This is the print version of the Skeptical Science article 'Climategate CRU emails suggest conspiracy', which can be found at http://sks.to/climategate.

What do the 'Climategate' hacked CRU emails tell us?

What The Science Says:
A number of independent investigations from different countries, universities and government bodies have investigated the stolen emails and found no evidence of wrong doing. Focusing on a few suggestive emails, taken out of context, merely serves to distract from the wealth of empirical evidence for man-made global warming.

Climate Myth: Climategate CRU emails suggest conspiracy
"[T]he 1079 emails and 72 documents seem indeed evidence of a scandal involving most of the most prominent scientists pushing the man-made warming theory - a scandal that is one of the greatest in modern science. [...] emails suggesting conspiracy, collusion in exaggerating warming data, possibly illegal destruction of embarrassing information, organised resistance to disclosure, manipulation of data, private admissions of flaws in their public claims and much more." (Andrew Bolt, Herald Sun)

In November 2009, the servers at the University of East Anglia in Britain were illegally hacked and emails were stolen. When a selection of emails between climate scientists were published on the internet, a few suggestive quotes were seized upon by many claiming global warming was all just a conspiracy. A number of independent enquiries have investigated the conduct of the scientists involved in the emails. All have cleared the scientists of any wrong doing:

1. In February 2010, the Pennsylvania State University released an Inquiry Report that investigated any 'Climategate' emails involving Dr Michael Mann, a Professor of Penn State's Department of Meteorology. They found that *"there exists no credible evidence that Dr. Mann had or has ever engaged in, or participated in, directly or indirectly, any actions with an intent to suppress or to falsify data"*. On "Mike's Nature trick", they concluded *"The so-called "trick"1 was nothing more than a statistical method used to bring two or more different kinds of data sets together in a legitimate fashion by a technique that has been reviewed by a broad array of peers in the field."*
2. In March 2010, the UK government's House of Commons Science and Technology Committee published a report finding that the criticisms of the Climate Research Unit (CRU) were misplaced and that CRU's *"Professor Jones's actions were in line with common practice in the climate science community"*.
3. In April 2010, the University of East Anglia set up an international Scientific Assessment Panel, in consultation with the Royal Society and chaired by Professor Ron Oxburgh. The Report of the International Panel assessed the integrity of the research published by the CRU and found *"no evidence of any deliberate scientific malpractice in any of the work of the Climatic Research Unit"*.
4. In June 2010, the Pennsylvania State University published their Final Investigation Report, determining *"there is no substance to the allegation against Dr. Michael E. Mann"*.
5. In July 2010, the University of East Anglia published the Independent Climate Change Email Review report. They examined the emails to assess whether manipulation or suppression of data occurred and concluded that *"we find that their rigour and honesty as scientists are not in doubt."*
6. In July 2010, the US Environmental Protection Agency investigated the emails and *"found this was simply a candid discussion of scientists working through issues that arise in compiling and presenting large complex data sets."*
7. In September 2010, the UK Government responded to the House of Commons Science and

Technology Committee report, chaired by Sir Muir Russell. On the issue of releasing data, they found *"In the instance of the CRU, the scientists were not legally allowed to give out the data"*. On the issue of attempting to corrupt the peer-review process, they found *"The evidence that we have seen does not suggest that Professor Jones was trying to subvert the peer review process. Academics should not be criticised for making informal comments on academic papers"*.

8. In February 2011, the Department of Commerce Inspector General conducted an independent review of the emails and found *"no evidence in the CRU emails that NOAA inappropriately manipulated data"*.
9. In August 2011, the National Science Foundation concluded *"Finding no research misconduct or other matter raised by the various regulations and laws discussed above, this case is closed"*.

Just as there are many independent lines of evidence that humans are causing global warming, similarly a number of independent investigations have found no evidence of falsification or conspiracy by climate scientists.

"Mike's Nature trick" and "hide the decline"

The most quoted email is from Phil Jones discussing paleo-data used to reconstruct past temperatures (emphasis mine):

> "I've just completed **Mike's Nature trick** of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) and from 1961 for Keith's to **hide the decline**."

"Mike's Nature trick" refers to a technique (aka "trick of the trade") used in a paper published in Nature by lead author Michael Mann (Mann 1998). The "trick" is the technique of plotting recent instrumental data along with the reconstructed data. This places recent global warming trends in the context of temperature changes over longer time scales.

