



## Select Committee staff analysis of the stolen electronic documents from the CRU

Topic: Temperature Reconstructions

### SYNOPSIS

Recently, thousands of emails and other electronic files were obtained illegally (hacked) from a server at the University of East Anglia (UEA). The conclusion that the Earth is warming and that most of this warming is caused by human emissions of greenhouse gases is unaffected by the release of these stolen personal emails from the UEA.

One of the most cited emails, which include the words “trick” and “hide the decline,” relates to the analysis of temperature records from past centuries developed from tree rings and other sources. Placing this 1999 email in context of the scientific literature of the time demonstrates that the techniques and issues the email raises were openly discussed in peer-reviewed journals. Even if the tree ring data set in question is ignored, the stolen emails do not substantially alter the multiple lines of independent scientific evidence for human-caused global warming.

### BACKGROUND

Recently, thousands of emails and other electronic files were obtained illegally (hacked) from a server at the University of East Anglia. These files were subsequently posted on various websites. The emails included in the posted documents were sent or received by the Climatic Research Unit (CRU) from 1996 to 2009.<sup>1</sup>

The hacked archive contains documents and email correspondence that appear to include a number of leading climate researchers, including Phil Jones (CRU), Keith Briffa (CRU), Michael Mann (Penn State), Malcolm Hughes (Univ. of Arizona), Kevin Trenberth (University Corporation for Atmospheric Research, UCAR), James Hansen (NASA), among others.<sup>2</sup> However, it is important to note that given the large quantity of electronic documents, the veracity of the emails and other files has not yet been thoroughly confirmed. Nor has the source behind the hacking been identified although media reports have suggested that Russian hackers and computers in the Middle East, including Saudi Arabia, were used.<sup>3</sup>

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1 CRU statement, <http://www.uea.ac.uk/mac/comm/media/press/2009/nov/homepagenews/CRUupdate>

2 <http://www.examiner.com/x-25061-Climate-Change-Examiner-y2009m11d20-ClimateGate--Climate-centers-server-hacked-revealing-documents-and-emails?cid=exrss-Climate-Change-Examine>

3 <http://www.timesonline.co.uk/tol/news/environment/copenhagen/article6946281.ece>

One of the most heavily cited emails, attributed to Dr. Phil Jones, considered temperature reconstruction. The 1999 email reads in full:<sup>4</sup>

From: Phil Jones <p.jones@xxxxxxxxxxx.xxx>  
To: ray bradley <rbradley@xxxxxxxxxxx.xxx>, mann@xxxxxxxxxxx.xxx,  
mhughes@xxxxxxxxxxx.xxx  
Subject: Diagram for WMO Statement  
Date: Tue, 16 Nov 1999 13:31:15 +0000  
Cc: k.briffa@xxxxxxxxxxx.xxx,t.osborn@xxxxxxxxxxx.xxx

Dear Ray, Mike and Malcolm,  
Once Tim's got a diagram here we'll send that either later today or first thing tomorrow.  
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) amd from 1961 for Keith's to hide the decline. Mike's series got the annual land and marine values while the other two got April-Sept for NH land N of 20N. The latter two are real for 1999, while the estimate for 1999 for NH combined is +0.44C wrt 61-90. The Global estimate for 1999 with data through Oct is +0.35C cf. 0.57 for 1998.  
Thanks for the comments, Ray.

Cheers  
Phil

Prof. Phil Jones  
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Critics have alleged that the reference to “Mike’s Nature trick” and “hide the decline” indicated a conscious attempt to alter data. In fact the two phrases refer to two distinct issues that were openly discussed in the peer-reviewed scientific literature of the time and are readily available now.

#### “TRICK” – NOT SO TRICKY

“Mike’s Nature trick” refers to an article authored by Michael Mann, Raymond Bradley and Malcolm Hughes and published in the journal Nature.<sup>5</sup> Because reliable thermometer data does not exist prior to 1880, the authors use multiple sources as so-called “proxy data” to reconstruct annual temperatures back to 1400 AD. Their data sources include tree rings, ice cores, ice melt, coral and long historical and instrumental records. The scientists took the instrumental land, air and sea temperature data from 1902 to 1995 and calibrated it with the proxy data

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4 <http://www.eastangliaemails.com/emails.php?eid=154&filename=942777075.txt>

5 Mann, et al. 1998 Nature vol 392, pg 779-787

sets in the time periods in which the data sets overlap 1902 to 1980. The discussion of this calibration makes up almost half of the entire paper.

