rather than observations in the real world.

**Feedback.** This is the response by a system to a change in it. Where feedback is *negative*, the system responds so as to reduce or eliminate the change. Where feedback is *positive*, the system responds so as to amplify the change. Positive feedback is nearly always bad and can be disastrous. Control

systems always use negative feedback. An example would be speed control in a motorcar. If the control were set to 100 kph and the car's speed went up to 110 kph on a downhill slope, the controller would reduce the speed back to 100 kph. In the Earth's climate, negative feedback is all-important.

**IPCC.** This is the Intergovernmental Panel on Climate Change, which was established in 1998 under the auspices of the United Nations. Its purpose is to investigate manmade climate change. It is funded by governments. It claims to be a scientific body but is in fact a political advocacy organisation promoting the fear that mankind is changing the climate in a dangerous way. It produces "Assessment Reports", of which the most widely read are the "Reports for Policy Makers". These are essentially pronouncements of dogma, such as you would expect from a religious council. The IPCC has been embroiled in scandals over its distortion of science.

**Climate Models.** The climate scare depends heavily on the predictions of computer climate models, rather than observations in the real world. These models use mathematical equations relating to thermodynamics, heat transfer, and fluid dynamics to try to describe and predict the behaviour of the climate. They have failed dismally. Their predictions have been wrong, and they have been unable to reproduce the observed behaviour of the climate.

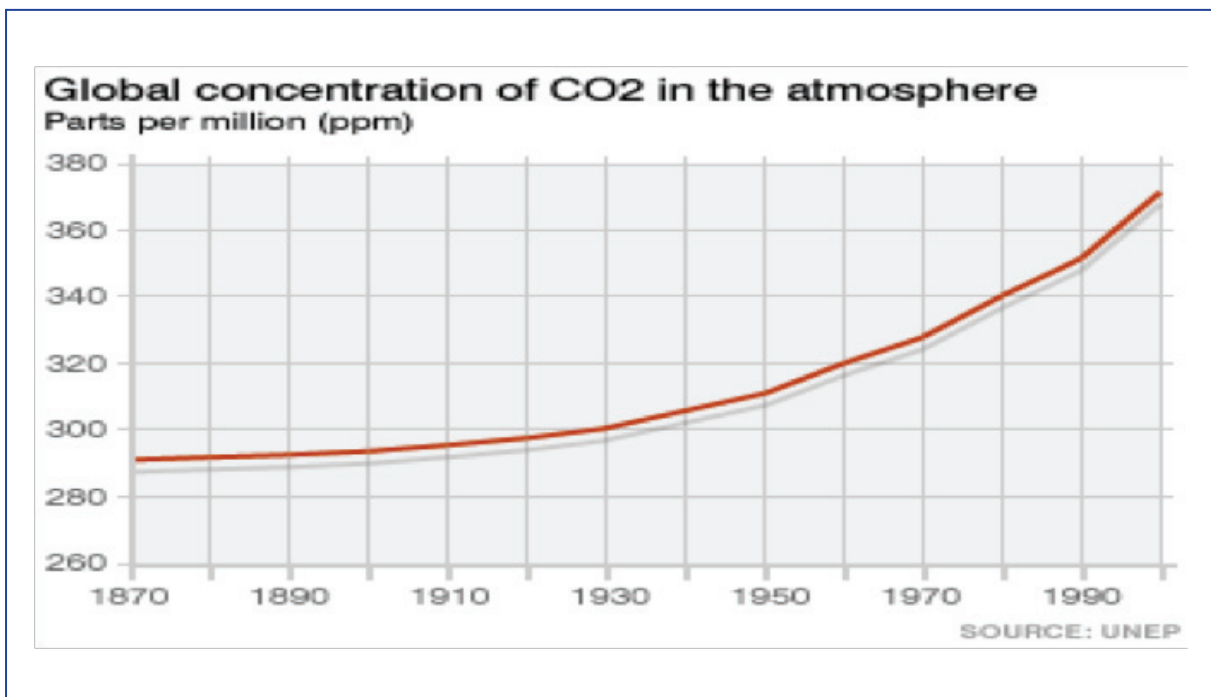
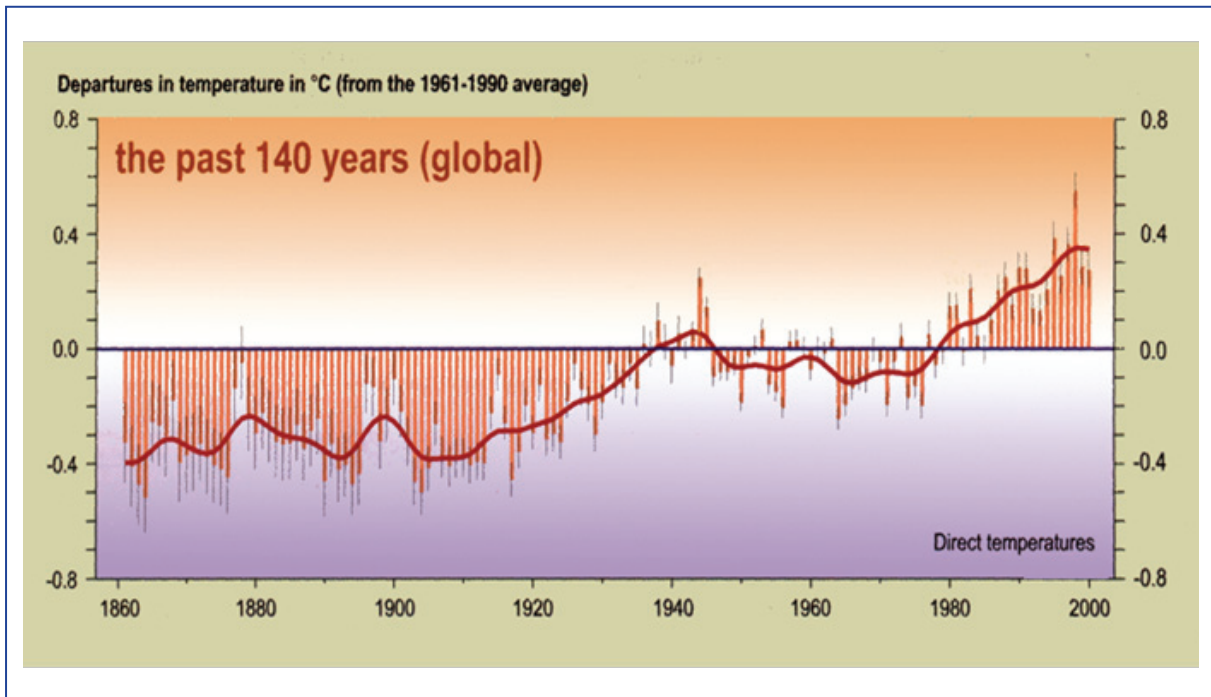
There are two reasons for this failure. The first is that the climate is immensely complicated and is far beyond our complete understanding (now and probably forever). The climate is "chaotic" in the mathematical sense that exact mathematical solutions for its future behaviour are impossible. Even the most advanced computers do not have nearly enough computing power to solve even simple climate problems. The second is that the models depend entirely on the assumptions fed into them, and these assumptions are affected by bias. The modellers know that the desired result from their models is climate alarm: the more alarm, the more funding.

**The "El Niño" is a natural climate phenomenon which causes global warming.**

**El Niño.** This is a very important natural climate phenomenon that affects much of the planet. It brings warm water from the western Pacific Ocean to the eastern Pacific Ocean near South America. It happens once every two to seven years in an irregular pattern. It causes global warming. It brings heavy rainfall to some parts of the world, such as the southern United States of America (USA), and drought to others, such as South Africa. It was called "El Niño", which means "Christ child", by west coast South Americans who noticed their fish yields dropping at around Christmas when the phenomenon occurred. There is an El Niño now (in November 2015) and this has brought drought to South Africa. It might also be responsible for the recent heat wave in parts of the country. There is evidence suggesting that some El Niños in the 17th Century had more severe effects than the current one.

### 3 The basis of the climate scare

The two graphs below summarise the climate scare.



The top graph shows global temperatures rising about 0.8°C from 1860 to about 2000. (Temperatures have stopped rising since then.) The lower graph shows CO<sub>2</sub> in the atmosphere rising from about 290 ppm in 1870 to about 370 ppm in 2000. (CO<sub>2</sub> has since risen to 400 ppm.)

**Global temperatures increased until about 2000, while CO<sub>2</sub> rose.**

The scare says that the rise in CO<sub>2</sub> caused the rise in temperatures, and that a further rise in CO<sub>2</sub> will cause dangerous global warming. There is no scientific justification for this conclusion, as will be shown below.

