**Facts about Global Climate Change That You Won't Read in the Popular Press**

*By Joseph D'Aleo, Fellow of the American Meteorological Society*

Claims that the ten warmest years have occurred in the last dozen years are blatantly untrue. We do not have an accurate assessment for temperature trends the last century. In fact dozens of peer review papers suggest the current estimates overestimate the changes by 50% or more. New research suggests virtually all the real changes can be explained by natural variability.

The most accurate temperatures come from satellites but the data starts in 1979. For the surface station data bases, contamination comes from a drop-out of 80% of the world's stations, most rural, by poor station siting (90% of the approximately 1000 surveyed climate stations do not meet the government's own published standards), by not adjusting properly for the urbanization warming that has taken place as the world's population rose for 1.6 to 6.7 billion people since 1900 (in the case of the US data, actually removing a very good urban adjustment), by employing instruments not really meant for precision temperature measurements or with warm biases, and most recently by eliminating ocean data sources like satellite or not using promising new sources like the global deployed Argo buoys because they are showing an alleged cold 'bias' or cooling in conflict with the model forecasts.

With the data the national data centers perform then a homogenization adjustment that blends the good with the bad (a little like the toxic assets in the mortgage crises). Though this may improve some of the bad data, it degrades the good data. Most of the warming is with the minimum temperatures at the surface in middle to higher latitude cities and in winter, all classic characteristics of the urban heat island, which can be experienced even for towns with populations of just 1000.

There has not been an increase in heat waves as claimed. In fact, the number of heat records have been lower this decade than any decade since the 1800s. The peak decade for heat records was very clearly the 1930s in the United States. Globally all the all-time continental heat records were in the early part of the last century or 1800s.

Climate models used to forecast warming as much as 10F or more by 2100 are failing miserably. None of the scenarios showed the cooling of the last 8 years and cessation of warming in 1998. The models are failing because they get don't get their warming from CO2 but from positive feedbacks from assumed changes to water vapor and cloudiness which produce most of the warming. Both weather balloons and satellites tell us the feedbacks are actually negative, producing a cooling for any increase CO2 allegedly causes. Read more here and here.

Other extreme weather events have also not increased. We are off to the quietest start to the Atlantic hurricane season in over 4 decades and the Global Accumulated Cyclone Energy Index tracked by FSU has remained at the lowest levels in 30 years the last few years (see paper on trends here). The number of strong F3-F5 tornadoes has declined

since the 1970s. The number of droughts have been declining and though there has been localized more heavy rain events, they are indicative of cooling not warming. Indeed all-time record or first time ever snowfalls have occurred in diverse locations worldwide the last few years (here and here and here).

Indeed global temperatures have been cooling since 2002, even as carbon dioxide has continued to rise. CO2 is not a pollutant, but a naturally occurring gas. Together with chlorophyll and sunlight, it is an essential ingredient in photosynthesis and is, accordingly, a plant food.

Reconstruction of paleo-climatological CO2 concentrations demonstrates that carbon dioxide concentration today is near its lowest level since the Cambrian Era some 550 million years ago, when there was almost 20 times as much CO2 in the atmosphere as there is today without causing a "runaway greenhouse effect." Our historical measurement methods are flawed.

Temperature changes lead, not lag, CO2 changes on all time scales. The oceans may play a key role, emitting carbon dioxide when they warm as carbonated beverages lose fizz as they warm and absorbing it as they cool. The atmospheric CO2 has a much shorter lifetime (the order of 5 years) than the IPCC and other models assume 150-200 years).

Indeed, greenhouse models show the warming should be greatest at mid to high atmosphere levels in the tropics. But balloon and satellite observations show cooling there. The greenhouse signature or DNA does not match reality, and the greenhouse models thus must greatly overstate the warming – and in a court of law would have to be acquitted of any role in global warming (more here and here).

The sun has both direct and indirect effects on our climate. Solar activity changes on cycles of 11 years and longer. When the sun is more active it is brighter and a little hotter. More important though are the indirect effects. Ultraviolet radiation increases much more than the brightness and causes increased ozone production, which generates heat in the high atmosphere that works its way down, affecting the weather. Also, an active sun diffuses cosmic rays, which play an important role in nucleation of low clouds, resulting in fewer clouds. In all these ways the sun warms the planet more when it is active. An active sun in the 1930s to 1950s and again near the end of the last century helped produce the observed warming periods. The current solar cycle is the longest and quietest in over 100 years, an unmistakable sign of a cooling sun that historical patterns suggest will stay so for decades. We had the 4$^{th}$ most sunspotless (265) days in 2008 since 1849 and this year we are already at 213 and likely to end up in the top 3.

The multidecadal cycles in the oceans (here and here and here and here and here) correlate extremely well with the solar cycles and global temperatures. These are 60 to 70 year cycles that relate to natural variations in the large-scale circulations. Warm oceans correlate with warm global temperatures. The Pacific started cooling in the late 1990s and it accelerated in the last year, and the Atlantic has cooled from its peak in 2004. This

supports the observed global land temperature cooling, which is strongly correlated with ocean heat content. Newly deployed NOAA buoys confirm global ocean cooling.

Warmer ocean cycles are periods with diminished Arctic ice cover. The arctic temperatures exhibit the same 60-70 year cycles.When the oceans were warm in the1930s to the 1950s, Arctic ice diminished and Greenland warmed. The recent ocean warming, especially in the 1980s to the early 2000s, is similar to what took place 70 years ago and the Arctic ice has reacted much the same way, with diminished summer ice extent. Dr. Willie Soon has shown this relates to solar activity far better than to CO2. The arctic ice extent has increased 24.5% since 2007. Greenland ice has increased in the interior and diminished near the edges since the Atlantic warmed in 1995 but there is little evidence of any increased threatening melting or warming.

Antarctic ice has been increasing and the extent in 2007 was the greatest in the satellite monitoring era. The icecover remains well above the normal. The fractures of the ice sheet near the Antarctic Peninsula are due to changing currents and winds and surface and ocean bottom volcanic activity.

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