Solar Cycle 24

Why the world will continue cooling and why carbon dioxide won't make a detectable difference.

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Foreword by Professor David Bellamy

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1.0 Prologue

Warming or cooling?

The first thing to be aware of is that the warming effect of carbon dioxide is strongly logarithmic. Of the 3°C that carbon dioxide contributes to the greenhouse effect, the first 20 ppm has a greater effect than the following 400 ppm. By the time we get to the current level of 384 ppm, each 100 ppm increment will produce only about 0.1° of warming. With atmospheric carbon dioxide rising at about 2 ppm per annum, temperature will rise at 0.1° every 50 years.

If that is true, you will ask, how does the Intergovernmental Panel on Climate Change (IPCC) get its icecap-melting figure of 5° for doubling of the preindustrial level to 560 ppm? An equation called the Stefan-Boltzmann equation tells us that in the absence of feedbacks, doubling would produce a rise of 1°. The IPCC climate modelling assumes that the feedback from this rise will be positive; that is, that the extra heat will cause more water vapour in the atmosphere, which in turn will cause more heat to be trapped, and the system compounds away until 1° gets turned into 5°. As described, the Earth's climate would be tremendously unstable, prone to thermal runaway at the slightest disturbance.

The real world evidence says the opposite. In late 2007, a Dr. Roy Spencer of the University of Alabama published a paper analyzing data from the Aqua satellite. Based on the response of tropical clouds, Dr. Spencer demonstrated that the feedback is negative. He calculates a 0.5° warming for a doubling of the preindustrial carbon dioxide level. Global warming is real, but it is also minuscule. Atmospheric temperature rose 0.7° in the 20th century; it has also fallen by the same amount in the last 18 months. Global warming, as caused by carbon dioxide, will be lost in the noise of the system.

If carbon dioxide didn't cause the warming of the 20th century, what did? Well, a good place to start is the sun. In the 20th century, the sun was more active than at any time in the previous 8,000 years. But what is happening now suggests that it will soon be much quieter. Two Danish researchers, Friis-Christensen and Lassen, demonstrated in a 1991 paper that there is a correlation between the length of a solar cycle and the temperature during the following solar cycle. The longer a solar cycle, the cooler the following solar cycle, and visa versa. In 1996, Butler and Johnson demonstrated the same relationship on climate data from the Armagh observatory in Northern Ireland. I have extended that to the 350 year Central England temperature record, the De Bilt data from Holland, and a number of temperature records from the northeastern US. In the latter, the relationship is that each 1-year increase in solar cycle length will cause a 0.7° decline of atmospheric temperature during the following cycle.

Solar cycles are normally 11 years long. We are currently near the end of Solar Cycle 23, which started in May 1996. It is now just over 12 years long. The previous cycle, 22, was a short one at 9.6 years. The differential is now two and a half years, which equates to a temperature decline of 1.7°. This is in the bag. The way that

Solar Cycle 23 is declining, combined with the very weak ramp-up of Solar Cycle 24 sunspot activity, suggests that the month of solar cycle minimum will be July 2009. If that transpires, the cooling will amount to over 2°.

That last time that something like this happened was a period called the Dalton Minimum from 1796 to 1820. This was caused by the very weak Solar Cycles 5 and 6. They were preceded by the very long Solar Cycle 4, which was 13.6 years long. There were quite a lot of crop failures due to cold weather during the Dalton Minimum. That is why there is so much interest in sunspot activity at the moment. Each day's delay in the month of solar minimum will make the second decade of the 21st century two thousandths of a degree colder. That doesn't sound like much, but we may have another year to go.

A little-discussed consequence of the coming doubling of the atmospheric carbon dioxide level is the effect on plant growth. Wheat yields have already risen 15% due to the 100 ppm rise from the preindustrial level. Doubling will cause a 50% increase in yield, with similar effects for all other crops. In summary, global warming is real but minuscule, there is a big solar-driven cooling coming in a few short years, and increased atmospheric carbon dioxide is wonderful for plant growth. It therefore follows that burying or trying to limit such a wonderful substance is exactly wrong in science.

2.0 Foreword

By Professor David Bellamy OBE

Early in my school career, the physics master told me that, despite my lack of mathematical acumen, I could still enjoy physics by mastering the definitions and the meaning of the laws that explain why the world goes round. Facts of science peer reviewed by observation, experiment and robust discussion across the centuries eventually took their place in the corpus of the knowledge and practice of civilization.

The fact that the Earth does go round the sun was proved thanks to Galileo's telescope and his faith in science and sun spots. Heat cannot of itself pass from a colder body to a hotter one, pointing to the fact that the universe must therefore be slowly but surely cooling down. The wavelengths of sunshine beaming in from our nearest source of heat and light pass freely through outer space because there is negligible mass of anything to affect their passage.

It is for this reason that the temperature in the nothingness of the interstellar void is only three degrees absolute, that is minus 270 degrees Celsius, so cold that all chemical reactions are at a standstill. As the sun's radiance approaches the atmosphere some 90 kilometres up it impacts with molecules of gases that are there because each have sufficient mass to be held in orbit by the gravitational mass of this lonely planet.