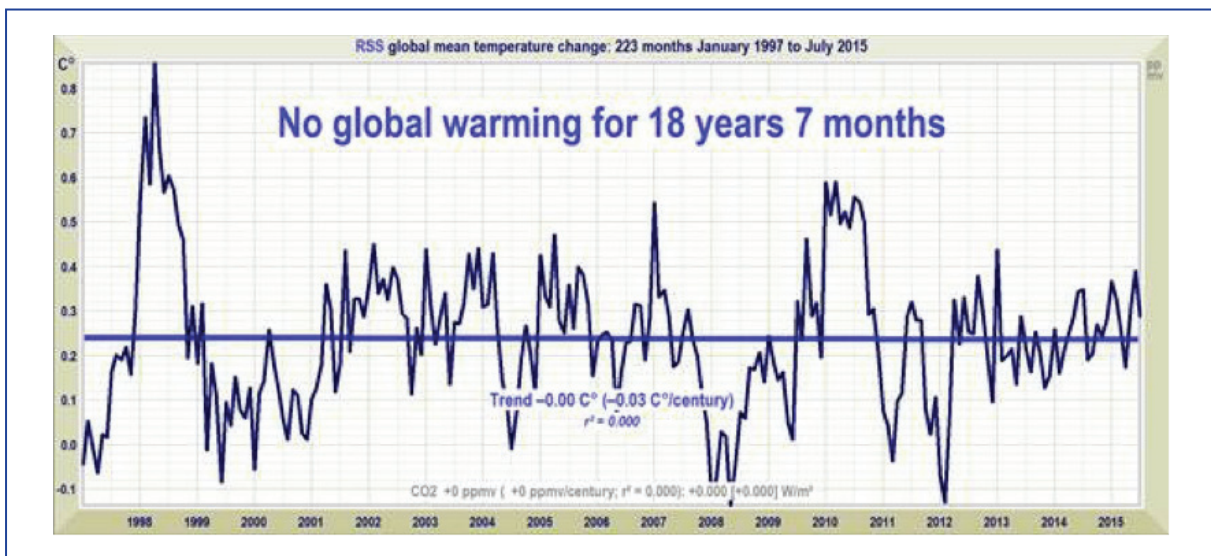
## Rising CO<sub>2</sub> is not causing dangerous climate change and will not do so.

### 4 Why mankind is not changing the climate in a dangerous way

As the following sections show, both physics and observation confirm that rising CO<sub>2</sub> is not causing dangerous climate change, and will not do so. They also describe some of the falsehoods behind the scare.

#### 4.1 No Global Warming in the Last 18 Years.

The graph below, taken from the most accurate and comprehensive data possible, namely satellite measurements, shows that there has been no warming for the last 18 years. During this period CO<sub>2</sub> has increased from about 350 ppm to 400 ppm. (The high temperature of 1998 was caused by a strong El Niño, a natural disturbance of pressure and weather conditions over the Pacific Ocean.)

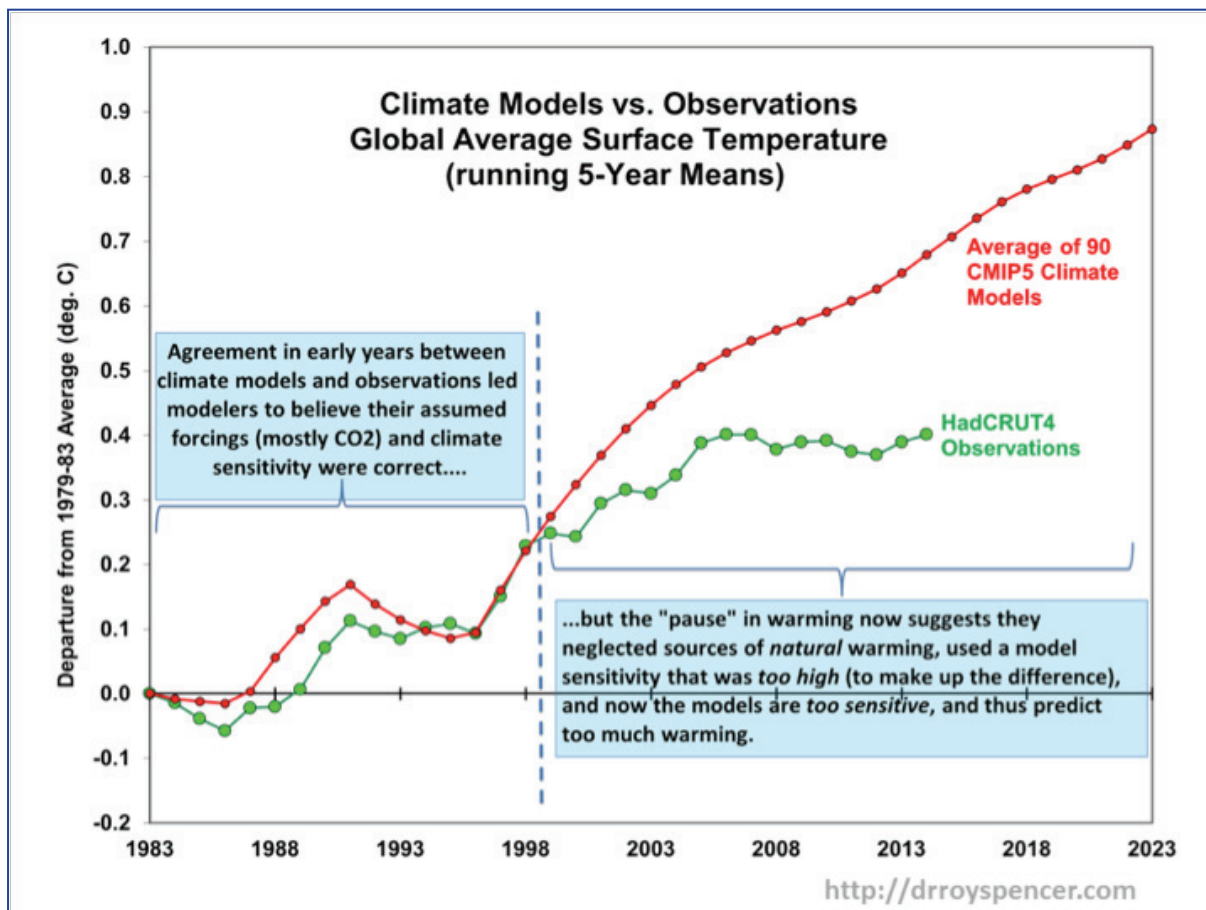


(Source: Remote Sensing Systems (RSS), of Santa Rosa, California, a scientific research company specialising in analysing microwave data from satellite microwave sensors. Taken from the Climate Depot website.)

The temperature spike in 1998 was due to an El Niño. We are also experiencing one again now, in November 2015.

The lack of warming is quite contrary to all of the predictions of the models used by the IPCC (Intergovernmental Panel on Climate Change). Below is a graph of model predictions of temperatures since 1983 compared with observed temperatures. (Source: Roy Spencer).

**The lack of warming in the past 18 years is contrary to the computer models and their predictions, especially as CO<sub>2</sub> has continued to rise.**



(HadCRUT: Hadley Climate Research Unit Temperature. Notice that its 5-year temperature average removes the 1998 high. CMIP5: Coupled Model Intercomparison Project. These are the climate models used by the IPCC.)

The models are badly wrong. The reason is simple: they assume CO<sub>2</sub> has a serious warming effect when it does not. The climate alarm establishment relies for its huge funding on scaring the public. The modellers need to promote their alarm. So their models are required to show serious warming. It is easy to do this by feeding in wrong assumptions.

Claims that 2014 was the hottest year of the last 150 years are wrong, as can be seen from the graph above (the one showing no global warming for the past 18 years). These claims are based on land-based thermometers, which are biased for a number of reasons. Their distribution is very patchy: they are only on the land surface, which means there are huge areas without any at all, and they tend to be clustered around Western towns and cities. Hence, they are not representative at all. The instruments are often also old and inaccurate, while their results are distorted by the "heat island effect" described above. Then there is deliberate fiddling with the thermometer data. The raw data might show cooling but it is "adjusted" in the name of this or that dubious correction and it then shows heating.

