

David C. Archibald 2008, "Warming or cooling?", *Oil & Gas Journal*, v.106 no.30 (*Letters*, August 11)

### **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-Boltzman equation tells us that in the absence of feedbacks, doubling would produce a rise of 1°. The IPCC climate modeling assumes that the feedback from this rise will be positive; that is, that the extra heat will cause more water vapor 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 400 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 2½ 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.

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