Lies, Damned Lies, and Al Gore on Climate

Answers to Al Gore's mendacious House testimony on 24 April 2009

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Gore: The Arctic is warming at an unprecedented rate. New research, which draws upon recently declassified data collected by U.S. nuclear submarines traveling under the Arctic ice cap for the last 50 years, has given us, for the first time, a three-dimensional view of the ice cap, and researchers at the Naval Postgraduate School have told us that the entire Arctic ice cap may totally disappear in summer in as little as five years if nothing is done to curb emissions of greenhouse gas pollution. For most of the last 3 million years, it has covered an area the size of the lower 48 states. Almost half of the ice has already melted during the last 20 years. The dark ocean, once uncovered, absorbs 90 percent of the solar heat that used to bounce off the highly reflective ice. As a direct consequence, some of the vast amounts of frozen carbon in the permafrost surrounding the Arctic Ocean are beginning to be released as methane as the frozen tundra thaws, threatening a doubling of global warming pollution in the atmosphere.

Answer: For most of the last 3 million years, the Earth endured ice ages, with brief interglacial periods of 5000 years occurring roughly every 125,000 years. Naturally, therefore, Washington and much of the contiguous US was under miles of ice most of the time. We are in an unusually-prolonged interglacial period at present – 11,000 years. For most of that period – and notably during the Minoan, Roman, and medieval warm periods – it was warmer than today in the Arctic and worldwide. Indeed, in the 1930s and early 1940s it was up to 4 Fahrenheit degrees warmer than today in the Arctic.

It is not true that "almost half" of the Arctic sea ice has melted – its winter extent has barely declined at all, though there has been some decline in summer, particularly in 2007, for largely natural reasons (we know the reason cannot have been "global warming", because the planet had been cooling for six years at the time – a cooling that has continued and is now seven and a half years long).

At present, both Arctic and Antarctic sea-ice extents are at or near record high levels for the time of year – the Arctic has set a nine-year record according to IARC/JAXA, and the Antarctic is approaching the record-high sea-ice extent set in late 2007, according to the University of Illinois. There is no likelihood of a total disappearance of Arctic sea ice any time soon.

Gore: Melting of the Greenland ice sheet has reached a new record, which was a staggering 60 percent above the previous high in 1998. The most recent 11 summers have all experienced melting greater than the average of the past thirty-five year time series (1973-2007). Glacial earthquakes have been increasing as the meltwater tunnels down through the ice to the bedrock below. Were the Greenland ice sheet to melt, crack up and slip into the North Atlantic, sea level would rise almost 20 feet.

Answer: Once again, even if it were true that Greenland's ice had been melting at "new record" rates, after seven and a half years of global *cooling* global *warming* cannot be the cause. The true position in Greenland is to be found in Johannessen *et al.* (2005), where satellite altimetry established that the mean thickness of the entire Greenland ice sheet had increased at 2 inches *per year* – a total of almost 2 feet – in the 11 years 1993-2003.

The thickness of the Greenland ice sheet is so great, and its weight so massive, that it has depressed the rock beneath, and sits in a bowl surrounded by mountains. Meltwater has been observed every summer making its way down through the ice, but even if it reaches the bedrock it merely freezes: and, contrary to excitable reports that it might cause the ice sheet to slide into the sea by lubrication, the ice sheet can only flow to the sea at points where glaciers emerge. Some of those glaciers have been advancing: others have been retreating: but there is not, and is not likely to be, any significant loss of Greenland ice soon.

Global mean sea level has not been rising in a statistically-significant sense for three years (University of Colorado), indicating that Greenland cannot be contributing much new water to the world's oceans.

Gore: We already know that the Antarctic Peninsula is warming at three to five times the global average rate. That is why the Larsen B ice shelf, which was the size of Rhode Island, already has collapsed. Several other ice shelves have also collapsed in the last 20 years. Another large shelf, the Wilkins ice shelf—which is roughly the size of Northern Ireland— is now beginning to disintegrate right before our very eyes. A recent study in the journal *Science* has now confirmed that the entire West Antarctic Ice Sheet is warming. Scientists have told us that if it were to collapse and slide into the sea, we would experience global sea level rise of another 20 feet worldwide. Each meter of sea level increase leads to 100 million climate refugees. Recent studies have shown that many coastal areas in the U.S. are at risk—particularly Southern Florida and Southern Louisiana.