**Land-based  
thermometers are  
biased, badly located,  
and often inaccurate.**

#### 4.2 The Recent Warming is Natural

The Earth has warmed about 0.8°C from the middle of the 19th Century to now. At the same time, CO<sub>2</sub> has risen from about 280 ppm (parts per million) to just over 400 ppm, which

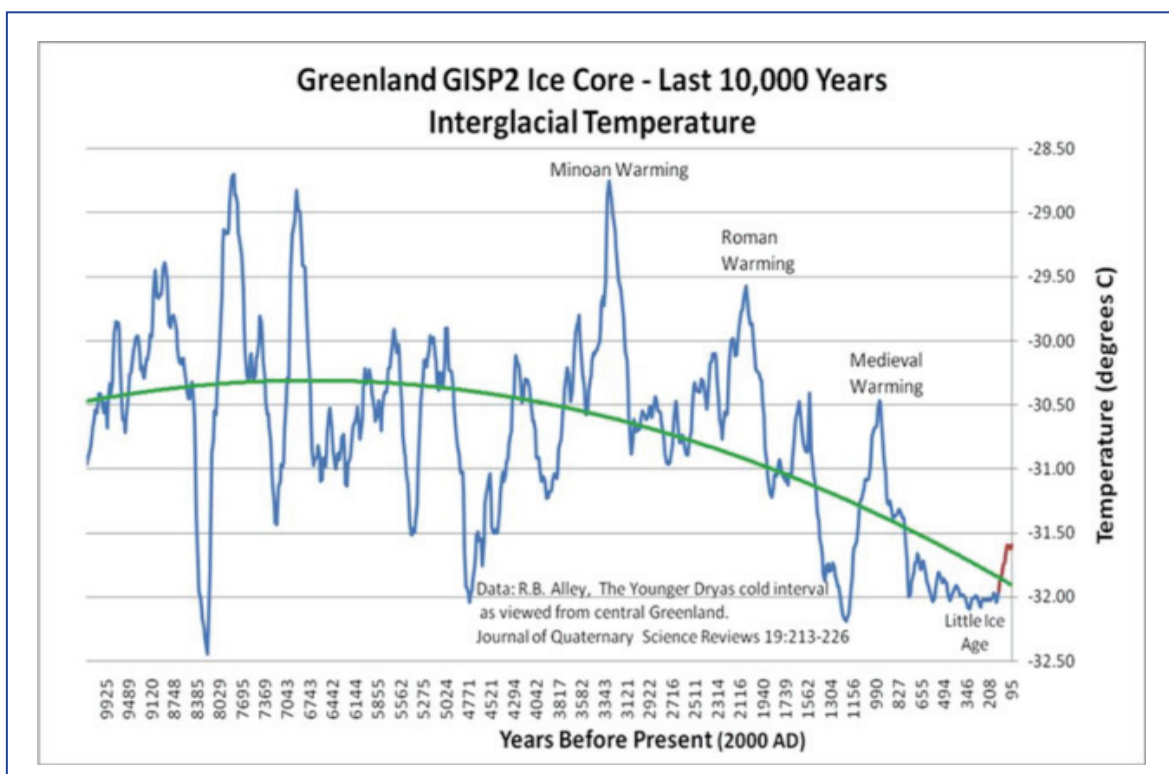


**In the Mediaeval Warm Period, temperatures were higher than now.**

has been caused by deforestation and the burning of fossil fuels. The deforestation changes the carbon in the leaves and wood of trees into CO<sub>2</sub> in the atmosphere. The question is how much the slight warming can be attributed to the rise in CO<sub>2</sub>. Since previous warming periods were rather warmer than now, while CO<sub>2</sub> was then lower than now, the answer is very little, if any.

The Mediaeval Warm Period roughly a thousand years ago (from approximately 900AD to 1 200AD) was evident worldwide, covering all continents. During this time, temperatures on average were rather higher than now. There is massive evidence for it, both in scientific studies and in historical records. During the Mediaeval Warm Period, the Vikings grew European crops on Greenland, which is now too cold for them. Grapes were grown in the north of England. China experienced rapid population growth because of the warm, favourable weather. It was a time of plenty, with good crops and good health, confirming the general trend in human history that warm weather is always better than cold weather. You will find over a thousand peer-reviewed studies confirming the existence of the Mediaeval Warm Period at [www.co2science.org](http://www.co2science.org). These studies cover every continent on Earth.

Before the Mediaeval Warm Period, there were other warming periods in which temperatures were even higher. This is evident from the graph below.



(Source: R B Alley, The Younger Dryas cold interval as viewed from central Greenland. Journal of Quaternary Science Reviews 19:213-226).

The highest temperatures since the last ice age were about 8 000 years ago. Since then there has been an uneven cooling. The Minoan Warming, about 3 000 years ago, saw temperatures about 3°C higher than now; the Roman Warming, about 2 100 years ago, about 2°C higher than now; the Mediaeval Warm Period, about 1 000 years ago, about 1°C higher than now.

After the Mediaeval Warm Period came the awful “Little Ice Age”, from about 1400 to 1850 AD. This was marked by low temperatures, terrible weather extremes, crop failures and ill health. The horrible weather of the 17th Century had a profound influence on the famines, revolutions, and wars of that tumultuous century. (This story has been told, in rather shocking detail, by British historian Geoffrey Parker in his recent book, *Global Crisis: War, Climate Change & Catastrophe in the 17th Century*.)

#### 4.3 Carbon Dioxide: Natural, Clean, Life-Giving and a Weak Greenhouse Gas

One of the worst insults to scientific integrity is the claim by climate alarmists that CO<sub>2</sub> is a “pollutant”. It is nothing of the sort. It is entirely clean, safe, and natural. Furthermore, it is essential to the plant life upon which we all depend. Without it the human race and all other

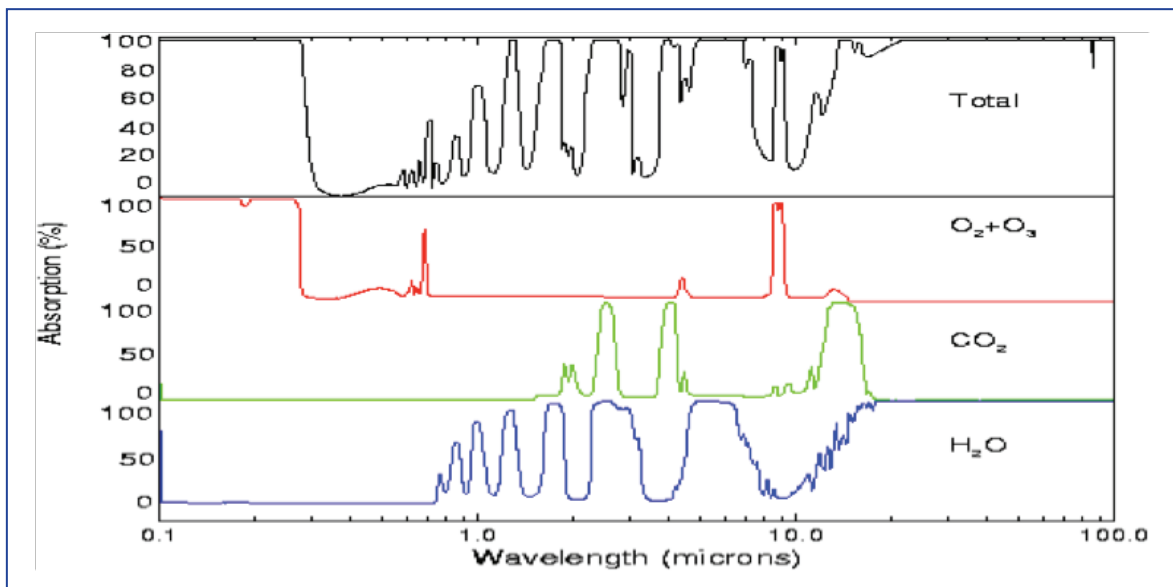
### CO<sub>2</sub> is clean and safe, and not a “pollutant”.

higher mammals would perish. It is a wonderful gas, and its levels are now extremely low in the history of planet Earth, probably dangerously low.

Climate alarmists often show photos of a grim orange-brown haze enveloping cities. You can also see this when you fly over Johannesburg. They suggest that this is caused by CO<sub>2</sub>. This is a lie. The haze you see is caused by a variety of pollutants coming from motor vehicles, factories, steel works, and coal power stations. It is not caused by CO<sub>2</sub>, which is invisible. Coal is certainly very polluting. But its pollution comes from sulphur dioxide, nitrogen oxides, and particulates (smoke). That is what you see. The CO<sub>2</sub> is transparent, and it does no harm whatsoever.

All mammals, including humans, evolved with CO<sub>2</sub> levels much higher than now. It is difficult to set an upper limit for CO<sub>2</sub> for human health since you can never see it doing any harm. It is chemically inert. Various regulatory authorities set the upper limit at 5 000 ppm or 10 000 ppm, but this is not indicative of any threshold for harm. Doctors often inject CO<sub>2</sub> at 100 000 ppm into the lungs of new-born babies to get them to start breathing (our breathing is controlled by the amount of CO<sub>2</sub> in our blood, not the amount of oxygen).

CO<sub>2</sub> is a weak greenhouse gas. The reason lies in the physics of radiant heat transfer. Greenhouse gases absorb IR (infra-red) radiation, but they do so only at certain wavebands, which are specific for each gas. These are called absorption bands. Below are graphs of the absorption bands of CO<sub>2</sub> and some other greenhouse gases.



The vertical axis shows the percentage of radiation absorbed. The horizontal axis shows the wavelength of the radiation in microns (millionths of a metre). Visible light extends from about 0.4 microns (violet) to about 0.7 microns (red). O<sub>2</sub> is by far the most common form of oxygen in the air, a molecule with two oxygen atoms. O<sub>3</sub> is ozone, a rare form of oxygen with three oxygen atoms.

