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The global warming hiatus? Climate models all wrongly predicted warming, so let's call it a discrepancy

Ross McKitrick, Special to Financial Post | June 16, 2014 | Last Updated: Jun 17 9:31 AM ET

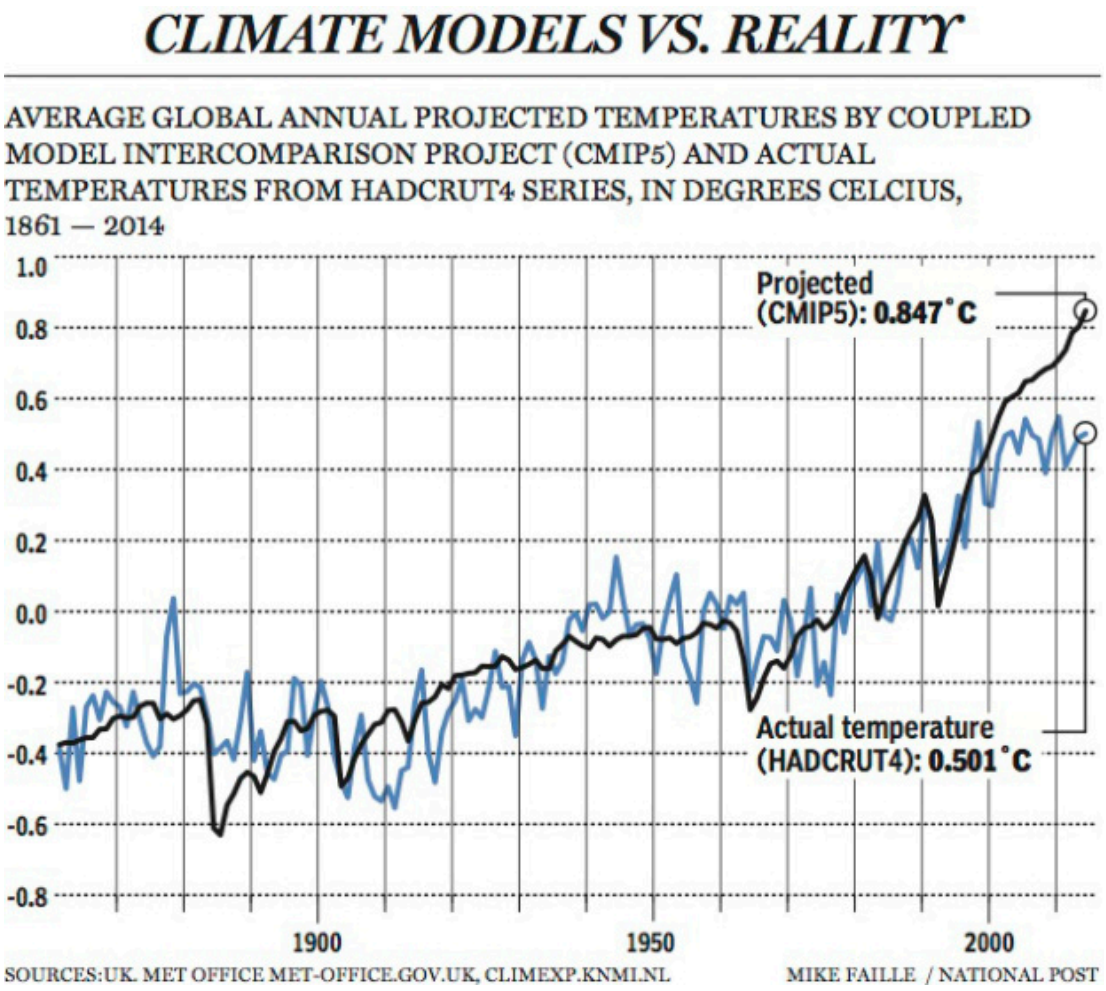
Climate models all wrongly predicted warming. Now this failure is called a 'discrepancy'. Associated Press

While the Intergovernmental Panel on Climate Change (IPCC) still uses the iconic word "unequivocal" to describe warming of the climate system over the past century, a new word has slipped into its lexicon: the "hiatus." They have begun referring, with a bit of hesitant throat-clearing, to "the warming hiatus since 1998."

Cracked-beakerBoth satellites and surface records show that sometime around 2000, temperature data ceased its upward path and leveled off. Over the past 100 years there is a statistically significant upward trend in the data amounting to about 0.7 oC per century. If one looks only at the past 15 years though, there is no trend.

