Global Warming - Is Carbon Dioxide Getting a Bad Rap?

by

Joseph D'Aleo

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With the prospect of climate change legislation that could cost American families up to $4,500 per year by 2015, and talk of using technology to sequester carbon through well drilling, which Michael Economides estimates could cost up to $7.2 trillion – or 60 times the current costs of drilling (Energy Tribune, June 2007) – it is ever more critical to determine whether we do in fact have a problem with carbon dioxide.

Despite the 90 percent certainty that man is behind recent global warming trends, the word "uncertainty" appears 494 times in the recent "Summary for Policymakers," produced by the UN's Intergovernmental Panel on Climate Change.

Though the actual research scientists generally did a commendable job, the more alarmist interpretation was provided by a smaller cadre of agenda-driven scientists and statesmen. Then the media took the most extreme of the messages to hype them further.

So what is the real story?

The report's final summaries had several failings. First, it blindly accepts a 20th-century carbon dioxide rise of 36 percent, when direct measurements(1) suggest the change is closer to 15 percent. Their models assume an annual increase of 1 percent, although over the last 50 years the long-term annual average consistently has been less than half that, 0.43 percent. Their models treat the oceans as distilled water when in reality they are an infinite buffer for atmospheric CO2. Burning all the earth's fossil fuels would amount to no more than a 20 percent increase. It could never double(2). In any event, ice cores tell us carbon dioxide lags, not leads, the temperatures by as much as 800 years.

The IPCC acknowledges no problems with the global data bases, stating urbanization has a negligible effect on global changes, and ignoring dozens of peer review papers that show urban contamination is significant (in diverse areas including China, central Europe, and even Barrow, Alaska). During the 20th century, the population of the world increased four-fold, from 1.5 billion to 6 billion. More and more areas are urbanized. Airports, once rural, find cities growing around them.

The report ignores the fact that total global stations decreased by 66 percent after 1990, and there was a ten-fold increase in months with no reported data from the remaining stations, mainly in the former Soviet Union and Africa. They also ignore the issue that the majority of world stations may not meet World Meteorological Organization standards for siting instruments, a problem that has also been widely documented in peer review journals. They ignore the half-dozen peer review papers suggesting that these problems could well account for 50 percent or more of the warming shown for the world data bases.

The National Climatic Data Center has a network of 1,221 stations in the U.S. that is more stable and continuous than the rest of the world's. Those stations adjust for urbanization and thus are likelier to produce data that more accurately represents the climate change picture. Data from those stations show changes that are cyclical in nature with a smaller rise over time, some man-made and some natural.

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[1] First appeared here: http://www.energytribune.com/articles.cfm?aid=544

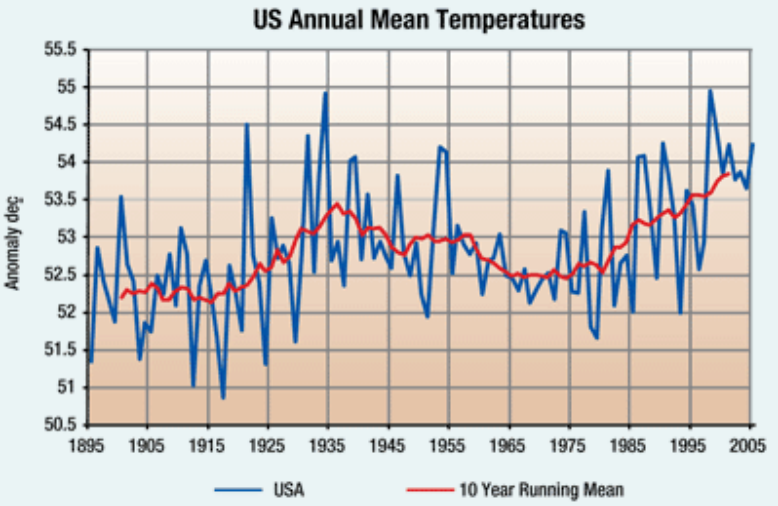

Figure 1: USHCN Annual Mean Temperatures, 1895-2005.

When dealing with cycles such as those shown in the graph, trends in changes are best determined by looking at maximum to maximum and minimum to minimum. In both cases, the changes are just 0.25 degree Fahrenheit over 75 years or 0.37 degree Fahrenheit for the entire record. This is well under half the global trend and the often quoted U.S. temperature trend. (The late 90s are the apparent peak, as many of the measures have been declining, certainly in the last 5 years.) This same cyclical behavior can be seen in Greenland and the Arctic.

What could be behind the temperature cycles? The data strongly indicates it is the sun and oceans, whose cycles are very much in sync with the observed station data.