**CO<sub>2</sub> has averaged more than 2 000 ppm over 550 million years and is now at 400 ppm.**

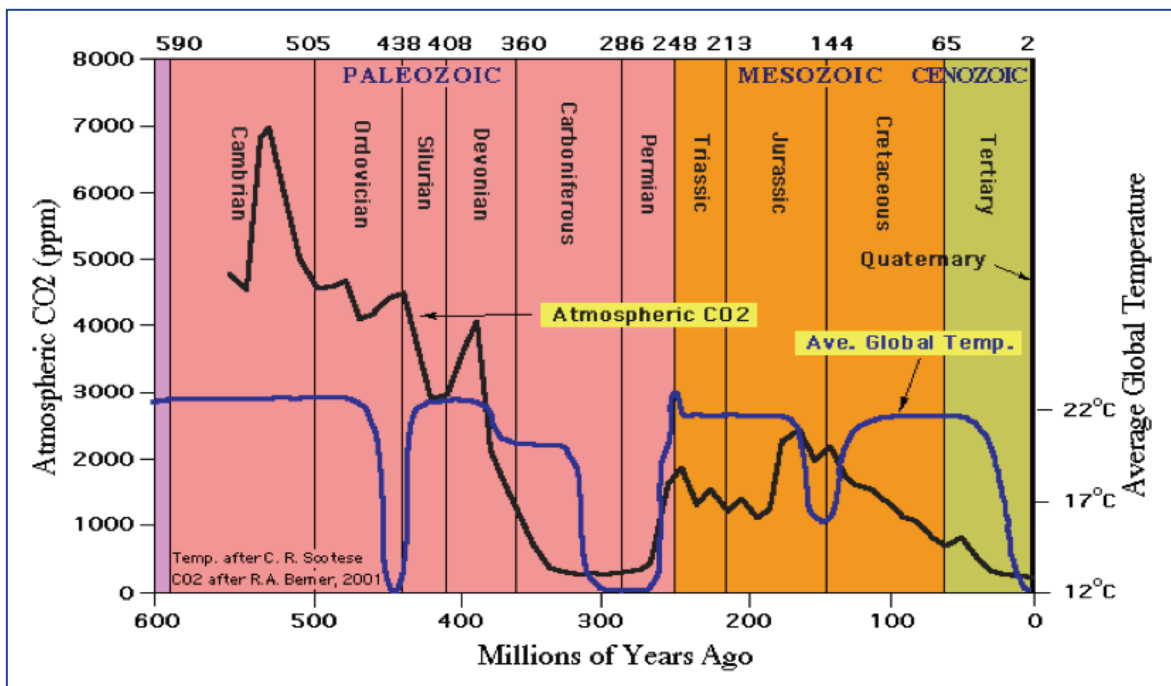
The Earth's temperature is about 15°C and its radiation spectrum peaks in the IR (infra-red) range, at about 20 microns. You can see that CO<sub>2</sub> has only one significant waveband in this range, at 15 microns. But this band is already saturated at its peak (meaning that all the IR leaving the Earth at this wavelength is already absorbed).

Adding more CO<sub>2</sub> has only minor effects: it captures a bit more IR at the edges of the band and lowers the altitude at which it is captured. This effect is not only small but diminishing; each addition of CO<sub>2</sub> has less effect than the previous addition.

It is because each addition of CO<sub>2</sub> has diminishing effect that rising CO<sub>2</sub> levels have such a small impact on the climate. If CO<sub>2</sub> doubled from the present 400 ppm to 800 ppm (which on present trends would take 140 years), the resulting increase in global temperatures would be less than 1°C. The calculation for this is given in Appendix 1.

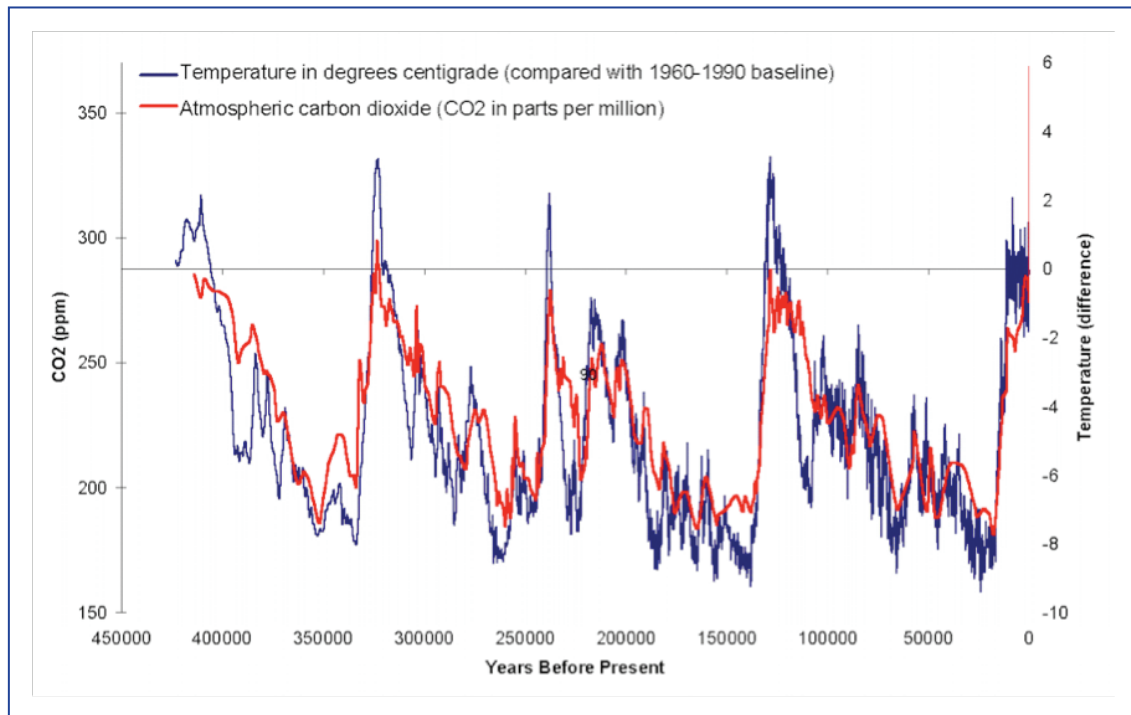
**4.2 CO<sub>2</sub> has Never had Significant Effects on Global Temperatures in the Past**

The graph below shows CO<sub>2</sub> levels and global temperatures over the last 550 million years, the span of multi-celled life. (Life began about 3 800 million years ago but for over 3 000 million years it consisted solely of single-celled organisms.)



There is no correlation between CO<sub>2</sub> and temperatures. In the late Ordovician period, CO<sub>2</sub> was over 4 000 ppm and temperatures were lower than now. CO<sub>2</sub> has averaged more than 2 000 ppm over these 550 million years. It is now at 400 ppm. (Temperature data in this graph comes from the ratios of oxygen isotopes of materials dated in the past, while CO<sub>2</sub> data is derived from chemicals sensitive to differing concentrations of atmospheric CO<sub>2</sub>.)

CO<sub>2</sub> does not noticeably affect temperatures but of course temperatures do affect CO<sub>2</sub>, for the simple reason that cold water dissolves more of it than warm water. A good example of this is shown in the regular fluctuations of the ice ages in the graph below.



The graph was based on measurements of CO<sub>2</sub> and temperature from bubbles of air trapped in the ice at Vostok, a Russian research station in Antarctica.

Analysis of the data on which the graph was drawn shows very clearly that CO<sub>2</sub> follows temperatures, and not the other way round. First temperatures rise and then, several hundred years later, CO<sub>2</sub> rises. The opposite occurs when temperatures fall. The reason is simple. Warming oceans release CO<sub>2</sub>; cooling ones absorb it. (If you put a cold glass of beer in the Sun, it will release CO<sub>2</sub> as it warms and goes flat.) Why the temperatures rise and fall is not understood, but is probably related to changes in the Earth's orbit.

#### **4.5 Changes in the Sun Drive the Earth's Climate**

More and more evidence points to the unsurprising conclusion that the Sun is by far the most important influence on the Earth's climate. Changes in the Sun cause changes in the climate, and are also responsible for the slight warming of the 20th century. The important factor is not the Sun's total energy but her emission of charged particles. Sunspots give a rough estimate of the intensity of these emissions.

During the Mediaeval Warm Period, the Sun was very active, emitting a lot of charged particles. During the Little Ice Age, the Sun was very quiet. During the 20th century, the Sun was usually very active. Since about 1996, the Sun has become quiet.