Answer: The global average rate of temperature change for the past seven and a half years has been a *cooling* rate, on all measures (Hadley; NCDC; RSS; UAH). Any average is composed of some data in one direction and some in another, and the data will exhibit various magnitudes. Doran *et al.* (2002) concluded that Antarctica as a whole had been cooling for half a century, though methods similar to those used by the scientists who had falsely abolished the medieval warm period have recently been used to invent temperature data where it did not exist, thus suggesting that the Antarctic has warmed.

The Antarctic Peninsula covers just 2% of the continent. The ice-shelves that have melted there have done so for reasons that have little or nothing to do with "global warming" – and the combined area of those that have melted represents around 2% of the land area of Texas. The vast majority of the Antarctic is at too high an altitude and too high a latitude to melt significantly. Ice continues to accumulate at the South Pole, where it is now 8850 feet deep, and the geodesic dome there is gradually being buried by the accumulation of snow, firn, and ice around it.

A better bellwether of Antarctic temperature than the Peninsula is the extent of winter sea ice. The sea-ice reached a record high extent in October 2007, and the trend in sea-ice extent has been upward throughout the 30 years of satellite observations.

There is no realistic prospect of the entire West Antarctic Ice Sheet disintegrating in the near future (if at all), and almost every study has made that plain. The UN's climate panel has said that global temperature increases of at least 4-5 Fahrenheit degrees would have to persist for at least several millennia before even half of the Greenland ice sheet disappears. Similar considerations apply to the West Antarctic Ice Sheet.

Since satellite altimetry began in 1993, sea level has been rising at just 1 ft/century, or one-quarter of the centennial mean rate inferred over the past 10,000 years. For the past three years it has not been rising at all, indicating that remarkably little ice is melting into the oceans. Naturally, much ice melts in the summer. In the winter, though, it re-forms rapidly, leading to little or no net long-term loss of the polar ice.

Gore: Carbon dioxide pollution is changing the very chemistry of our oceans. Ocean acidification is already underway and is accelerating. A recent paper published in the journal *Science* described how the seawater off the coast of Northern California has become so acidic from CO2 that it is now corrosive. To give some sense of perspective, for the last 44 million years, the average pH of the water has been 8.2. The scientists at Scripps measured levels off the north coast of California and Oregon at a pH of 7.75. Coral polyps that make reefs and everything that makes a shell are now beginning to suffer from a kind of osteoporosis because of the 25 million tons of CO2 absorbed the oceans every 24 hours.

Answer: Once again, Gore argues from the particular to the general. In an average ocean, some parts will be less alkaline than others (any pH value above 7 is actually alkaline, not acid, and *all* parts of the ocean are in fact pronouncedly alkaline). As for corals, the calcite corals evolved during the Cambrian era, 550 million years ago, when there was 20 times as much CO2 in the atmosphere as there is today, and the more delicate aragonite corals evolved 175 million years ago, in the Triassic era, when there was also 20 times as much CO2 as today. Corals are perfectly capable of adapting to changing levels of alkalinity. There is in fact no reliable, global monitoring of ocean alkalinity, and there is no reliable way to tell whether it has diminished significantly or at all.

Gore: Salmon have now disappeared off the coast of California. Researchers are now working to determine the cause and whether or not this is due to acidity and the relationship between acidity and "dead zones" of extreme oxygen depletion that now stretch from the west coast of North, Central, and South America almost all the way across the Pacific. The health and productivity of all the world's oceans are at risk.

Answer: This is a fine instance of the ancient Aristotelian fallacy of *igoratio elenchi:* we don't know what is causing a phenomenon, so we blame it on "global warming". Oxygen depletion in the oceans is a natural phenomenon and there is no reliable basis for blaming it on the minuscule increase in the partial pressure of CO2 in the atmosphere or in the oceans.

Gore: The Union of Forest Research Organizations, with 14 international collaborating partners, reported that forests may lose their carbon-regulating service and that it "could be lost entirely if the earth heats up 2.5 degrees Centigrade." Throughout the American west, tree deaths are now at record levels, year after year. For the same reason, Canada's vast forest is now contributing CO2 to the atmosphere rather than absorbing it. The Amazon, the forests of Central Africa, Siberia, and Indonesia are all now at risk.