After this calibration, the authors then plot the reconstructed temperatures along with the directly measured instrumental temperature record. This combination of proxy data and instrumental measurements are clearly labeled in their Figure 5b.

Back in 1998, the non-instrumental data provided annual temperatures only up until 1980, so the scientists used only instrumental data from 1981 onward. This technique -- the so-called “trick” -- of supplementing the non-instrumental data with thermometer data to plot the annual temperature up to the present is what Dr. Jones referenced in his 1999 email. In a subsequent 1999 article, Dr. Mann and his co-authors also use instrumental data in combination with non-instrumental data to reconstruct the Northern Hemisphere’s annual temperatures back to 1000 AD.<sup>6</sup> Again the technique, or “trick,” is used openly in publicly-available, peer-reviewed journals.

The use of the word “trick” in the context of a personal email does not confirm that deception has occurred. As Dr. John Holdren, the President’s Science Advisor, stated before the Select Committee: “I would point out, for example, that the term ‘trick’ is often used in science to describe a clever way to get around a difficulty that is perfectly legitimate. The use of the word ‘trick’ does not, in itself, in science demonstrate that there was manipulation.”<sup>7</sup>

## NOTHING TO HIDE

Tree ring data can be used to determine past temperatures due to the known physiological response of trees to increased temperatures. In a warmer year, a tree will tend to develop thicker, denser wood as compared to a cooler year. Calibration of tree ring data with directly measured temperature from thermometers allows scientists to reconstruct temperatures back hundreds of years in time beyond the instrumental record. As discussed by the Intergovernmental Panel on Climate Change (IPCC), there are numerous calibrated tree ring data sets that provide confidence in this technique.<sup>8</sup>

The second phrase from the emails attracting attention -- “hide the decline” -- refers to a challenge with the use of tree-ring wood density in a specific data set after 1960. In a 1998 Nature article, Dr. Keith Briffa and his co-authors clearly state that their tree ring data set cannot be used to reconstruct temperatures after 1960 because the wood density decreases despite increasing temperatures, the opposite of

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<sup>6</sup> Mann, et al. 1999 Geophysical Research Letters, Vol. 26, No. 6, pg 759-762.

<sup>7</sup> Transcript Select Committee Hearing December 2, 2009, pg 63

<sup>8</sup> IPCC, Climate Change 2007: The Physical Science Basis, pg 472

the known physiological response.<sup>9</sup> In fact the last 2 of the 6 sentences of their article's abstract focus on the limitations of their data after 1960 and the possibility of overestimating past temperatures and underestimating future carbon dioxide concentrations if it is used.

In addition, the IPCC discussed the difference between this tree-ring data with the thermometer record, noting that: "This 'divergence' is apparently restricted to some northern, high-latitude regions, but it is certainly not ubiquitous even there."<sup>10</sup> Why this divergence occurs in this particular tree data set is still an openly debated question in the scientific community. Hypotheses regarding impacts from acid rain or a heretofore unidentified response to passing warming threshold have been advanced, but there is no consensus on the issue yet.<sup>11</sup>

Rather than indicating an attempt to conceal unwanted data, Dr. Jones' email represents a scientist communicating to his colleagues an accepted technique of reconstructing temperature data from the past to the present and the exclusion of data previously acknowledged to introduce bias. It does not, as critics have suggested, represent an attempt to conceal a decline in global temperatures.

#### PUTTING THE TREE-RING DATA IN CONTEXT

In 2006, in response to a request from Congress, the National Academy of Sciences convened a panel to assess the state of climate science focusing on reconstructing global surface temperature records over the past 2,000 years.<sup>12</sup> In particular, the panel investigated the evidence for the dramatic increase of temperatures in the 20<sup>th</sup> century as compared to the rest of the millennium as portrayed in the so-called "hockey stick" graph.