A leveling-off period is not, on its own, the least bit remarkable. What makes it remarkable is that it coincides with 20 years of rapidly rising atmospheric greenhouse gas levels. Since 1990, atmospheric carbon dioxide levels have risen 13%, from 354 parts per million (ppm) to just under 400 ppm. According to the IPCC, estimated "radiative forcing" of greenhouse gases (the term it uses to describe the expected heating effect) increased by 43% after 2005. Climate models all predicted that this should have led to warming of the lower troposphere and surface. Instead, temperatures flatlined and even started declining. This is the important point about the pause in warming. Indeed, the word that ought to have entered the IPCC lexicon is not "hiatus" but "discrepancy."

The chart on this page reproduces an important diagram from Chapter 9 of the IPCC report. The gray line shows the surface temperature record (HadCRUT4 from the UK Met Office) from 1860 to the present. The black line shows the average of climate model runs covering the same interval. The black line in effect sums up mainstream views on how the climate works. Leading theories of major climatic mechanisms are programmed into models, which are then used to simulate the evolution of the climate. All models remain within a fairly narrow neighbourhood of the mean. This implies that the models share an overall central tendency and do not wander too far from it. In that sense the black line can be described as the mainstream thinking of contemporary climate science.



The data prior to the year 2000 represent historical reconstructions. Modellers were able to "peek at the answer" since they could not only observe inputs to the climate system (such as historical greenhouse gas levels, volcanic activity, solar changes and so forth) but also the simulation targets, namely average temperatures, when tuning their models. The match over the historical interval is therefore not proof of model accuracy since the models were forced to line up with observations.

But as of around 2000, the models are run prospectively, and this is where they begin to fail. Prior to 2000, the gray and black lines continually touch and cross, diverging and converging as they track each other over time. Whenever they drift apart for a few years they quickly turn and close up again.

But the post-1999 gap is something new. It has not only run the longest of any previous gap but it is still widening. Even if the black line were to rise over the next few years, it is difficult to foresee it ever catching up to and re-crossing the gray line. In other words, it is difficult to see models and observations ever agreeing again.

The IPCC briefly discussed the seriousness of the model-observation discrepancy in Chapter 9 of the 2013 report. It reports that over the 1998-2012 interval 111 out of 114 climate model runs over-predicted warming, achieving thereby, as it were, a 97% consensus.

The IPCC informally proposes several candidate explanations for this discrepancy, including the possibility that models are simply too sensitive to greenhouse gases, but does not identify a solution to the problem.

The absence of warming over the past 15 to 20 years amidst rapidly rising greenhouse gas levels poses a fundamental challenge to mainstream climate modeling. In an interview last year with the newspaper Der Spiegel, the well-known German climatologist Hans von Storch said "If things continue as they have been, in five years, at the latest, we will need to acknowledge that something is fundamentally wrong with our climate models." Climatologist Judith Curry of Georgia Tech recently observed "If the 20-year threshold is reached for the pause, this will lead inescapably to the conclusion that the climate model sensitivity to CO2 is too large."

We will reach the 20 year mark with no trend in the satellite data at the end of 2015, and in the surface data at the end of 2017. With CO2 levels continuing to rise, it will at that point be impossible to reconcile climate models with reality and the mainstream consensus on how the climate system responds to greenhouse gases will begin breaking apart.

Defenders of the current paradigm need to come up with an explanation as to why there has been no warming over an interval with rapidly increasing greenhouse gas levels. Natural mechanisms that might be strong enough to override greenhouse warming are starting to be proposed in the scientific literature. The problem is that the "science is settled" crowd spent the last 20 years insisting that natural mechanisms are puny compared to greenhouse warming, which is why they were so sure that greenhouse gases are the driving force in climate.

There are important policy implications of this situation. Benefits and costs of climate policy are analyzed using so-called Integrated Assessment Models (IAMs), which build simplified representations of climate

processes into dynamic economic models. The problem is that IAMs are calibrated to mimic climate models, not reality. To the extent climate models overstate the effects of CO2, so do IAMs, thereby yielding exaggerated estimates of the social cost of carbon emissions and overly stringent policy prescriptions.

Information will emerge over the next few years that has the potential to upend our understanding of the effect of CO2 emissions. At this point it seems unlikely that climate models in their current form will survive another five years. There is a high probability of new information emerging in the next two to four years that strongly affects calculations of the long term optimal policy stance on greenhouse gas.

There is no downside to awaiting this information. Though climate activists are always in a hurry, climate itself is a slow-moving issue. There is little benefit to acting now rather than, say, two years from now, but potentially major benefits, since what we learn over the next couple of years will make a major difference in understanding what the optimal course of action over the next century looks like. Waiting to get all these final, crucial facts could prevent countries from making very costly mistakes on how they manage fossil energy resources over the coming century.

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