These gases which are important building blocks of all living things including you and me are nitrogen, oxygen, water vapour, carbon dioxide, nitrogen oxides and methane. Nitrogen and oxygen that make up 98.63% of the mass of the atmosphere are spectrally transparent to the incoming radiation from the sun and so take no part in warming the atmospheric envelope. The sun's rays heat the surface of the earth and the heated surface gives off infrared radiation.

Most of the infrared radiation is absorbed by the molecules of water vapour and carbon dioxide in the atmosphere so producing heat which causes the local excitation of other atoms and molecules. As the air warms it becomes less dense and rising into the colder layers above obey Newton's Law of cooling which states that the rate of cooling is dependant on the difference in temperature between the warmest and the coolest body.

The wrap-round galactic fridge acts as an eternal sink and the attenuation of gravity with distance from this lonely planet sets the outer limit of the atmospheric blanket as the gases are further attenuated in the enormity of space.

Anyone who travels by jumbo jet can bear witness to Newton's law, as the plane takes off, the ambient temperature drops and the reverse happens during descent. Every such in-flight experience demonstrates the fact that without these reactive "greenhouse" gases we would freeze to death as life as we know it came to an end. The turbulence of mass flow and solar wind complicates the matter as does the fact that the amount of water vapour in the atmosphere varies with temperature.

Between plus 4 degrees and zero Celsius, liquid water begins to take on the structure of ice, which being less dense than the liquid, floats on the surface, putting a protective lid on lakes and oceans that prevents them from deep freezing. The fact that the overwhelming mass and spectral clout of water vapour in the atmosphere fluctuates with temperature serves to regulate the vagaries of temperature by producing sunshade or heat trapping clouds, and high albedo ice crystals. The latent heat of evaporation and ice formation add to the complexities of Le Chatelier's concept of mobile equilibrium.

Back in the early 1970s while teaching botany at Durham University, morning coffee became spiced with Armageddon talk. The current ice age had not come to an end, indeed it was about to return with a vengeance, so warned the doomsters highlighting a drop in the Earth's temperature of 0.3 of a degree Celsius over a period of 20 years to press their argument.

During this short period, the enactment of a clean air act had effectively reduced the scourge of death by sulphurous smogs in the cities of Britain, cities that had done their best to keep death by hypothermia at bay by burning cheap low grade coal in millions of open grates. The only real problem with switching to this simple form of clean coal technology was that our farmers had to add the cost of sulphur to their already expensive mix of fertilisers. Life expectancies took a turn for the better but the icy sword of Damocles was wielded with good effect by the media and other consenting scaremongers.

However an inconvenient upswing of world temperatures put the ice age scenario on hold, setting part of the same pack of sandwich board scientists off on a new band wagon of doom and gloom which has already cost the world's taxpayers over 50 billion greenbacks to pay for computer and international conference time. They called it anthropogenic global warming and blamed it on carbon dioxide, the atmospheric levels of which had been rising since the industrial revolution began digging and drilling into the world's fossil fuel reserves.

The days of production biology sent research teams out across the world to measure the production of organic matter by a range of natural and managed ecosystems from the poles to the equator and from mountain tops to the depths of the euphotic zone. Each study was a working inventory of the state of play in the balance of photosynthesis and respiration that makes this living planet go round, while keeping its environment in some form of balance.

Plant ecologists worthy of their honours degree were well versed in the importance of stomatal indices controlling the ingress of carbon dioxide and egress of water vapour from photosynthetic plants. They even had the audacity to point out that far from being a pollutant, carbon dioxide was the most important airborne fertiliser in the world.

All just in time because the decades of destruction were gathering pace and diversification of the use of the internal combustion engine was in the driving seat. Soil erosion, floods, droughts, the collapse

of coral reefs and the extinction of species made headlines in the broadsheets and tabloids as habitat destruction, overgrazing and over-fishing took their toll. Wanton acts of ecological vandalism starred on films, tapes, documentaries, newsprint, books, magazines and scientific papers and the conservation industry was born.

Sadly it did not take long for them to sing along with the global warmers, blaming just about every one of the world's environmental woes on their favourite tail pipe emission carbon dioxide, not on the march of the machines themselves.

By this time computers were opening up the world of maths to biologists like me and the rapid handling of data allowed even taxonomy, evolution and plant ecology into realms undreamed of by Linnaeus, Wallace and Darwin. I felt ready to join in the discussion.

I rapidly found myself confronted by what can only be termed a state of McCarthyism in Science, unbelievably backed up by that once doyenne of impartiality the BBC, for whom I had made many documentaries based on natural history and the environment. Hence this book.

David Bellamy is the most eminent botanist and conservationist in the United Kingdom. He is the author of over 45 books published over the last 36 years and the writer and presenter of over 400 television programmes. His presidencies include the Wildlife Trusts Partnership, the Galapagos Conservation Trust and the British Naturalists' Association. David Bellamy's deep commitment to conservation and energy in promoting that cause has made him the recipient of many honours.