

# COMPUTER CLIMATE MODEL PREDICTIONS

Last year approximately 2 billion dollars was spent on computer programs to predict climate changes (Discover Magazine-March 2008, page 13). You can contact Discover Magazine for information on how you can use your own computer to help crunch numbers to support the development of these climate models.

The computer climate model tries to build a mathematical model which will predict climate changes. I, personally, don't have much faith in these computer programs. All of us have heard the term GIGO---garbage in = garbage out. Today there are 14 climate models being used and the projected temperature increases range is from 2 to 11.5 F by the end of the century. Past IPCC temperature predictions were overestimated by a factor of at least 2 or 3. One must ask, "How you can predict the climate when you can't even predict the weather two weeks in advance?"

To have a successful climate model, you must have all the major inputs, yet I hear experts saying these climate models do not know how to input cloud formation and do not account for the heat transfer to the upper atmosphere by evaporation. *The IPCC frankly admits that... "probably the greatest uncertainty in future projections of climate arise from clouds and their interaction with radiation... Clouds represent a significant source of potential error to climate simulations"* (Reference 11, page 271).

Further, just having all of the most important parameters in place is not good enough. You must understand the principles which drive the phenomena. The eminent Princeton physicist, Freeman Dyson, claims the climatic computer programs *use fudge factors, rather than physics*, to represent important parameters like evaporation and convection, clouds, and rainfall.

These computer programs do not predict the existence of El Ninos and La Ninas, which we know not only affect US climates but are the major factors in determining rainfall in southern Africa. Dyson says these climate models should be used as *tools* to understand climate, but certainly not to predict it.

Finally, I must add that any such climate program may never be successful because of the “butterfly effect” (Reference 5, page 30). The “butterfly effect” states that a butterfly in the Amazon, just by flapping its wings, can affect the weather in the United States. Sir Isaac Newton thought everything was predictable, but with the advent of quantum mechanics and the “uncertainty principle”, we know that it is not so, at least, on a sub-atomic level. Chaos Theory, which deals with the non-linearity and subtle effects of initial starting conditions, also shows this is not the case for real-life unstable-equilibrium systems.

For example, we don’t even know the relationship between cloud formation and cosmic rays. In a Wilson Cloud Chamber, atomic radiation is detected by particles forming ion condensation trails along their flight paths. Supercooled water vapor exists at high altitudes and has not yet formed clouds. While some scientists argue that historic data does not support a role of cosmic rays in cloud formation, a number of scientists are not convinced. The European atomic physics group, CERN, have a program underway involving 19 countries, 18 scientific institutes and many physicists with various backgrounds to investigate whether cosmic rays do affect cloud formation.

In the section of this course on hurricane predictions, we see the IPCC struck out in 2006 and 2007 ---big time! When you examine the historical relationship between temperatures and carbon dioxide levels, there appears to be no relationship. (They struck out again!) When you examine ice core data and see all three greenhouse gases (carbon dioxide, methane, and oxides of nitrogen) rising simultaneously, you can hardly blame man, for ice core data goes back 600,000 years! In other words, they struck out again! I really don’t think IPCC understands what they are doing!

Among the most important factors to understand are the natural feedback loops. For example, why have we had thousands of “ice ages cycles”? Every time things get too cool, something reverses the cycle, causing a warming period. Every time the Earth heats up too much, something reverses the cycle and we go into a major chill down. (See Figure 14 on page 35.)

So many computer programs today allow a scientist or engineer to plug in numbers and get an answer, yet the engineer may not have the foggiest insight into the importance of various parameters. In fact, when an obviously wrong answer comes out, he cannot recognize there must have been an input or program error.

In other words, just crunching numbers is just plain foolish. I once had a boss who said, “The purpose of analysis is insight, not numbers.”

Finally, just because you can compute it, doesn't mean it will happen. *You can extrapolate nearly any trend and predict a catastrophe.* Hence, the world has been full of people with dooms-day predictions. Professor Paul Ehrlich, in his book "The Population Bomb" extrapolated the population and agricultural trends and claimed "The battle to feed humanity is over. In the 1970's and 1980's, hundreds of millions of people will starve to death in spite of any crash program embarked upon now." It never happened! Then there was the famous "Club of Rome" who were convinced we would run out of raw materials so soon that the prices would rise out of sight. It never happened!

If one of your ancestors had set up a trust fund, depositing a single dollar and received 6% interest on it every year since Christ was born, it would be worth 6.5 hundred trillion trillion trillion dollars today \* (Yes, that's  $6.5 \times 10^{50}$  dollars). (Try it on your hand calculator---raise 1.06 to the 2008<sup>th</sup> power.) It can never happen, for the trust fund would have easily accumulated all of the wealth of the world in less than 550 years!

\* That is about the same number of grains of sand that would fit into a box measuring 10 billion miles on a side.

If bacteria reproduced so rapidly that its population doubled every minute, in 2 hours it would weigh 10 times more than the Earth. It will never happen!

So, what is my point? I am personally skeptical of those who predict doom. I am also skeptical of the magnitude of the IPCC climate computer programs. The speed is impressive, processing more than 45 trillion floating-point operations per second (45 teraflops), but the quality of the output is very suspicious. It reminds me of the cynical saying, "Pick up the ball and run with it. It's the speed that's important, not the direction!"