Here is a theory gaining support for how the Sun influences the climate. On Earth, probably the most important climate influence is low clouds (cumulus). These cause cooling by reflecting away more energy from the Earth than they absorb or reflect towards the Earth. To form a cloud, you need the right temperature,

**The Sun is by far the most important influence on the Earth's climate.**

## **When the Sun is active, we have warming. When it is inactive, we have cooling.**

pressure, and humidity. But, crucially, you also need a fourth factor: nucleation sites. The water vapour condenses into liquid water at these sites, forming the droplets that make up clouds. Cosmic rays, which enter the Earth's atmosphere from outside our solar system, form such sites by nuclear and chemical reactions. The more cosmic rays, the more clouds, and the more cooling. Charged particles from the Sun deflect away the cosmic rays, reducing cloud cover and causing warming. When the Sun is active, we have warming. When it is inactive, we have cooling.

### **4.6 No Increase in Extreme Weather Events**

After global temperatures failed to rise dangerously as predicted by the IPCC, the terminology of alarm changed from "Global Warming" to "Climate Change". Now we are told that rising CO<sub>2</sub> will cause more extreme climate events. There is no scientific theory to support this. Take droughts for example. The usual alarmist theory about rising CO<sub>2</sub> is that it will raise temperatures, therefore causing more evaporation, therefore producing more water vapour in the air, therefore making more rain. OK, then explain why it also causes more droughts? Of course there is no explanation. It is nonsense.

Extreme weather events have been an inevitable feature of the Earth's climate since her beginning about 4.5 billion years ago. Because of the chaotic nature of the climate system, it could not be otherwise. However, in the last 50 years, there has been no increase in the severity or frequency of extreme weather events. In some cases, there has been a decrease.

Hurricanes (cyclones) in the USA have had lower activity under President Barack Obama than under any previous president since, and including, President Abraham Lincoln (1861 to 1865). Tornado activity seems to be slowing too. The typhoons (also cyclones) of the East show no sign of increasing. Typhoon Haiyan, which struck the Philippines in 2013, was only the 7th worst typhoon there since 1970. Heat and drought in the USA were worse in the 1930s than anything now. Bengal cyclones, British floods, and storms worldwide were all at least as bad in the past, and often much worse. In one of Australia's many heat waves, nearly 200 people died, bushfires raged throughout New South Wales, and the temperature at Bourke (about 800 kilometres north-west of Sydney) did not fall below 45.6°C for six weeks, while the maximum reached was 53.3°C. The year? 1896.

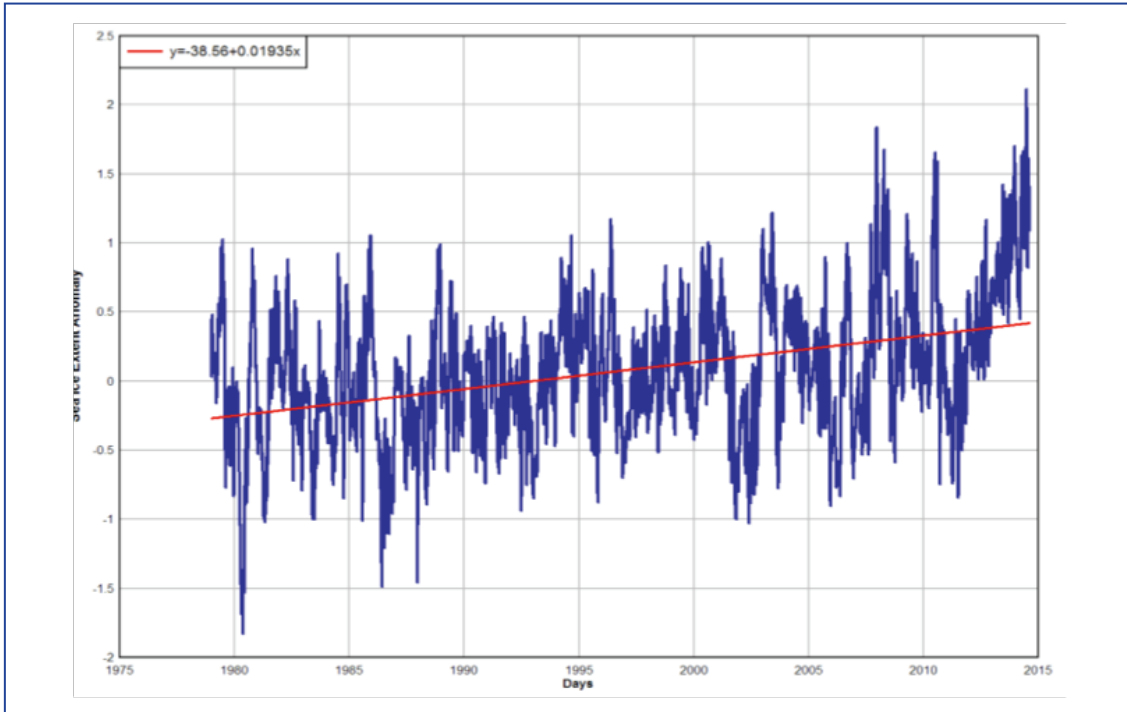
Indeed, as far as can be seen from historical records, the slightly warm climate of the last hundred years or so has been benign compared to the cold of the three or four centuries before. The 17th Century saw not only the worst cold of the last 10 000 years but probably the worst weather extremes, with dreadful storms, droughts, and floods of a ferocity unknown in our times. Warmer climate seems to reduce weather extremes.

### **4.7 Arctic and Antarctic**

The Arctic and Antarctic have been at the forefront of climate alarm, with frightening predictions of melting ice and sensational photographs of collapsing ice shelves and desperate polar bears. It was predicted that all the ice in the Arctic would have gone by 2013 and that the ice at the Antarctic would rapidly shrink. These alarming predictions have proved false. The Antarctic ice has grown, the Arctic ice has shrunk somewhat but in no alarming fashion, and the polar bear population has at least doubled in the last 50 years.

**The Antarctic ice has grown, while the Arctic ice has shrunk to some extent.**

The Antarctic contains about 90% of the world's ice. You would expect, with the slight global warming evident from about 1975 to 1996, that its ice would have melted somewhat. This hasn't happened. On the contrary, it has increased. Satellite measurement, incomparably the best measurements of global temperatures and ice cover, began in 1979. They show that the ice at the Antarctic has been increasing since then and is now at a record extent for this period.



The graph above shows the growth of the “sea ice” at the Antarctic from 1979 to 2015. This is ice in addition to the ice on the land mass of the Antarctic. The vertical axis measures the “anomaly” in sea ice cover. This is the departure from the average of ice extent, for the period measured, in millions of square kilometres. (Source: Antarctic Sea Ice Exent 1979-2014. Data from University of Illinois Cryosphere Today.)

Not only has the ice extent increased in this period, but temperatures over the Antarctic have dropped slightly.

This is exactly the opposite of what the alarmists predicted. Various explanations have been offered. One of them uses the relative cooling power of ice and clouds. Clouds seem to be the dominant terrestrial force behind climate change. Low clouds (cumulus) reflect away more energy than they absorb or reflect back down. They cause cooling everywhere on Earth – with one exception, the Antarctic. This is because this is the only area on Earth where the albedo (reflective power) of the land surface is greater than that of clouds. The large area of ice in the Antarctic, brilliantly white, disconnected from other continents, gives the greatest albedo on Earth. Everywhere else on Earth, when cloud cover increases, it causes cooling; at the Antarctic, it causes warming. Vice versa when cloud cover decreases, as it did in the warming period from about 1975 to 1996. However, the actual reason is no doubt rather more complicated.

**Antarctic ice is at a record extent and temperatures have dropped slightly, contrary to predictions.**

**Arctic ice has declined somewhat since 1979 but not in an unusual way.**

The alarmists ignore the increased ice on 97% of the Antarctic, and warn about declining glaciers on the West Peninsula, about 3% of the continent. All the photographs of collapsing Antarctic ice shelves come from this small region of the continent. There is evidence of large volcanic activity under the sea in this area, which might account for the warming there.

There is no land mass at the Arctic, so all the ice there is sea ice. This makes its physics different from that of the Antarctic. The ice there is susceptible not only to temperatures but to winds and ocean currents. The total ice at the Arctic is much smaller than that at the Antarctic. Since 1979 it has declined, but there is no evidence to show that the change is much different from any time in the last 150 years. The notion that it is unique or even unusual to have open water at the North Pole is not true. Here is a picture of the US nuclear submarine, Skate (SSN-578), surfaced at the North Pole on 17 March 1959. (Image from NAVSOURCE)



In the early months of 2015, the Arctic ice showed a rapid decline, which excited the alarmists, but then it bounced back and by July 2015 it stood at 8.8 million square kilometres, which is only a little below the average of the last 40 years. This makes it unexceptional. (Source: National Ice & Snow Data Centre or NISDC).

