# Climate Science Fiction

*Computer models just don't work. Words by William Happer, Ph.D. Photo illustration by John Bardwell.*

I'm a physicist. I have published over 200 peer-reviewed scientific papers and I have co-authored several books, including one of the first on the effects of increasing levels of carbon dioxide ($CO_2$) on climate. I served as director of the Office of Energy Research at the U.S. Department of Energy from 1990 to 1993, where my office spent over $3 billion a year funding basic research in many areas of science, including climate and climate models.

I know a lot about the science of the Earth's atmosphere and climate. Before coming to DOE, I invented the "sodium guide star" that is used on most big astronomical telescopes to measure and correct for the turbulence of the atmosphere. Atmospheric turbulence blurs the images of stars and other space objects.

I want to discuss computer models that paint frightening scenarios of climate change. These models don't work. They predict far more warming than has been observed over the past few decades. Other model predictions have also failed. The rates of sea-level rise have not accelerated. The weather has not become more extreme.

The Earth's climate involves the complicated interaction of two turbulent fluids, the atmosphere and the oceans. It is devilishly hard to predict what a fluid will do, as was noted thousands of years ago in a biblical verse: "The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth."

As the verse suggests, climate modeling is a very hard problem. When asked what he would ask God, Werner Heisenberg, one of the inventors of modern quantum mechanics, supposedly responded: "I would ask God two questions. 'Explain quantum mechanics, and explain turbulence.' I think he will have an answer for the former."

Poorly informed proponents of climate alarmism like to claim that the science of climate change is as well understood as the laws of celestial mechanics and that we can predict climate one hundred years from now as well as we can predict eclipses of the sun. Anyone who followed the forecasts of the path of Hurricane Irma in fall 2017 can appreciate how absurd such claims are. As recently as a few days before the hurricane struck, models could not even forecast whether the storm would move up the west or east coasts of Florida.

However, based on models of the climate a century from now, we are supposed to embrace wrenching economic policies. These will be a minor inconvenience for the privileged saviors of the planet. But the policies will hurt the rest of humanity and probably damage the environment as well.

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It is not hard to write partial differential equations that describe the Earth's climate: heating by the sun, cooling due to thermal radiation to space, how the motions of parcels of air and water respond to the driving forces of pressure, gravity, viscosity, the rotation of the Earth, etc. But the resulting equations cannot be solved, even by the most powerful supercomputers.

Instead, the equations are replaced with highly simplified models that throw away much of the detail of the real atmosphere and oceans. The models have lots of "parameters," numbers that are adjusted to produce whatever the modelers believe the correct results should be. In their relationship to reality, climate models and the financial statements of the Enron Corporation have some similarities.

Our beautiful Earth is the water planet. The atmosphere holds large amounts of water vapor and clouds of water droplets and little ice crystals. And then there are the oceans that cover 70 percent of the Earth's surface. Water is probably the single biggest problem for climate models.

Water has huge effects on atmospheric heating and cooling, both by radiation and convection. Compared to water vapor and clouds, $CO_2$ is a minor contributor to the greenhouse warming of the Earth.

The convection of heat, oxygen, salt and other quantities through the oceans continues to provide one surprise after another to oceanographers. Oceans warm and cool yearly. They are perturbed by quasi-periodic El Niño episodes in the tropical Pacific every few years and influenced by many other cyclic phenomena. The slow convection of heat, salt, oxygen, $CO_2$ and other quantities from the poles to the deep oceans can take many centuries.

Few are aware that present $CO_2$ levels—about 404 parts per million in 2017—are low by the standards of geological history, where levels of 2,000 ppm and even much higher were common. Life flourished even more abundantly at these higher past levels of $CO_2$. Indeed, the only clear consequence of the increase of $CO_2$ levels from about 300 ppm in the year 1900 to about 404 ppm today has been a greening of the Earth and an increase of primary biological activity by photosynthesis.

I know the difference between real and phony science. My sodium guide stars work. Climate models do not. ■

*William Happer is professor emeritus of physics at Princeton University. Check video on YouTube or at PragerU.com.*