Answer: CO2, with water, chlorophyll, and solar radiance, is an essential ingredient in photosynthesis. As Prof. Will Happer of Princeton testified before the Senate recently, the planet's atmosphere is currently starved of CO2 – now at <400 ppmv when it has been >1000 ppmv for most of the past 600 million years, and sometimes as high as 7500 ppmv (IPCC, 2001). Satellite assessments of vegetation density show that plant productivity is increasing rapidly worldwide as CO2 starvation gradually ends. As a result, as figures by US Forest Service show, there has been a rapid increase in the rate of growth – and hence in the volume – of standing timber. Forests worldwide are indeed at risk worldwide, but not from CO2, which is nothing but a boon to them. They are at risk from the chainsaws of the loggers.

There is no scientific basis for the assertion that Canada's forests are contributing CO2 to the atmosphere rather than absorbing it.

Gore: This year, a number of groups ranging from the National Audubon Society to the Department of Interior, released the U.S. State of the Birds report showing that nearly a third of the nation's 800 bird species are endangered, threatened or in significant decline due to habitat loss, invasive species and other threats including climate change. The major shift attributed to the climate crisis related to the migratory patterns and a large shift northward among a vast range of bird species in the U.S.

Answer: Given seven and a half years' global cooling, northward migration patterns must be caused by regional warming, not by global warming. The chief threat to birds is not CO2 (after all, they evolved from creatures that survived 20 times today's atmospheric concentration) but human encroachment upon their habitats. Wind-farms, for instance, are notorious for killing larger birds that fly through the turbine-blades.

The world has been warming for 300 years. There has been no increase in the warming rate – indeed, the warming from 1975-1998 (when we *might,* in theory, have had *some* influence on temperature) was at the same rate as from 1860-1880 and again from 1910-1940. During those two periods, we cannot have had any significant influence. It is settled science that most of the warming of the past 300 years is natural. Of course, the transition from the solar Grand Minimum of 1645-1715 to the solar Grand Maximum of 1925-1995 has led to planetary warming, and of course that warming has led to northward migrations of temperature-sensitive species: but in all that time the increase in temperature in any one place is a minuscule fraction of the temperature change that occurs in that place between winter and summer.

Gore: Some of the most intriguing new research is in the area of extreme weather events and rainfall. A recent study by German scientists published in *Climatic Change* projects that extreme precipitation will increase significantly in regions that are already experiencing extreme rainfall. Man-made global warming has already increased the moisture content of the air worldwide, causing bigger downpours. Each additional degree of temperature increase causes another seven percent increase in moisture in the air, and even larger downpours when storm conditions trigger heavy rains and snows.

Answer: In fact, it is settled science that – outside of the tropics, where the jury is still out – extreme-weather events would become rarer if the world continued to warm. Since there has been global *cooling* for seven and a half years, recent extreme-weather events cannot credibly be attributed to global *warming*. By the Clausius-Clapeyron relation, the space occupied by the atmosphere is capable of carrying near-exponentially more water vapour as it warms: however, the humidity is not uniform, and recent studies (*e.g*. Paltridge *et al.,* 2009) have shown that in the tropical upper troposphere the atmosphere is considerably drier than expected, greatly reducing the water-vapor feedback and hence the temperature response to increasing CO2 concentrations.

There has been no discernible change in the incidence or frequency or severity of extreme-rainfall events, except that they are more widely reported and known about today than they were. There have in the past been massive, and fatal, floods in the US, on a scale that has not been seen since the Second World War.

Gore: To bring an example of this home, 2009 saw the eighth "ten year flood" of Fargo, North Dakota, since 1989. In Iowa, Cedar Rapids was hit last year by a flood that exceeded the 500-year flood plain. All-time flood records are being broken in areas throughout the world.

Answer: This is another instance of argument from the particular to the general. It is also an instance of the Wisden fallacy – the expression of

surprise that in a stochastic system, with a large variety of datasets, new records will frequently be set (Wisden is the cricketers' almanac in the UK, and the weather, like the cricket, has large numbers of records available to be broken).

Gore: Conversely those regions that are presently dry are projected to become much dryer, because higher average temperatures evaporate soil moisture.