Various environmental pioneers have recently ventured into the Arctic and Antarctic to record and publicise rising temperatures and melting snow. Unfortunately, extreme cold and increasing ice forced them to abandon these quests. Sometimes they needed rescue from what could have been icy graves. In 2007 two brave women, Ann Bancroft and Liv Arnesen, set off to the Arctic to “raise awareness about Global Warming”. After 18 miles, facing frostbite, amputated fingers, and death in the awful cold, they were airlifted to safety. In 2013 an Australian

**It is not unique or even unusual to have open water at the North Pole.**

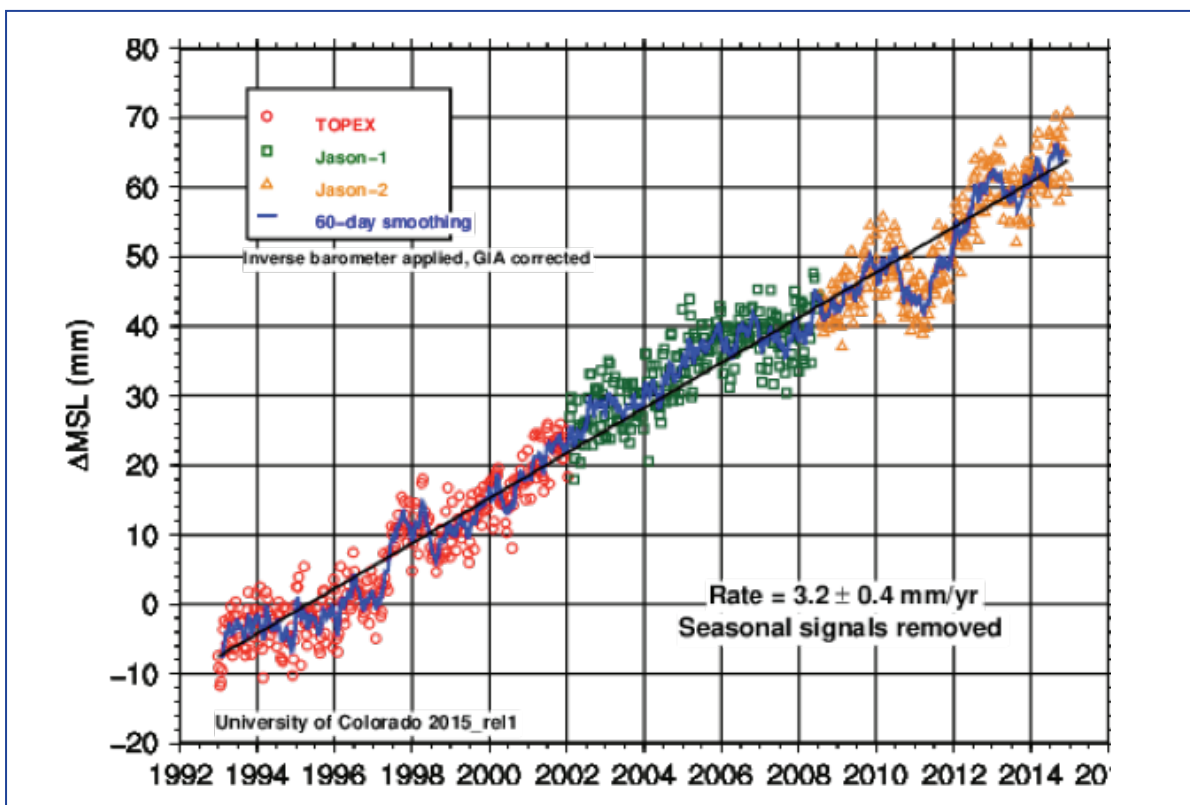
mission to study “how quickly the Antarctic sea ice was disappearing” had to be abandoned when the ship was trapped in thickening ice. The environmentalists aboard had to be rescued by a Chinese helicopter. (Regrettably, these failed ventures evoked ribald laughter from some climate sceptics.)

**The polar bear population has gone from some 10 000 to 25 000 or more.**

Since 1965, the polar bear population has more than doubled. The US Fish and Wildlife Service estimates that the polar bear population currently stands at between 20 000 and 25 000. Yet in the 1950s and 1960s, there were only 5 000 to 10 000 polar bears. The service’s high estimate of 25 000 may also be too conservative, as more recent figures put the global polar bear population at some 26 300. (By contrast, the global population of endangered snow leopards now stands at some 6 000, yet little public concern has been generated around their fate.)

**4.8 Sea Levels**

The graph below shows the rise in sea levels since 1992. This rise averages just over 3 mm a year. There is no sign of acceleration. If it continues in this way, sea levels will rise by the end of the century by 272 mm (less than a foot). So much for predictions of the sea rising by metres and New York being drowned. (Source: University of Colorado 2015.)



The slight increase in sea levels is almost certainly because of a natural recovery from the cold of previous centuries.

Similarly, the alarm about rising acidification of the oceans has no basis in science. When CO<sub>2</sub> levels were above 5 000 ppm, it posed no danger at all to marine life (on the contrary, that was the time of the greatest proliferation of marine life the world has ever seen). Ph levels in



the oceans show no alarming decline at all. This is hardly surprising given the large buffering effect of dissolved chemicals in the sea.

#### **4.9 Rising CO<sub>2</sub> is Greening the Planet**

CO<sub>2</sub> is a wonderful, safe, natural, life-giving gas. It is NOT a pollutant. It has very little effect on the climate but a profound effect on plants. They depend utterly upon it. CO<sub>2</sub> levels over the whole span of multi-celled life have averaged a bit over 2 000 ppm. In the Cambrian Period, which saw the most glorious proliferation of life forms in the planet's history, CO<sub>2</sub> was above 4 000 ppm. Over the last 50 million years or so, CO<sub>2</sub> dropped radically (perhaps because of

**In the Cambrian Period, with its glorious proliferation of life, CO<sub>2</sub> was above 4 000 ppm.**

tectonic movements, exposing calcium surfaces). The last five to ten million years saw CO<sub>2</sub> at extreme low values, dropping as low as 180 ppm during the ice ages. These levels were dangerously low for plants and put them under stress. During this period, there was a large increase in C<sub>4</sub> plants, which use a different type of photosynthesis. This was almost certainly a response to low CO<sub>2</sub>.

The best thing mankind has ever done for the planet (the only good thing?) is to push CO<sub>2</sub> levels up from 280 ppm to over 400 ppm. The plants have responded gratefully. There has been a greening of the arid parts of the planet, notably the Sahel. (There are many studies of this, including "Impact of CO<sub>2</sub> fertilization on maximum foliage cover across the globe's warm, arid environments", Geophysical Research Letters, June 2013.) Increased CO<sub>2</sub> means that plants can survive with less water. Crop yields have been increasing all over the world for the last 50 years, which is probably mainly because of improving agriculture but also in some part because of increased CO<sub>2</sub>.

#### **4.10 Some Climate Nonsense: Hockey Stick / 97% of Scientists / 95% Confidence / Climategate / 2°C**

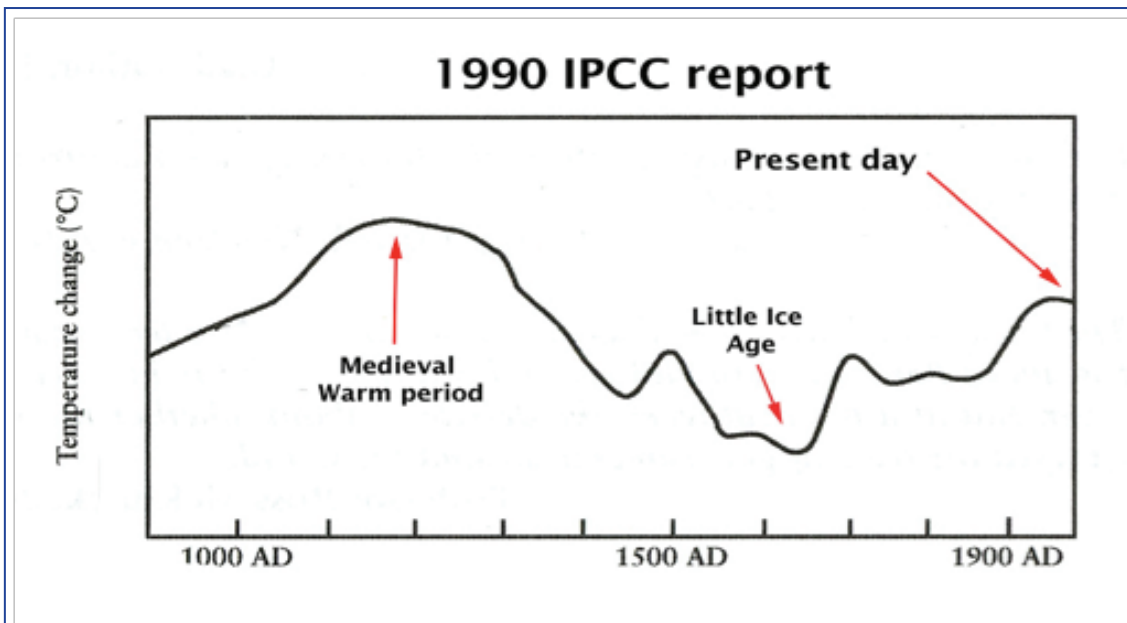
There is an enormous vested interest, financial and ideological, in promoting climate alarm. Funding, jobs, reputations, and ideological satisfaction depend upon scaring the public about dangerous manmade climate change. If the truth were made known, that rising CO<sub>2</sub> is having no dangerous effects, a lot of people would lose a lot of money and righteousness. So the scare is promoted by falsehoods, threats, silencing of critics, hiding of data, name-calling and personal attacks. Anyone who lays out the facts is derided as a "Denier!" or accused of being in the pay of oil companies or coal mines or any other substitute for Satan.