In their final report, the Committee found: "The basic conclusion of Mann et al. (1998, 1999) was that the late 20th century warmth in the Northern Hemisphere was unprecedented during at least the last 1,000 years. This conclusion has subsequently been supported by an array of evidence that includes both additional large-scale surface temperature reconstructions and pronounced changes in a variety of local proxy indicators, such as melting on ice caps and the retreat of glaciers around the world, which in many cases appear to be unprecedented during at least the last 2,000 years."<sup>13</sup>

After evaluating the evidence (including figure S-1 below), the Committee concluded that the measured warming of 0.6 °C (1.1°F) during the 20<sup>th</sup> century is reflected in

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9 Briffa, et al. 1998 Nature vol 391 pg 678-682

10 IPCC, Climate Change 2007: The Physical Science Basis, pg 473

11 IPCC, Climate Change 2007: The Physical Science Basis, pg 473

12 National Research Council, 2006, *Surface Temperature Reconstructions for the last 2,000 Years* pg 1

13 National Research Council, 2006, *Surface Temperature Reconstructions for the last 2,000 Years* pg 3

data from boreholes, glacial retreat, and can be simulated with models.<sup>14</sup> The NAS thus concluded that the reconstructions provided a consistent picture of temperature trends. They also noted that “it can be said with a high level of confidence that global mean surface temperature was higher during the last few decades of the 20th century than during any comparable period during the preceding four centuries. This statement is justified by the consistency of the evidence from a wide variety of geographically diverse proxies.”<sup>15</sup>

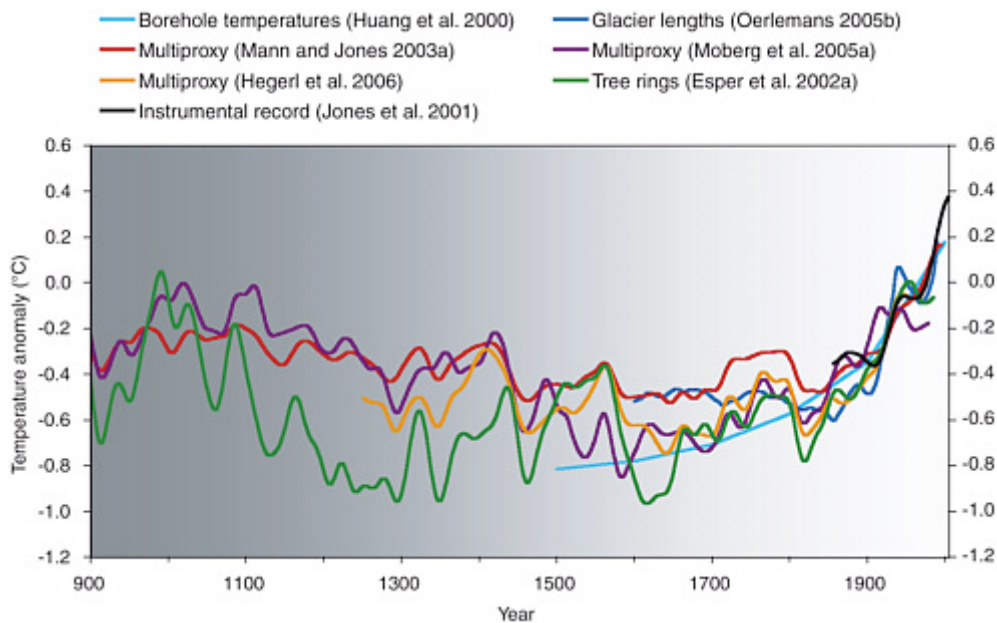


Figure S-1. Smoothed reconstructions of large-scale (Northern Hemisphere mean or global mean) surface temperature variations from six different research teams are shown along with the instrumental record of global mean surface temperature. Each curve portrays a somewhat different history of temperature variations and is subject to a somewhat different set of uncertainties that generally increase going backward in time (as indicated by the gray shading). This set of reconstructions conveys a qualitatively consistent picture of temperature changes over the last 1,100 years and especially over the last 400. See Figure O-5 for details about each curve..<sup>16</sup>

Even if tree ring data is excluded, evidence for global warming comes from corals, ocean and lake sediments, cave deposits, ice cores, boreholes, and glaciers.<sup>17</sup> Further, the thermometer data compiled by NOAA and NASA from the past 130 years shows a clear sign of global warming and that this decade has been the hottest on record. It is the many lines of evidence and the work of thousands of researchers from hundreds of research facilities around the world that makes global warming “unequivocal.”

14 National Research Council, 2006, *Surface Temperature Reconstructions for the last 2,000 Years* pg 2

15 National Research Council, 2006, *Surface Temperature Reconstructions for the last 2,000 Years* pg 3

16 National Research Council, 2006, *Surface Temperature Reconstructions for the last 2,000 Years* pg 2

17 National Research Council, 2006, *Surface Temperature Reconstructions for the last 2,000 Years* pg 1