The Sun: The Real Climate Driver

The sun changes on cycles of 11, 22, 80, and 180 years, and even more. When the sun is more active it is warmer, and there are more sunspots and solar flares. When the sun is warmer, the earth is warmer. Though the changes in brightness or irradiance during the 11-year cycles are small (0.1 percent), when the sun is more active there is more ultraviolet radiation (6 to 8 percent for UV up to a factor of two for extremely short wavelength UV and X-rays; Baldwin and Dunkerton, 2004)(3) and there tends to be a stronger solar wind and more geomagnetic storms. Increased UV has been shown to produce warming in the high and middle atmosphere (that leads to surface warming), especially in low and mid latitudes. This is has been shown through observational measurements by Labitzke(4) over the past 50 years and replicated in NASA models by Shindell(5).

Increased solar wind and geomagnetic activity has been shown by Svensmark(6) and others to lead to a reduction in cosmic rays reaching the ground. Cosmic rays have a cloud-enhancing property and their reduction during active solar periods leads to a reduction in low clouds, up to a few percent. Low clouds reflect solar radiation, leading to cooling. Decreased low cloudiness means more sunshine and warmer surface temperatures. Shaviv (7) found the cosmic ray and irradiance factors could account for up to 77 percent of the warming since 1900, and found the strong correlation extended back 500 million years

Though the IPCC acknowledged these indirect UV and cosmic ray effects may be important (although a source of considerable uncertainty), they latched onto the small 0.1 percent change in

the 11-year cycle and a single paper by Lean with Wang,(8) which used a new untested model approach suggesting the sun's longer-term role is not as great, to cut back solar forcing by a factor of 7 from the 2001 prior assessment. This, despite the slew of peer reviewed papers showing the sun as more important, not less. This is this current report's "Hockey Stick," the original of which in 2001 did away with the great detective work of hundreds of the world's best climatologists, and wiped out the medieval warm period and subsequent Ice Ages, making the current warming seem more important and man's role more plausible. The Hockey Stick has since been totally debunked in numerous peer review papers and did not appear in the latest IPCC report. I am confident that this recent assessment's downgrading of the solar effect will meet a similar fate.

Scafetta and West (9) suggested the solar could account for at least half of the warming since 1950, and showed it using simple total solar irradiance, assuming it was a proxy for the total (direct and indirect) solar effect. They used the global data bases with their exaggerated warming. I repeated the effort using the U.S. data and found a correlation (r-squared) of 0.64. You can see how well the solar activity on the 80-year time scale (Gleissberg cycle) matches the average U.S. station annual mean temperatures (both data bases with 11-year smoothing to filter out the 11-year cycle changes).

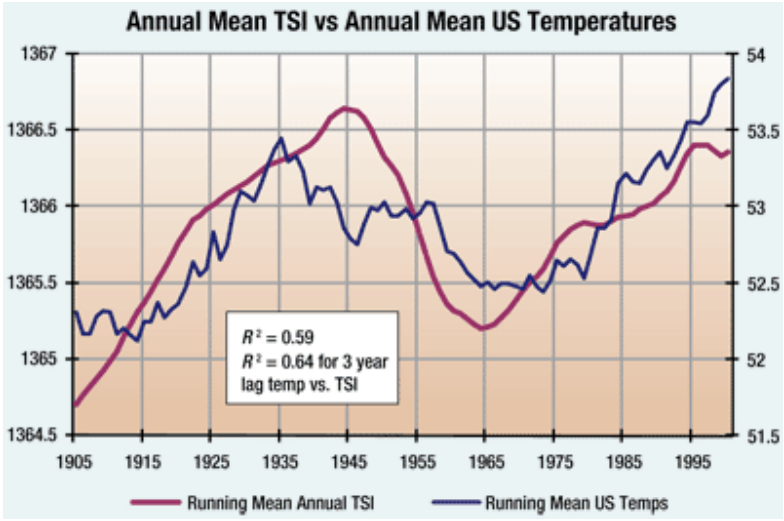

Figure 2: 11-year running mean Total Solar Irradiance (Hoyt and Schatten) vs. Annual Mean Temperatures. Correlation (r-squared) of 0.59 (0.64 for 3-year lag of temperatures after solar).

Both the Atlantic and Pacific have multidecadal cycles in ocean temperatures, which the IPCC correctly attributes to changes in the global thermohaline ocean circulation resulting in long-term changes in the large-scale atmospheric and ocean-current gyres.

When the Pacific is in its warm mode, there are more El Niños and more global warming; in its cold mode, there are more La Niñas and global cooling. The Pacific was in the warm mode from 1978 to at least the late 1990s. Indeed, during that period we have had nearly twice as many El Niños (including two super El Niños) than La Niñas. In the prior cold Pacific Decadal Oscillation period, there were approximately twice as many La Niñas as El Niños.

In the Atlantic, the Atlantic Multidecadal Oscillation changes over a period of about 70 years. In 1995, it flipped into the positive mode. When the Atlantic is in its warm mode there are more and stronger hurricanes and more landfalls. There is also widespread warming in the Northern Hemisphere on an annual basis. Since the warm (positive) modes of both cycles lead to warming and the cool (negative) modes lead to cooling, I normalized and added them and used this as an "Ocean Warming Index." I found a very strong correlation (r-squared) of 0.86 for this relationship. Again the data was smoothed to eliminate the 11-year solar cycle effects.