The most common misconception regarding this email is the assumption that "decline" refers to declining temperatures. It actually refers to a decline in the reliability of tree rings to reflect temperatures after 1960. This is known as the "divergence problem" where tree ring proxies diverge from modern instrumental temperature records after 1960. The divergence problem is discussed in the peer reviewed literature as early as 1995, suggesting a change in the sensitivity of tree growth to temperature in recent decades (Briffa 1998). It is also examined more recently in Wilmking 2008 which explores techniques in eliminating the divergence problem. So when you look at Phil Jone's email in the context of the science discussed, it is not the schemings of a climate conspiracy but technical discussions of data handling techniques available in the peer reviewed literature. More on the hockey stick divergence problem...

Trenberth's "travesty we can't account for the lack of warming"

The second most cited email is from climate scientist and IPCC lead author Kevin Trenberth. The highlighted quote is this: ***"The fact is that we can't account for the lack of warming at the moment and it is a travesty that we can't."*** This has been most commonly interpreted (among skeptics) as climate scientists secretly admitting amongst themselves that global warming really has stopped. Trenberth is actually discussing a paper he'd recently published that discusses the planet's energy budget - how much net energy is flowing into our climate and where it's going (Trenberth 2009).

In Trenberth's paper, he discusses how we know the planet is continually heating due to increasing carbon dioxide. Nevertheless, surface temperature sometimes shows short term cooling periods. This is due to internal variability and Trenberth was lamenting that our observation systems can't comprehensively track all the energy flow through the climate system. More on Trenberth's travesty...

The full body of evidence for man-made global warming

An important point to realise is that the emails involve a handful of scientists discussing a few pieces of climate data. Even without this data, there is still an overwhelming and consistent

body of evidence, painstakingly compiled by independent scientific teams from institutions across the world.

What do they find? The planet is steadily accumulating heat. When you add up all the heat building in the oceans, land and atmosphere plus the energy required to melt glaciers and ice sheets, the planet has been accumulating heat at a rate of 190,260 Gigawatts over the past 40 years (Murphy et al. 2009). Considering a typical nuclear power plant has an output of 1 Gigawatt, imagine over 190,000 power plants pouring their energy output directly into heating our land and oceans, melting ice and warming the air.

This build-up of heat is causing ice loss across the globe, from the Arctic to the Antarctic. Both Greenland and Antarctica are losing ice at an accelerated rate (Velicogna 2009). Even East Antarctica, previously thought to be too cold and stable, is now losing ice mass (Chen et al. 2009). Glacier shrinkage is accelerating. Arctic sea ice has fallen so sharply, observations exceed even the IPCC worst case scenario. The combination of warming oceans and melting ice has resulted in sea level rise tracking the upper limit of IPCC predictions.

Rising temperatures have impacted animal and plant species worldwide. The distribution of tree lines, plants and many species of animals are moving into cooler regions towards the poles. As the onset of spring is happening earlier each year, animal and plant species are responding to the shift in seasons. Scientists observe that frog breeding, bird nesting, flowering and migration patterns are all occurring earlier in the year (Parmeson & Yohe 2003). There are many other physical signs of widespread warming. The height of the tropopause, a layer in our atmosphere, is rising (Santer et al. 2003). Arctic permafrost, covering about 25% of Northern Hemisphere land, is warming and degrading (Walsh et al. 2009). The tropical belt is widening (Seidel et al. 2007). These results are all consistent with global warming.

What's causing this heat build-up? Humans are emitting huge amounts of carbon dioxide into the atmosphere - 29 billion tonnes in 2009 (CDIAC). Greenhouse theory predicts that more carbon dioxide in the atmosphere will trap heat energy as it escapes out to space. What do we observe? Carbon dioxide absorbs heat at certain wavelengths. Satellites over the past 40 years find less heat escaping to space at these wavelengths (Harries et al. 2001, Griggs & Harries 2004, Chen et al. 2007). Where does the heat go? Surface measurements find more heat returning back to the Earth's surface (Philipona et al. 2004). Tellingly, the increase occurs at those same carbon dioxide absorption wavelengths (Evans 2006). This is the human fingerprint in global warming.

There are multiple lines of empirical evidence that global warming is happening and human activity is the cause. A few suggestive emails may serve as a useful distraction for those wishing to avoid the physical realities of climate change. But they change nothing about our scientific understanding of humanity's role in global warming.

Intermediate rebuttal written by John Cook

Update July 2015:

Here is a related lecture-video from Denial101x - Making Sense of Climate Science Denial

[*see video at **this link**.*]

Expert interview with Kevin Trenberth

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Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a college textbook on climate change and the book Climate Change Denial: Heads in the Sand. Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.

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