

Sun refuses to set on warming theories

Mark Lawson.

The existence of global warming continues to be a cause of heated debate, writes Mark Lawson.

After many years of debate, a surprising consensus has emerged from the fledgling field of climate forecasting - global temperatures are likely to remain stable and may even fall until around 2015 and then kick up.

After that, the climate crystal ball becomes decidedly murky with climate modellers following the lead of the Intergovernmental Panel on Climate Change saying that temperatures will keep on rising.

But one forecaster and strong advocate of the overriding influence of the sun on climate, professional UK weather forecaster Piers Corbyn, says that after 2015 temperatures will go up but only temporarily, then decline again.

Scientists generally regard Corbyn's approach as unconventional, while those who agree variations in solar activity affect climate to the exclusion of most other factors (including industrial gases), decline to make forecasts.

However, an article in the science journal *Nature* (letters, May 1) states that global temperatures are expected to remain stable over the next decade. Paper lead author Noel Keenlyside of the Leibniz Institute of Marine Sciences in Kiel, Germany, expanded on that point in a subsequent interview with the UK-based *Daily Telegraph* newspaper.

He says that he does not expect there will be any warming until 2015, but once past that period global temperatures will pick up.

Keenlyside repeatedly says that his work does not contradict that of the IPCC. Instead he is making short-term climate projections by adding the effect of climate cycles to existing IPCC projections.

The paper in *Nature* says that over the next decade, the current Atlantic meridional overturning circulation (AMO is a climate cycle like El Nino) will weaken to its long-term mean. In addition, the "North Atlantic sea surface temperatures and European and North American surface temperatures will cool slightly, whereas tropical Pacific sea surface temperatures will remain almost unchanged.

"Our results suggest that global surface temperatures may not increase over the next decade, as natural climate variations in the North Atlantic and tropical Pacific temporarily offset the projected anthropogenic warming."

The paper in *Nature* is the second major effort to include climate cycles in IPCC forecasts. A team led by Greg Smith of the UK Meteorological Office reported last year (*Science*, August 10, 2007) that, after allowing for climate cycles, they expected temperatures to remain subdued this year and then turn up.

Peter Baines, a professorial fellow at the University of Melbourne's Faculty of Civil and Environmental Engineering, who has also done considerable work on climate cycles says that papers by Keenlyside and Smith are broadly similar, although there are differences in detail.

"Together they are encouraging, and the variability in the AMO (with a period of about 60

years) seems to be real," he says.

Although the AMO influence on sea surface temperatures is largest in the northern North Atlantic, its influence may well be global.

"Since we have a viable mechanism (the AMO), we have a process on which to base decadal scale climate forecasts, to this extent at least," Baines says. "I believe that there are other decadal-scale processes out there yet to be identified, and can be included once they are understood and monitored."

Whatever the merits of these, forecast temperatures have been subdued of late. Charts on the site run by the Hadley Centre in the UK, show declines in temperatures in the past two years, plus a very sharp drop in temperature in the first few months of this year due to the La Nina climate cycle.

Forecasts by Corbyn do not have the same scientific credibility as articles in Nature. His career includes being featured on the television documentary The Great Global Warming Swindle, and an on-radio shouting match with an English professor of solar physics, Mike Lockwood.

But Corbyn is also able to point to some success in weather forecasting. He runs a long-range weather forecasting agency in London, Weather Action, and won £20,000 placing bets on England's notoriously changeable weather with betting agency William Hill, before the agency banned him.

Speaking to the AFR from London, Corbyn says that most meteorologists do not like his approach to weather and climate prediction, mostly because he ignores the orthodoxy that industrial emissions are affecting temperatures. His predictions rely on pairs of solar cycles (the sun goes through distinct cycles of high and low activity marked by sun spots, in which each cycle takes 11 years) and its effect on pairs of earth years.

He says he does not concern himself with changes in visible light but in changes in the streams of charged particles (electrons and protons) and in changes in the solar magnetic field.

All of the past major changes in climate can be explained by changes in solar activity, and he does not believe the IPCC can produce a single piece of direct evidence that industrial gases are causing the earth to warm, he says.

General climate trends of previous centuries have been strongly linked to highs and lows in solar activity, but there is considerable argument over whether current comparatively high global temperatures can be linked to solar activity, let alone any accepted way to forecast temperatures. In contrast, the IPCC forecasts future temperatures but does not look back beyond the industrial era.

Baines says that there are about 30 years of good observations of incoming solar radiation, but the variations are not large enough to cause the global warming experienced over this period.

"The sun may well have caused changes over the past 1000 years, but I have been to several international meetings over the past few years where people who work on the sun address this question, and I have heard none of them claim that it causes global warming," he says.

One strong advocate of the link between solar activity and climate is Willie Soon, a solar physicist and climate scientist at the Harvard-Smithsonian Centre for Astrophysics in the US.

In an email response to a query about forecasting Soon says, "I think any speculation

about the future, especially weather and climate, is always dangerous".

He also says he has tried to understand Corbyn's methods but believes the rules keep on changing.

As for past links between solar activity and climate, Soon says he can point to a connection, and a physical mechanism, for climate changes in the arctic and coastal Greenland surface temperatures. He says this is a key region for detecting specific influences on climate.

Another scientist who has written extensively about previous natural variations in earth climate is Fred Singer, a professor at George Mason University in the US. Singer has co-authored the book *Unstoppable Global Warming*, which points to a 1500-year climate cycle. He was also a major organiser of the Nongovernmental International Panel on Climate Change - a group of scientists established as a counterweight to the IPCC. The NIPCC has produced a report highly critical of the conclusions of its more famous counterpart, but has not produced any forecasts.

Singer says, "I am often asked to make predictions. I cannot - and neither can climate models - for similar reasons. We don't know what the sun is going to do. We don't understand the details of the internal oscillations. They may at times cancel each other, or they may reinforce each other.

"On the other hand, we can analyse the past and try to deduce causes of climate change. I am reasonably convinced, and NIPCC presents compelling evidence, that the human contribution is minor and that natural causes dominate. This conclusion, that climate change is essentially unstoppable, and that CO₂ is not a pollutant, has, of course, important implications for policy."

Singer also notes that although carbon dioxide will have a warming effect, all current models assume a positive feedback that amplifies that warming effect. But many researchers believe a negative feedback, from clouds or from the way water vapour is distributed in the atmosphere, is more likely.

He also points to a host of different long and short-term climate cycles. The short-term fluctuations include those caused by interaction between the atmosphere and ocean, such as the El Nino, the Pacific Decadal Oscillation and several other climate cycles. He says these are essentially unpredictable but are evident in historic records of climate going back millions of years and current IPCC models have not included them.

Then there are cycles caused by changes in solar activity, with typical cycles lengths of 11, 22, 60-80, and up to 1500 years. None of those cycles should be confused with the nearly 20 ice ages of the past 2 million years - or even longer-term climate changes.

The Leibniz-Hamburg researchers are talking about cycles caused by the interaction between the atmosphere and the ocean, while Corbyn is talking about the externally-forced cycles.

"They don't talk to each other," Singer says.