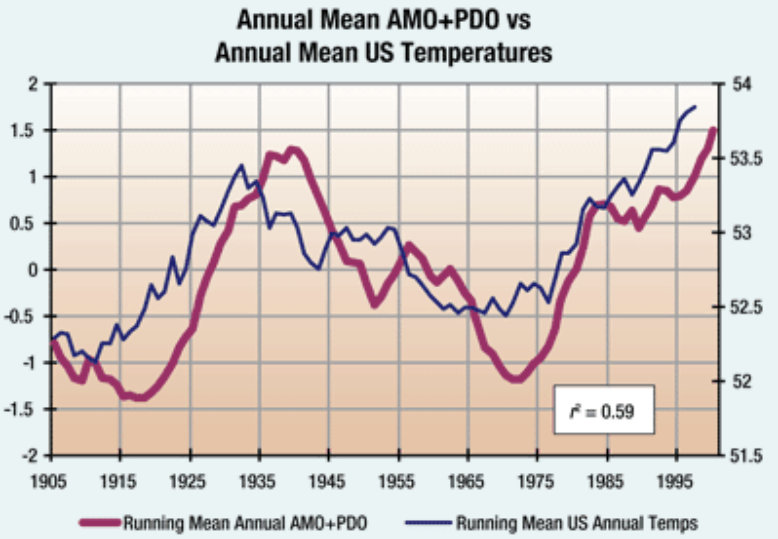

Figure 3: 11-year Annual Mean AMO + PDO vs. Annual Mean Temperatures. Correlation (r-squared) of 0.86.

The correlation with carbon dioxide increases during the same period was less than 0.5. In fact Willie Soon (10) showed a correlation with carbon dioxide of just 0.22 for the Arctic basin temperatures.

The high correlations with both solar and the oceans suggest they are themselves correlated. Indeed it is highly possible that the extra heat input into the tropical oceans during an active solar period energizes the thermohaline circulation, producing a positive PDO, more El Niños, and then a warm Atlantic. This, together with the increase in hurricanes and strong winter storms, is another way the atmosphere and ocean systems compensate for unbalanced energy distribution. These are all ways to move that heat to higher latitudes, where there is a net loss of radiation out to space.

Where Do We Go From Here?

There are indications, given both the 80-year and 180-year cycles, that the sun will be much less active over coming decades. The majority of solar cycle methods suggest the next cycle will be less than the last one, which itself was 20 percent less than the prior cycles. NASA (Hathaway), based on the observed slowing of the sun's plasma flow, predicts that cycle 25, which peaks in 2022, could be the quietest in centuries. Remember that quiet cycles are cool cycles.

Also, the Pacific Decadal Oscillation increasingly shows signs of descending back into its cold mode. This, too, should result in global cooling. The Atlantic may have another decade to go before it cools again.

These three factors suggest a cooling is about to begin. In fact, there are a number of measures, such as ocean heat content (which has not increased in the last 4 years), satellite-derived atmospheric temperatures, and ocean and land temperatures, which are all showing a cooling period over the last 5 to 8 years. It is possible either 1998 or 2001 will end up being the peak of this current warm cycle.

Before the next assessment, the world may be taking note of the cooling or the cessation of the warming. I suppose the UN and the alarmist scientists and environmental groups will claim credit for stopping the disaster just in time.

Lost in all of this is the fact that we have had an optimum climate the last 30 years – with warmer temperatures, more rainfall, and increased CO2 – that has enabled us to grow more food in more places, and consume less energy than had the cold weather of the 60s and 70s persisted. Descending back into a little Ice Age has far greater negative consequences than a slow and relative minor warming. Crop failures and famines are more common due to dryness and cold, and the world would consume more energy for heating. We may look back at the late 20th and early 21st centuries as the golden years.

Future generations will shake their heads over how we failed to recognize a good thing when we had it and how science was hijacked by politics, environmentalism, and greed. We would be better off spending all our dollars and efforts on maximizing energy sources, new and old, than trying to eliminate a gas that does far more good than harm.

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Joseph D'Aleo: CCM, AMS Fellow

Joseph D'Aleo has over 35 years experience in professional meteorology. He was the first Director of Meteorology and co-founder of the cable TV Weather Channel. Mr. D'Aleo was Chief Meteorologist at Weather Services International Corporation and Senior Editor for WSI's popular Intellicast.com web site. He is a former college professor of Meteorology at Lyndon State College. He is the author of a Resource Guide on El Nino and La Nina. Mr. D'Aleo has frequently written about and made presentations on how research into ENSO and other atmospheric and oceanic phenomena has made skillful seasonal forecasts possible as well as the roles cycles in the sun and oceans have played in climate change. He is currently Executive Director of the International Climate and Environmental Change Assessment Project.

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The views expressed are those of the author and not necessarily those of SPPI.

Robert Ferguson, President
bferguson@sppinstitute.org

209 Pennsylvania Ave., SE
Suite 299
Washington, D.C 20003
www.scienceandpublicpolicy.org (202) 288-5699