'Synchronized chaos' points to a cooler climate

By Laura L. Hunt

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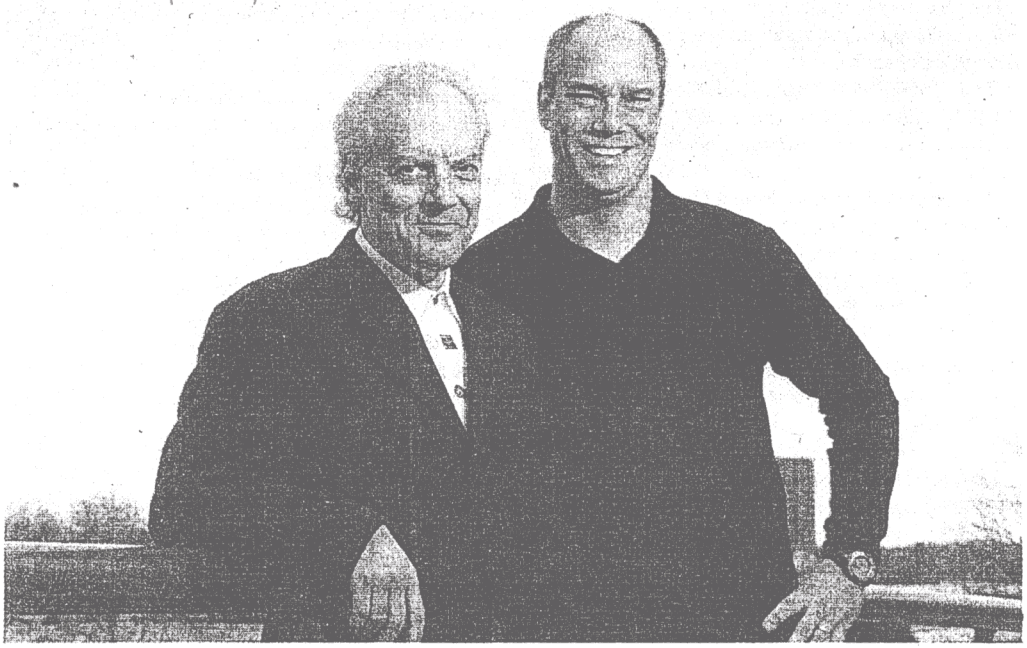

Peter Jokubowski

A study by UWM Distinguished Professor Anastasios Tsonis (left) and Professor Kyle Swanson shows that the global climate is cooling for now.

Two UWM scientists have used a new technique to build a mathematical model that can assess global climate change.

Their model indicates that global warming will be on hold for the next 20 to 30 years while the Earth's temperatures actually cool.

The work, funded by the National Science Foundation, doesn't refute the assertion of long-term, human-driven global warming, says UWM Distinguished Professor Anastasios Tsonis and Professor Kyle Swanson. But it illustrates that climate change is an extremely complicated system and its natural drivers are not yet fully understood.

"That's something we have to determine first – how the natural forces behave – before we try to address the issue of global warming due to other variables," says Tsonis. "What we're saying is that natural forces are going to take over. Any other warming variable would be riding on the back of this."

Using a technique called "synchronized chaos," the pair charted the collective effects of four main natural drivers of Earth's climate since 1915 – the year climate monitoring began. They found that these continuous short- and long-term cycles affecting weather patterns are synchronized. But when two or more interact with one another, the synchronicity is destroyed – and the result is a shift in climate states worldwide.

After this last occurred in 2000, global temperatures flattened and, by 2005, were dropping. According to the model, this cooling trend will continue for the next 20 to 30 years before temperatures begin rising again (see the red line on the accompanying chart).

ing the Earth's atmosphere, he believes it will be another 50 years before scientists have enough data to know for sure.

"What else is happening?" he asks. "What role do the oceans play? How sensitive is climate to more carbon dioxide emissions? There is so much we don't know.

"It looks like the planet has a tendency to avoid an extreme of either kind," he says. Because adjustment mechanisms appear on many scales, more information and time are needed to predict how those adjustments will impact the overall trend.

Twenty-five years ago, Tsonis was the first scholar to apply chaos theory – the notion that systems that appear random actually operate within certain rules – to meteorology.

Swanson, who has been on the UWM faculty since 1997, specializes in climate dynamics and modeling hurricane activity.