The centre of the climate establishment is the IPCC (Intergovernmental Panel on Climate Change). This is a political advocacy group rather than a scientific body. Its aim is not to find scientific truth but to promote climate fear. It is controlled by activists, politicians, and bureaucrats. It collects the work of scientists around the world, including many good ones, and then filters and distorts their work in order to present a message of doom. Its "Assessment Reports" sometimes disgrace science. Thousands of the studies they refer to are not peer-reviewed science at all but simply activist propaganda. Its "Summaries for Policy Makers" come across as statements of dogma, telling the faithful what they should believe. Here are just a few examples of climate nonsense.

**There is an enormous vested interest, financial and ideological, in promoting climate alarm.**

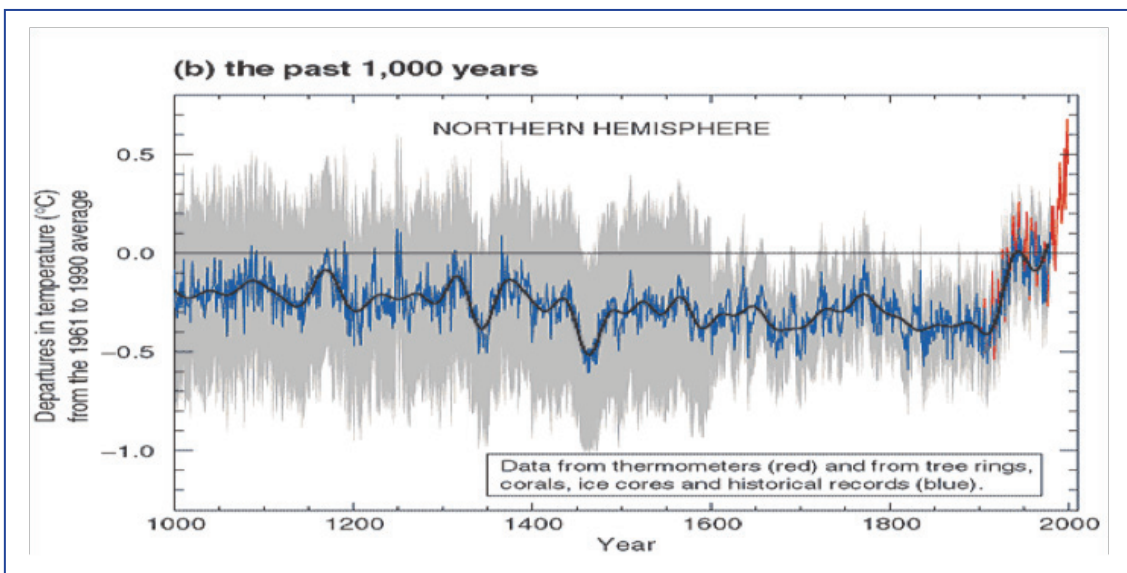
(i) *The Hockey Stick Graph*

This probably represents the worst corruption of science in the history of climate alarm. In its 1990 report, the IPCC showed the following graph of global temperatures over the last thousand years.



This was unexceptional. It showed the established science of the time. It was backed up by a huge amount of data and historical record. It showed the Mediaeval Warm Period, warmer than now, and the Little Ice Age, colder than now, and both entirely natural. But of course this did not suit the purposes of the climate alarm establishment.

In its 2001 report, this new graph appeared.



The graph made an immediate sensation. It featured six times in the IPCC's 2001 report. It was banished around the world as proof positive of dangerous manmade global warming. In Canada it was distributed to every school. It showed that the Mediaeval Warm Period and

the Little Ice Age had not existed. It was exactly what every alarmist wanted to see. It was complete nonsense.

It is called the “Hockey Stick” graph because the first flat part resembles the handle of an ice hockey stick, the sudden upturn the blade.

## **The famous “Hockey Stick” graph used illegitimate statistical methods and inaccurate data.**

The graph was based on two papers in *Nature* magazine (MBH98 and MBH99). It made the authors famous, especially the lead author, Michael Mann, and greatly advanced their careers in climate alarm. For a long time nobody questioned it or the data it was drawn from. Then a Canadian statistical expert, Steve McIntyre, asked to see the data. Eventually,

reluctantly, it was ceded to him. He quickly showed that such data could not yield a Hockey Stick. The graph was pure quackery.

The authors had used illegitimate statistical means, especially short-centring the data series for principal component analysis (a statistical method for identifying trends in a mass of data). Such a false method would yield a hockey stick out of red random noise. They had used a series of tree-ring data (Graybill-Idso) that was known to be wrong – and which they presumably knew to be wrong because they put it in a file marked “censored”. They relied on highly unreliable trees whose rings were known not to give a good measure of temperatures. And so on. The closest equivalent to this misinterpretation was Piltdown Man, but in that case the author was almost certainly a prankster whereas in this case the authors were distorting science for seemingly political ends. (In 1908 in Piltdown (England), a strange hominid skull was discovered that shook the scientific community. For decades it made scientists revise their theories of human evolution. It turned out to be a complete hoax, with a man’s skull and an ape’s jaw superimposed. The hoaxter was never discovered.)

We have been warned that we must not use the word “fraud” in relation to the Hockey Stick. This is because the climate establishment and, in particular, Michael Mann are powerful and may not hesitate to turn to litigation to silence critics. Please read the excellent paper on this by Professor Ross McKittrick entitled: “What is the Hockey Stick Debate About?” The Hockey Stick is certainly consistent with fraud, but we probably have to accept that its authors might have been entirely innocent in making one mistake after another.

*(ii) 97% of Scientists say that Mankind is Changing the Climate in a Dangerous Way*

This claim comes from John Cook, the main author of the notorious “Skeptical Science” website. This promotes climate alarm with extraordinary zeal and would much better be called “Gullible Superstition”. It was also passed around the world. President Obama tweeted it.

If you look at the scientific studies on which Cook bases this claim, you will see that only a tiny fraction of them support the notion that rising CO<sub>2</sub> is changing the climate in a dangerous way. Cook’s survey actually showed the exact opposite of what he claimed. If any scientist agreed that CO<sub>2</sub> had increased in the air, or that it was a greenhouse gas, that scientist would be included in the 97%. This summary of mine would be part of the 97%. Almost every climate sceptic would be part of the 97%.

**Only a tiny fraction of scientific studies agree that rising CO<sub>2</sub> is changing the climate.**

(iii) *It is 95% Certain that Man is Responsible for Most of the Recent Warming*

This ludicrous claim came in the IPCC's 2014 report. It has no basis in science. The warming of the 20th Century (which stopped in about 1996) was no different from previous natural warming periods (except that they had higher temperatures in the past). So where is the evidence to support this claim? There is none. Where is the statistical analysis to support it? It doesn't exist. It is simply a wild guess, and complete nonsense.

## **The “Climategate” e-mails showed a number of climate scientists hiding, deleting, and manipulating data and seeking to silence critics.**

(iv) *Climategate E-mails*

The Climatic Research Unit (CRU) at the University of East Anglia in England is one of the world's most important climate science centres. Its scientists communicate with the rather small group of international scientists who control the reports of the IPCC. In November 2009, some whistle blower, a more important version of Edward Snowden, published around 3 000 of the emails these insider scientists were sending to each other. These showed them hiding data, manipulating and deleting data, discussing how best to influence the IPCC graphs, admitting that the Hockey Stick was wrong, and aiming to censor or shut down any journal that didn't follow the party line of alarm. Above all, it also showed them discussing how to ostracise and silence any scientific critics.

Some examples:

16 November 1999: email 0942777075, Phil Jones to Ray Bradley, Mike Mann, Malcolm Hughes, Keith Briffa, and Tim Osborn, regarding a diagram for a World Meteorological Organisation Statement:

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

(Phil Jones is the director of the Climatic Research Unit. The actual data showed a decline in temperatures rather than the desired increase, so he tucked them away.)

2 February 2005: email 1107454306, Phil Jones writes to Mike Mann:

*And don't leave stuff lying around on anonymous download sites—you never know who is trawling them. McIntyre and McKittrick have been after the Climate Research Unit ... data for years. If they ever hear there is a Freedom of Information Act now in the United Kingdom, I think I'll delete the file rather than send it to anyone.*

(In proper science, all data is freely available to everyone. In climate alarm science, data that contradicts the scare is hidden away or deleted.)