Answer: This is nonsense. The Sahara, for instance, has shrunk by 300,000 sq.km in the past 30 years, as warmer, moister weather has reintroduced vegetation to formerly barren regions, allowing nomadic tribes to settle in places where they have not been in living memory.

Prof. Will Alexander and his colleagues in South Africa have done a detailed hydrological survey and have established definitively that changes in flood and drought patterns are chiefly influenced by the Sun, and that there is absolutely no correlation between CO2 concentration and droughts or floods.

Gore: The American West and the Southeast have been experiencing prolonged severe drought and historic water shortages. In a study published in January 2008 in the journal *Science*, scientists from the Scripps Institute estimated that 60 percent of the changes in the West's water cycle are due to increased atmospheric man-made greenhouse gases. It predicts that although Western states are already struggling to supply water for their farms and cities, more severe climatic changes will strain the system even more. Agriculture in California is at high risk. Australia has been experiencing what many there call a thousand-year drought, along with record high temperatures. Some cities had 110 degrees for four straight days two months ago. And then they had the mega-fires that caused so much death and destruction.

Answer: Another argument from the particular to the general. The greatest droughts in the US in recent times were in the 1930s in the Great Plains (see John Steinbeck's *Grapes of Wrath* for a graphic description). There is no credible scientific basis for the assertion that increased CO2 has caused three-fifths of all changes in the West's water cycle: it is simply computerized guesswork, no more reliable than that of the UK Met Office, which predicted a long, hot, dry summer in 2007 just weeks before the coldest, wettest summer on record began.

The reason why many are struggling to water their farms has more to do with increasing demand for finite supplies than with "global warming" (of which there has been none for 15 years, the last seven-and-a-half of which have shown cooling).

One of the most significant threats to California is frost. An exceptional frost wiped out two thirds of California's citrus crop a couple of years ago, just after Gov. Schwarzenegger had said global warming was a problem. Forest fires, as is well established in the literature are partly of natural origin and partly caused by humans – often, in California and in Australia, by arsonists.

It is fanciful to attribute every extreme-weather event to "global warming", especially when there has been none for 15 years, and when the warming that had occurred had been occurring for 300 years.

Gore: Federal officials from our own National Interagency Fire Center report that we have seen twice as many wildfires during the first three months of 2009 as compared to the same period last year. Due to the worsening drought, the outlook for more record fires in Texas, Florida, and California is not good.

Answer: The Wisden fallacy again. New records are set frequently in the climate somewhere in the world, and it is the height of naiveté to ascribe the setting of these new records to "global warming" – particularly after a long period when there has not been any.

Gore: **A number of new studies continue to show that climate change is increasing the intensity of hurricanes. Although we cannot attribute any particular storm to global warming, we can certainly look at the trend. Dr. Greg Holland from the National Center for Atmospheric Research says that we have already experienced a 300-400 percent increase in category 5 storms in the past 10 years in the United States. Last August, hundreds of thousands of people had to evacuate as Hurricane Gustav hit the Gulf Coast. And then, of course, there is the destruction of Galveston and areas of New Orleans, where the residents are still recovering. The same is happening in the rest of the world. Last year, Cyclone Nargis inflicted catastrophic death tolls in Burma (Myanmar) killing twenty thousand people and leading to the suffering of many more.**

Answer: Here, as elsewhere, Gore is deliberately repeating one of the numerous errors for which he has been condemned by a judge in the London High Court. The Accumulated Cyclone Index, a two-year running sum that combines the frequency, intensity, and duration of all tropical storms, is currently at a 30-year low.

The judge was particularly strong in his criticism of Gore for blaming individual hurricanes on "global warming". In fact, there has been no trend in landfalling Atlantic hurricanes for 150 years (NOAA). Cyclone Nargis, likewise, cannot be blamed on "global warming": these are naturally-occurring events that, as it happens, are occurring less frequently now than at any time in the past 30 years.

Conclusion: All of Gore's points are at best significant exaggerations, at worst wholly false. In some instances, it can be proven that Gore is wilfully mendacious – particularly where he repeats errors that have been condemned by the High Court in London after acceptance on the part of Her Majesty's Government, to which Gore is a climate advisor, that the errors identified by the judge were indeed errors.

No serious legislature could found any policy on anything that Gore says about the climate. He is not a credible witness and should be disregarded.

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