12 October 2009, email 1255352257, from Kevin Trenberth, a lead author of various IPCC scientific assessment reports, to Michael Mann:

*... [I]n Boulder...we have broken records the past two days for the coldest days on record. We had 4 inches of snow. The high the last 2 days was below 30F and the normal is 69F, and it smashed the previous records for these days by 10F. The low was about 18F and also a record low, well below the previous record low.*

*The fact is that we can't account for the lack of warming at the moment and it is a travesty that we can't.*

(The “lack of warming” has continued until now, in 2015. In public the alarmists make all sorts of excuses about it. In private, it seems, they admit it contradicts their theory.)

The Climategate scandal was made far worse by a series of “enquiries” into it. They were all led by people within the climate establishment and they all whitewashed the key issues. The 2010 report by Lord Ron Oxburgh, for instance, reportedly held no public hearings, did not

**There is no scientific basis for the widely-accepted goal of limiting global warming to 2°C.**

call for evidence, and did not interview any climate critics; its five-page final report is widely seen as a cover-up. Oxburgh had interests in carbon capture and renewable energy, both of which benefit from climate alarm. It was as if Watergate had been investigated only by President Richard Nixon’s allies or Nkandla had been probed solely by senior African National Congress (ANC) figures close to President Jacob Zuma.

*(v) 2°C Rise*

When the climate scare failed to meet any of its predictions – and when rising CO<sub>2</sub> in the 21st Century produced no global warming whatsoever – there emerged from one of the innumerable climate conferences the whimsical objective that we must endeavour to reduce global warming to 2°C. This is meaningless. No climate alarmist can justify it. What increase in CO<sub>2</sub> does this correspond to? Nobody has the slightest clue. In the far past, when CO<sub>2</sub> was over 4 000 ppm, temperatures were lower than now. In the recent past, when CO<sub>2</sub> was even lower than now, temperatures were higher than now. We can see no correlation at all between CO<sub>2</sub> and global temperatures (for the reasons earlier described). So what must we do to reduce global warming by 2°C? Nobody knows. Actually mankind can do nothing one way or the other, since climate change is decided by nature.

**5 The effects of the climate change scare: threats to poor people**

The climate change scare has had alarming effects on human rationality. It has perverted science and replaced it with superstitious belief, returning us to an age of irrationality we hoped had long since gone. But unfortunately it has also had practical effects, all malign, and might have worse ones in future. The worst victims will be the poor of the world, including the poor in South Africa.

Though roof-top solar has useful applications, governments in Germany, Britain, and elsewhere in Europe and the USA, partly because of the climate scare, are turning away from reliable economic sources of grid electricity from fossil fuels and are trying to derive base load electricity from extremely expensive and hopelessly unreliable wind and solar power. The result has been soaring electricity prices, which have hit poor people hardest of all. In South Africa, the Government is busy adopting a ridiculous and damaging carbon tax. It will harm the economy, add even more layers of obstructive bureaucracy to already struggling industry, and stifle economic growth. The poor will suffer most. The carbon tax will do absolutely nothing to protect the environment. On the contrary, it will injure it.

There are real environmental threats to our planet and our country. These we must combat with science and reason. Some of the threats come from energy. Coal power stations do indeed produce harmful pollution in the form of smoke (particulates), sulphur dioxide, nitrogen oxides, heavy metals and dangerous organic materials. Far worse to human health, however, is the burning of wood, coal, and paraffin in the dwellings of the poor in townships and shanty towns. This produces an appalling toll of death and disease, especially among children. But the CO<sub>2</sub> from the burning of these fuels is doing no harm at all. So we must clean up

**There are real environmental threats to our planet and country that we must combat with science and reason.**

the coal stations and, more important still, give poor people access to clean energy, such as electricity and LPG (liquid petroleum gas), in their homes.

South Africa, partly from ideological fashion driven by the climate scare, is spending some R193 billion on the REIPPPP (Renewable Energy Independent Power Producers Procurement

## **We must clean up coal stations and give poor people access to clean energy in their homes.**

Programme). This is supposed to provide mainly wind and solar power for grid or base load electricity. Private companies have been invited to compete not on how effectively they can supply sufficient electricity at market prices (which is impossible for wind and solar), but on the size of the state subsidies they are willing to accept.

There is great interest in the REIPPPP because participants are guaranteed high prices for their electricity whether it is needed or not. The results so far have been quite predictable: wildly fluctuating and almost useless wind power; solar power produced only in the middle daylight hours when demand is low. Because of Eskom's crisis, the parastatal has been forced to use, for long periods and at enormous cost, its gas turbines running on very expensive diesel fuel. A report by the Council for Scientific and Industrial Research (CSIR) says that REIPPPP power has slightly reduced this use of diesel and so saved money. It is difficult to think of any other benefit from it. Even this benefit will be eliminated once Eskom has sufficient conventional stations. Otherwise the REIPPPP will simply raise the price of base load electricity and lower its reliability.

Anyone who questions the climate scare is faced with furious denunciation from the climate establishment. The denunciation consists of curses ("denialist!"), the questioning of motives ("You're a stooge of the oil companies!"), accusations of mental instability, and comparisons with various false beliefs of the past ("You're just like those who: said the world was flat, denied HIV caused AIDS, denied cigarettes cause cancer etc"). The denunciation seldom if ever rests on any scientific evidence. This is hardly surprising since there is no scientific evidence to show that mankind is changing the climate in a dangerous way.

**Anyone who questions the climate scare is faced with furious denunciation, which seldom rests on any scientific evidence.**

But we must rely on science. It is our surest, perhaps our only, path to truth. And the advance of science and reason has brought profound practical benefits to humanity.

- by Andrew Kenny

Kenny is an engineer.

### **Appendix: Calculation of Temperature Increase if CO<sub>2</sub> Doubles.**

The Earth's climate is far too complicated for anyone to make exact calculations about its future. This is one of the reasons the climate computer models fail. But simple calculation estimates can give a rough indication of certain aspects of the climate. Below is a simplified calculation of the likely rise in global temperatures if CO<sub>2</sub> were to double from 400 ppm now to 800 ppm.

The warming effect of CO<sub>2</sub> is *logarithmic* with increasing concentrations. This means that each new addition of CO<sub>2</sub> has less effect than the previous one.

The warming power of CO<sub>2</sub> is usually given by:

$$\Delta F = 5.35 \ln (C / C_0) \text{ watts / m}^2$$

where C is the new concentration of CO<sub>2</sub>, C<sub>0</sub> the initial concentration

A doubling of CO<sub>2</sub> concentrations gives:

$$\Delta F = 3.7 \text{ watts / m}^2$$

We then use the Stefan-Boltzman equation to get an energy balance for the Earth. This is:

$$S (1 - \alpha) / 4 = \sigma T^4$$

Where:

S = solar constant (about 1370 watt/m<sup>2</sup>)

α = Earth's albedo (about 0.31)

σ = Boltzmann constant (5.67 \*10<sup>-8</sup> w/m<sup>2</sup>)

T = Earth's effective emitting temperature

Put these two together, and a doubling of CO<sub>2</sub> (to 800 ppm) has the direct effect of increasing the global temperature by 1°C. Upon this almost everyone is agreed. But of course there would be *feedback*, a response by the climate system to this small change in temperature. The response of the climate to rising CO<sub>2</sub> is sometimes referred to as its *sensitivity*.

All the predictions by the alarmists of a temperature increase of 2°C more depend upon the assumption of *positive feedback*, that the climate system would amplify the small increase in temperature. There is simply no evidence for this. On the contrary, all the evidence points to *negative feedback*, that the climate system would reduce the small increase.

A theory of extra warming through positive feedback goes like this. There is a slight warming. This causes more evaporation and therefore more water vapour in the air. But water vapour is a greenhouse gas. So this causes more warming and more evaporation, and more water vapour... So there is runaway heating and all the oceans boil dry and we all perish. But this has never happened. So we know with certainty that there isn't uncontrolled positive feedback. Indeed, if there were positive feedback the Earth's climate would be so unstable that higher life could not have evolved on it.

In fact a remarkable feature of the Earth's climate is its stability. Although the climate is chaotic, meaning that we can never make exact predictions about its likely behaviour, certain aspects – notably global temperatures – have remained remarkably constant for long periods of time. Temperatures fluctuate, but only within rather narrow bands of variation. This can only mean that there are powerful negative feedbacks at work.

The obvious negative feedback against rising temperature is clouds. As temperature rise, there is more evaporation, and more water vapour, which condenses into clouds, which cause cooling by reflecting away more heat than they absorb or reflect down. The clouds counter the temperature rise.

Tropical thunderstorms would also have a potent effect in removing heat from any temperature rise.

Various studies have been done which compare the heat entering and leaving the Earth's atmosphere in response to changes of temperature at the planet's surface. Temperature lags make this analysis difficult, but they all point to negative feedback.

In short, though a doubling of CO<sub>2</sub> would prompt a temperature rise of about 1°C, negative feedback would reduce it to about 0.5°C.

Talk of rising CO<sub>2</sub> causing a temperature rise of 2°C or more is nonsense.